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

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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
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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.

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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.

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**.

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

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

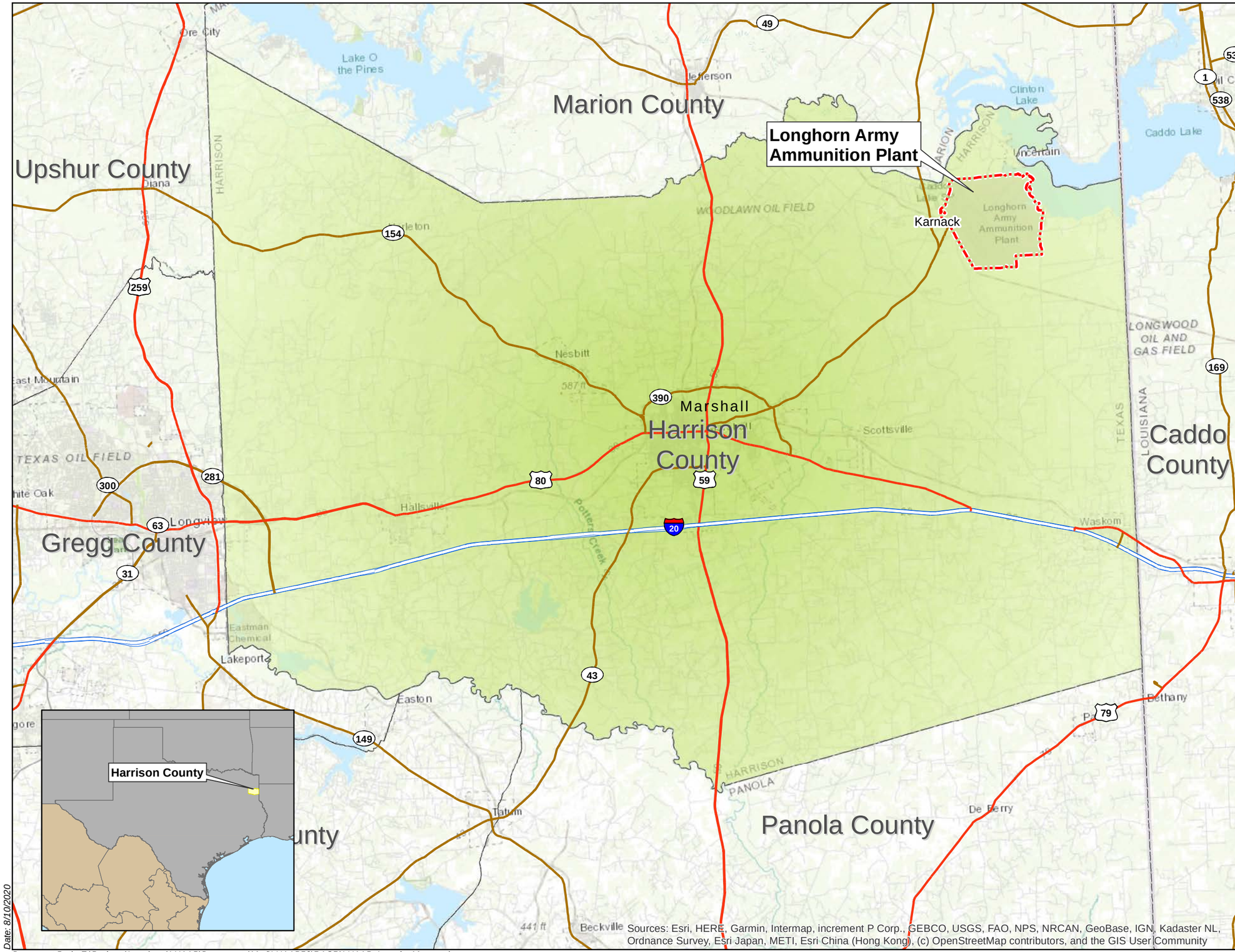
ORP - oxidation reduction potential

RA-O - remedial action operation

TOC - total organic carbon

VOCs - volatile organic compounds

Figures



N

0 2 4 Miles

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TULSA, OKLAHOMA

bhate APTIM

Figure 1-1
LHAAP Location Map

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

Date: 8/10/2020

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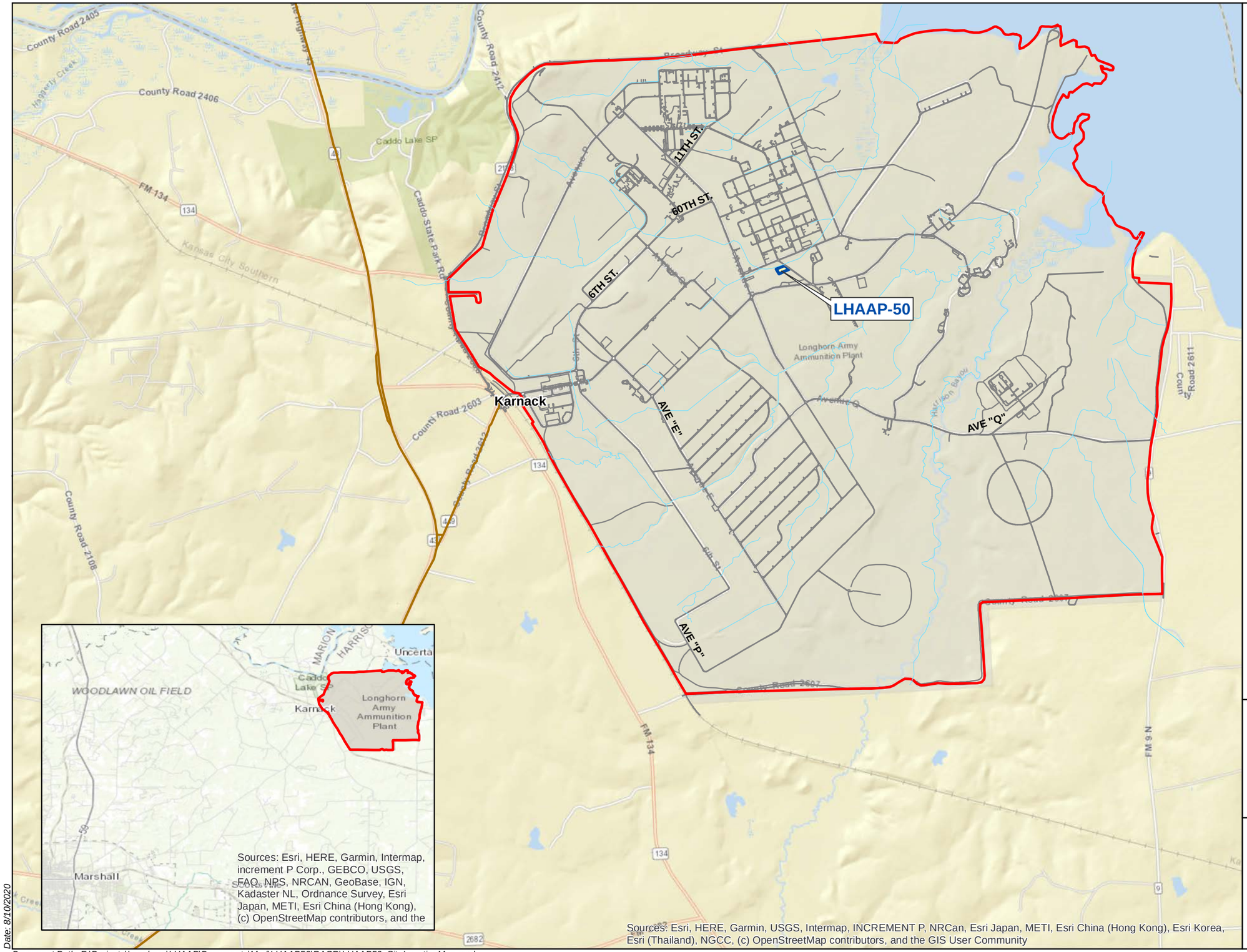

Stream
Road
LHAAP Boundary
LHAAP-16 Site Boundary

N

0 1,500 3,000
Feet

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TULSA, OKLAHOMA

bhate APTIM

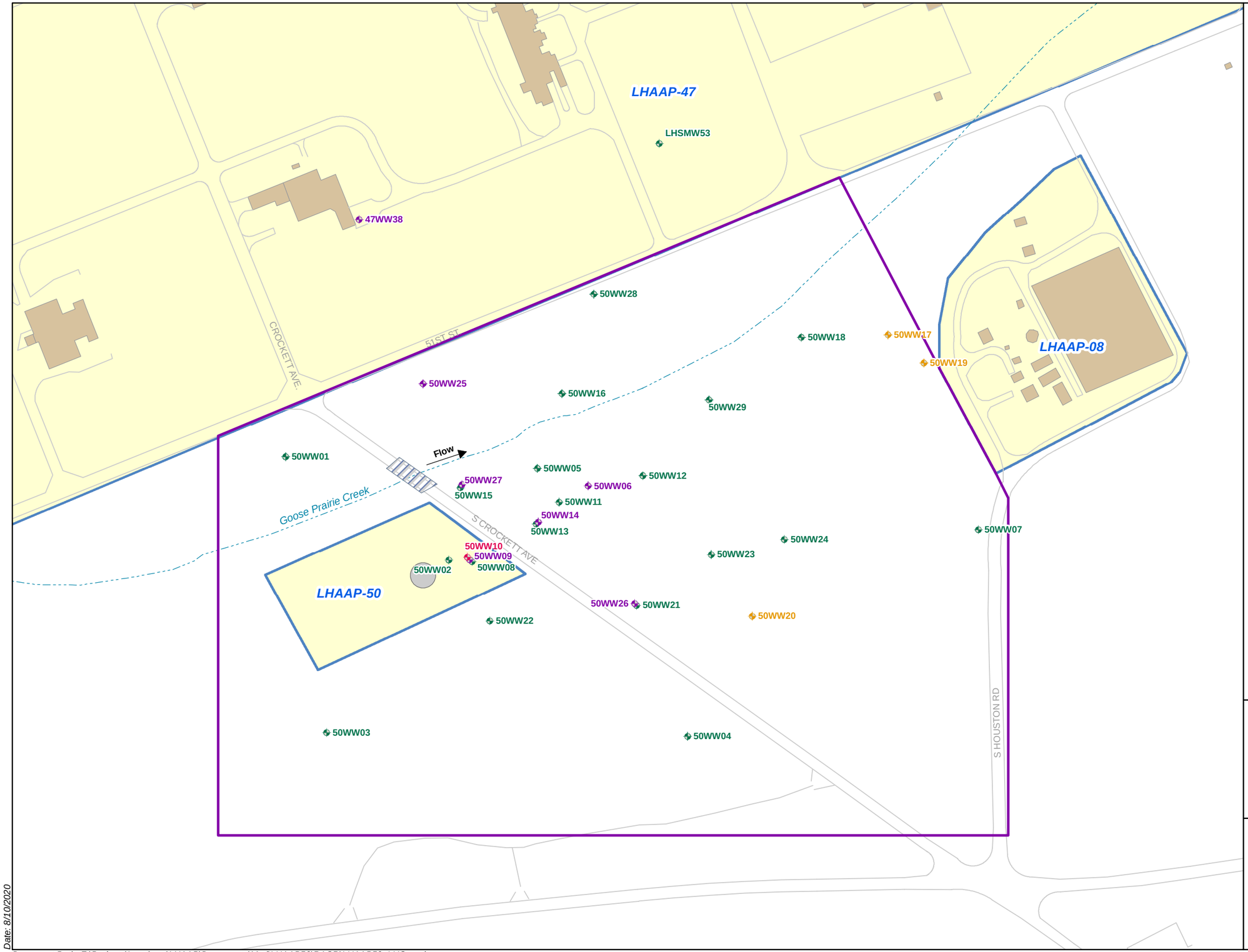
Figure 1-2
LHAAP Site Location Map

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



- 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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TULSA, OKLAHOMA

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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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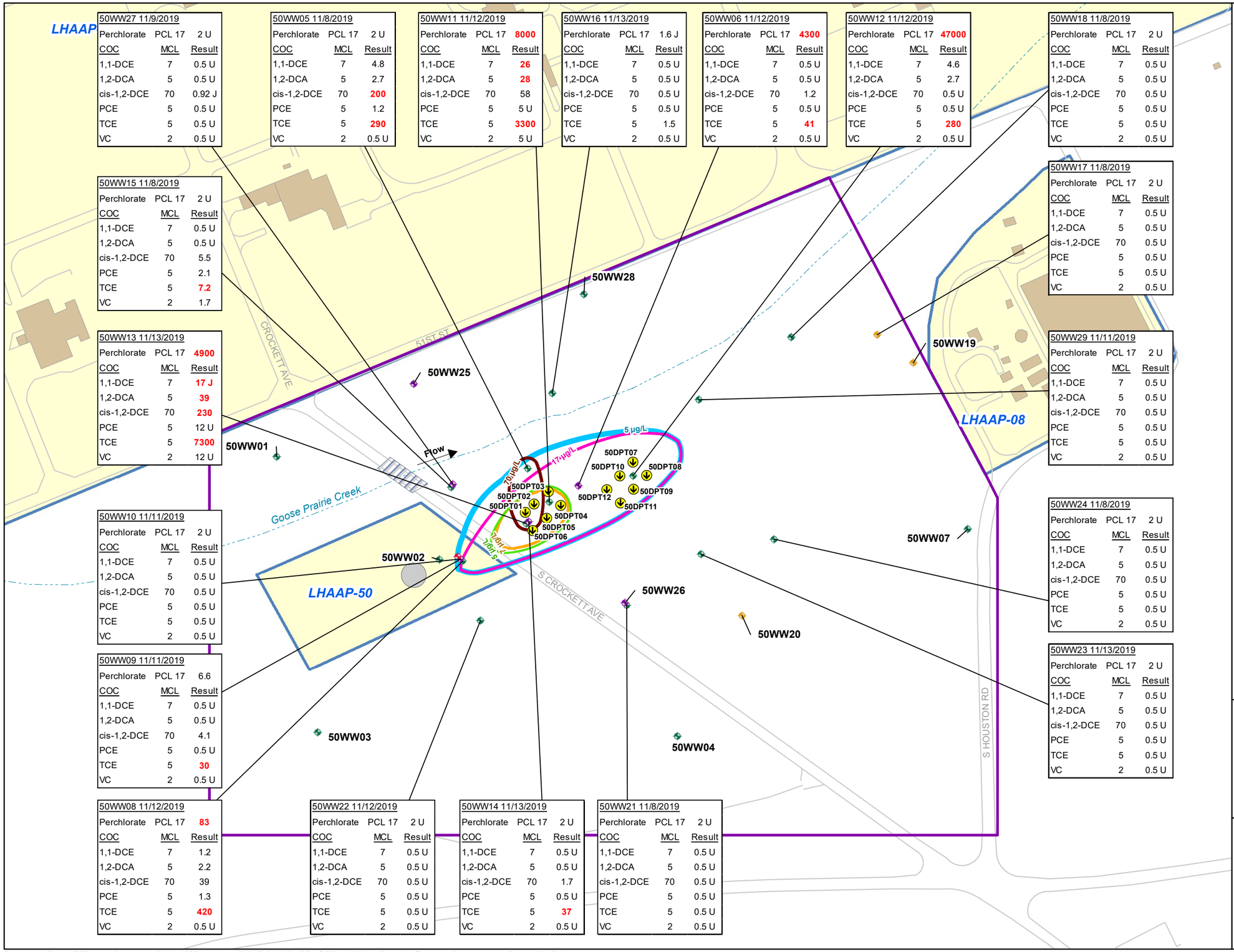

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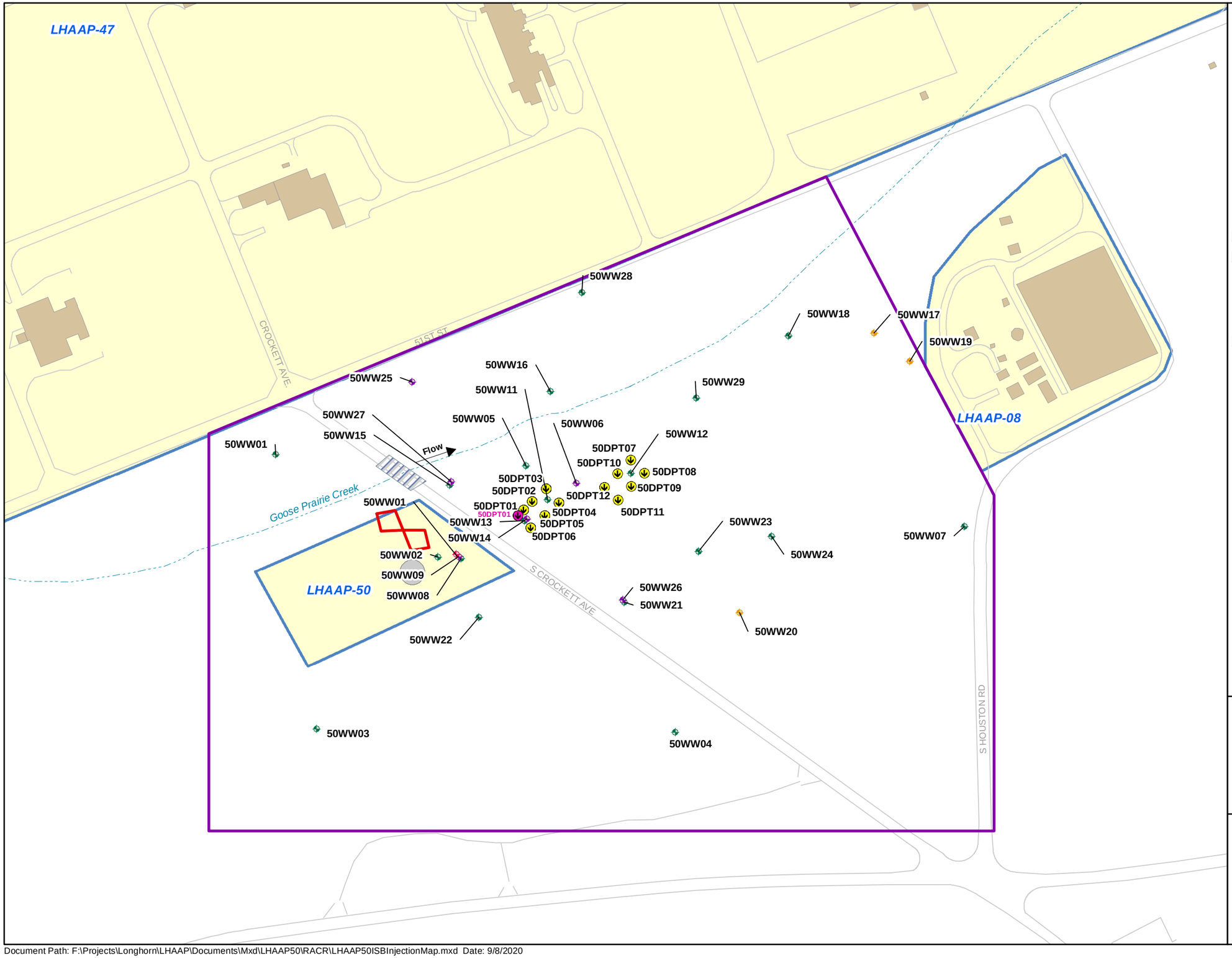

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TULSA DISTRICT
TULSA, OKLAHOMA

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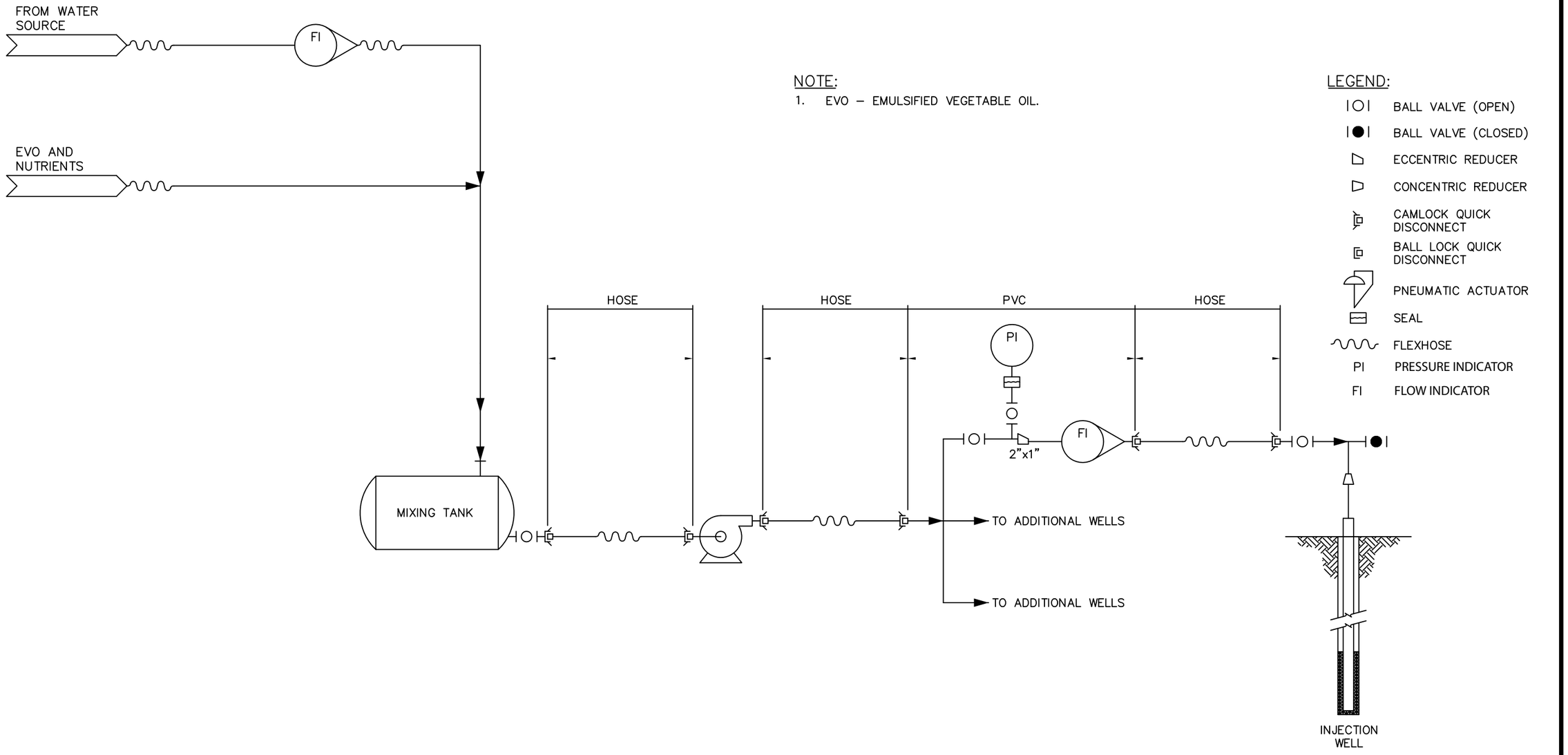
Figure 3-1
In Situ Bioremediation Injection Map

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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TULSA, OKLAHOMA

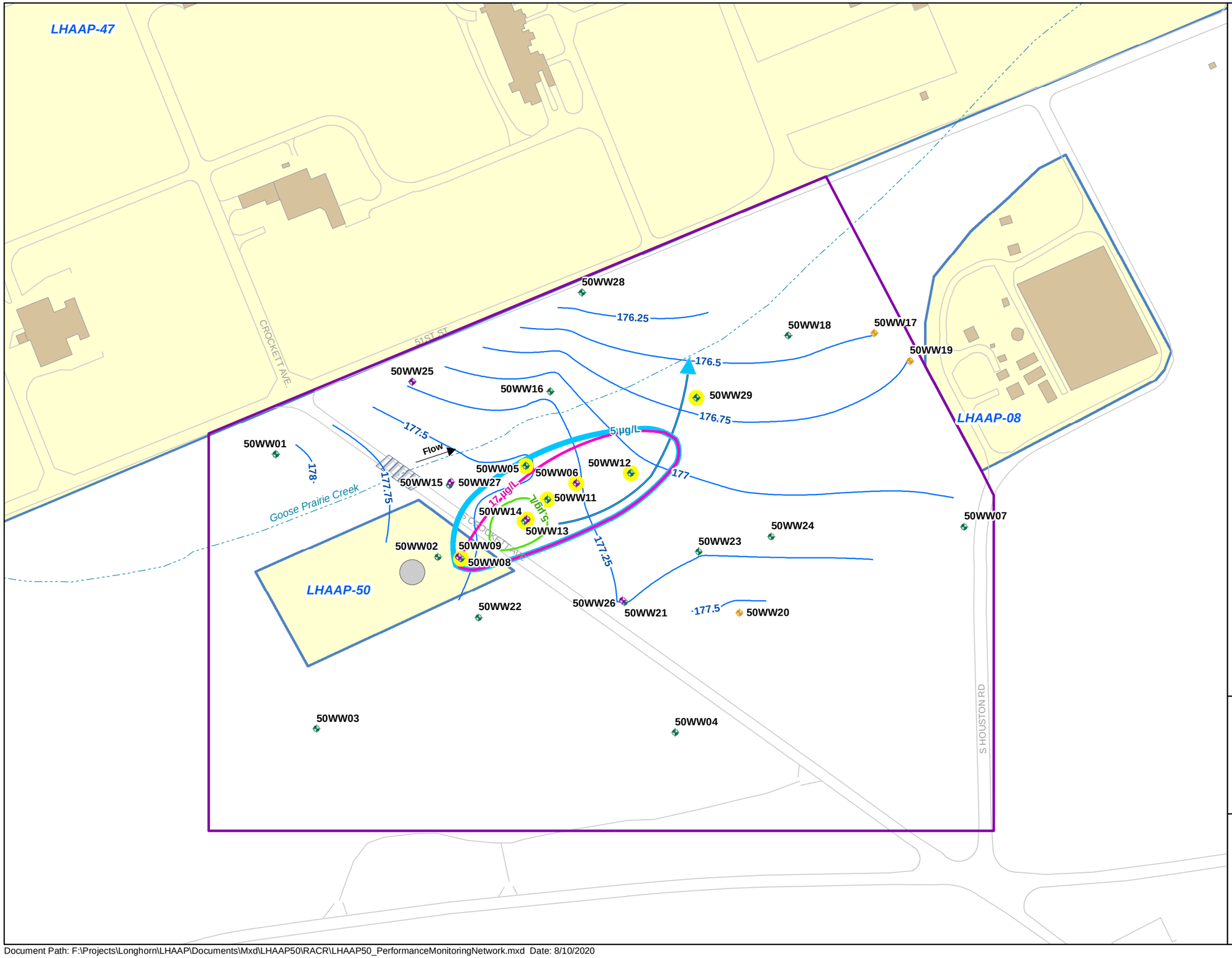
Figure 3-2

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



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TULSA, OKLAHOMA

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

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	☐

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

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.

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
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.

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
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.

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.

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.

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
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.

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.

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.

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.

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.

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.

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
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.

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.

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.

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.

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
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.

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

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

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*				

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*				

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	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				

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*				

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*				

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				

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*				

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*				

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	

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*	

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

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

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

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

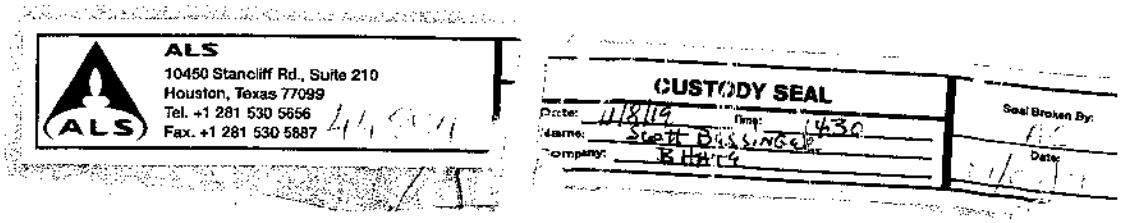
Lab Name	ALS Laboratories
Lab Contact	RJ Modashia
Email	RJ.Modashia@alsglobal.com
Address	10450 Stancliff Rd , Suite 210
City	Houston
State	TX
Postal Code	77099
Country	USA
Phone Number	281.575.2279 or 281.530.5656

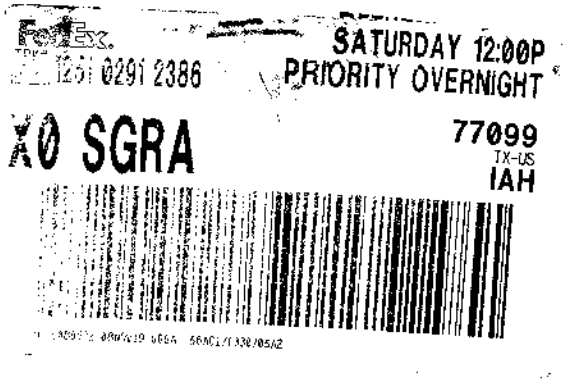
SAMPLE DETAILS / **ANALYSIS REQUESTED**

Sample ID	Location	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	# Of Cont.	Sample Container and Presrvatives: 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/sulfate/nitrate) by 9056	Perchlorate by 6850
50WW21-191108	LHAAP50				WG	11/8/19	0825	4	X					X
50WW24-191108	LHAAP50				WG	11/8/19	0915	4	X					X
50WW27-191108	LHAAP50				WG	11/8/19	1005	4	X					X
50WW15-191108	LHAAP50				WG	11/8/19	1050	4	X					X
50WW05-191108	LHAAP50				WG	11/8/19	1145	4	X					X
50WW18-191108	LHAAP50				WG	11/8/19	1235	4	X					X
50WW17-191108	LHAAP50				WG	11/8/19	1325	4	X					X
TRip BLANK	LHAAP50				W	11/8/19		2	X					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Santa Bleiger / BHATE	11/8/19 1430	J.M ALS-HOUSTON	11/09/19 08:50

U/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
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



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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:

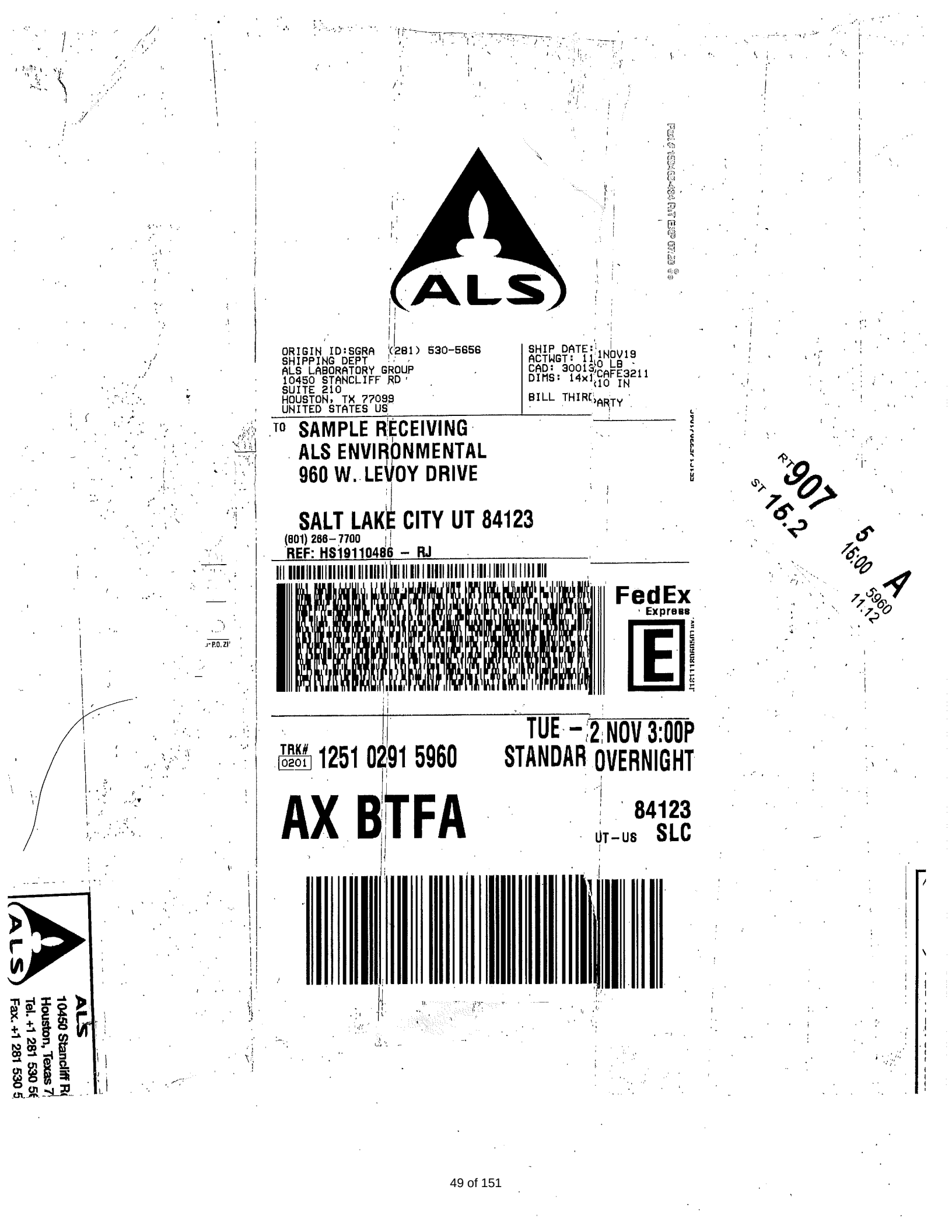
Client Notified? YES ☐ NO ☐

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

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

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** COOL

Requested Analysis

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	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
[signature]	11/12/19 1400	4C	storage
R-33.1	11.19.19/08:15	T. Bush	CL04 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

Tue, 11/12/19 12:48 PM

ALSCOCV3.1

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	SA
Standards traceability checked and meets criteria	TB	SA
Standard curve coefficients evaluated and meet criteria	TB	SA
ICVs analyzed and meet acceptance criteria	TB	SA
CCVs analyzed and meet acceptance criteria	TB	SA
Retention Time Windows checked	TB	SA
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	SA
MSs, MSDs, and/or MDs analyzed and calculations checked; applicable	TB	SA
RLVS analyzed	TB	SA
Preparation and analysis hold times met	TB	SA
Preparation deviations and re-preparations noted when performed	TB	SA
Analysis deviations and re-analyses noted when performed	TB	SA
Sample dilution factors noted on reports	TB	SA
Electronic records in HBN transcription accuracy and completeness	TB	SA
Preparation and analysis calculations checked	TB	SA
NCRs are completed as necessary NC/CAR#_____	TB	SA
Report forms are complete and accurate	TB	SA
Manual integrations checked	TB	SA

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

Created By: Thomas Bosch
Create Date: 09/20/2019 03:09PM

Amount: 10 mL
Expires: 07/25/2020
Usable: Yes
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
MFG: AccuStandard
MFG Lot: 218065075
Part ID: IC-PER-10X-1

Created By: Thomas Bosch
Create Date: 09/17/2018 09:09AM

Amount: 100 mL
Expires: 07/25/2020
Usable: Yes
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	**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			

Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK	Description - 6850 QC Stock STD 1,000ug/mL

Standard: 36748
MFG: Ultra Scientific
MFG Lot: CP-0860
Part ID: ICC-013

Created By: Thomas Bosch
Create Date: 05/11/2017 01:05PM

Amount: 100 mL
Expires: 03/31/2020
Usable: Yes
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®

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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

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 ISO GUIDE 34 REFERENCE MATERIAL PRODUCER

ANAB ACCREDITED ACCREDITED 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 ISO 17034 REFERENCE MATERIAL PRODUCER

ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY

ISO 9001 Registered Quality System – TUV USA

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

#*	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 Table:

Method and Injection Info Part:

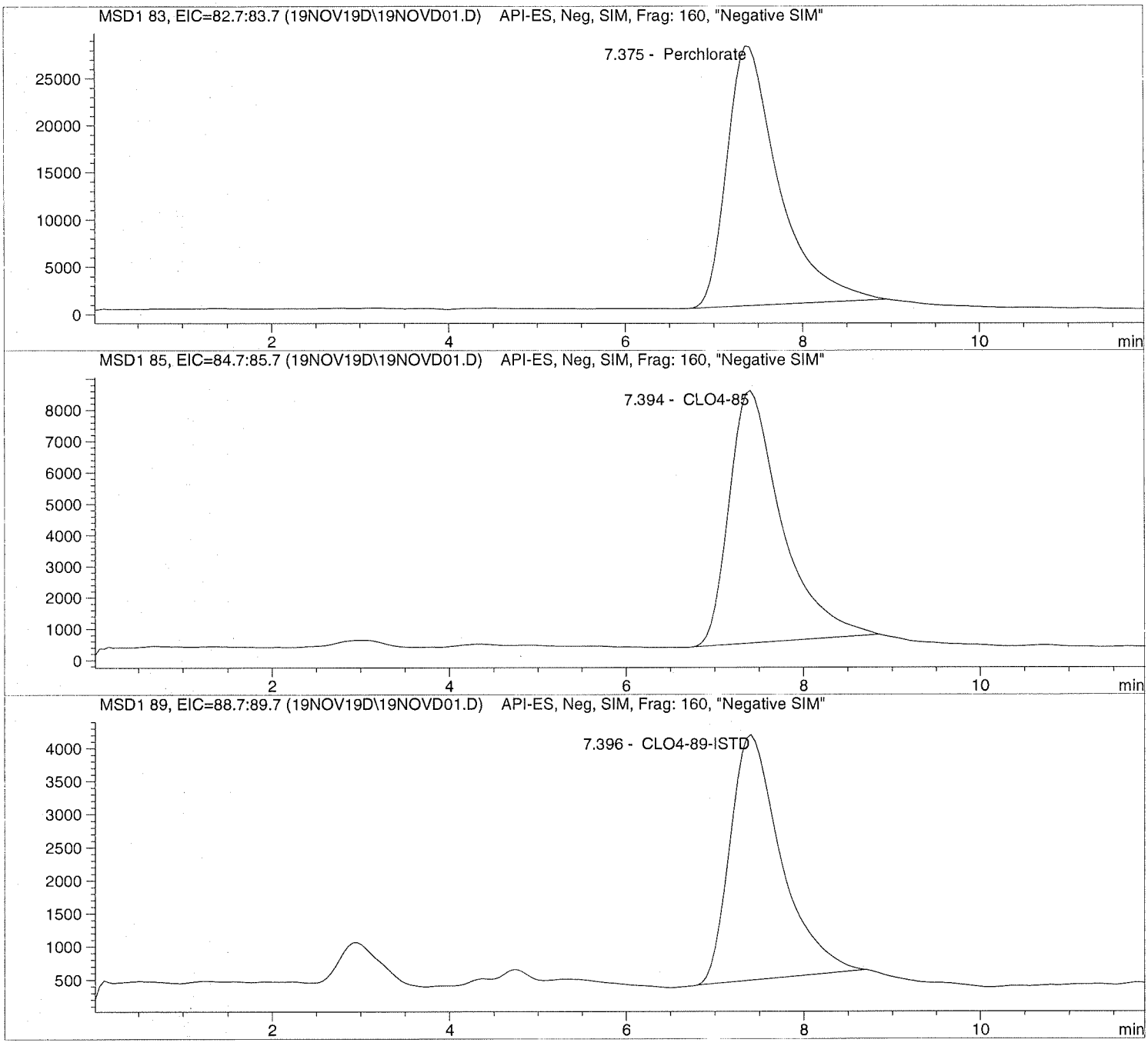
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	684804 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	684805 QC@3.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	684807 ICS@3.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	684808 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1931753001	CLO4-AQN	1	Sample		
6	Vial 76	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

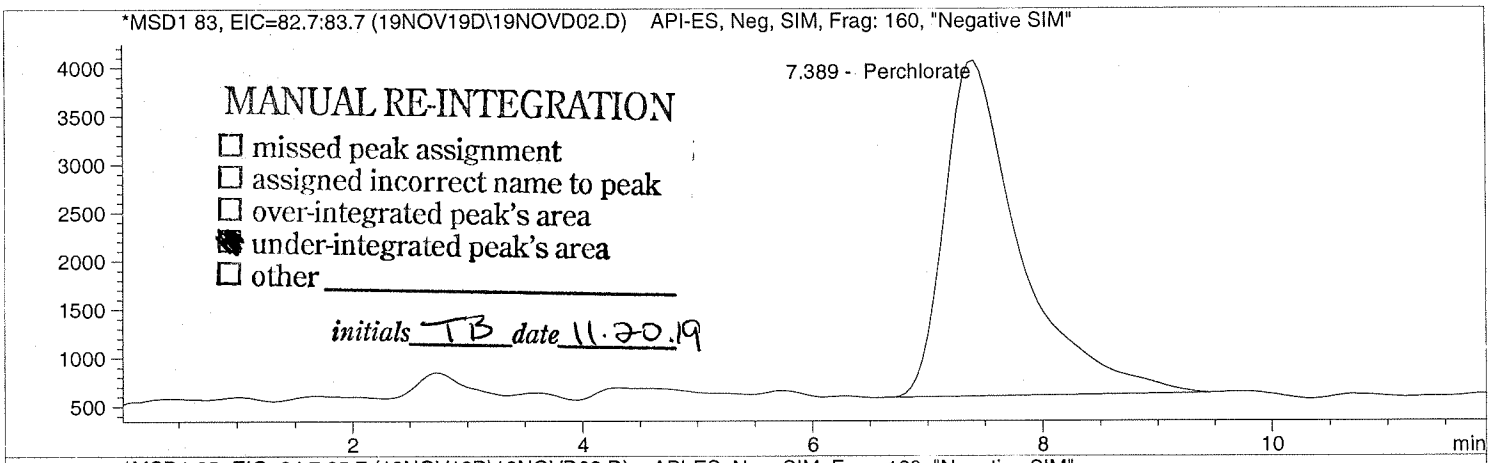
*** End of Report ***

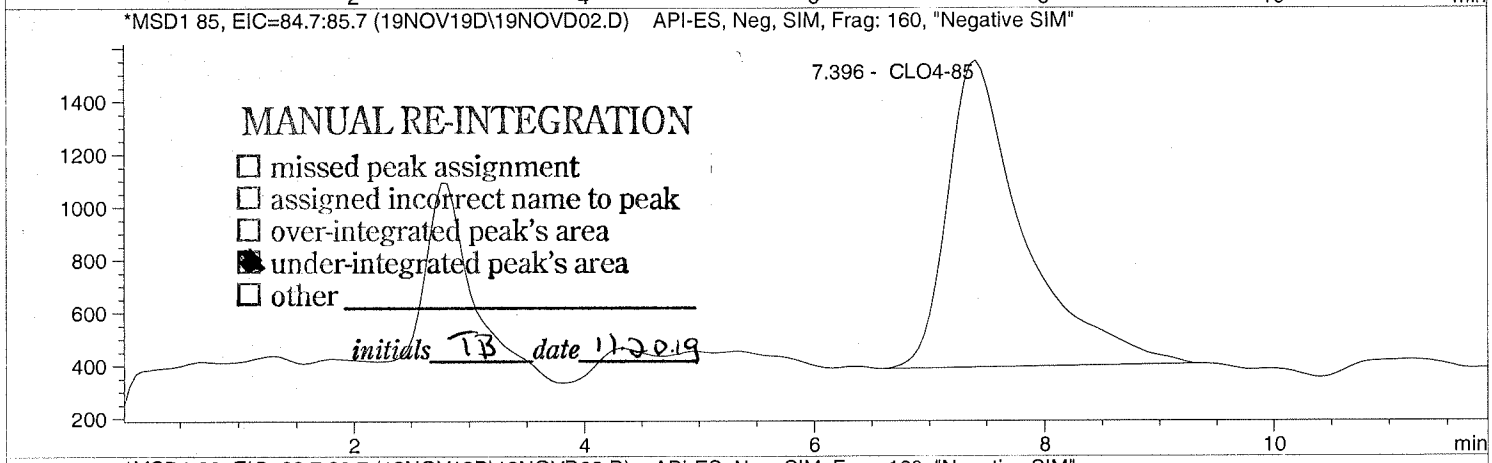
Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD02.D Sample Name: 684805 QC@3.0

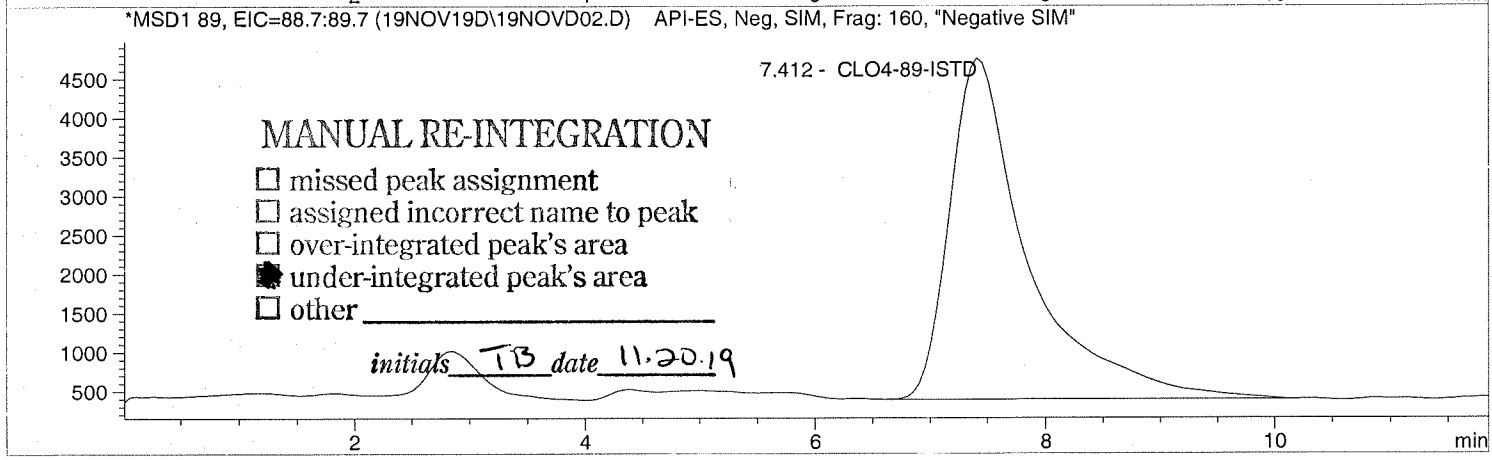
Injection Date:	11/19/2019 09:04:34	Seq Line:	2
Sample Name:	684805 QC@3.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

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

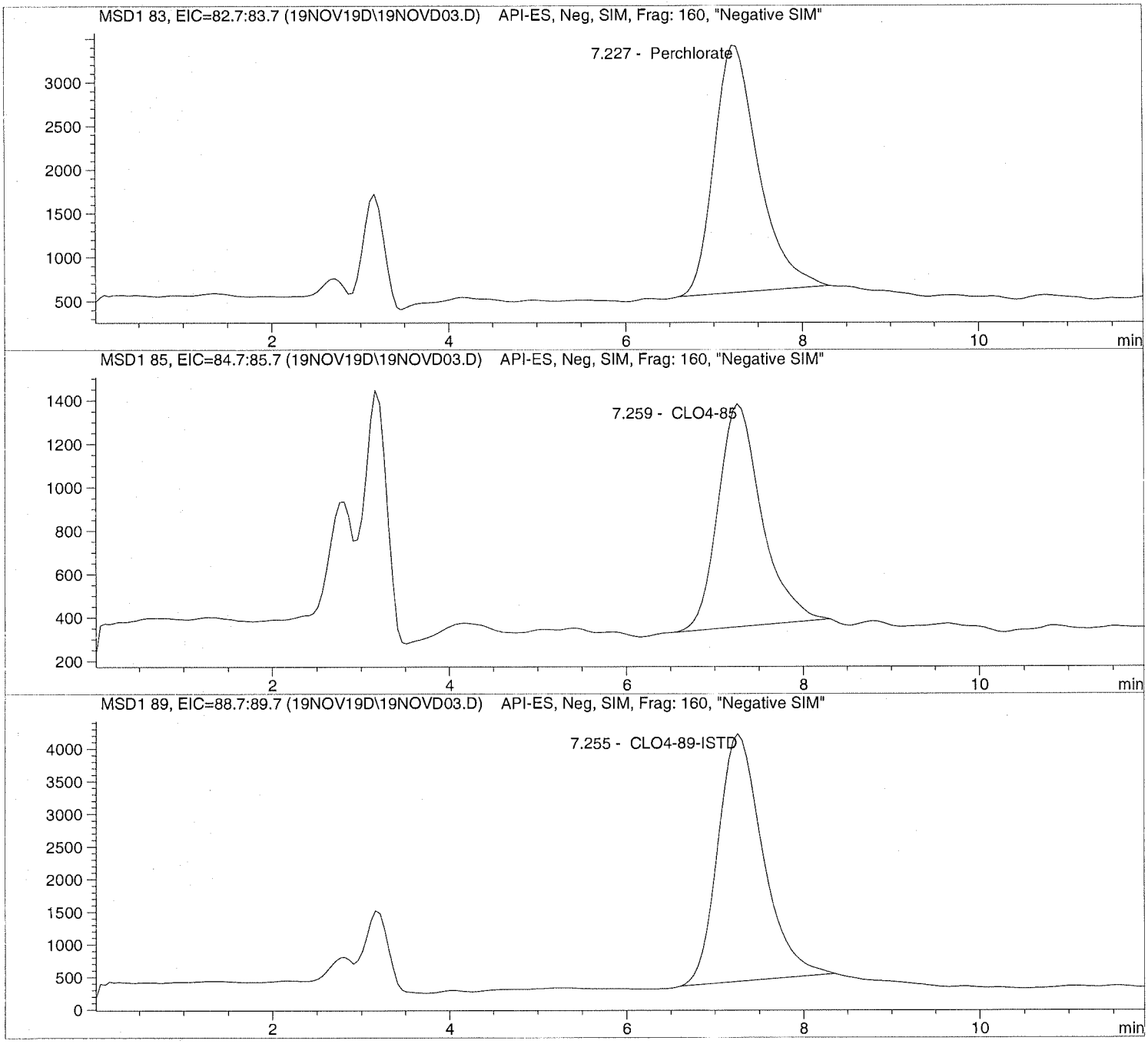
*** End of Report ***

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

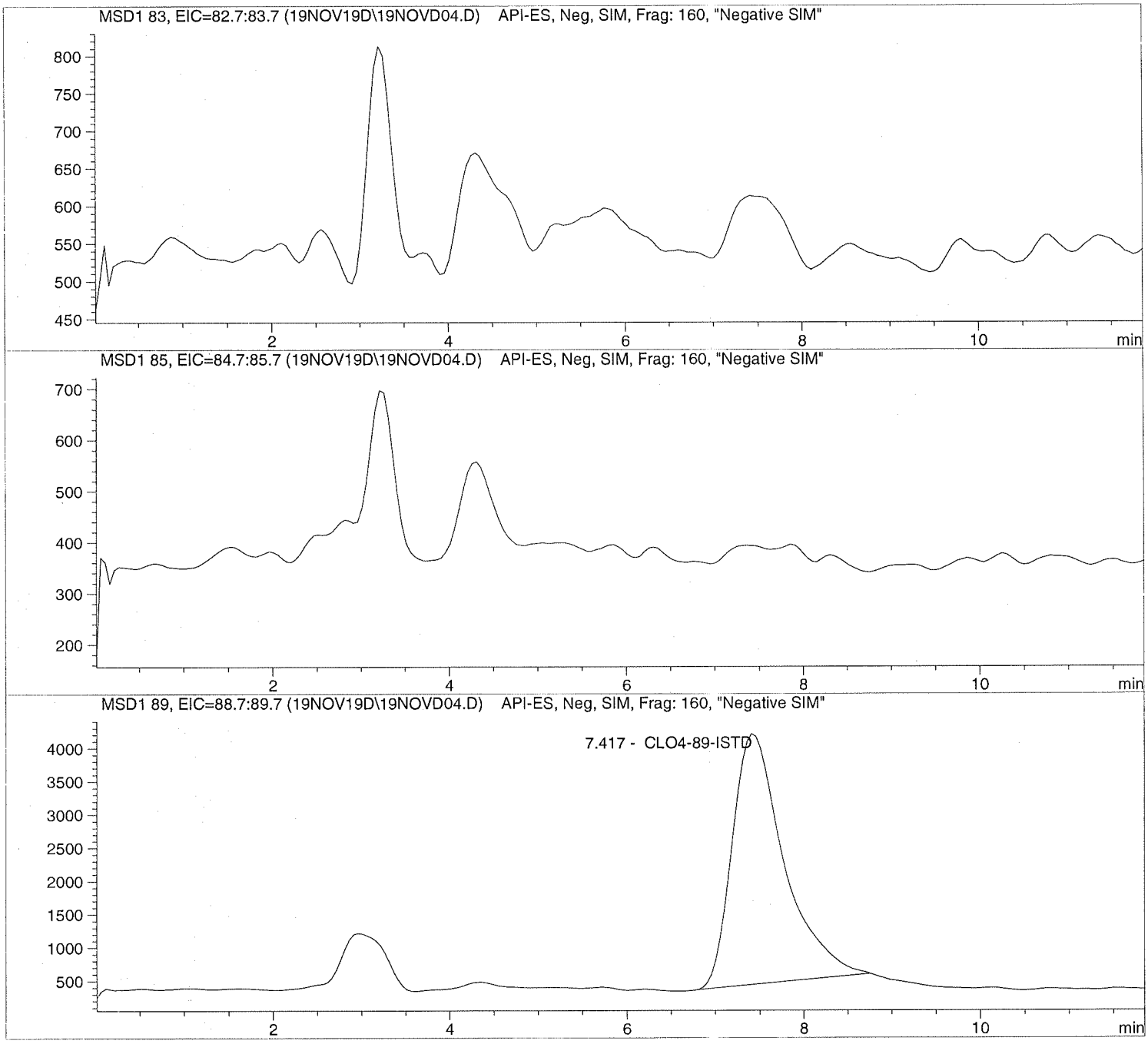
*** End of Report ***

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

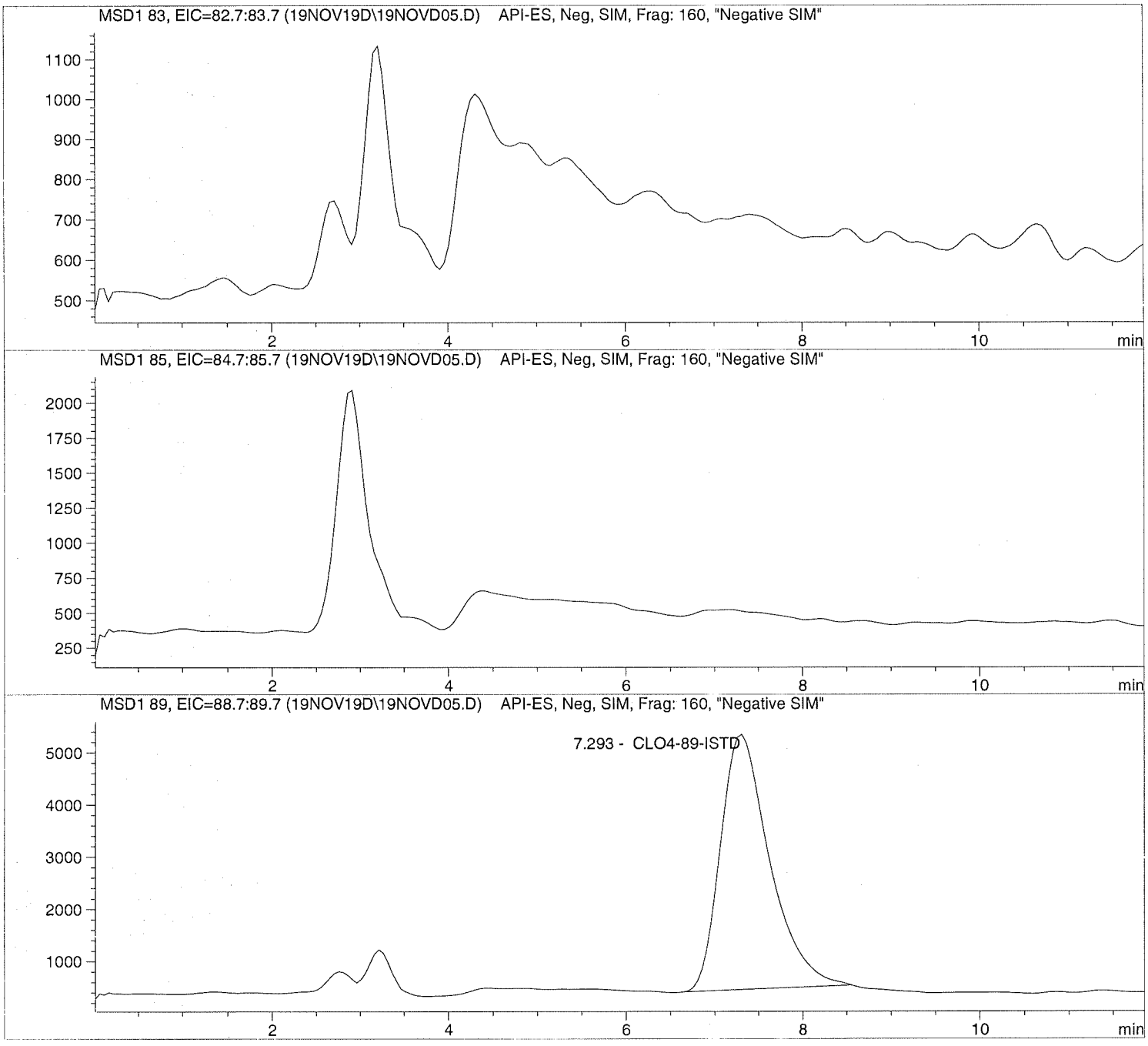
*** End of Report ***

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

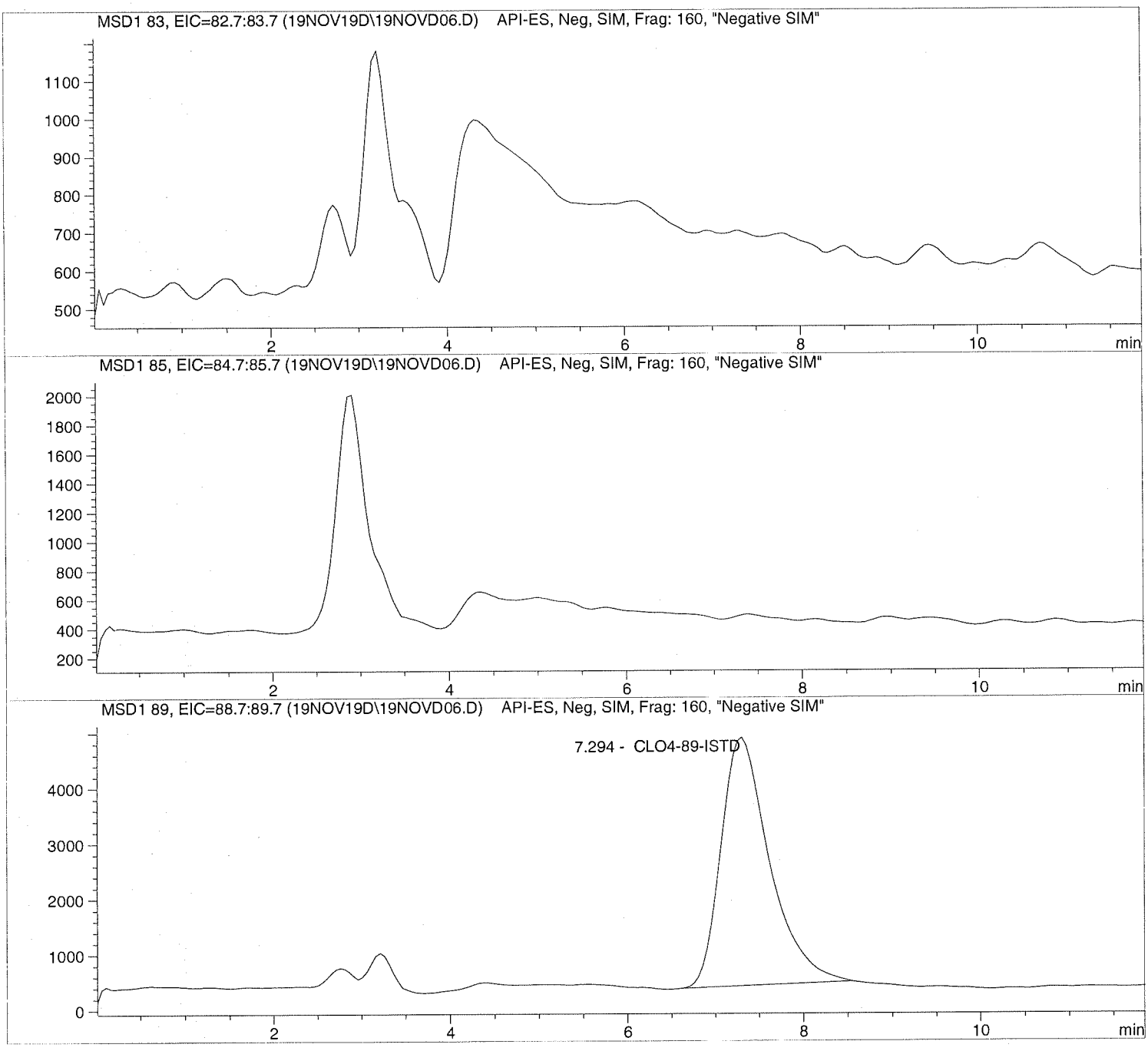
*** End of Report ***

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

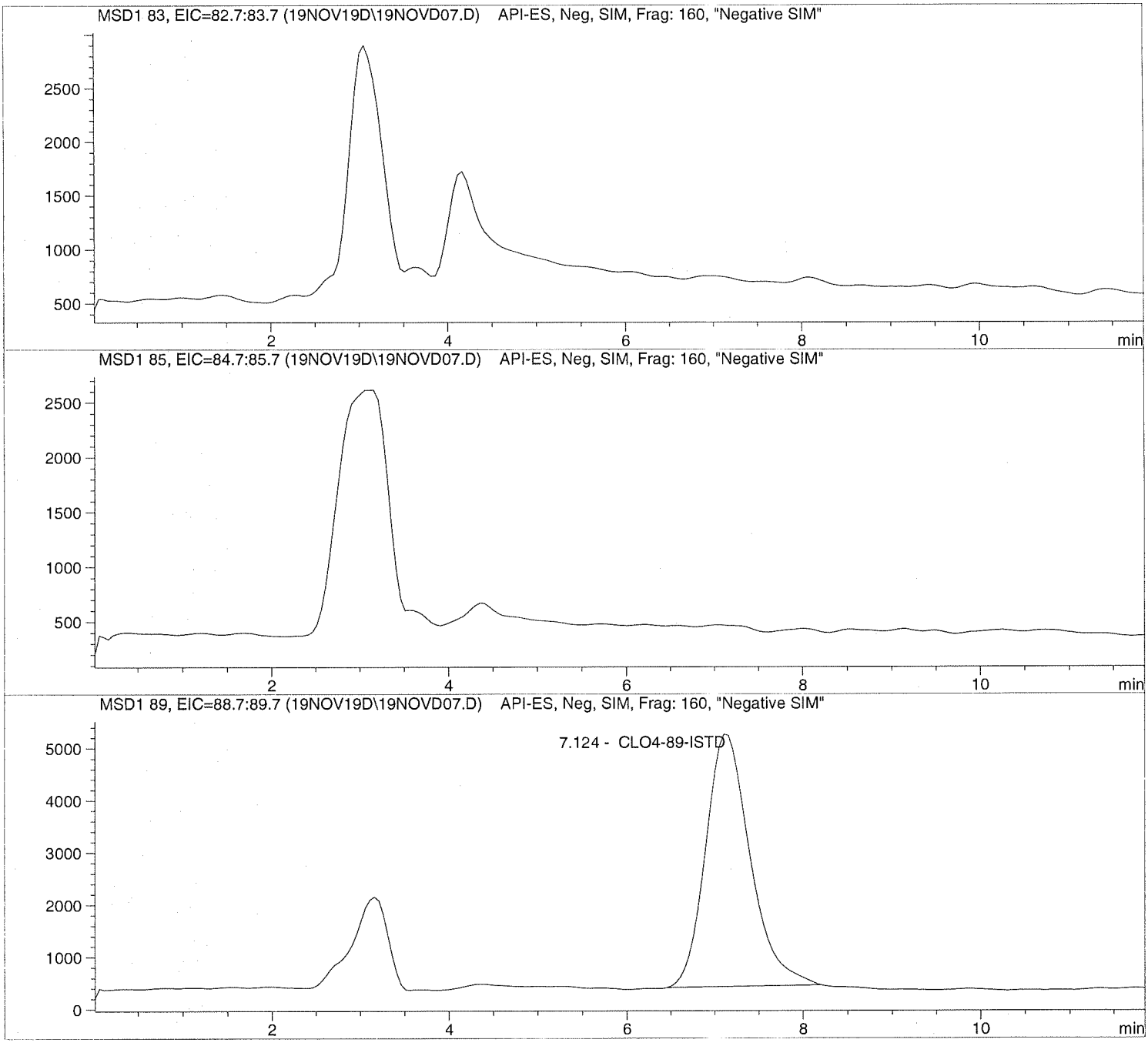
*** End of Report ***

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

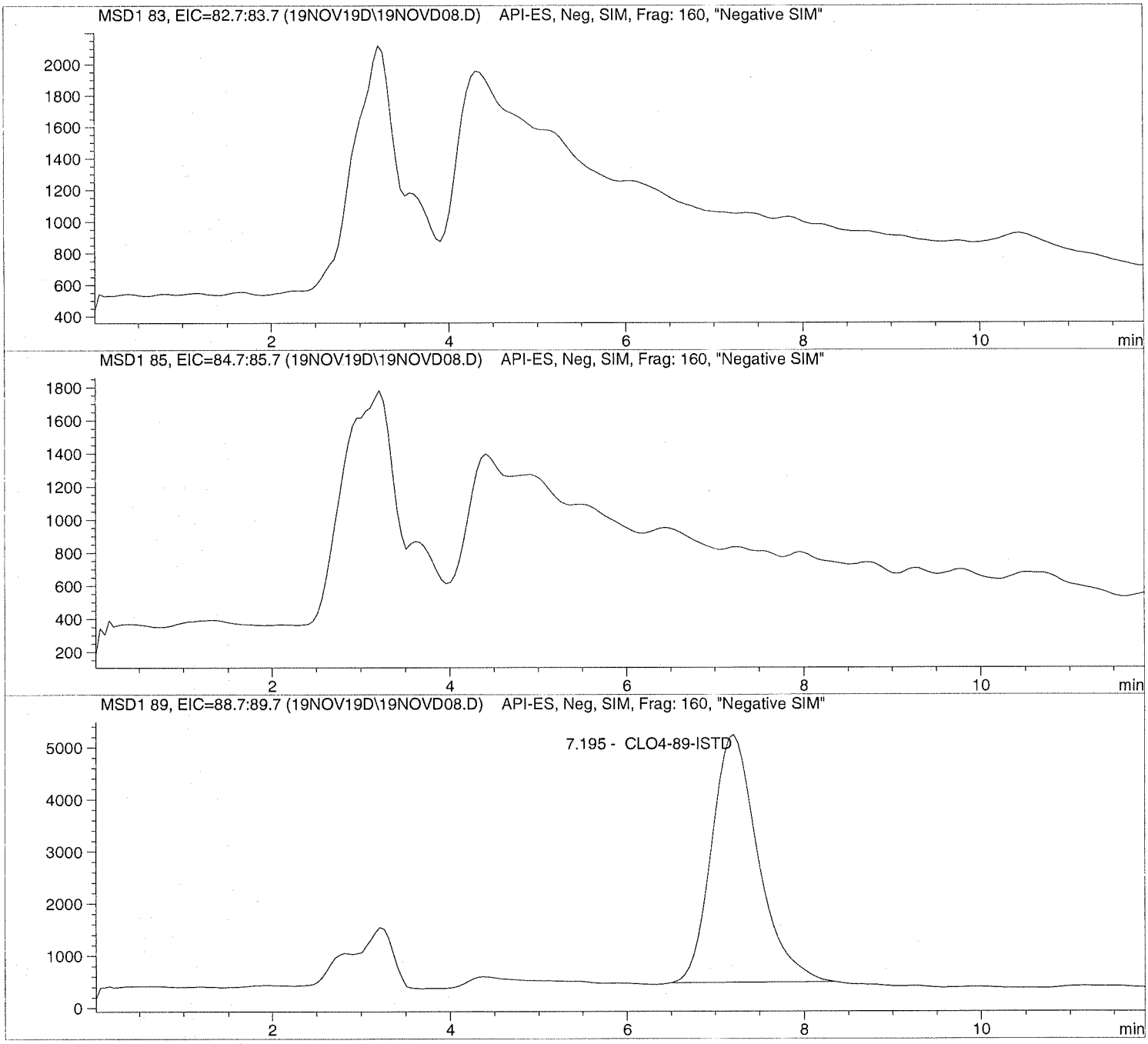
*** End of Report ***

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

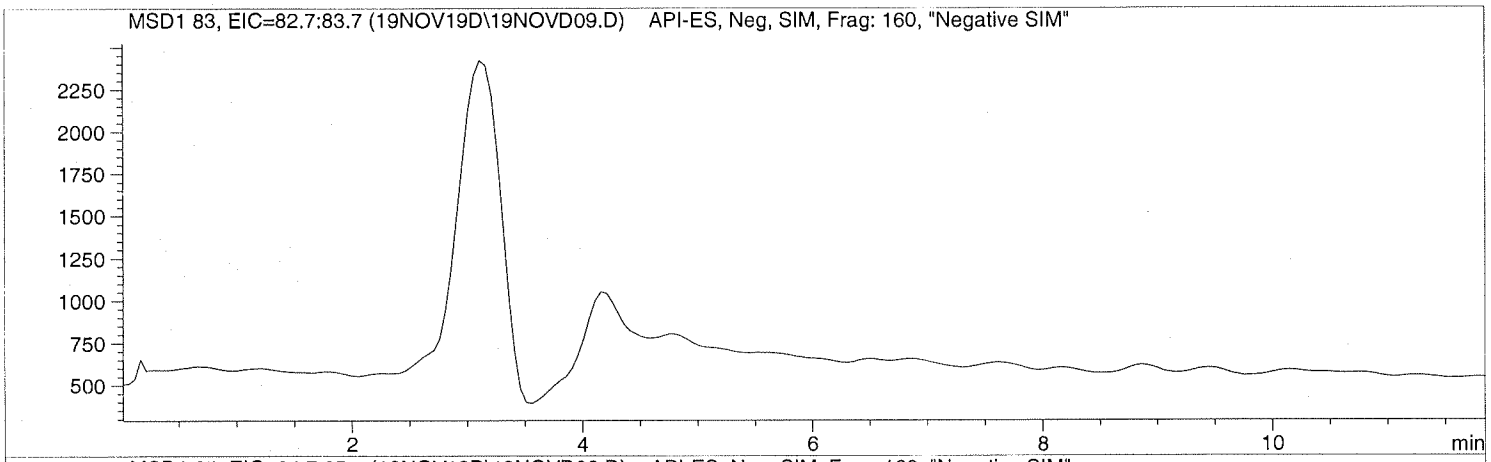
*** End of Report ***

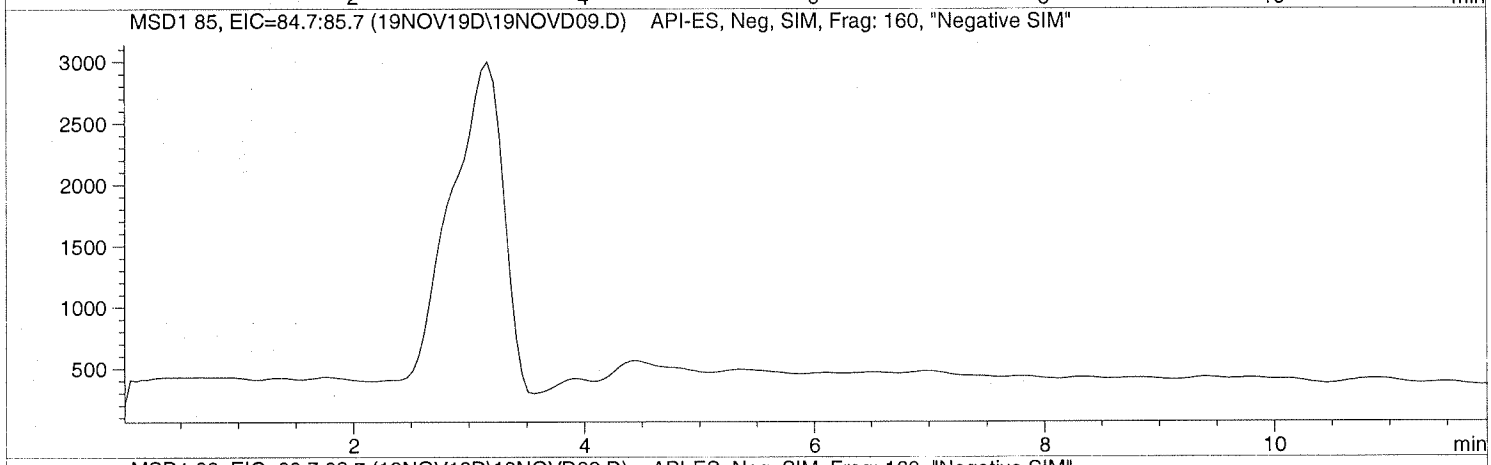
Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD09.D Sample Name: 1931753005

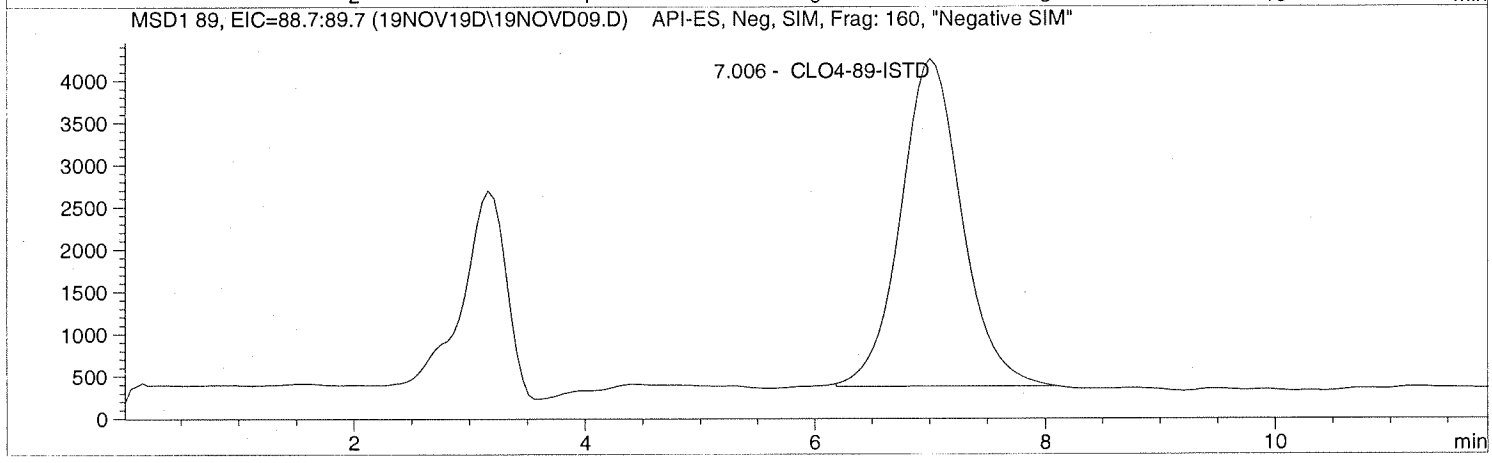
Injection Date:	11/19/2019 10:41:09	Seq Line:	9
Sample Name:	1931753005	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

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

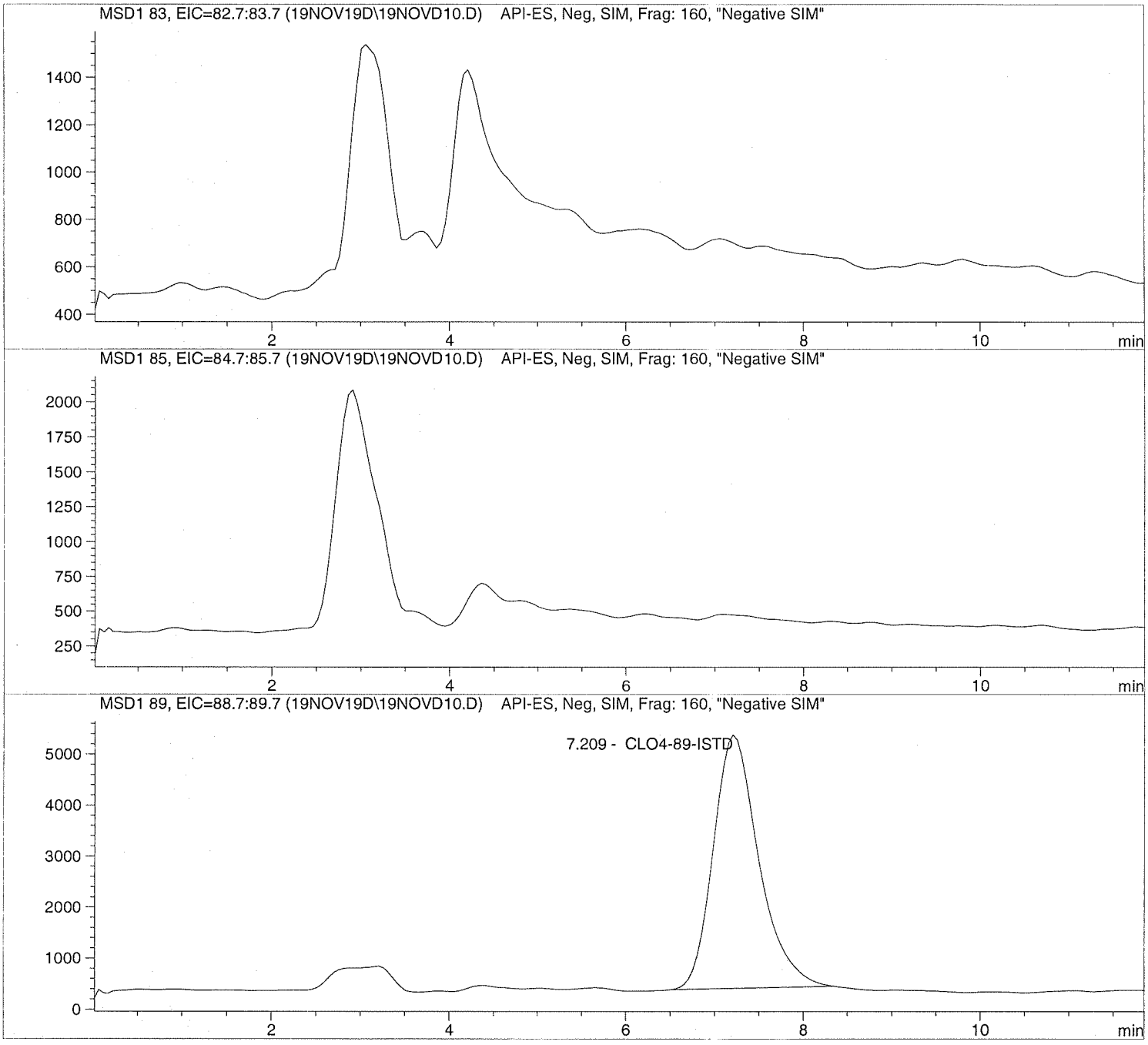
*** End of Report ***

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

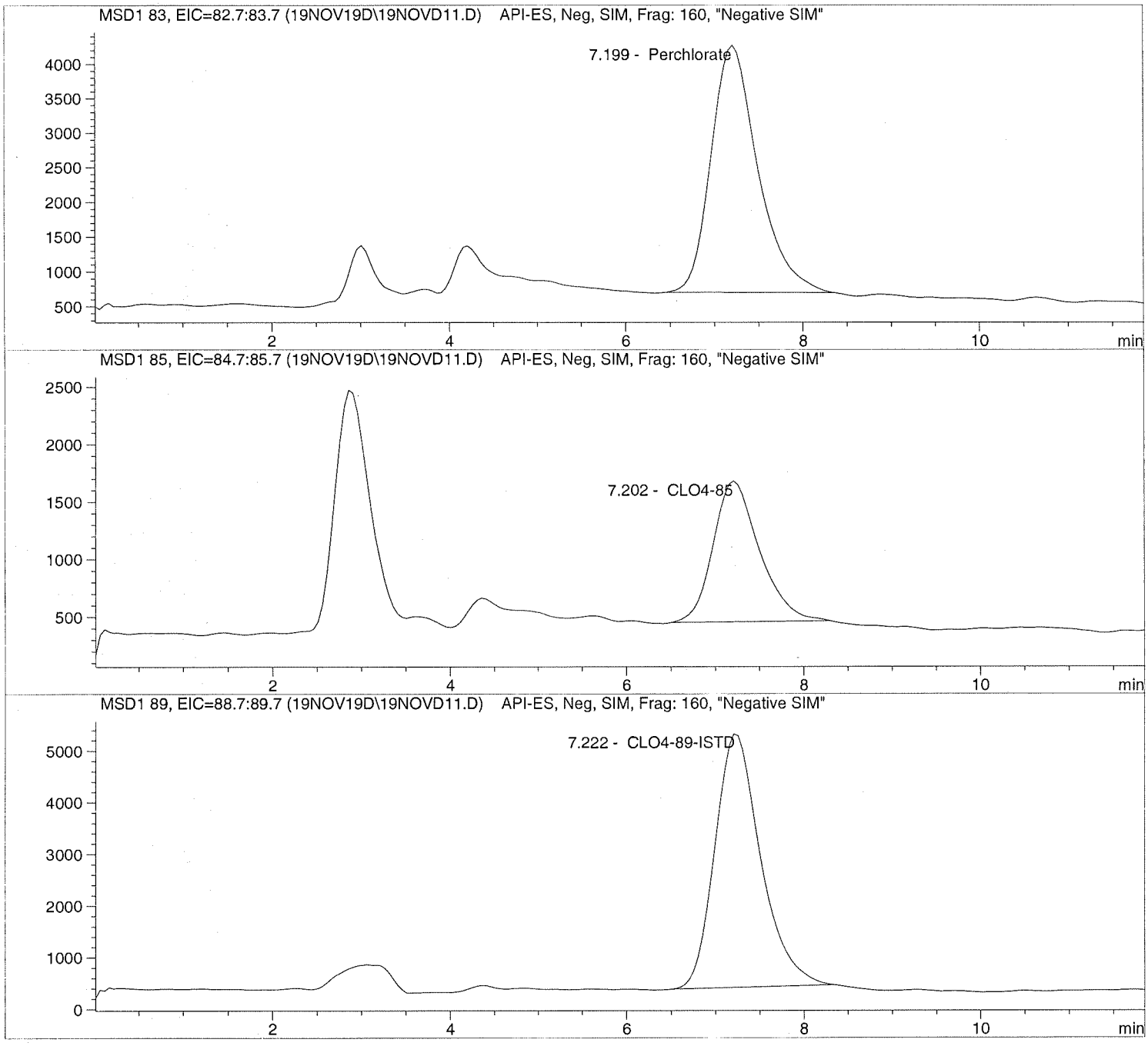
*** End of Report ***

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

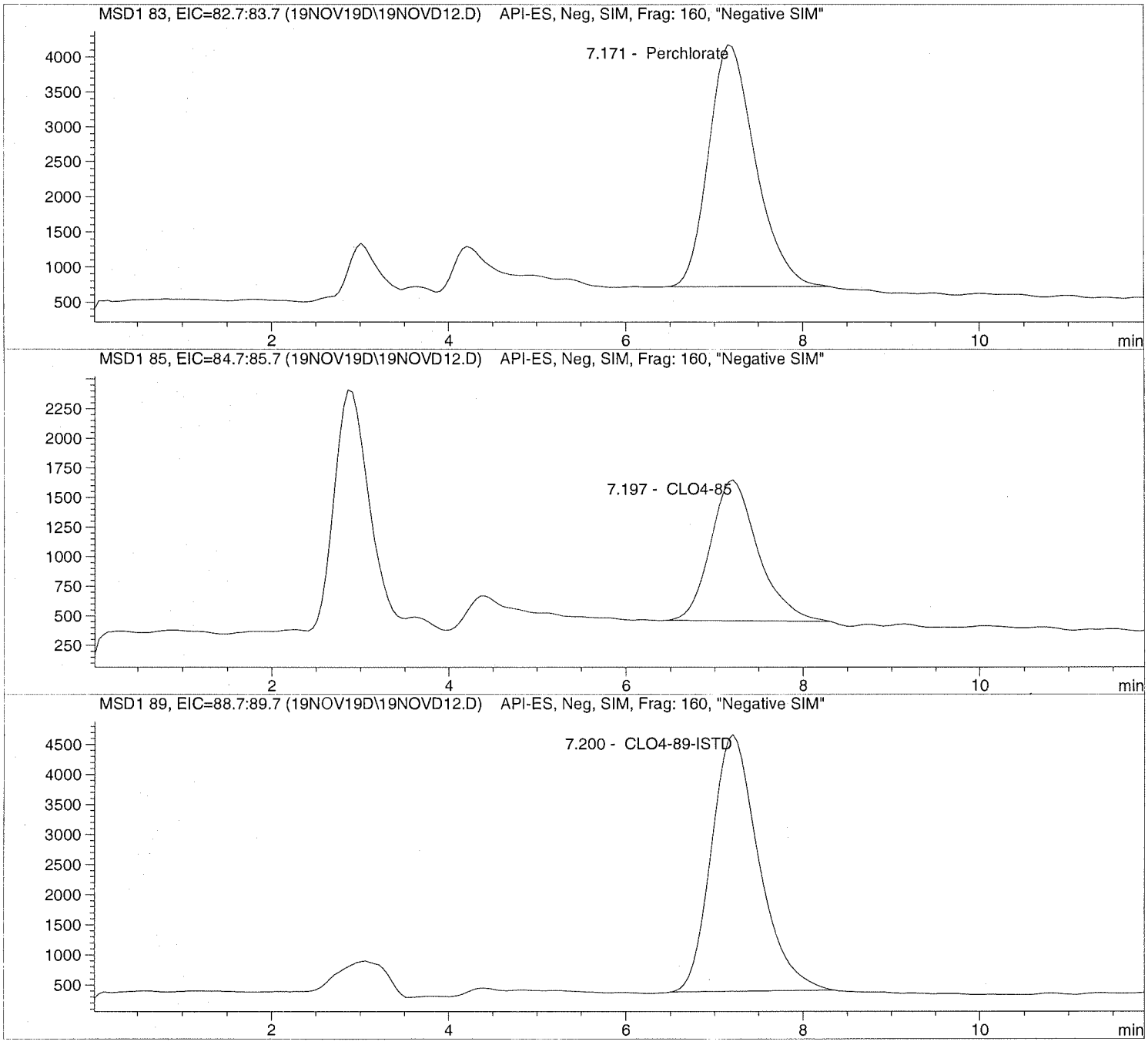
*** End of Report ***

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

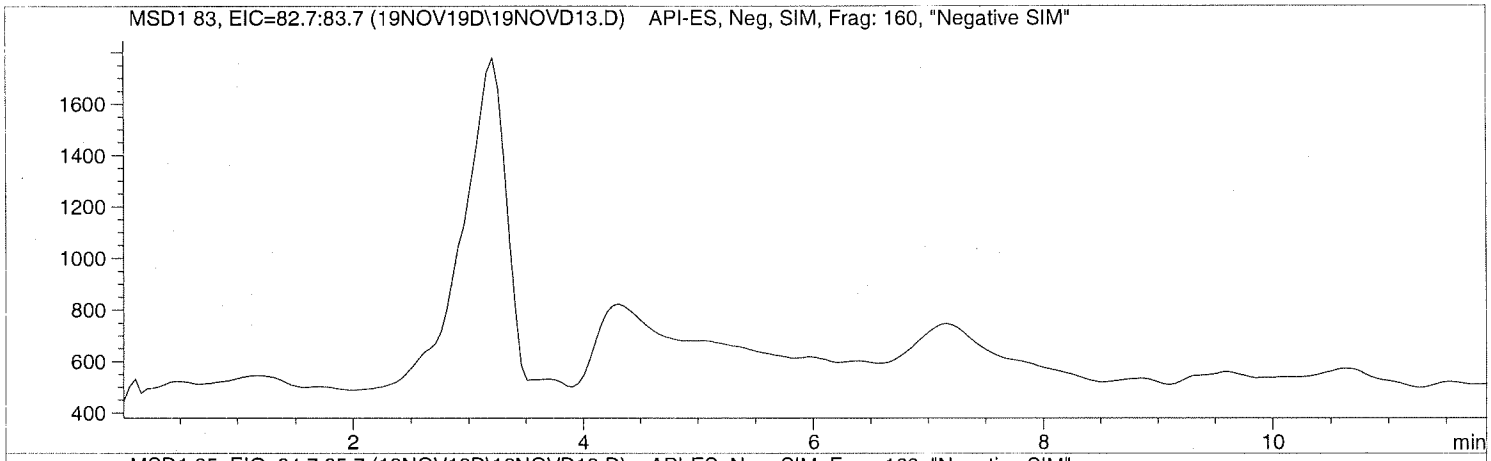
*** End of Report ***

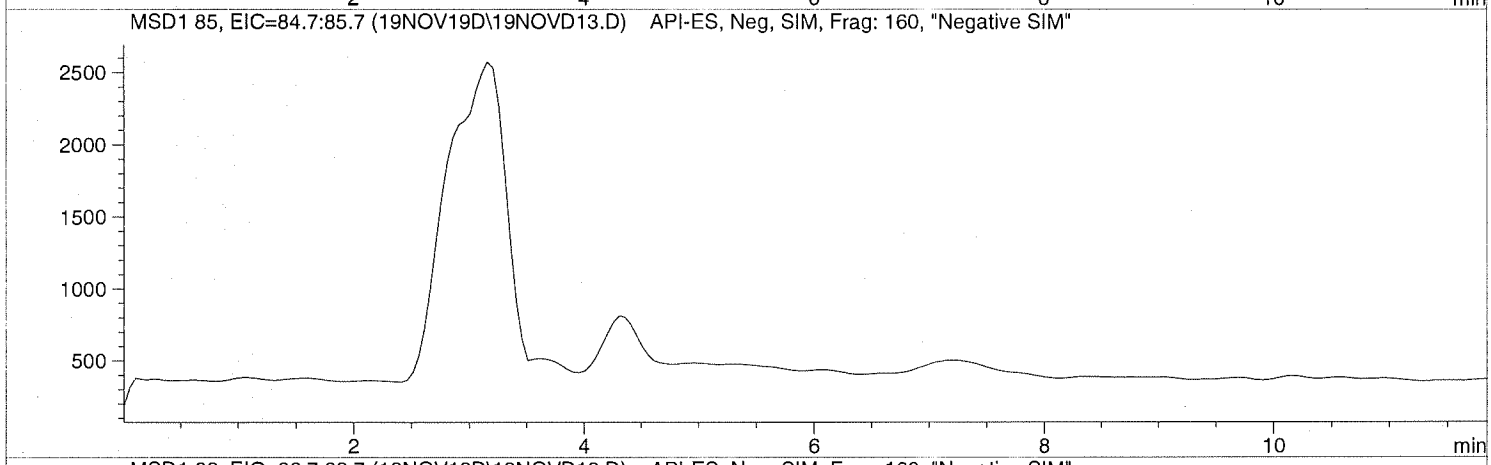
Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD13.D Sample Name: 1931753009

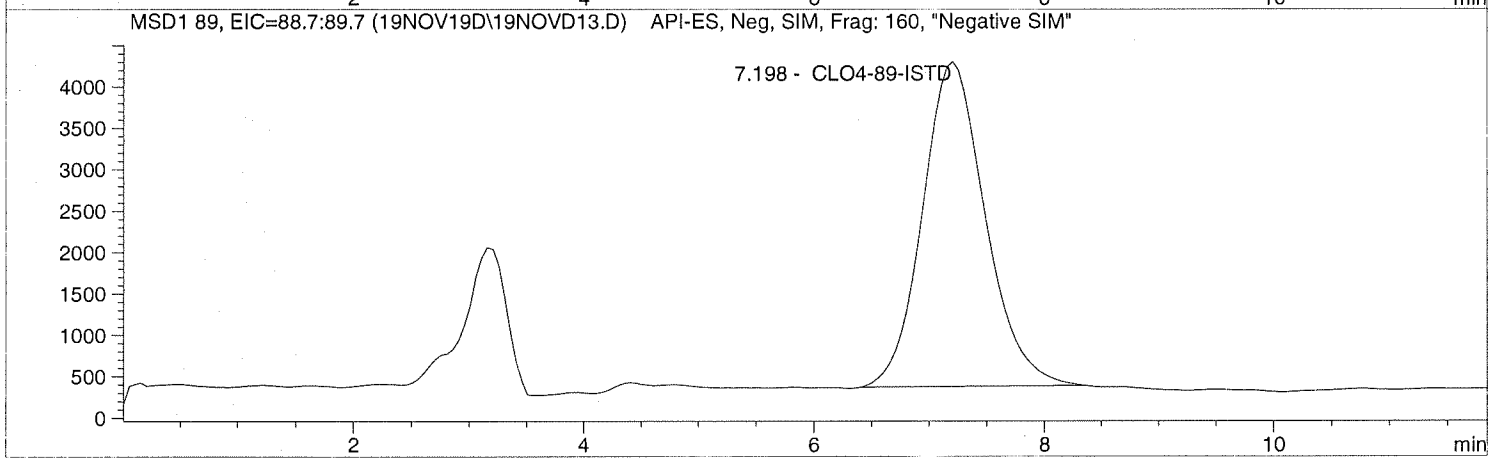
Injection Date:	11/19/2019 11:36:21	Seq Line:	13
Sample Name:	1931753009	Location:	Vial 83
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

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

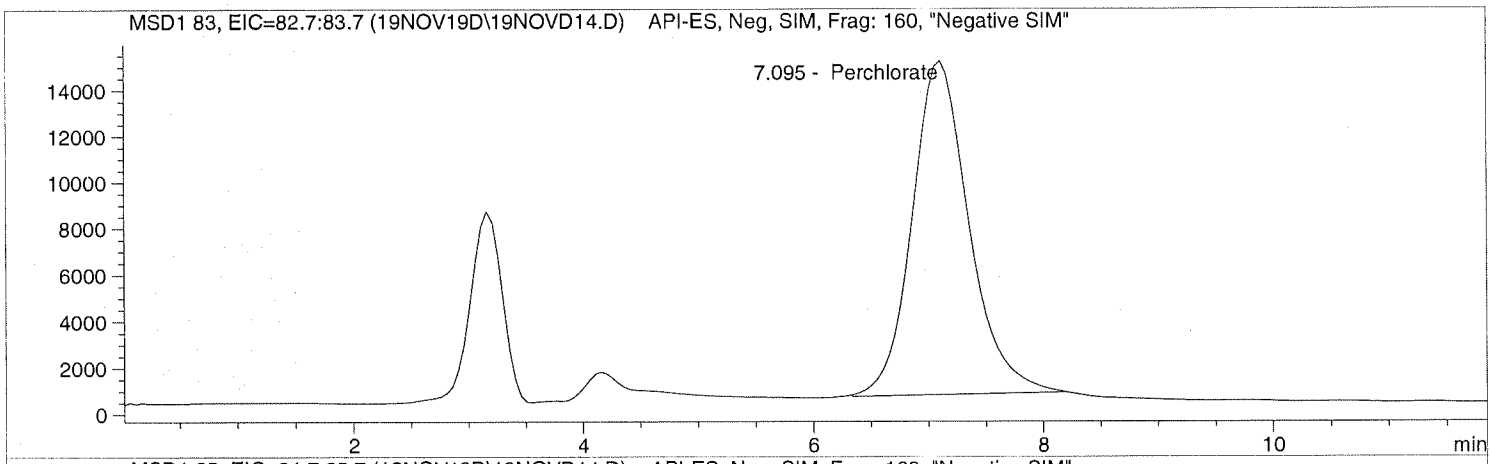
*** End of Report ***

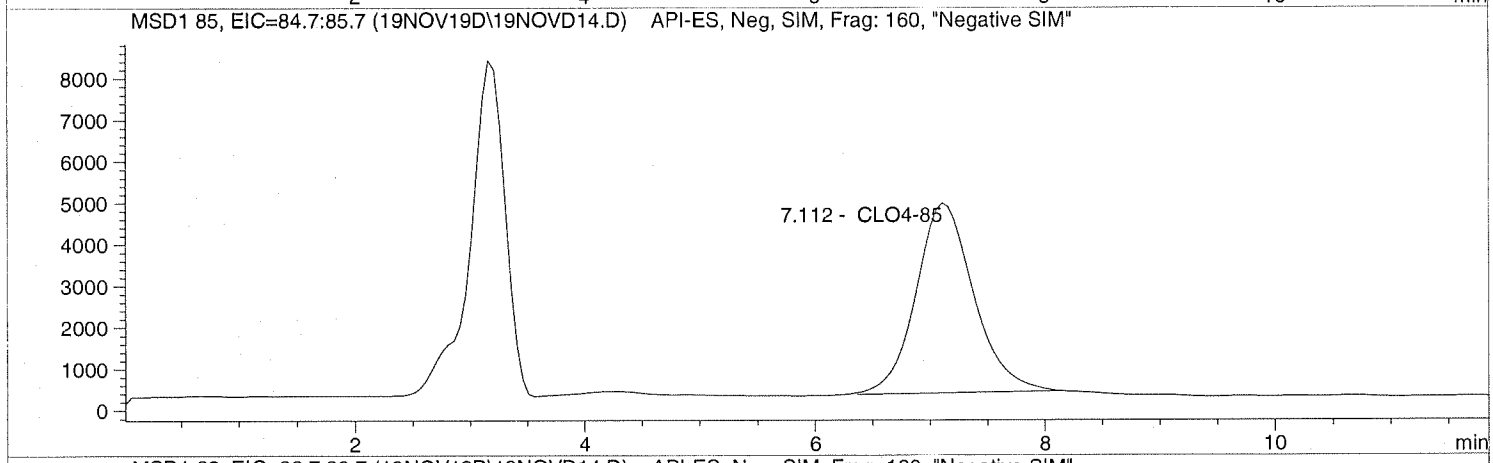
Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD14.D Sample Name: 1931753010

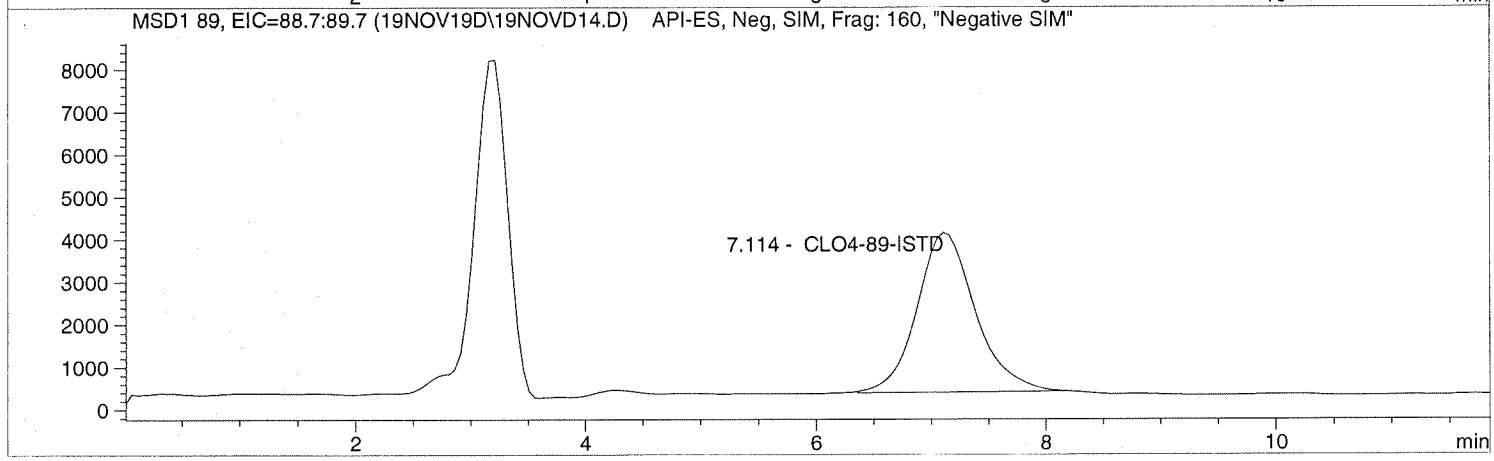
Injection Date:	11/19/2019 11:50:06	Seq Line:	14
Sample Name:	1931753010	Location:	Vial 84
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

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

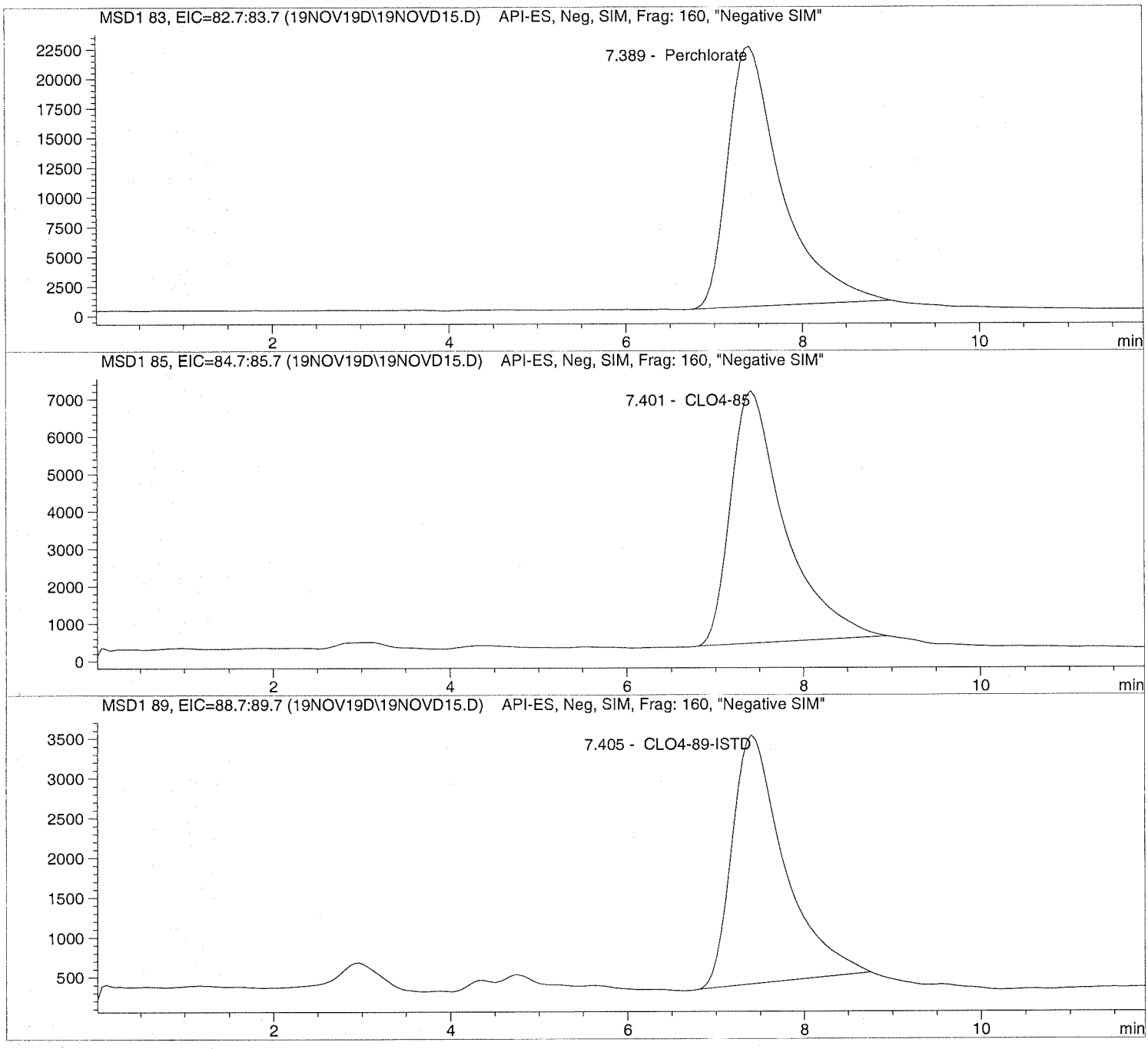
*** End of Report ***

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

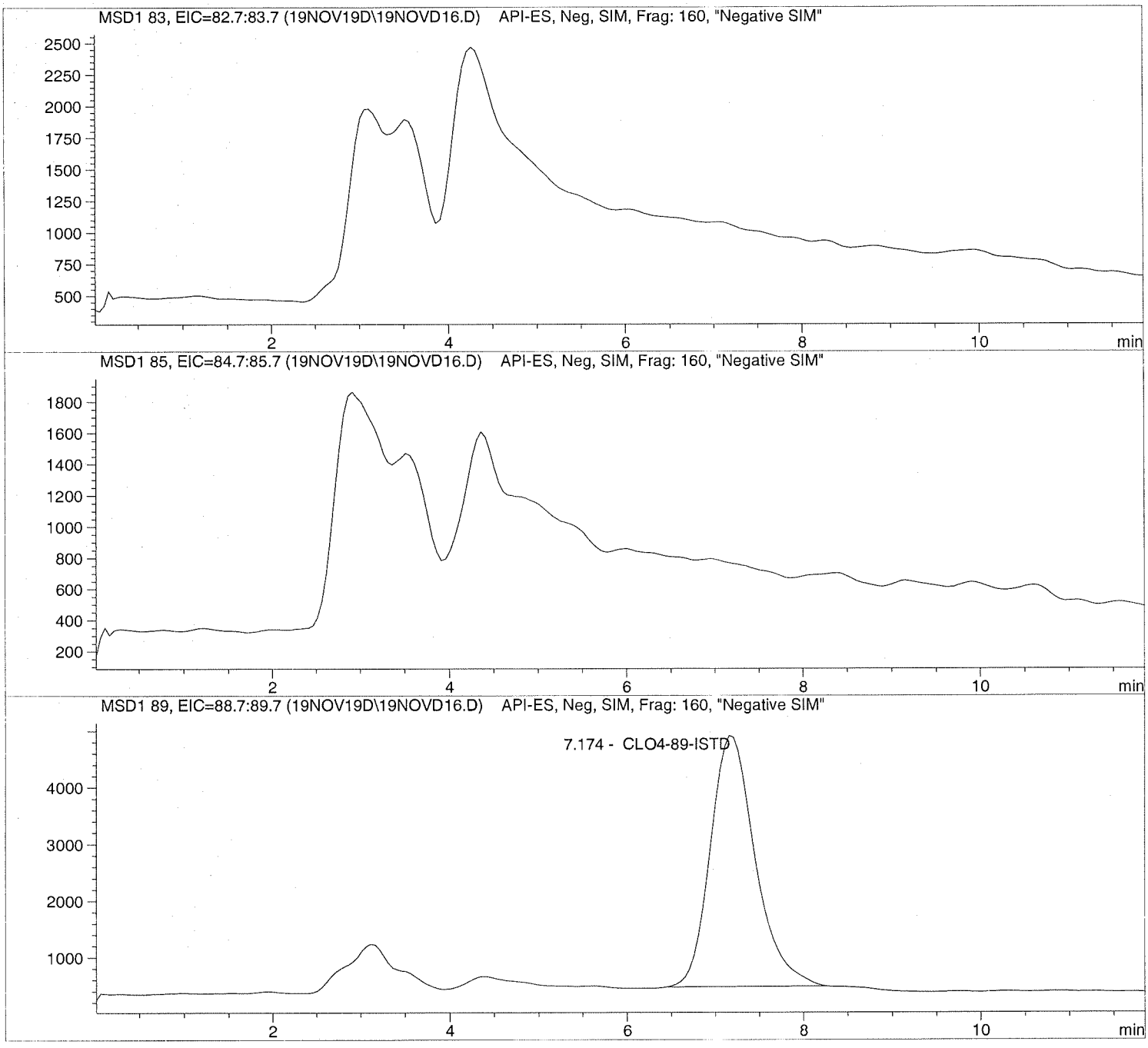
*** End of Report ***

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

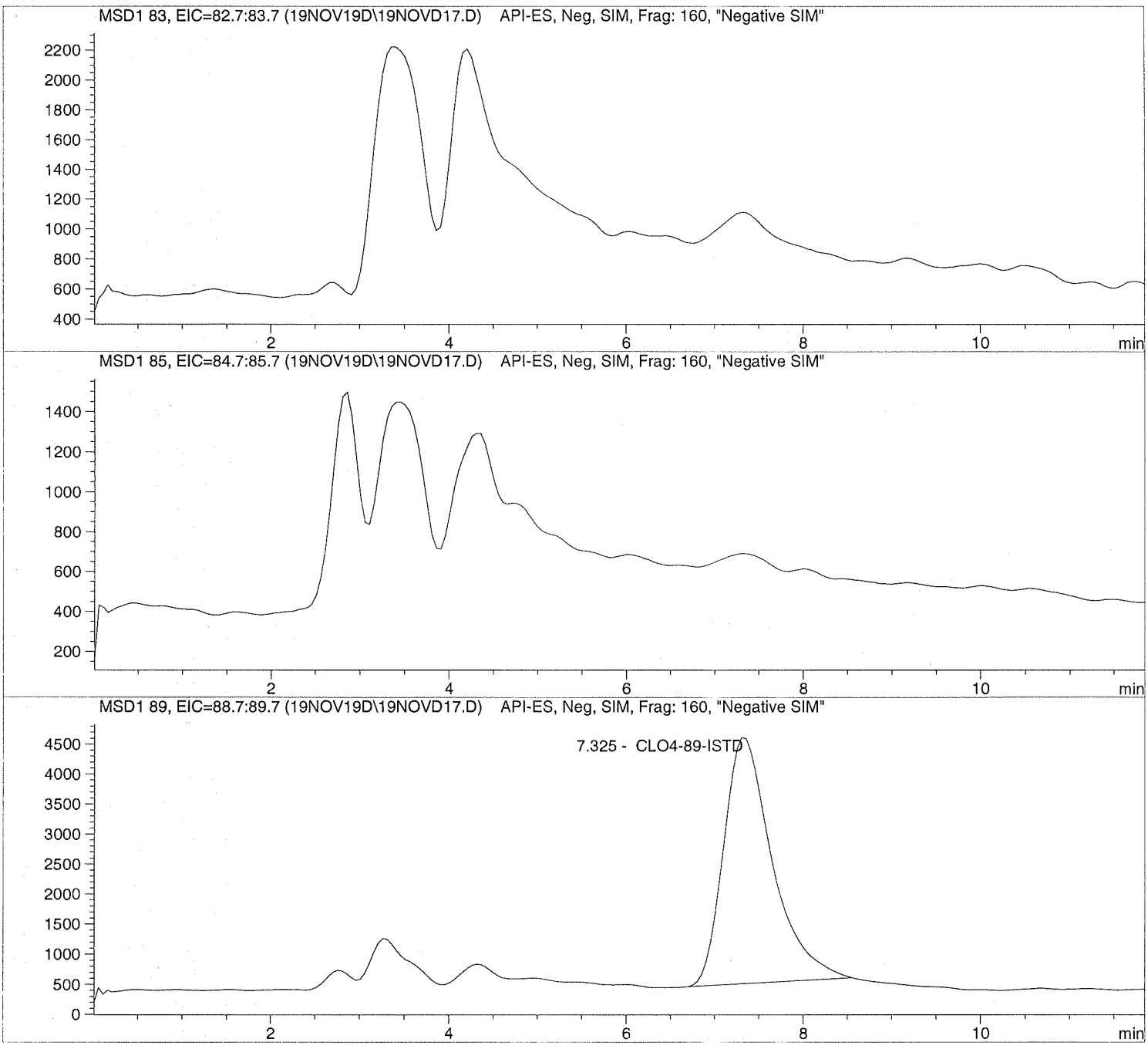
*** End of Report ***

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

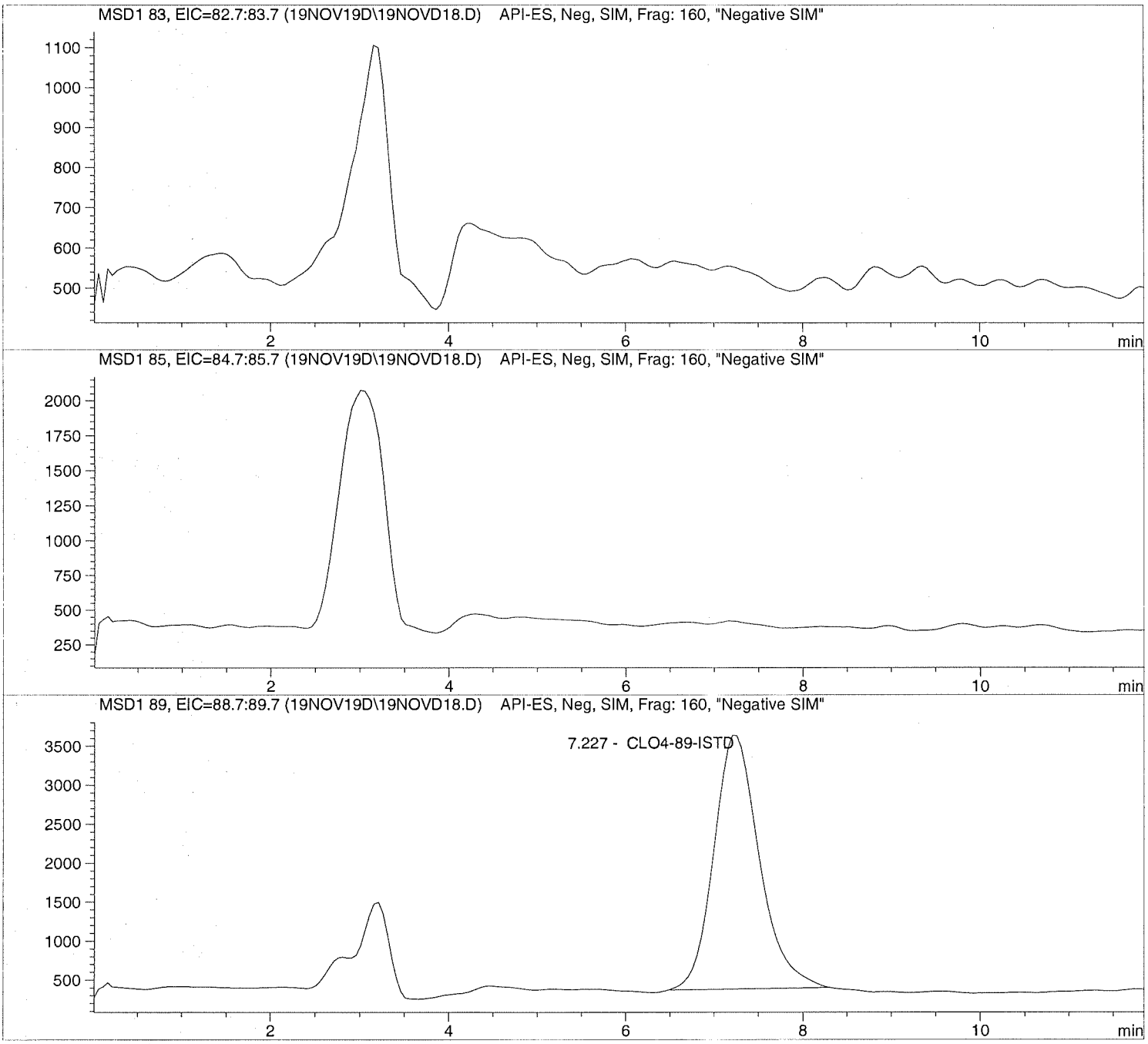
*** End of Report ***

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

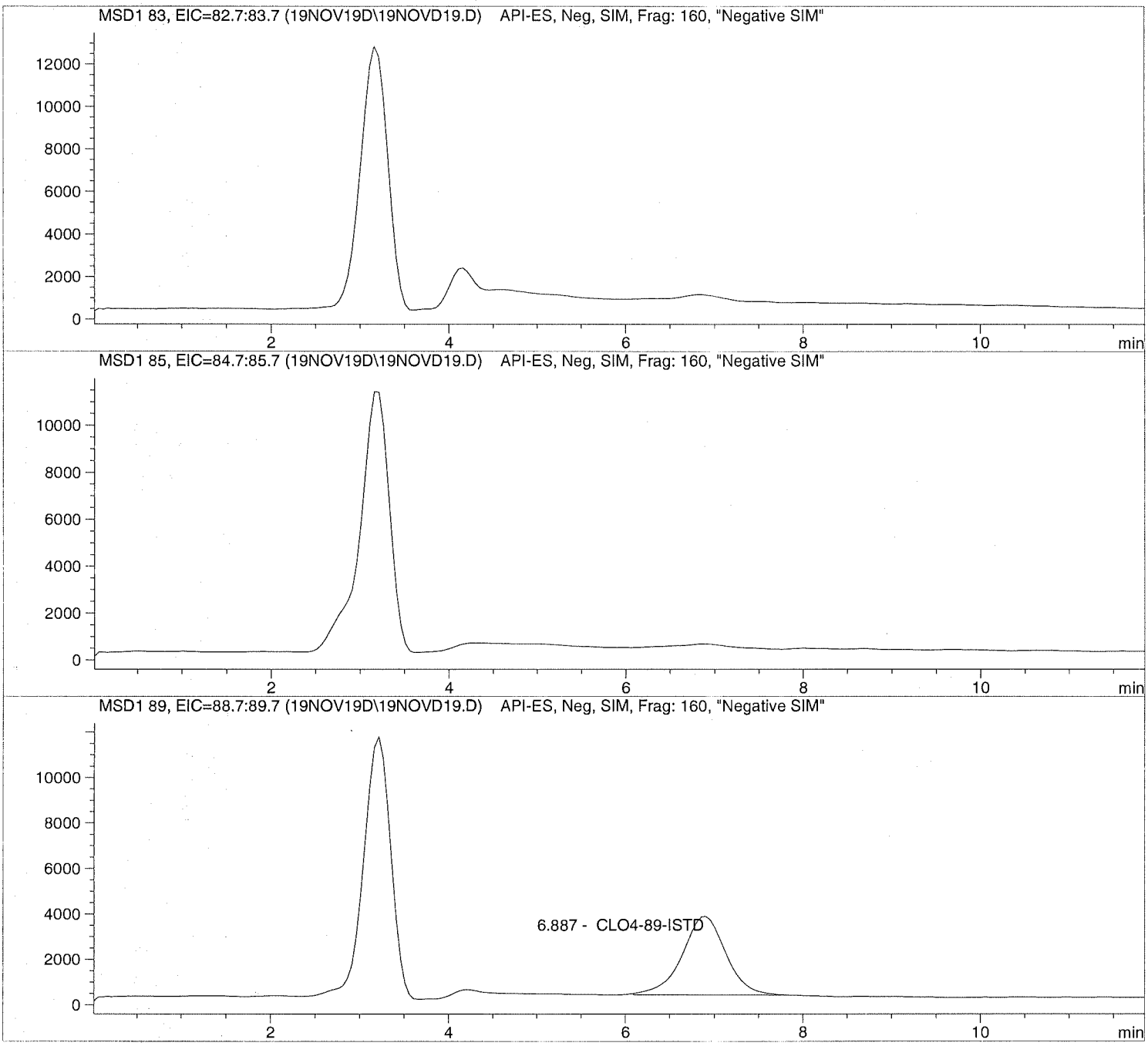
*** End of Report ***

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

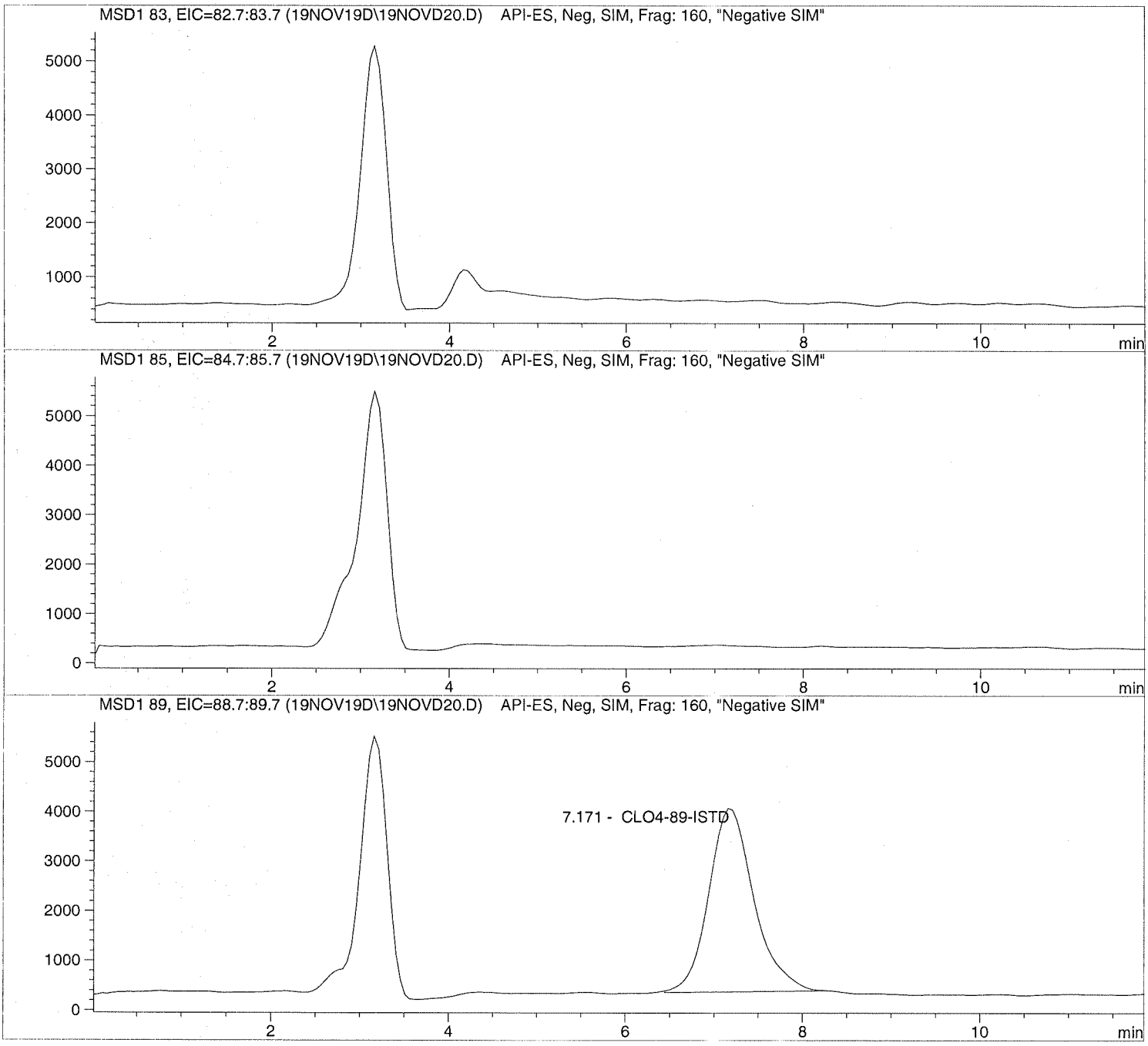
*** End of Report ***

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

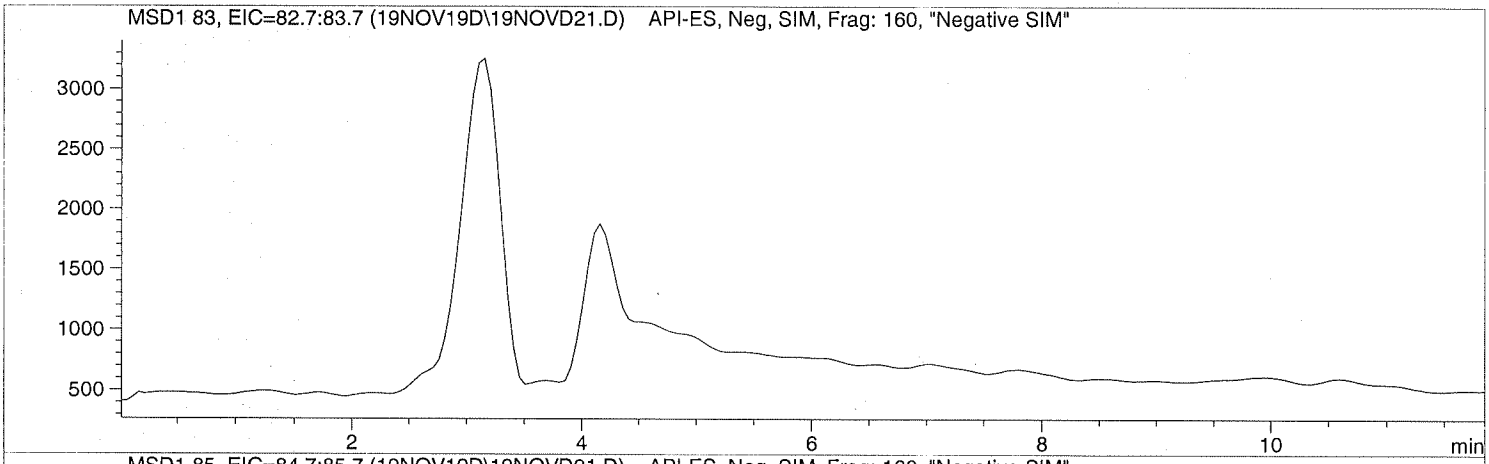
*** End of Report ***

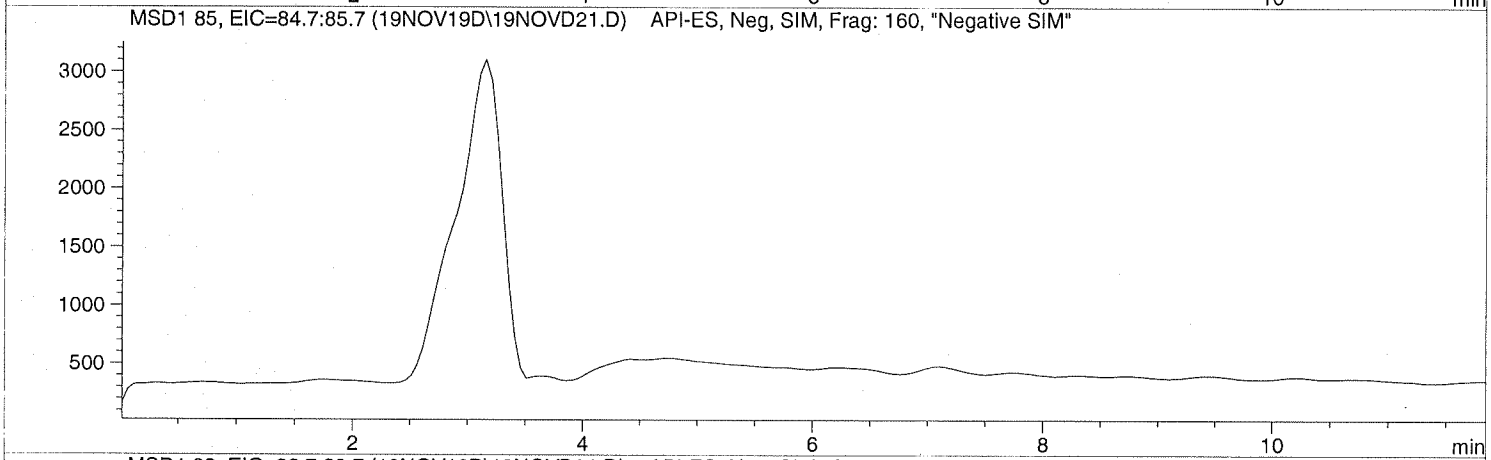
Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD21.D Sample Name: 1932010003

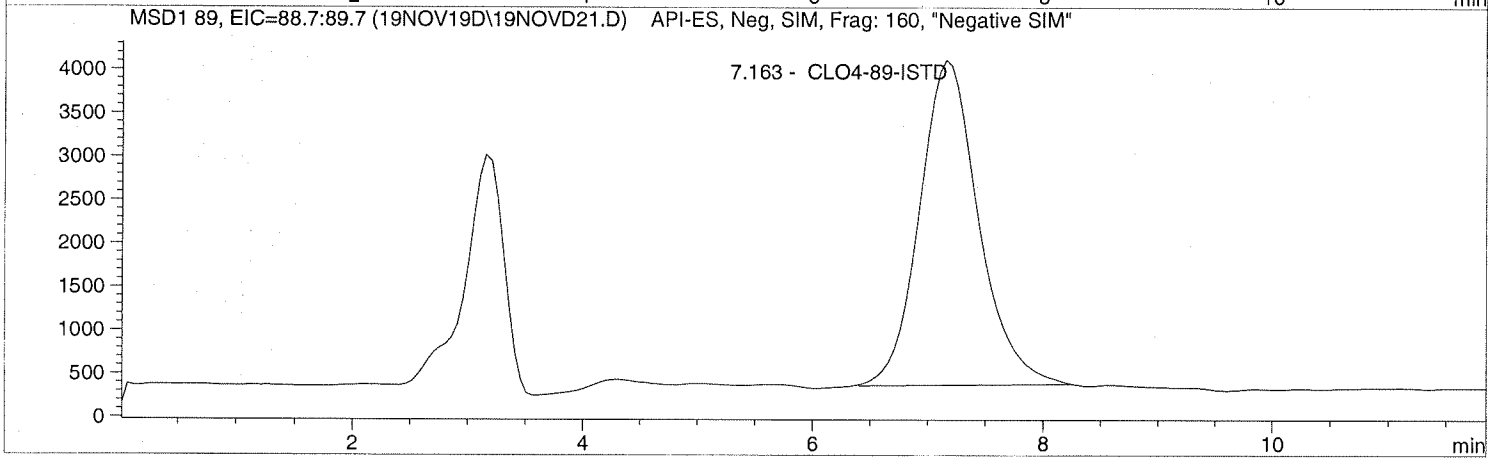
Injection Date:	11/19/2019 13:26:30	Seq Line:	21
Sample Name:	1932010003	Location:	Vial 90
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

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

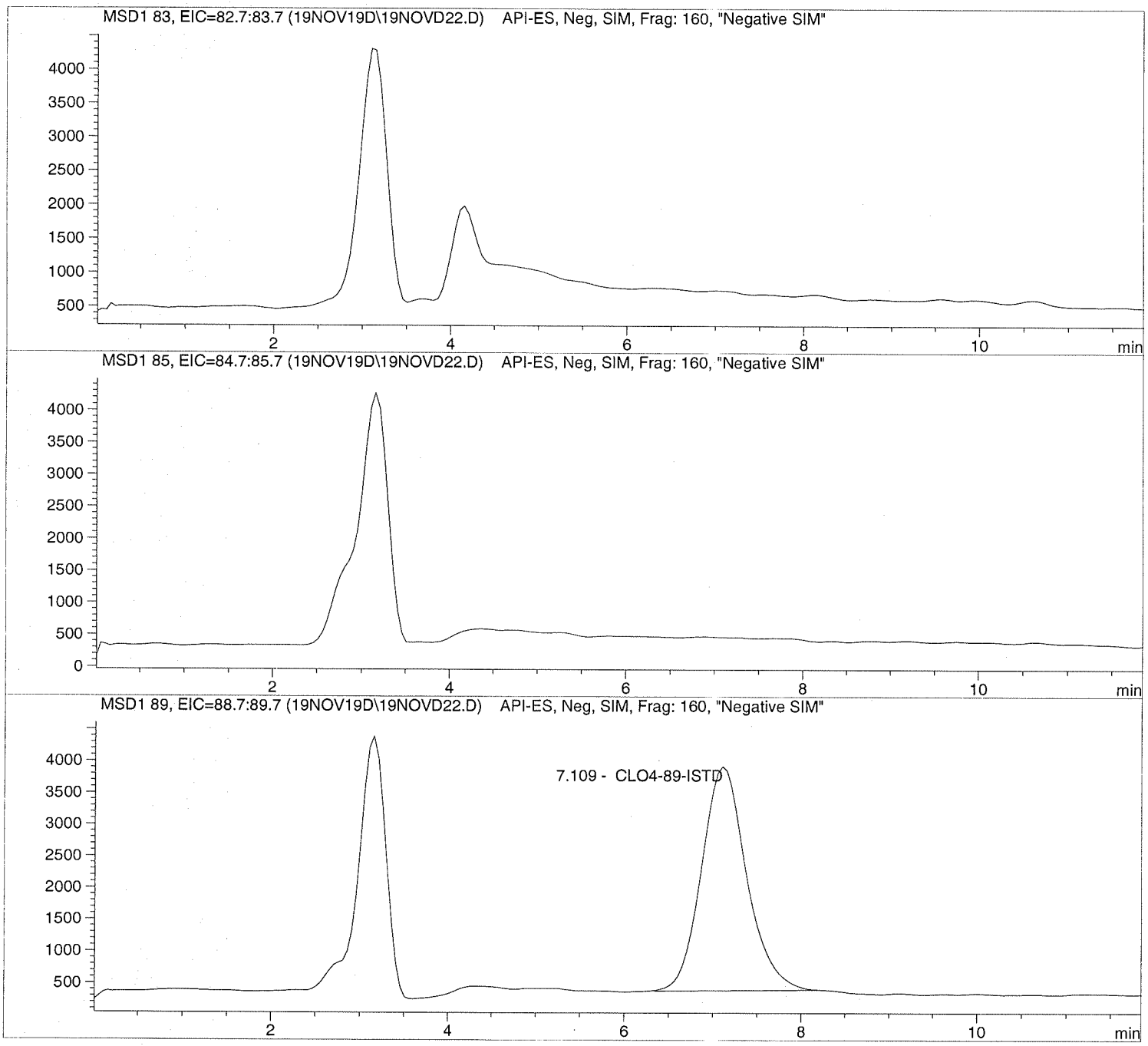
*** End of Report ***

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

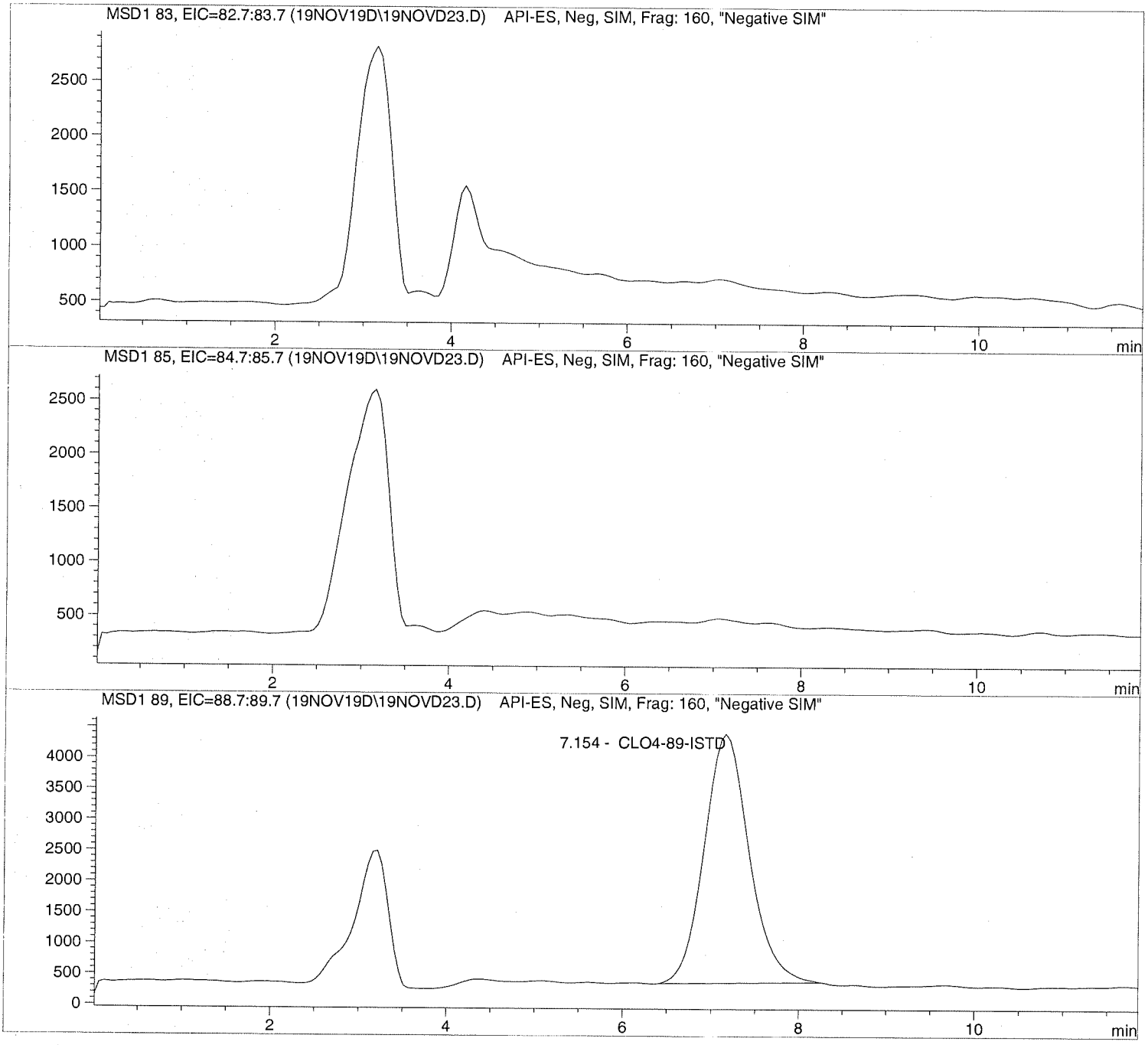
*** End of Report ***

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

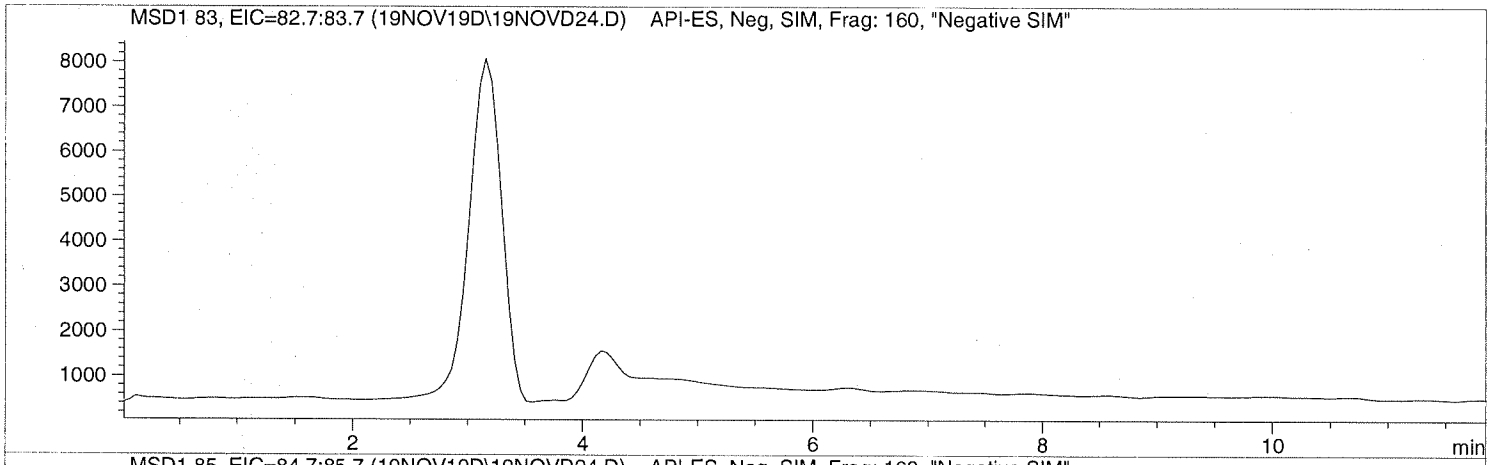
*** End of Report ***

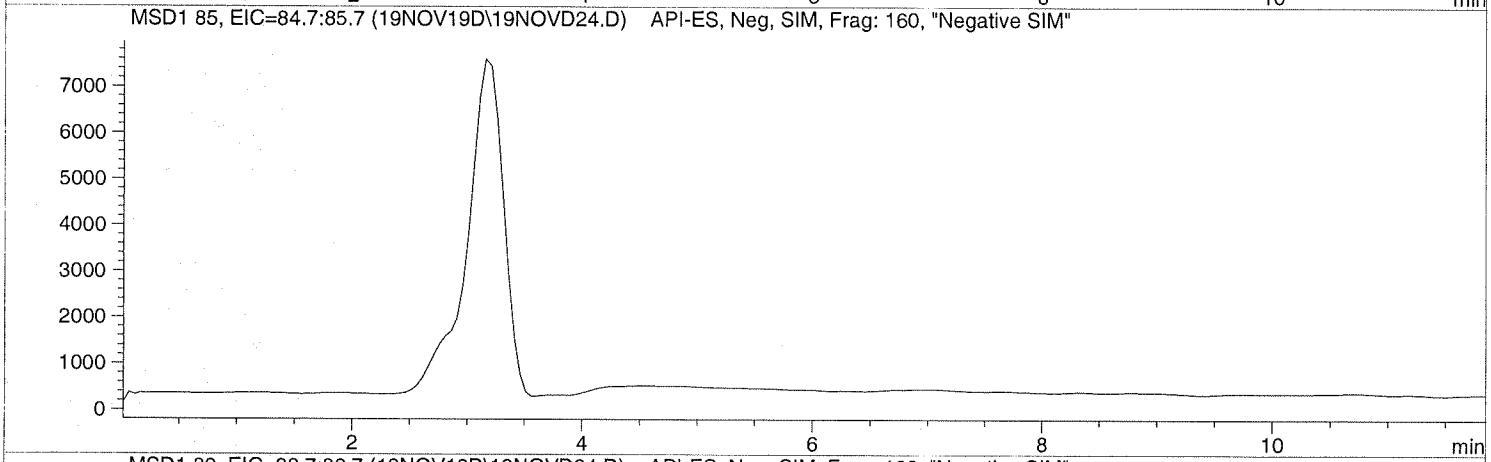
Data file: C:\HPCHEM\1\DATA\19NOV19D\19NOVD24.D Sample Name: 1932010006

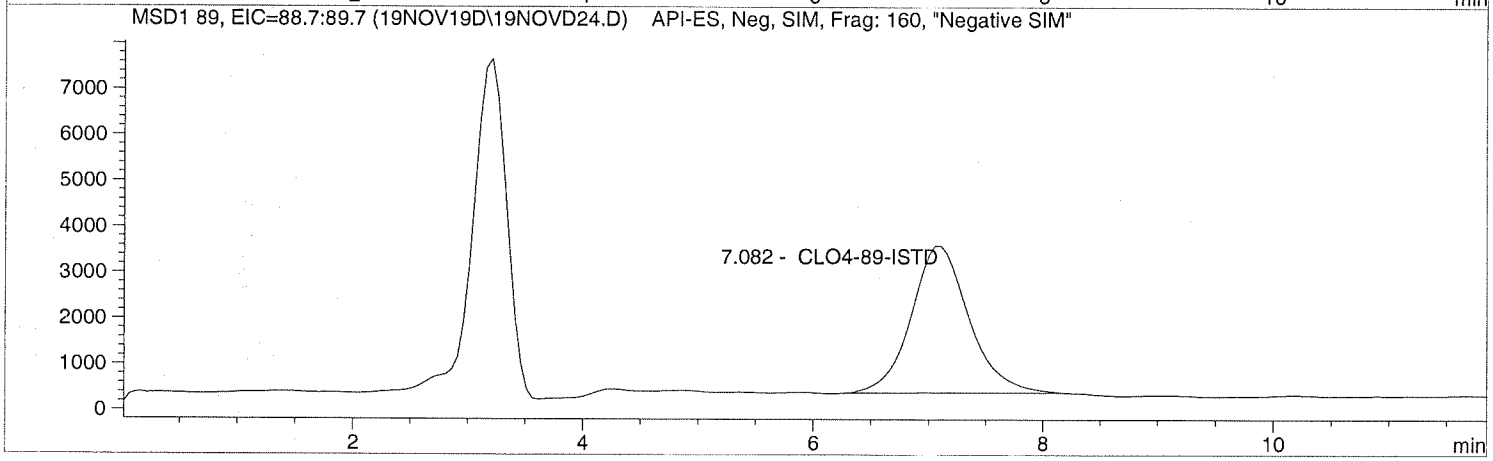
Injection Date:	11/19/2019 14:07:50	Seq Line:	24
Sample Name:	1932010006	Location:	Vial 93
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

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

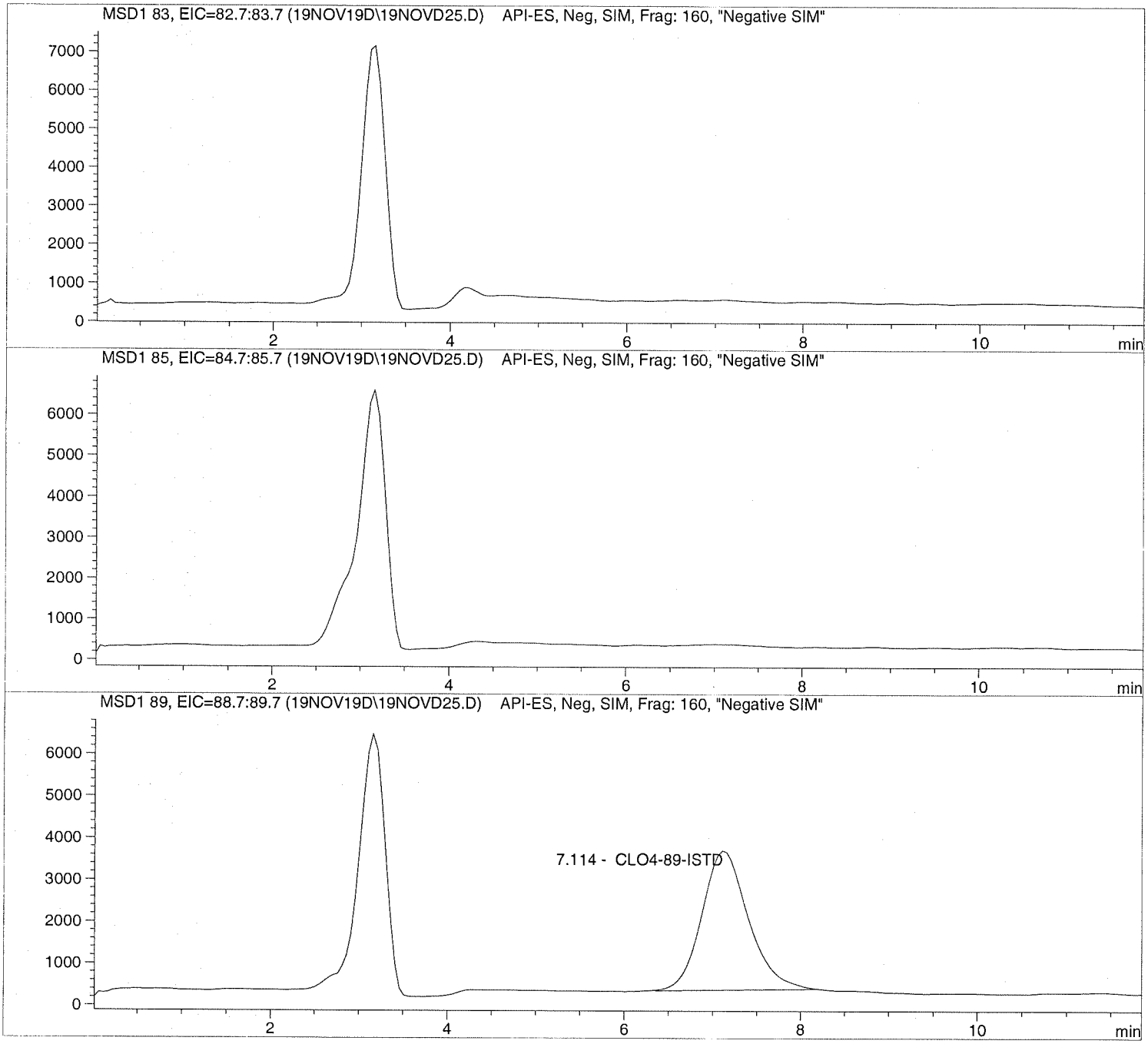
*** End of Report ***

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

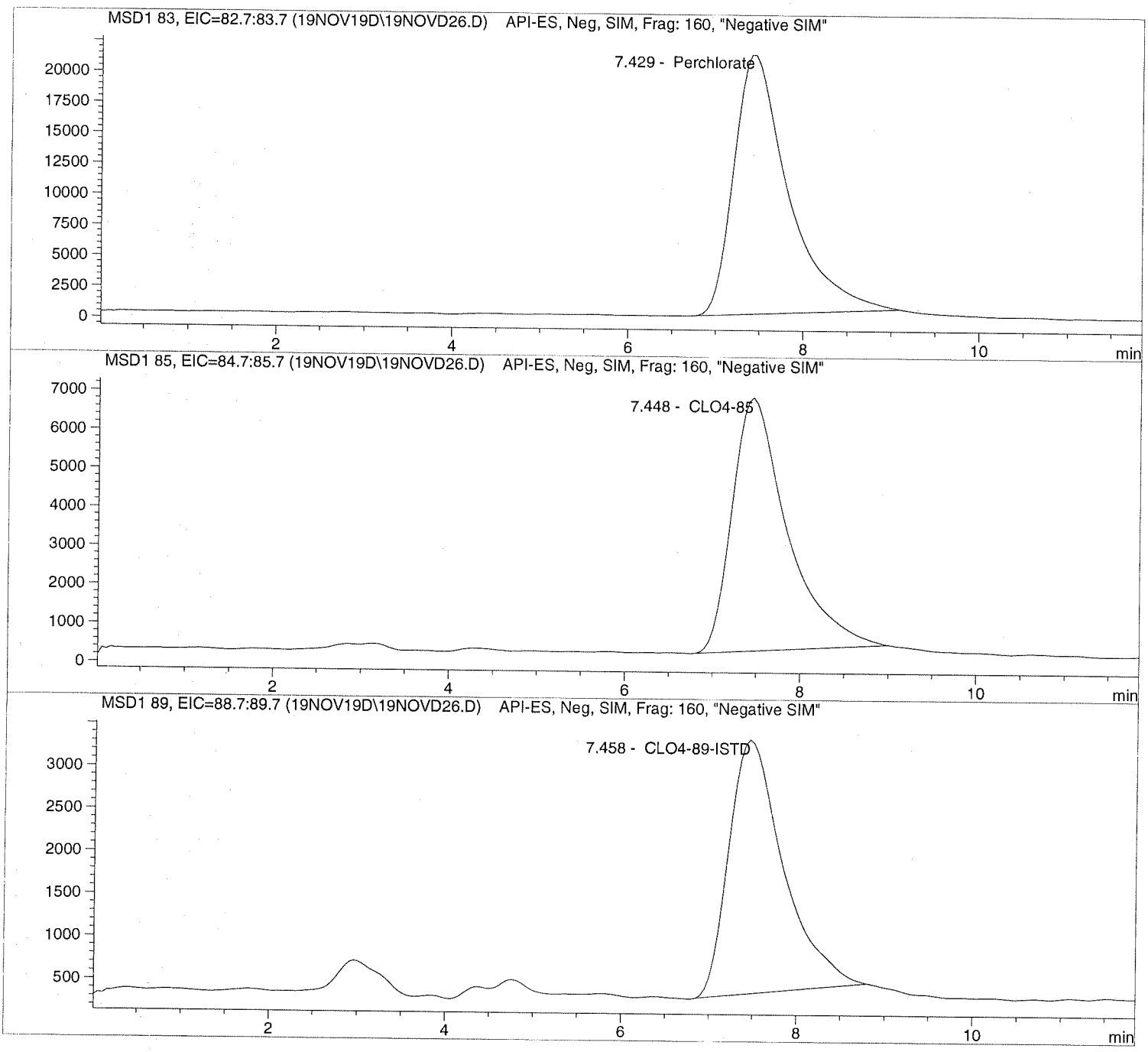
*** End of Report ***

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			

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

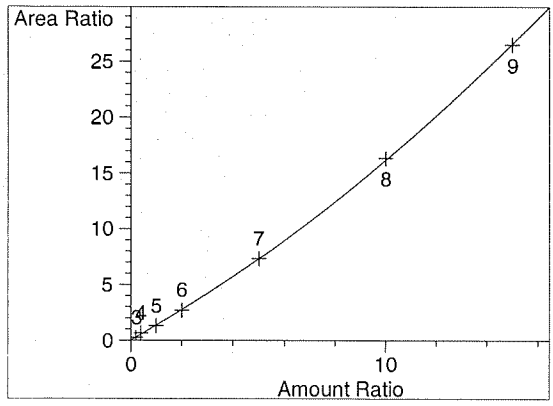
Compound: CLO4-89-ISTD
- Time Window : From 3.581 min To 11.896 min
- Curve Type : Linear
- Origin : Included
- Calibration Level Weights:/
  - Level 3 : 1
  - Level 4 : 1
  - Level 5 : 1
  - Level 6 : 1
  - Level 7 : 1
  - Level 8 : 1
  - Level 9 : 1

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

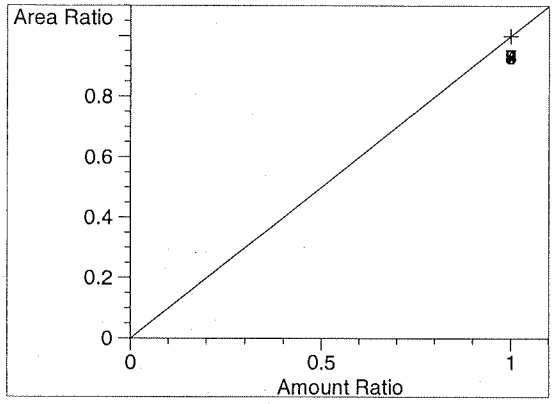
Peak Sum Table

No Entries in table

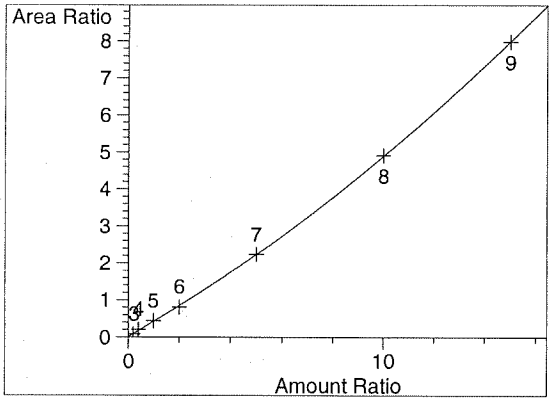
Calibration Curves



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 Table:

Method and Injection Info Part:

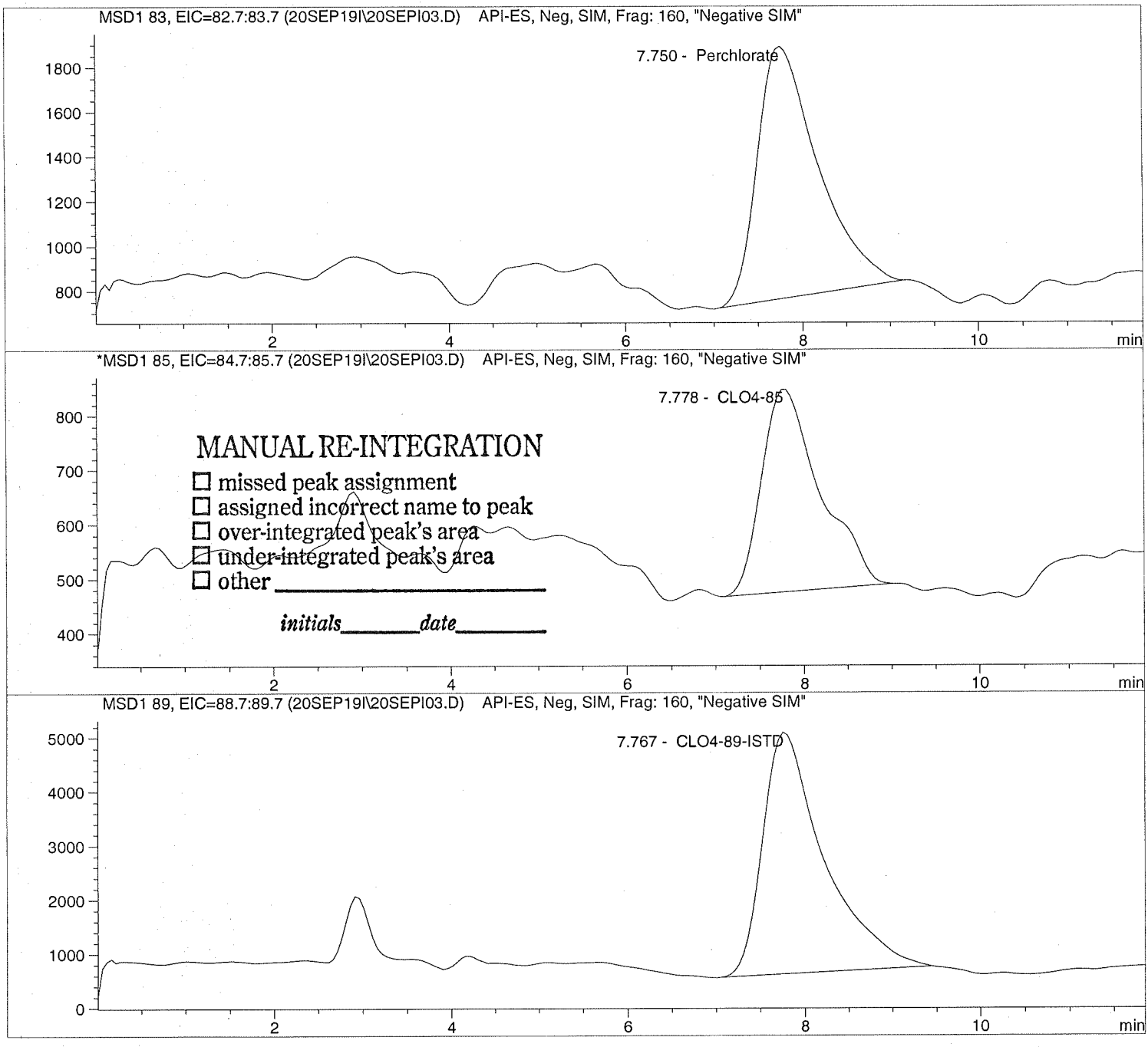
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	CLO4@ 5.0ug/L	CLO4-AQN	1	Ctrl Samp		
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

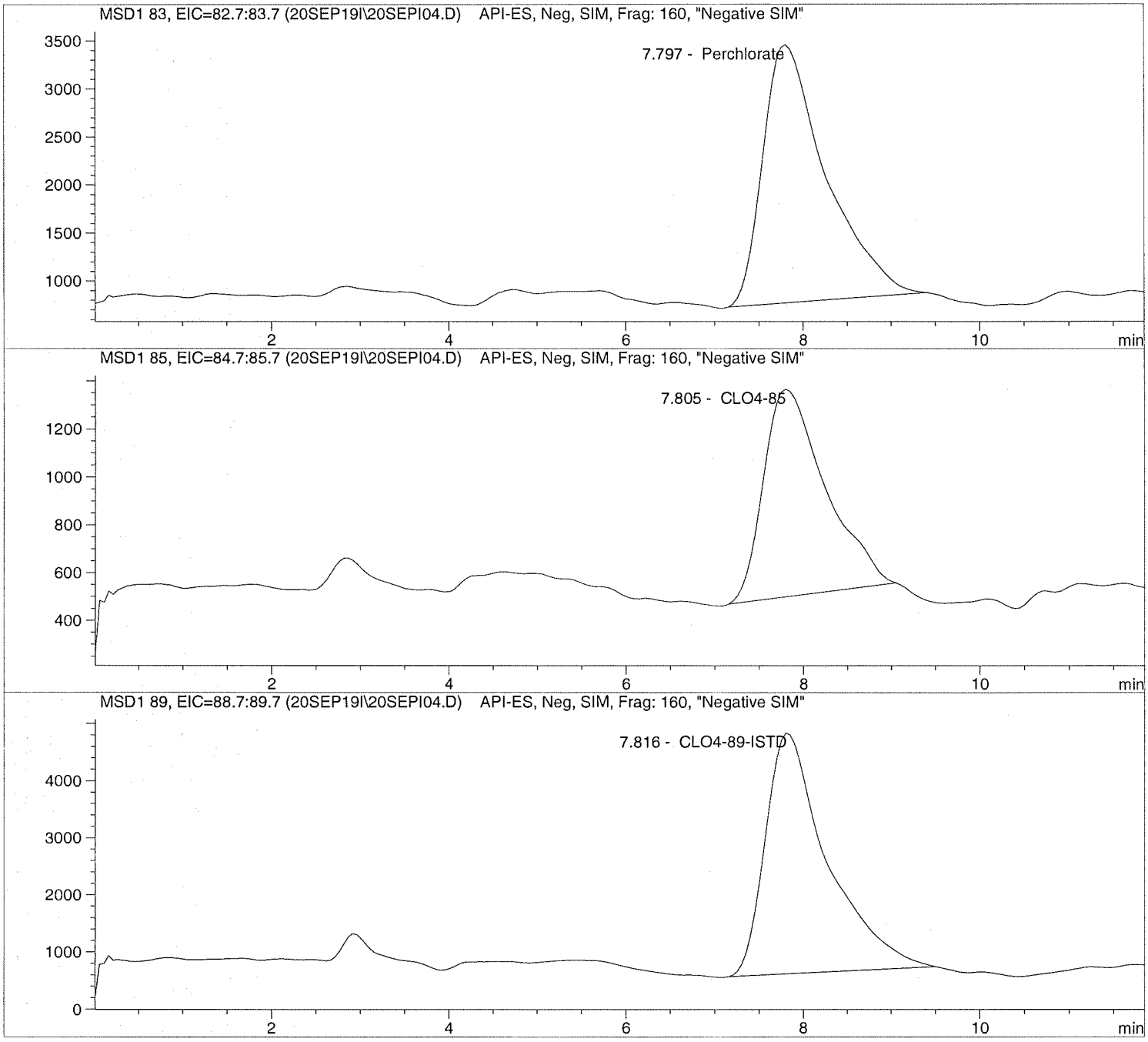
*** End of Report ***

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

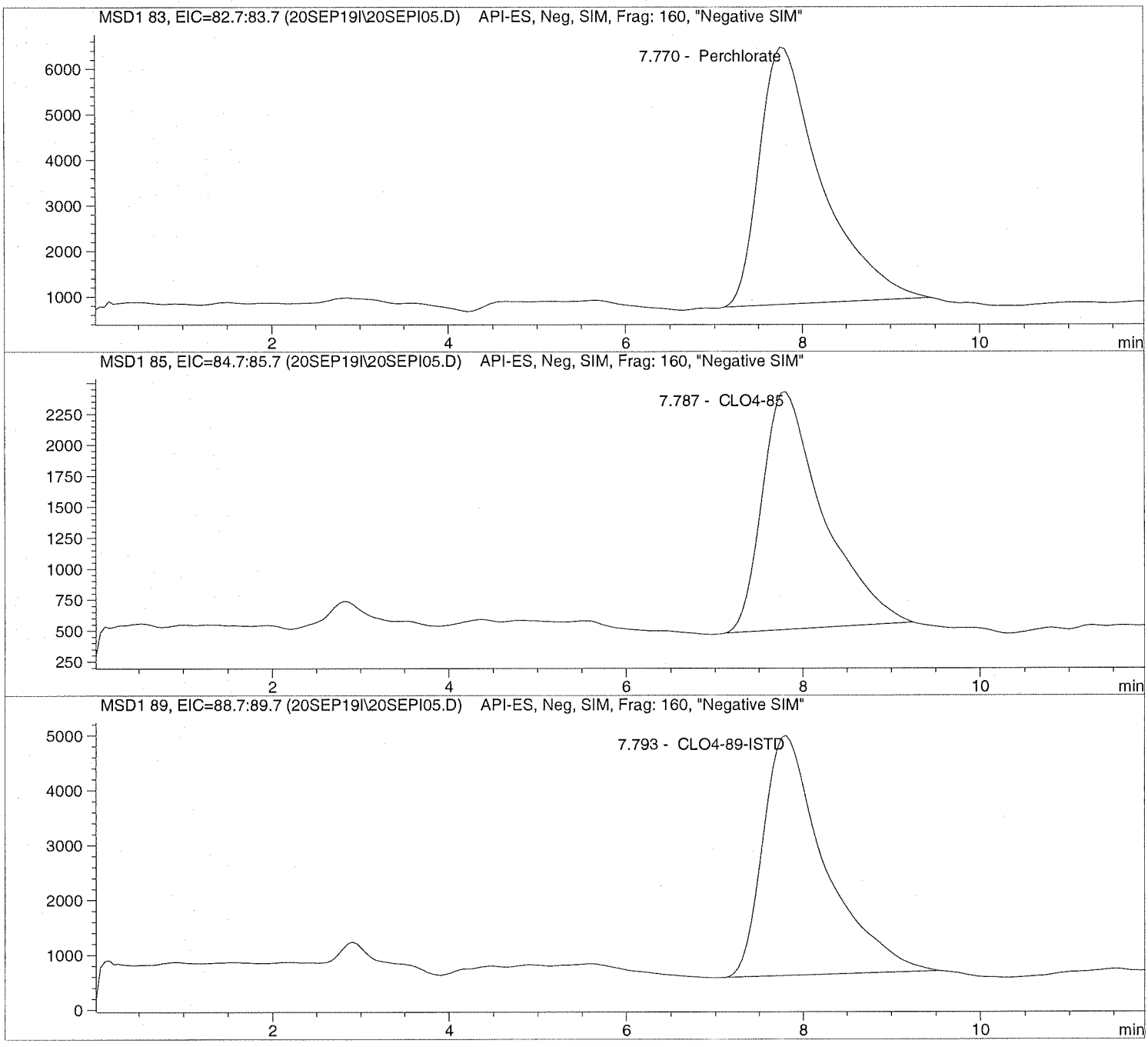
*** End of Report ***

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

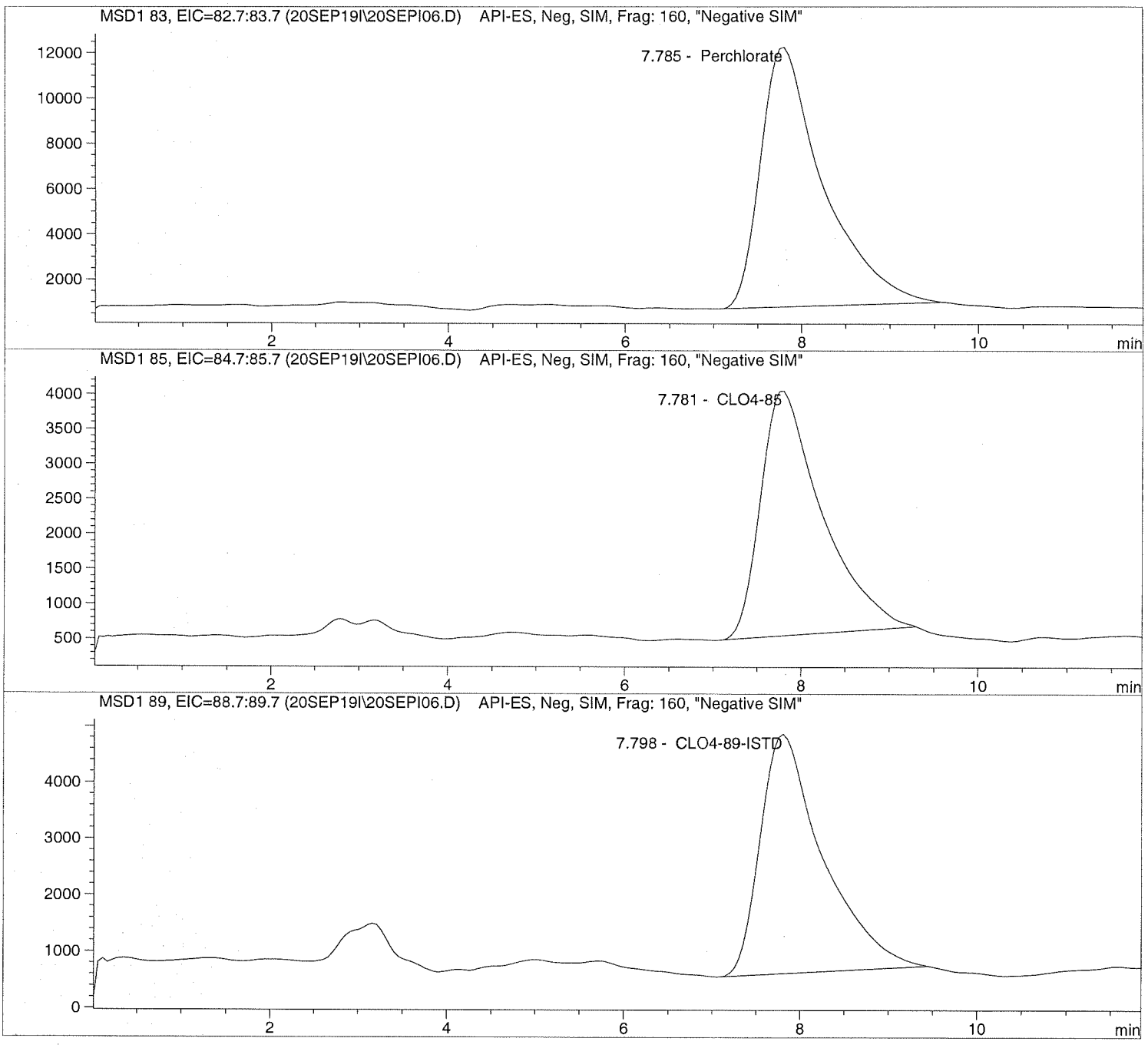
*** End of Report ***

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

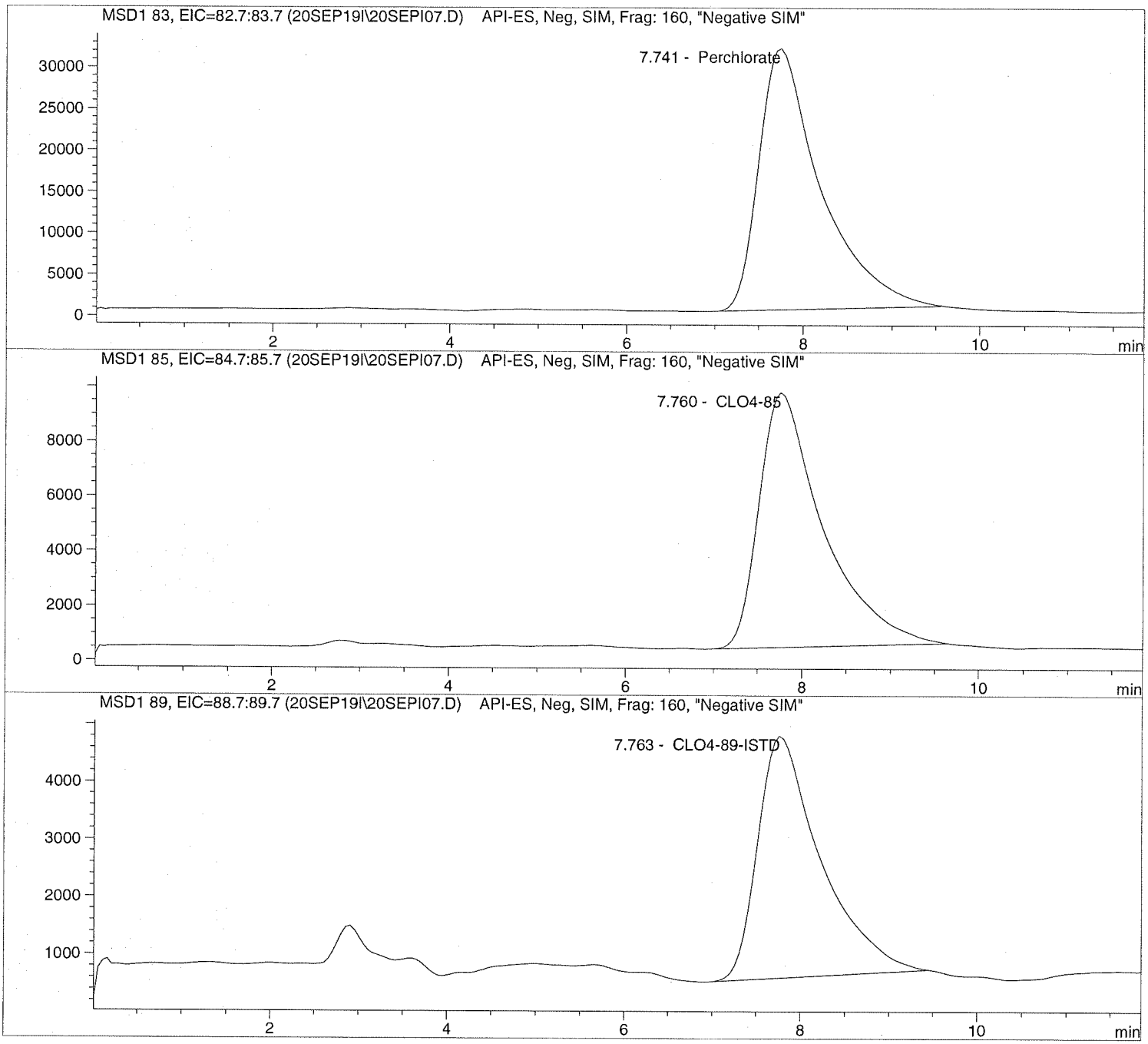
*** End of Report ***

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

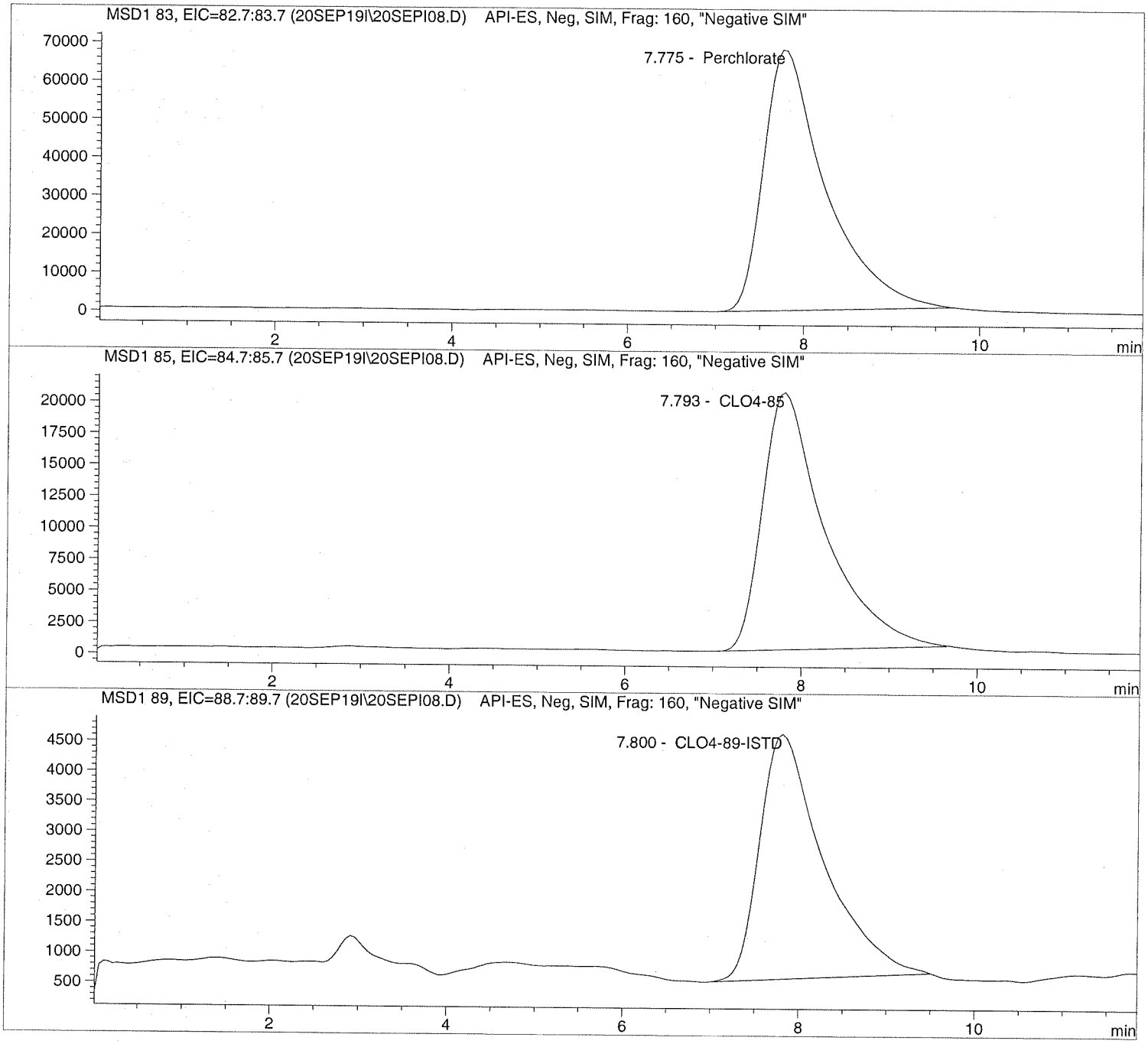
*** End of Report ***

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

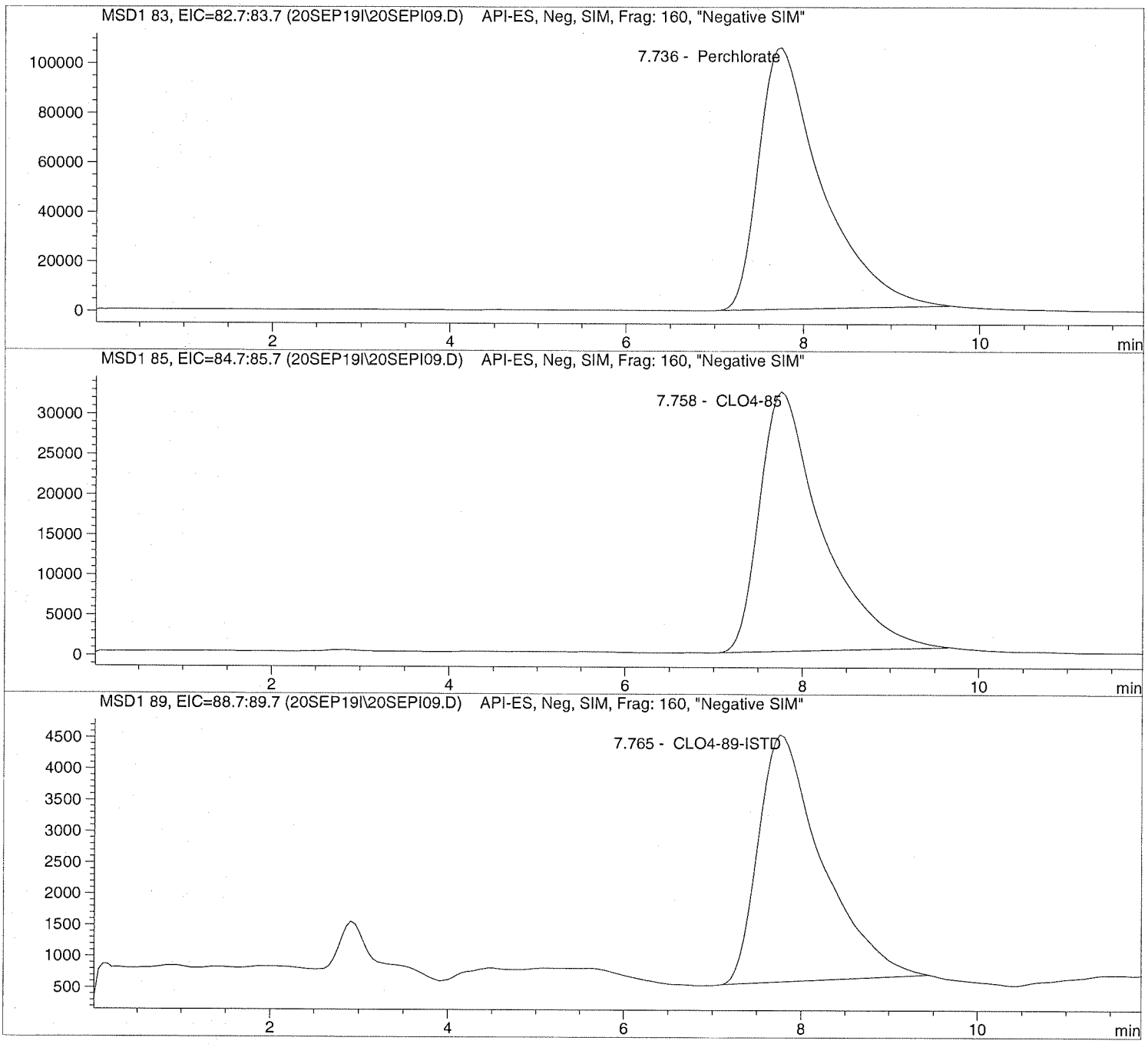
*** End of Report ***

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

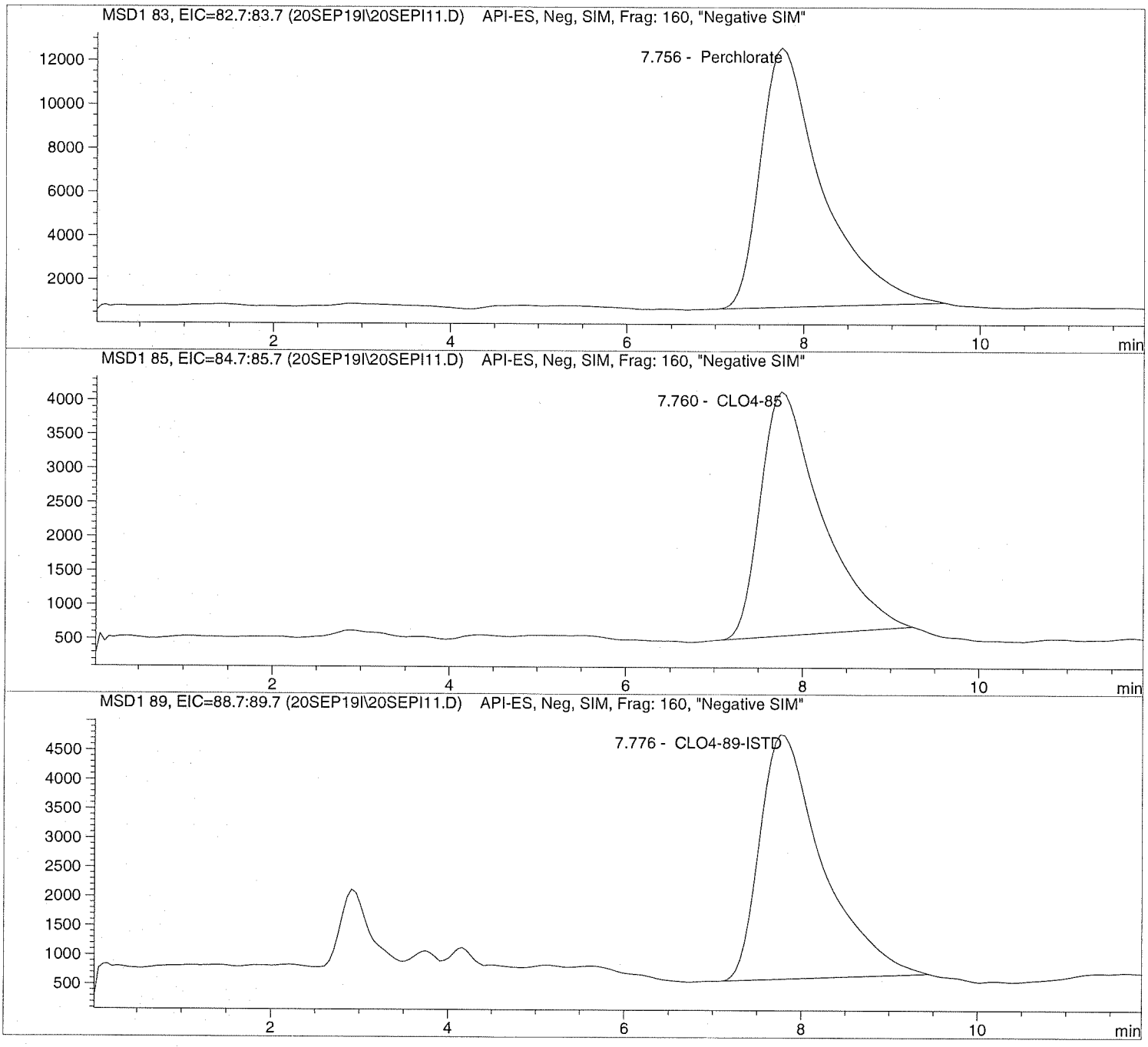
*** End of Report ***

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

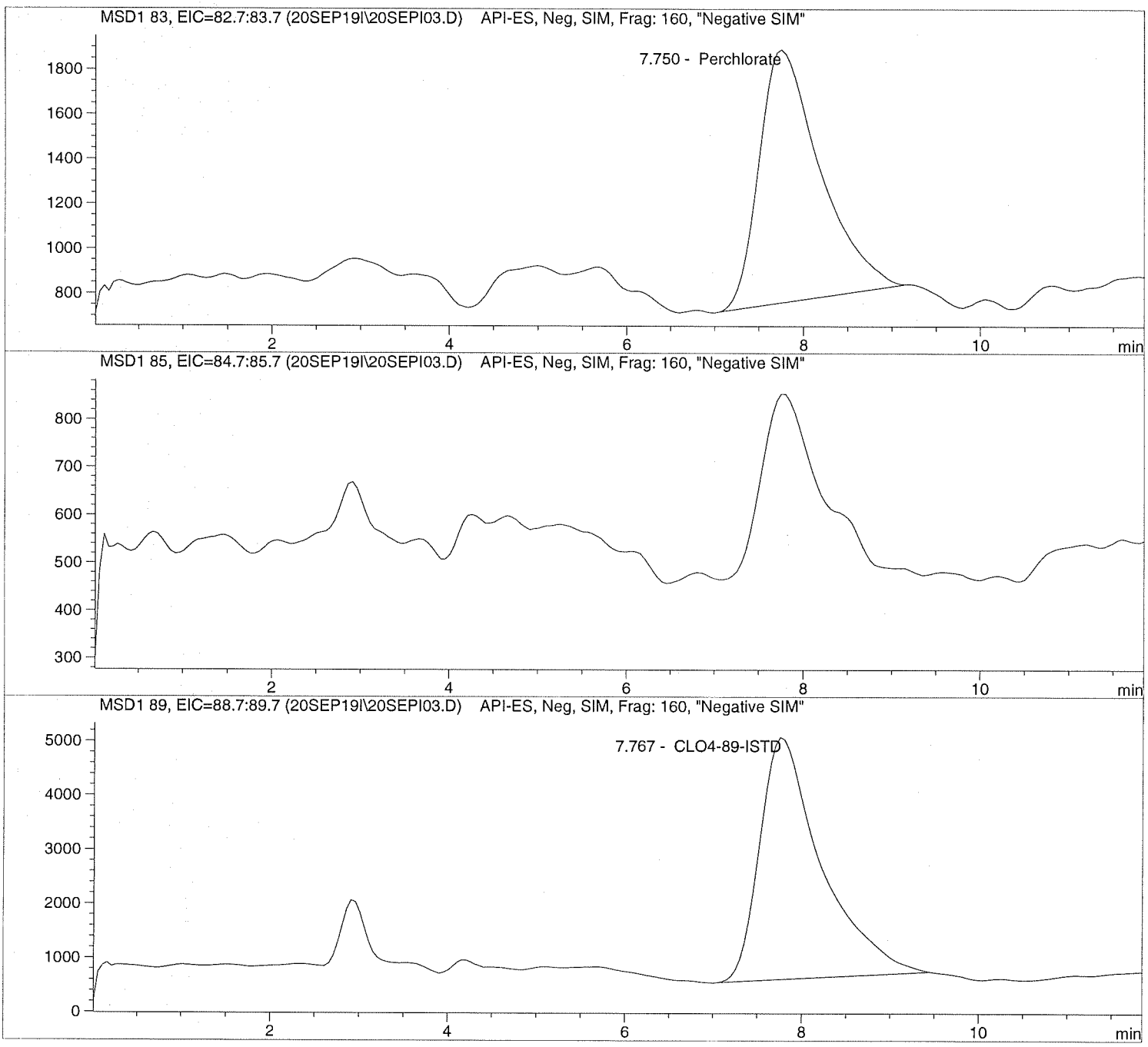
Unmodified

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

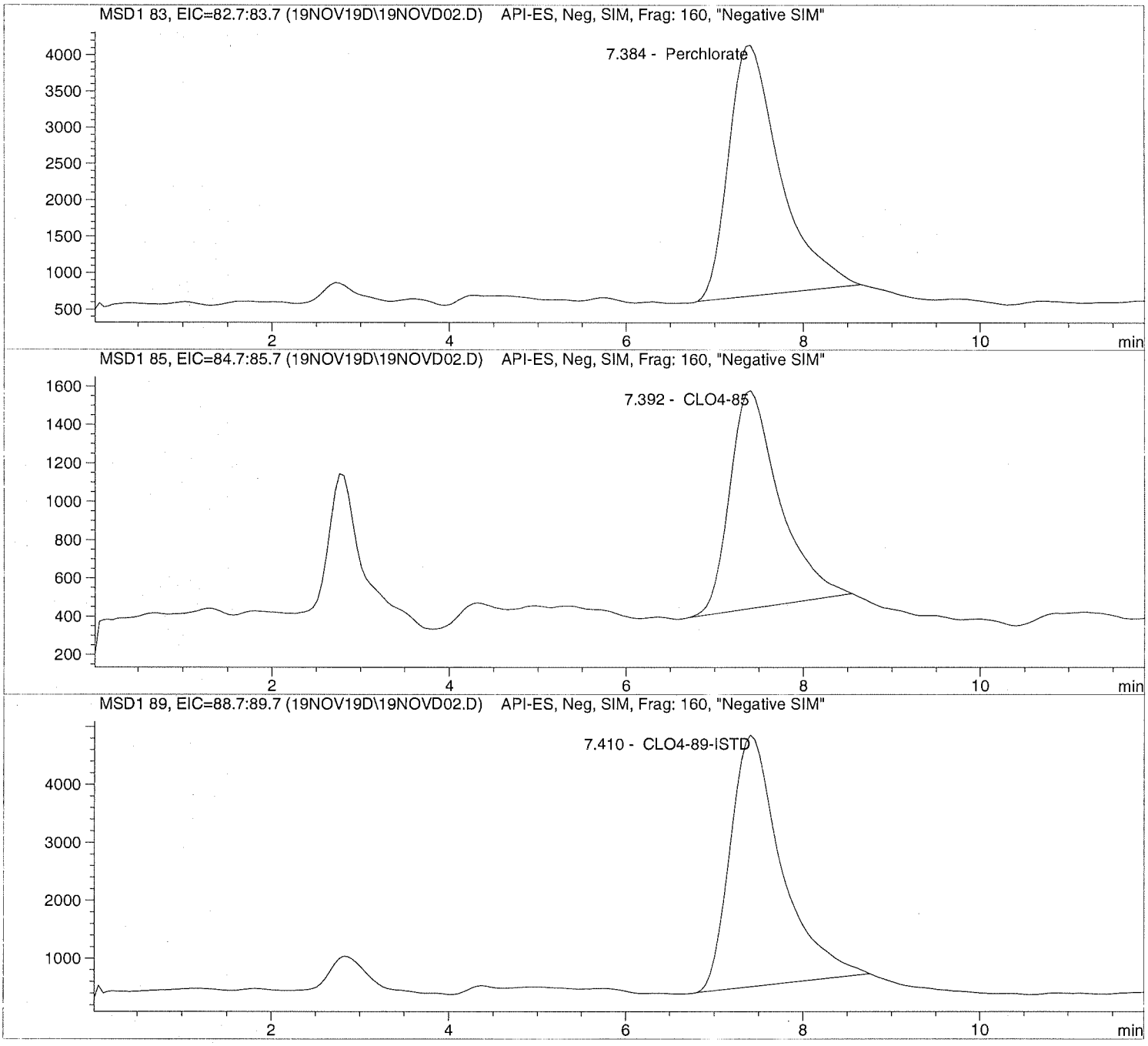
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\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
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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

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	☐

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)

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
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.

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.

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.

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.

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.

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
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.

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.

Client: Aptim Environmental & Infrastucture, Inc. **ANALYTICAL REPORT**
Project: LHAAP-50 501032 WorkOrder:HS19110644
Sample ID: 50WW09-191111-FD Lab ID:HS19110644-04
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 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.

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
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.

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.

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.

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
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.

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.

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.

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.

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
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.

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.

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.

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.

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.

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.

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.

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.

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
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.

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.

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.

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.

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.

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

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: 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

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

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*				

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*				

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				

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*				

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*				

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				

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*				

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*				

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	

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*	

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	

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				

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

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

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

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 Stanciff 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
Postal Code	75670	Country	USA	Postal Code	77099	Country	USA	Postal Code	94520
Phone Number	713.243.7264			Phone Number	281.575.2279 or 281.530.5656				
Project Manager	Praveen Srivastav							Shipping Company	

SAMPLE DETAILS

ANALYSIS REQUESTED

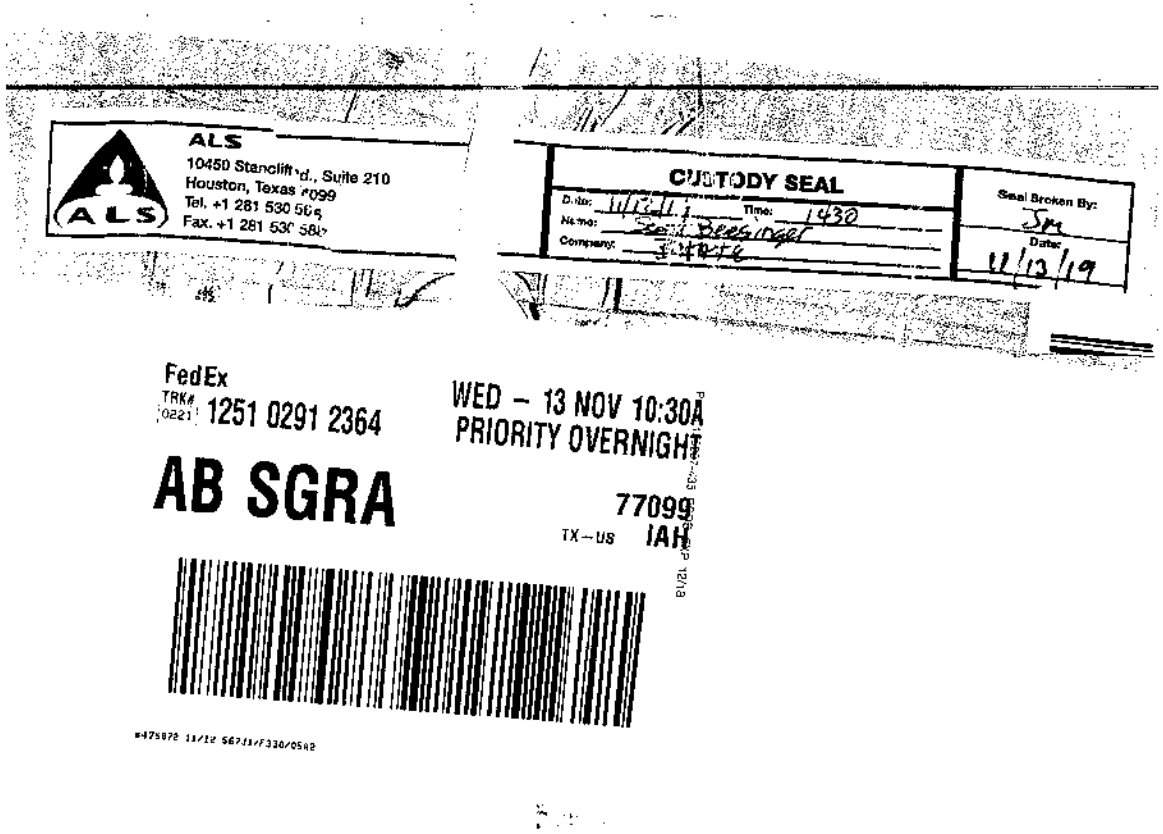
Sample ID	Location	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	# Of Cont.	Sample Container and Preservatives	3-40 ml VOA/HCL	3-40 ml VOA/HCL	3-40 ml VOA/Cool to 6 deg C	2-40ml Amber/H2SO4	1-250ml/Cool to 6 deg C	1-125ml/Cool to 6 deg C
									ANALYSIS	Vocs by 8260B	MEE by RSK175	CO2 by RSK175	TOC by Sm5310C	Anions (chloride/sulfate/nitrate) by 9056	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	1130	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 43736 1421	Sam Bueno / BHATE	11/12/19 1450	[signature]	11/13/19 0930
Temp 1.0 3F-0-5				

HS19110644

Aptim Environmental & Infrastructure, Inc.

LHAAP-50 501032



ALS
10450 Stancliffe Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5857

CUSTODY SEAL
Date: 11/12/19 Time: 1430
Name: Scott Beesinger
Company: [illegible]

Seal Broken By: JM
Date: 11/13/19

FedEx
TRK# 0221 1251 0291 2364

WED – 13 NOV 10:30A
PRIORITY OVERNIGHT

AB SGRA

77099
TX–US IAH

#475872 11/12 567J1/F330/0542

ALS Environmental
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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

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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

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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
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T: +1 281 530 5656
F: +1 281 530 5887
www.alsglobal.com

KH910755

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

13. *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

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.

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.

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

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

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

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	

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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

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.

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.

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

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

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

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General Chemistry

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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: BCD

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

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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.

Printed 11/21/19 14:20

Results Summary

11/21/19

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
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)
Comment:

Engine Version: 1.1.5.1
Firmware Version: 1.2.0696
Connection: RS232 COM1

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 - Criteria met.
Success Action: Do Nothing
Method: Extended Reaction 021711 (v4)
Calibration: Extended Reaction 021711 (v27)
STD Conc - Pos C: 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: 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
◆	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: 1:10
Blank Contribution: (TC) 10.3749 (IC) (v1321)
Method: Extended Reaction 021711 (v4)
Calibration: 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: 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
◆	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 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
◈	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 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
◈	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 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
◈	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 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)	23.7504 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

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:	BLP	Date Analyzed:	11/19/19
Reviewed By:	[signature]	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
Project ID: HS19110644

Service Request: P1906981

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

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)

RIGHT SOLUTIONS | RIGHT PARTNER

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** ALS Project ID: P1906981
Client Project ID: **HS19110644** ALS Sample ID: P1906981-001

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	**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** ALS Project ID: P1906981
Client Project ID: **HS19110644** ALS Sample ID: P1906981-002

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	**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** ALS Project ID: P1906981
Client Project ID: **HS19110644** ALS Sample ID: P1906981-006

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	**1.6**	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** ALS Project ID: P1906981
Client Project ID: **HS19110644** ALS Sample ID: P191118-MB

Test Code: RSK 175 Date Collected: NA
Instrument ID: HP5890A/GC10/FID Date Received: NA
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	1.0	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.

Quantitation Report (QT Reviewed)

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 :

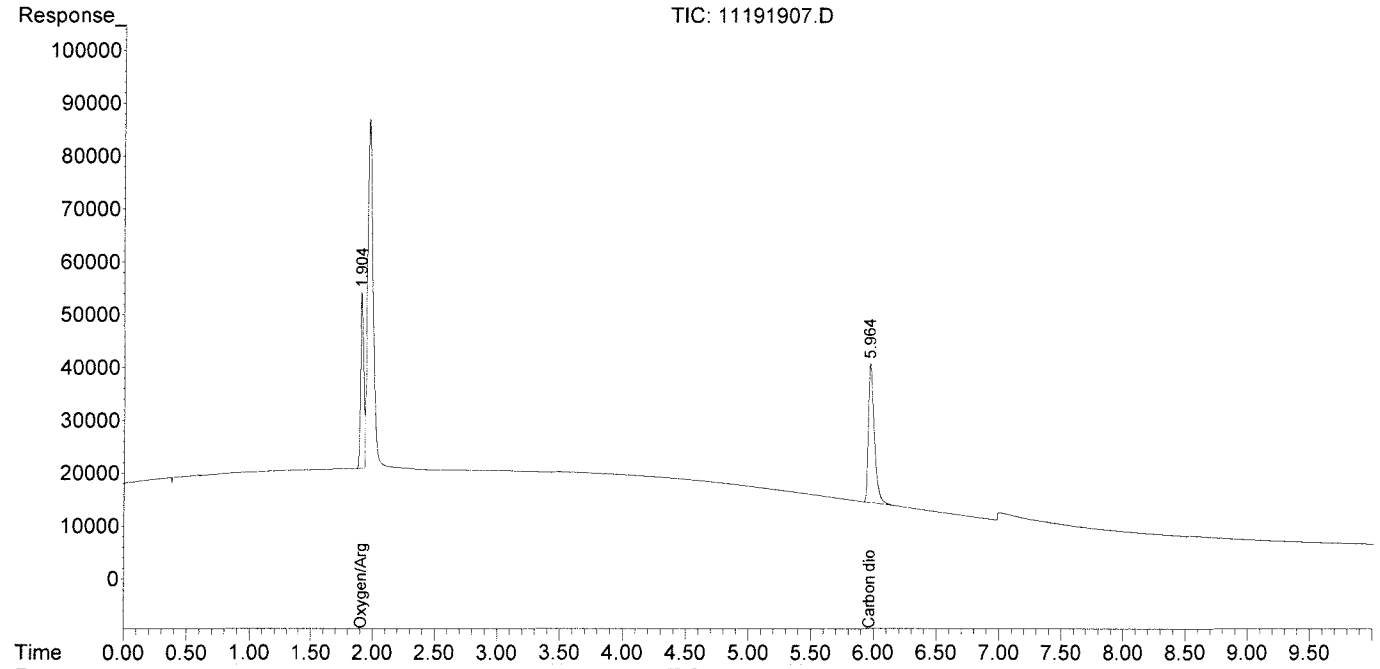
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.905f	565206	0.119	ppm
2)	Carbon monoxide	1.905	565206	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.965	853972	3638.117	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	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

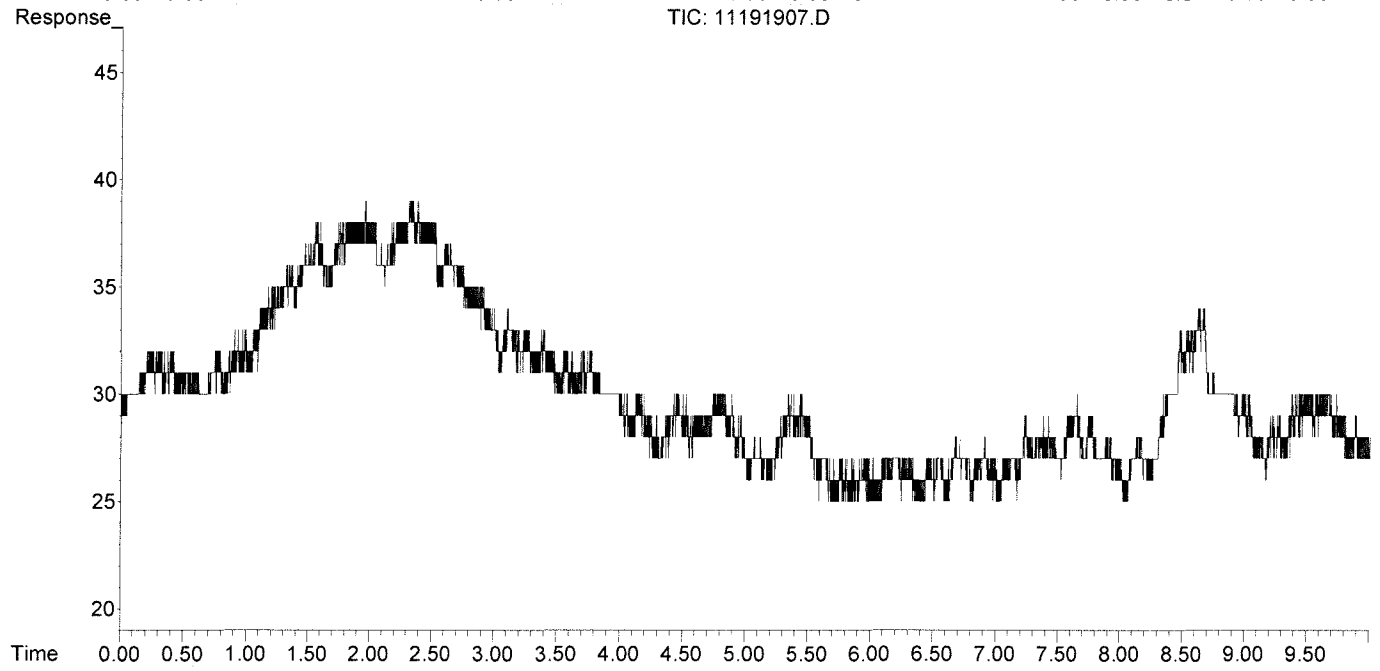
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





Quantitation Report (QT Reviewed)

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 :

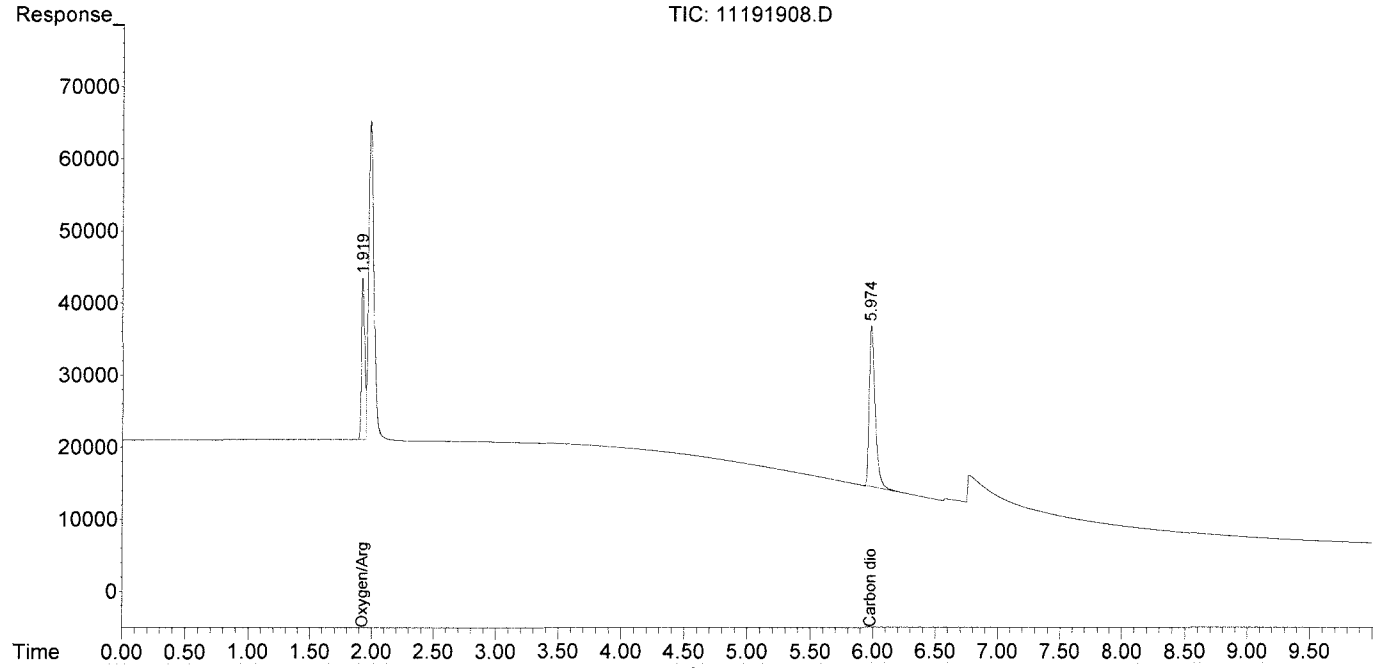
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.920f	399837	0.084	ppm
2)	Carbon monoxide	1.920f	399837	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.975	741977	3160.990	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	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

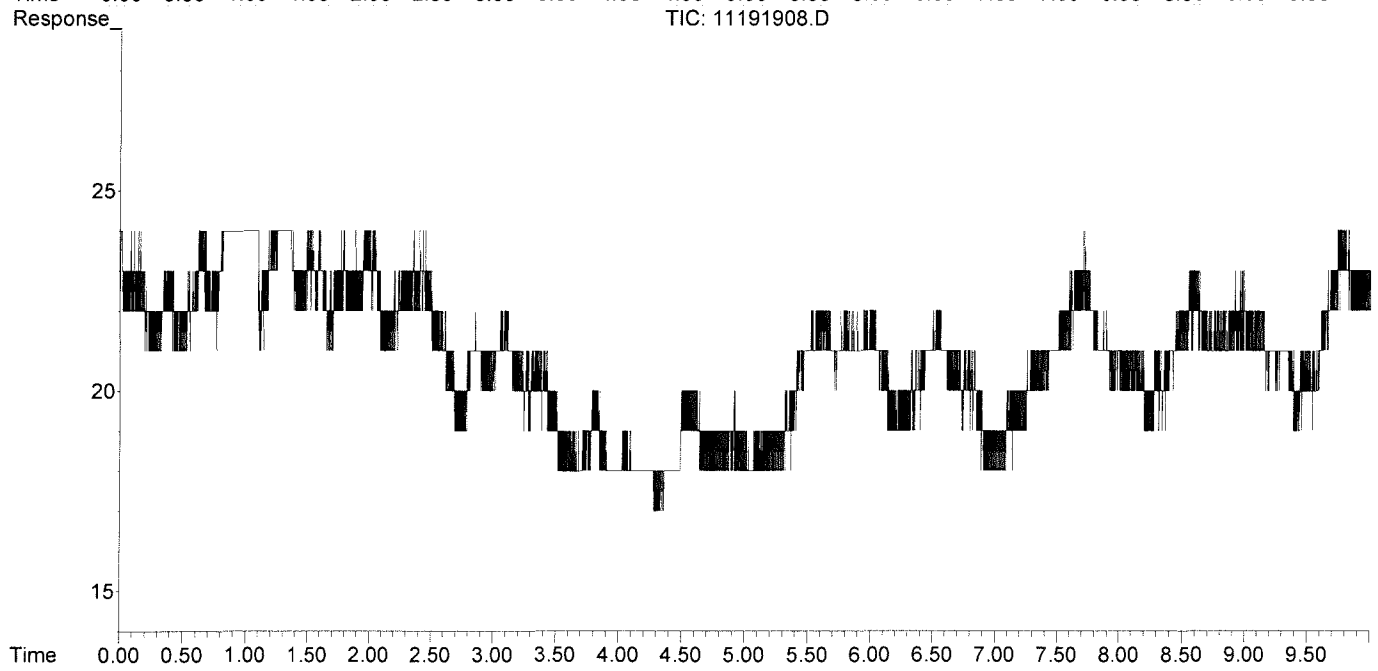
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





Quantitation Report (QT Reviewed)

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 :

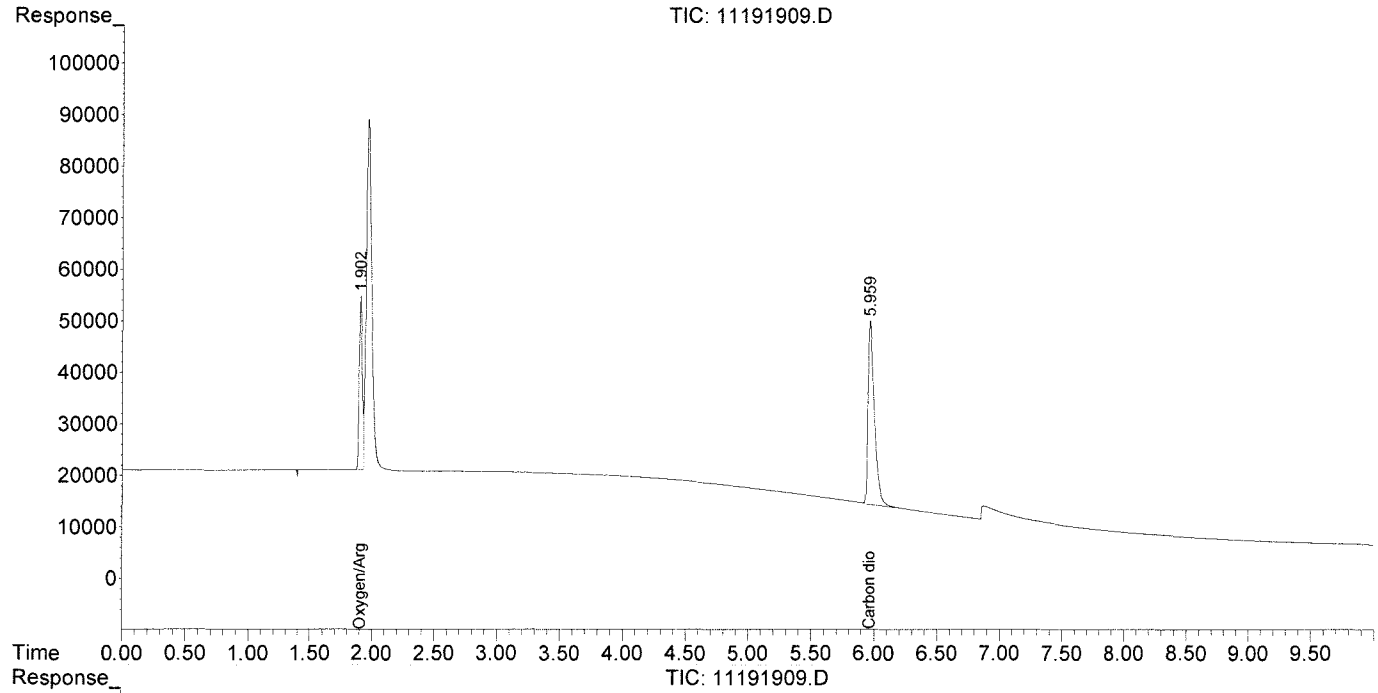
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.903	575266	0.121	ppm	
2)	Carbon monoxide	1.903	575266	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	5.959	1248003	5316.778	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	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	

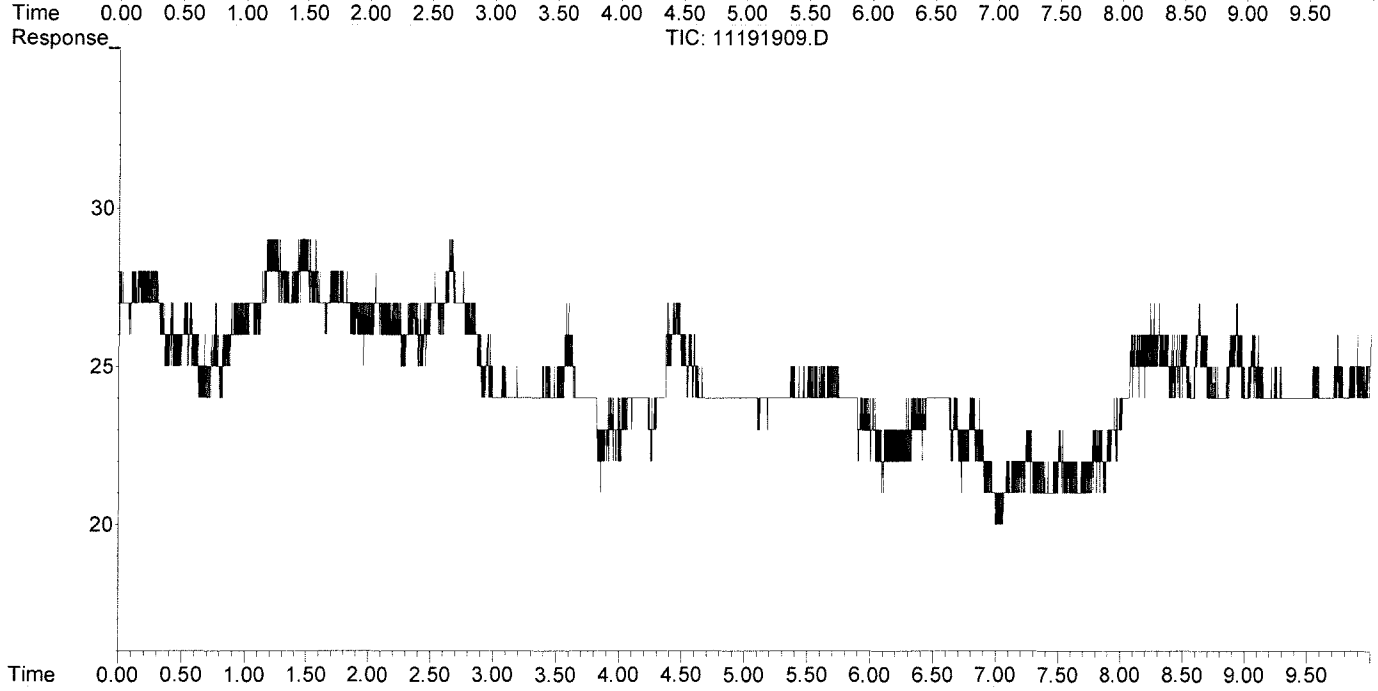
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :



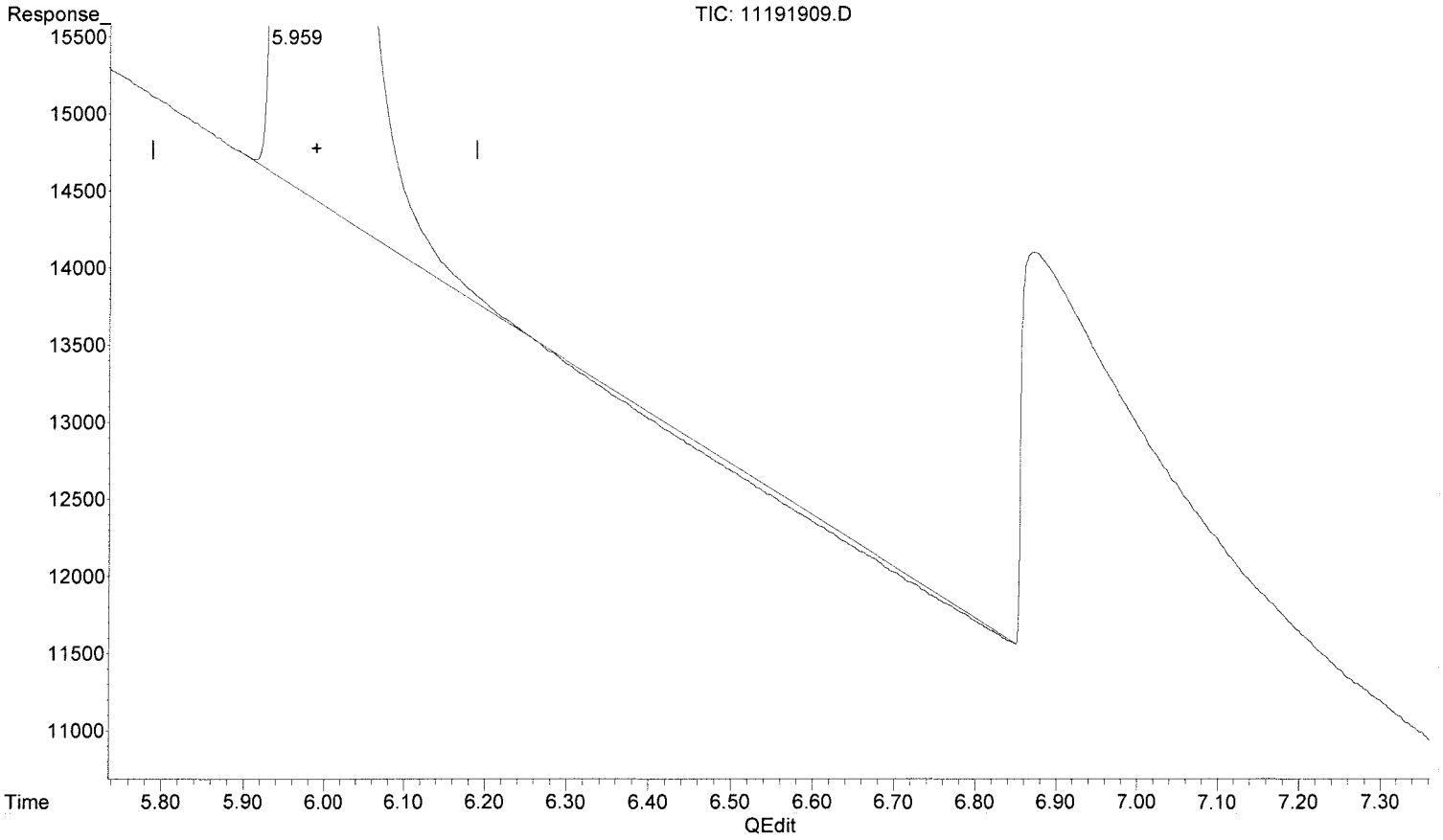


Quantitation Report (Qedit)

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

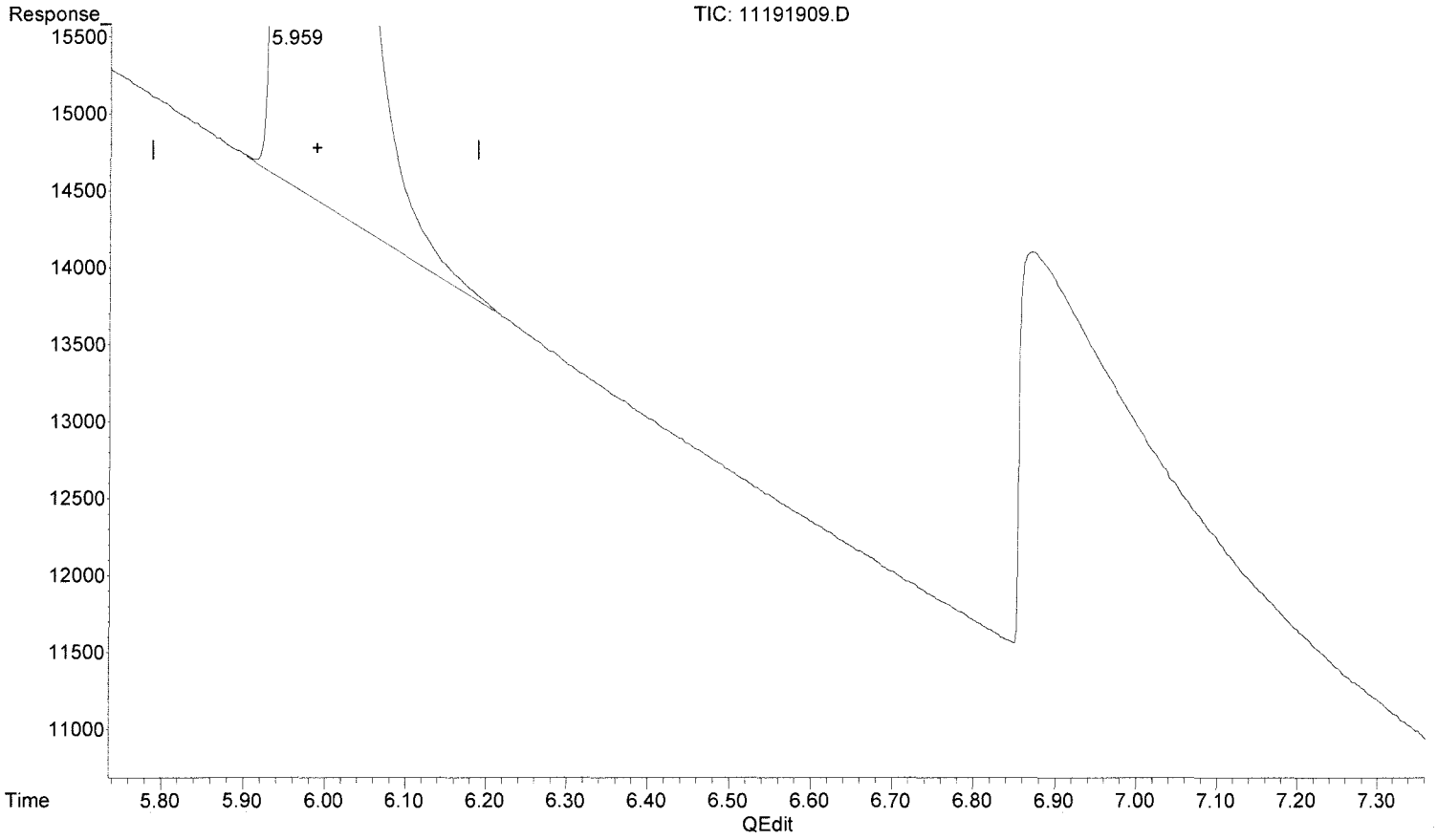
Quantitation Report (Qedit)

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

Quantitation Report (QT Reviewed)

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 :

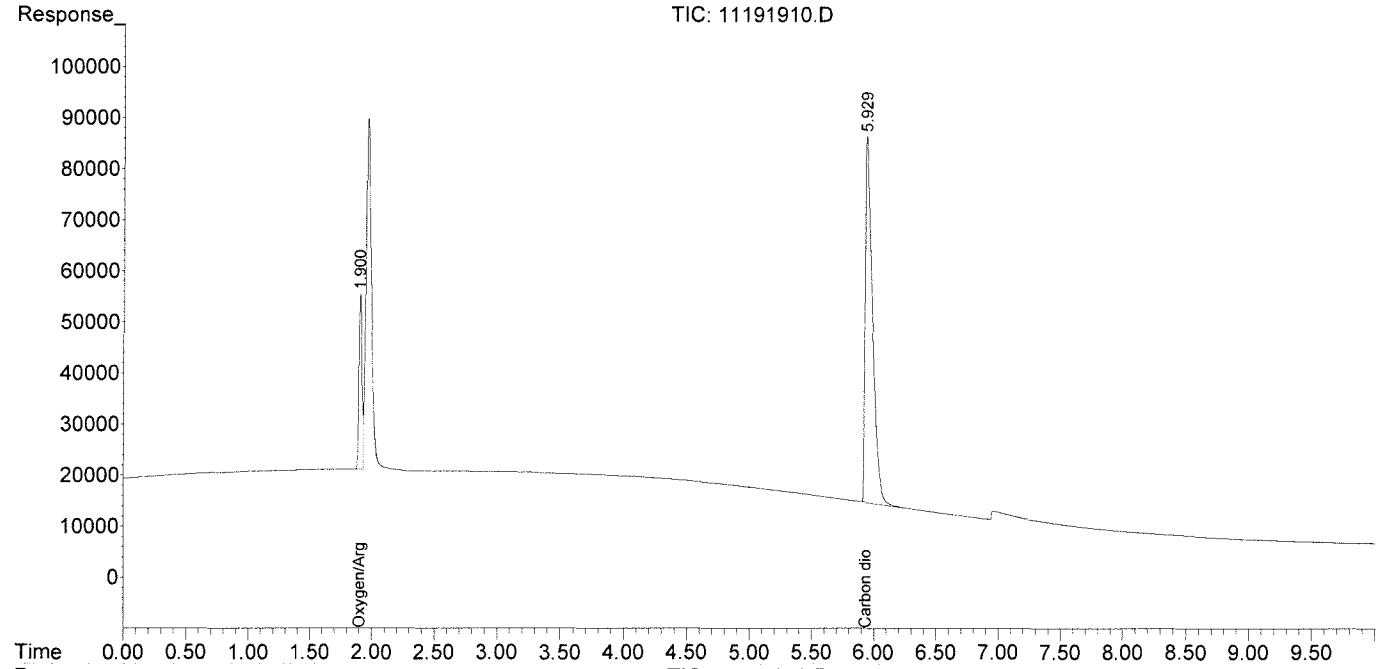
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.901	578218	0.121	ppm
2)	Carbon monoxide	1.901	578218	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.930	2942979	12537.765	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	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

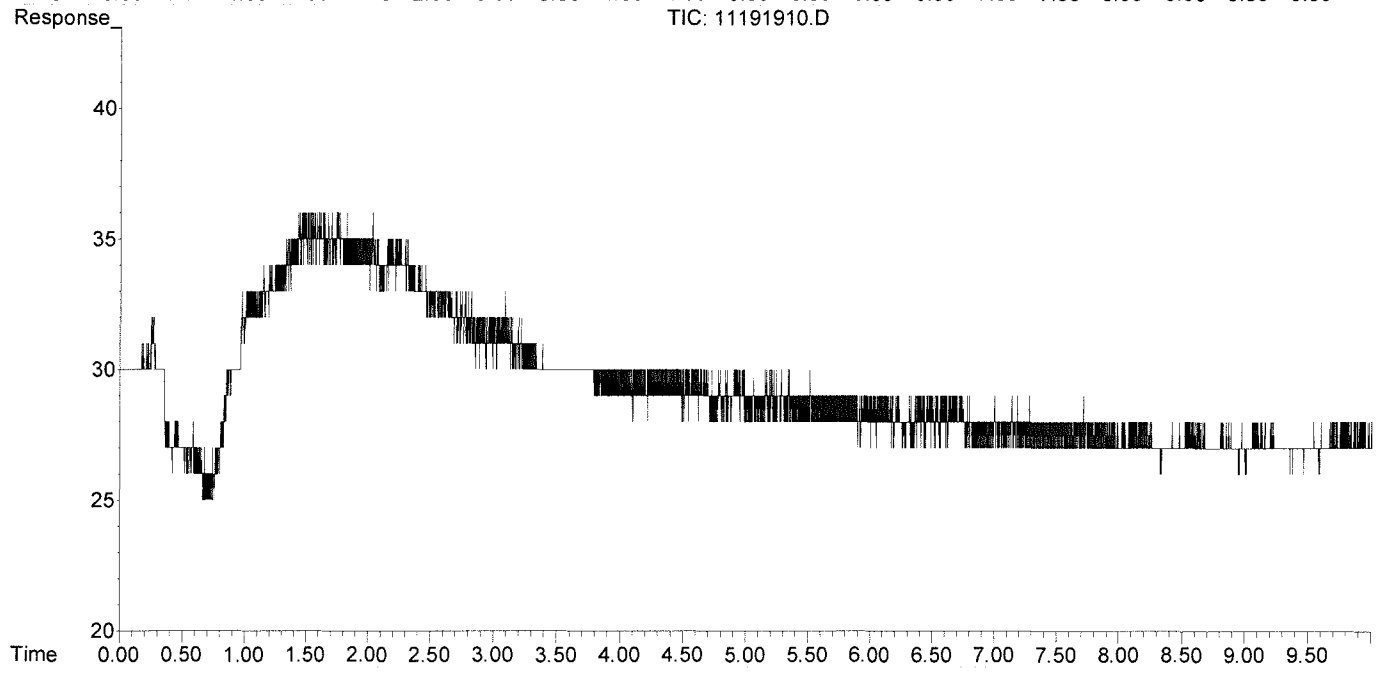
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





Quantitation Report (QT Reviewed)

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 :

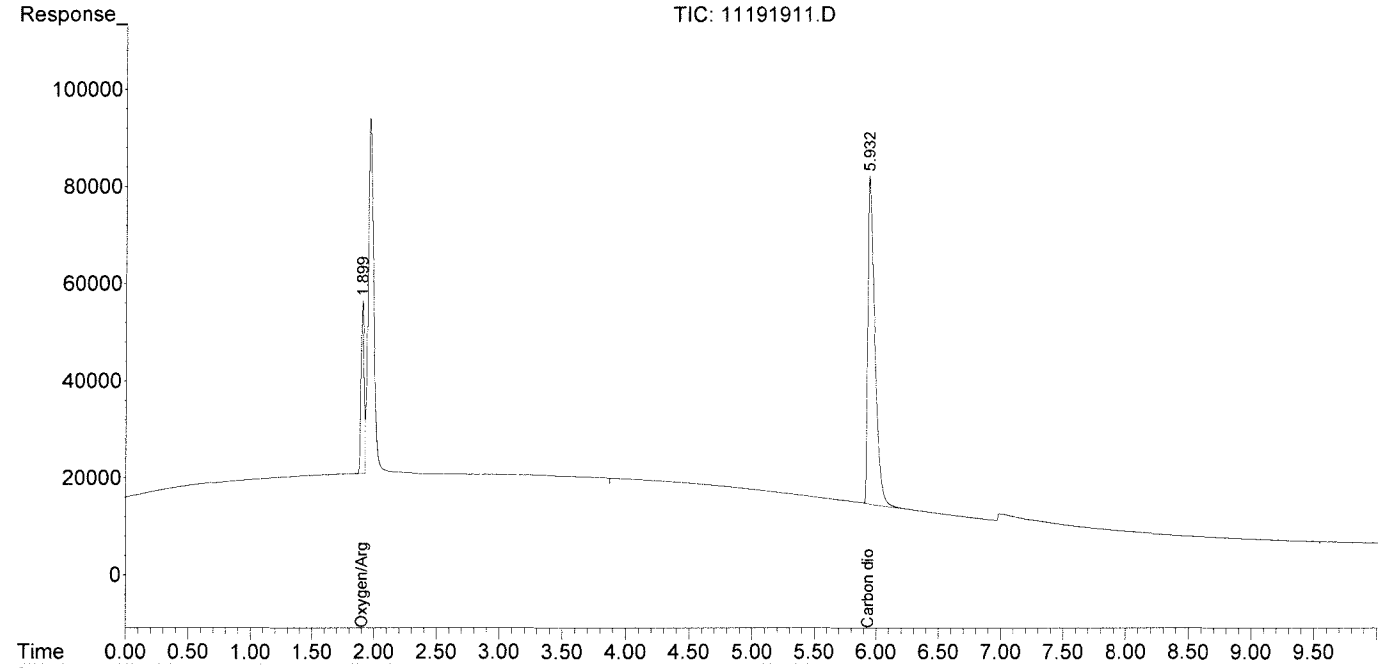
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.900	597951	0.126	ppm	
2)	Carbon monoxide	1.900	597951	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	5.932	2669272	11371.711	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	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	

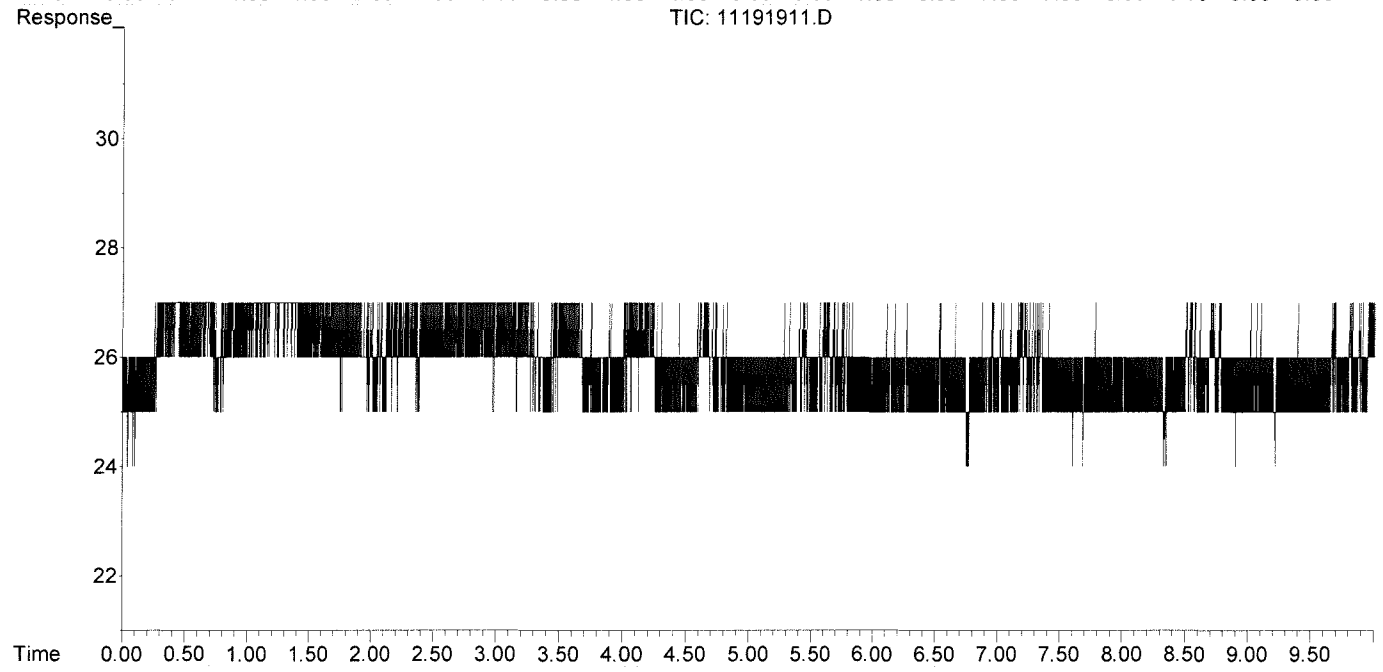
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :



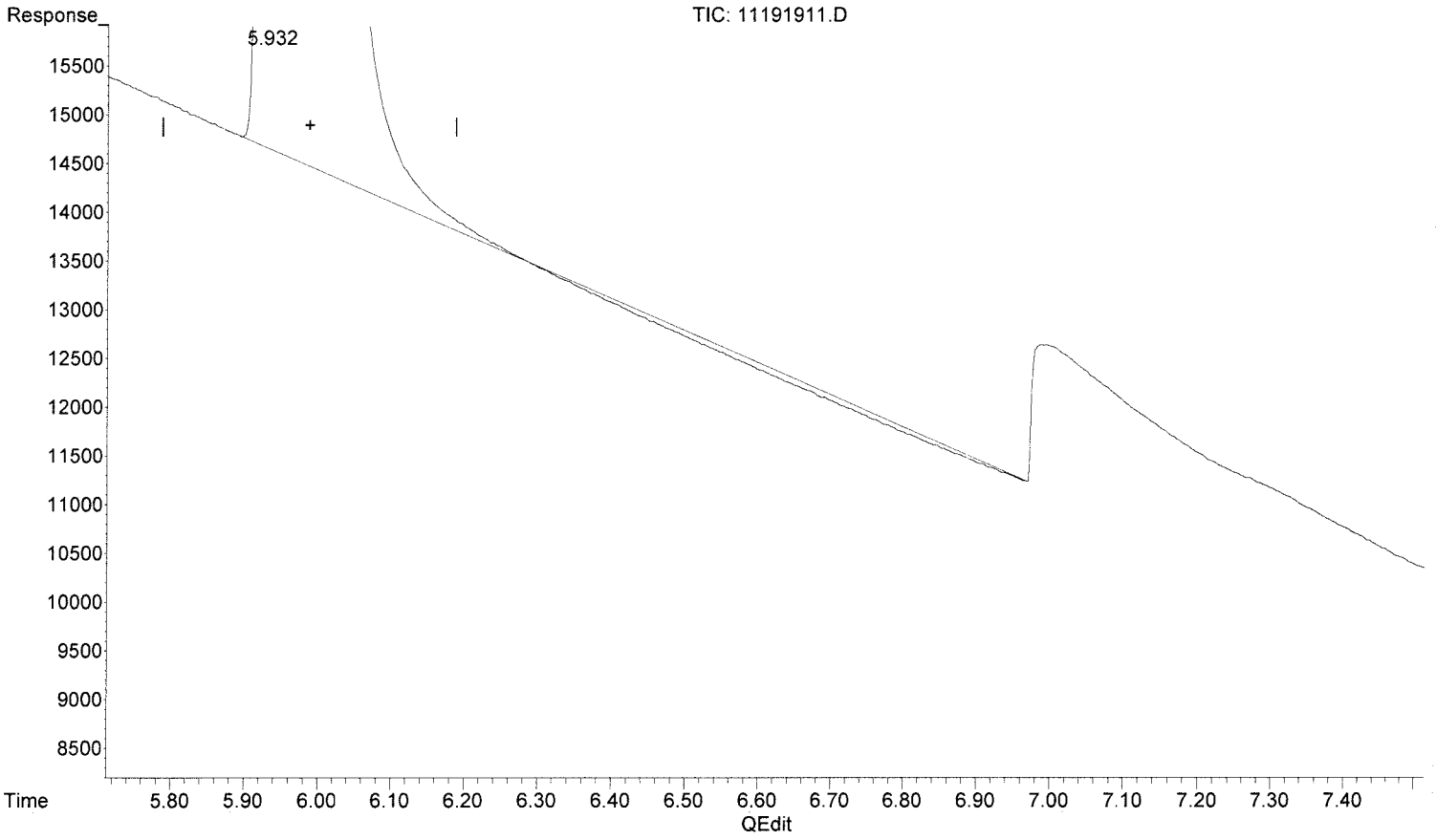


Quantitation Report (Qedit)

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

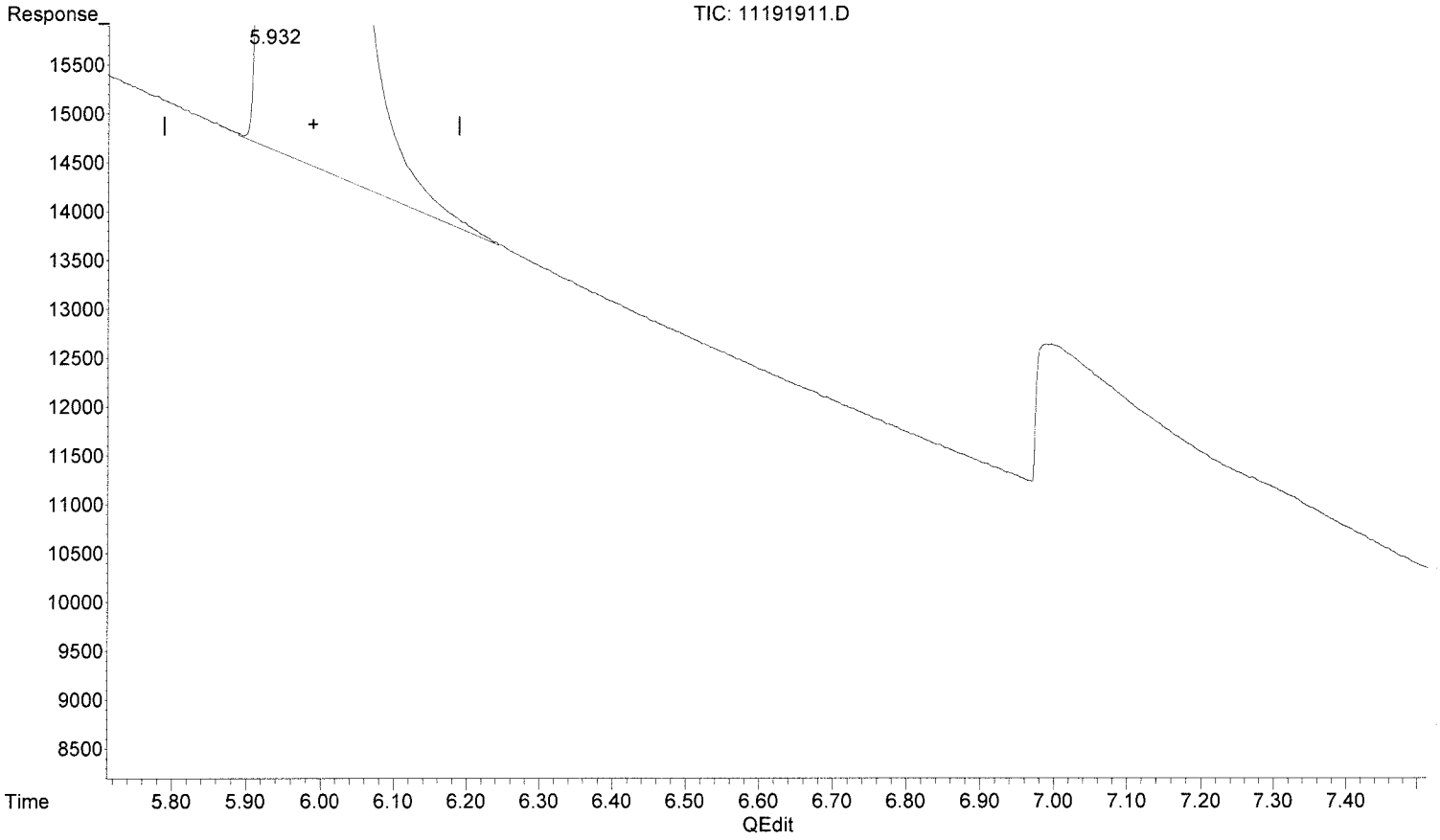
Quantitation Report (Qedit)

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

Quantitation Report (QT Reviewed)

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 :

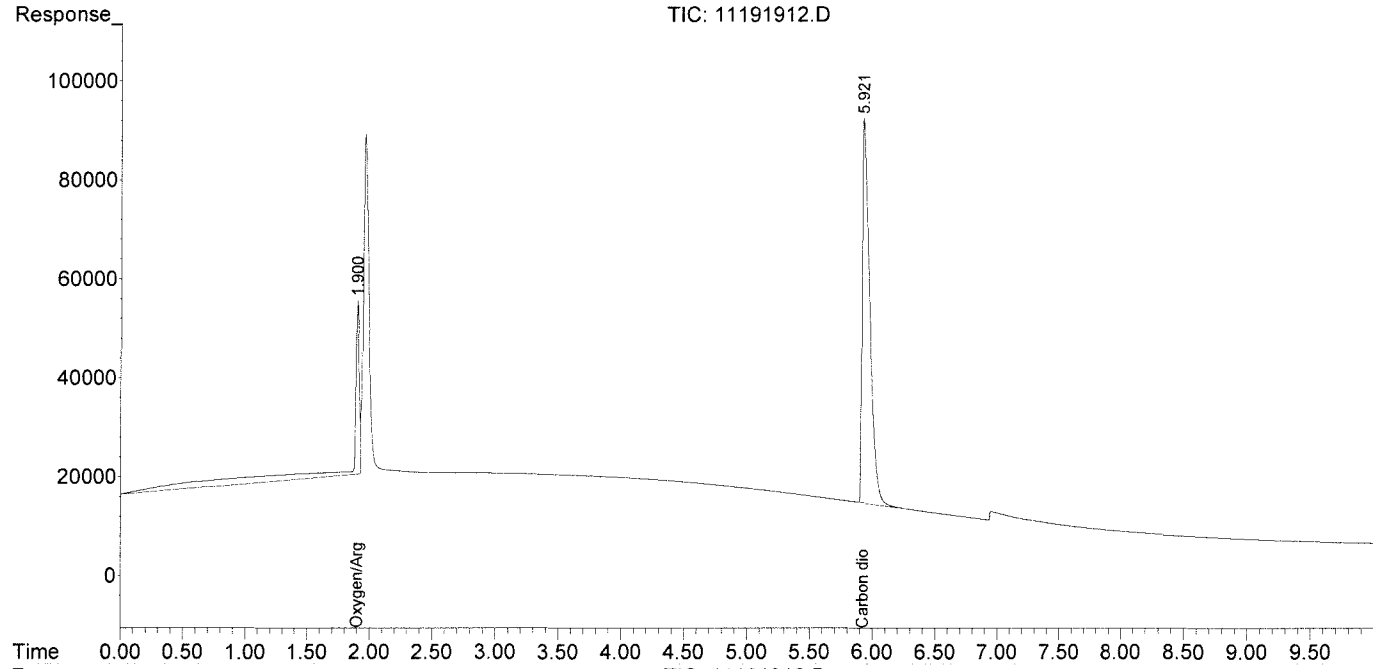
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.901	1701904	0.358	ppm	
2)	Carbon monoxide	1.901	1701904	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	5.921	3225515	13741.433	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	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	

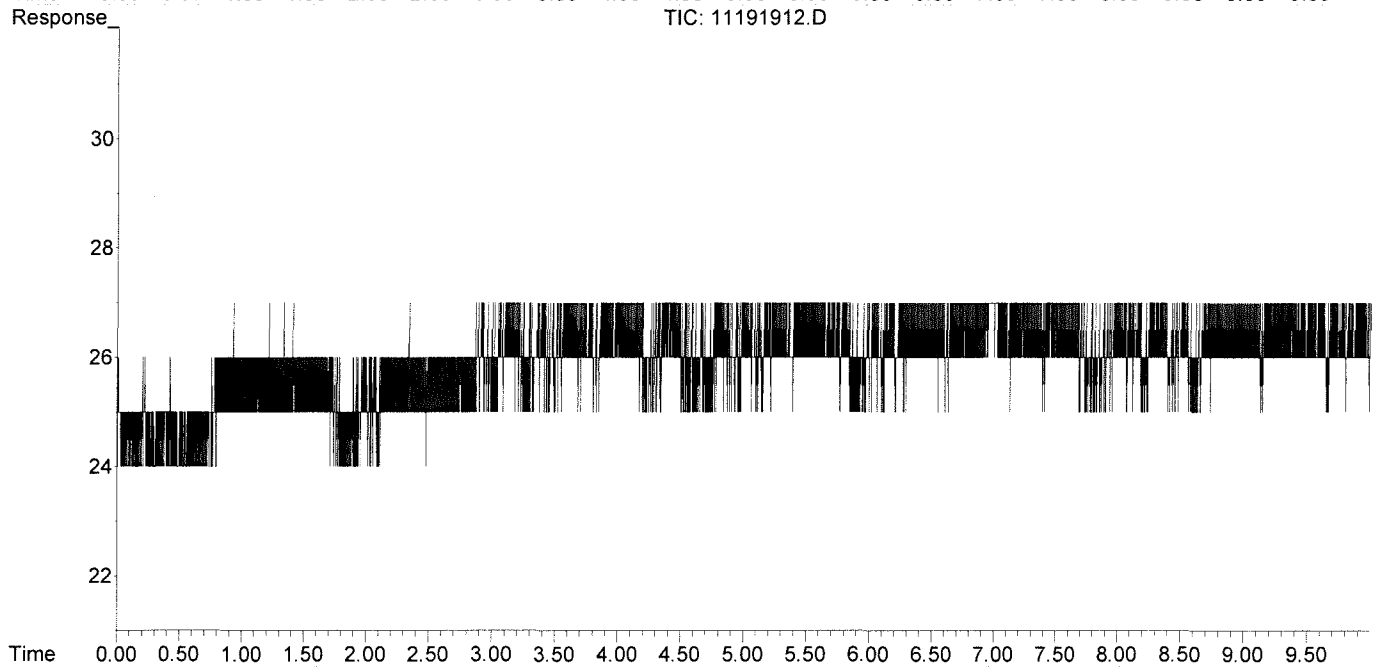
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

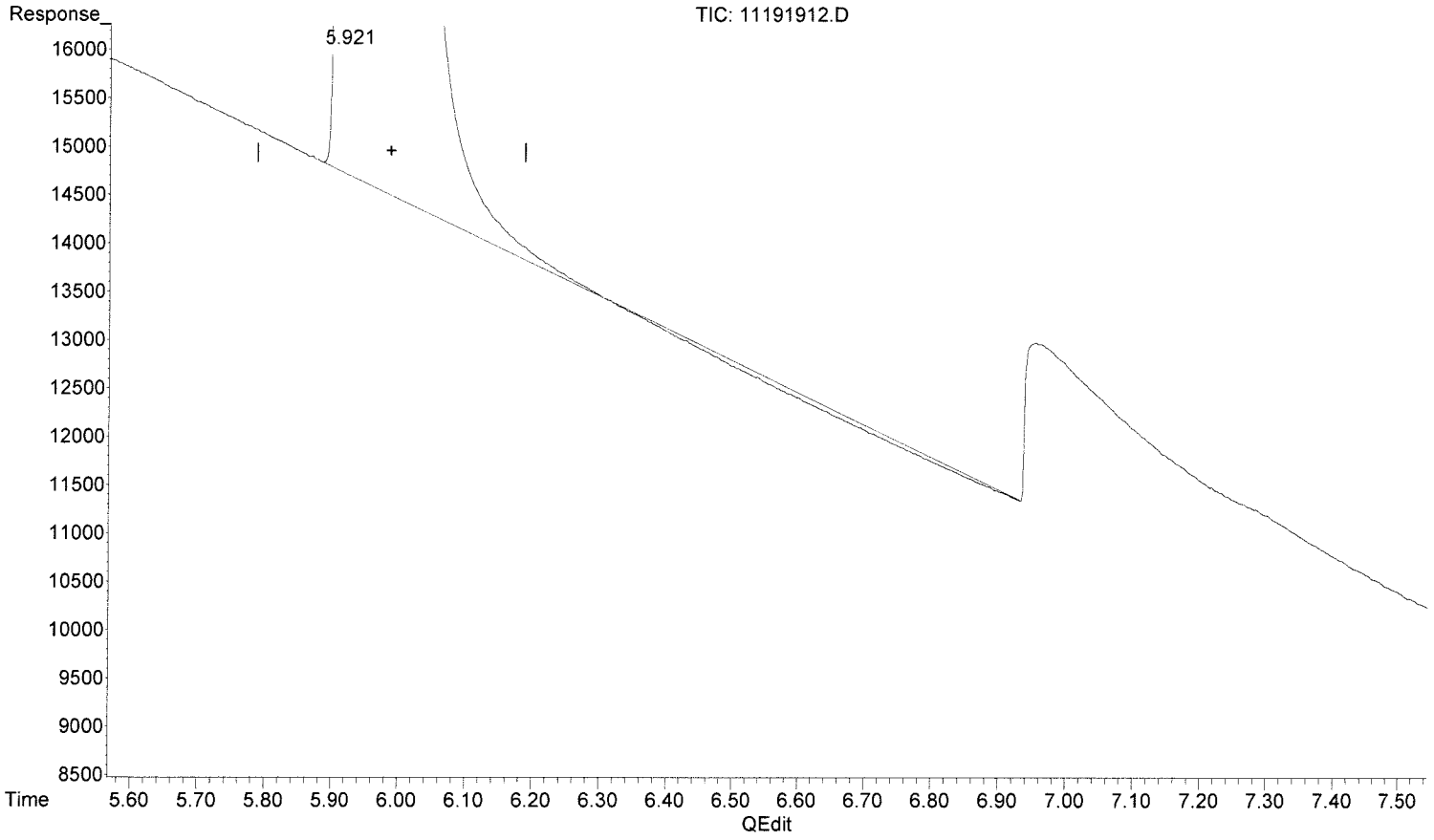




Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191912.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 14:55:10
Operator : WH/LD
Sample : P1906981-006 0.1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

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

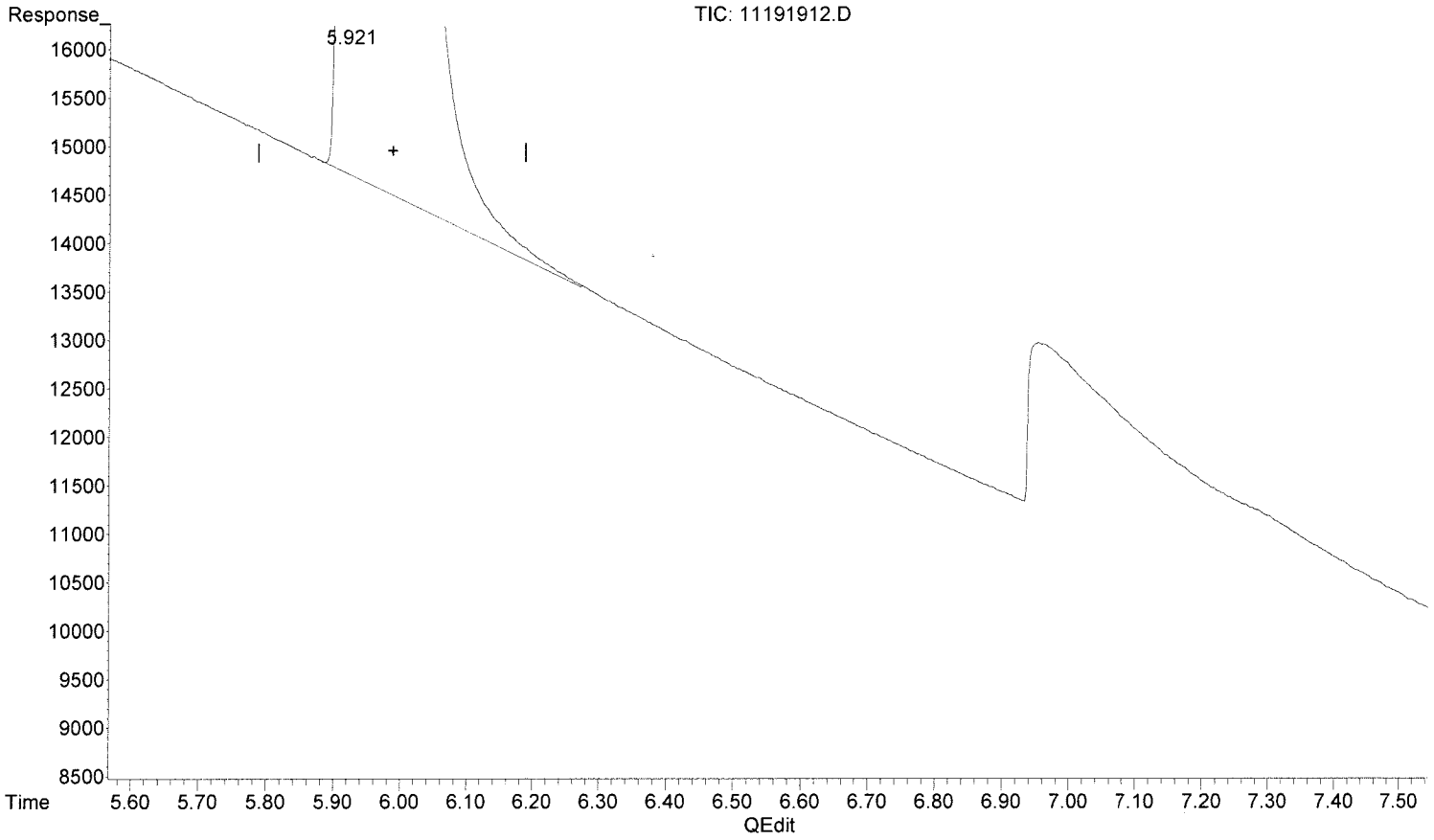
Quantitation Report (Qedit)

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

Quantitation Report (QT Reviewed)

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 :

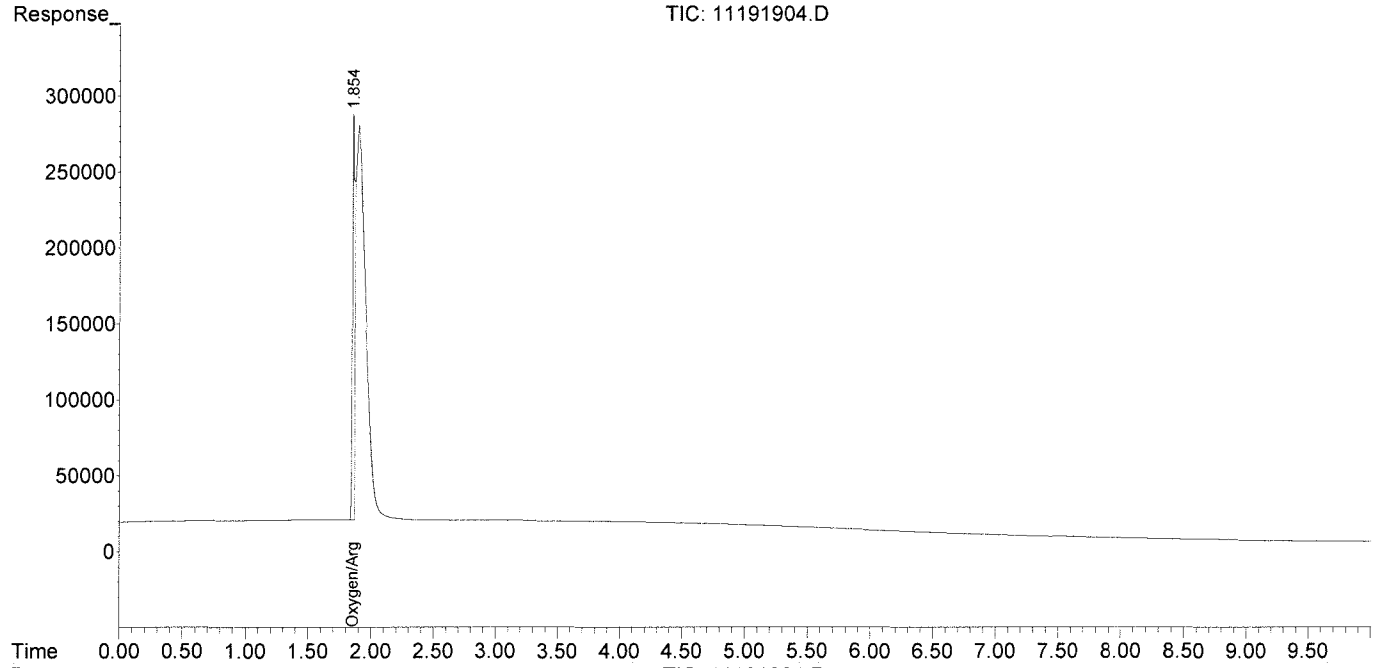
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.855	3182198	0.669	ppm
2)	Carbon monoxide	1.855	3182198	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	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

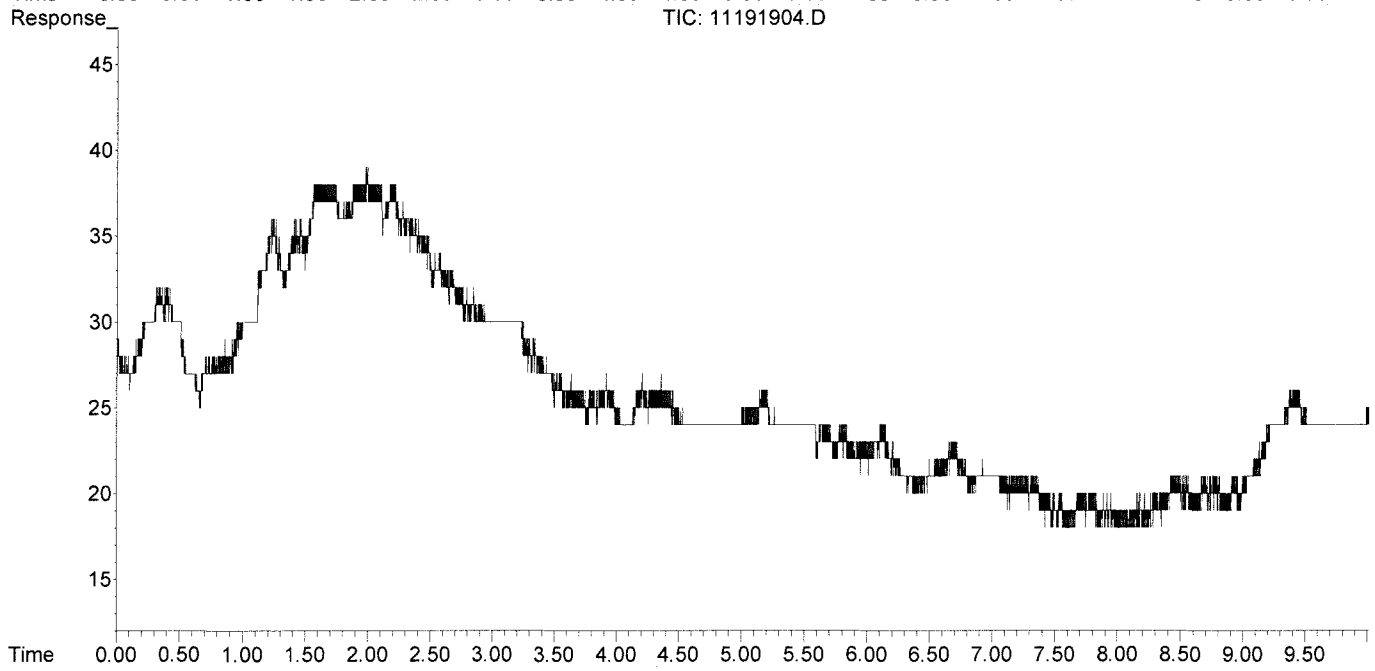
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





Quantitation Report (QT Reviewed)

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 :

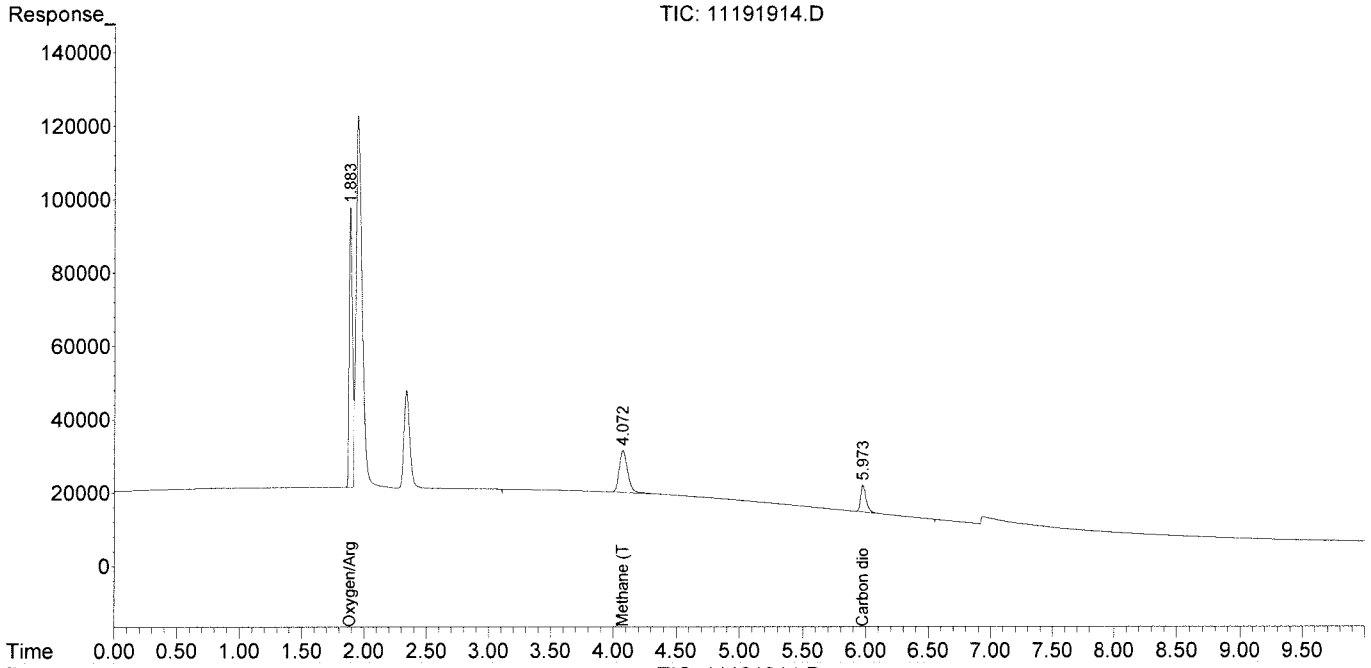
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.883	1353672	0.284	ppm	
2)	Carbon monoxide	1.883	1353672	N.D.	ppm	
3)	Methane (TCD)	4.073f	530835	56129.320	ppm	
4)	Carbon dioxide	5.973	227313	968.407	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	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	

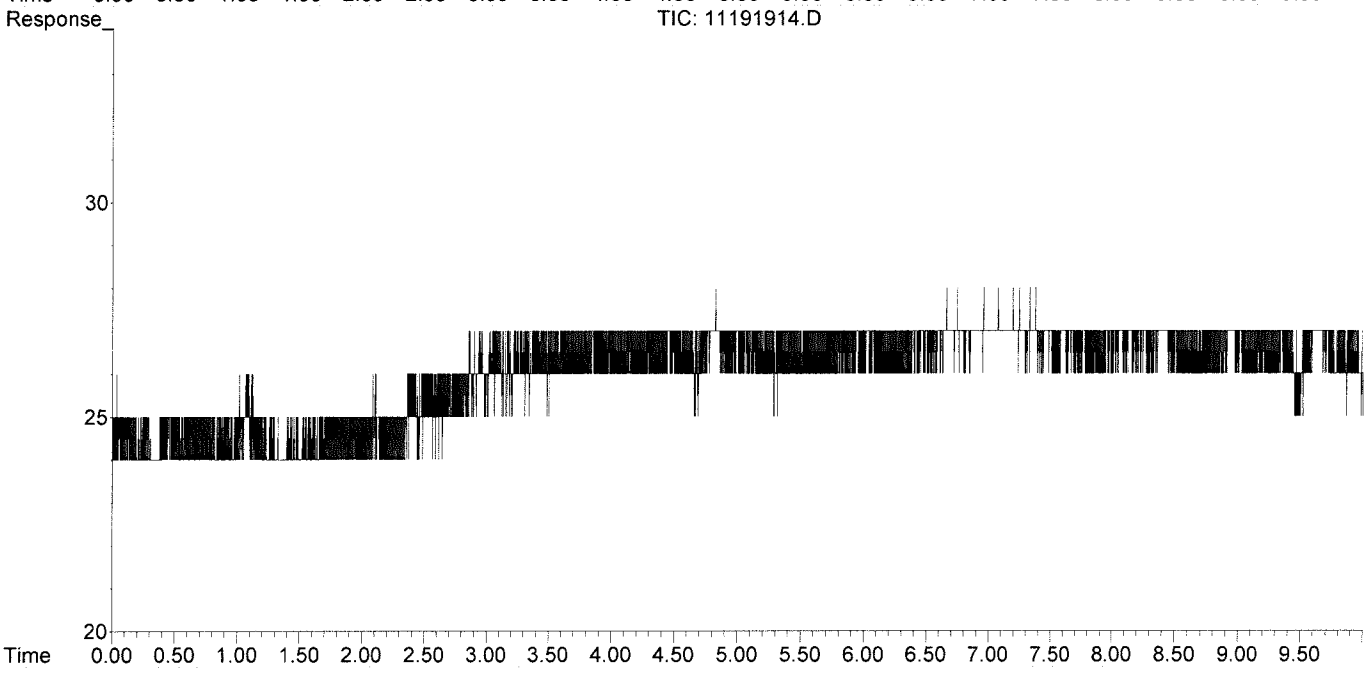
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :



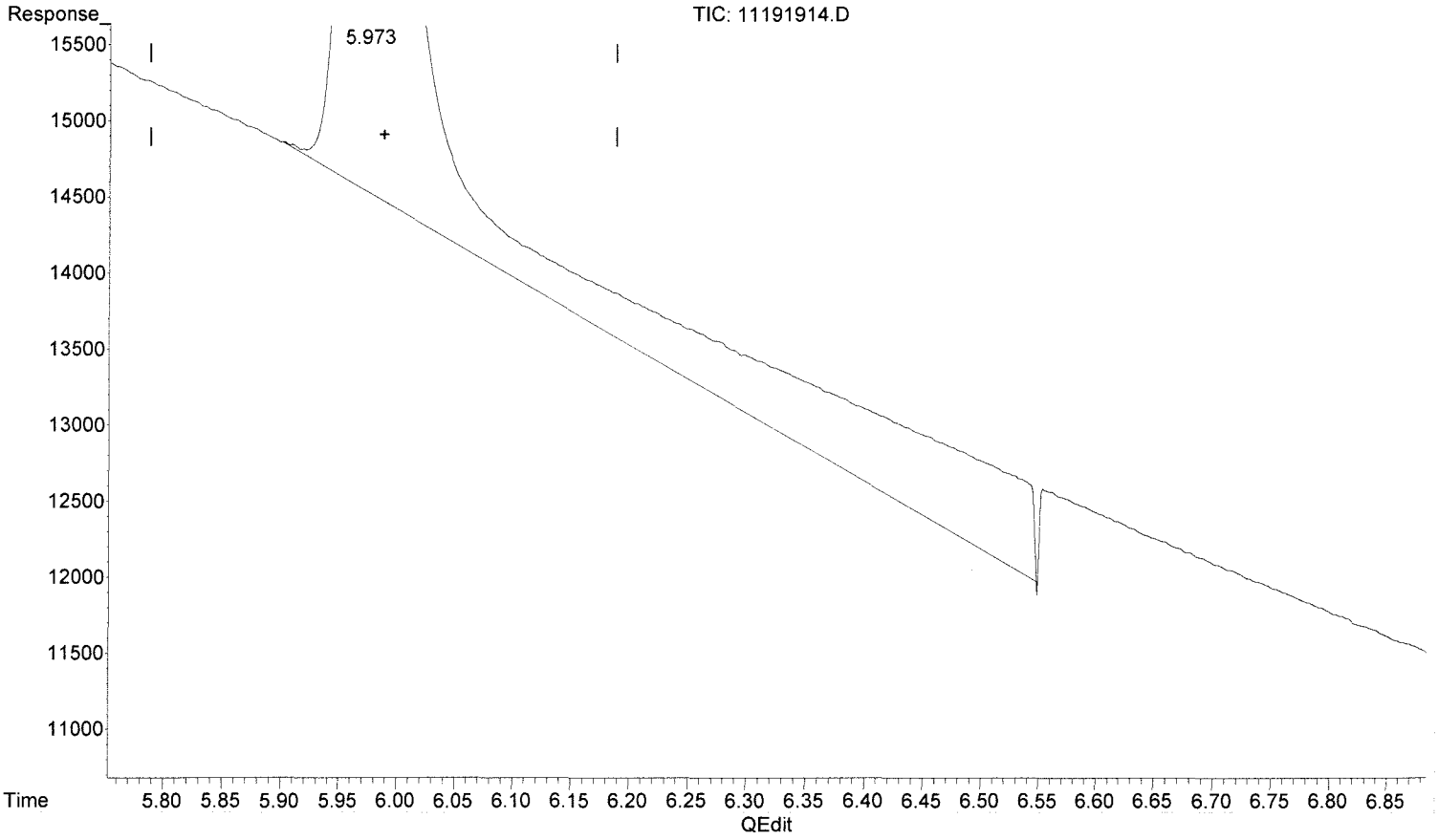


Quantitation Report (Qedit)

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

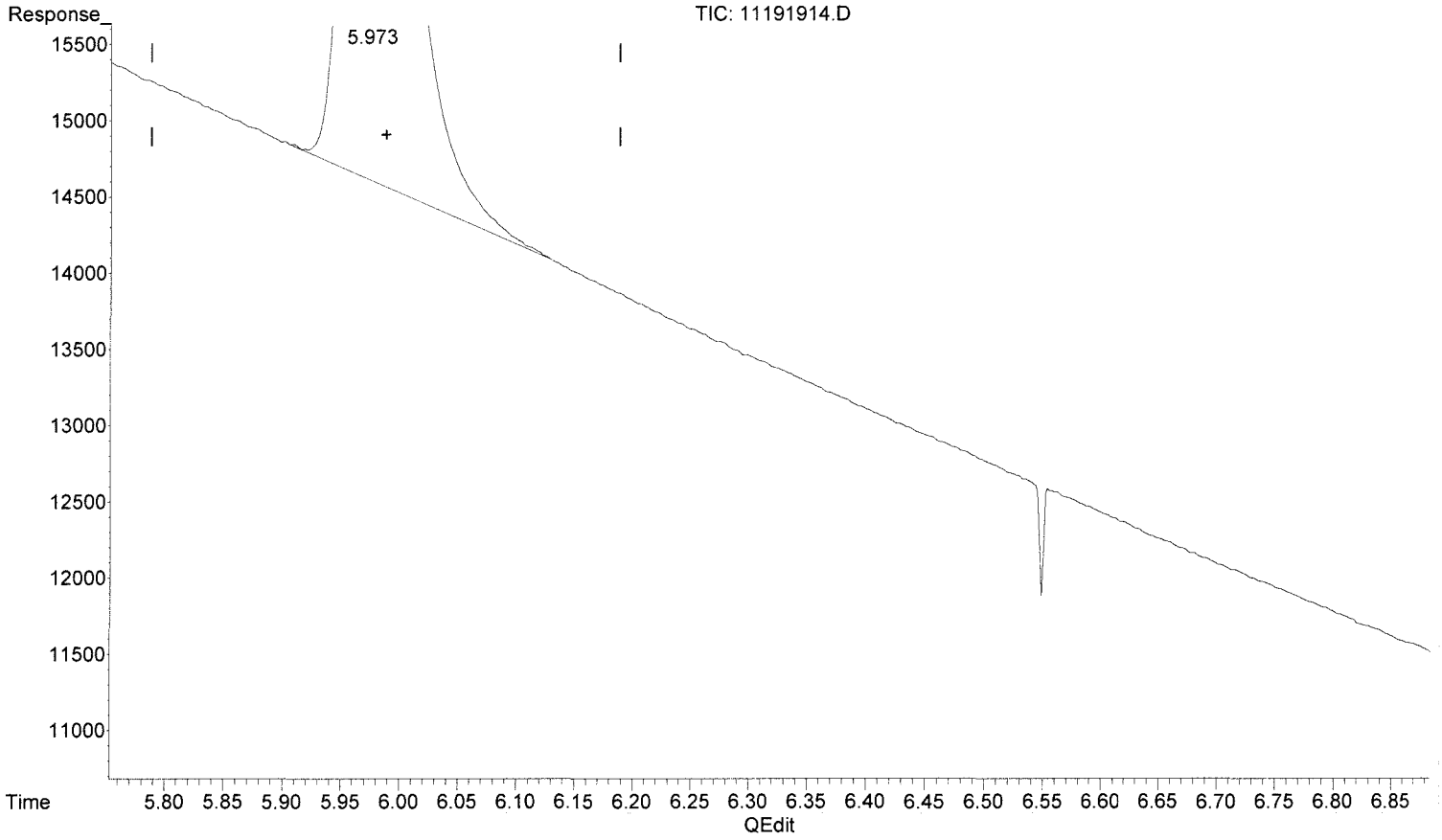
Quantitation Report (Qedit)

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 #1 Info :
Signal #2 Phase:
Signal #2 Info :



(4) Carbon dioxide

5.973min 968.407 ppm m

response 227313

11/20/19

(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

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 :

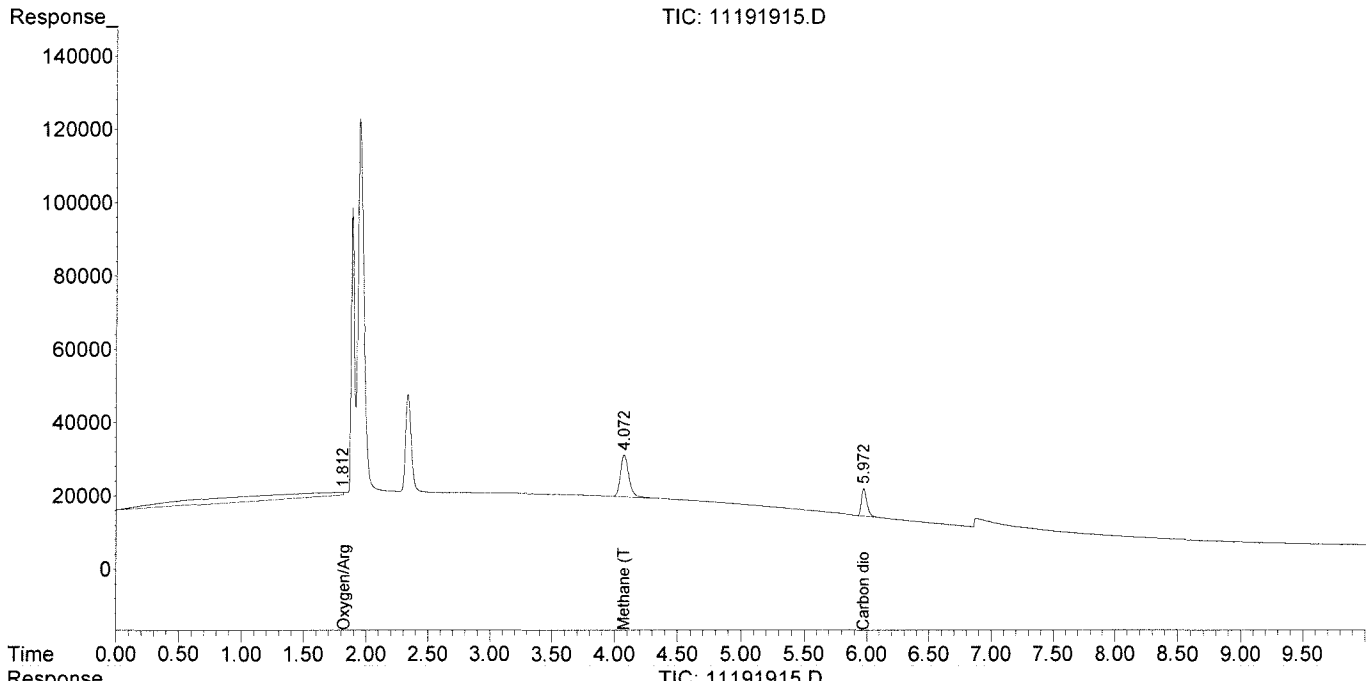
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.812	1190812	0.250	ppm	
2)	Carbon monoxide	1.812	1190812	N.D.	ppm	
3)	Methane (TCD)	4.073f	523663	55370.957	ppm	
4)	Carbon dioxide	5.972	226846	966.415	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	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	

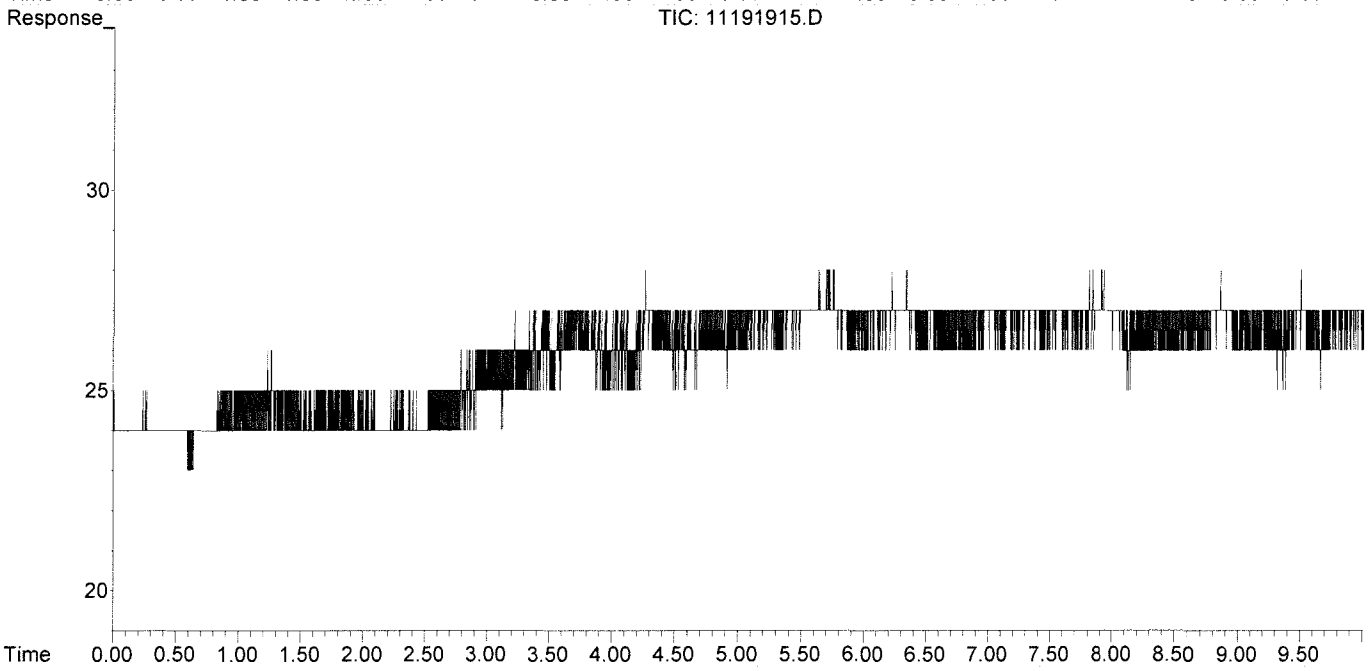
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

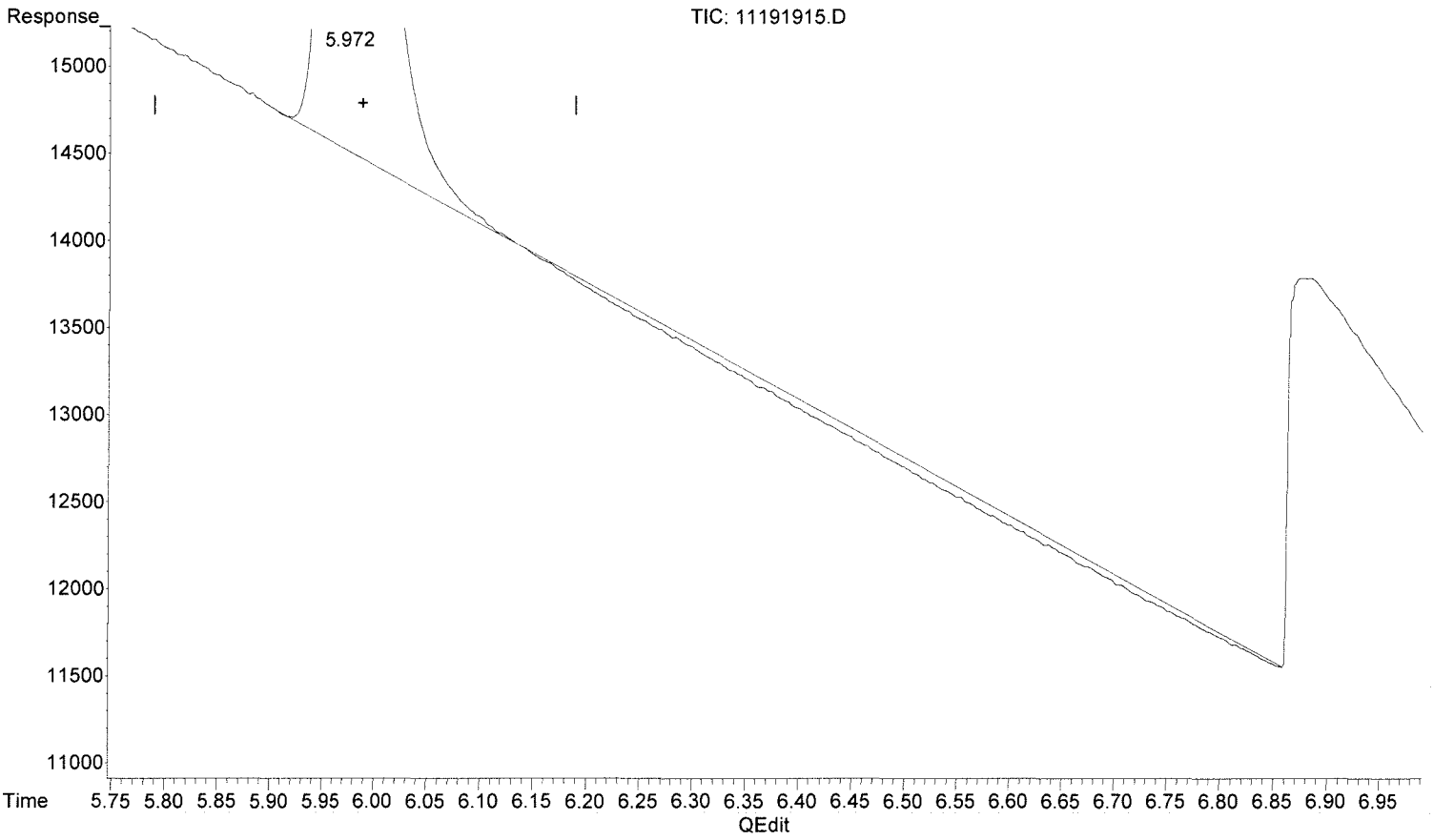




Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191915.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:43:01
Operator : WH/LD
Sample : LCSD S32-08141901
Misc :
ALS Vial : 1 Sample Multiplier: 1

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

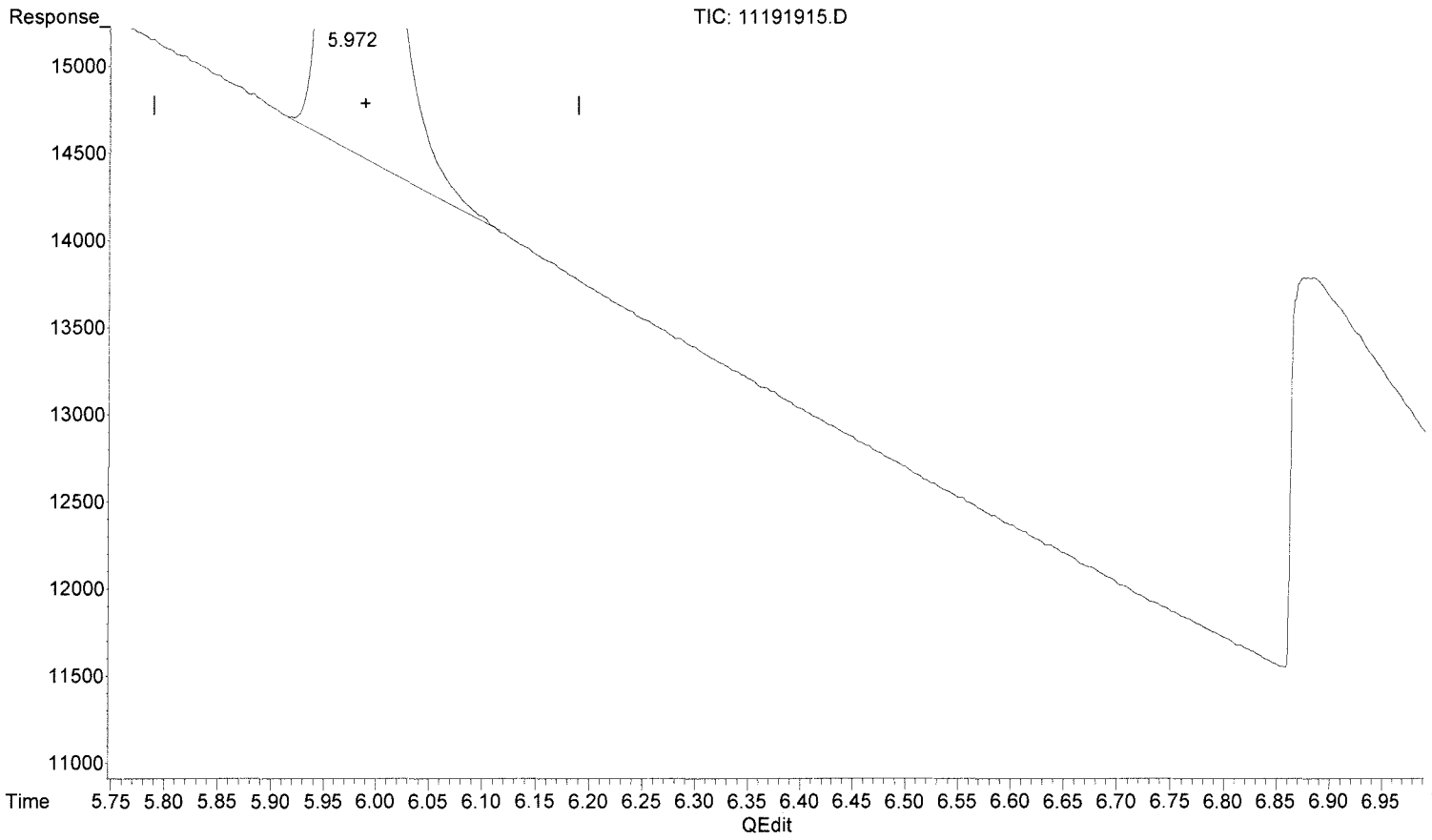
Quantitation Report (Qedit)

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

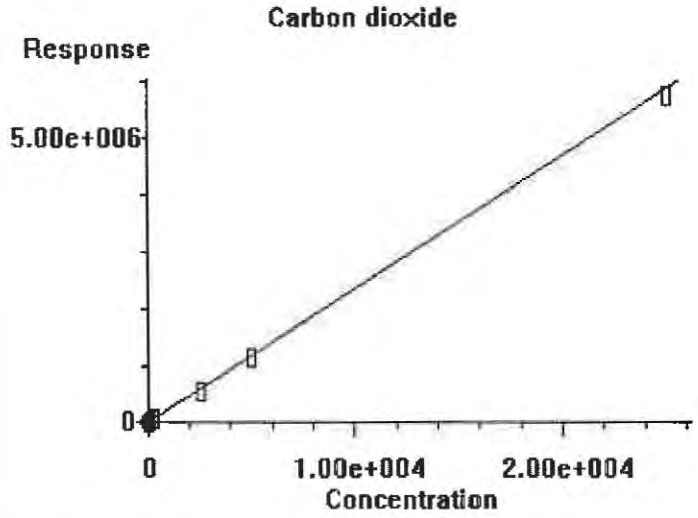
Search by: Ret Time | Name | Index — Find Compound

- 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

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	

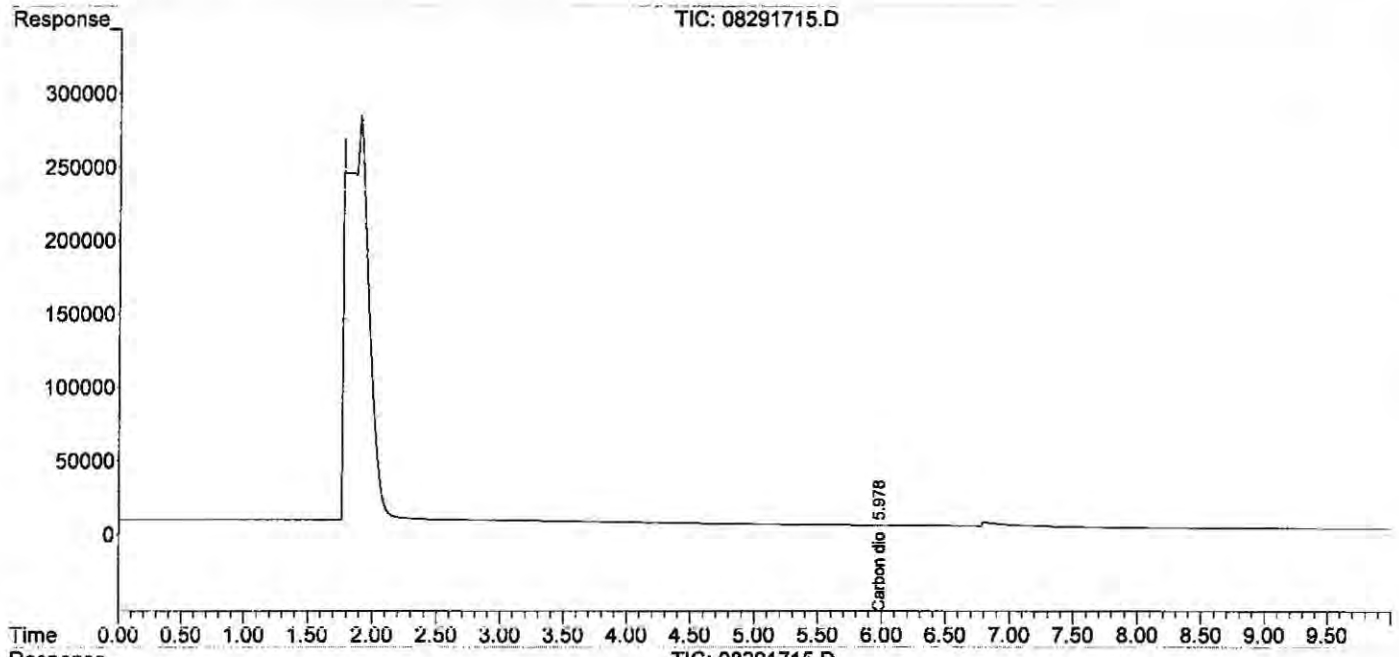
(f)=RT Delta > 1/2 Window (m)=manual int.

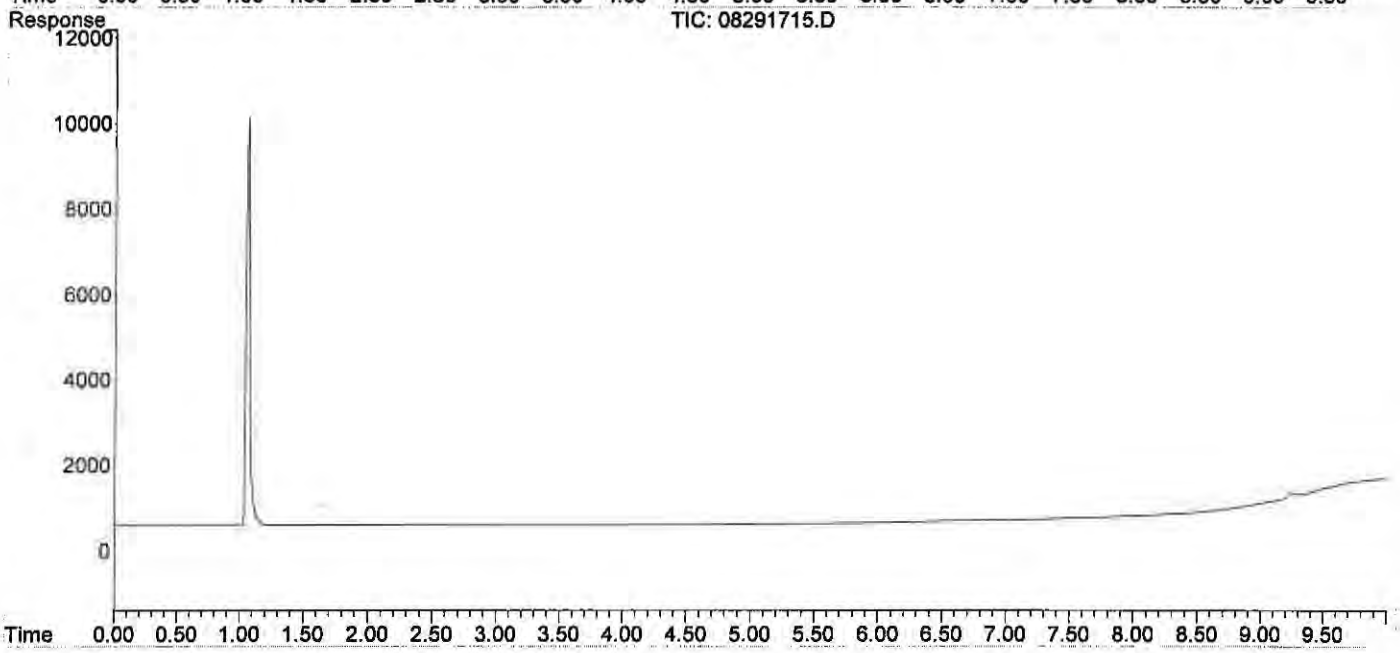
Quantitation Report (QT Reviewed)

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 :



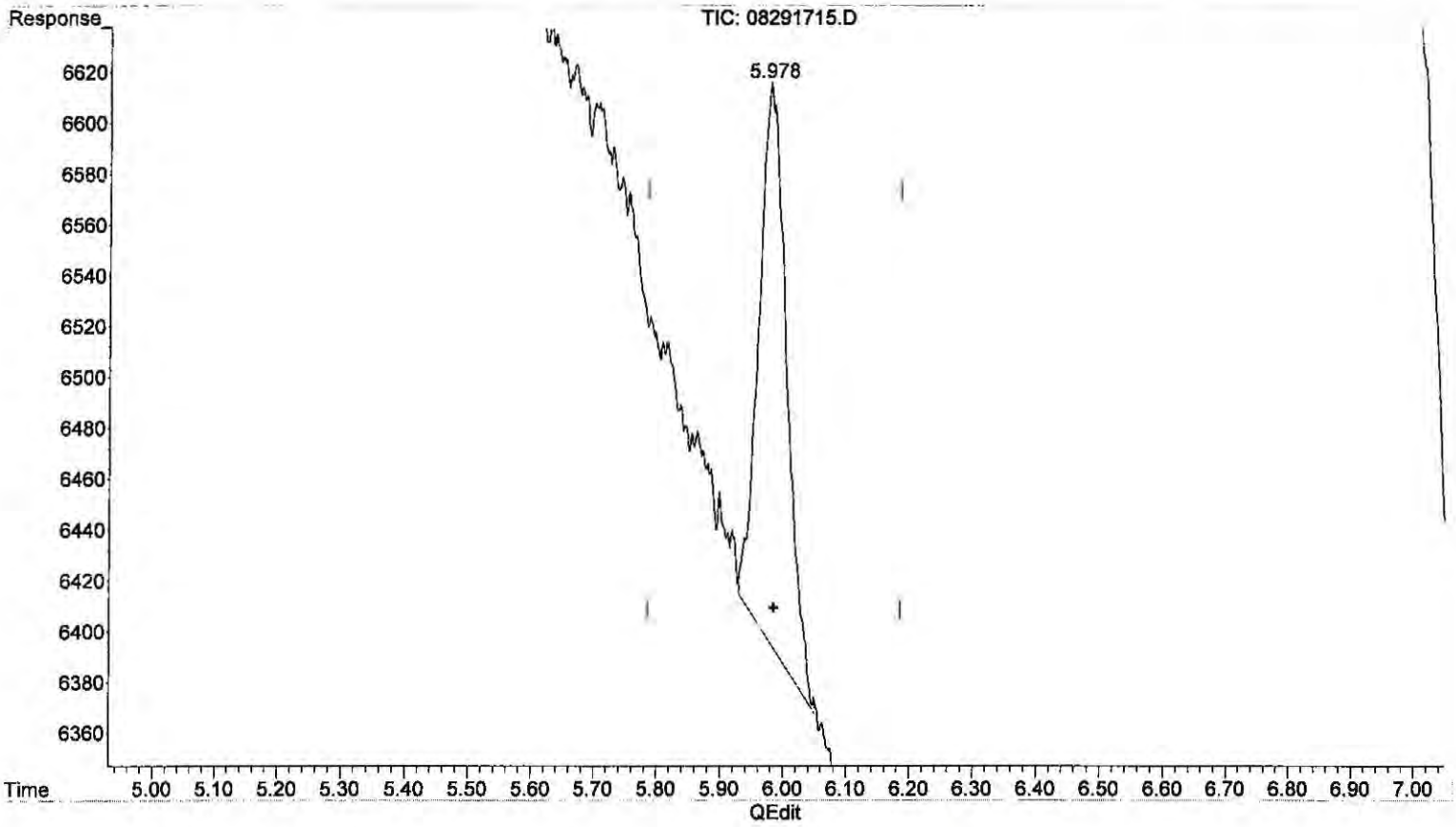


Quantitation Report (Qedit)

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

(+) = Expected Retention Time

RS082817_CO2.M Wed Aug 30 13:17:47 2017

Page: 1

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	

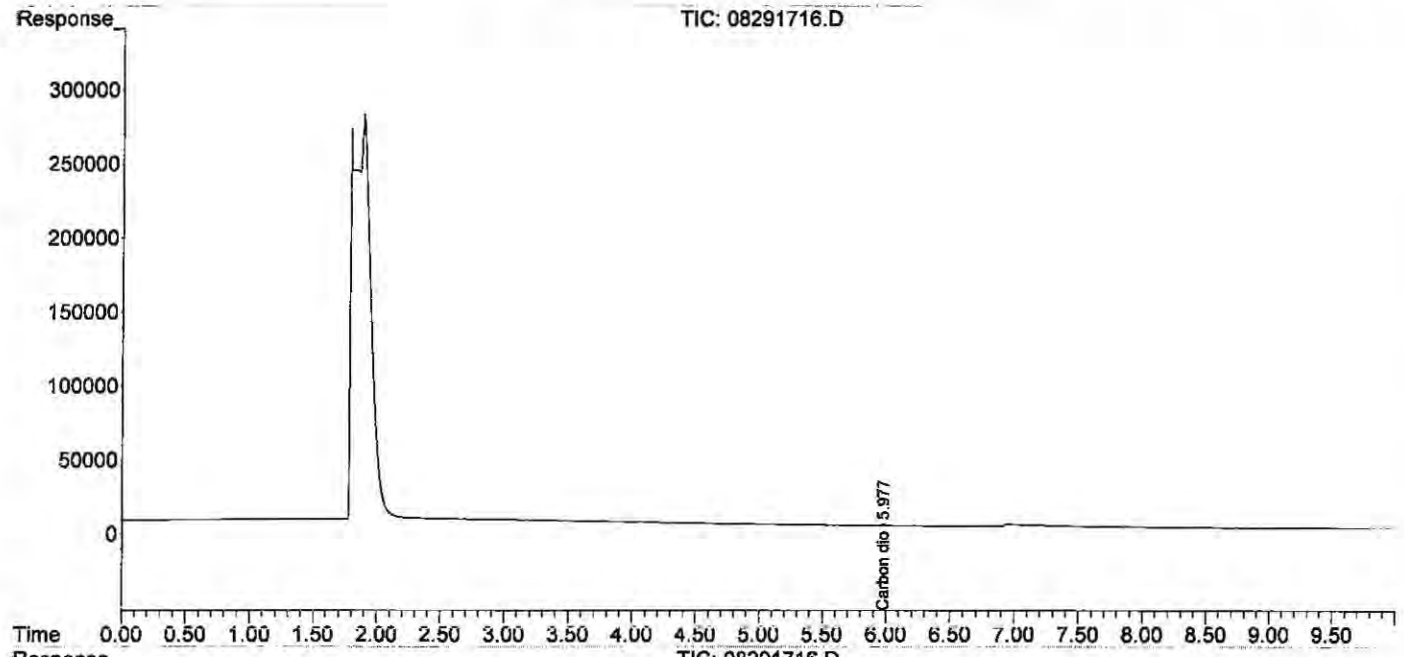
(f)=RT Delta > 1/2 Window (m)=manual int.

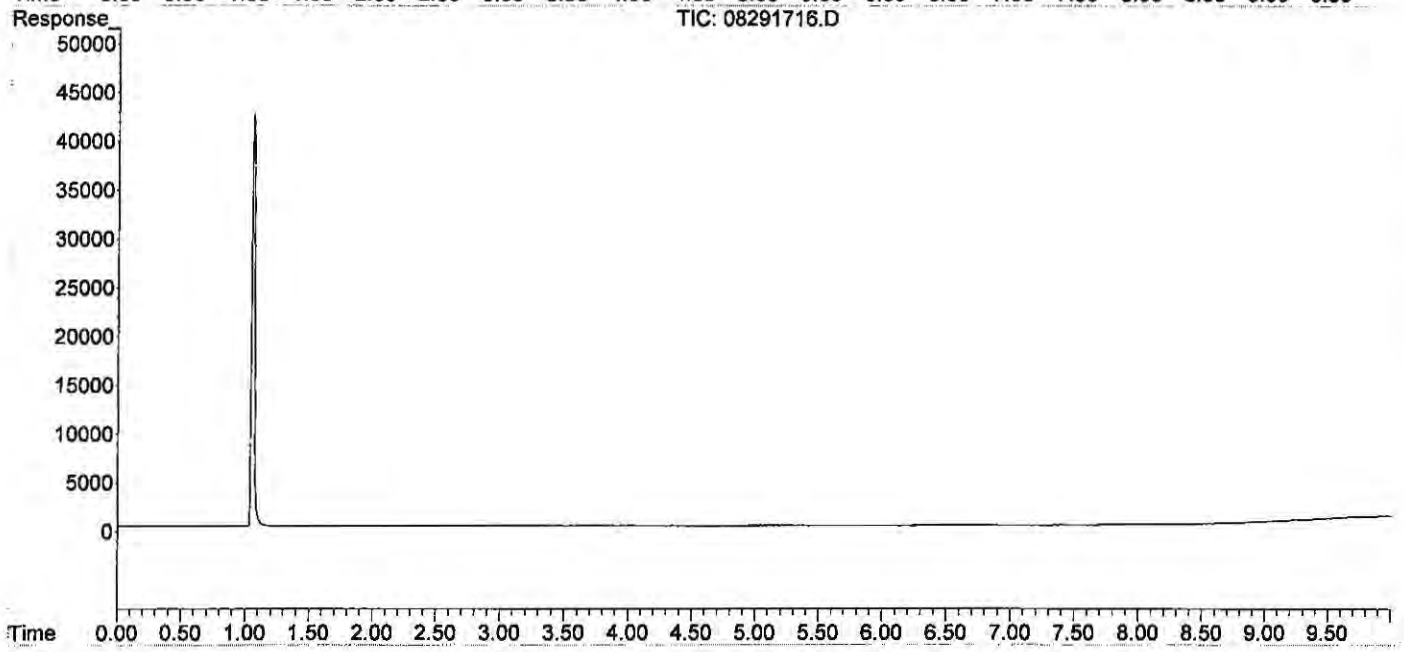
Quantitation Report (QT Reviewed)

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	

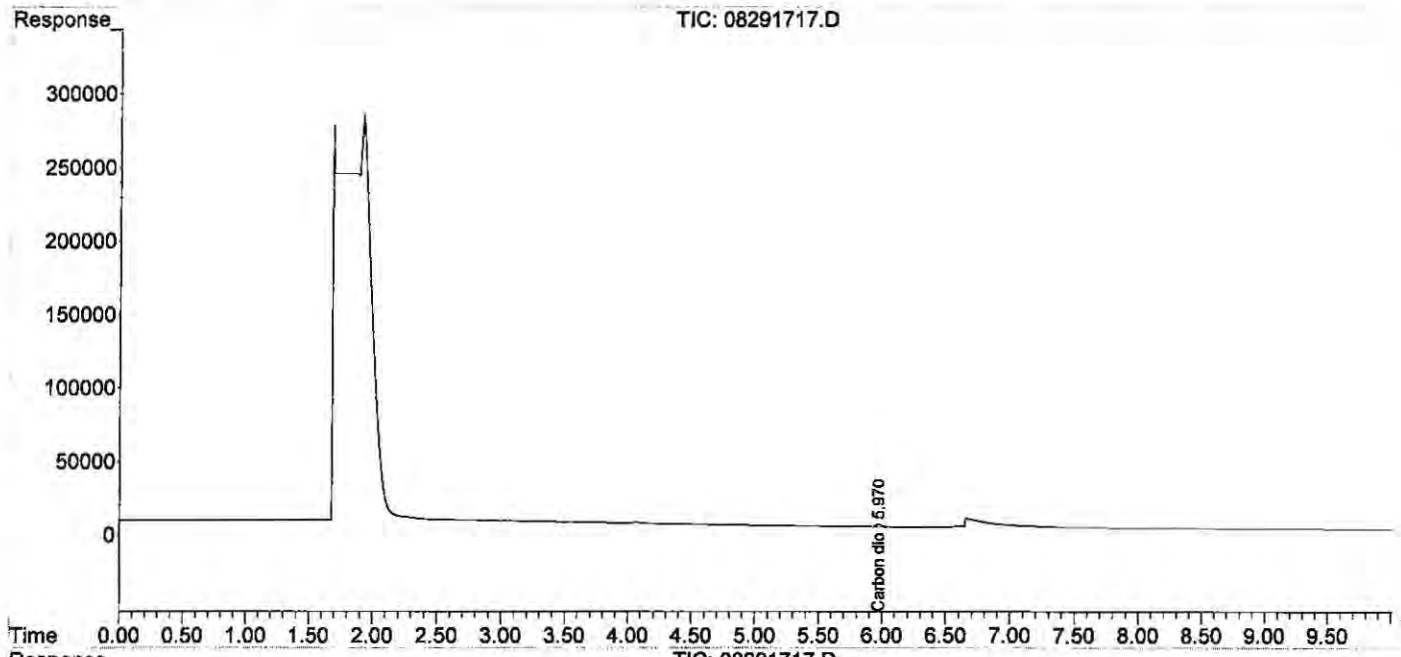
(f)=RT Delta > 1/2 Window (m)=manual int.

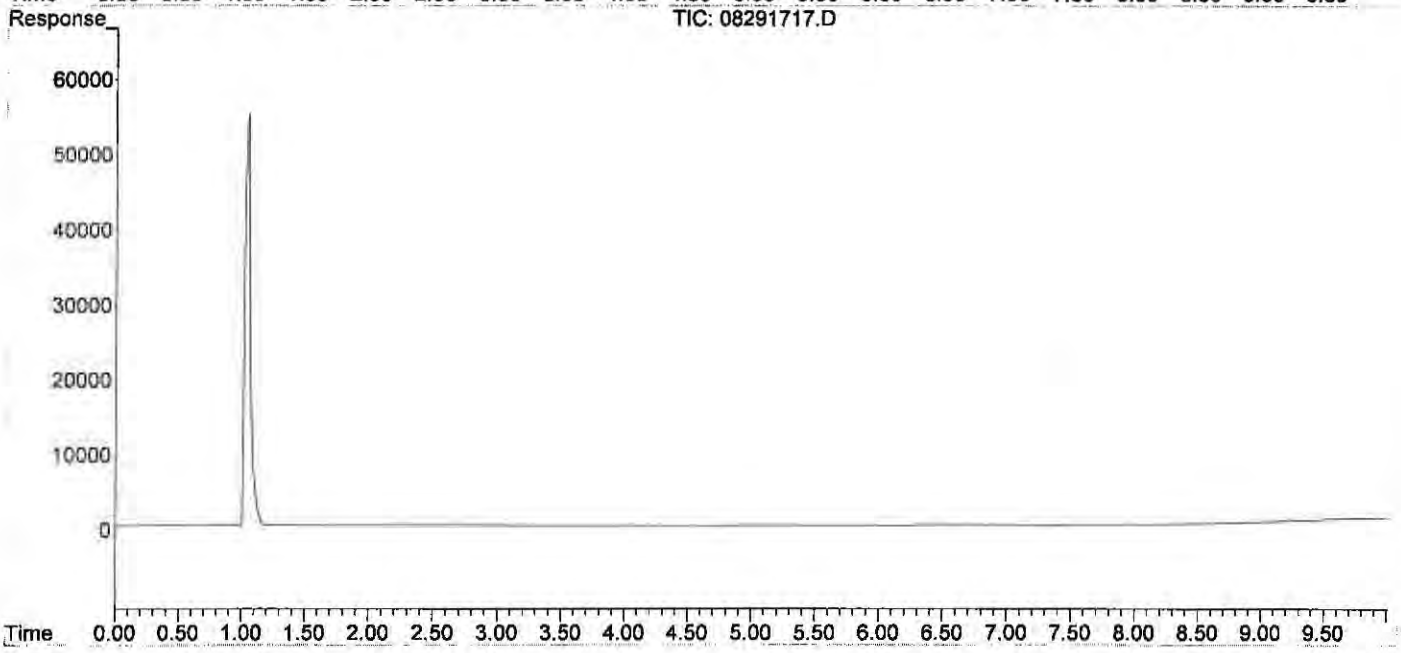
Quantitation Report (QT Reviewed)

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 :



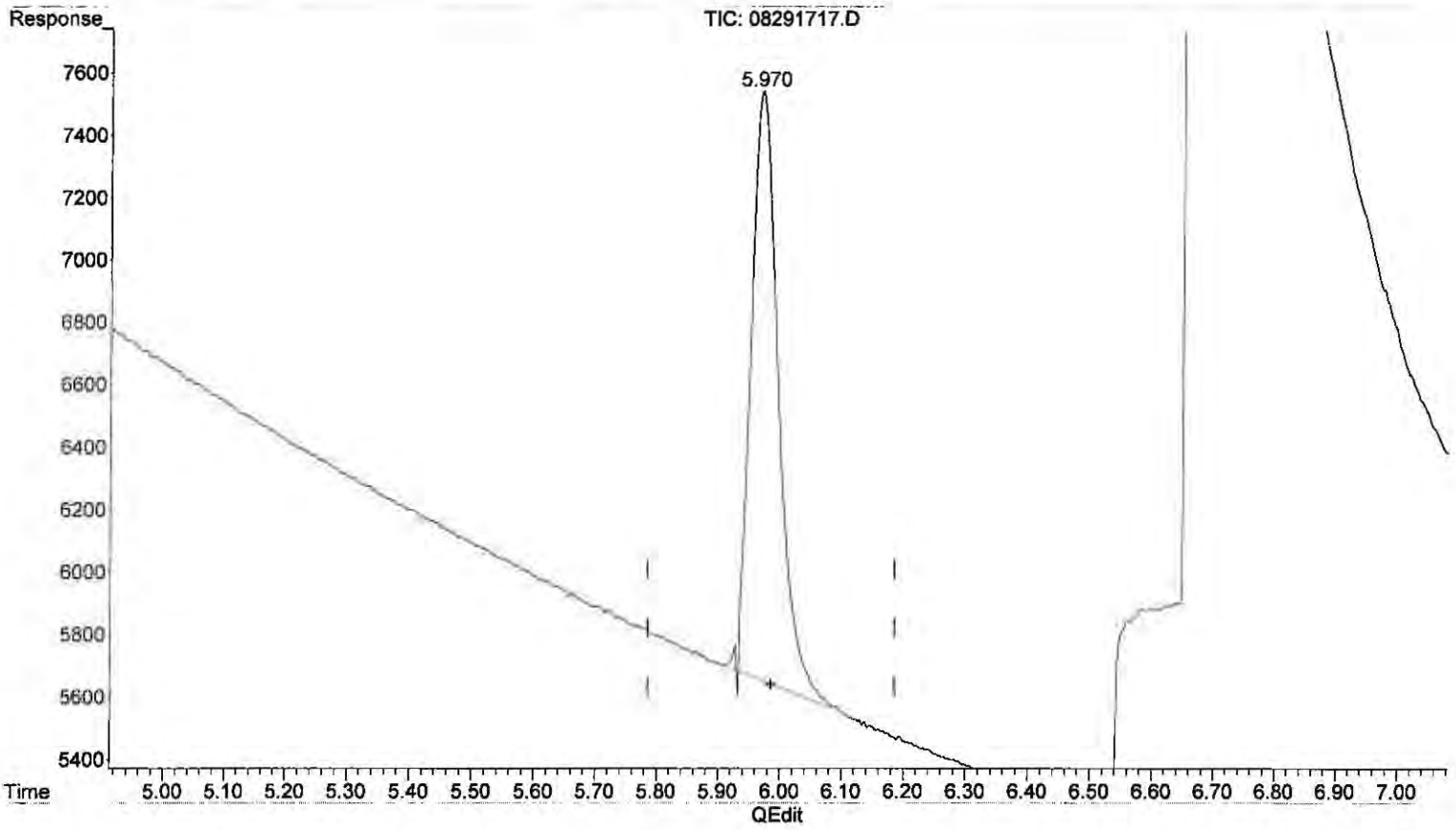


Quantitation Report (Qedit)

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 #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 :

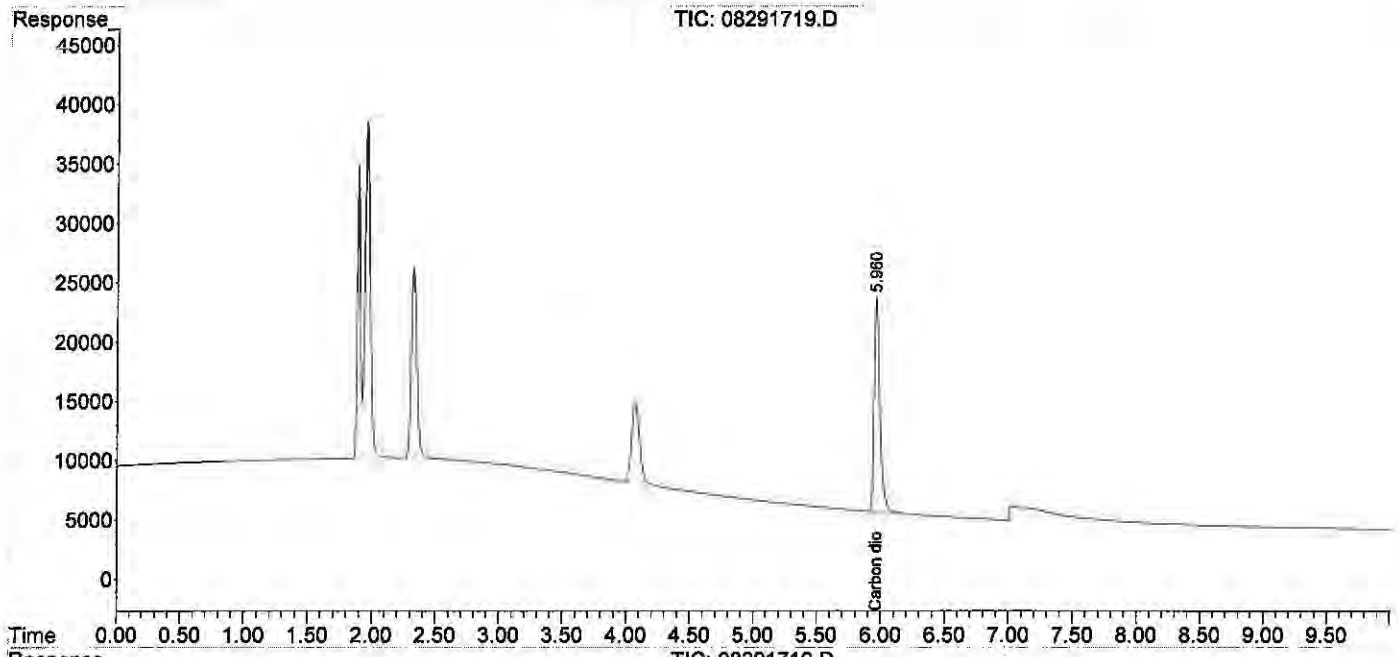
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	1.891	425113	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	5.962	568043	2369.673	ppm	
6)	Methane (FID)	0.000	0	N.D.	ppm	d
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	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	

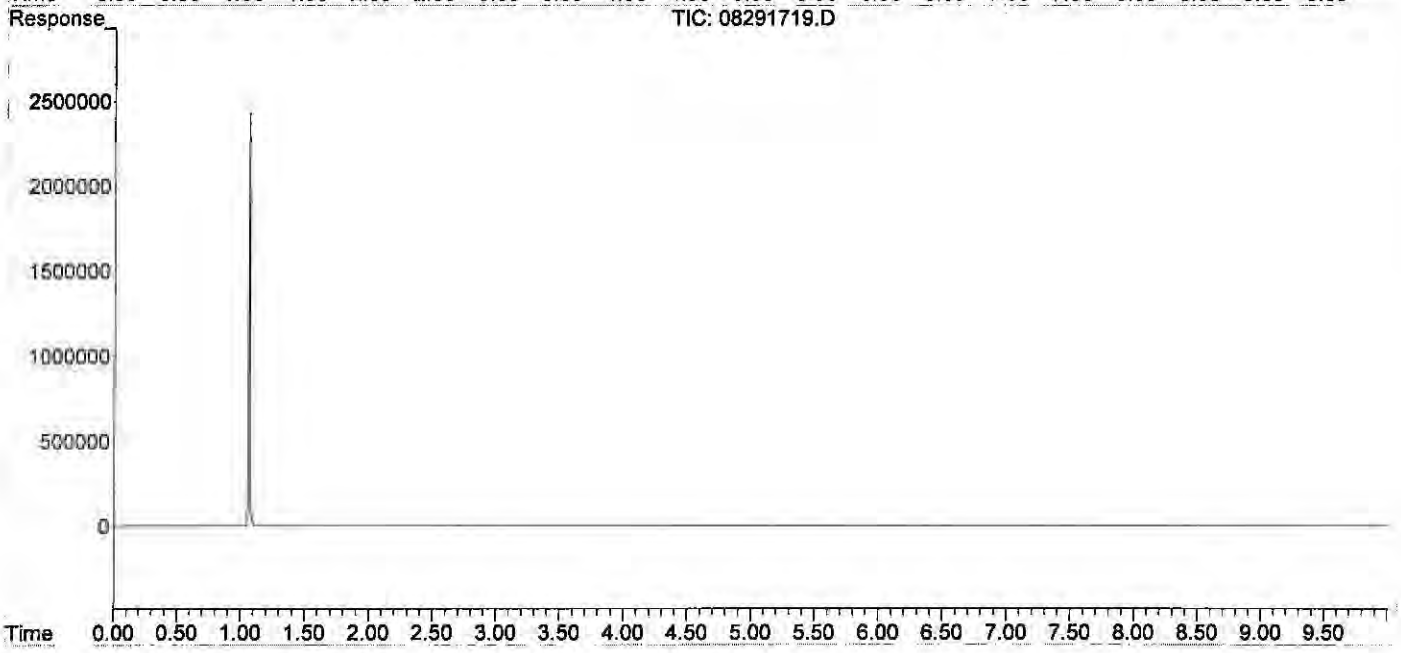
(f)=RT Delta > 1/2 Window (m)=manual int.

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	

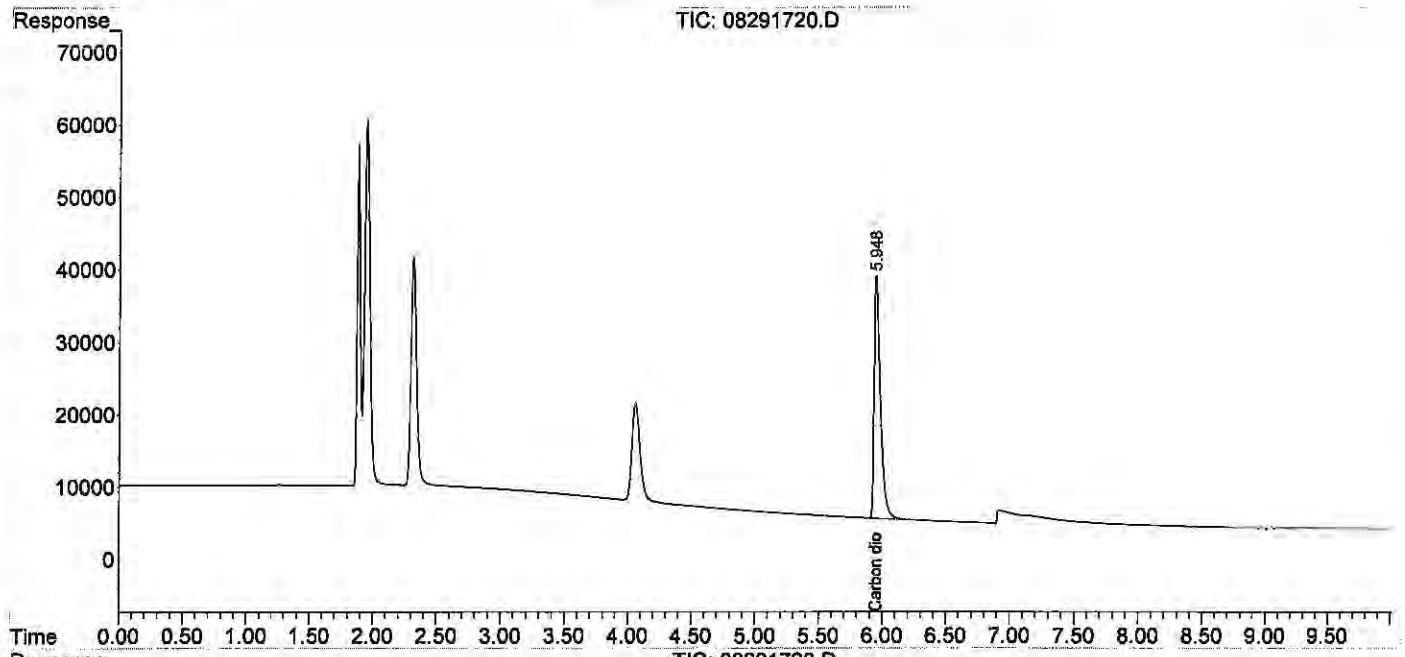
(f)=RT Delta > 1/2 Window (m)=manual int.

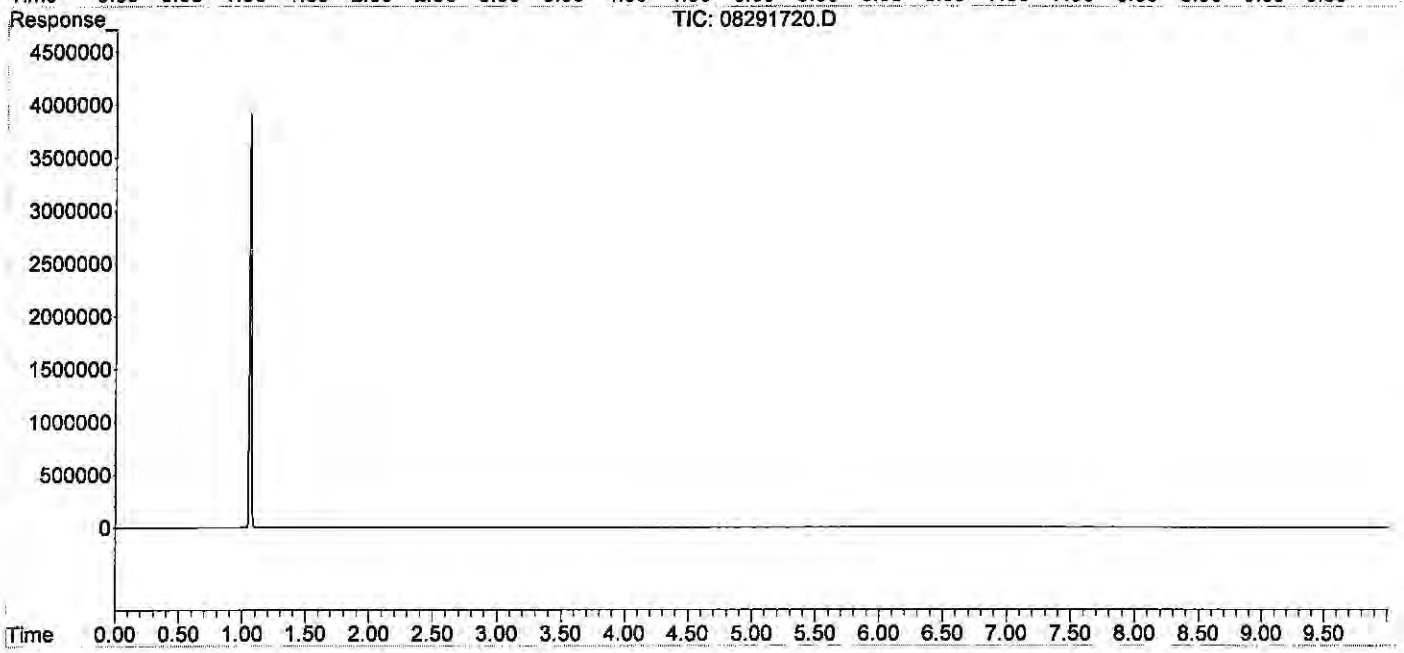
Quantitation Report (QT Reviewed)

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 :





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	

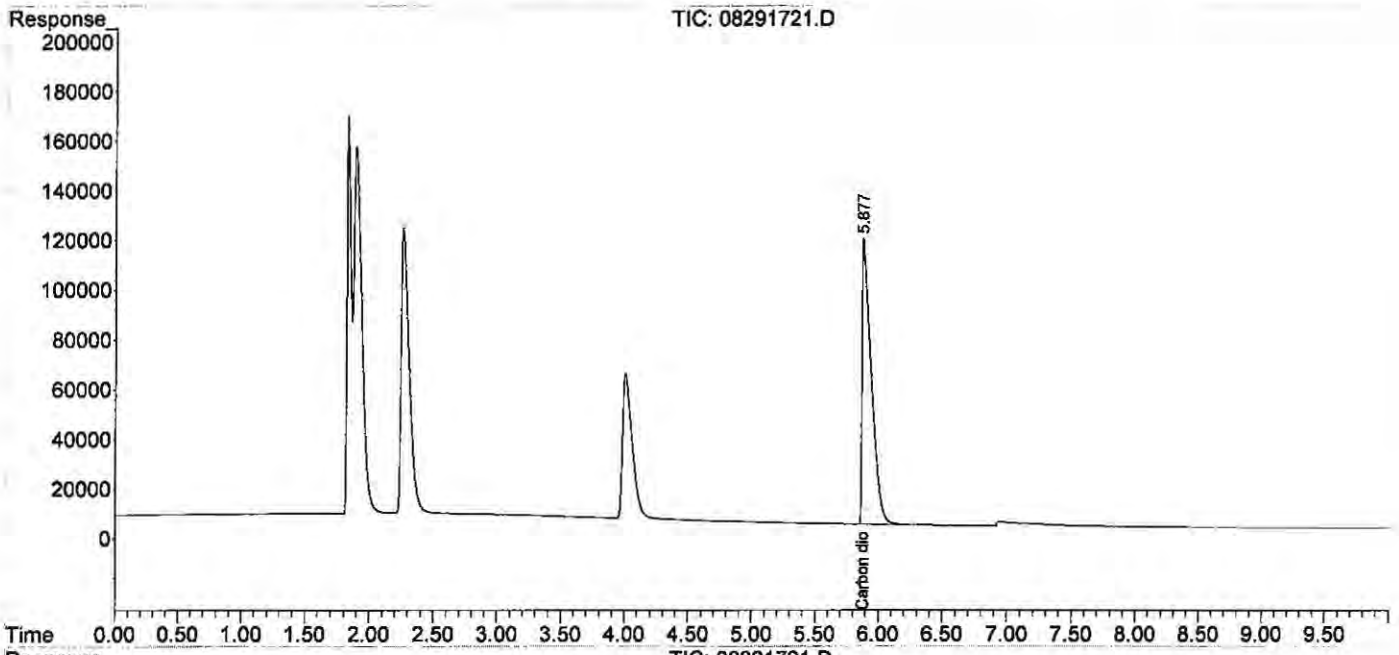
(f)=RT Delta > 1/2 Window (m)=manual int.

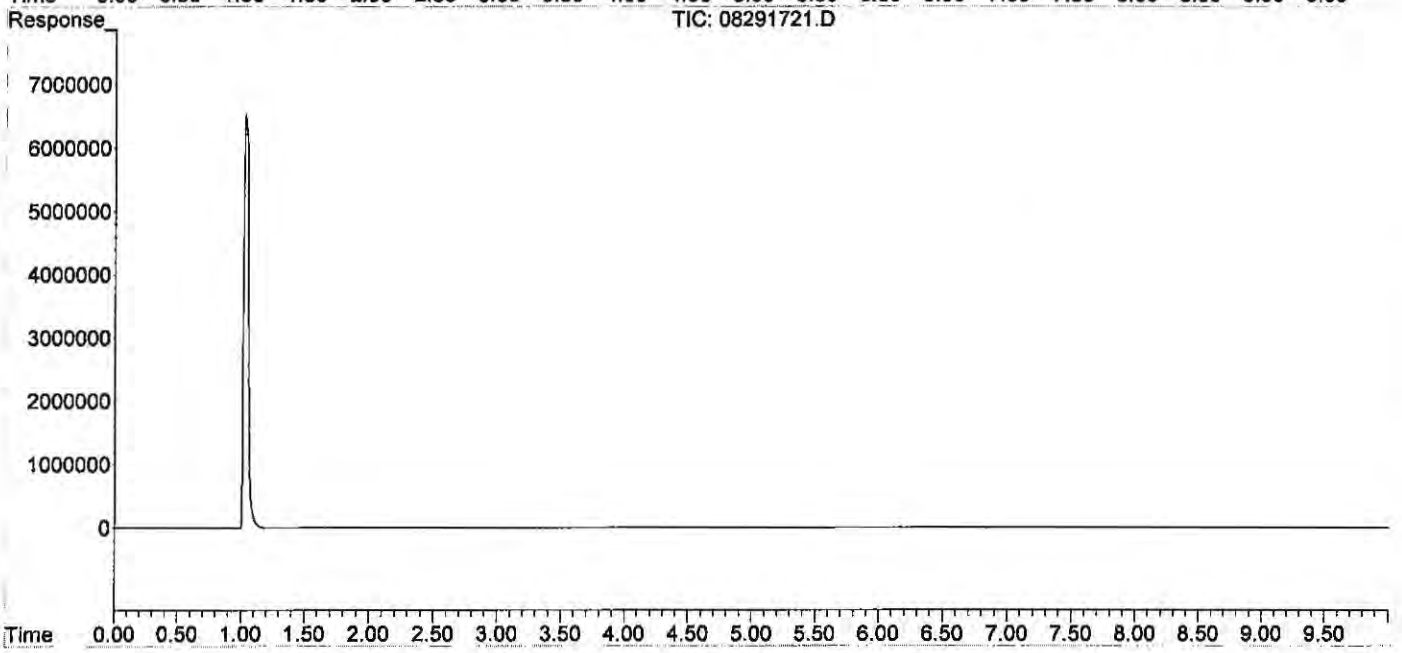
Quantitation Report (QT Reviewed)

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
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
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

Actual %D
5000 99.16

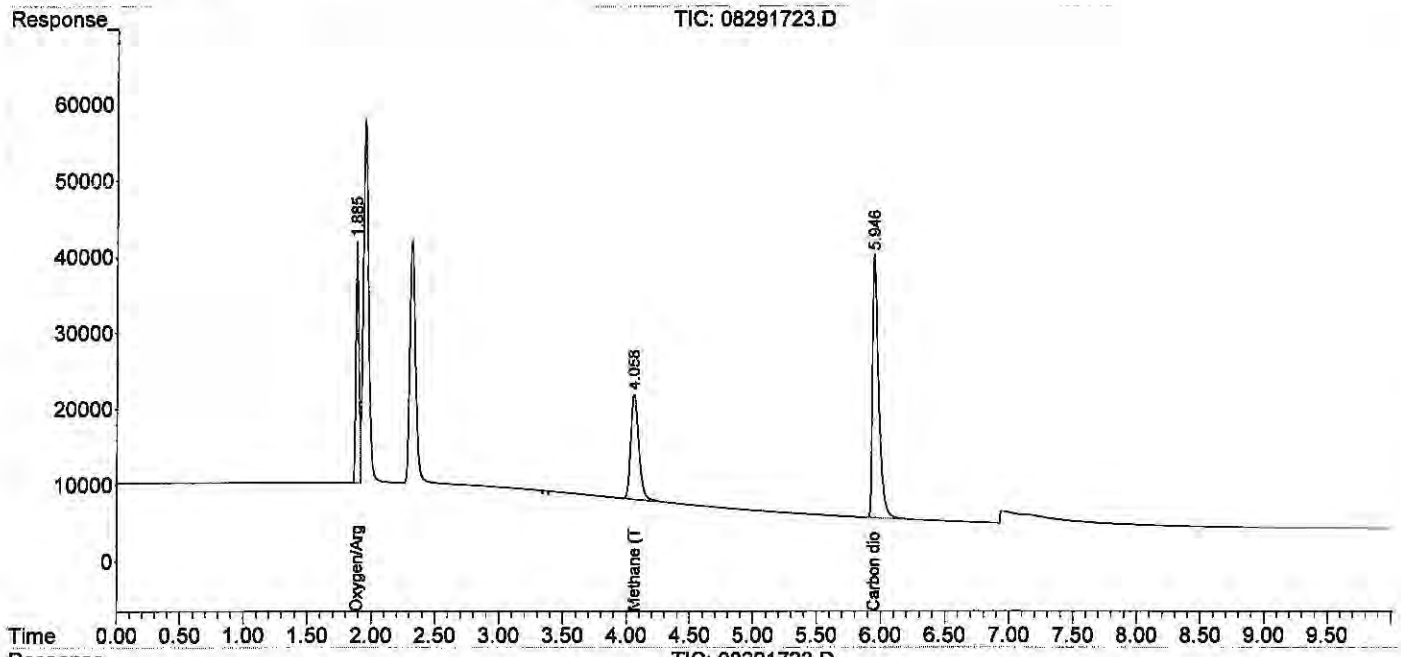
(f)=RT Delta > 1/2 Window (m)=manual int.

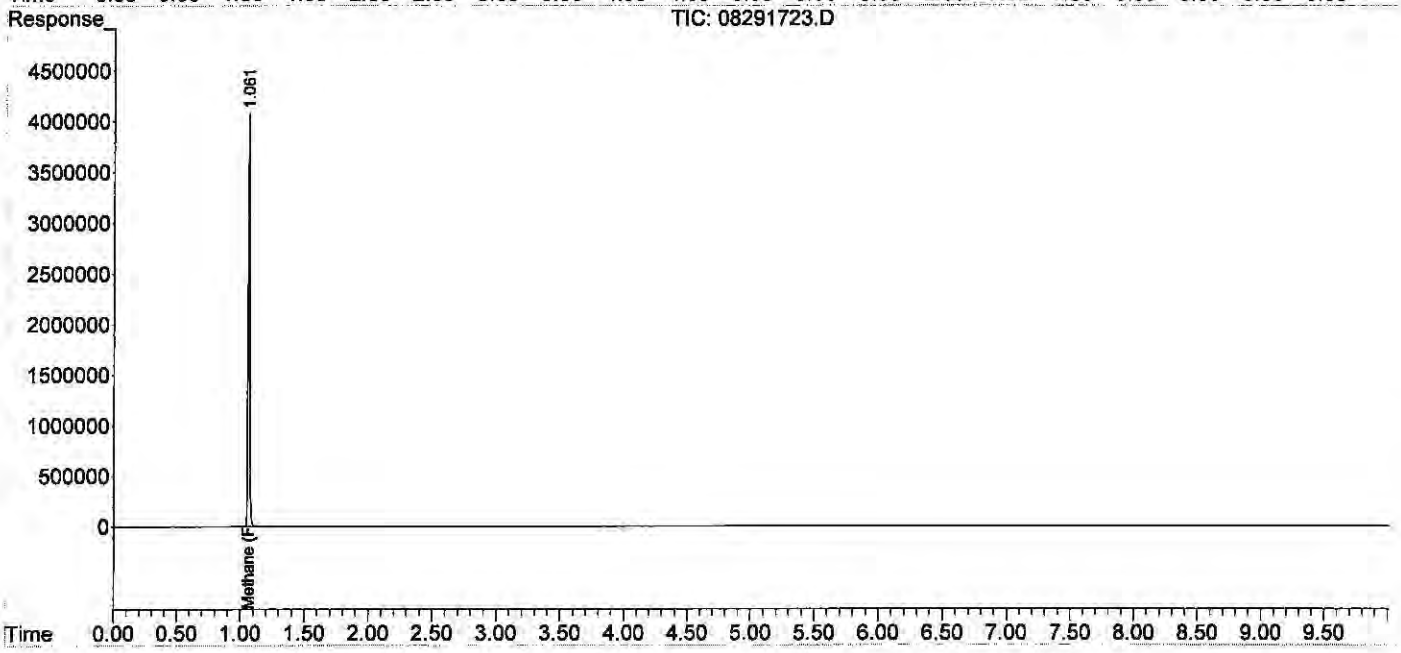
9/4/17

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 :





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%						

Quantitation Report (QT Reviewed)

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 :

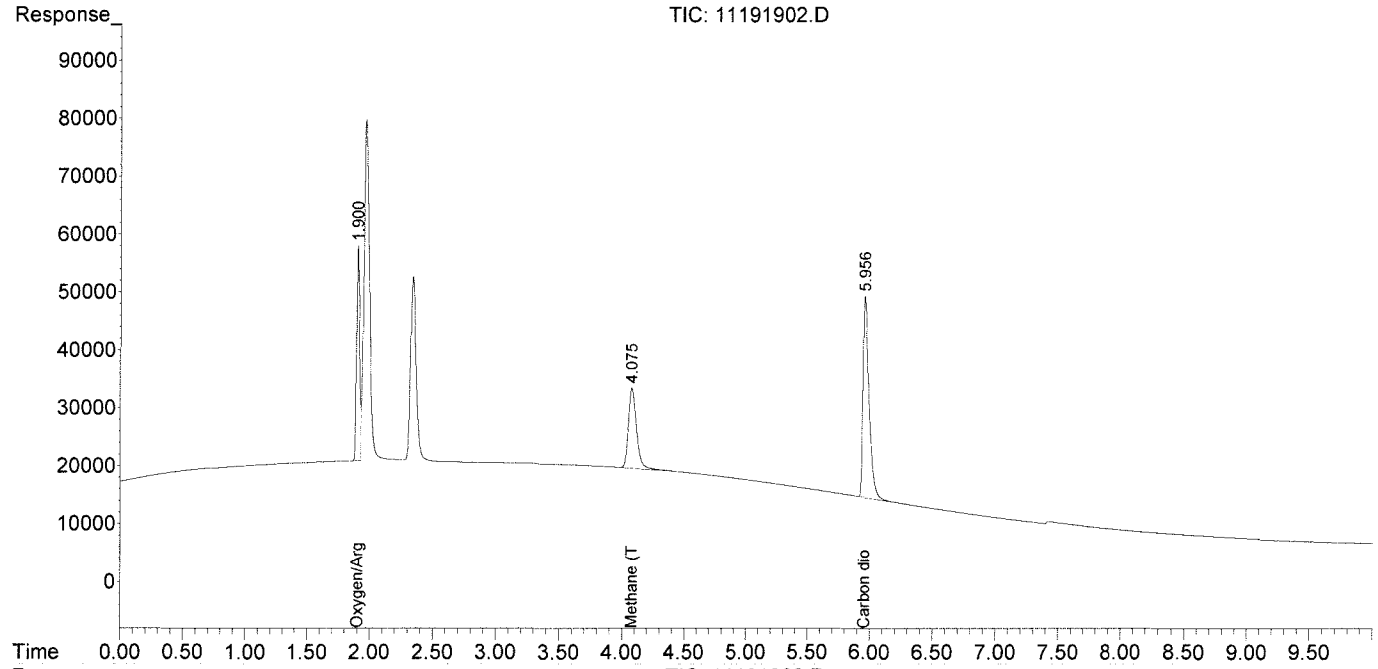
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.901	633578	0.133	ppm	
2)	Carbon monoxide	1.901	633578	N.D.	ppm	
3)	Methane (TCD)	4.076f	642456	67931.889	ppm	
4)	Carbon dioxide	5.956	1175202	5006.629	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	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	

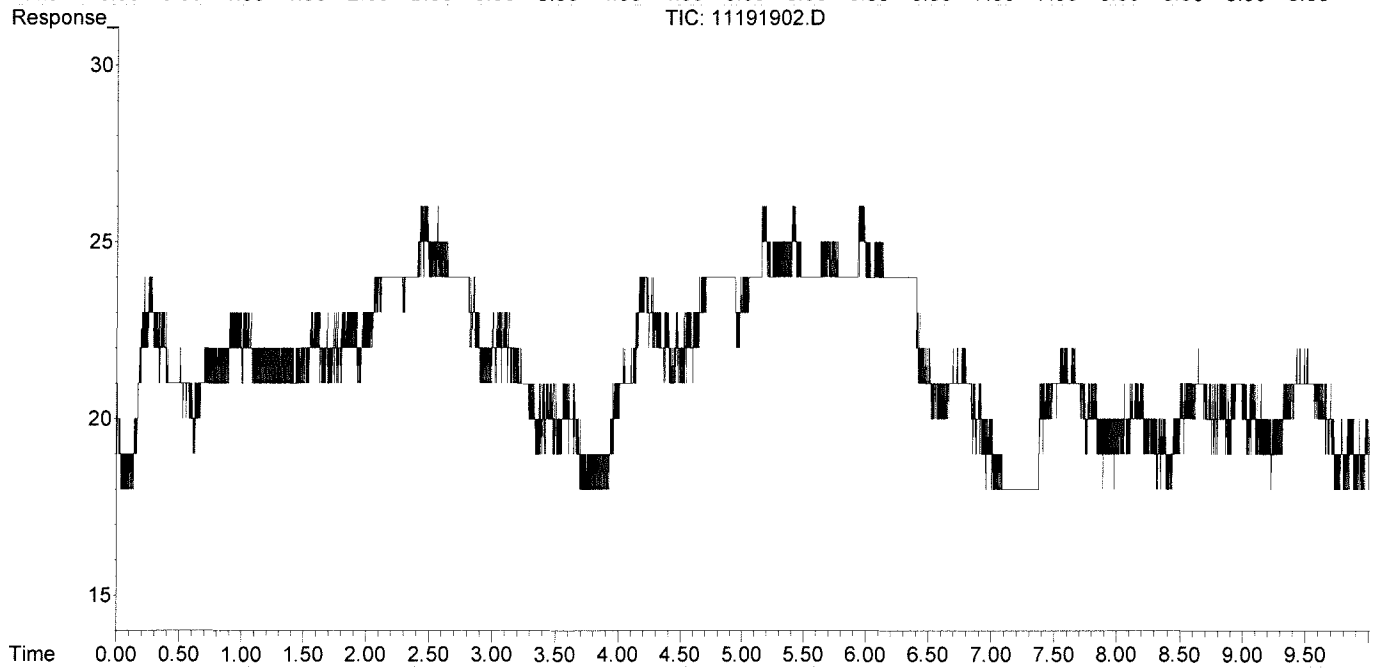
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :



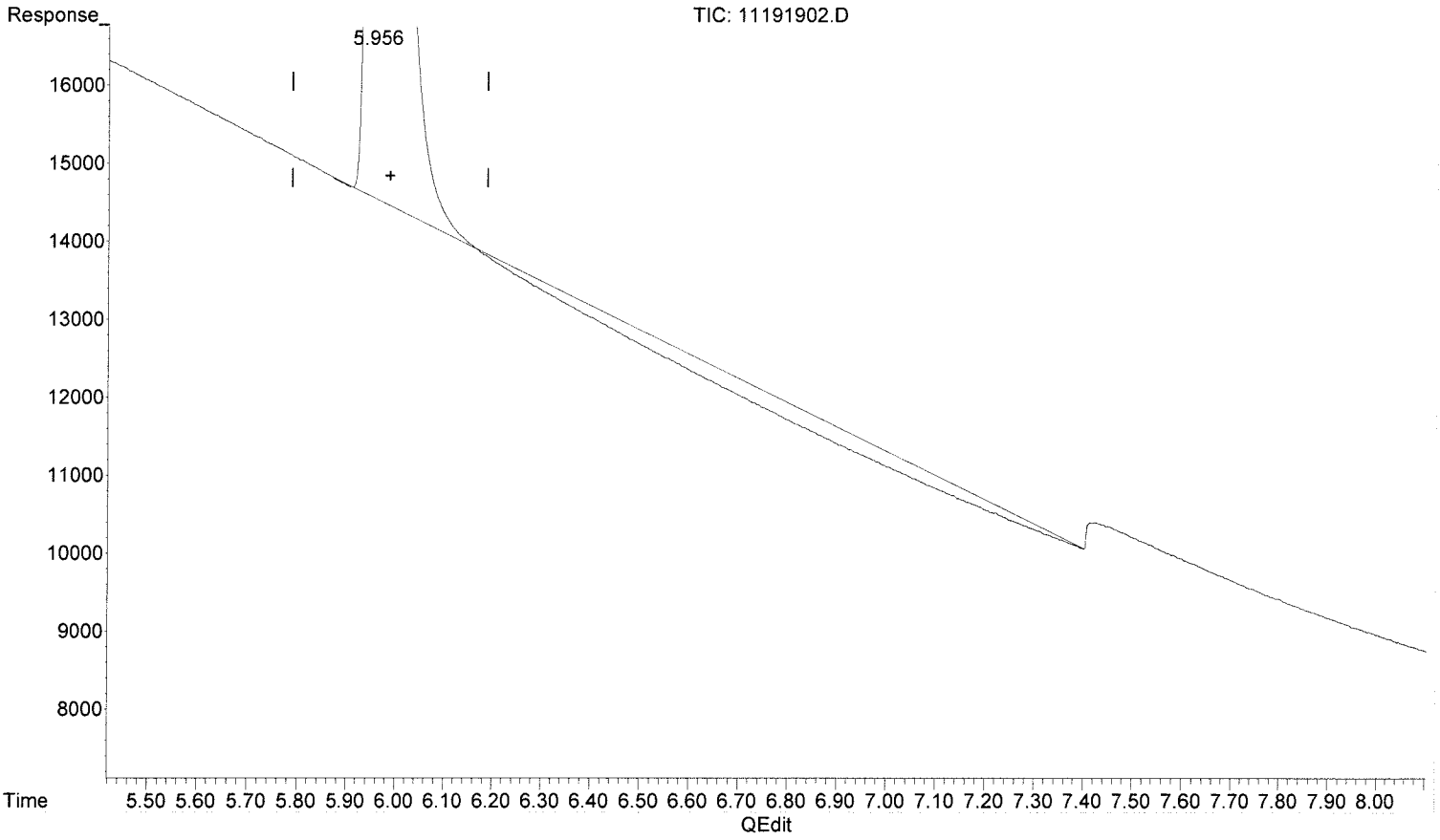


Quantitation Report (Qedit)

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

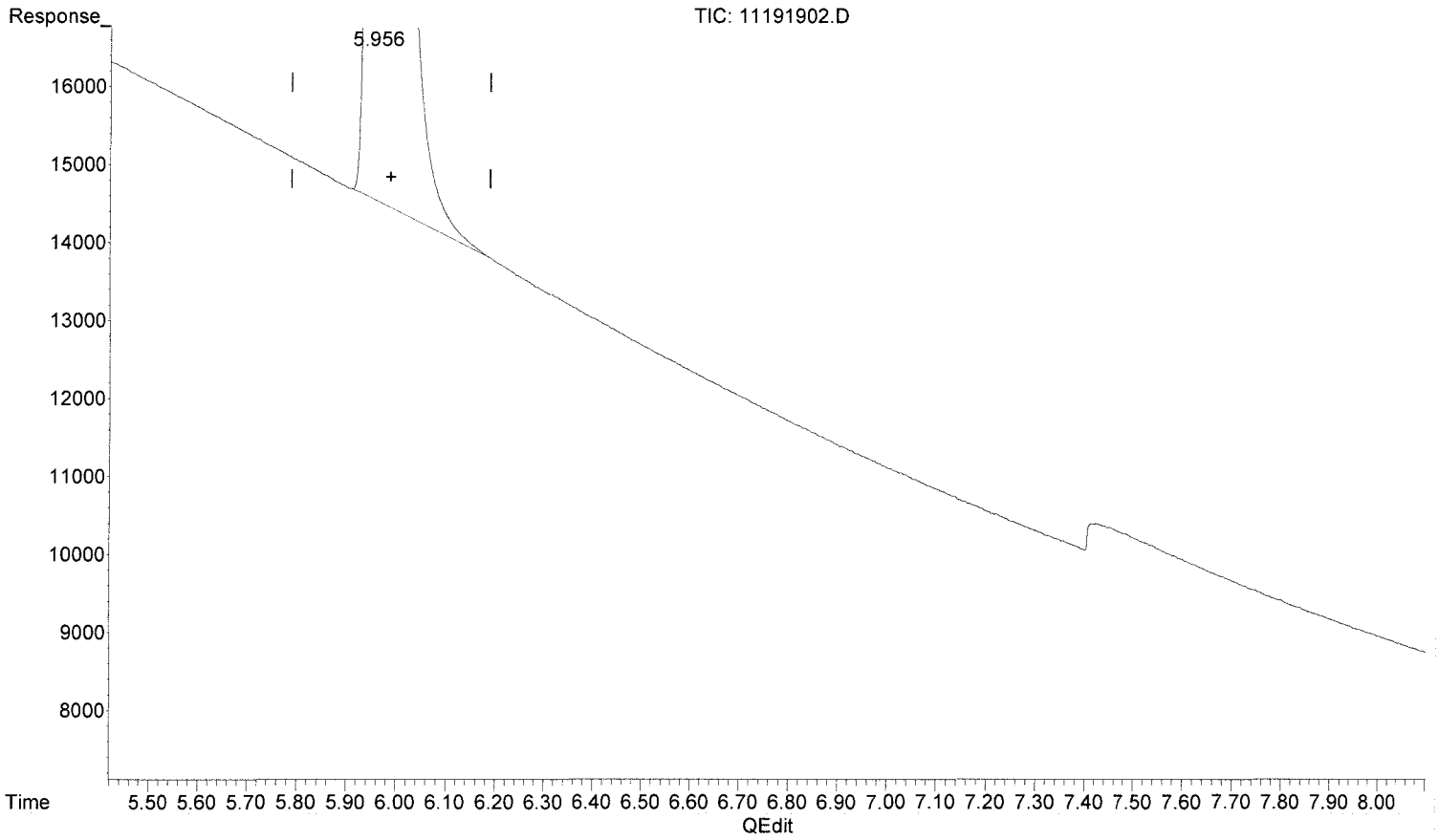
Quantitation Report (Qedit)

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

Quantitation Report (QT Reviewed)

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 :

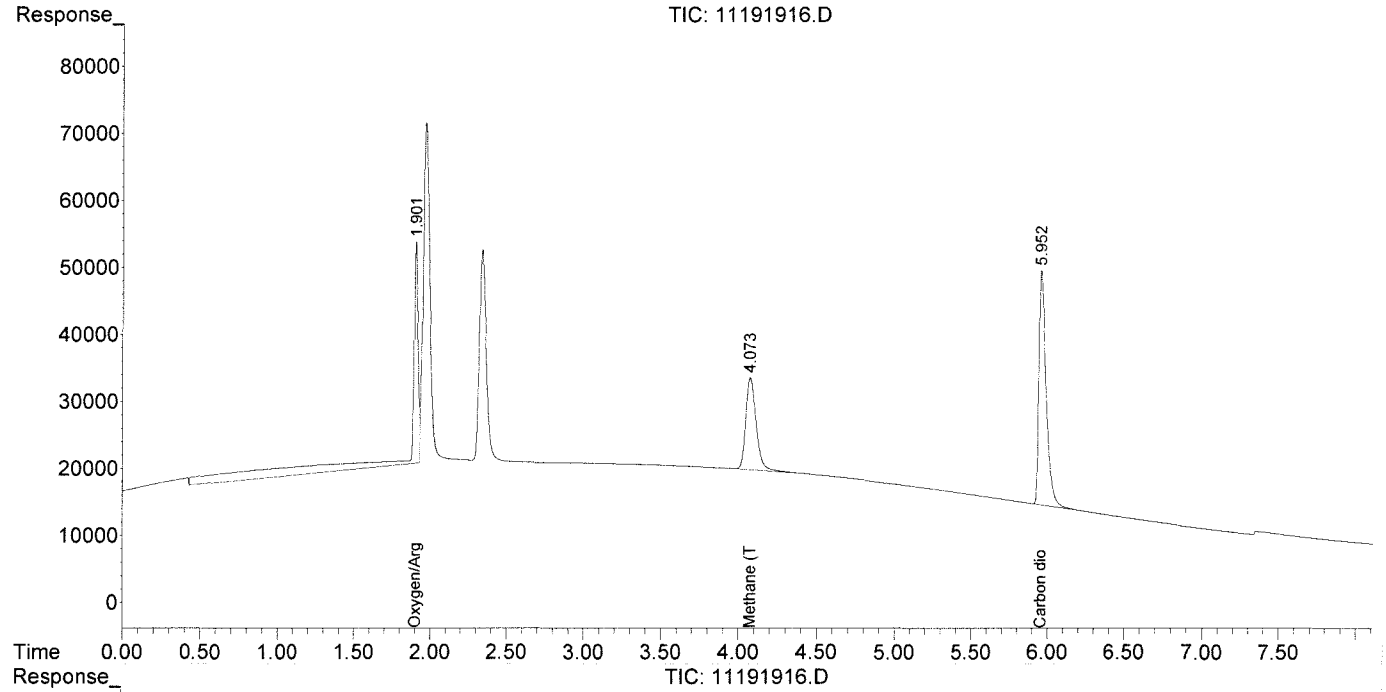
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.902	1497758	0.315	ppm	
2)	Carbon monoxide	1.902	1497758	N.D.	ppm	
3)	Methane (TCD)	4.073f	632021	66828.577	ppm	
4)	Carbon dioxide	5.952	1171842	4992.314	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	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	

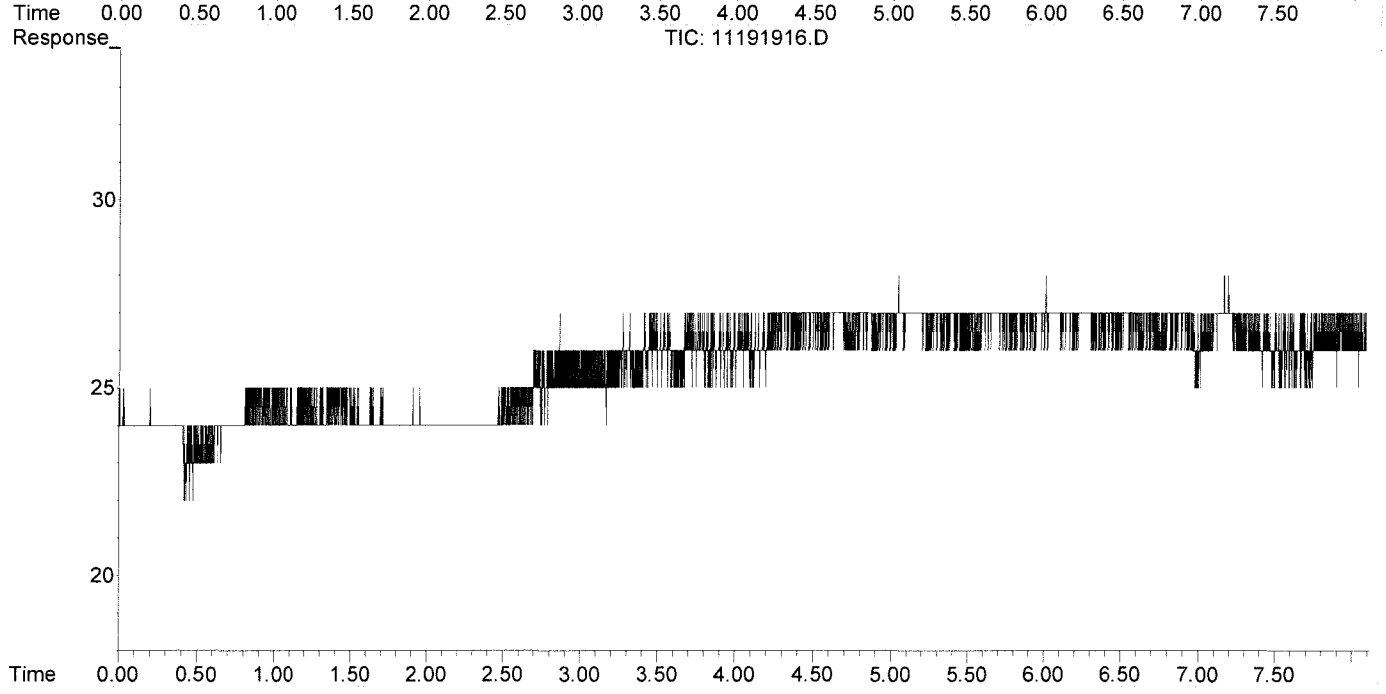
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

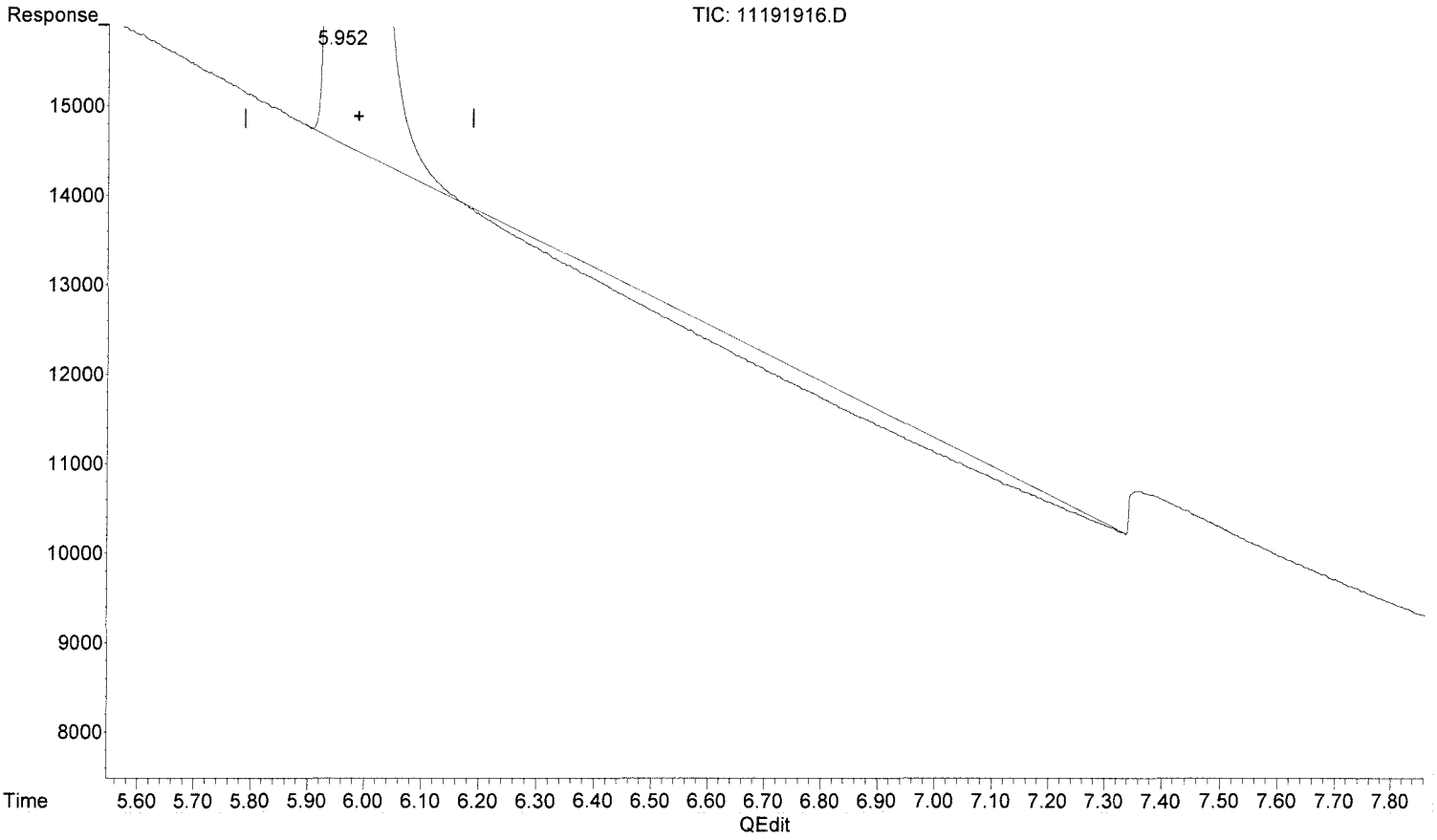




Data Path : J:\GC10\DATA\RSK_TCD\2019_11\19\
Data File : 11191916.D
Signal(s) : Signal #1: TCD1A.CH Signal #2: FID2B.CH
Acq On : 19-Nov-2019, 15:56:00
Operator : WH/LD
Sample : STD S32-10291901
Misc :
ALS Vial : 1 Sample Multiplier: 1

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

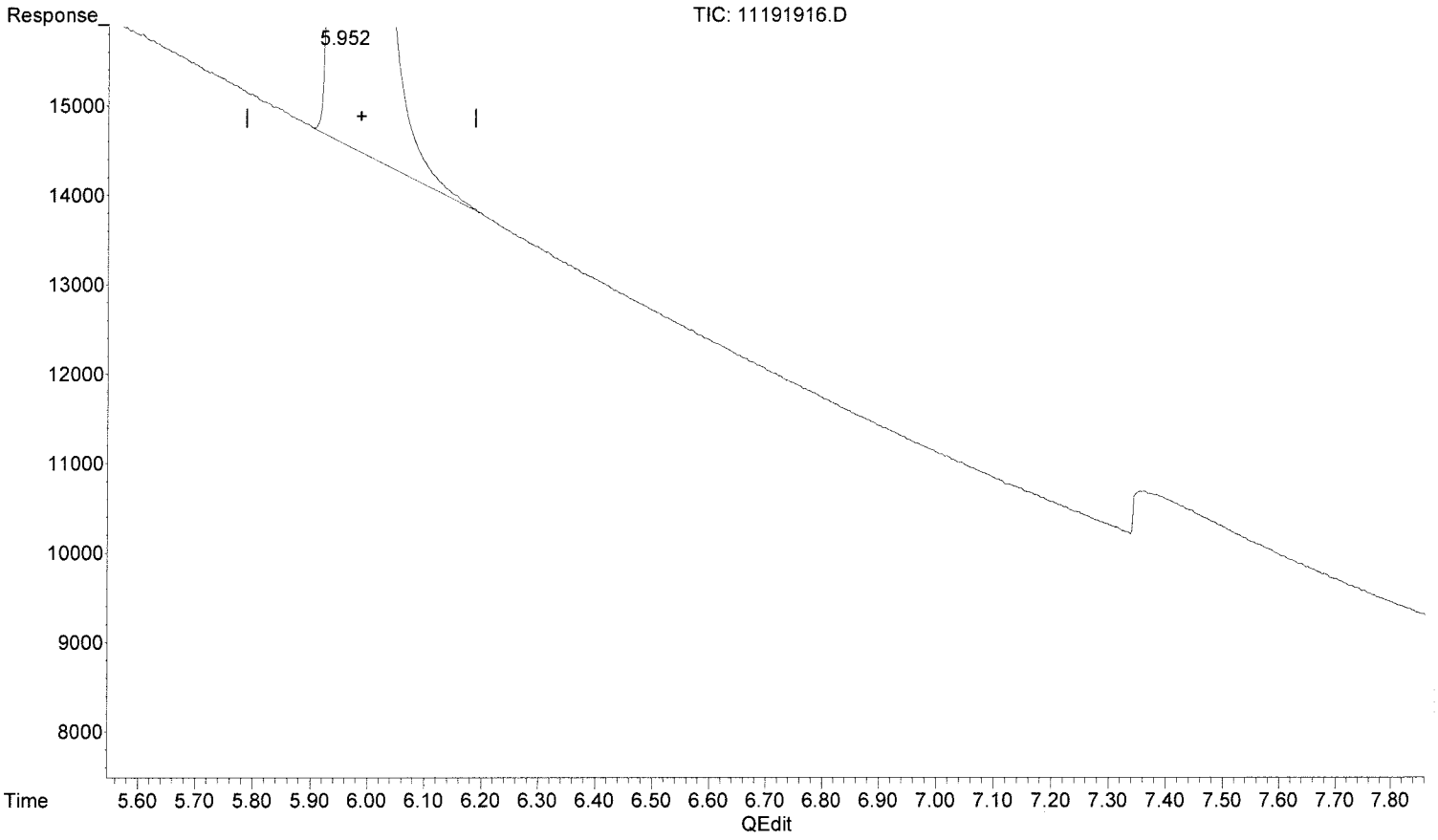
Quantitation Report (Qedit)

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 #1 Info :
Signal #2 Phase:
Signal #2 Info :



(4) Carbon dioxide

5.952min 4992.314 ppm m

response 1171842

1/20/19

(+) = 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 :

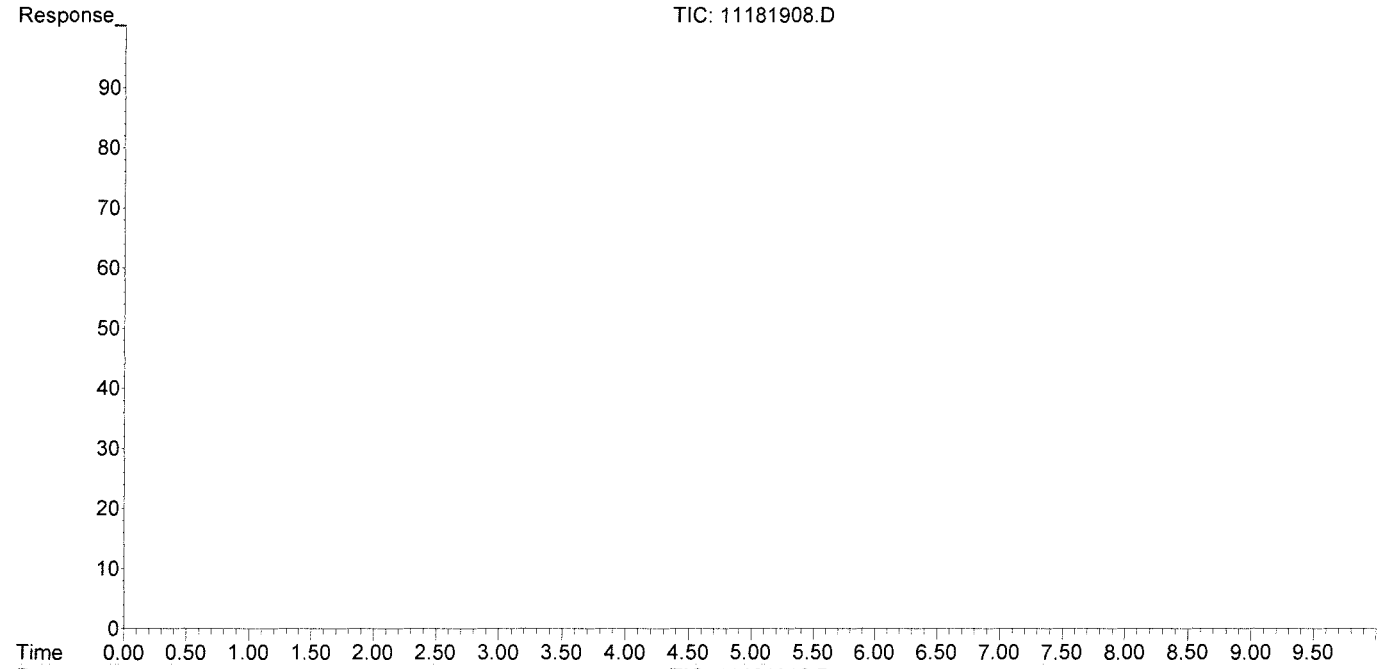
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	
2)	Carbon monoxide	0.000	0	N.D.	ppm	
3)	Methane (TCD)	0.000	0	N.D.	ppm	
4)	Carbon dioxide	0.000	0	N.D.	ppm	
6)	Methane (FID)	1.144	2609	0.288	ppm	m
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	ppm	
9)	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	

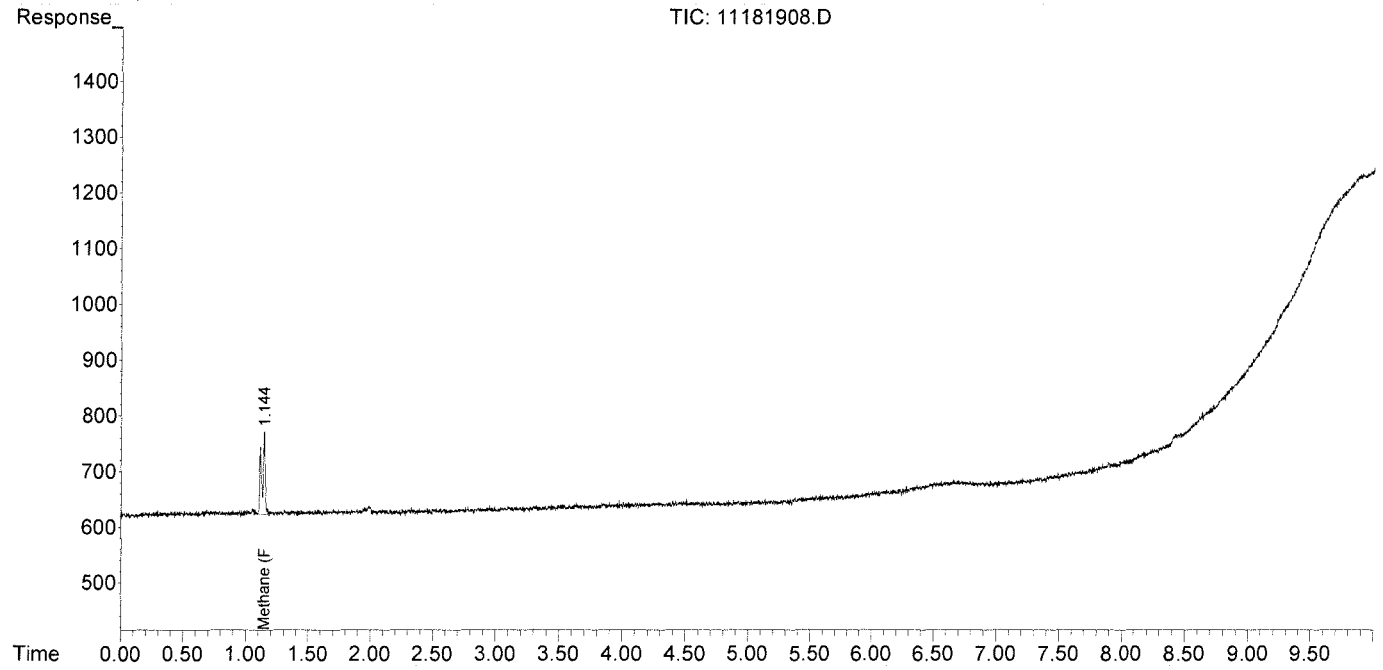
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :



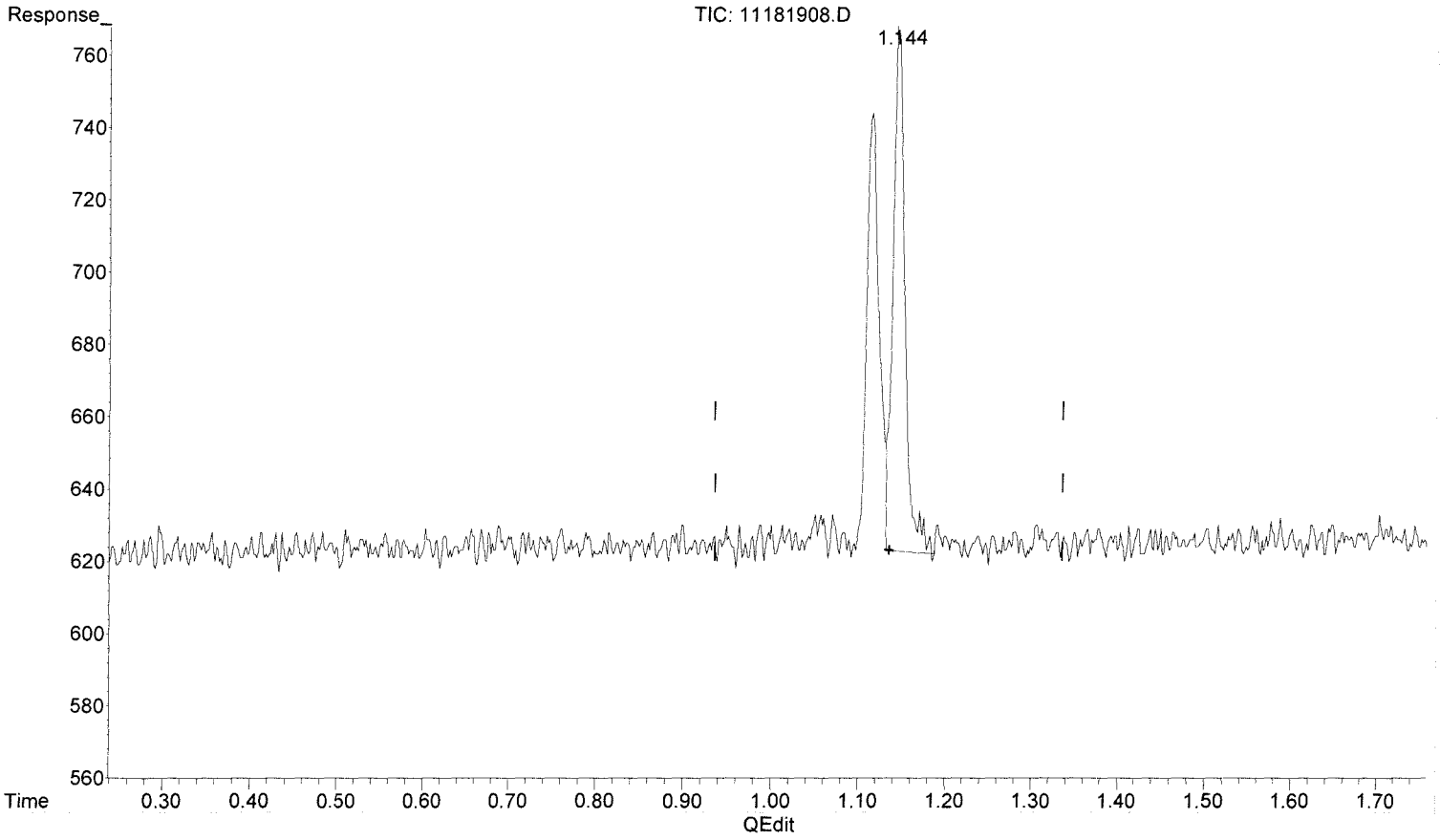


Quantitation Report (Qedit)

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

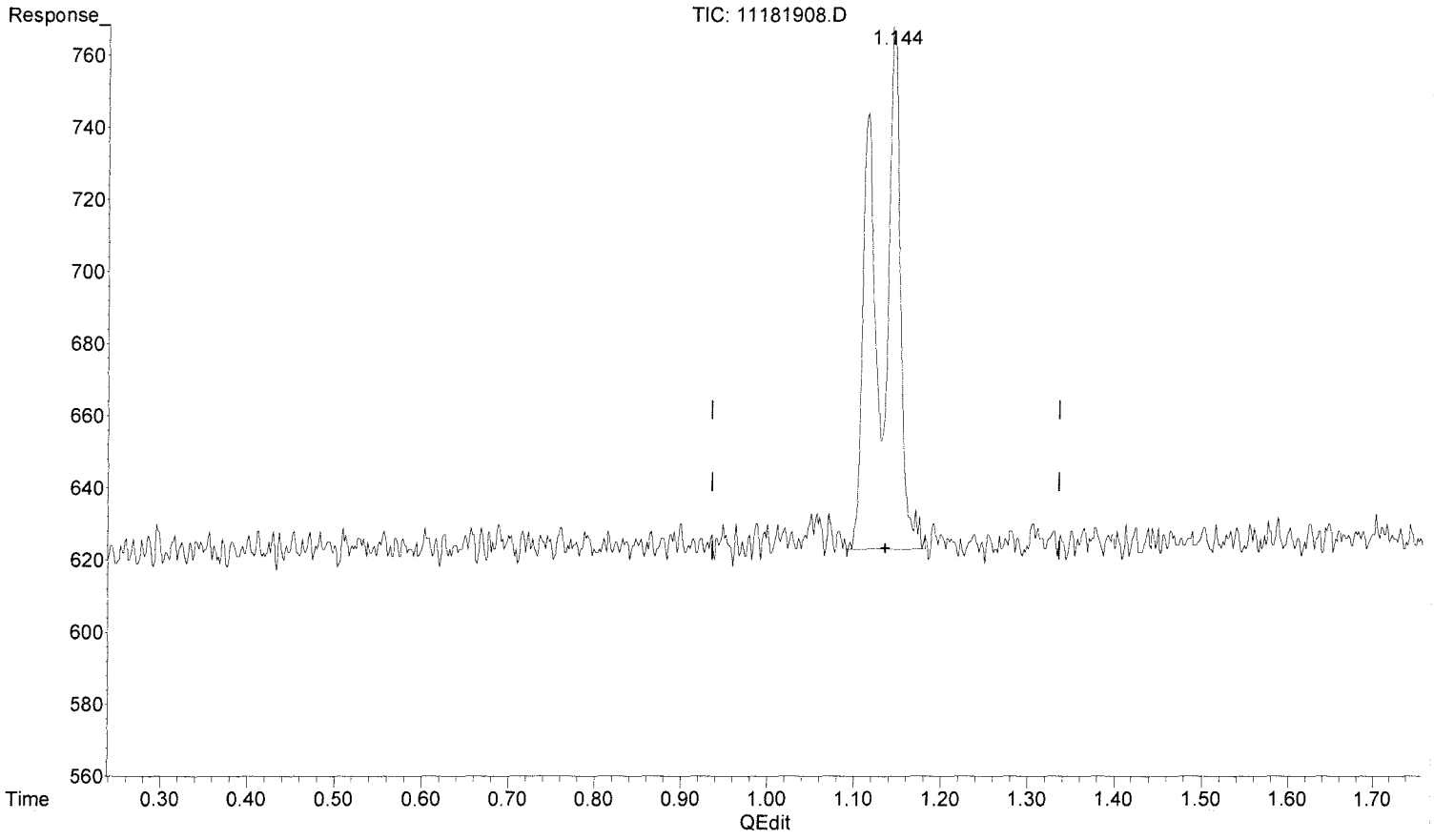
Quantitation Report (Qedit)

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

Quantitation Report (QT Reviewed)

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 :

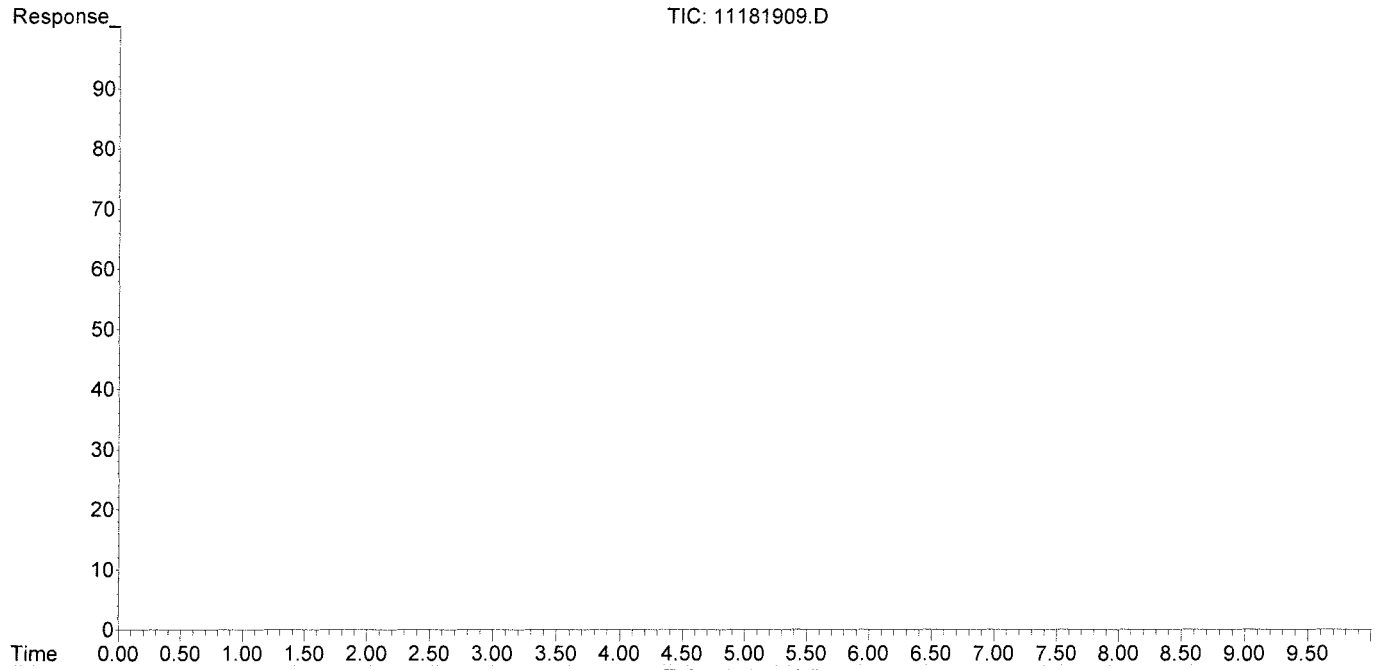
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.116	14418	1.590	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	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

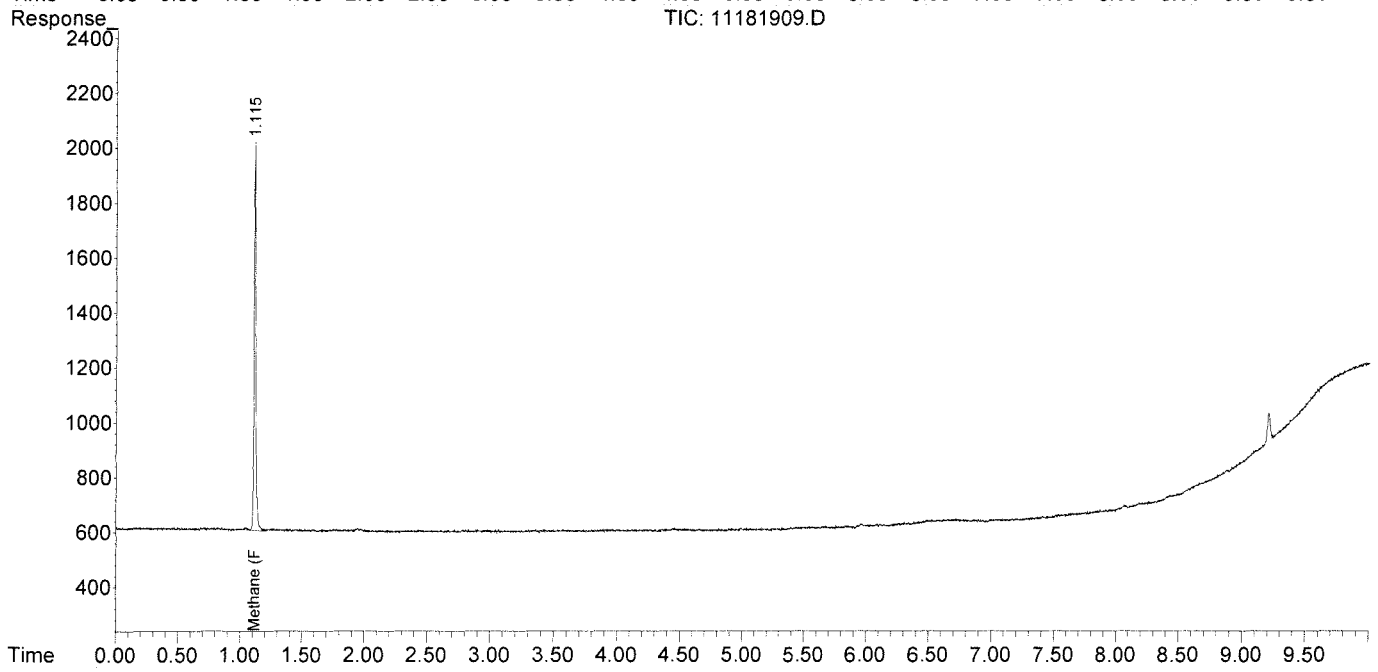
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





Quantitation Report (QT Reviewed)

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 :

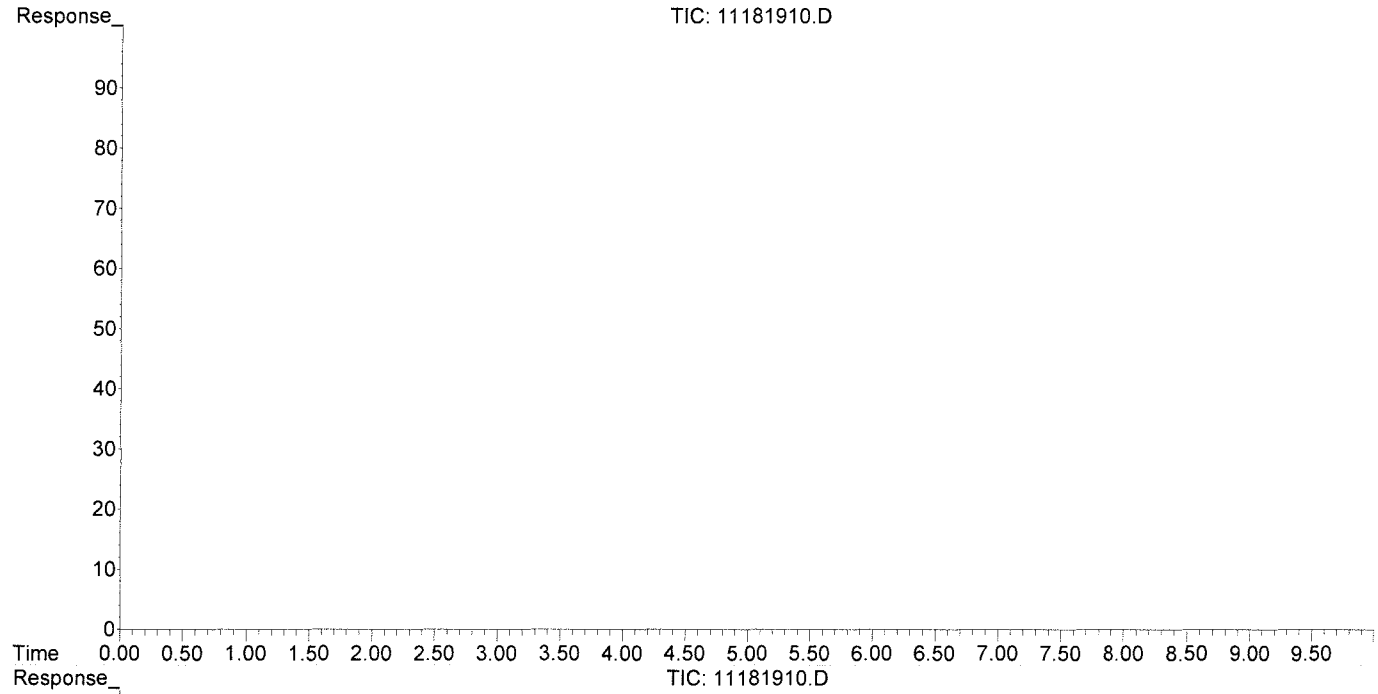
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.119	5075	0.560	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	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

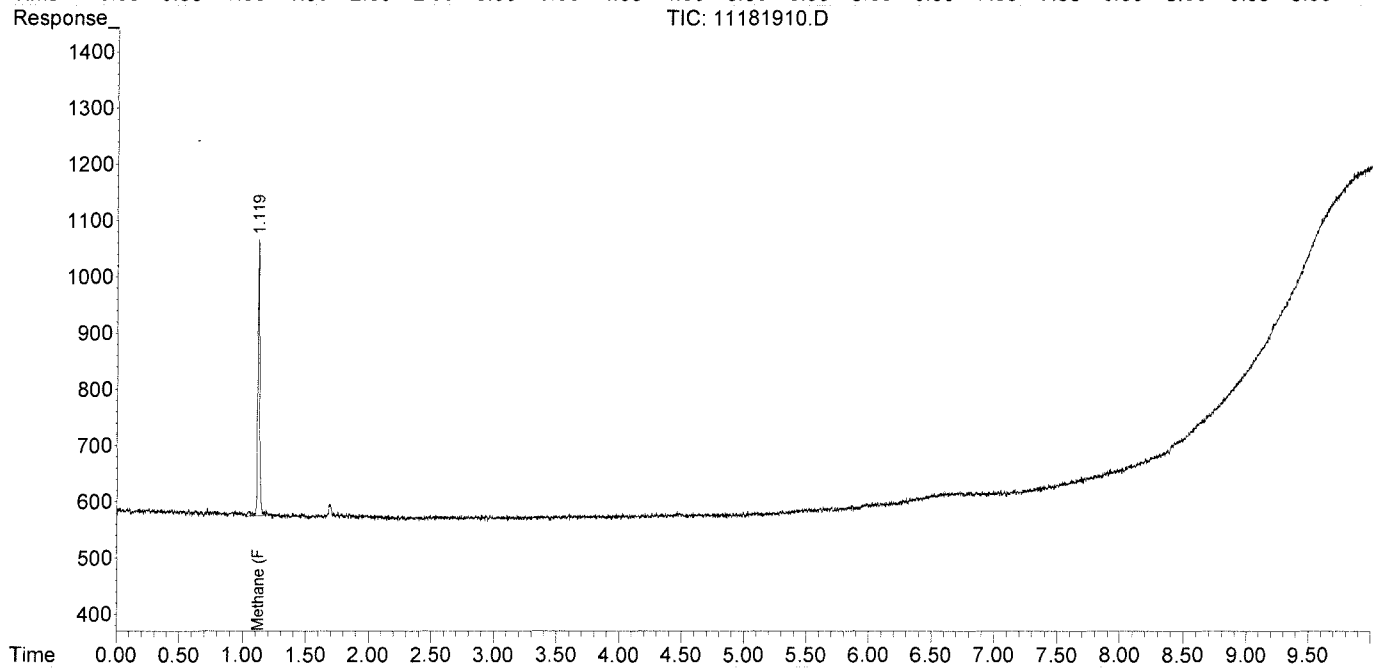
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





Quantitation Report (QT Reviewed)

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 :

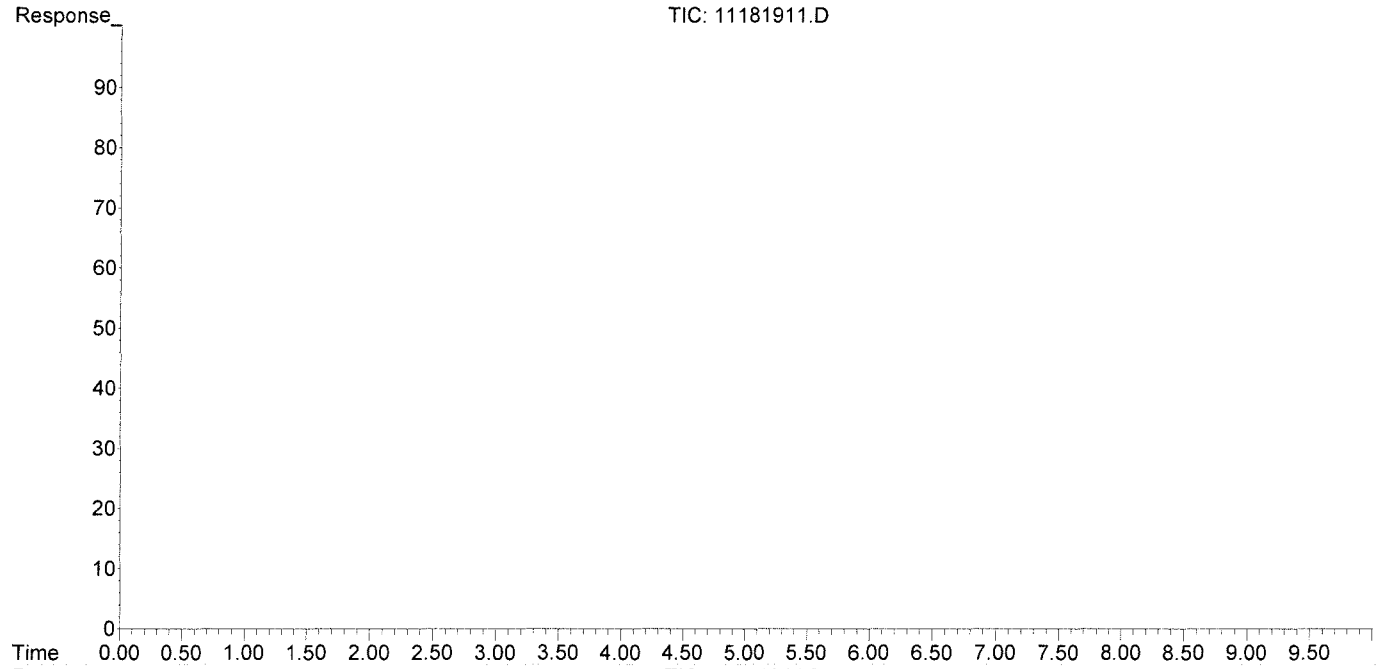
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.111	32616	3.596	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	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

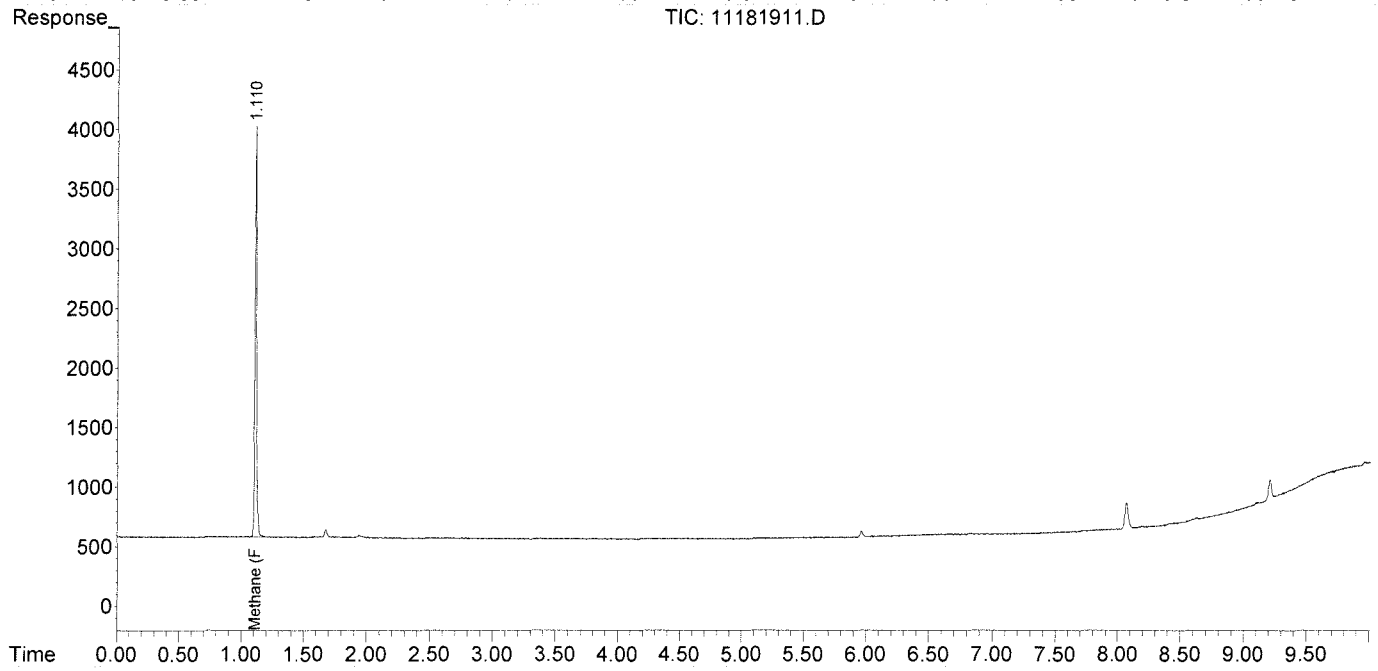
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





Quantitation Report (QT Reviewed)

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 :

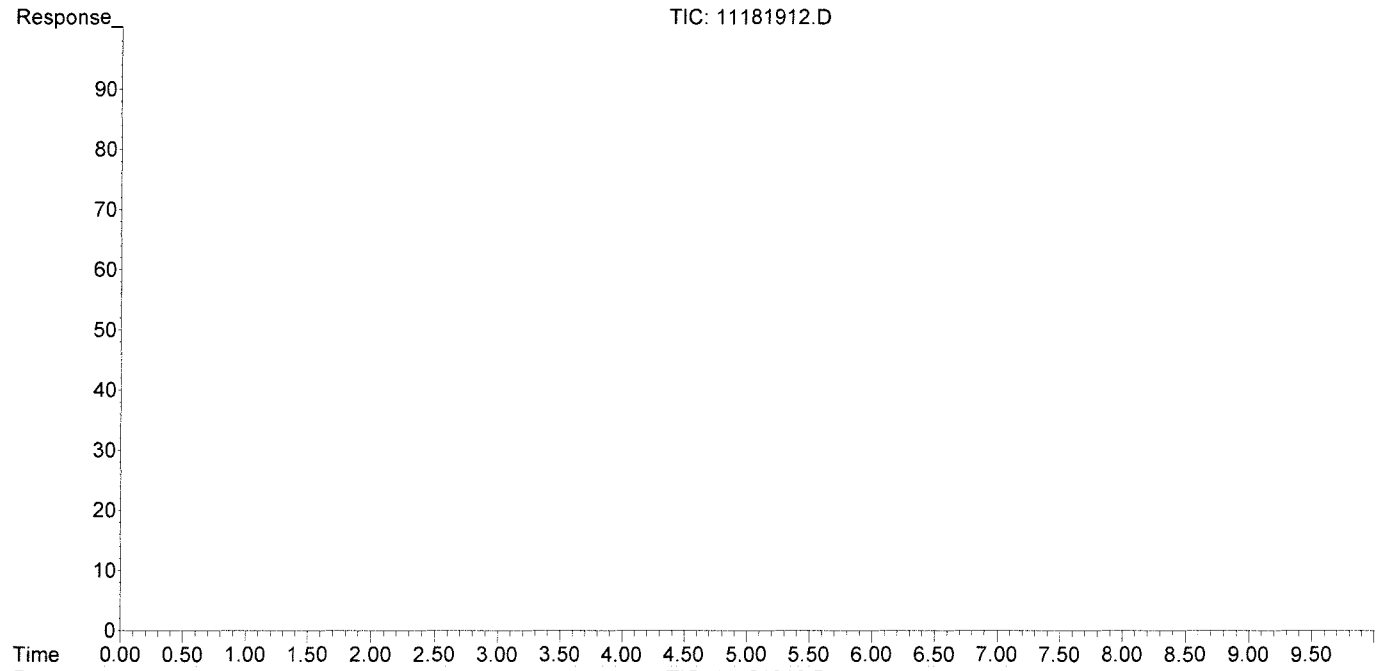
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.121	7128	0.786	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	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

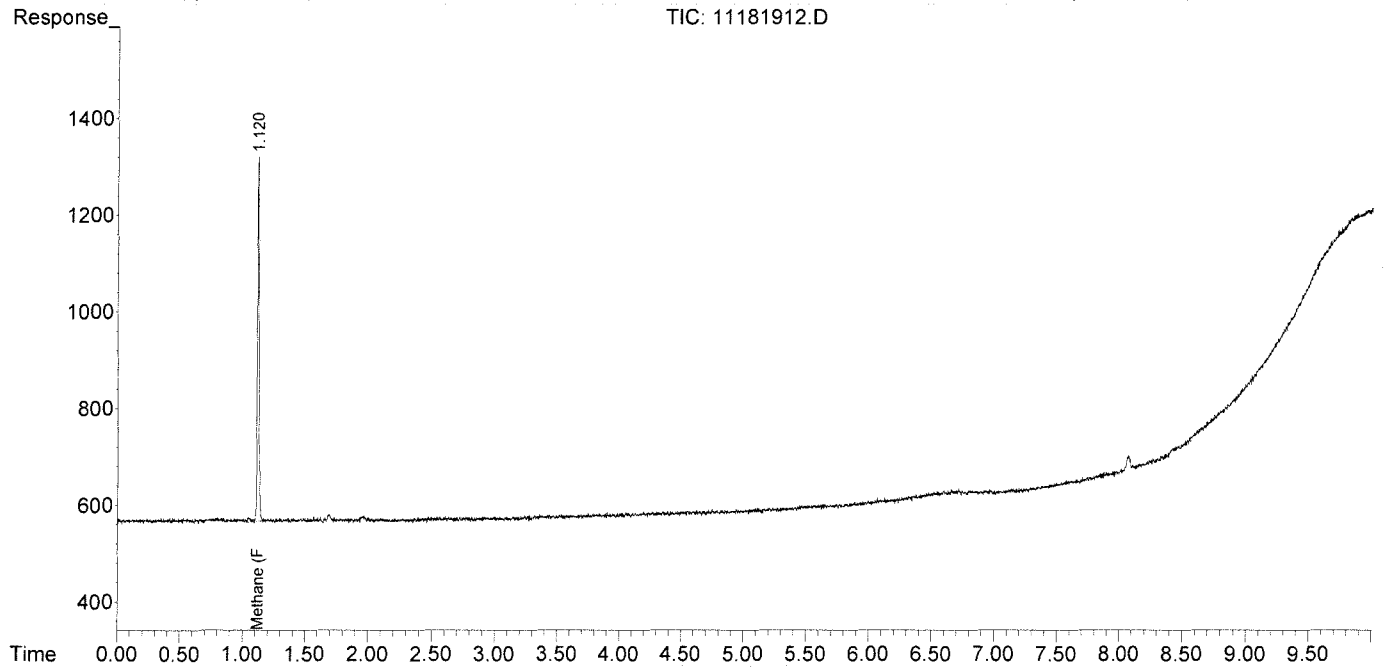
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





Quantitation Report (QT Reviewed)

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 :

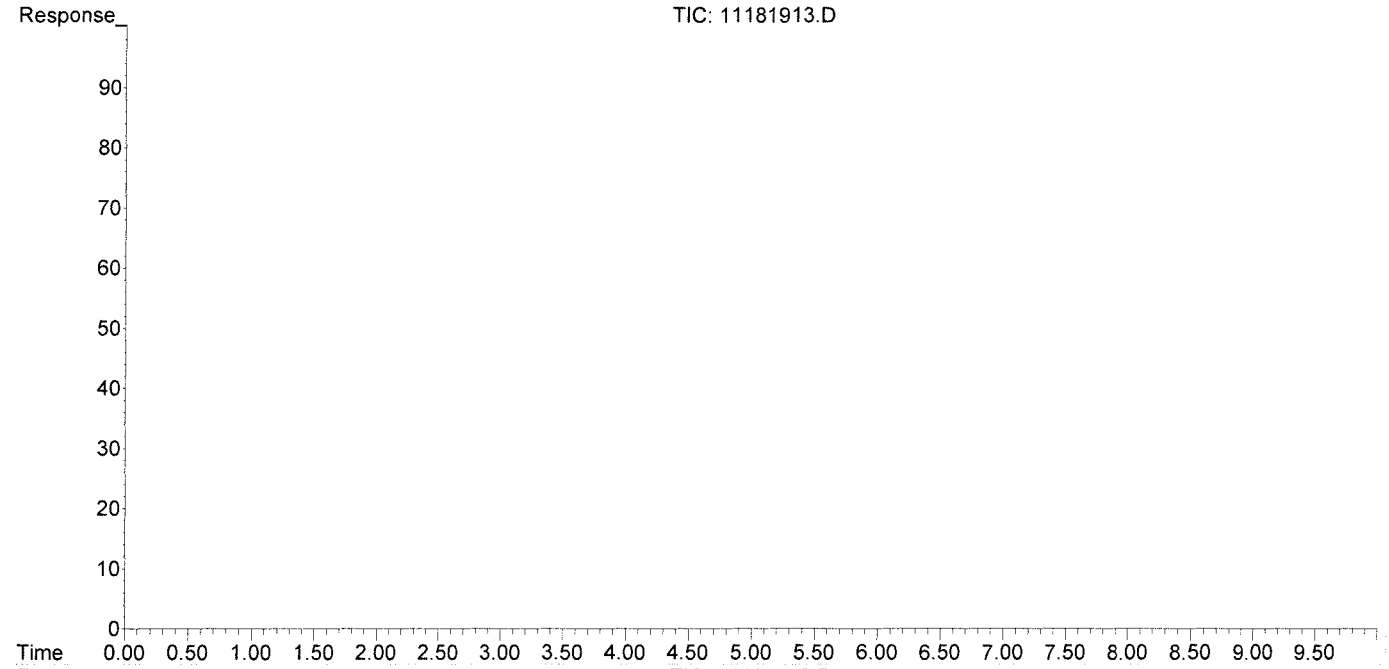
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.118	7753	0.855	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	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

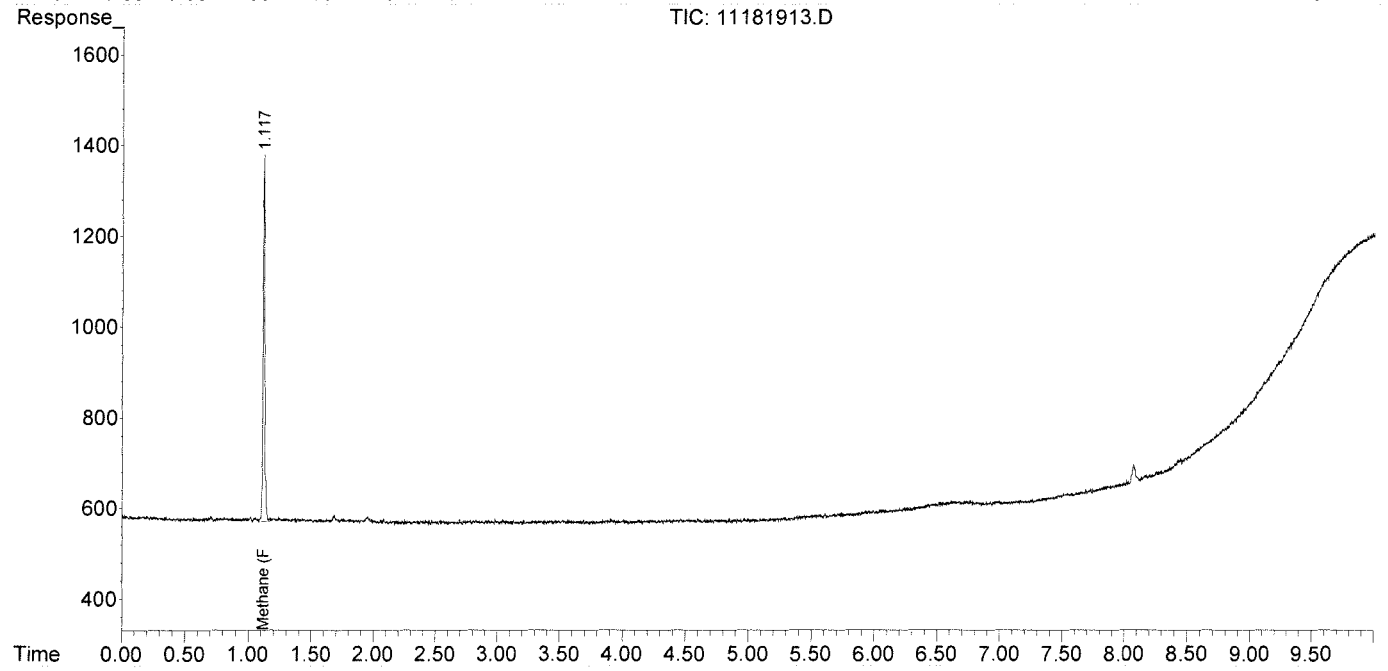
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





Quantitation Report (QT Reviewed)

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 :

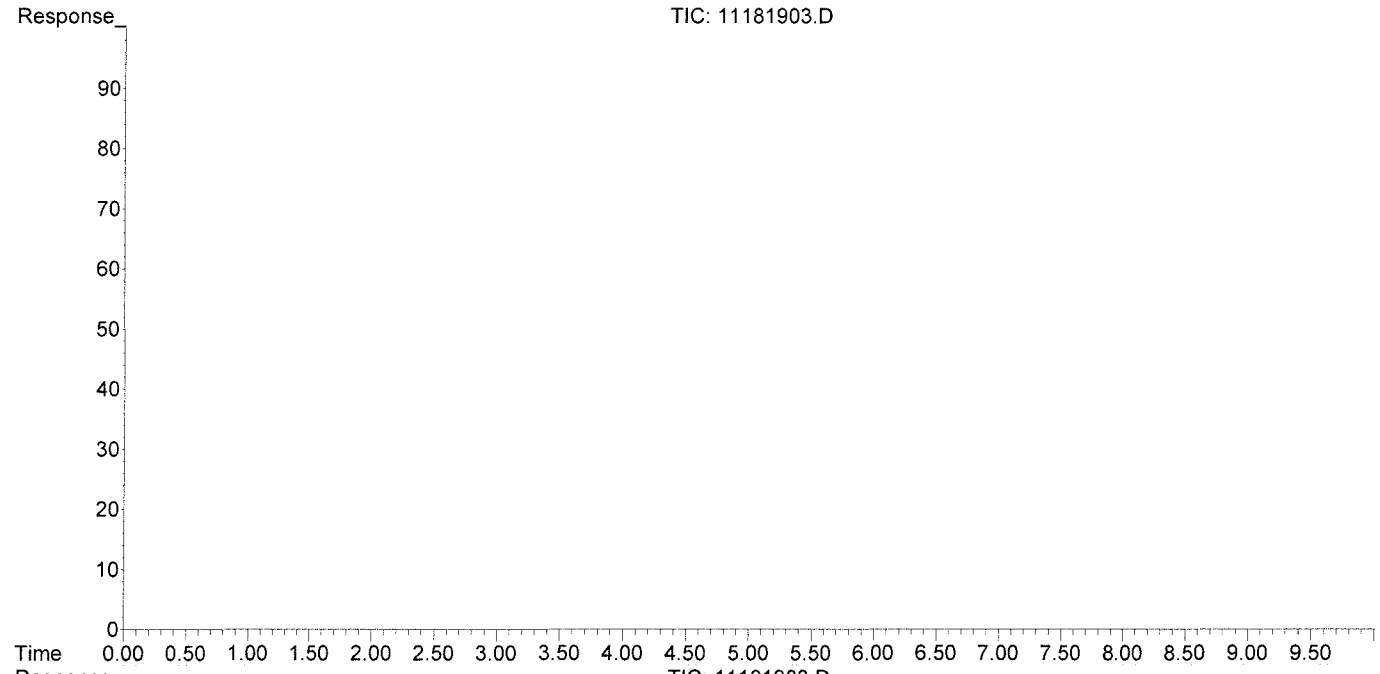
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.117	1685	0.186	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	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

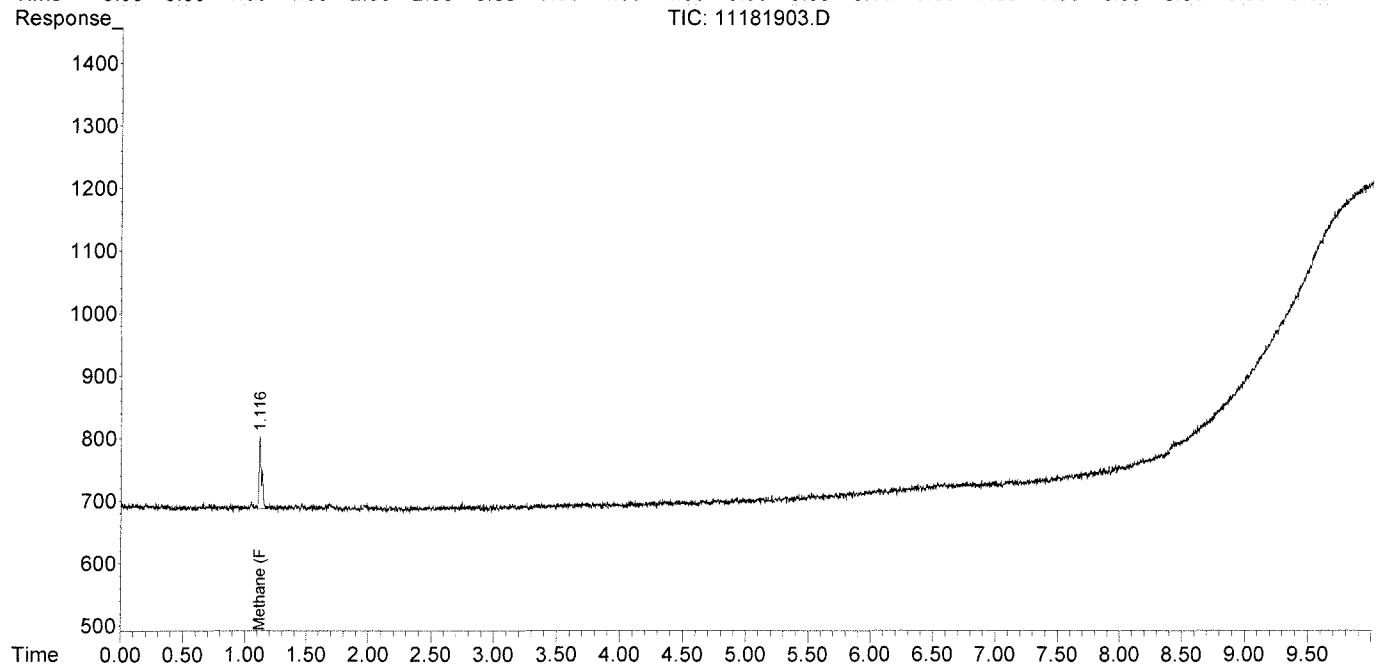
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





Quantitation Report (QT Reviewed)

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 :

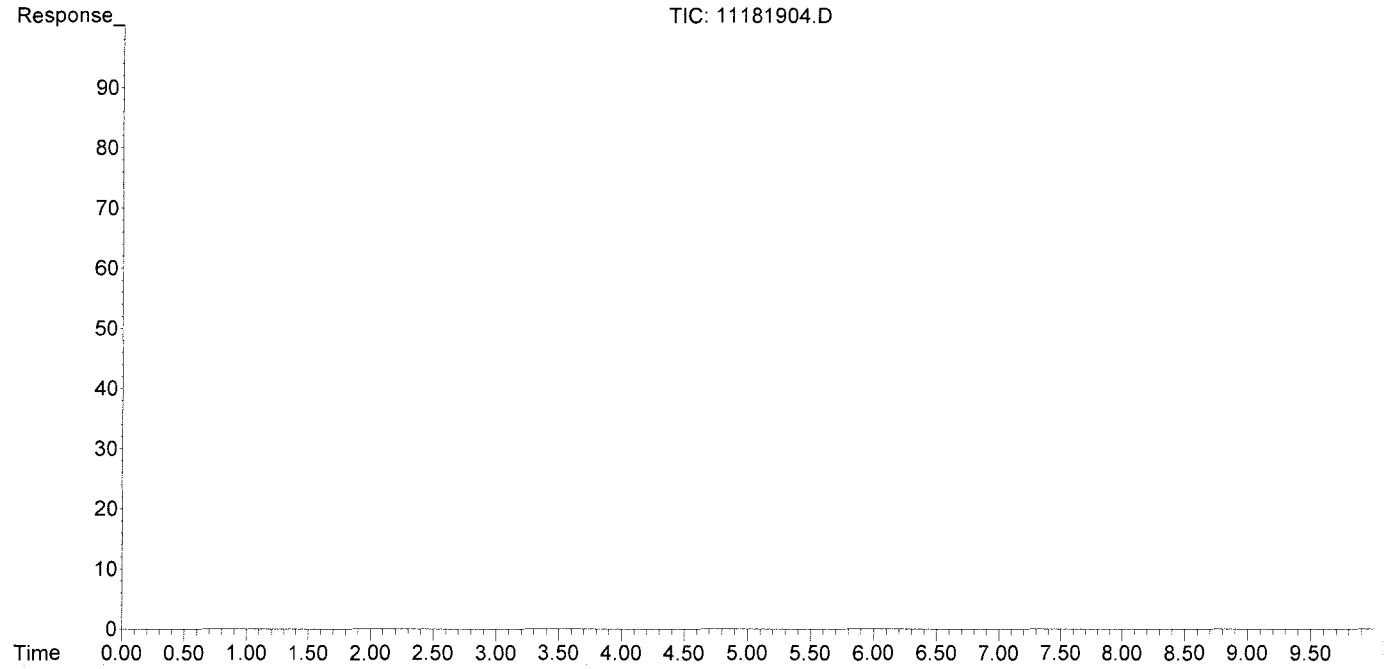
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.104	12525	1.381	ppm
7)	Ethylene	1.678	16145	0.965	ppm
8)	Ethane	1.945	19741	1.165	ppm
9)	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

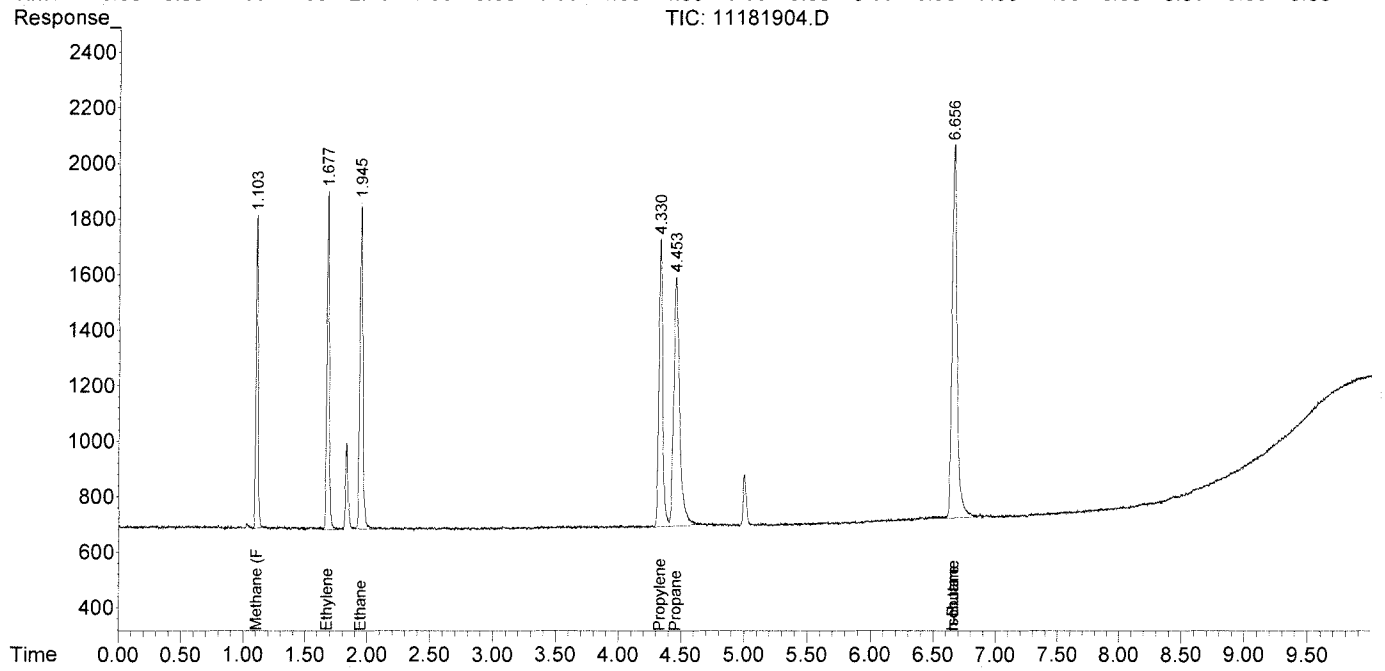
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





Quantitation Report (QT Reviewed)

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 :

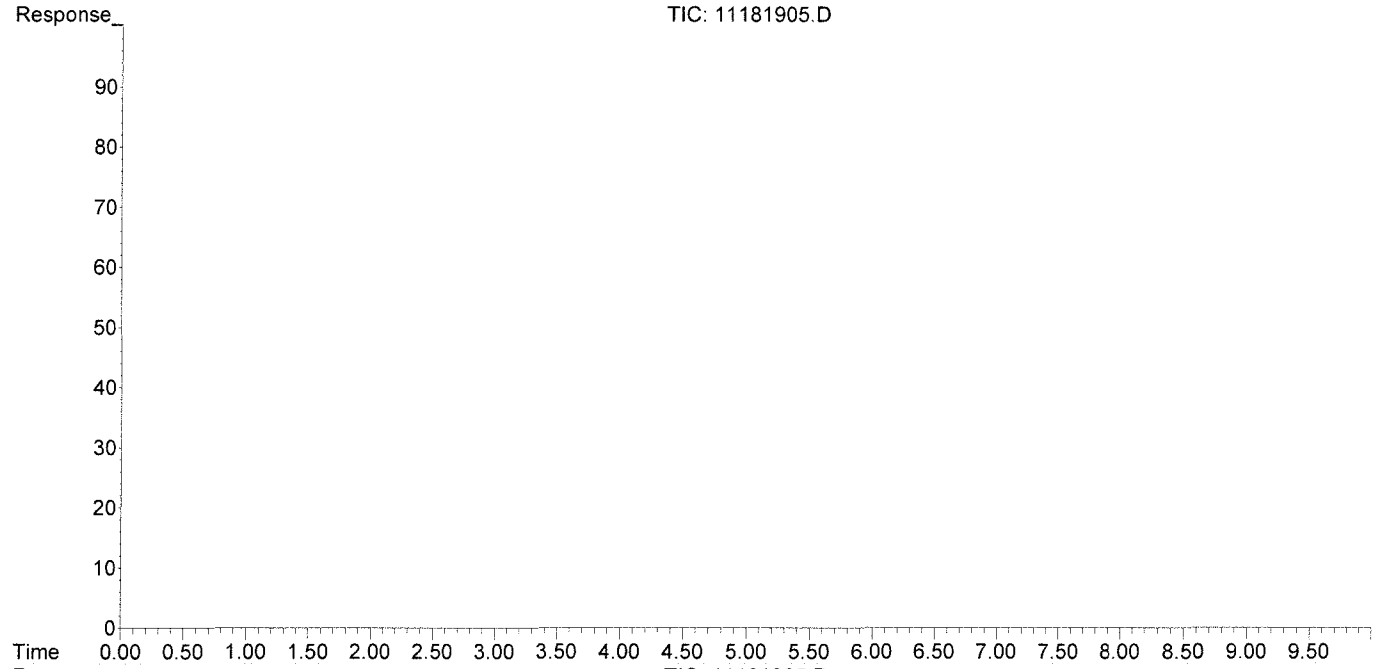
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.120	12378	1.365	ppm
7)	Ethylene	1.693	15989	0.955	ppm
8)	Ethane	1.960	19608	1.157	ppm
9)	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

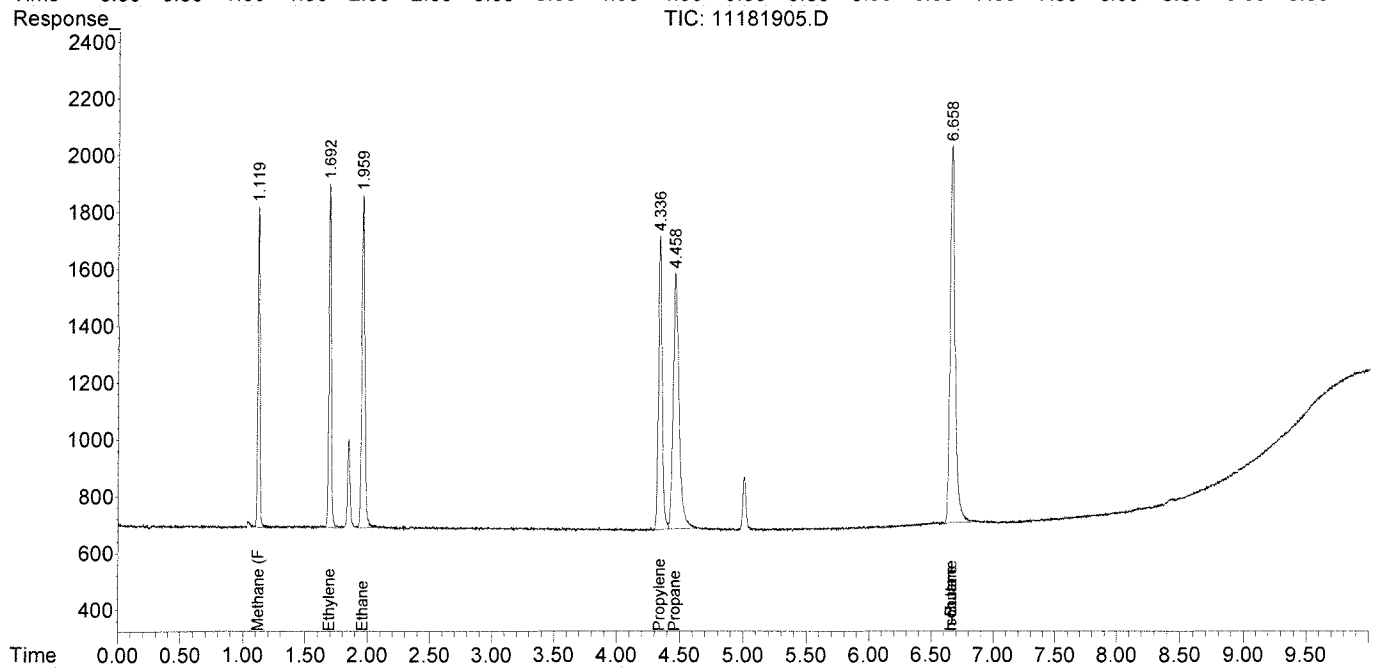
(f)=RT Delta > 1/2 Window (m)=manual int.

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)

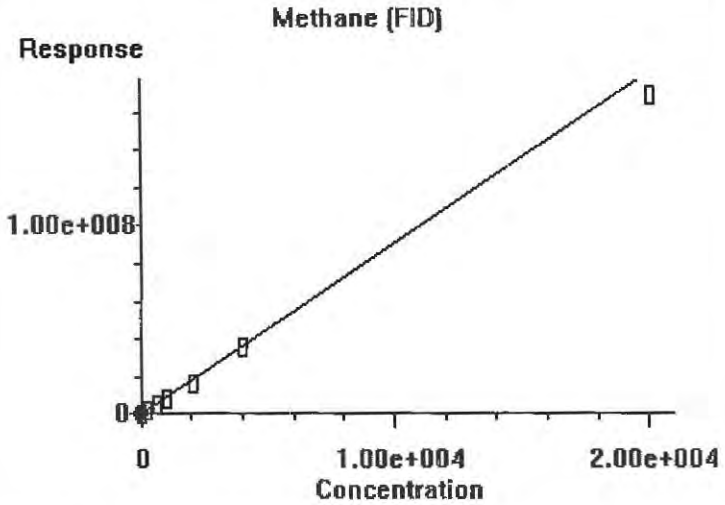
Search by: Ret Time | Name | Index | Find Compound

- 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



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

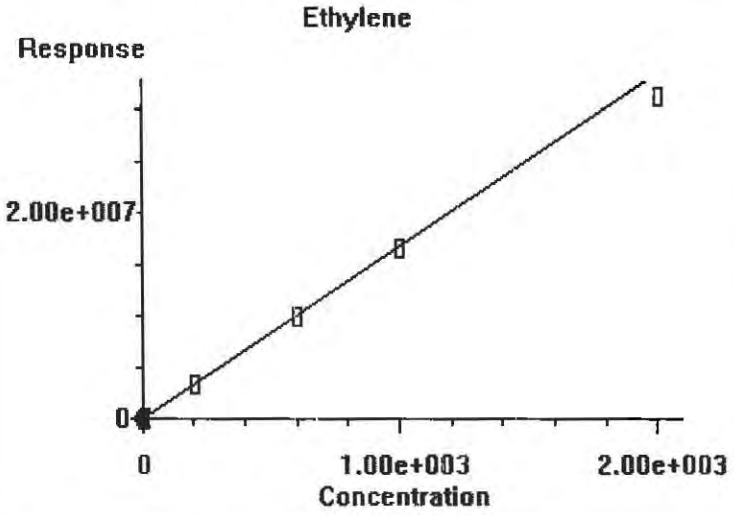
Search by: Ret Time | Name | Index | Find Compound

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

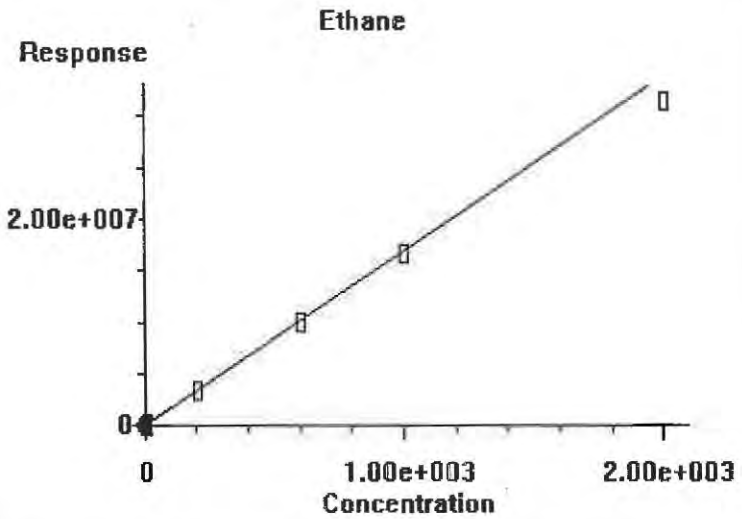
Search by: Ret Time | Name | Index — Find Compound

- 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	



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

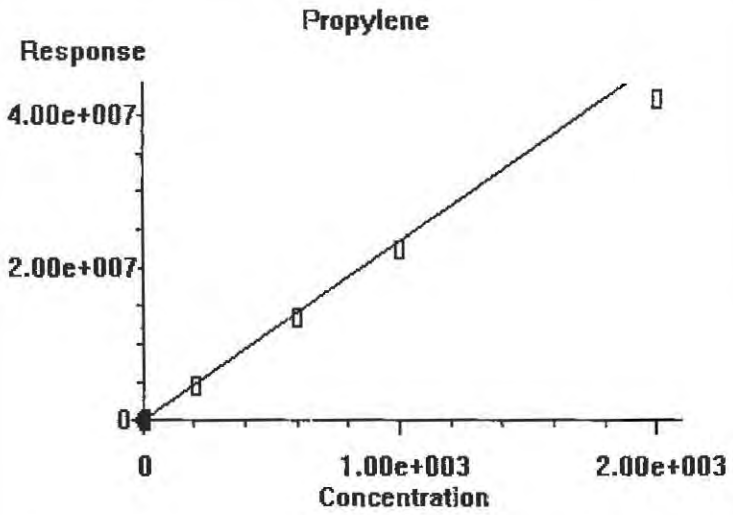
Search by: Ret Time | Name | Index | Find Compound

- 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

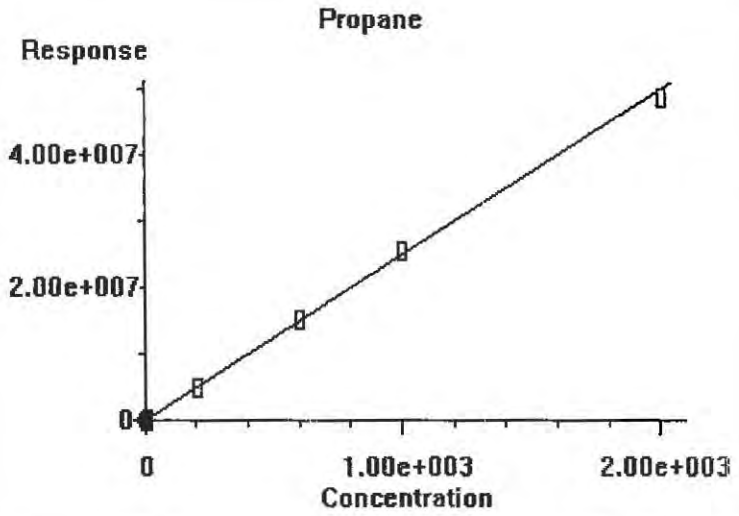
Search by ◉ Ret Time ○ Name ○ Index | Find Compound

- 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.

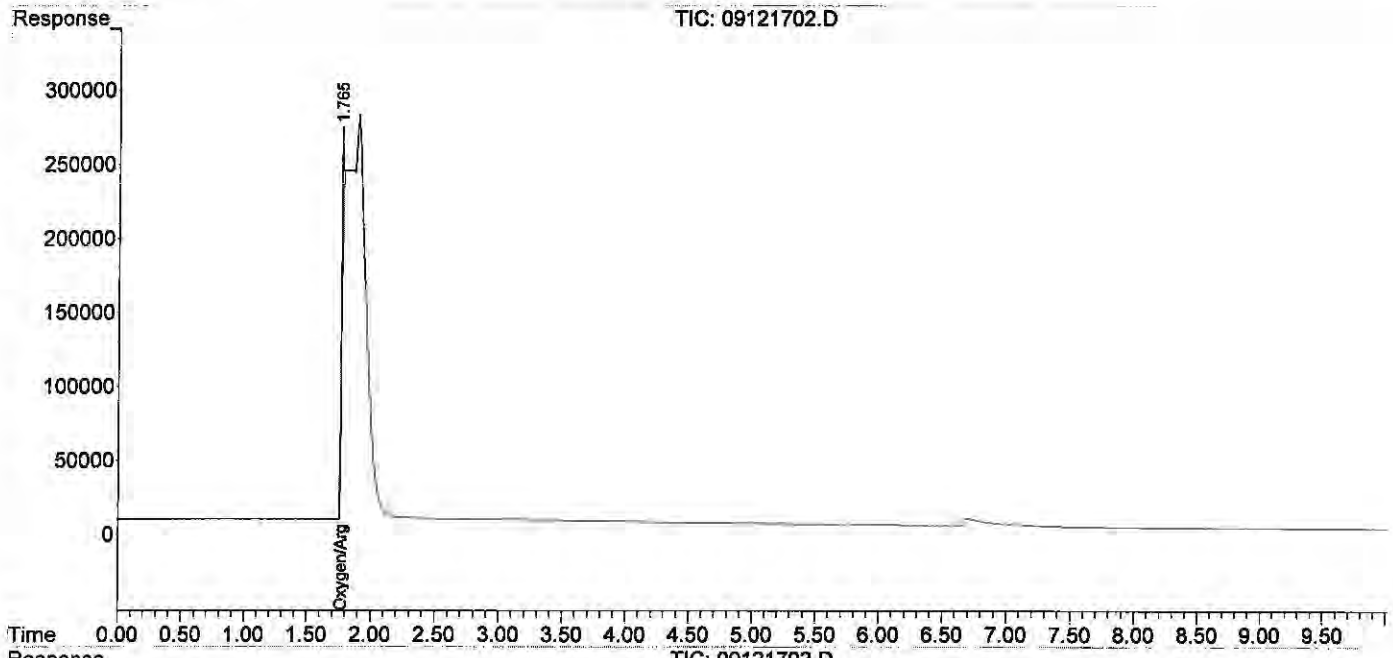
9/13/17

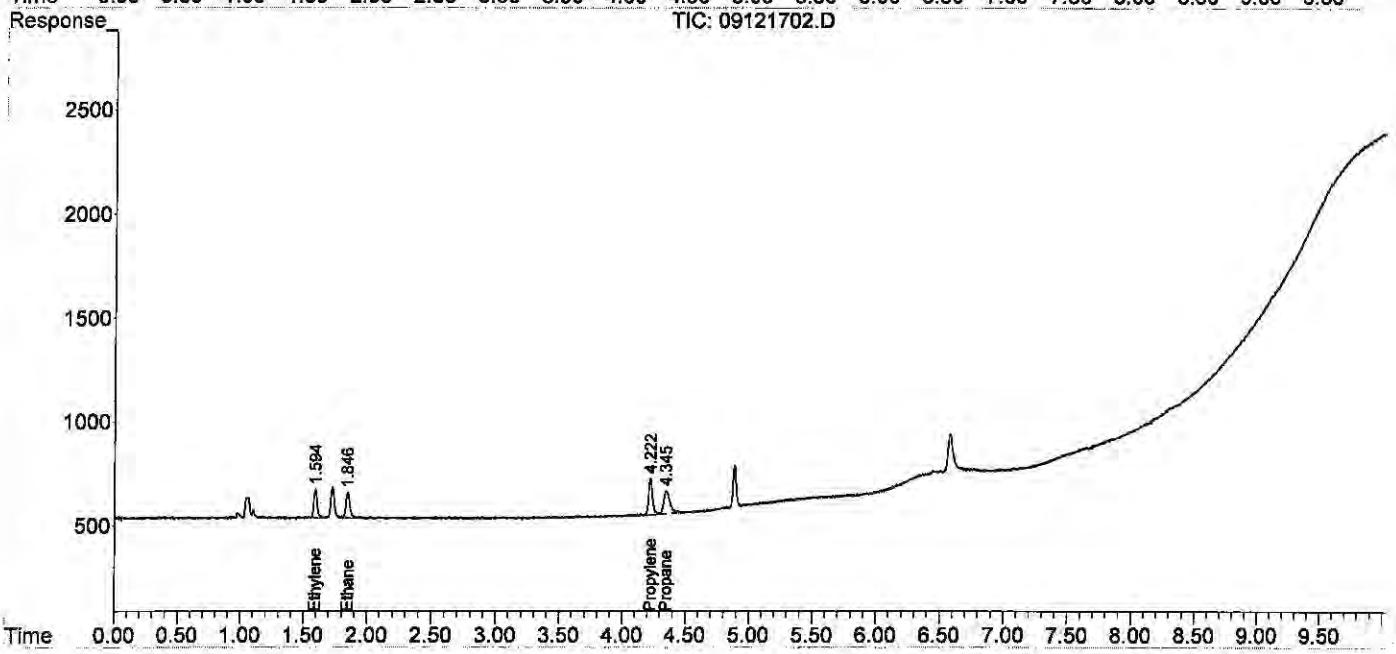
Quantitation Report (QT Reviewed)

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 #1 Info :
Signal #2 Phase:
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	

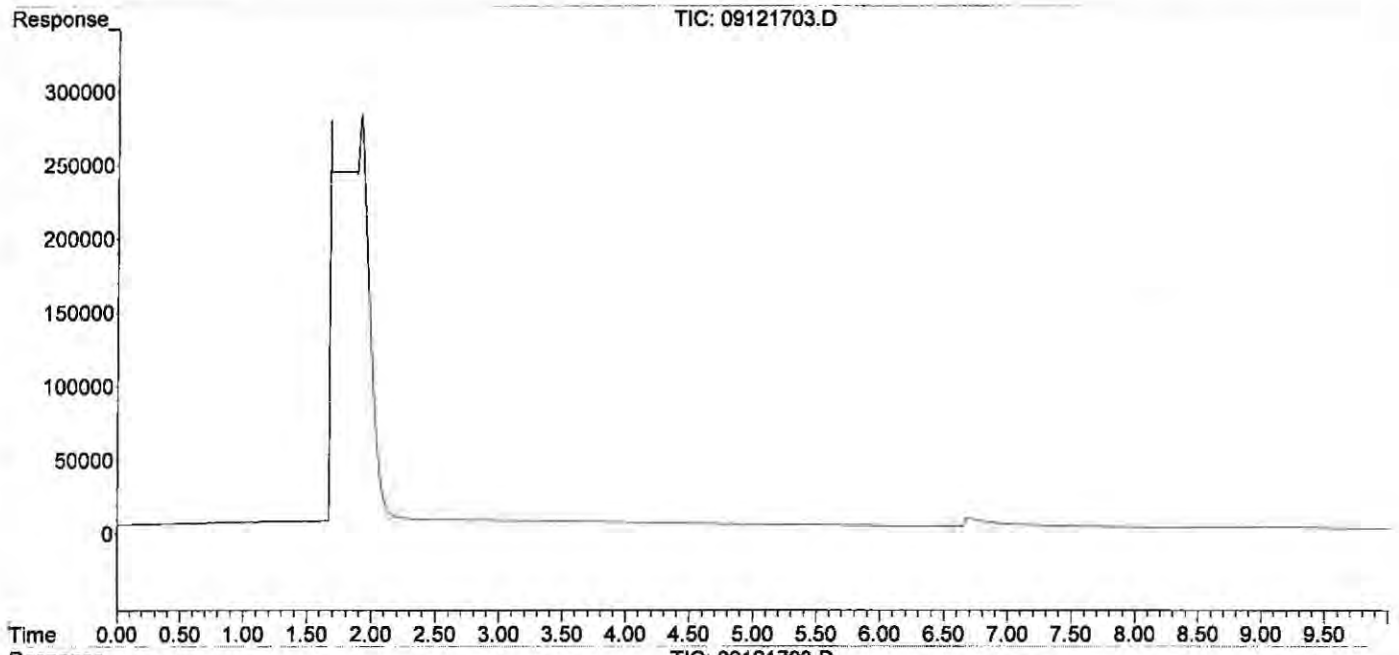
(f)=RT Delta > 1/2 Window (m)=manual int.

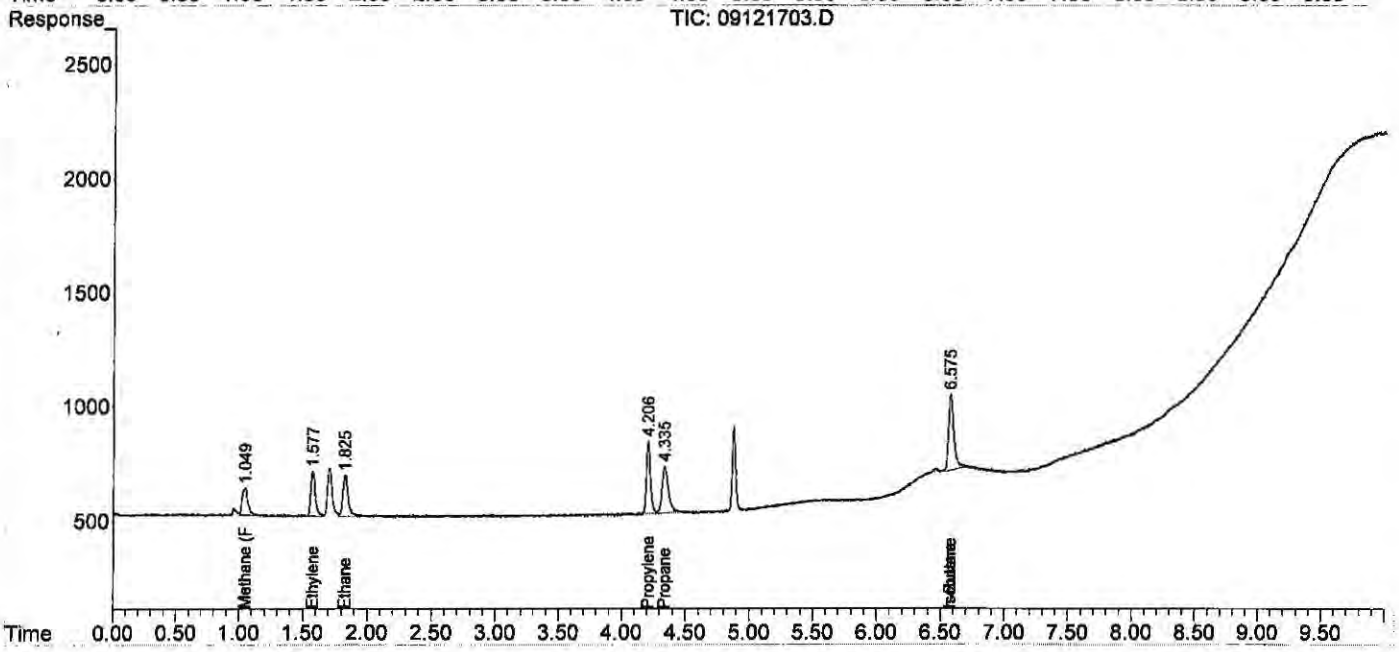
Quantitation Report (QT Reviewed)

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 :



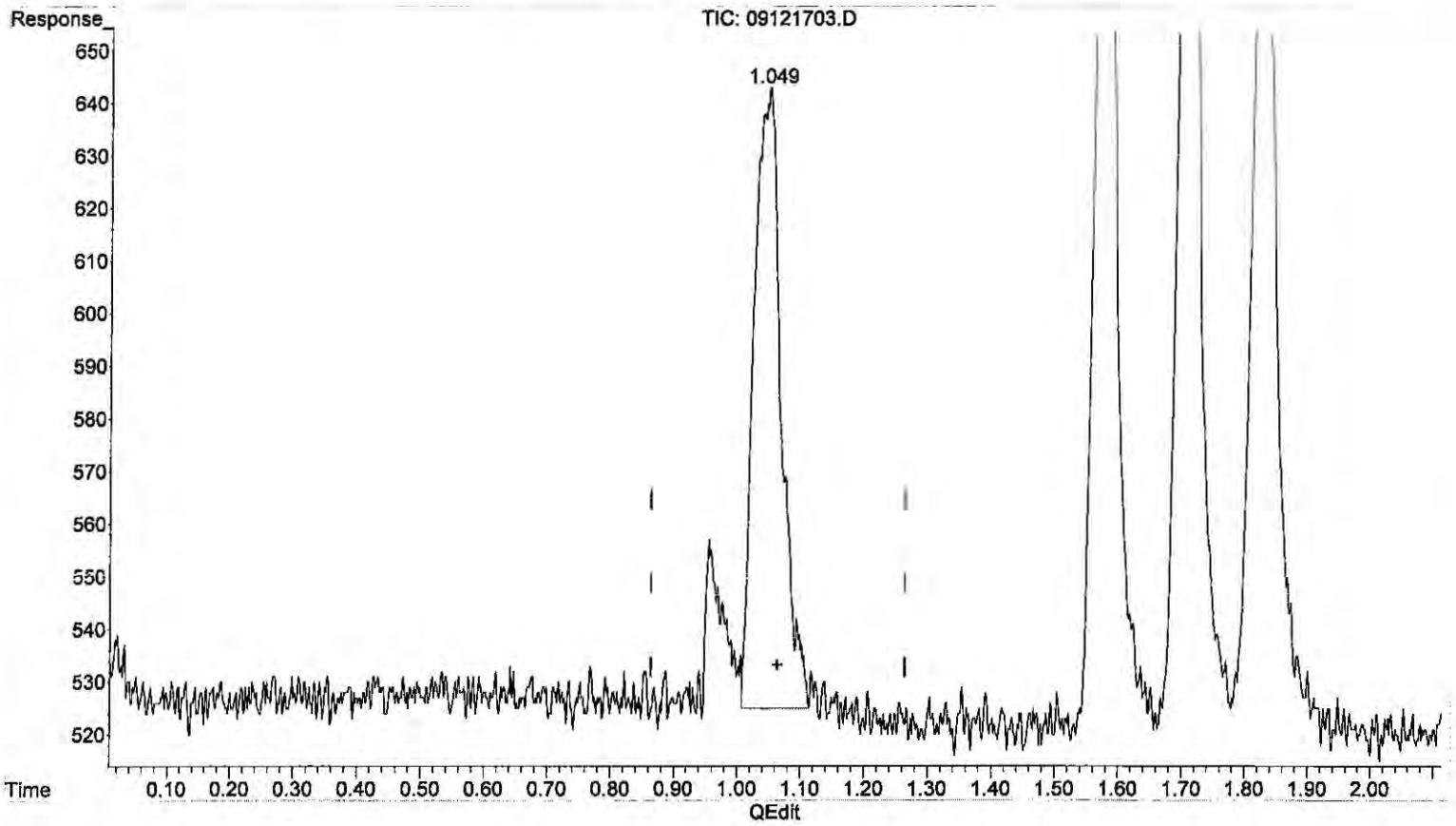


Quantitation Report (Qedit)

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 #2 Phase:
Signal #1 Info : 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 :

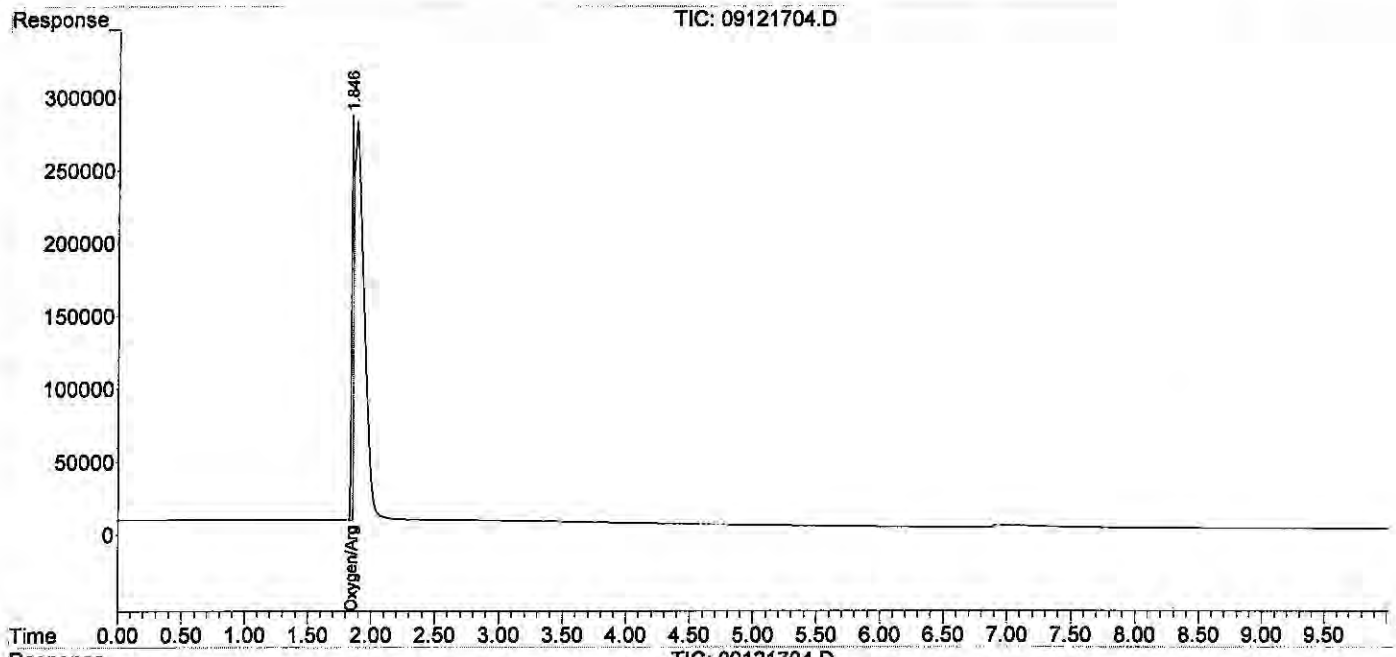
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.847	2536230	1.056	ppm
2)	Carbon monoxide	1.847	2536230	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.064	14725	1.613	ppm
7)	Ethylene	1.598	26885	1.582	ppm
8)	Ethane	1.851	26944	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

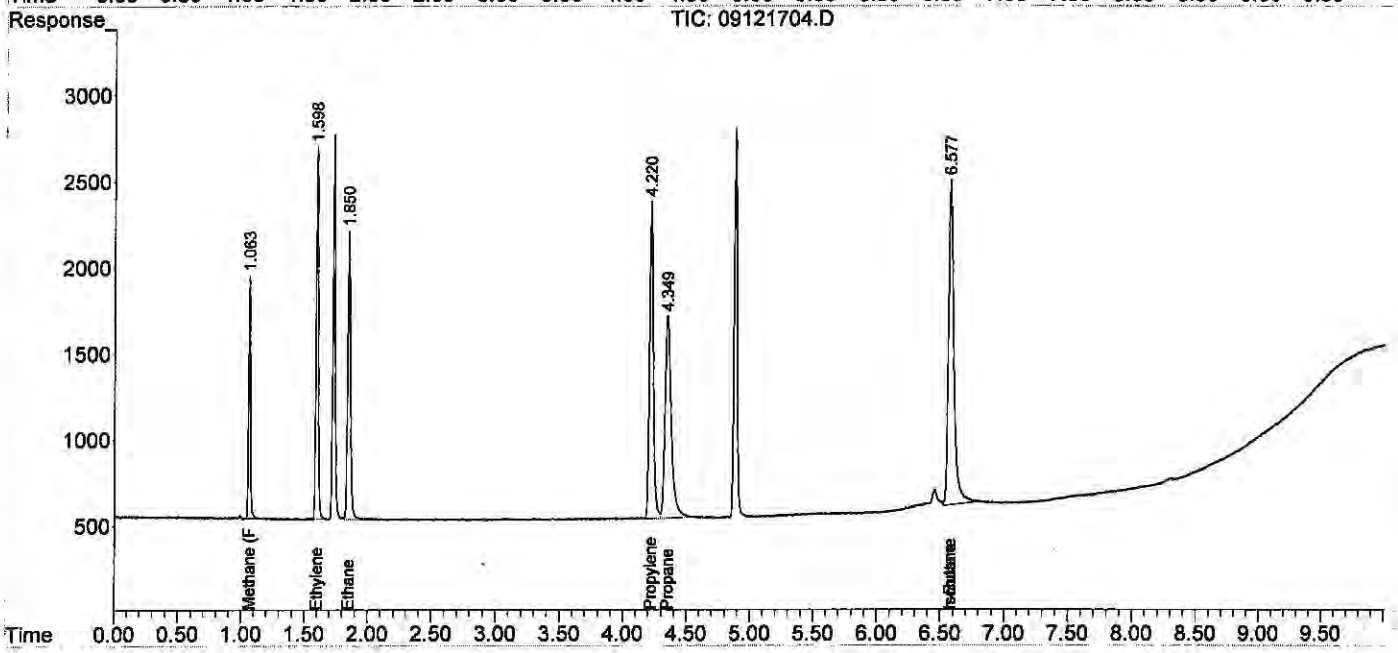
(f)=RT Delta > 1/2 Window (m)=manual int.

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

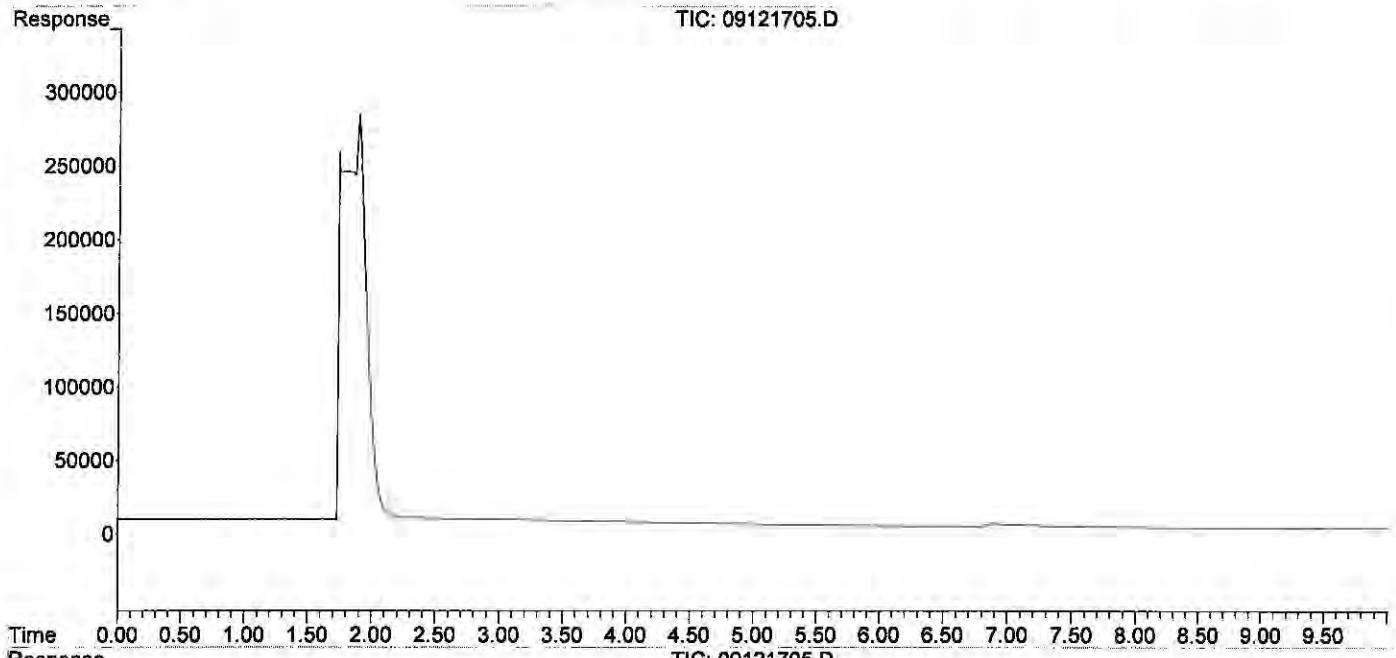
(f)=RT Delta > 1/2 Window (m)=manual int.

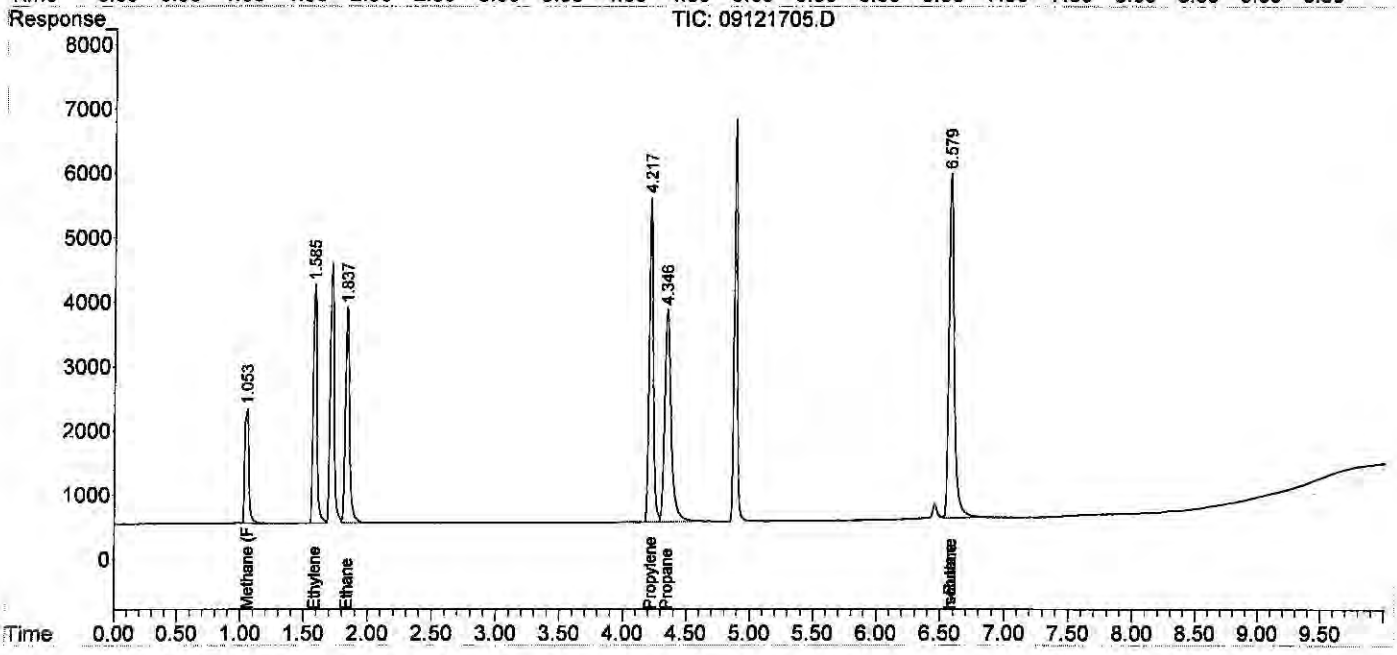
Quantitation Report (QT Reviewed)

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 :





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

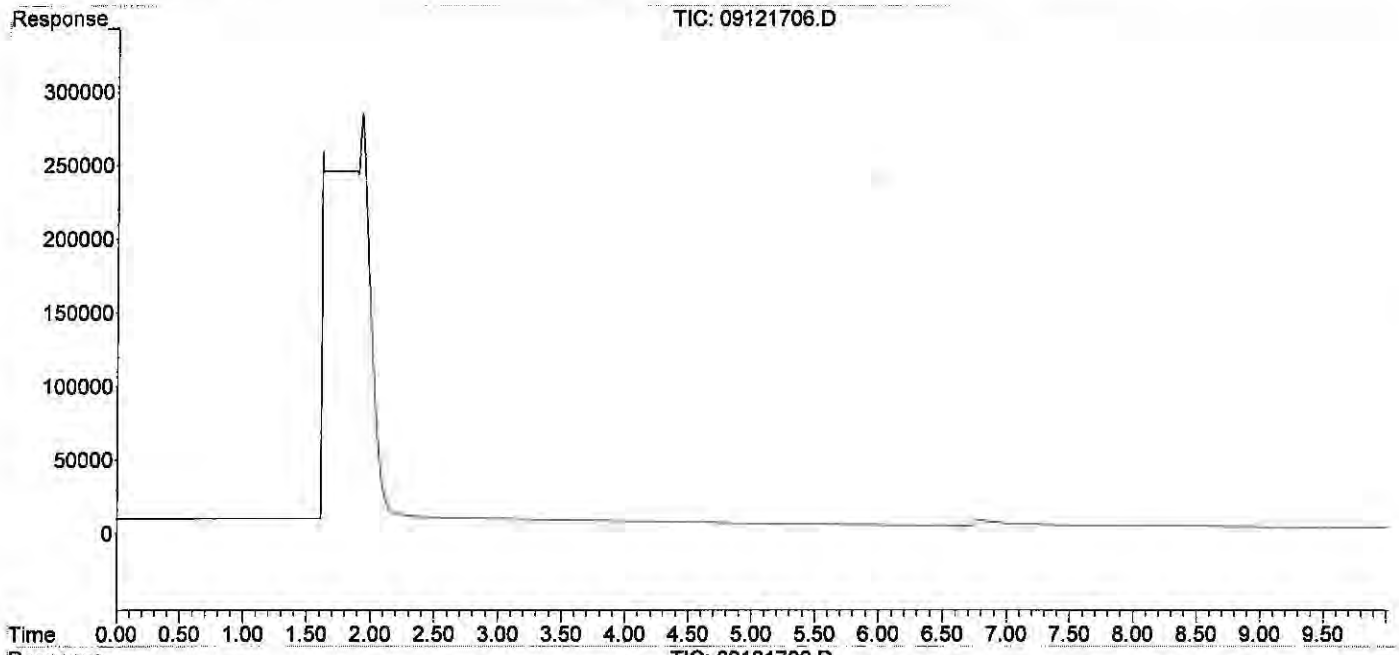
(f)=RT Delta > 1/2 Window (m)=manual int.

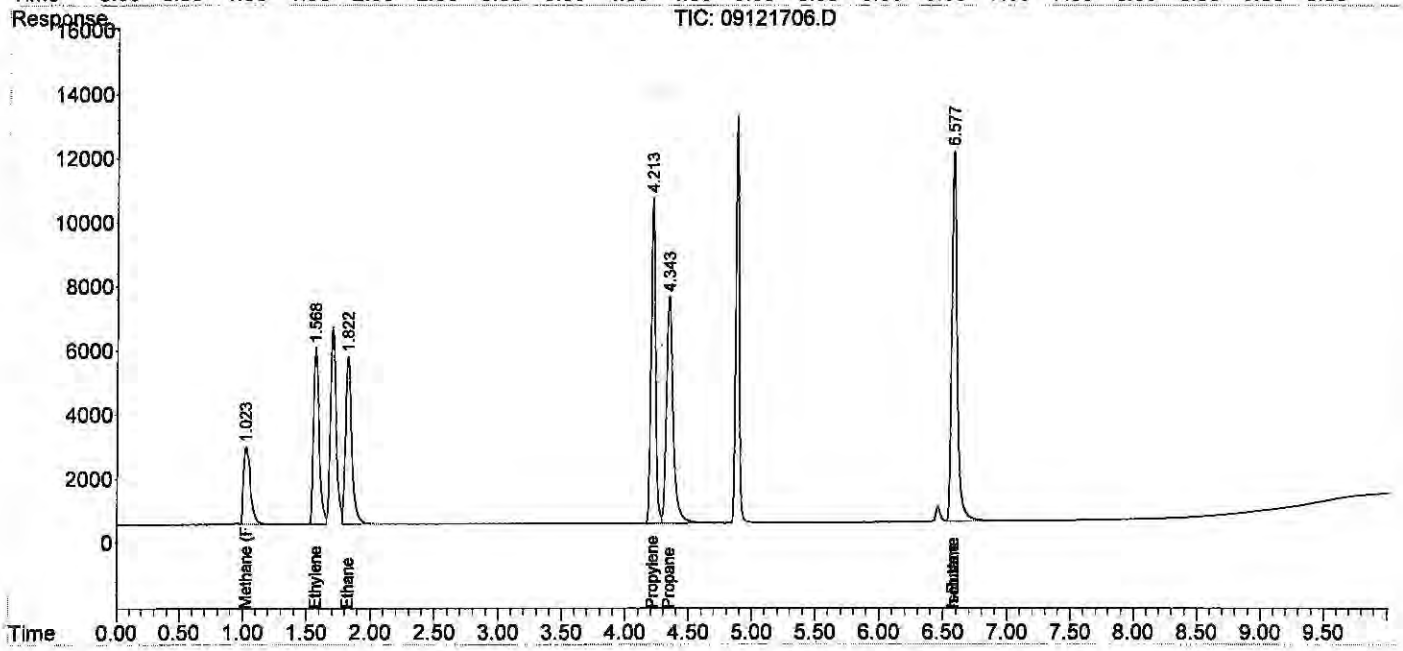
Quantitation Report (QT Reviewed)

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

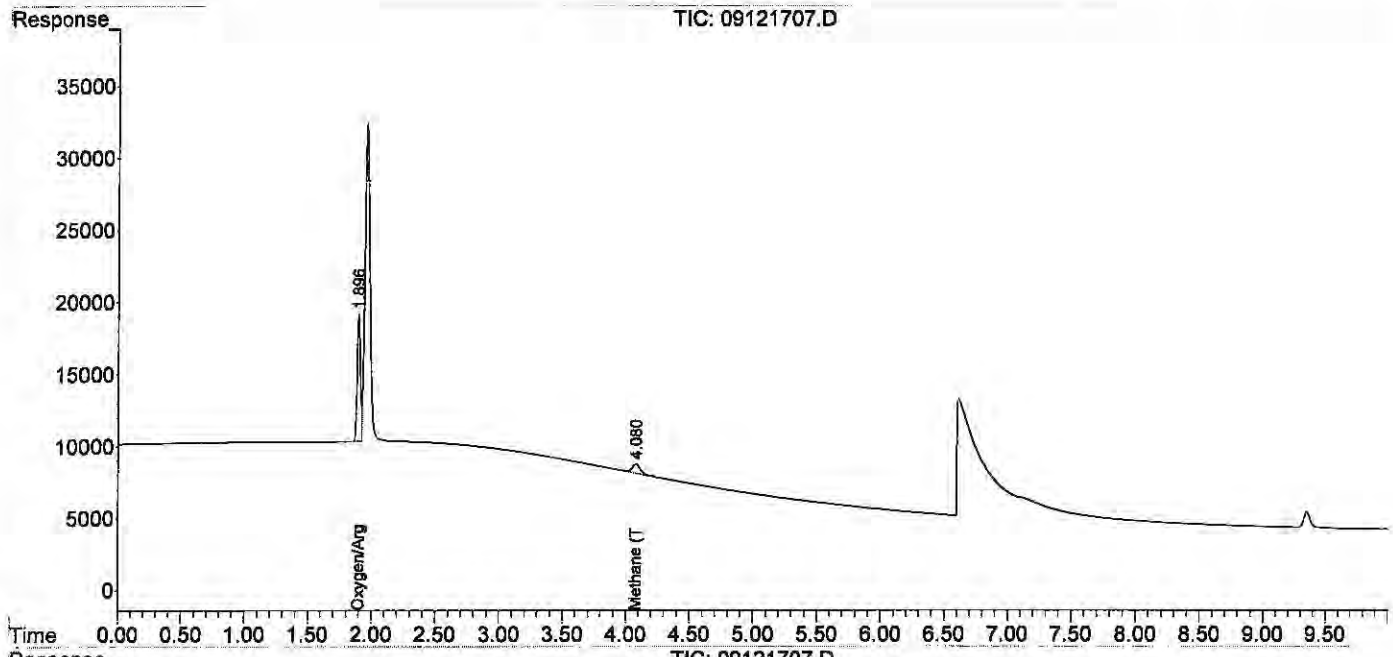
(f)=RT Delta > 1/2 Window (m)=manual int.

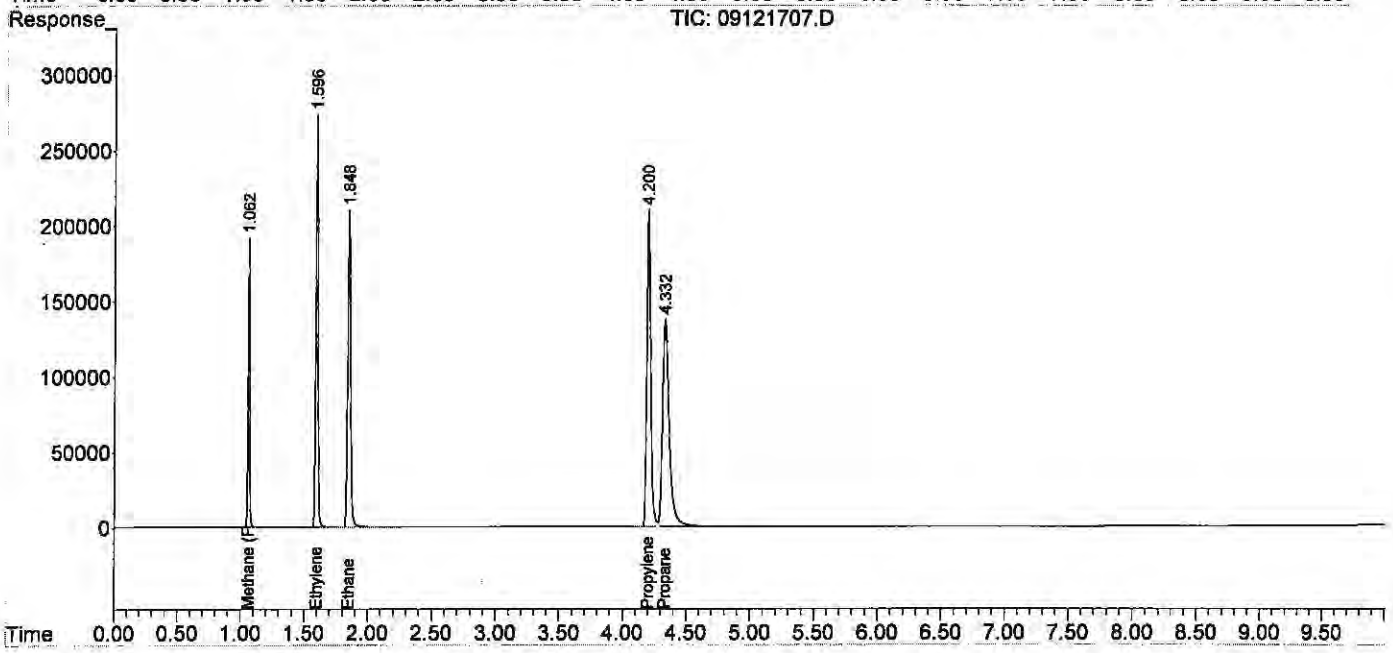
Quantitation Report (QT Reviewed)

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

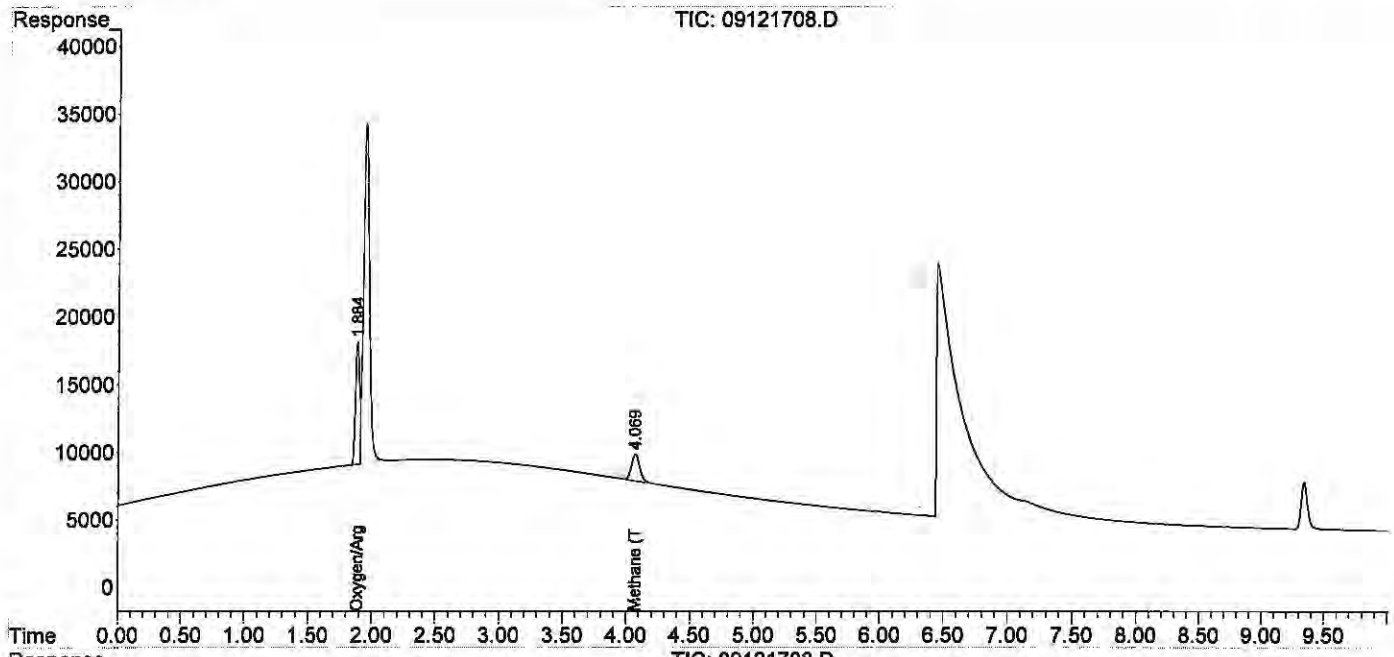
(f)=RT Delta > 1/2 Window (m)=manual int.

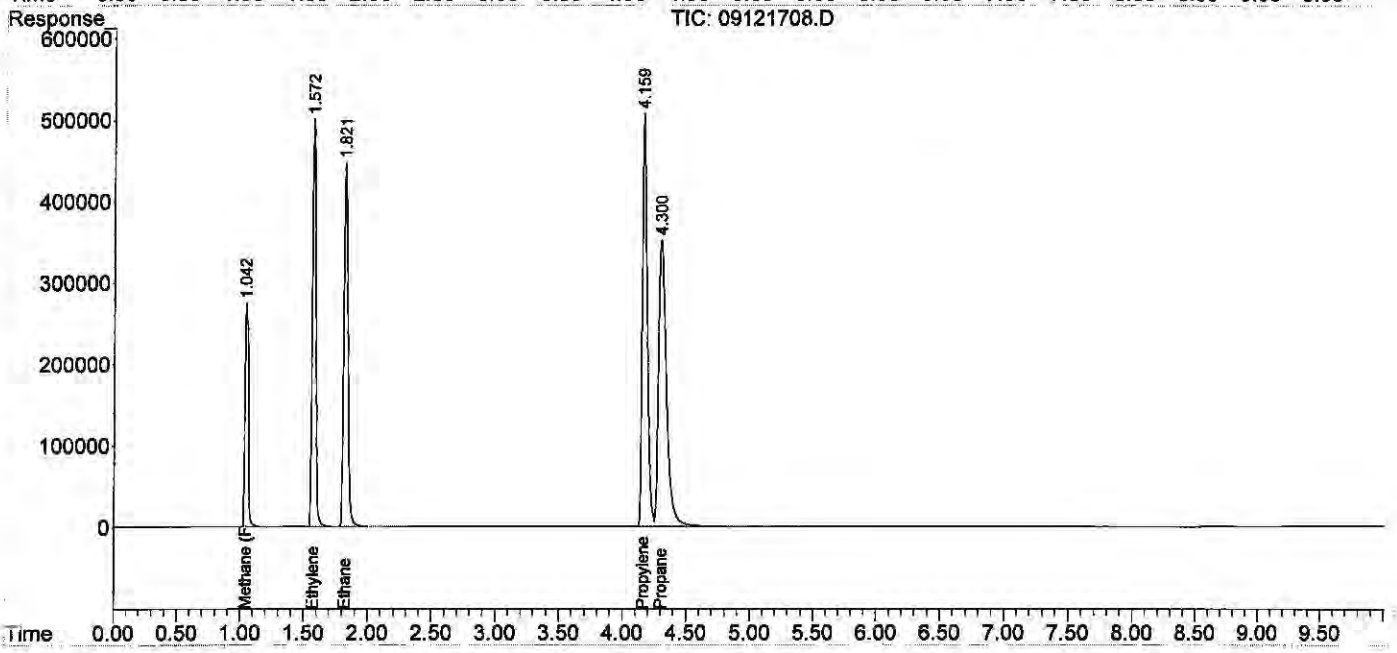
Quantitation Report (QT Reviewed)

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 :

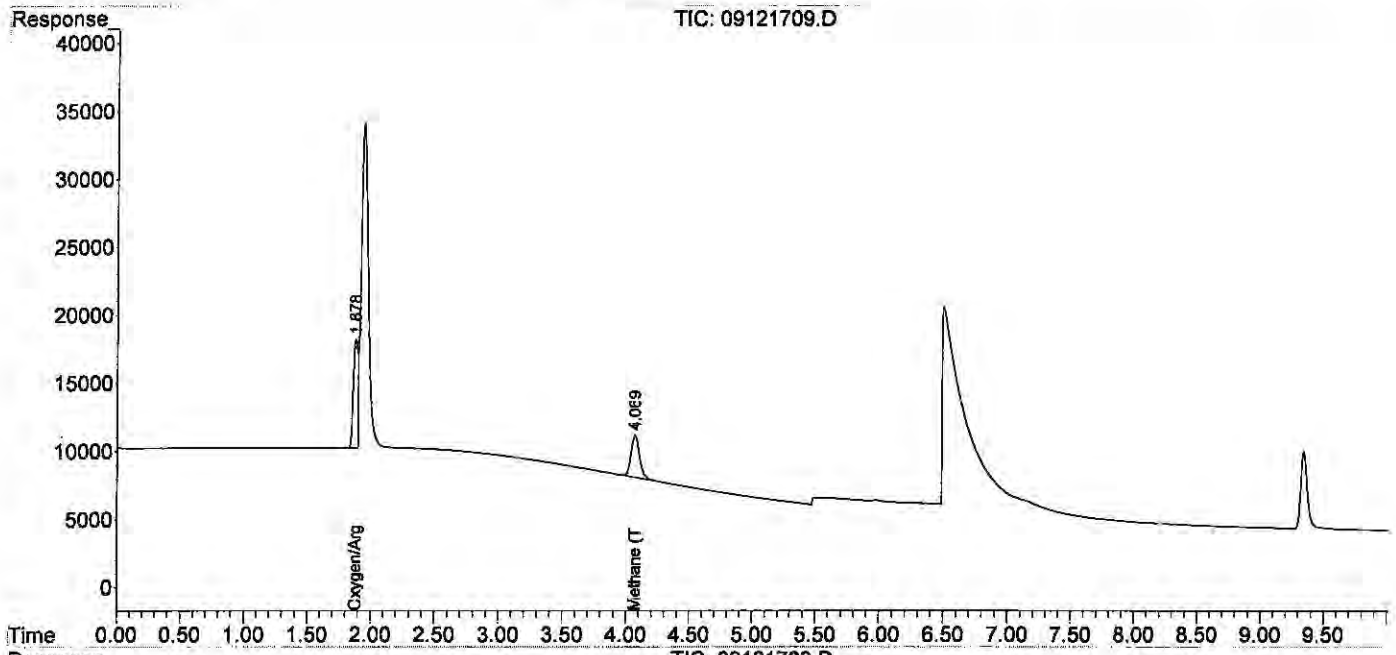
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.879	192611	0.162	ppm
2)	Carbon monoxide	1.879	192611	N.D.	ppm
3)	Methane (TCD)	4.070f	145492	1244.729	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.039	8598534	945.644	ppm
7)	Ethylene	1.576	16608504	981.887	ppm
8)	Ethane	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

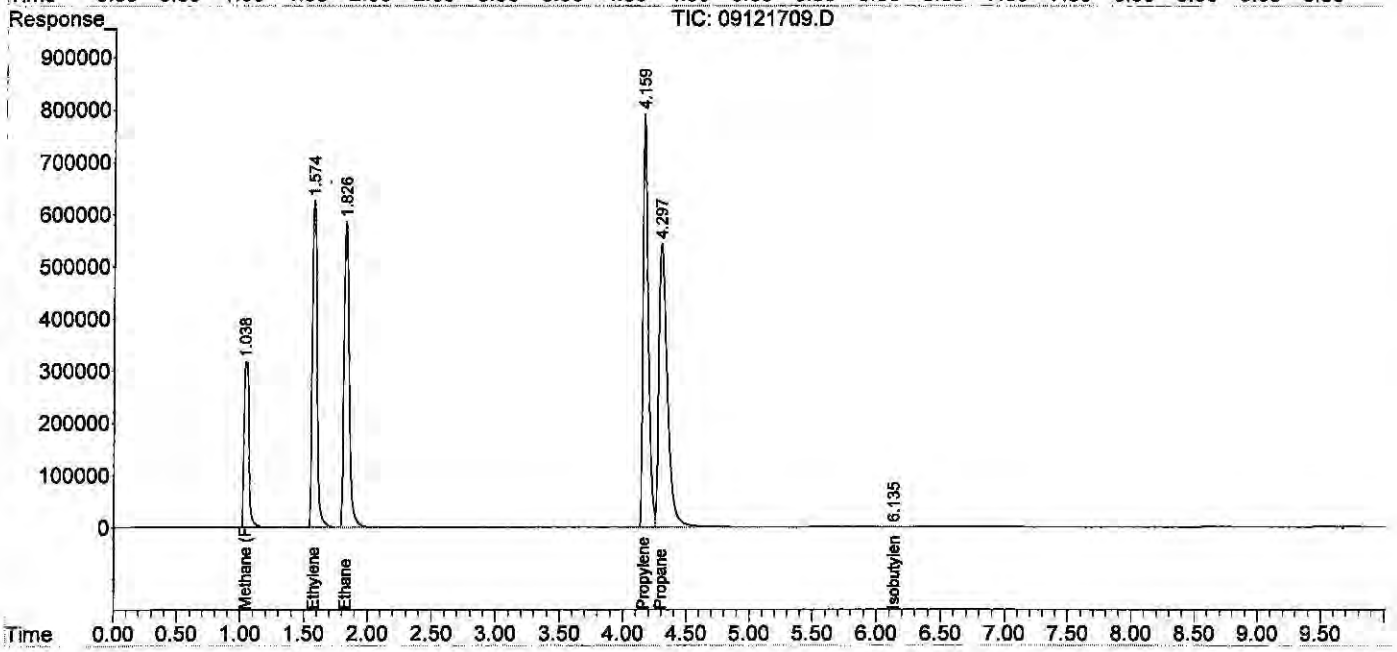
(f)=RT Delta > 1/2 Window (m)=manual int.

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	

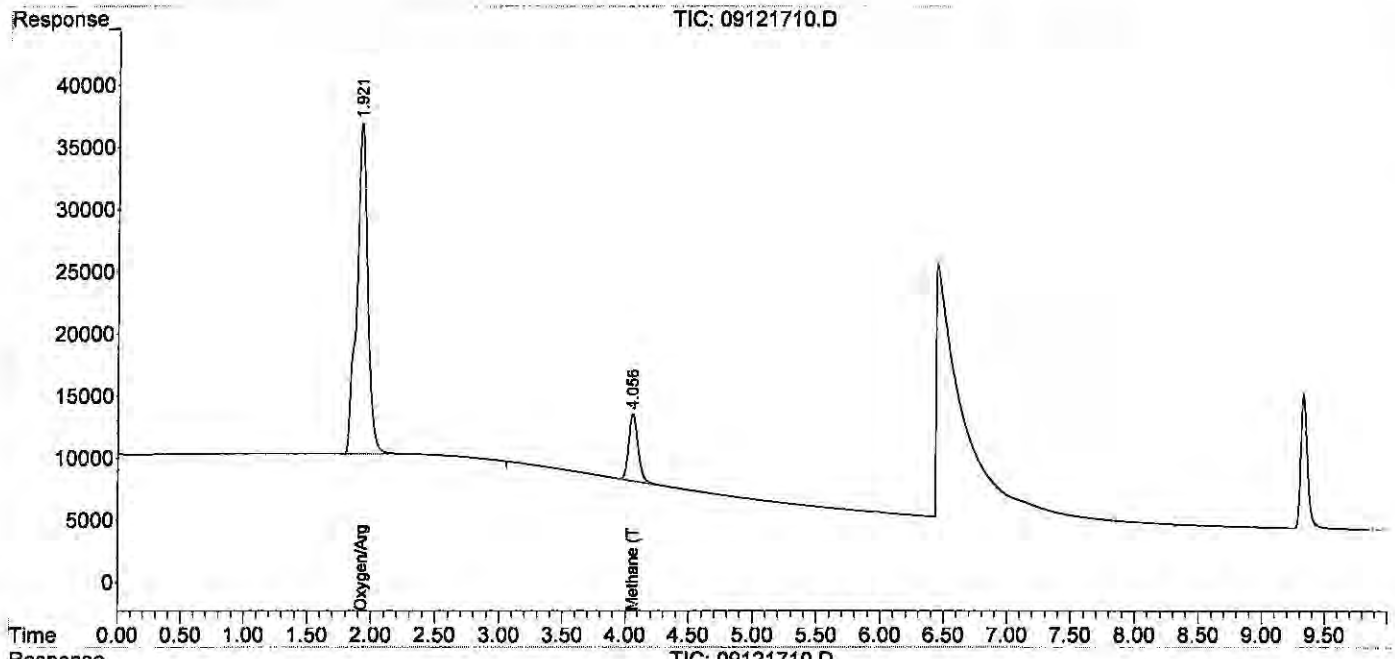
(f)=RT Delta > 1/2 Window (m)=manual int.

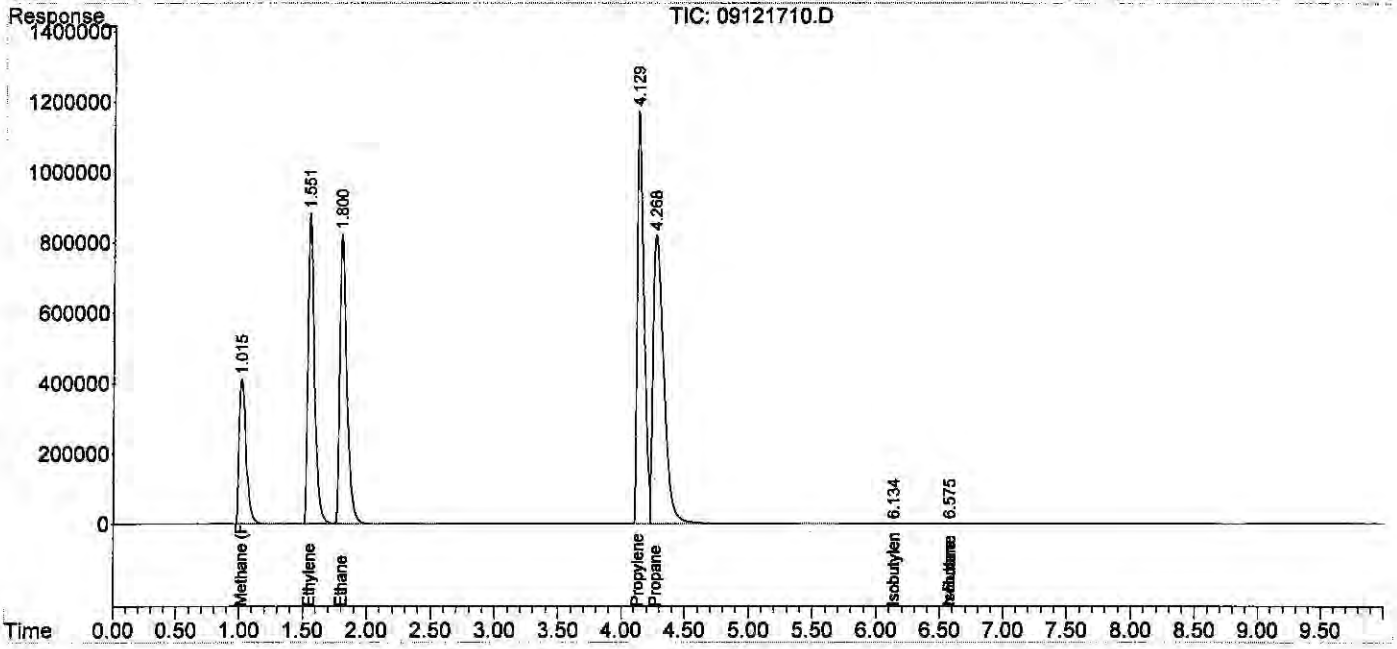
Quantitation Report (QT Reviewed)

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 :



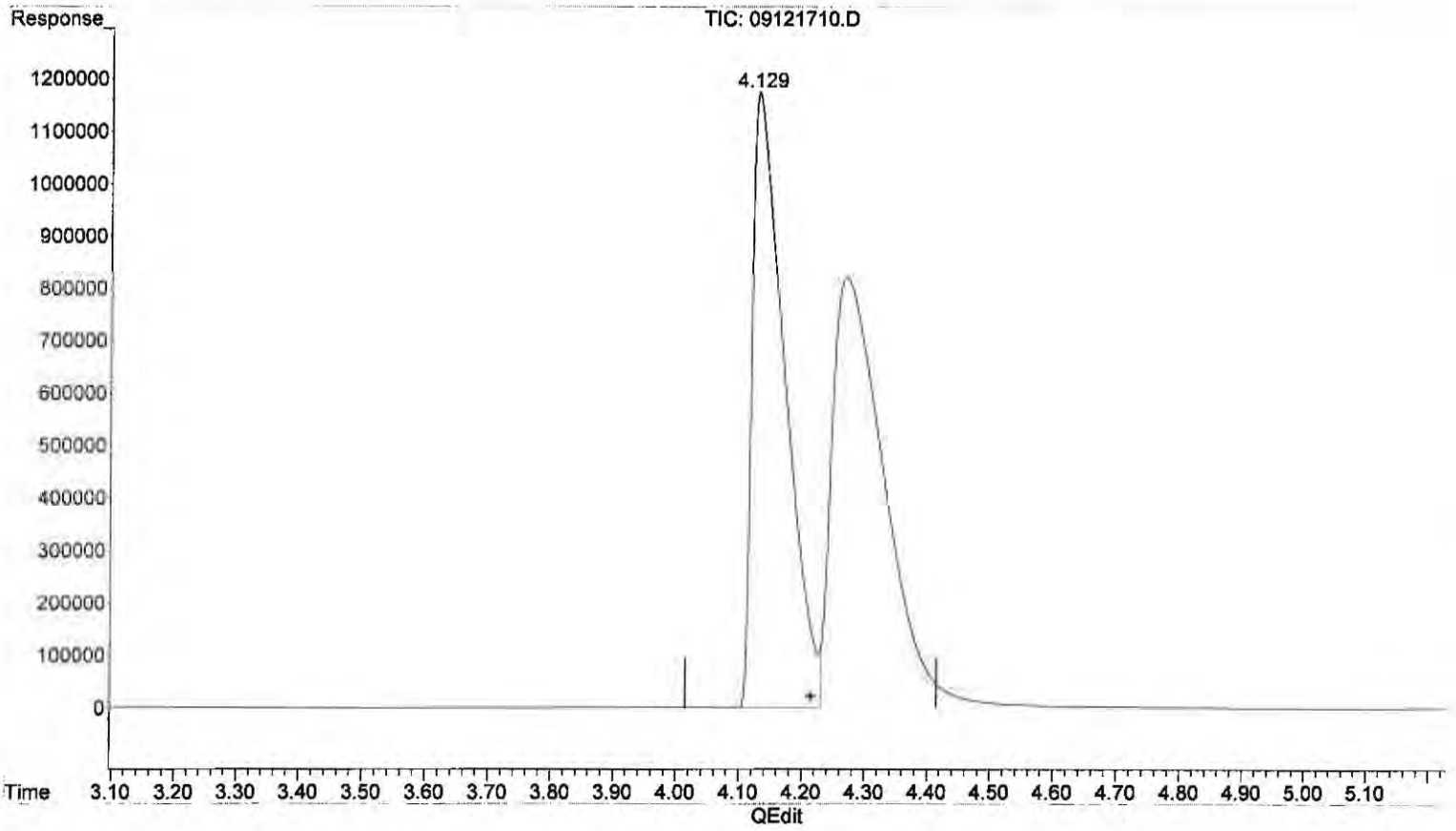


Quantitation Report (Qedit)

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

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 :

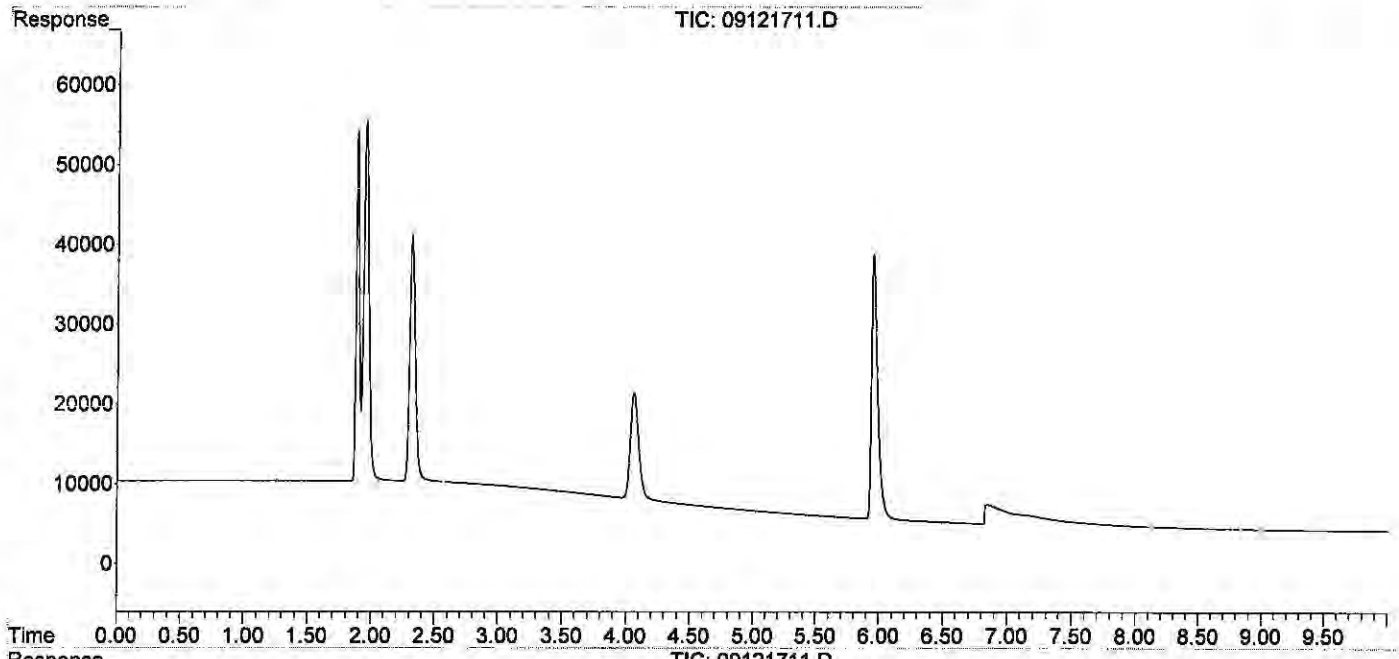
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	0.000	0	N.D.	ppm	d
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	0.000	0	N.D.	ppm	d
6)	Methane (FID)	1.059	35776839	3925.122	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	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	

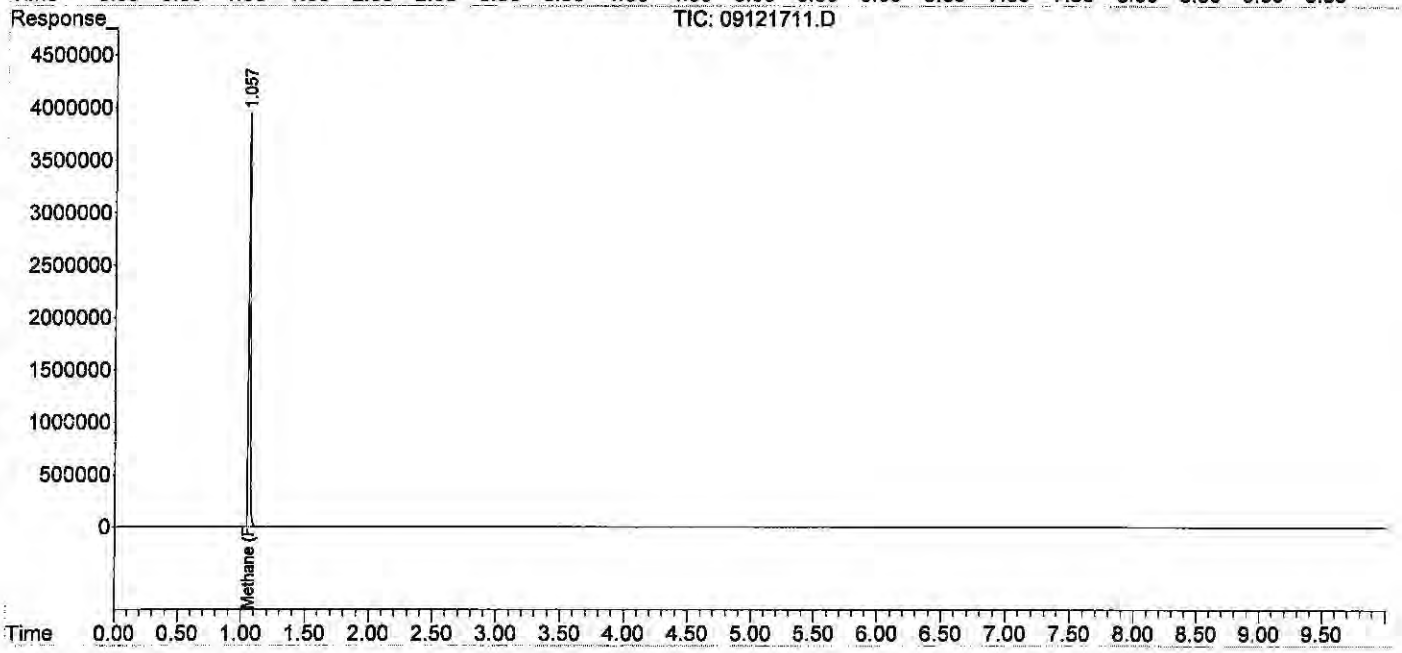
(f)=RT Delta > 1/2 Window (m)=manual int.

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	

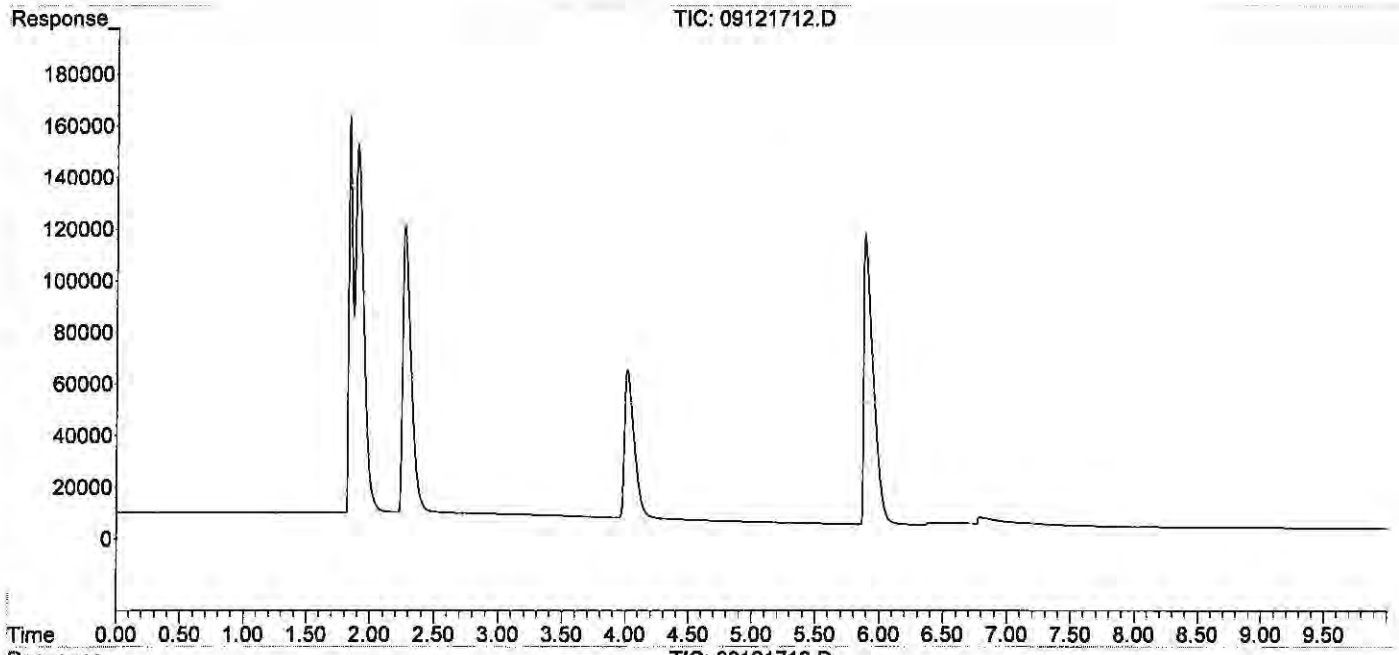
(f)=RT Delta > 1/2 Window (m)=manual int.

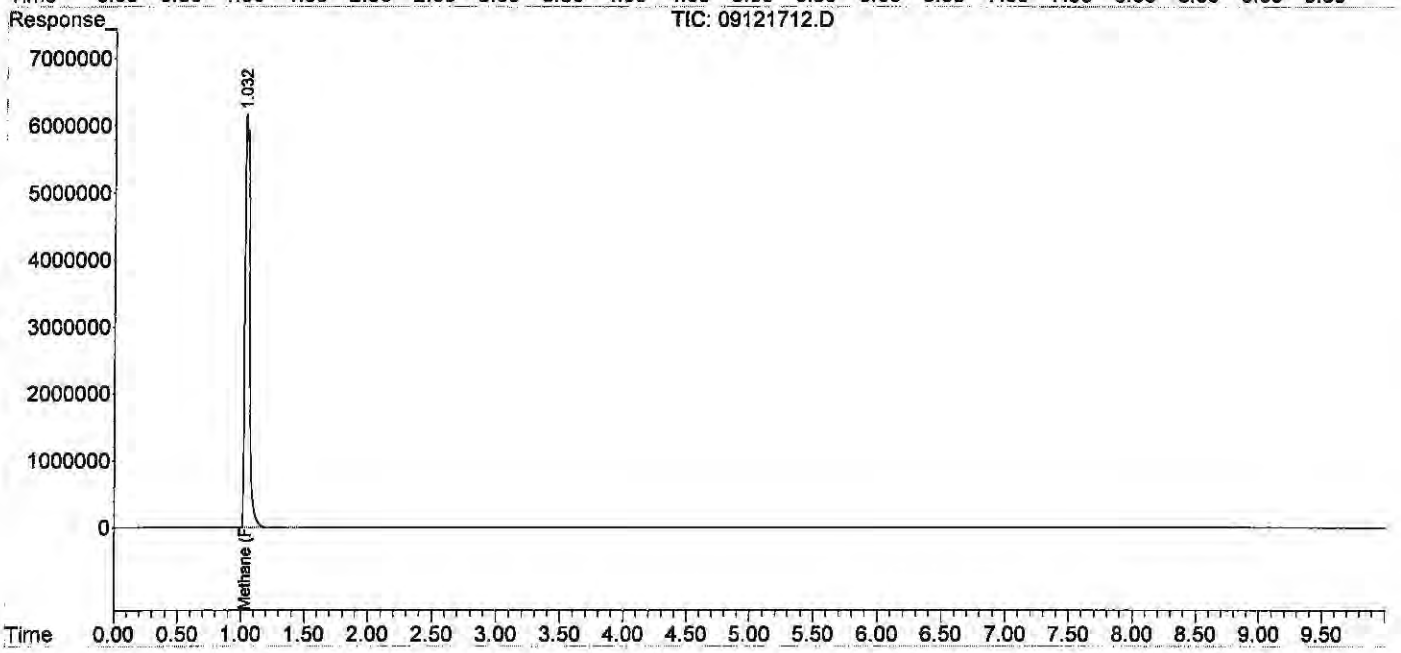
Quantitation Report (QT Reviewed)

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	1.50 101.1
7)	Ethylene	1.598	24153	1.443	ppm	1.50 96.2
8)	Ethane	1.850	24488	1.445	ppm	1.50 96.3
9)	Propylene	4.221	36004	1.537	ppm	1.50 102.5
10)	Propane	4.350	37738	1.517	ppm	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.

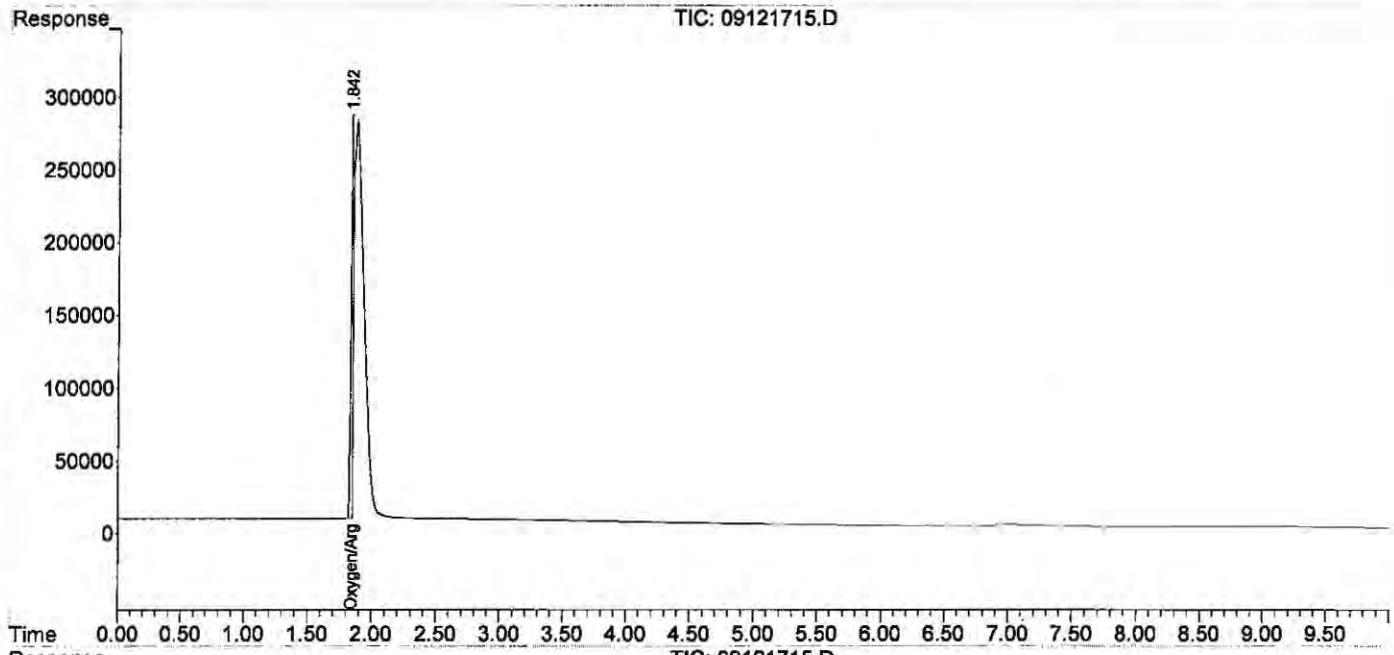
9/14/2017

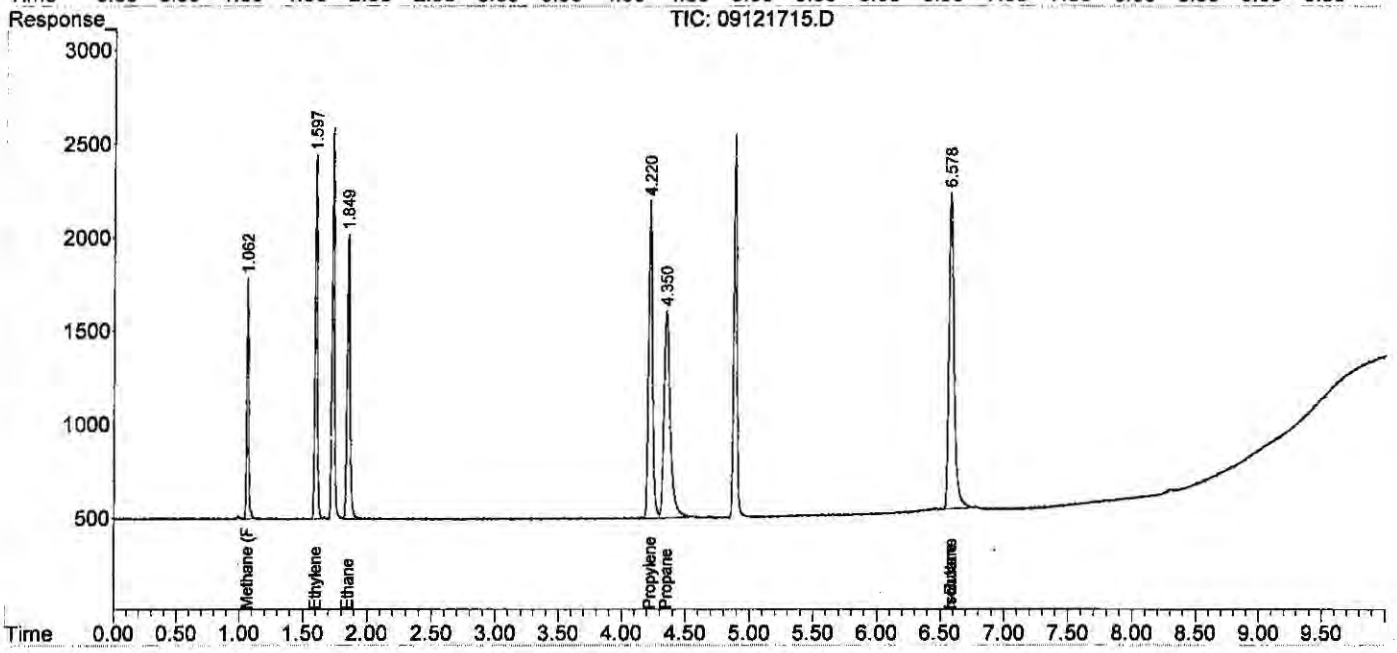
Quantitation Report (QT Reviewed)

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 :





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 :

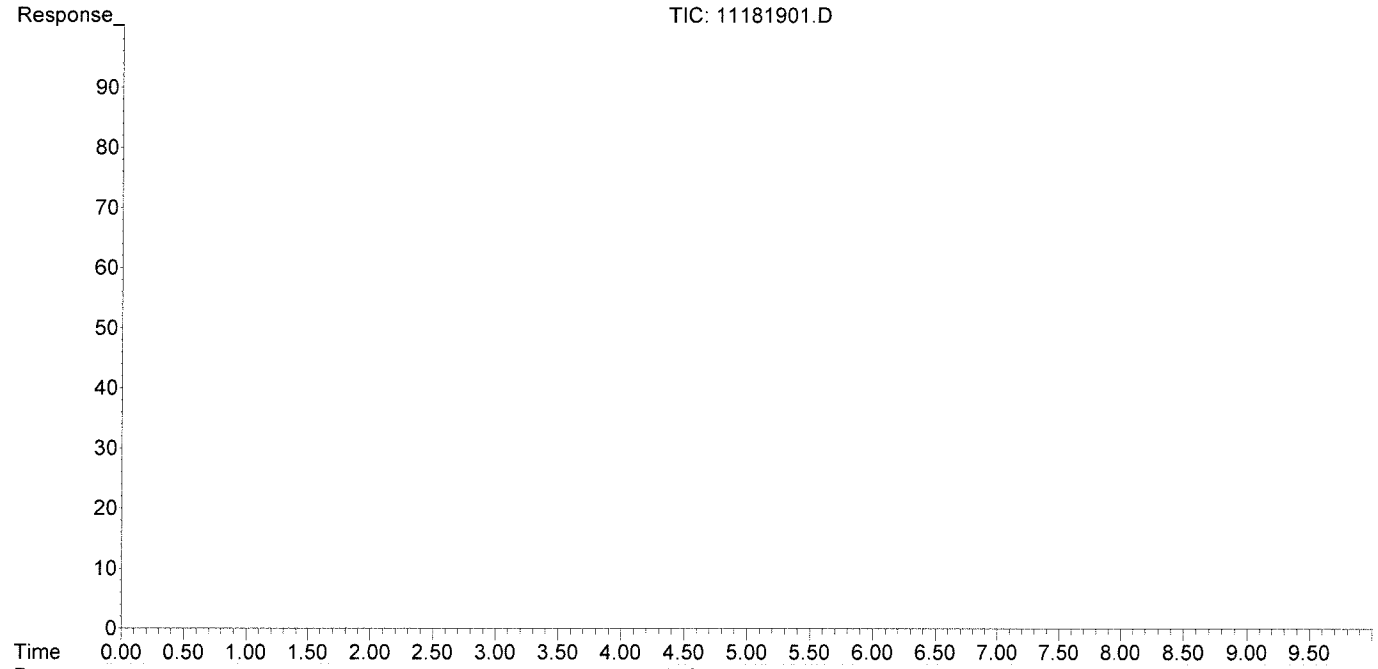
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.109	811925	89.511	ppm
7)	Ethylene	1.682	1584438	94.682	ppm
8)	Ethane	1.948	1591472	93.891	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

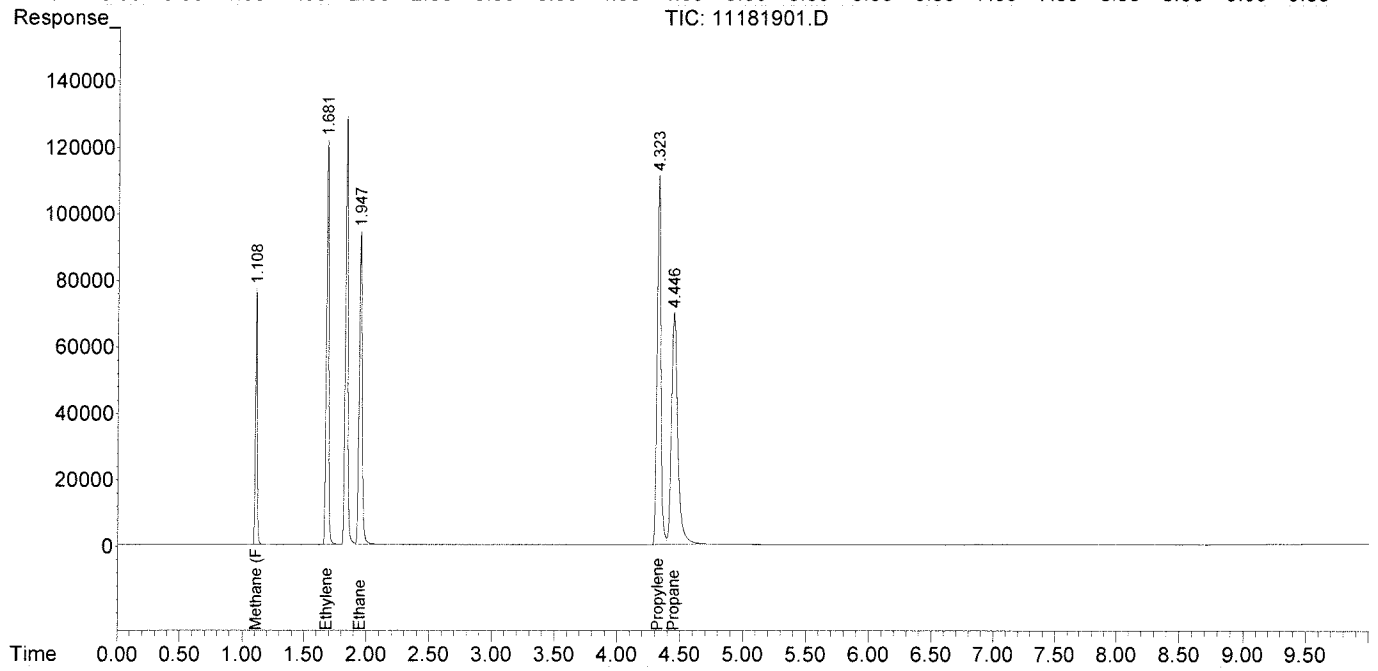
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





Quantitation Report (QT Reviewed)

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 :

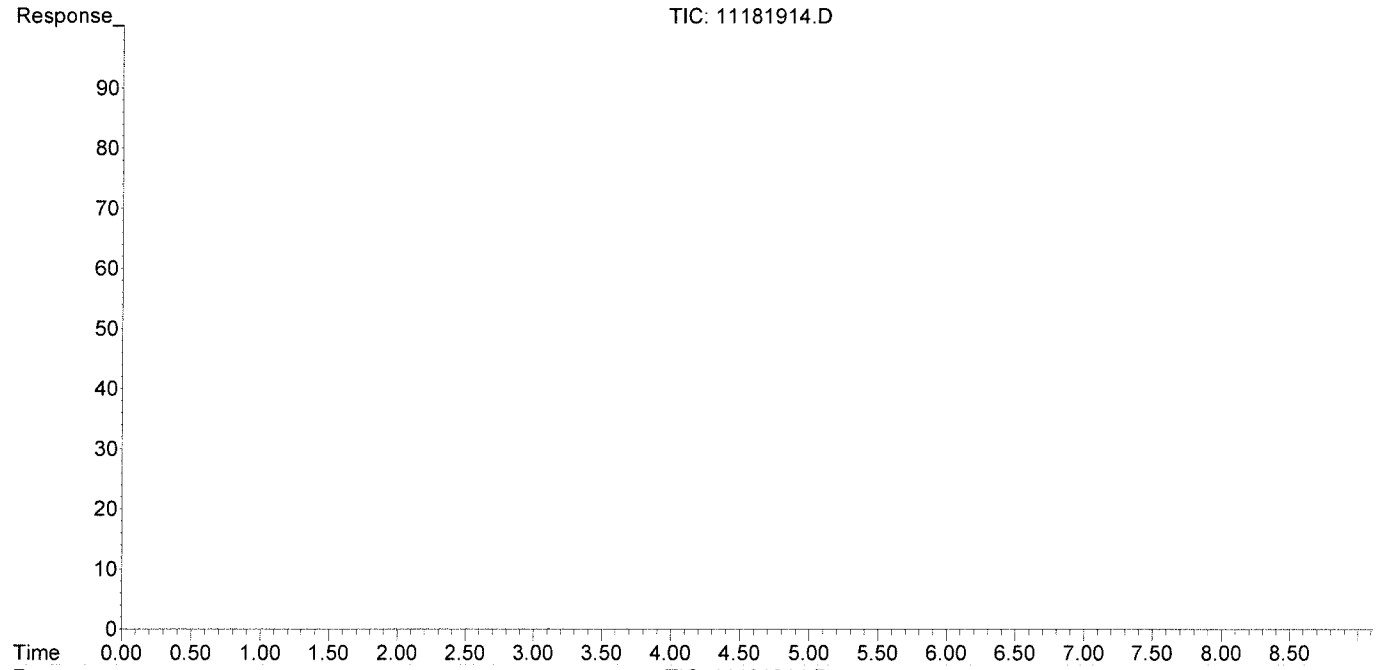
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.118	828575	91.347	ppm
7)	Ethylene	1.686	1617930	96.683	ppm
8)	Ethane	1.951	1627156	95.996	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

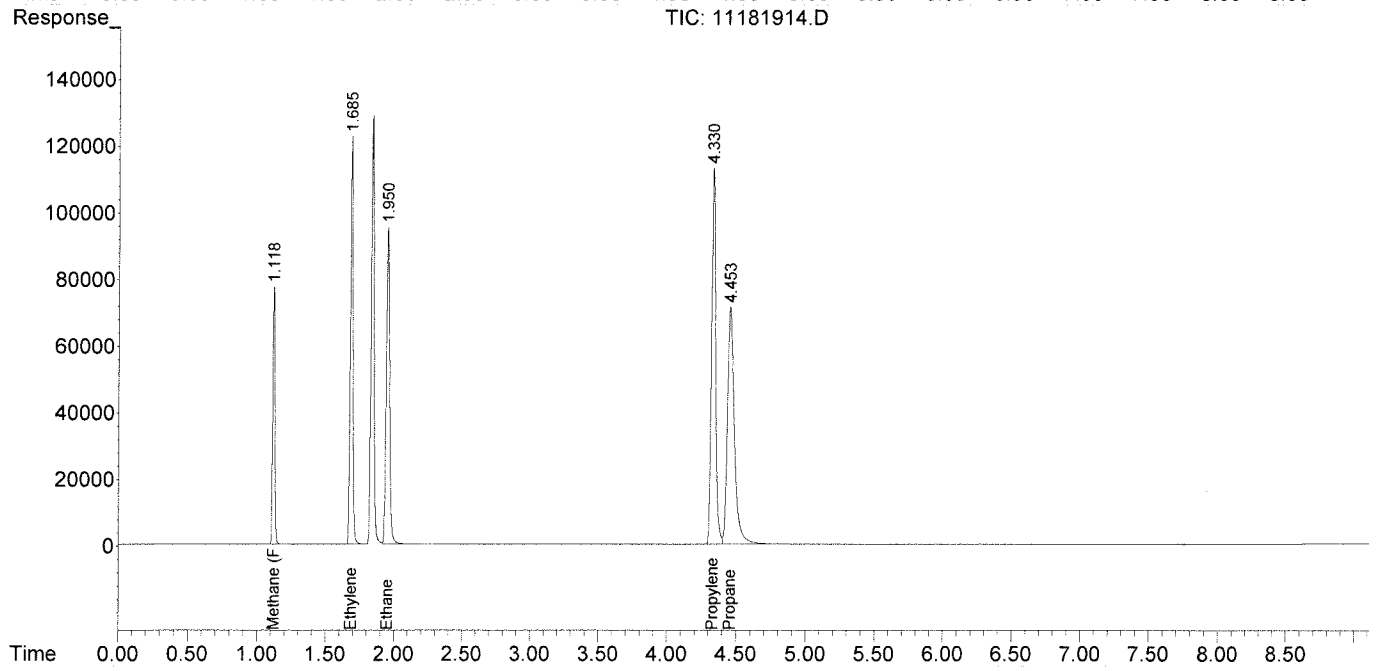
(f)=RT Delta > 1/2 Window (m)=manual int.

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 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: **34-1932284**
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

1932284

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:** **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**

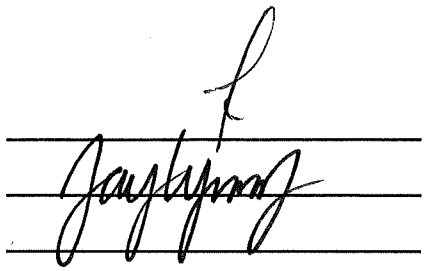
Subcontract Chain of Custody

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: 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	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

Preservatives: COOL

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 11.20 19/14:00	BB T. Bush	Storage CLP 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 Johnson (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: HBN: 252432

Rule: EPA 6850, DoD QSM Water Analyst: T. Bosch Status: WP

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
MFG: AccuStandard
MFG Lot: 218065075
Part ID: IC-PER-10X-1

Created By: Thomas Bosch
Create Date: 09/17/2018 09:09AM

Amount: 100 mL
Expires: 07/25/2020
Usable: Yes
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

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Fax (203)786-5287
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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

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 17025 REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED ISO 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

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Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

S 47863

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

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

#*	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:

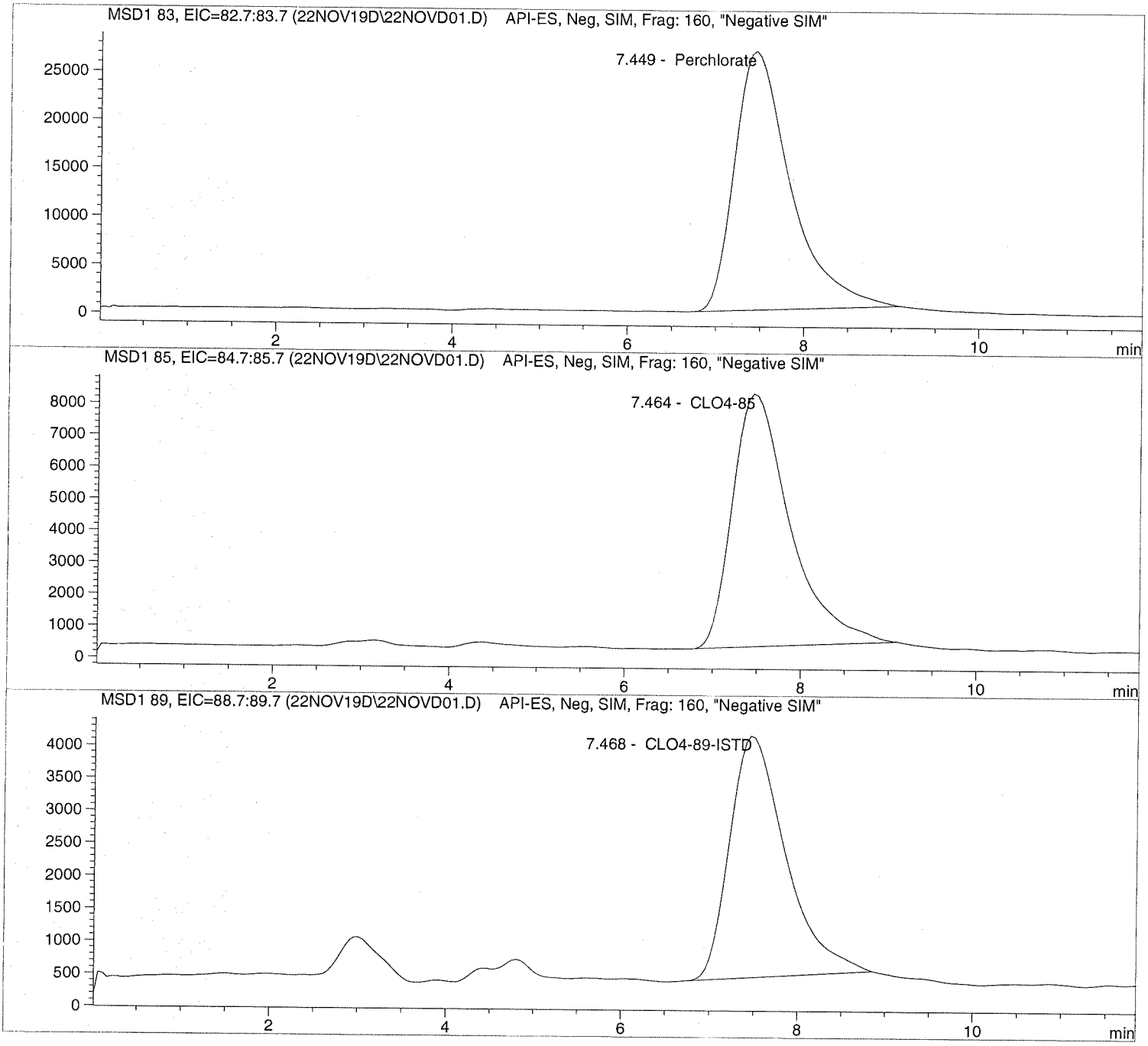
Line	Location	SampleName		Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	685438	CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	685439	QC@3.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	685441	ICS@3.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	685442	LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1932283001		CLO4-AQN	1	Sample		
6	Vial 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

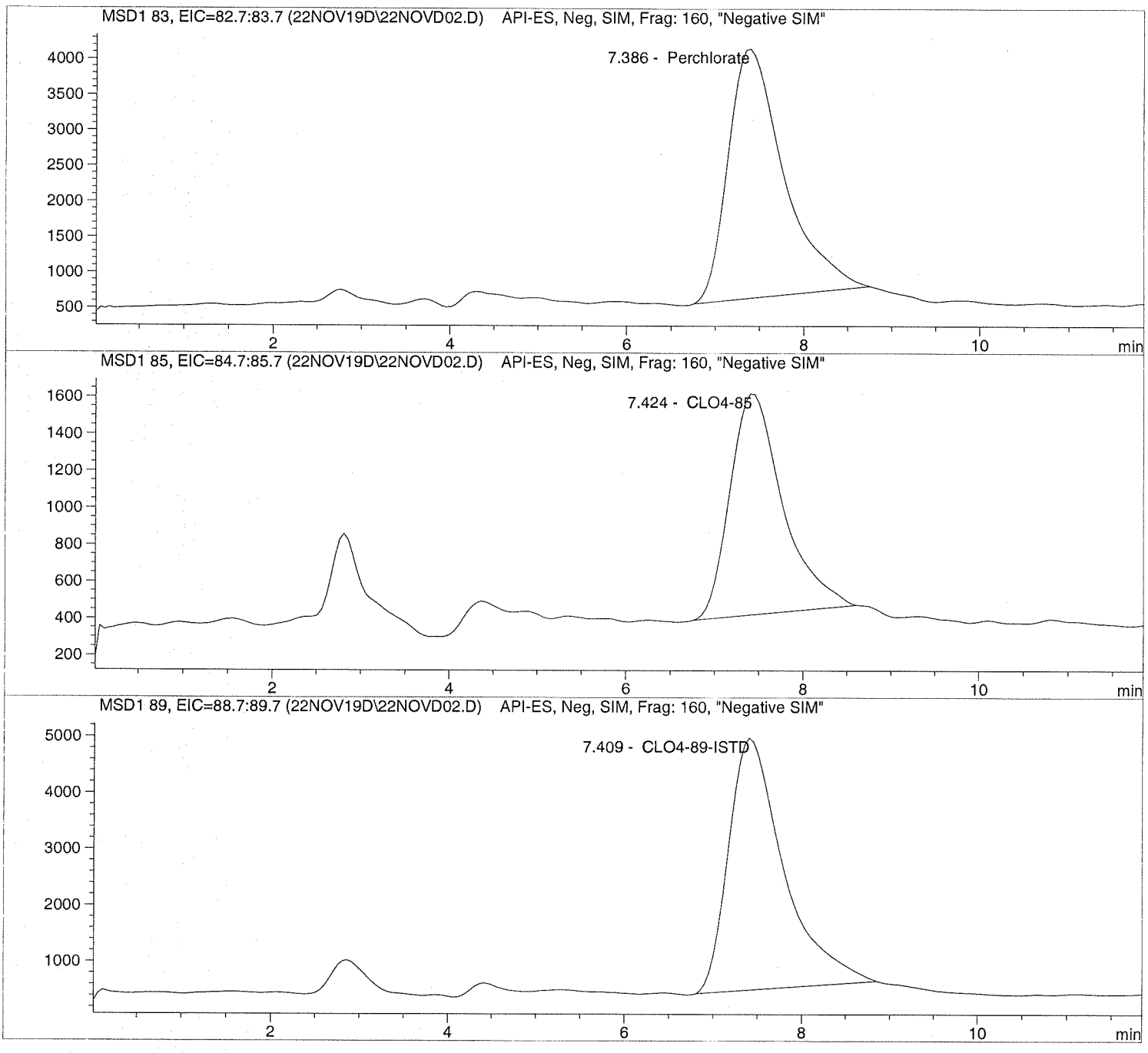
*** End of Report ***

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

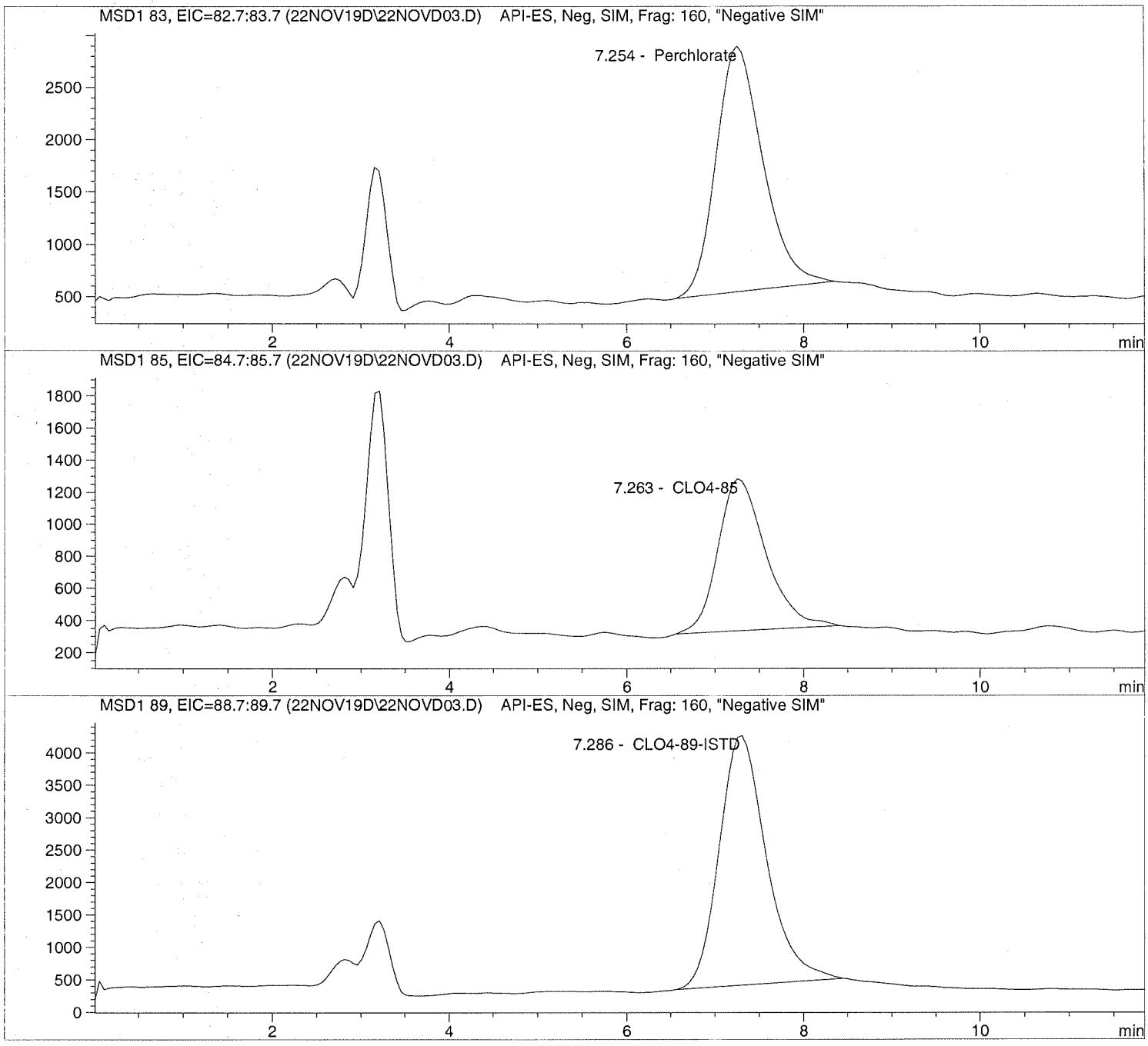
*** End of Report ***

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



Injection Date: 11/22/2019 08:37:06
Sample Name: 685441 ICS@3.0
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
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

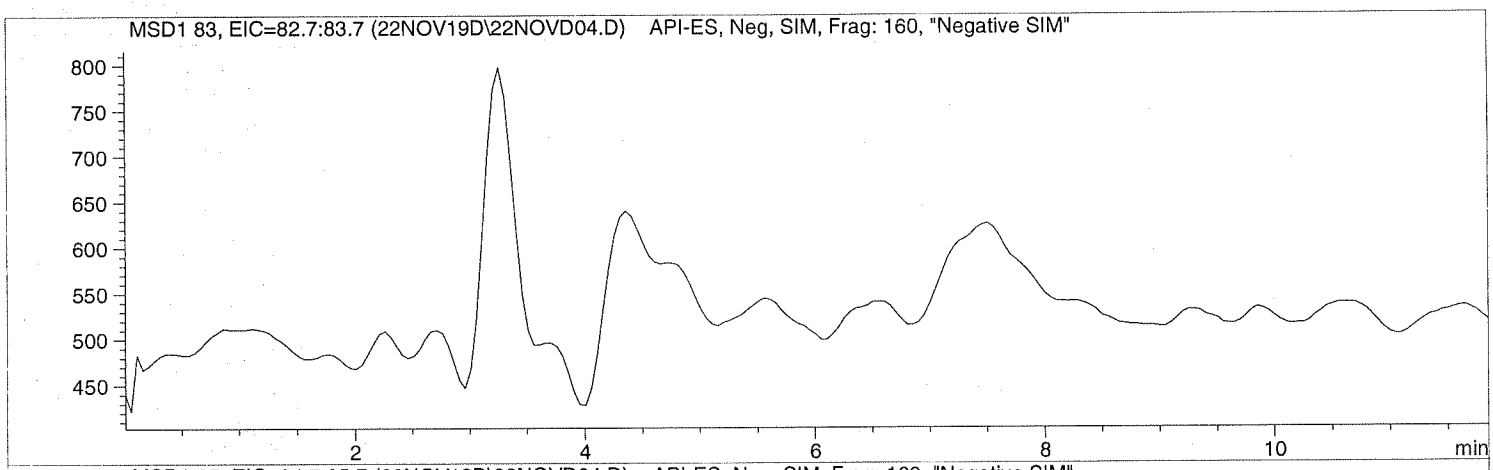
*** End of Report ***

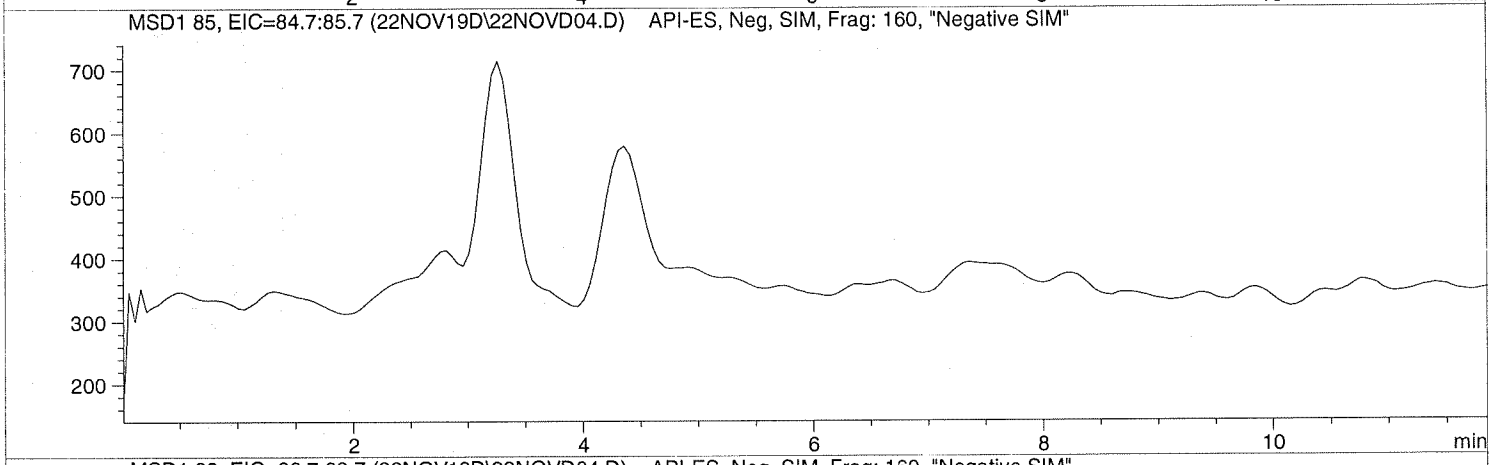
Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD04.D Sample Name: 685442 LMB

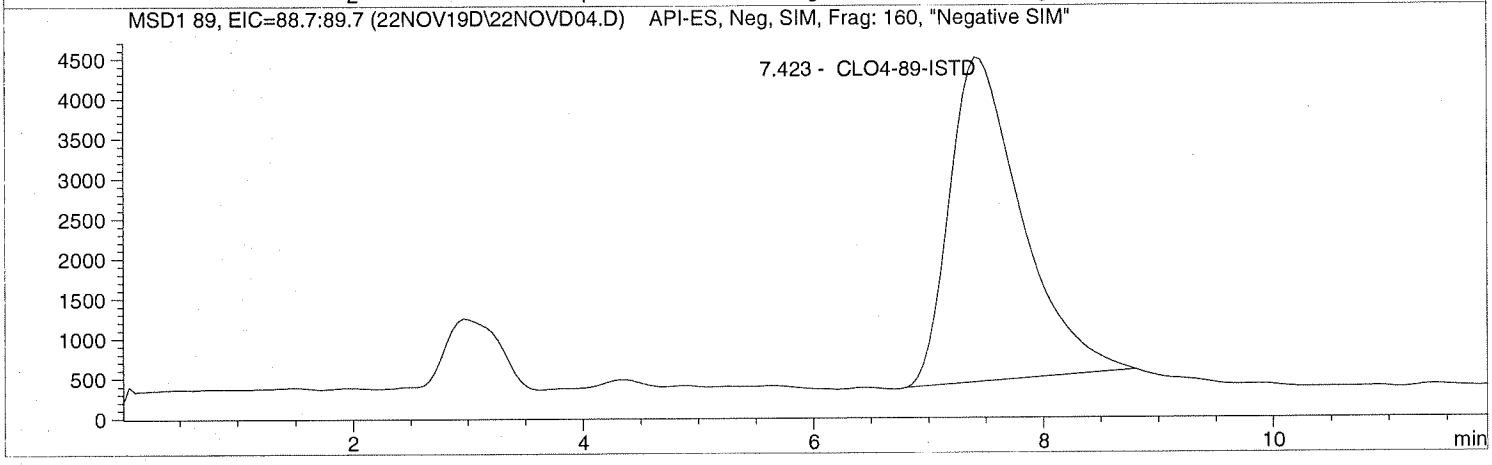
Injection Date:	11/22/2019 08:51:01	Seq Line:	4
Sample Name:	685442 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

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

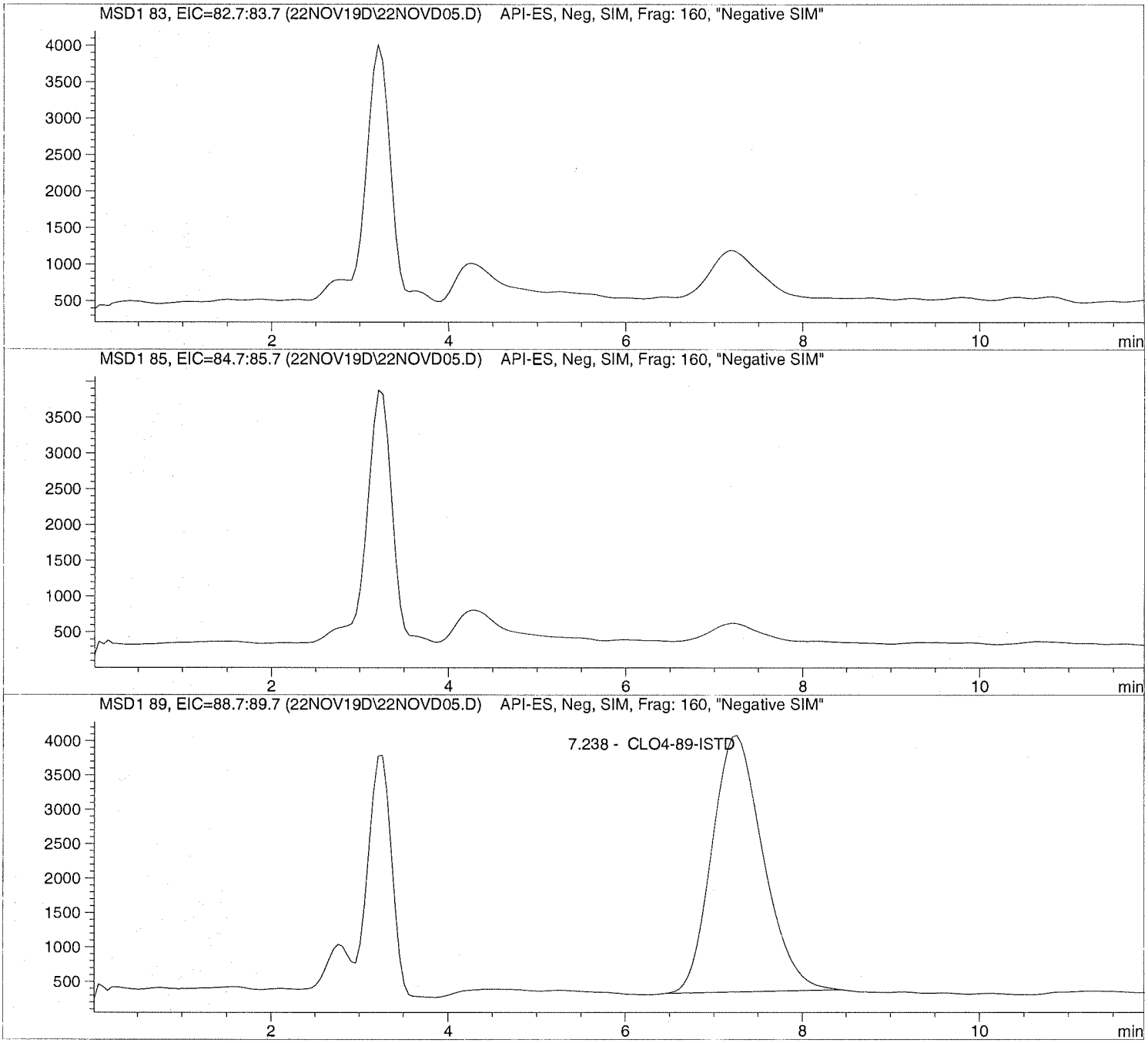
*** End of Report ***

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

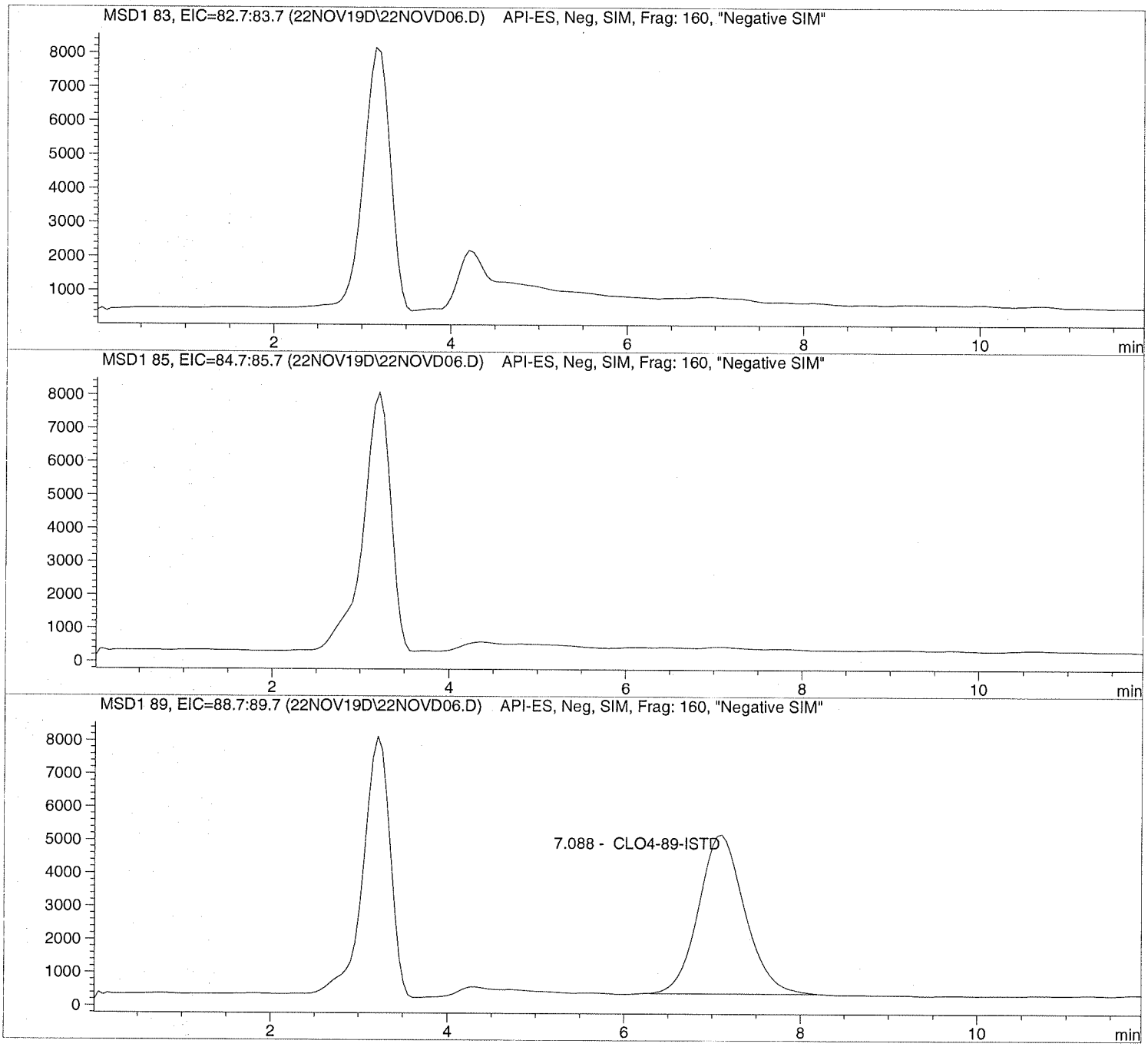
*** End of Report ***

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

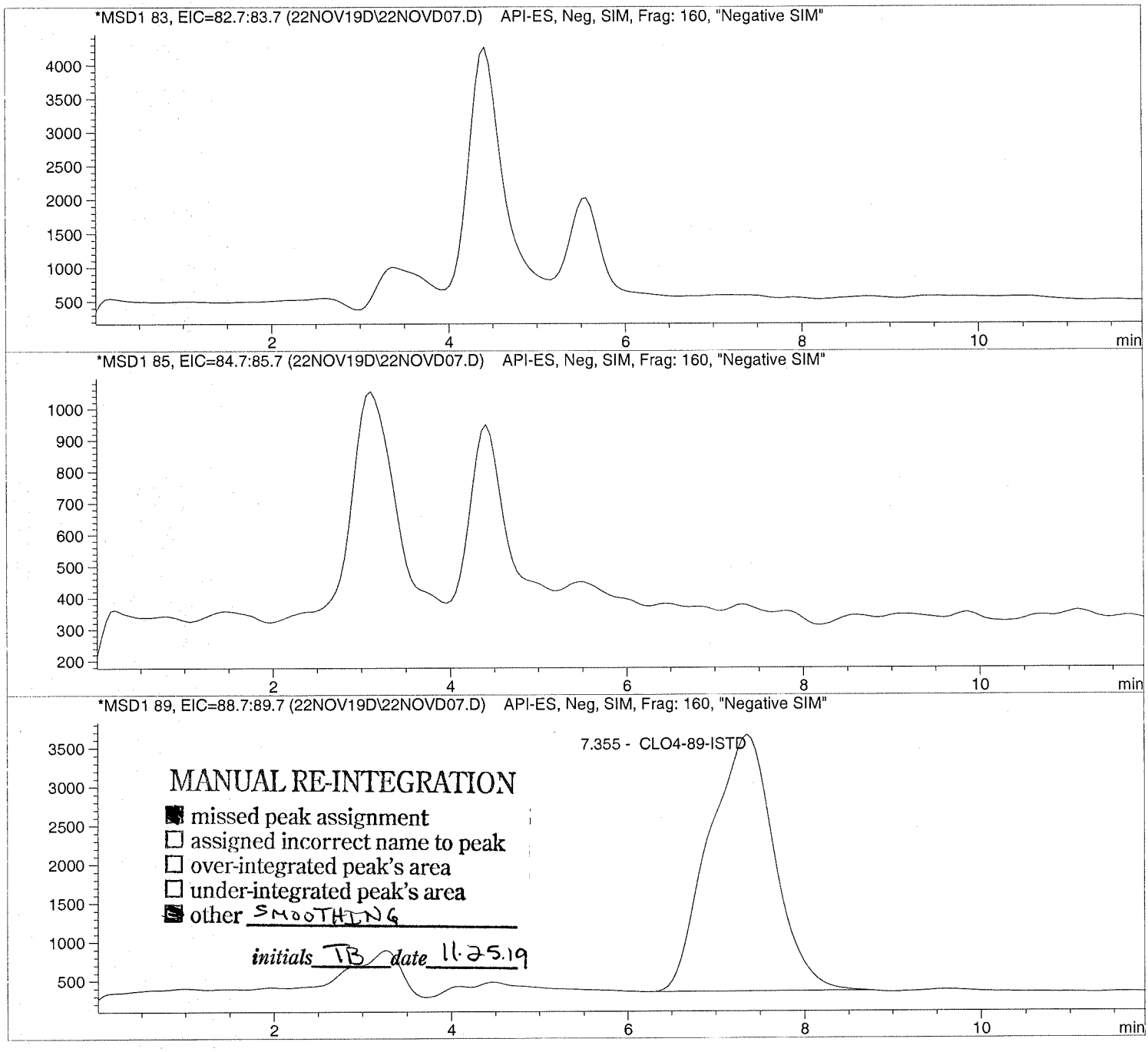
*** End of Report ***

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

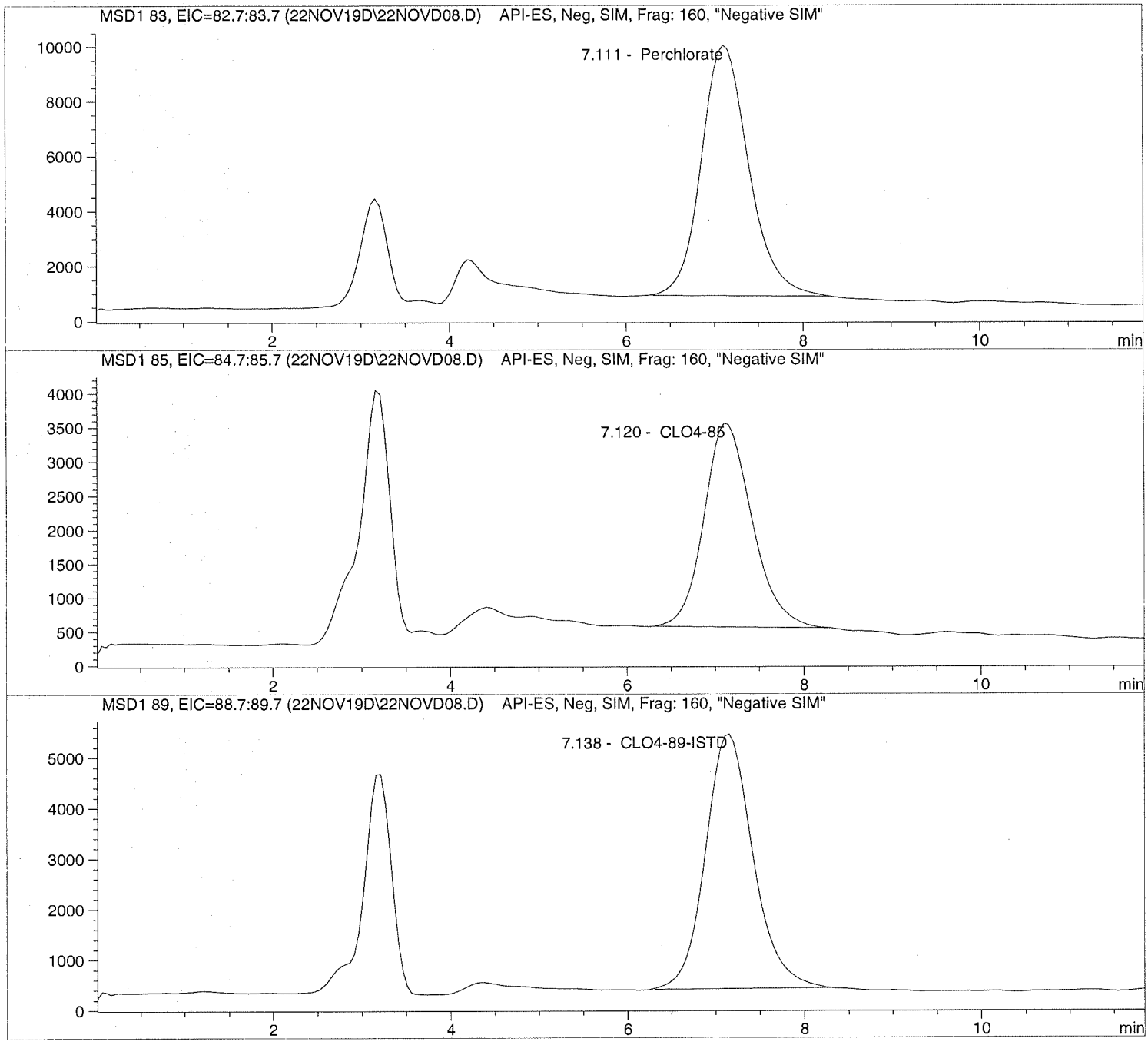
*** End of Report ***

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

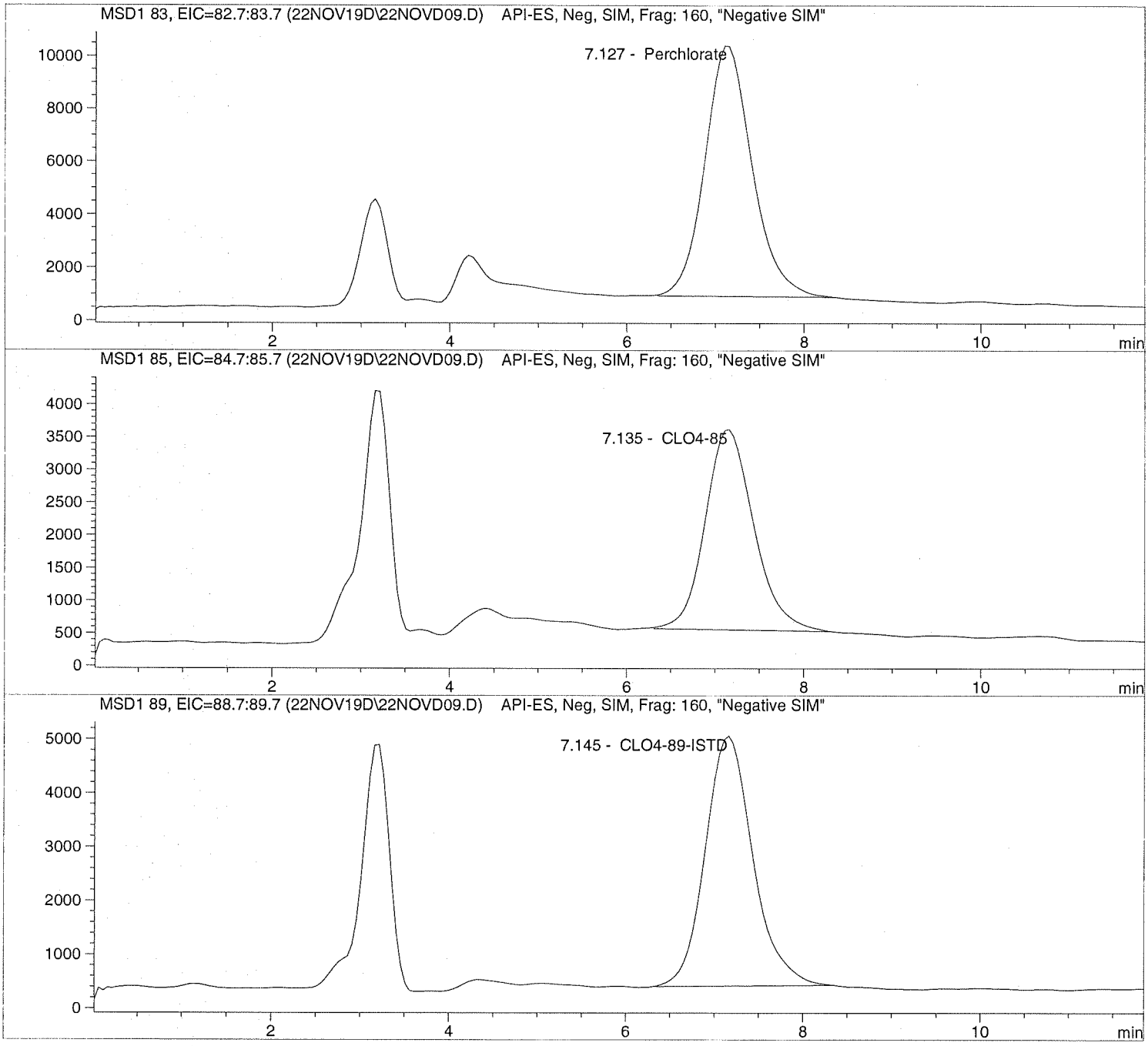
*** End of Report ***

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

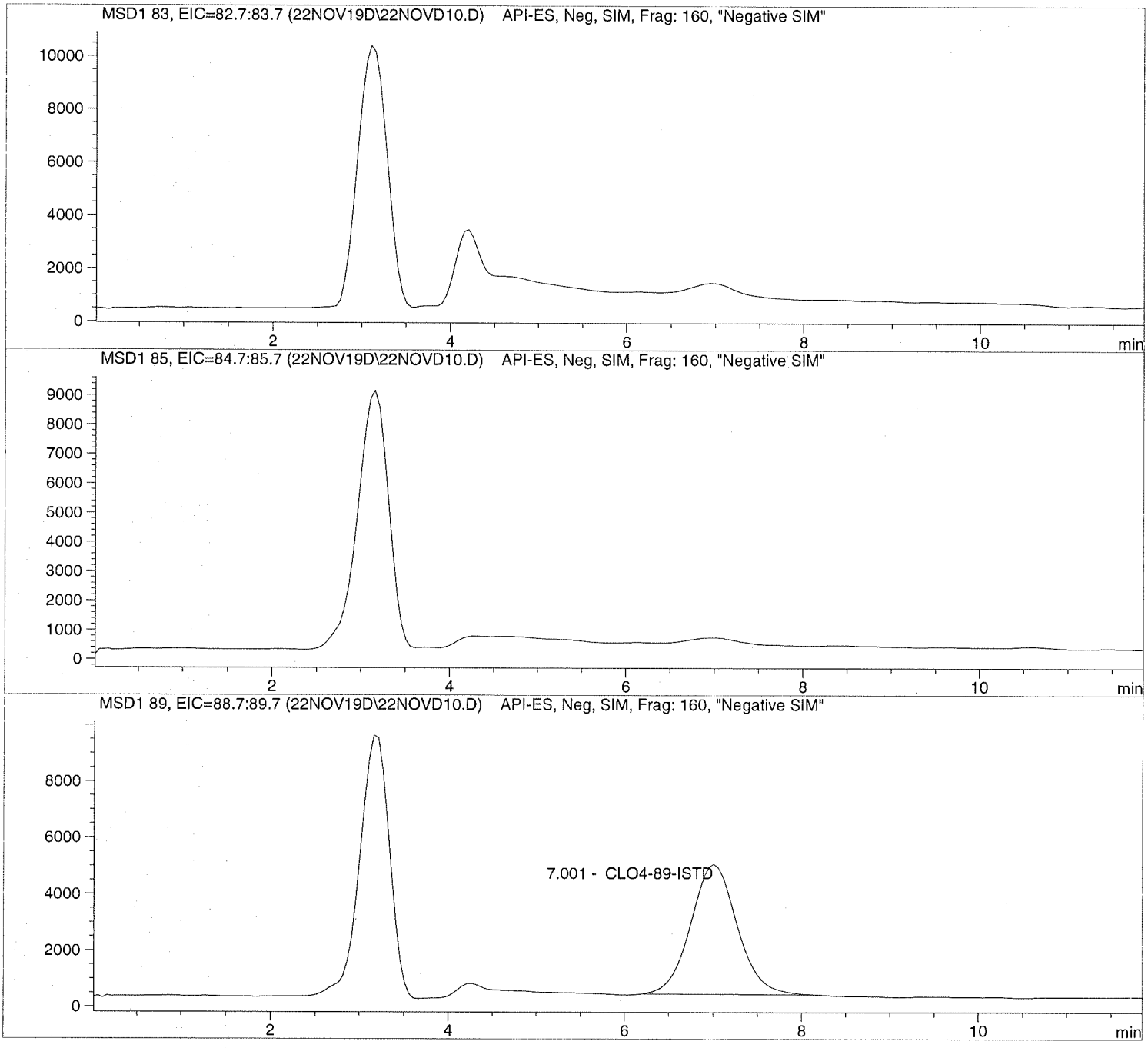
*** End of Report ***

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

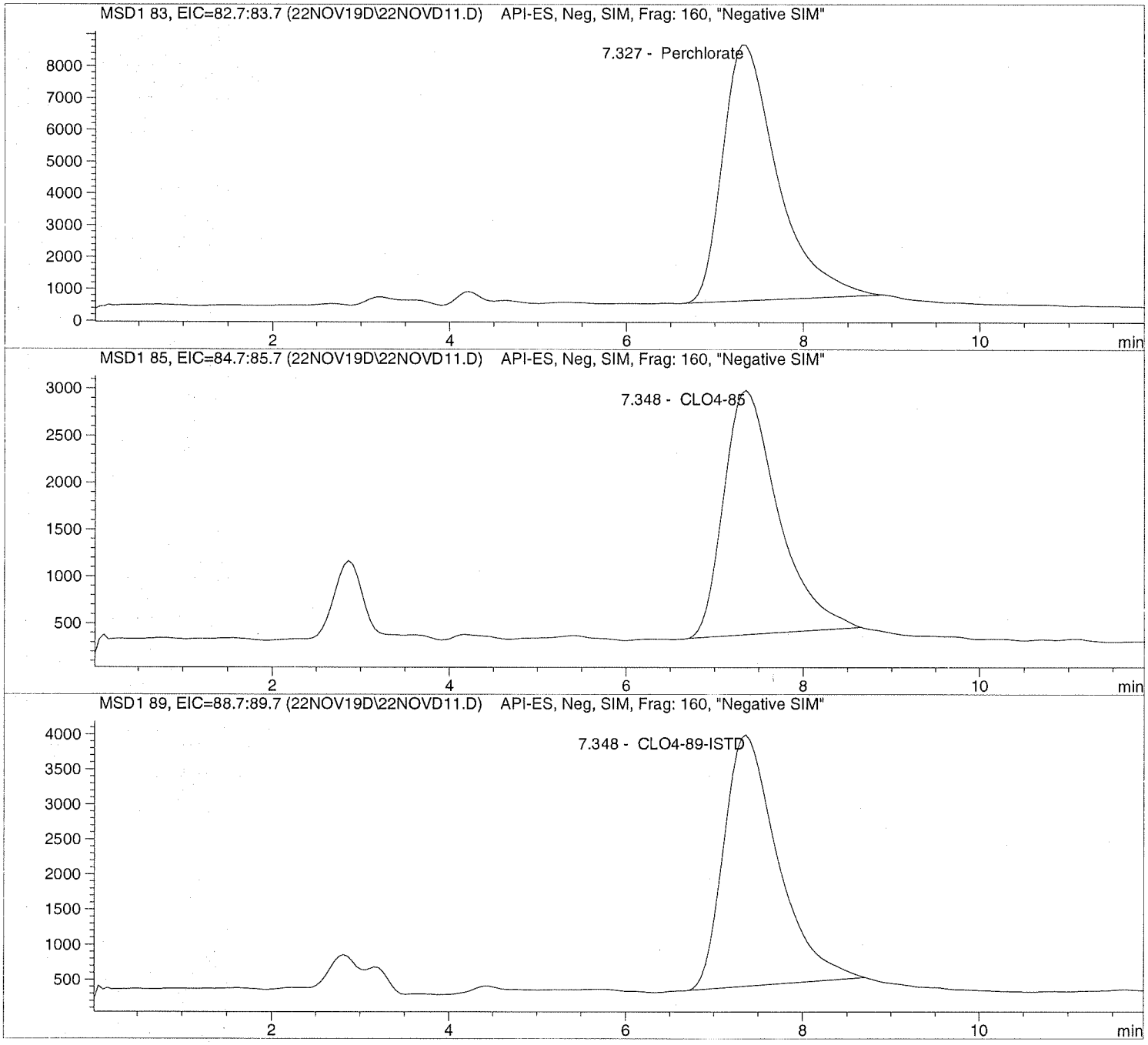
*** End of Report ***

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

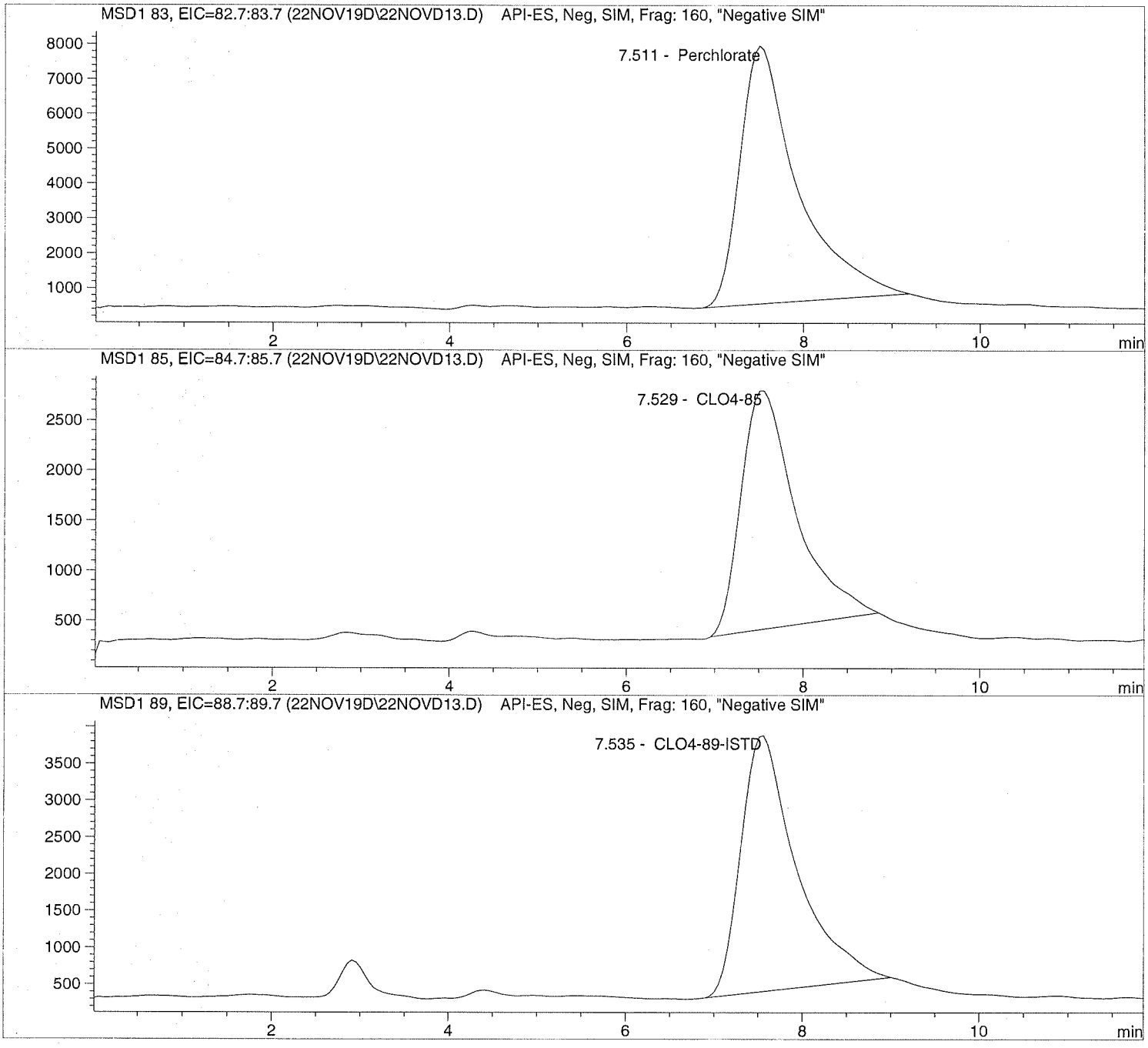
*** End of Report ***

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

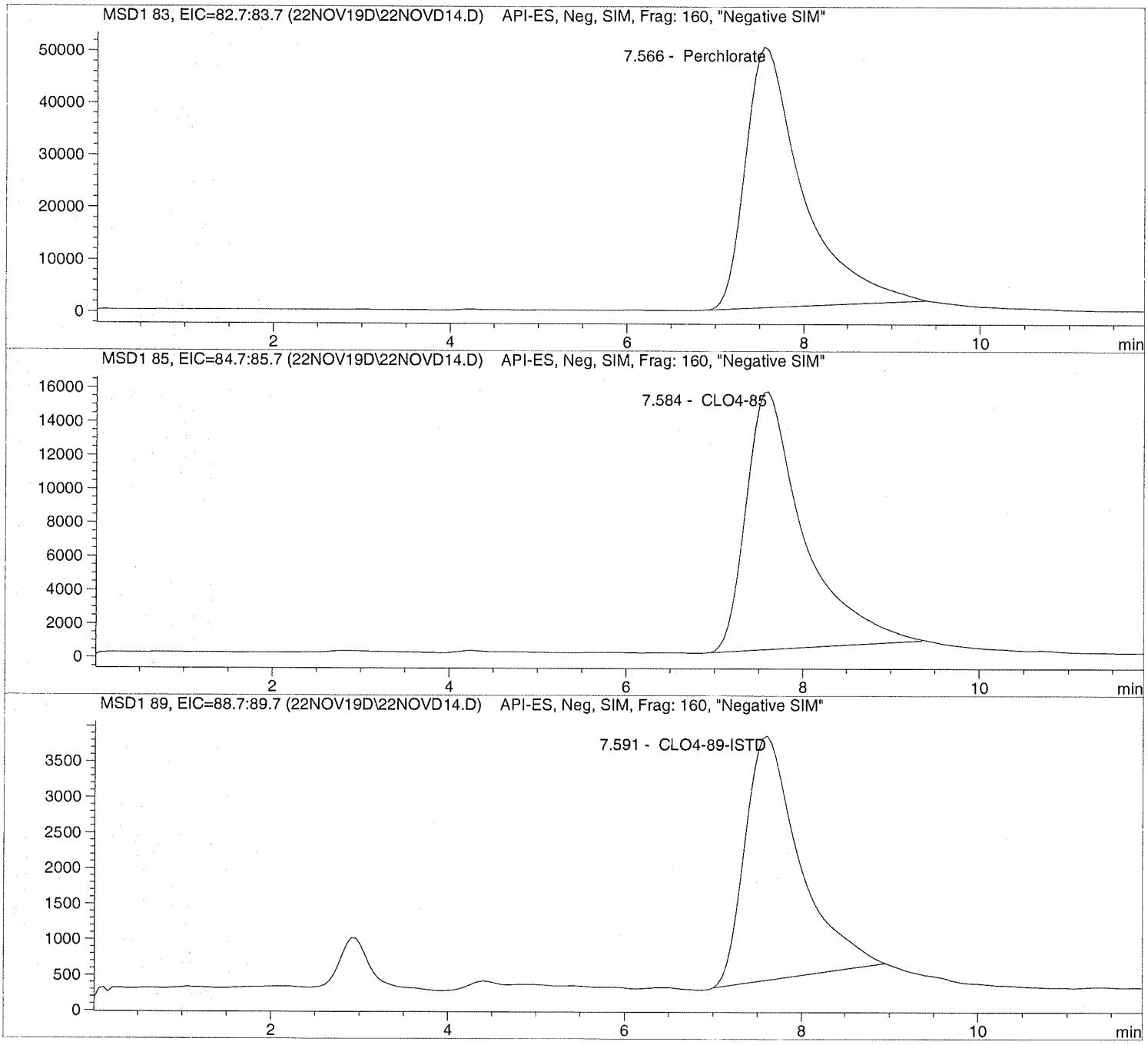
*** End of Report ***

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

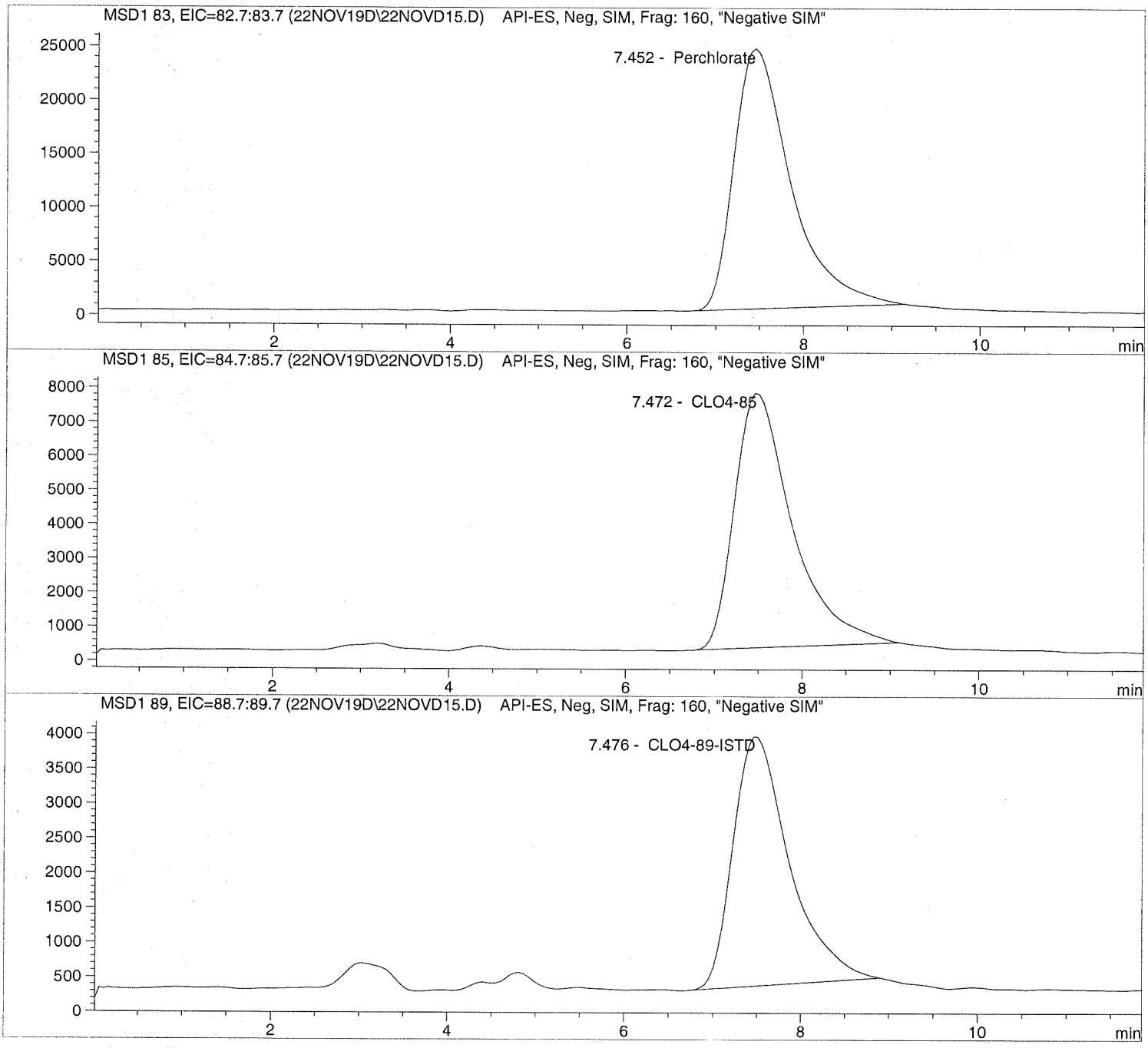
*** End of Report ***

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

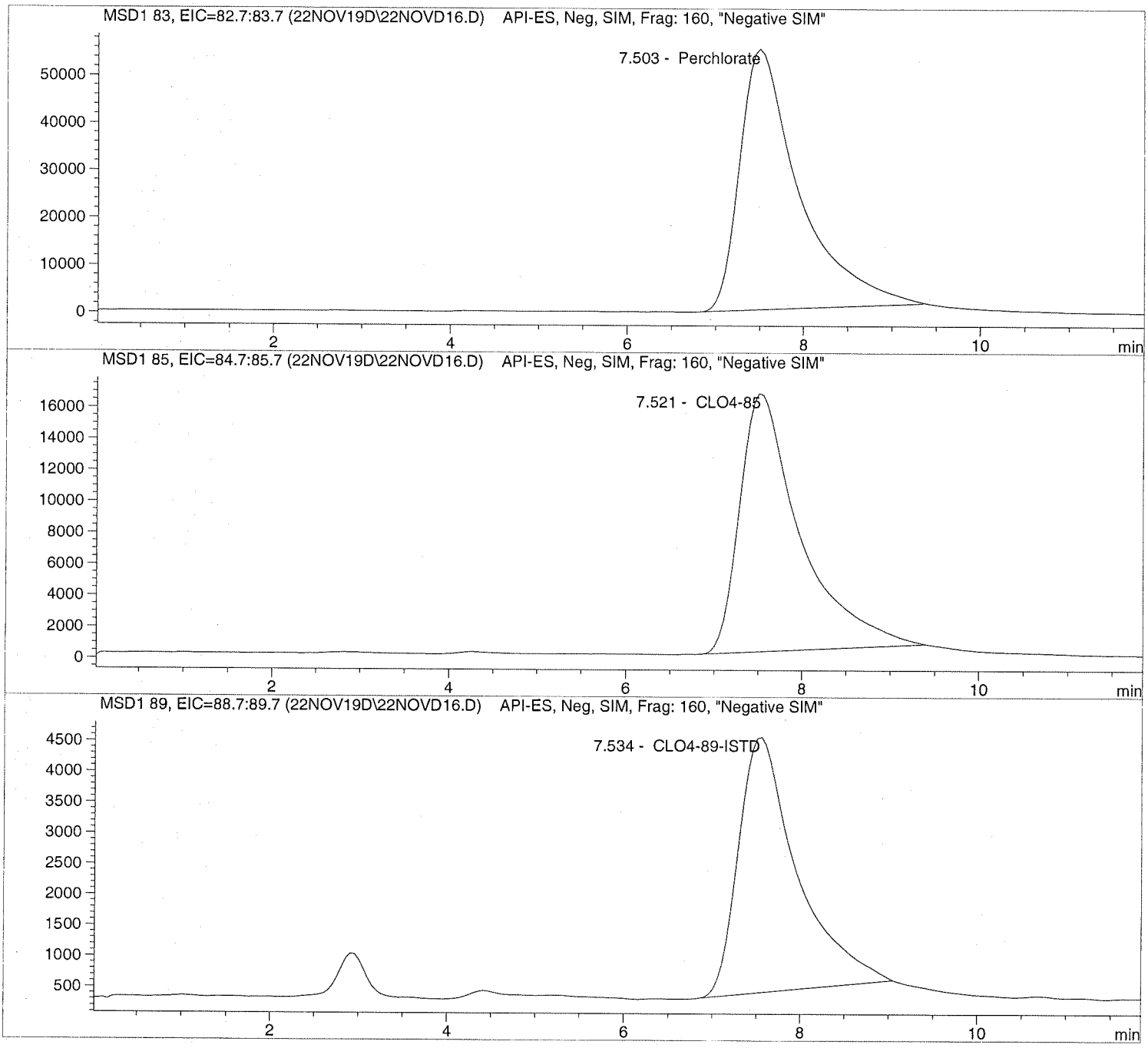
*** End of Report ***

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

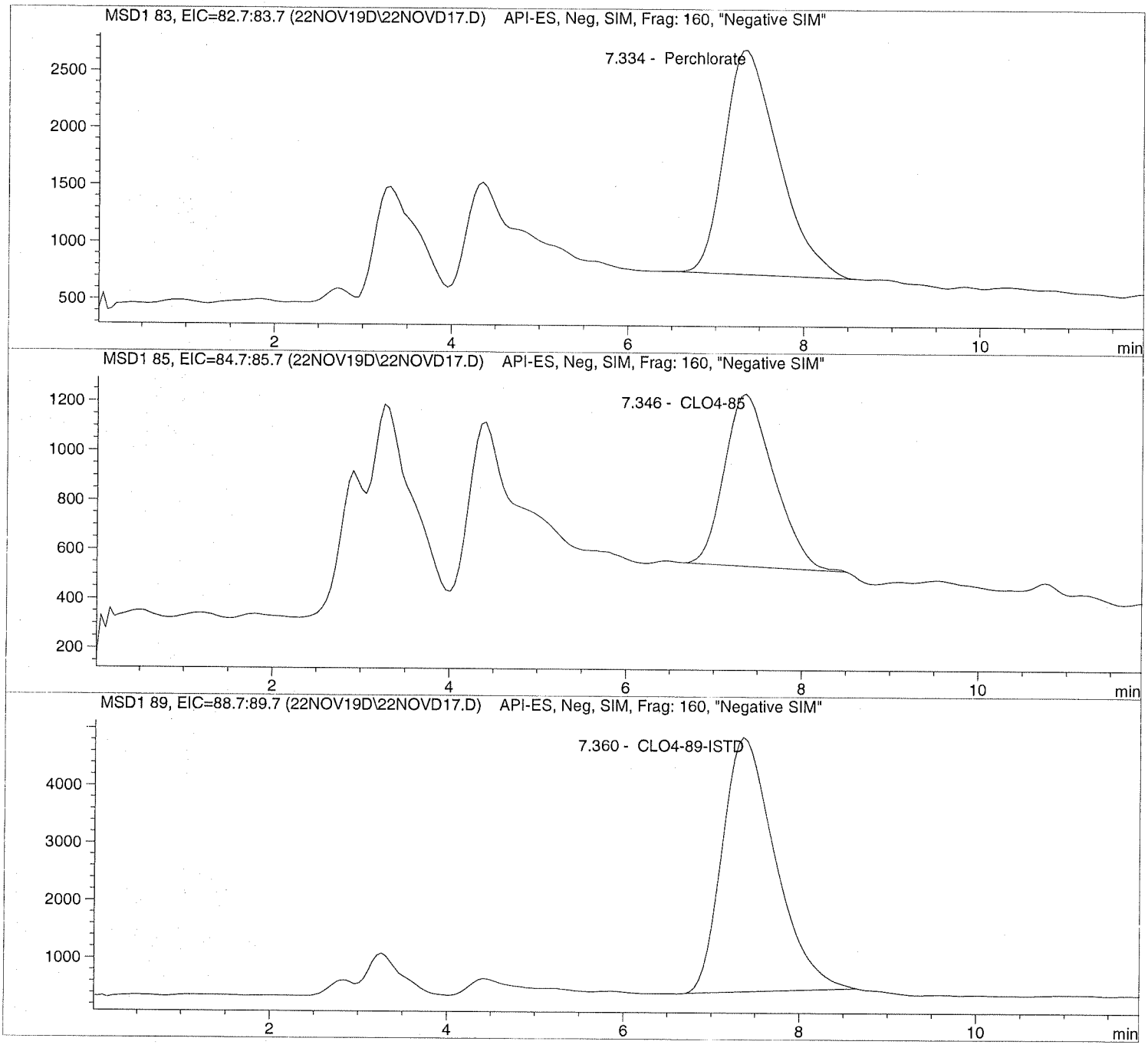
*** End of Report ***

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

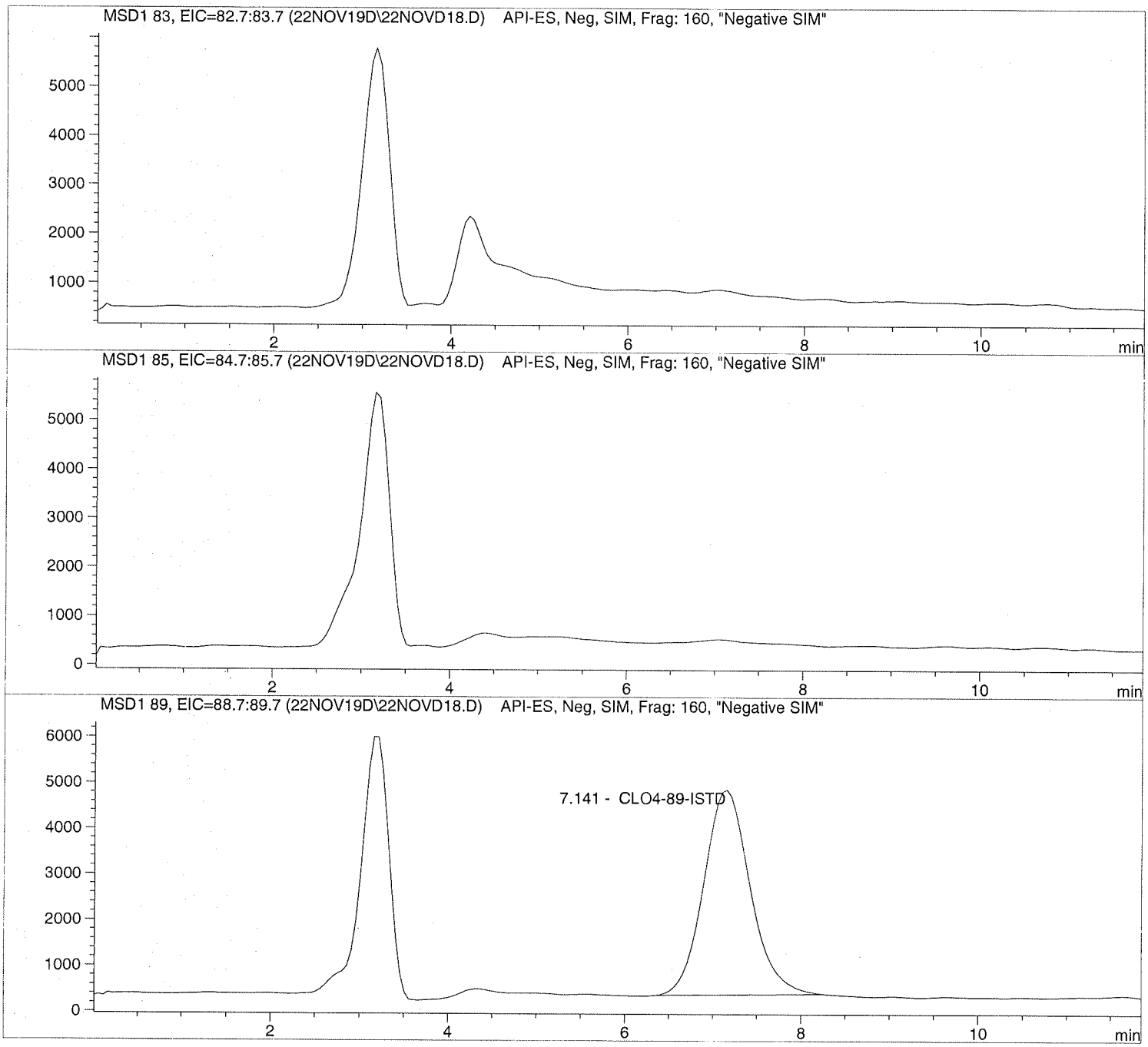
*** End of Report ***

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

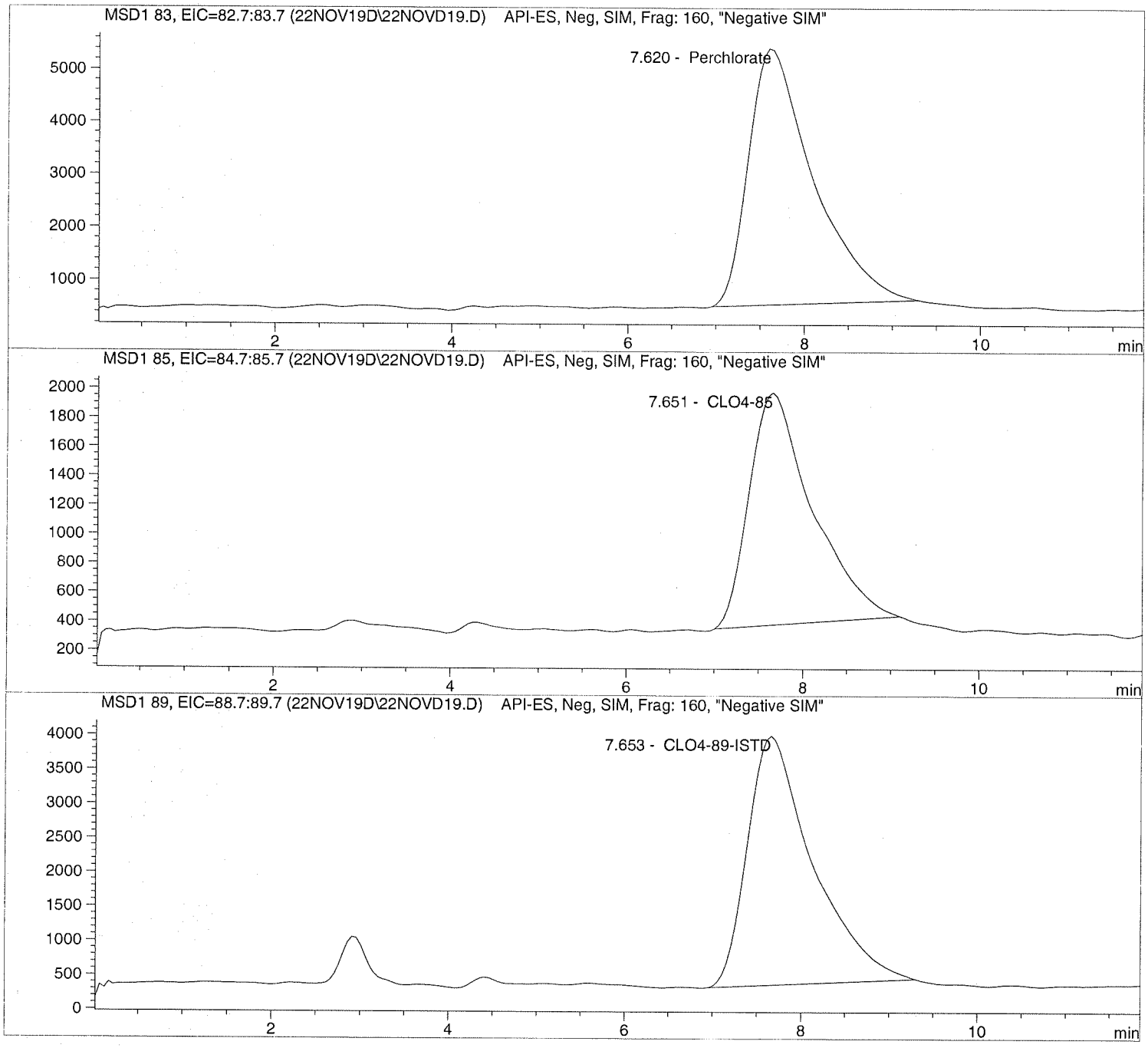
*** End of Report ***

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

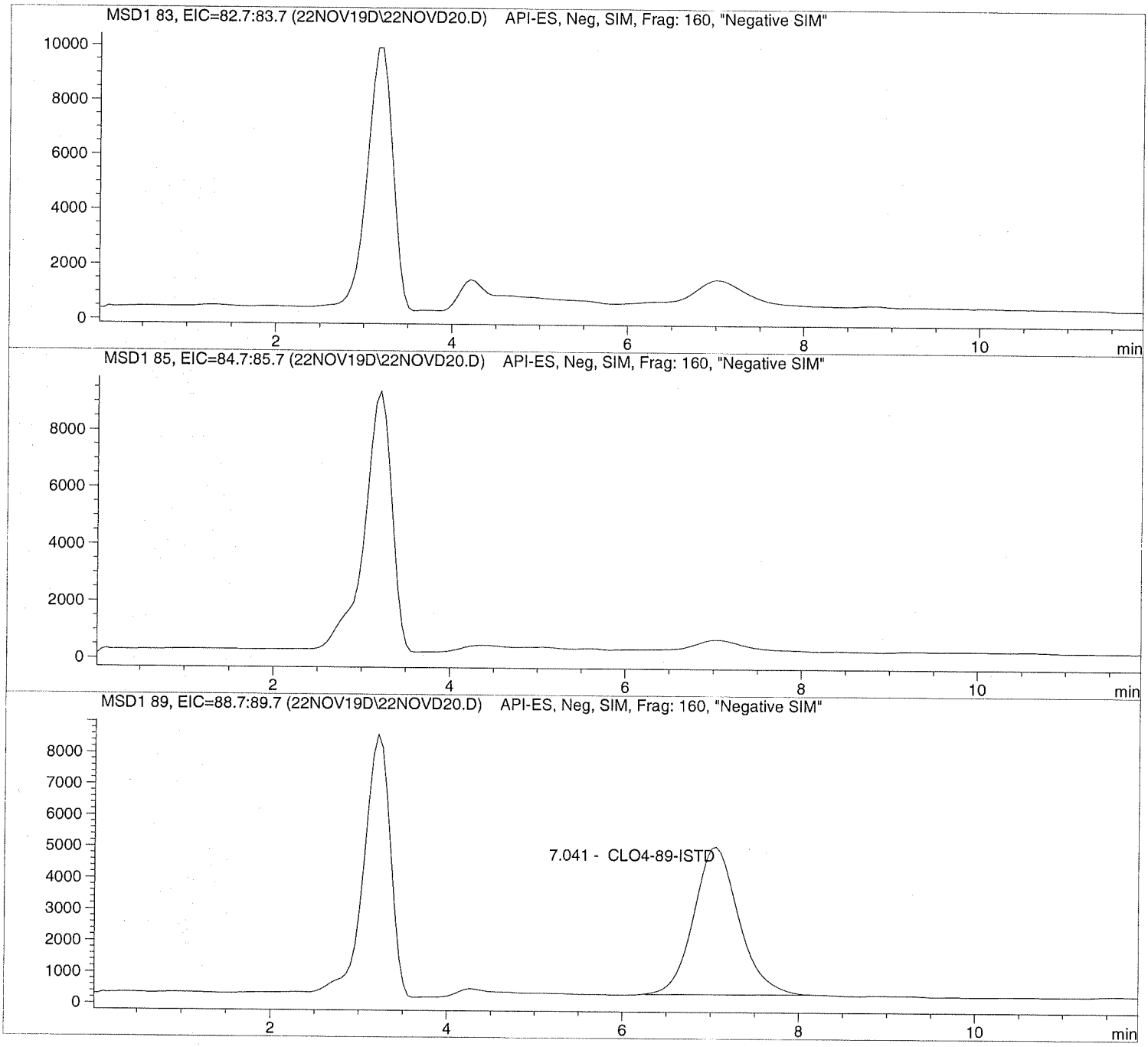
*** End of Report ***

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

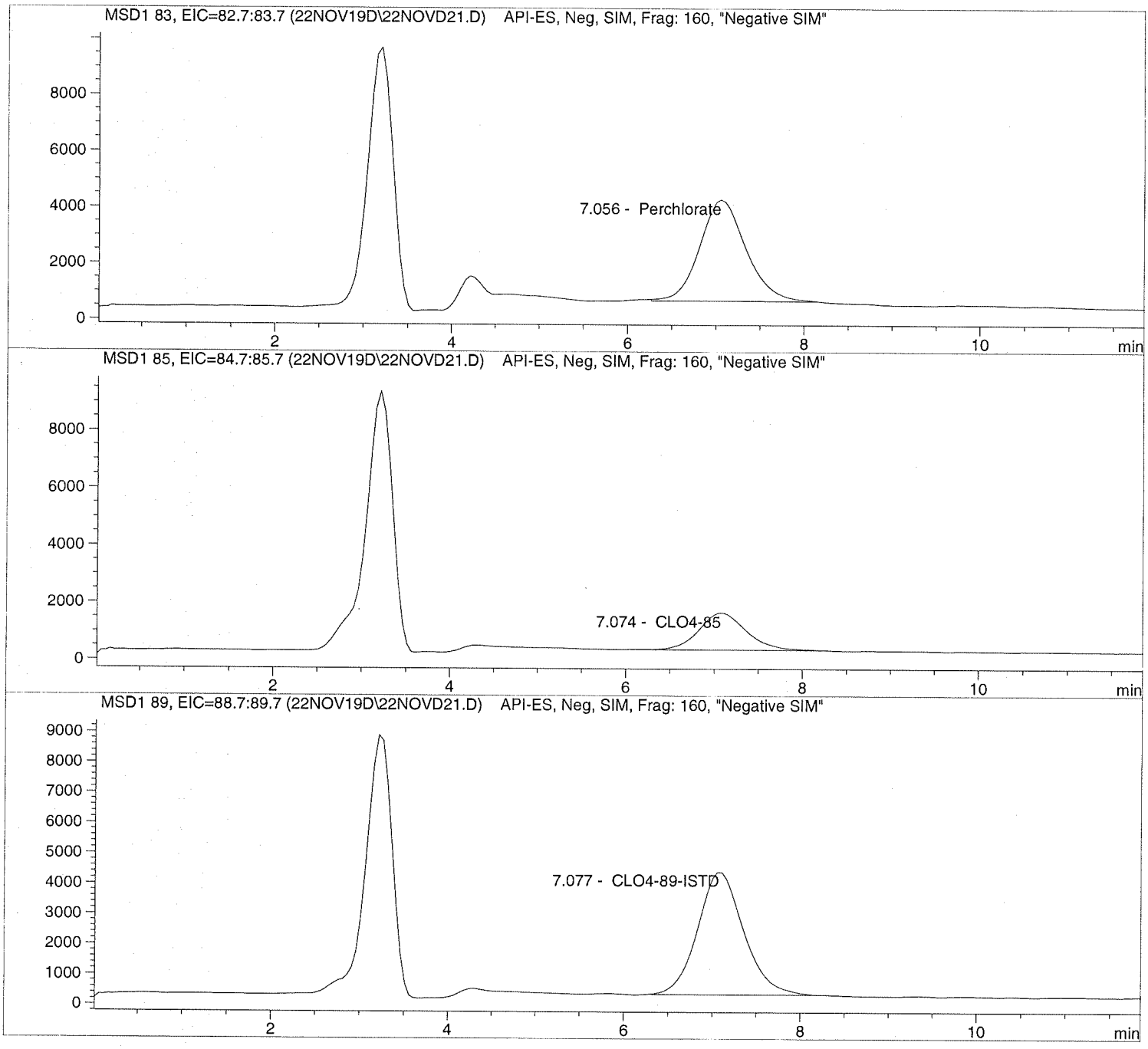
*** End of Report ***

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

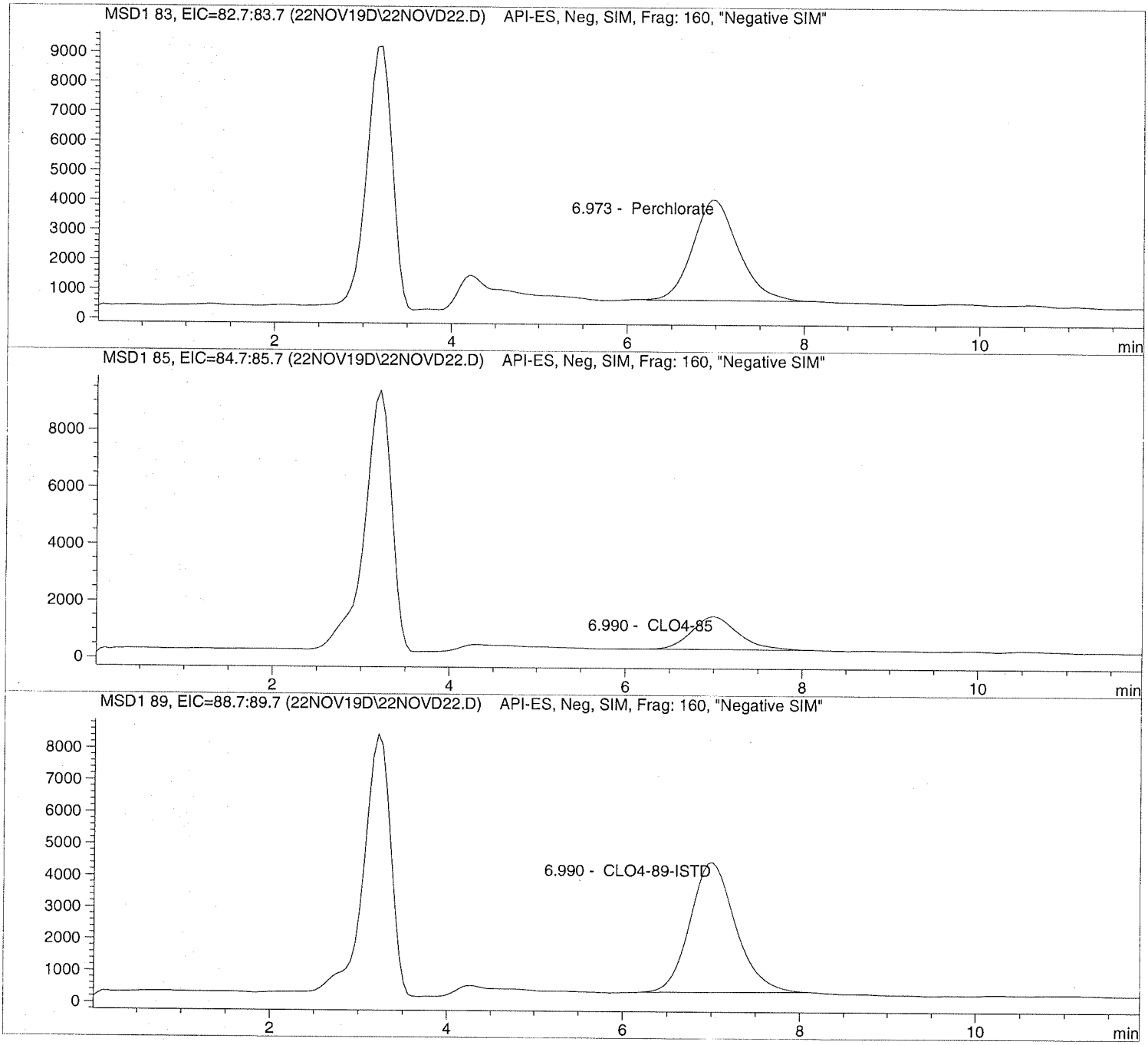
*** End of Report ***

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

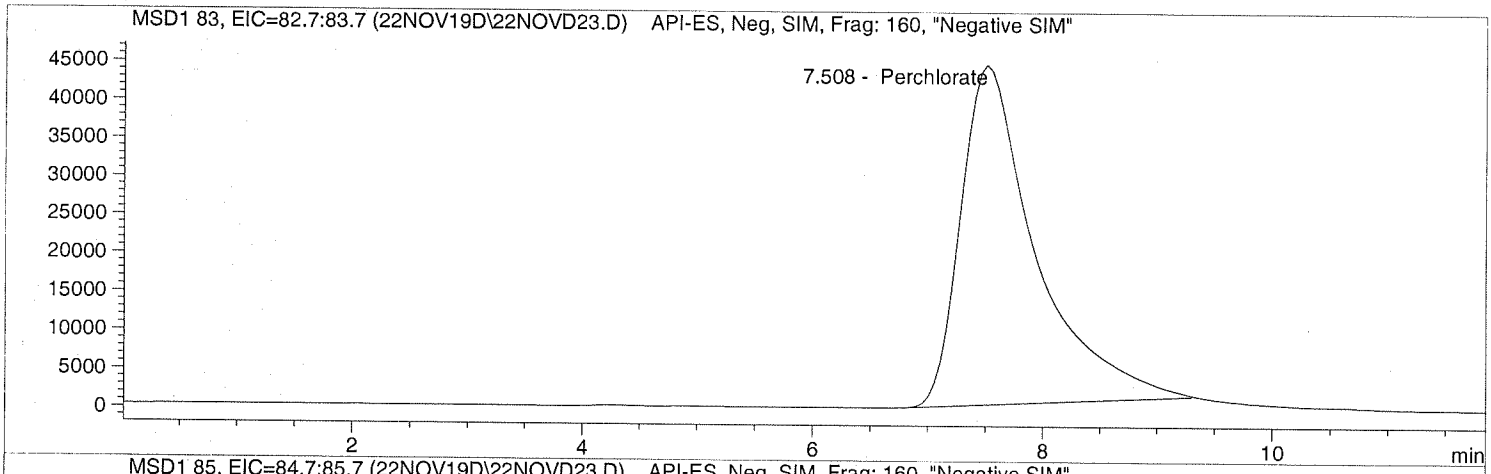
*** End of Report ***

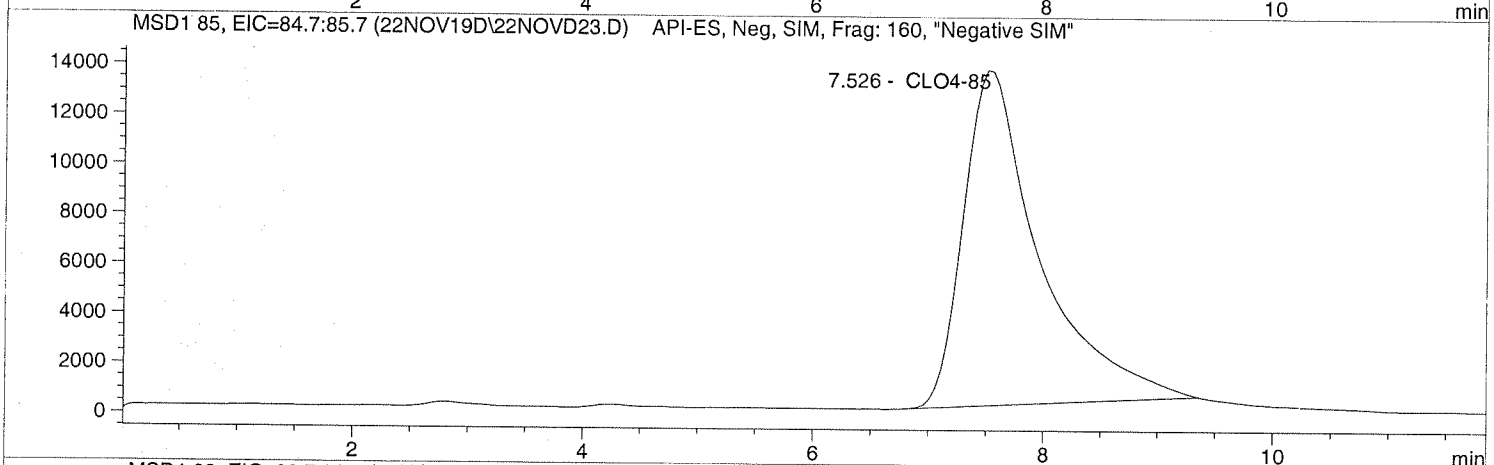
Data file: C:\HPCHEM\1\DATA\22NOV19D\22NOVD23.D Sample Name: 1932284007 100

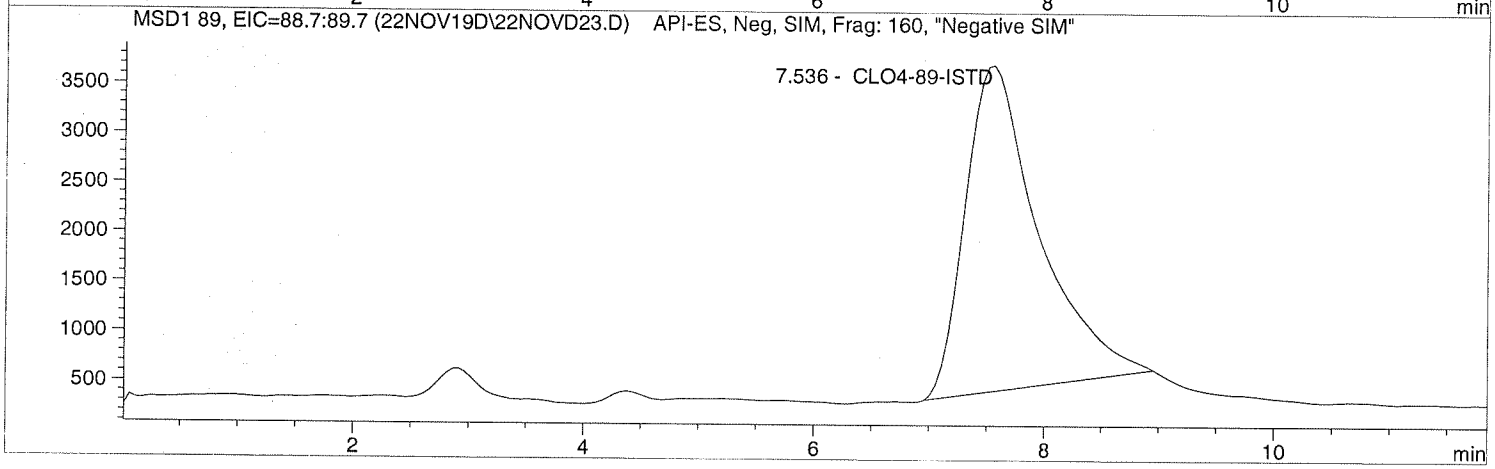
Injection Date:	11/22/2019 13:39:02	Seq Line:	23
Sample Name:	1932284007 100	Location:	Vial 92
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 µl

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

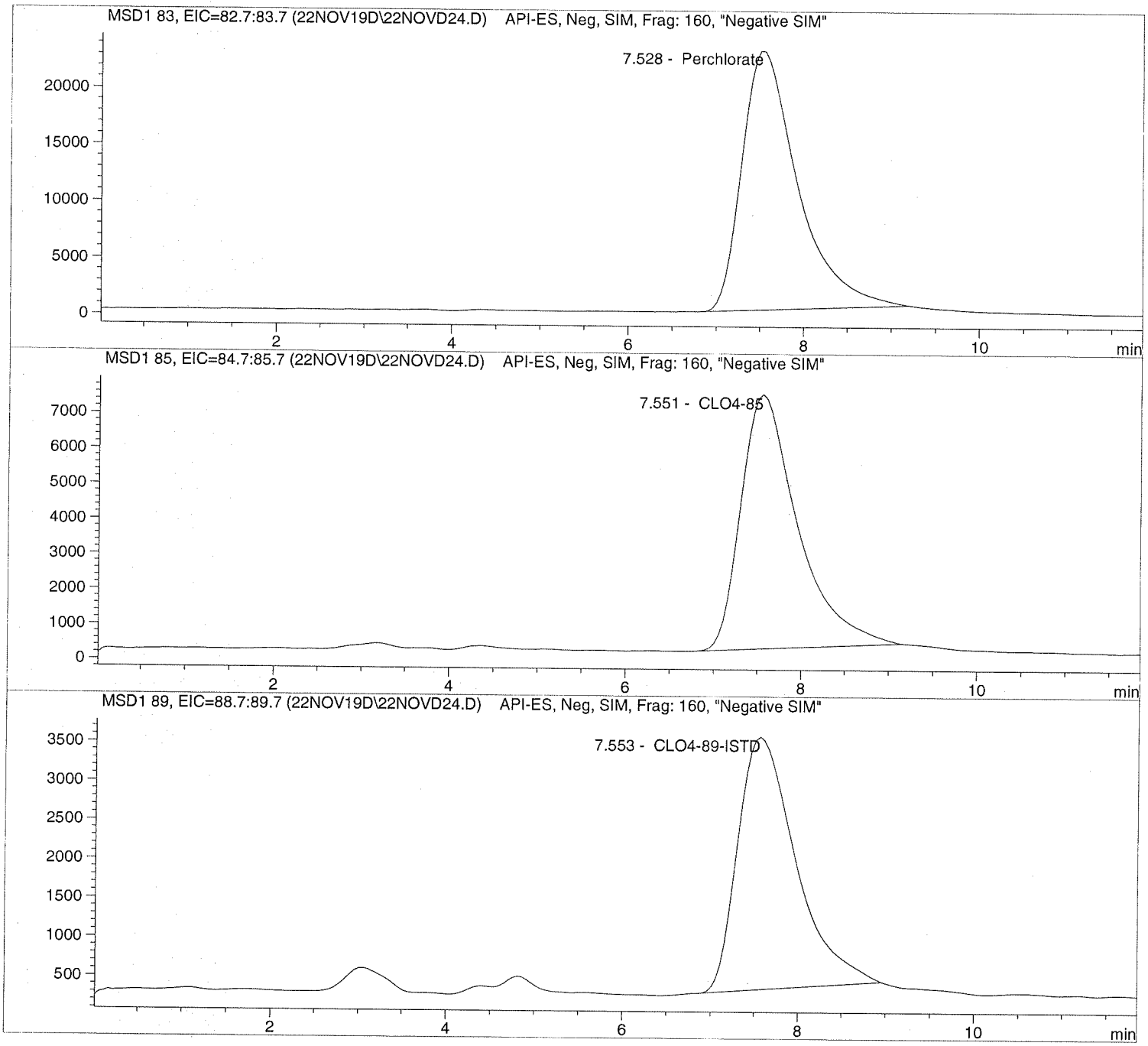
*** End of Report ***

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

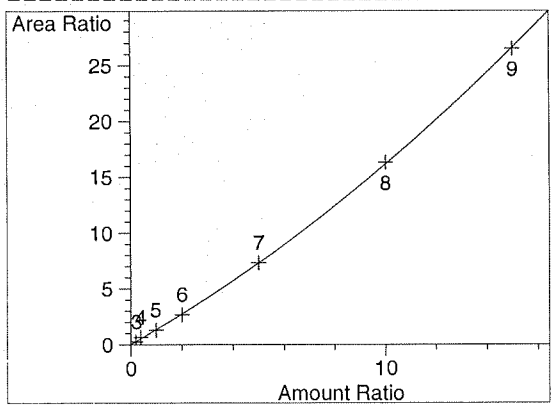
Compound: CLO4-89-ISTD
- Time Window : From 3.581 min To 11.896 min
- Curve Type : Linear
- Origin : Included
- Calibration Level Weights:/
  - Level 3 : 1
  - Level 4 : 1
  - Level 5 : 1
  - Level 6 : 1
  - Level 7 : 1
  - Level 8 : 1
  - Level 9 : 1

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

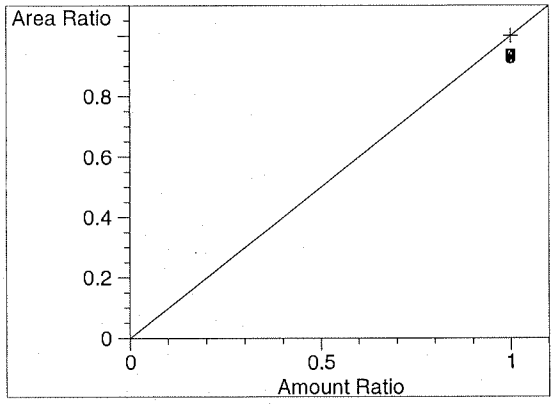
Peak Sum Table

No Entries in table

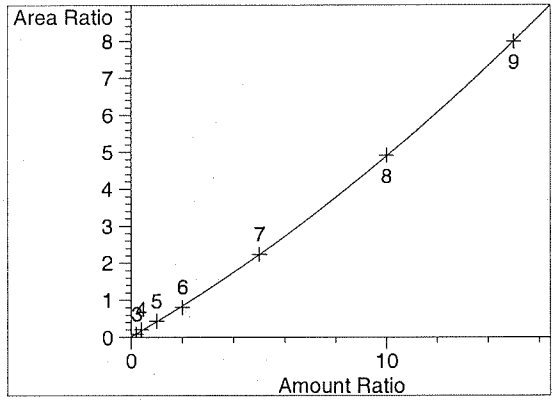
Calibration Curves



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 Table:

Method and Injection Info Part:

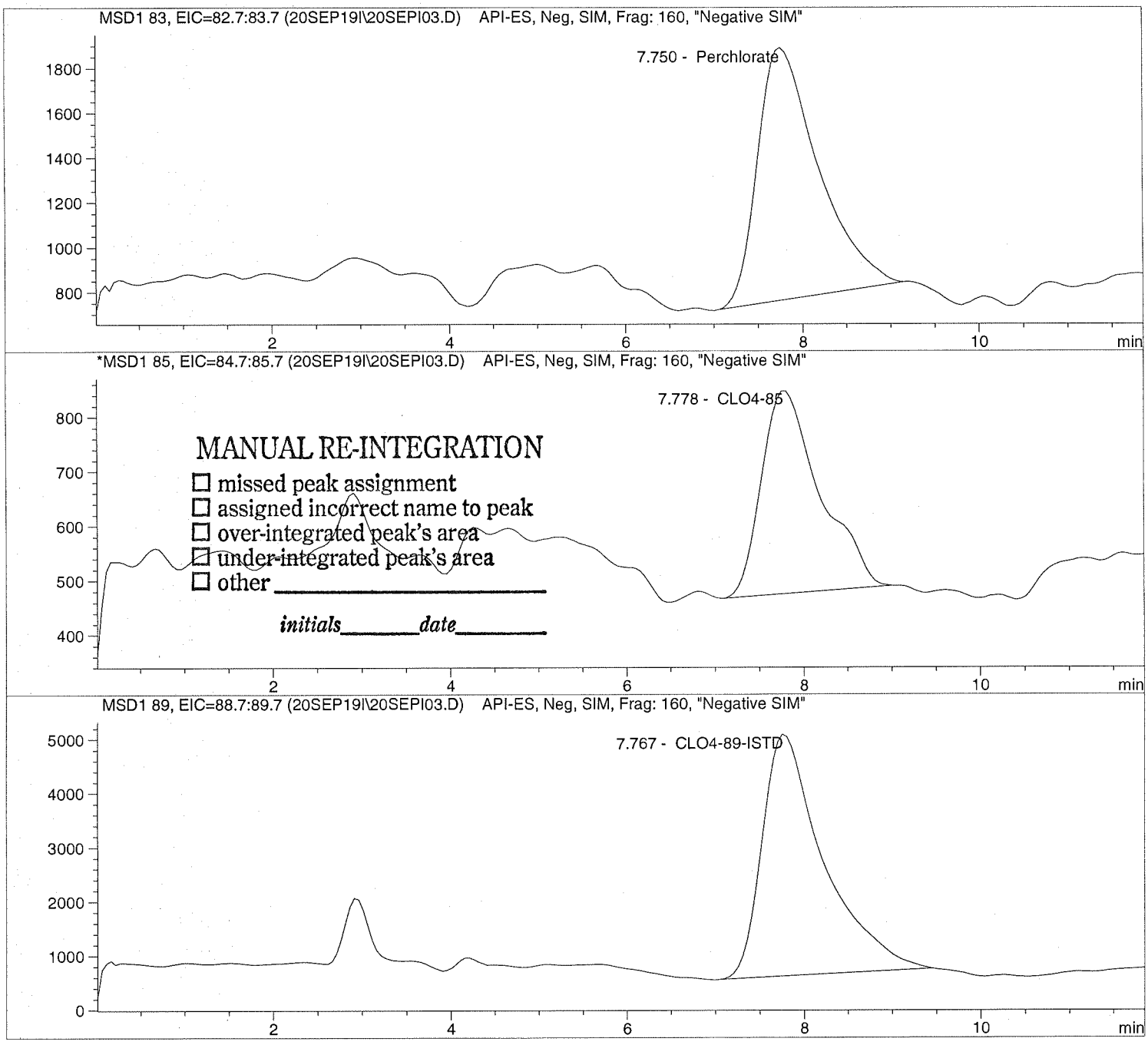
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	CLO4@ 5.0ug/L	CLO4-AQN	1	Ctrl Samp		
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

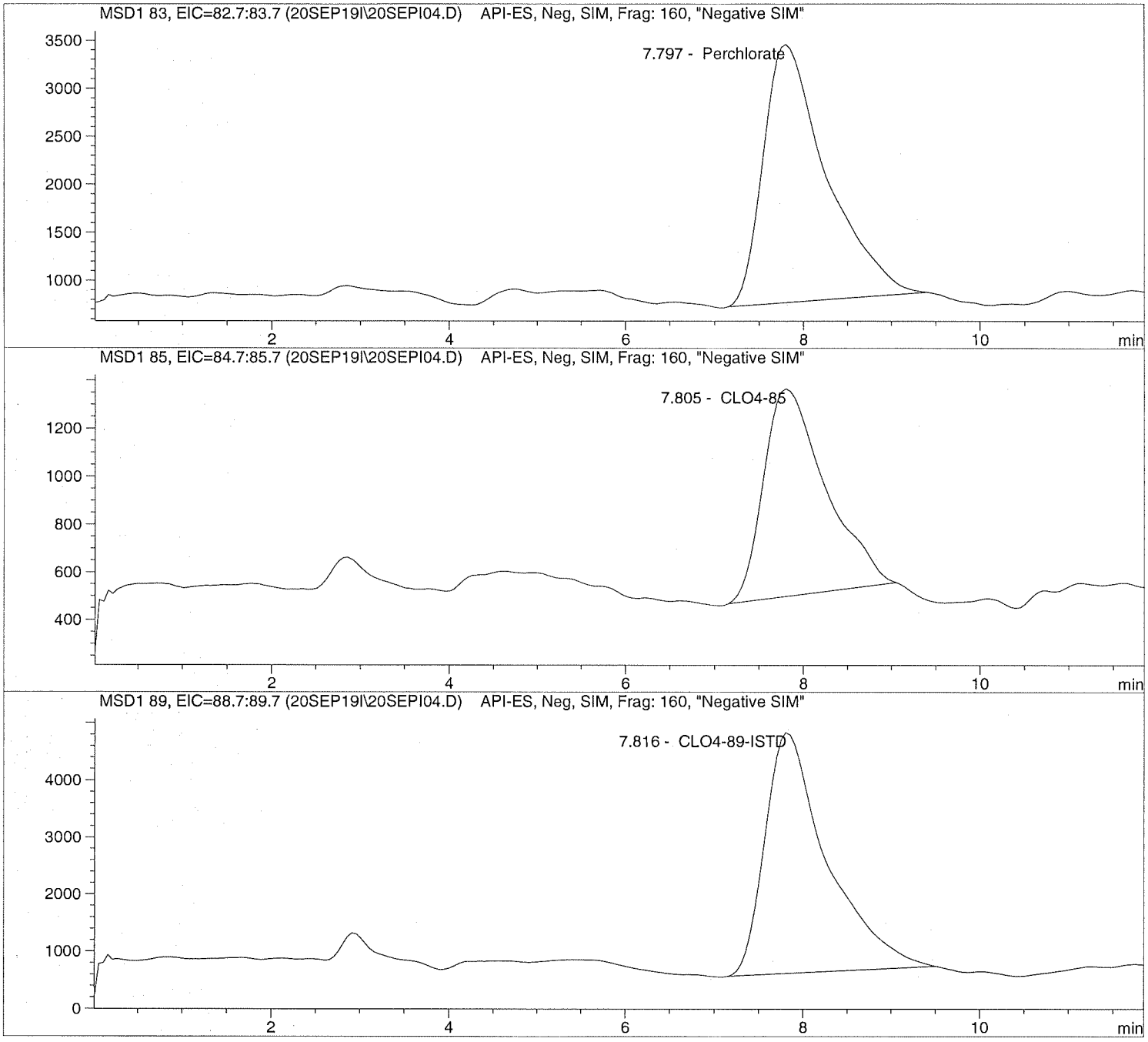
*** End of Report ***

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

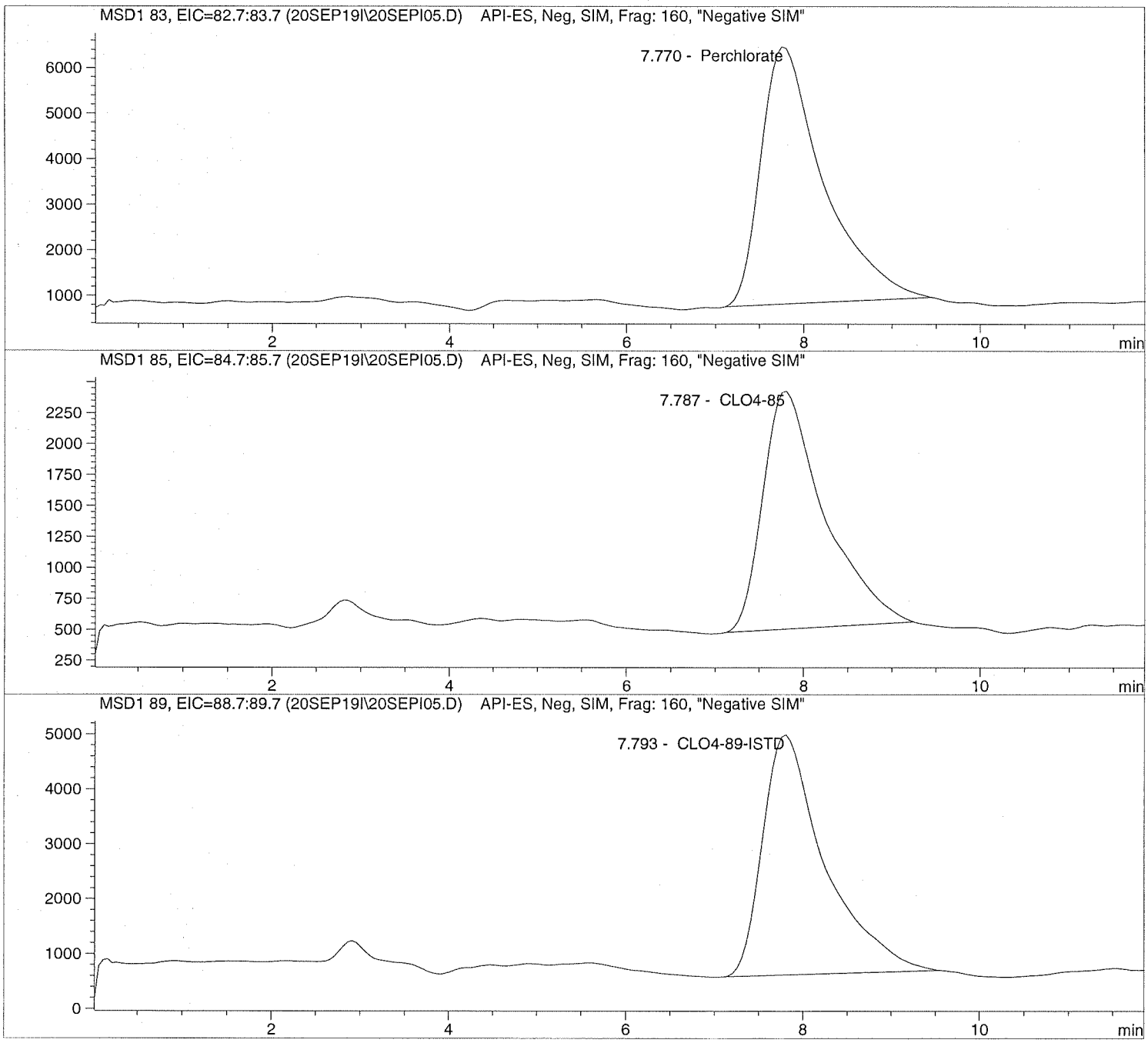
*** End of Report ***

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

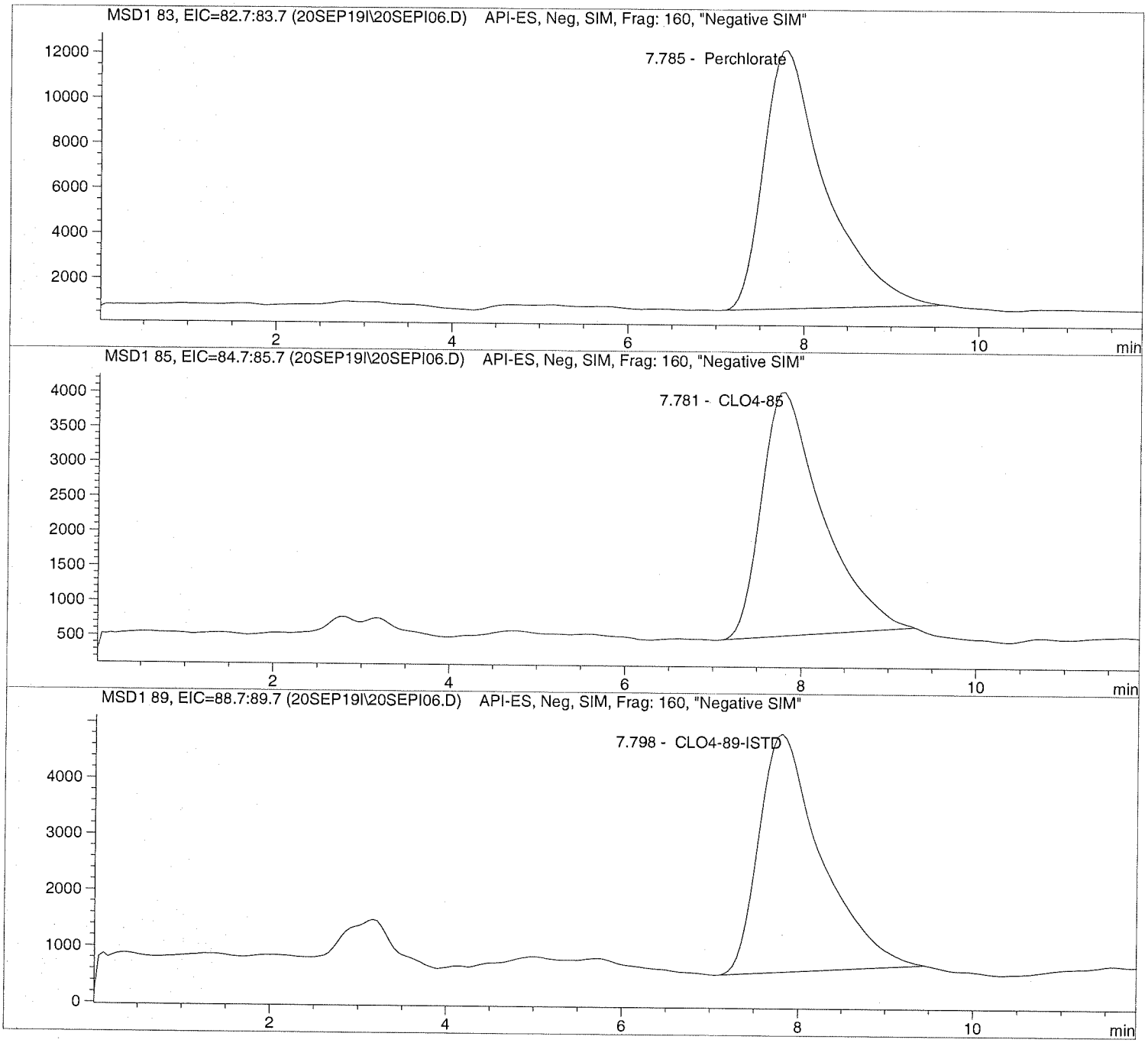
*** End of Report ***

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

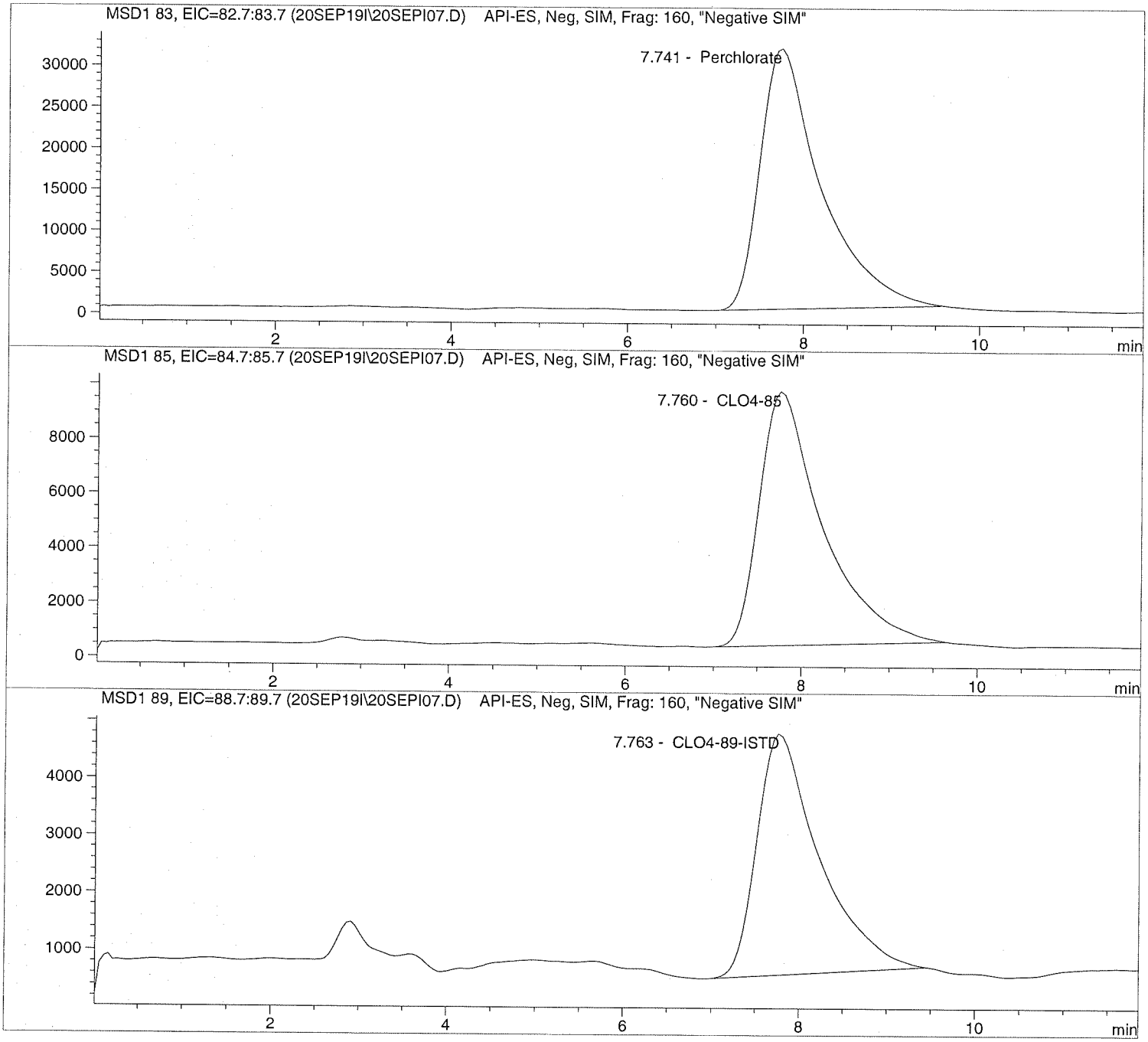
*** End of Report ***

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

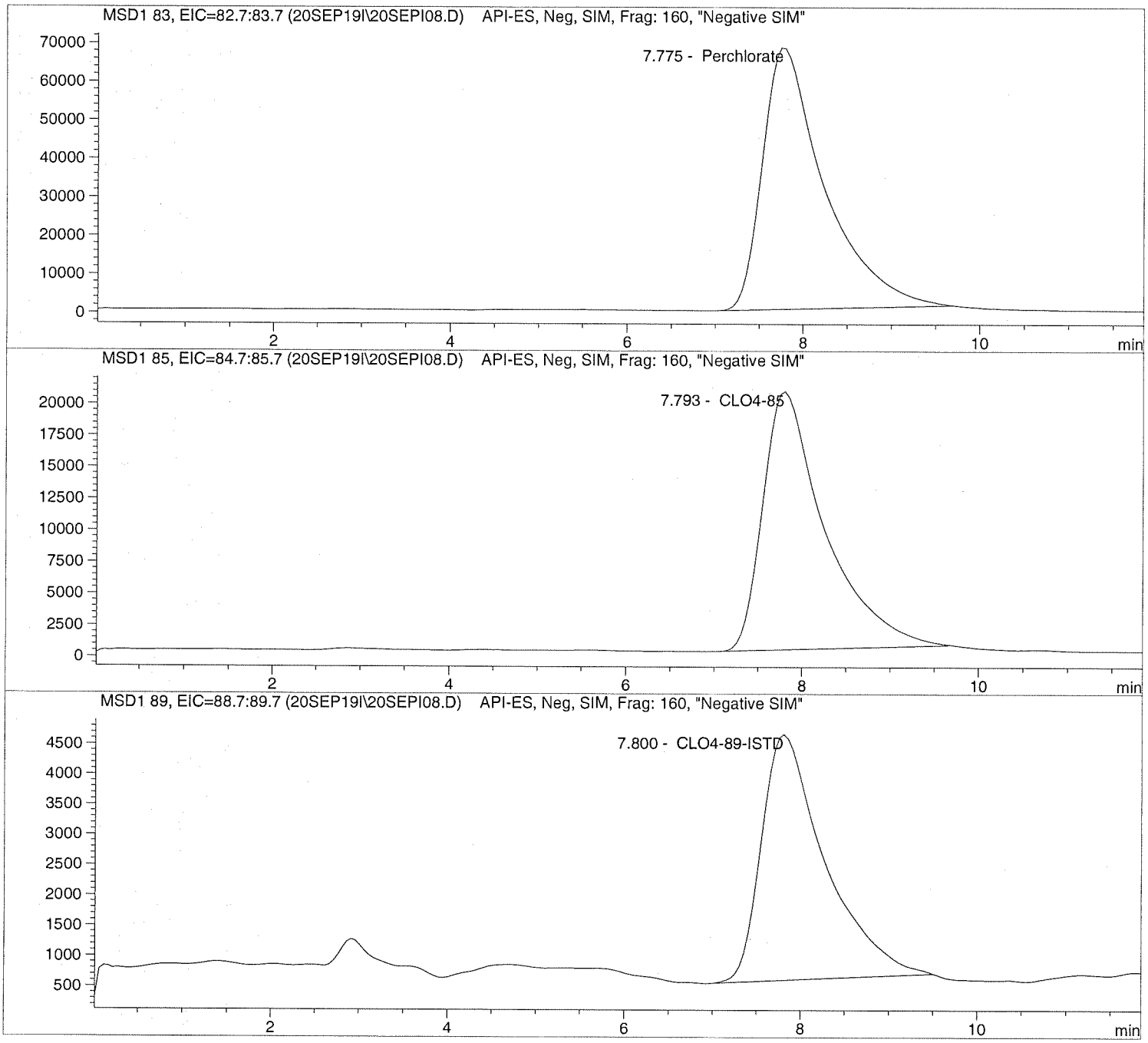
*** End of Report ***

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

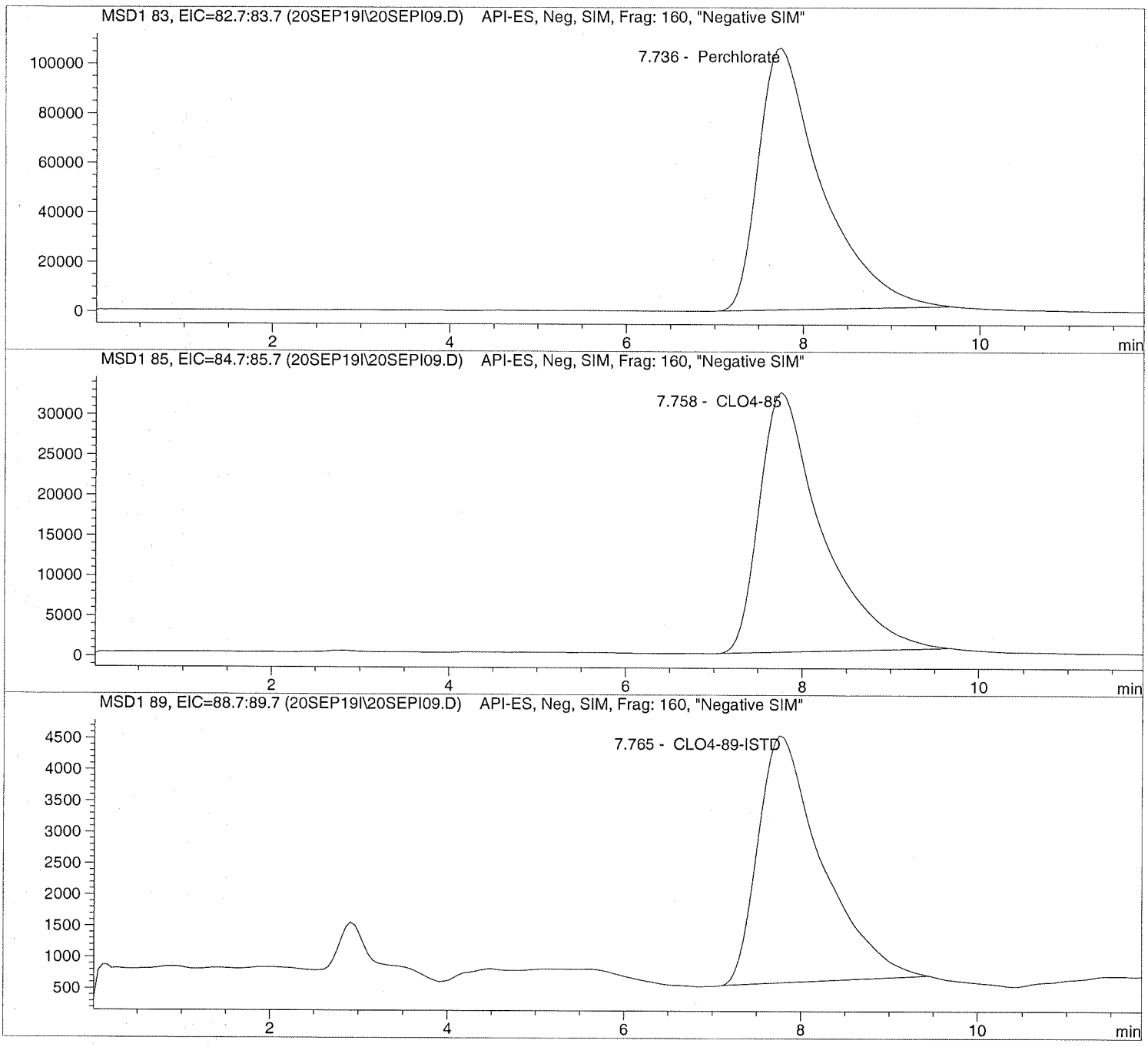
*** End of Report ***

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

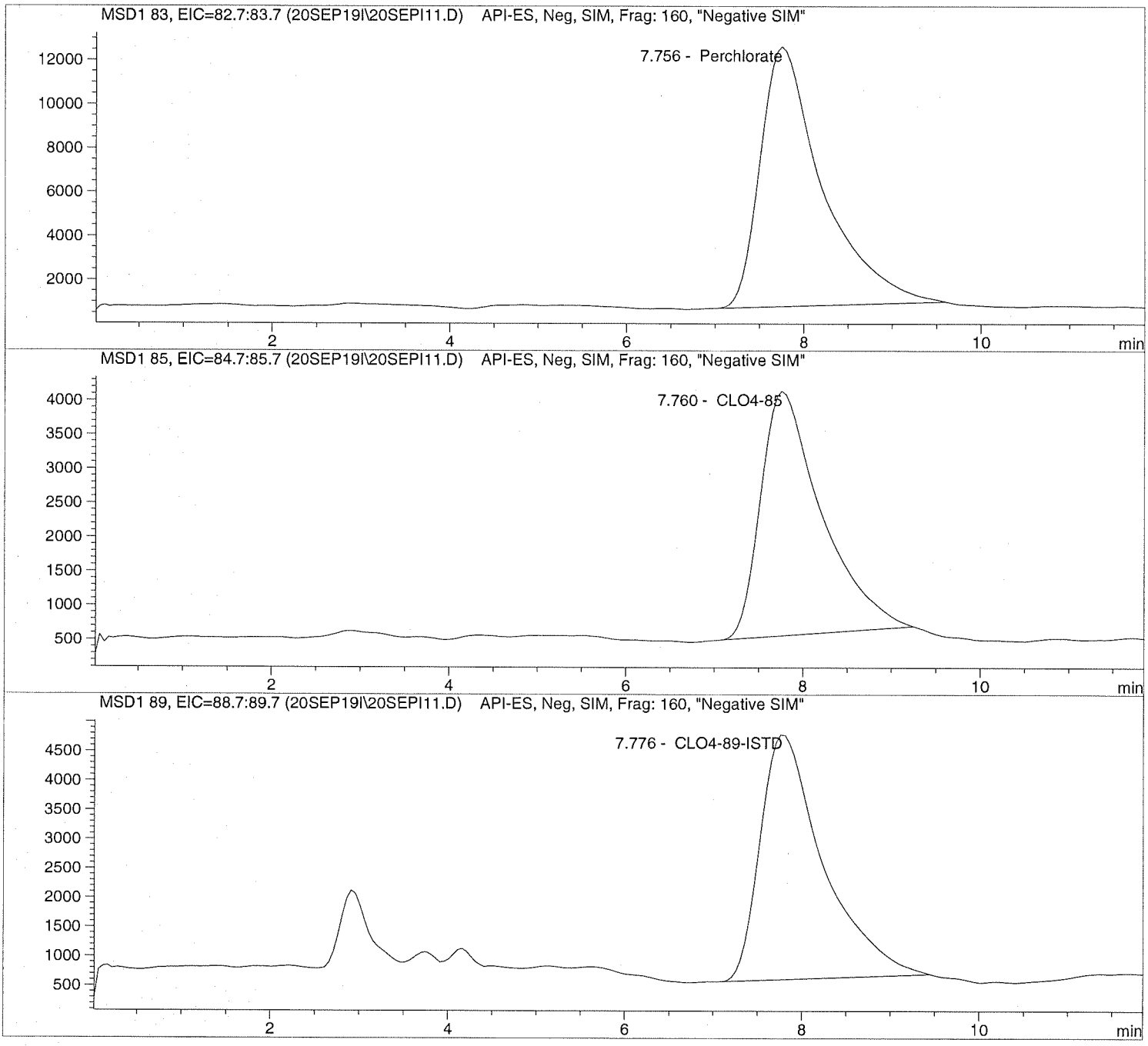
*** End of Report ***

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

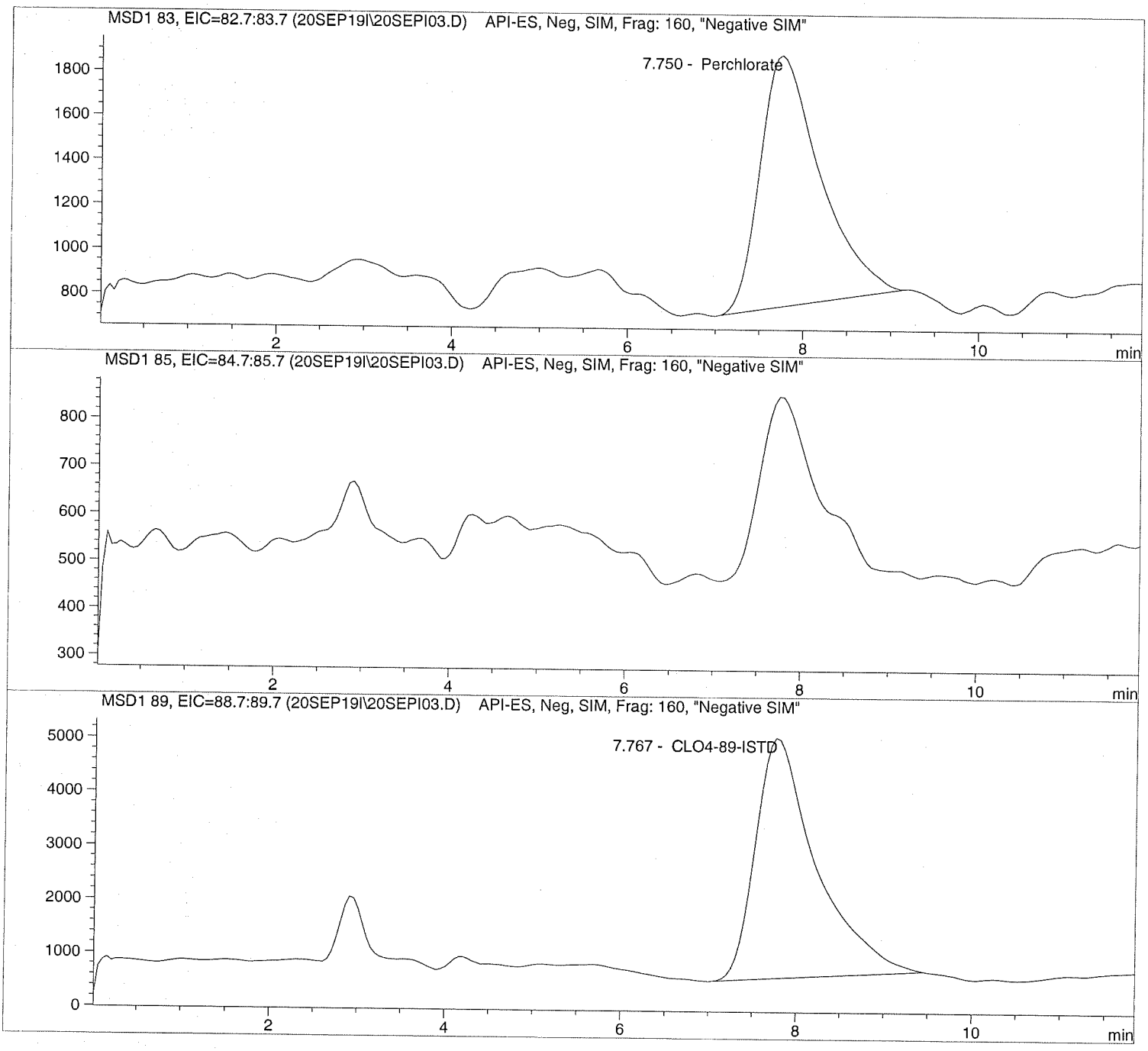
Unmodified

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

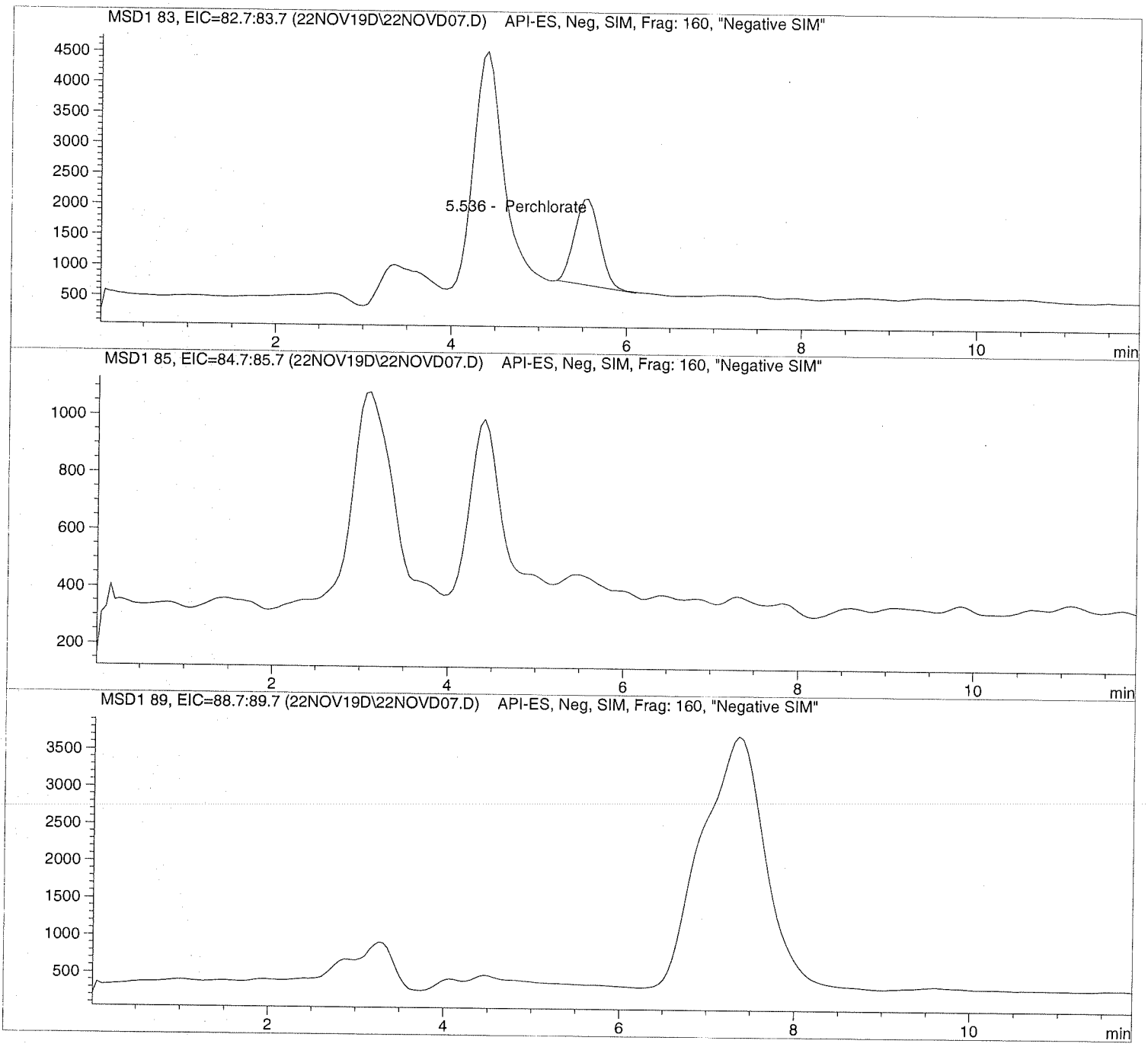
*** End of Report ***

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
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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

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	☐

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)

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.

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.

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.

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.

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
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.

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.

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
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.

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
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.

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.

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.

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.

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.

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.

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.

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

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

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*				

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*				

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
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				

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*				

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*				

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				

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*				

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*				

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	

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*	

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

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

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

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

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

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.	ANALYSIS	Vocs by 8260B (3-40 ml VOA/HCL)	MEE by RSK175 (3-40 ml VOA/HCL)	CO2 by RSK175 (3-40 ml VOA/Cool to 6 deg C)	TOC by Sm5310C (2-40ml Amber/H2SO4)	Anions (chloride/sulfate/nitrate) by 9056 (1-250ml /Cool to 6 deg C)	Perchlorate by 6850 (1-125ml /Cool to 6 deg C)
SDWW16-191113	LHAAP 50				WG	11/13/19	0835	13		X	X	X	X	X	X
SDWW14-191113	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				WG	11/13/19		2		X					

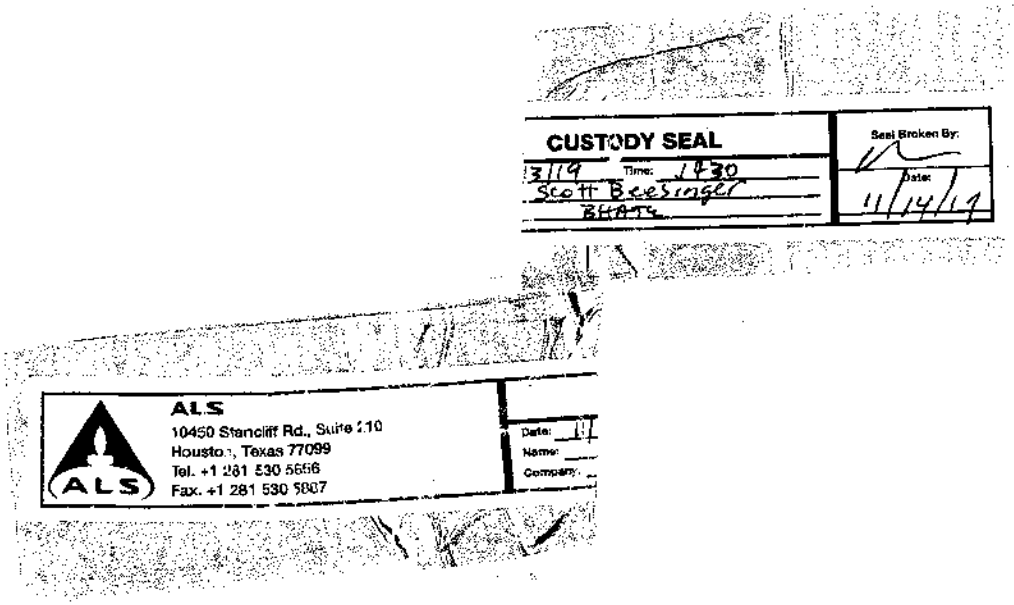
HS19110684

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 1425 CFOW	Sarita Bessinger / BHATE	11/13/19 1430	J. [illegible]	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:
3/19
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
Date:
Name:
Company:

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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

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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

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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
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Phone (360)577-7222 Fax (360)636-1068
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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 10791

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

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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	

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.

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.

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

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

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

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General Chemistry

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Work Request # Original ( ) K1910680, 796, 847, 861, 929, 959, 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: BCV

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, K1910903-2/2d, 803-4/4d sent for CA due to being above calibration curve.
K1910903-3/3d, 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.

11/26/19

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.

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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.

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
0.000				STD Deviation	0.08537
0.000				AVERAGE	0.03675
0.000				UCL	0.12213
0.000				LCL	-0.04862
0.000					
0.270					
0.177				OBSERVATIONS	1
0.000				STD Deviation	#DIV/0!
0.000				AVERAGE	0.03100
0.000				UCL	#DIV/0!
0.000				LCL	#DIV/0!
0.000					
				OBSERVATIONS	0
				STD Deviation	#DIV/0!
				AVERAGE	#DIV/0!
				UCL	#DIV/0!
				LCL	#DIV/0!
				OBSERVATIONS	0
				STD Deviation	#DIV/0!
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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

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

Revision 1, 2010 R:\WET\ANALYSES\TOC\TEMPLATE\TOCwaterLIMS

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	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) Fusion1 (Fusion1) (v8)		
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 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
◆	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	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
◆	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	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
◆	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	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

◈	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 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
◆	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 1:10 | **Blank Contribution** (TC) 8.7842 (IC) (v1323) | **Method** CAS_salt_010711 (v4) | **Calibration** 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 - Criteria met. | **Success Action** Do Nothing | **Method** CAS_salt_010711 (v4) | **Calibration** CAS_salt_010711 (v30) | **STD Conc - Pos B** 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 - Criteria met. | **Success Action** Do Nothing | **Method** CAS_salt_010711 (v4) | **Calibration** CAS_salt_010711 (v30) | **STD Conc - Pos D** 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

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: BP	Date Analyzed: 11/26/19
Reviewed By:	Date Reviewed: 11/26/19

23 BP 11/26/19

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

1932352

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:** **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 / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / 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: [signature] Date/Time: 11/14/19 1800.

Received By: [signature] Date/Time: 11-15-19 9:04

Cooler ID(s): Temperature(s):

ALS Environmental

CHAIN-OF-CUSTODY

Project / Job / Task: HS19110684-01	***Split:***	**Workorder ID:** 1932352	**Level:** ENV_LVL4
Client: ALS Environmental (Houston)		**Account:** 8101	**Type:** 125Poly
Comments:			**Preservatives** COOL

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	Requested Analysis: 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								

116 of 342

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
Tami VanTassell	11/15/19 11:20	6C	Storage
R.33.	11/2019/14:00	T. Busch	CLO4 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: 11-5-19 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) 11-5-19 (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: HBN: 252432

Rule: EPA 6850, DoD QSM Water Analyst: T. Bosch Status: WP

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
MFG: AccuStandard
MFG Lot: 218065075
Part ID: IC-PER-10X-1

Created By: Thomas Bosch
Create Date: 09/17/2018 09:09AM

Amount: 100 mL
Expires: 07/25/2020
Usable: Yes
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

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 17025 REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED ISO 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)

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

#*	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:

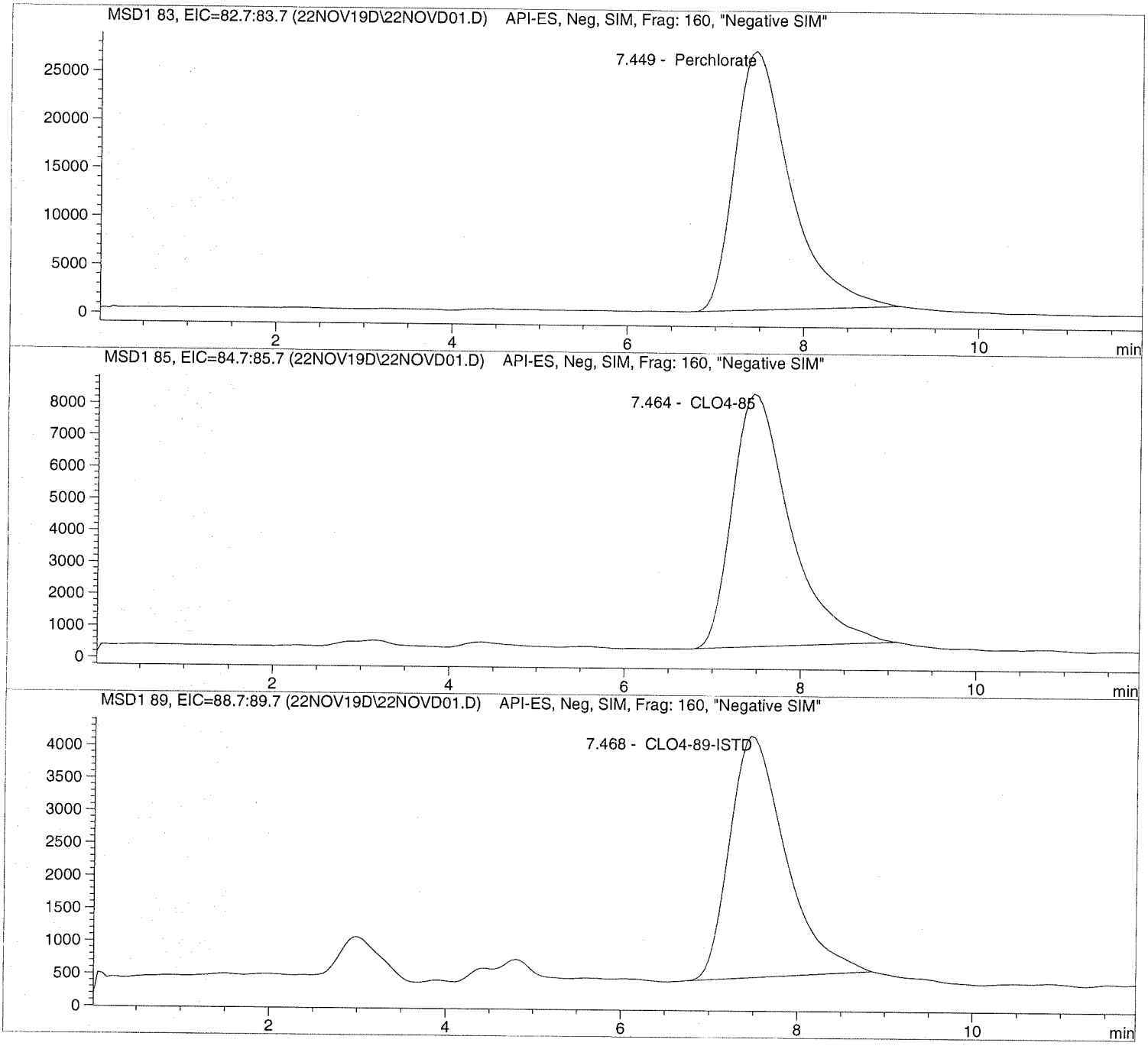
Line	Location	SampleName		Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	685438	CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	685439	QC@3.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	685441	ICS@3.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	685442	LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1932283001		CLO4-AQN	1	Sample		
6	Vial 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

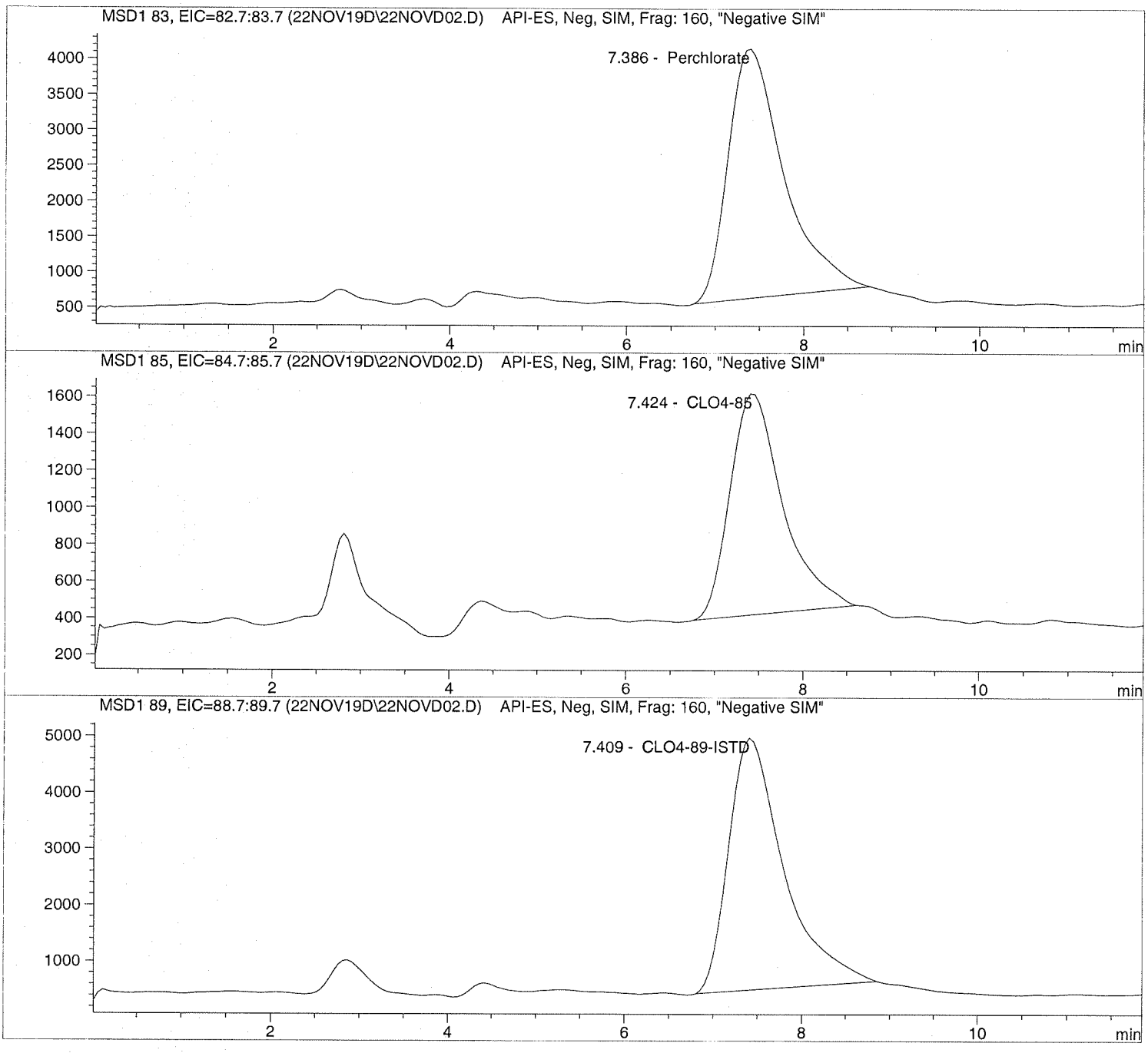
*** End of Report ***

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

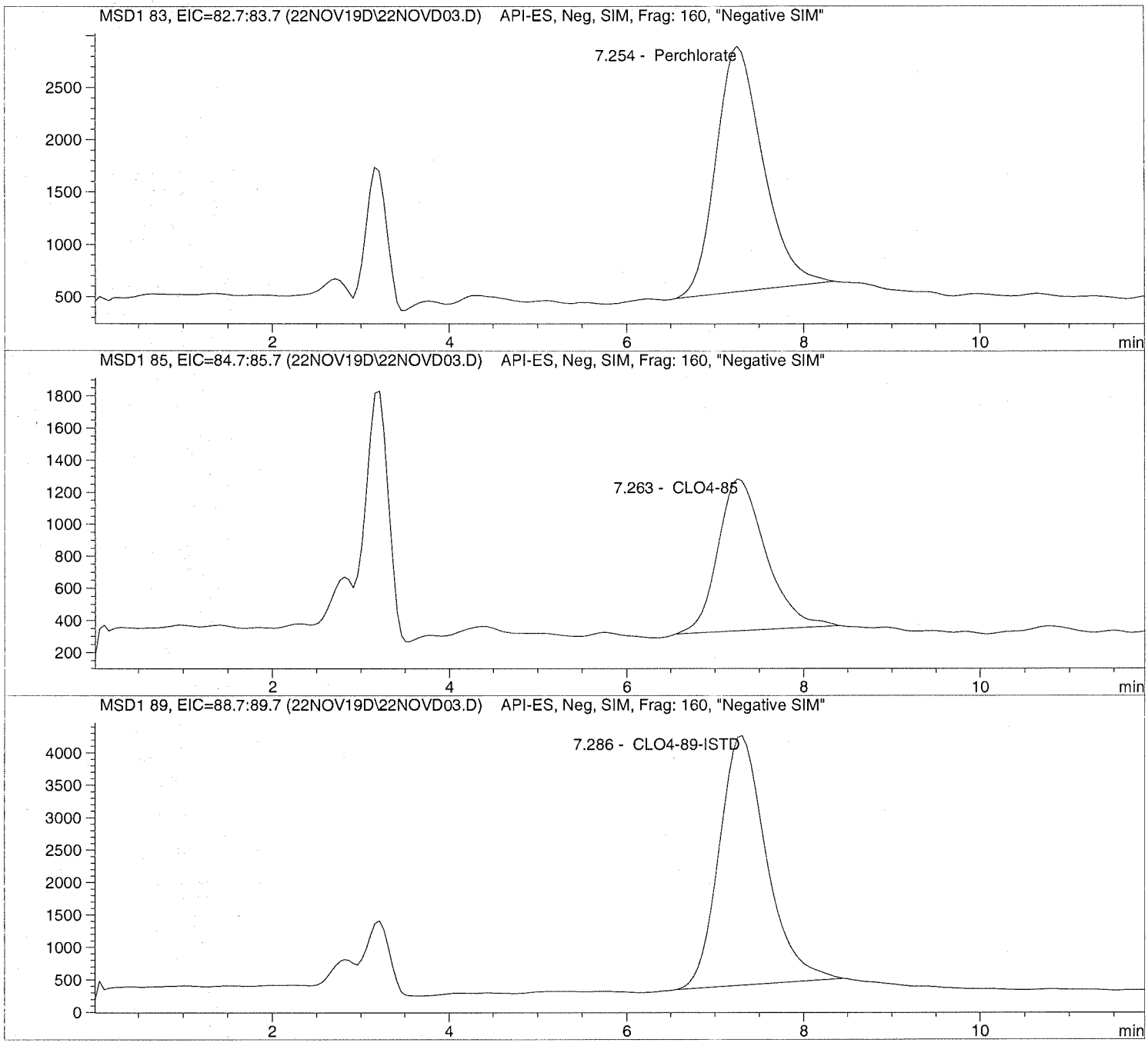
*** End of Report ***

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



Injection Date: 11/22/2019 08:37:06
Sample Name: 685441 ICS@3.0
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
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

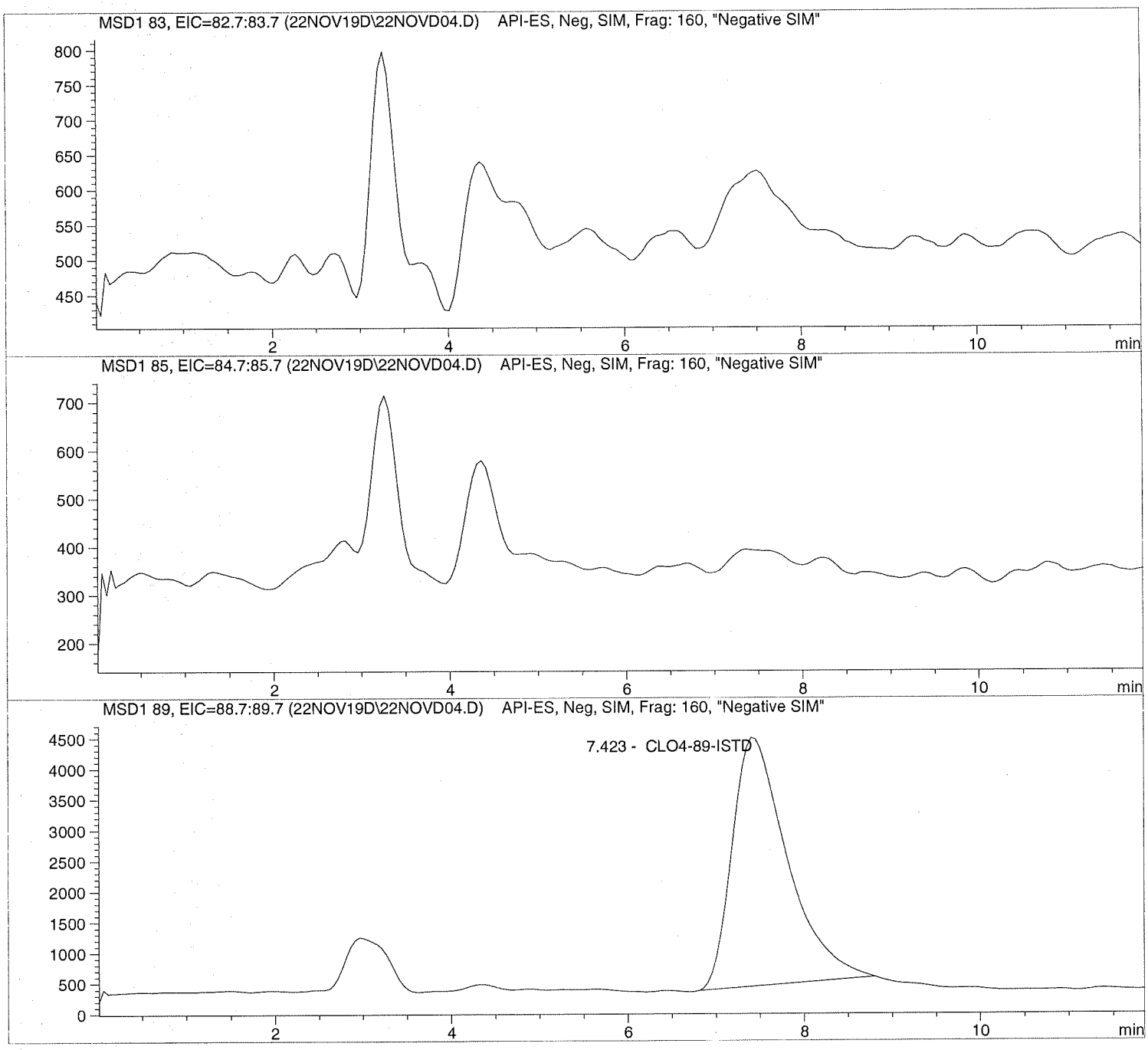
*** End of Report ***

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

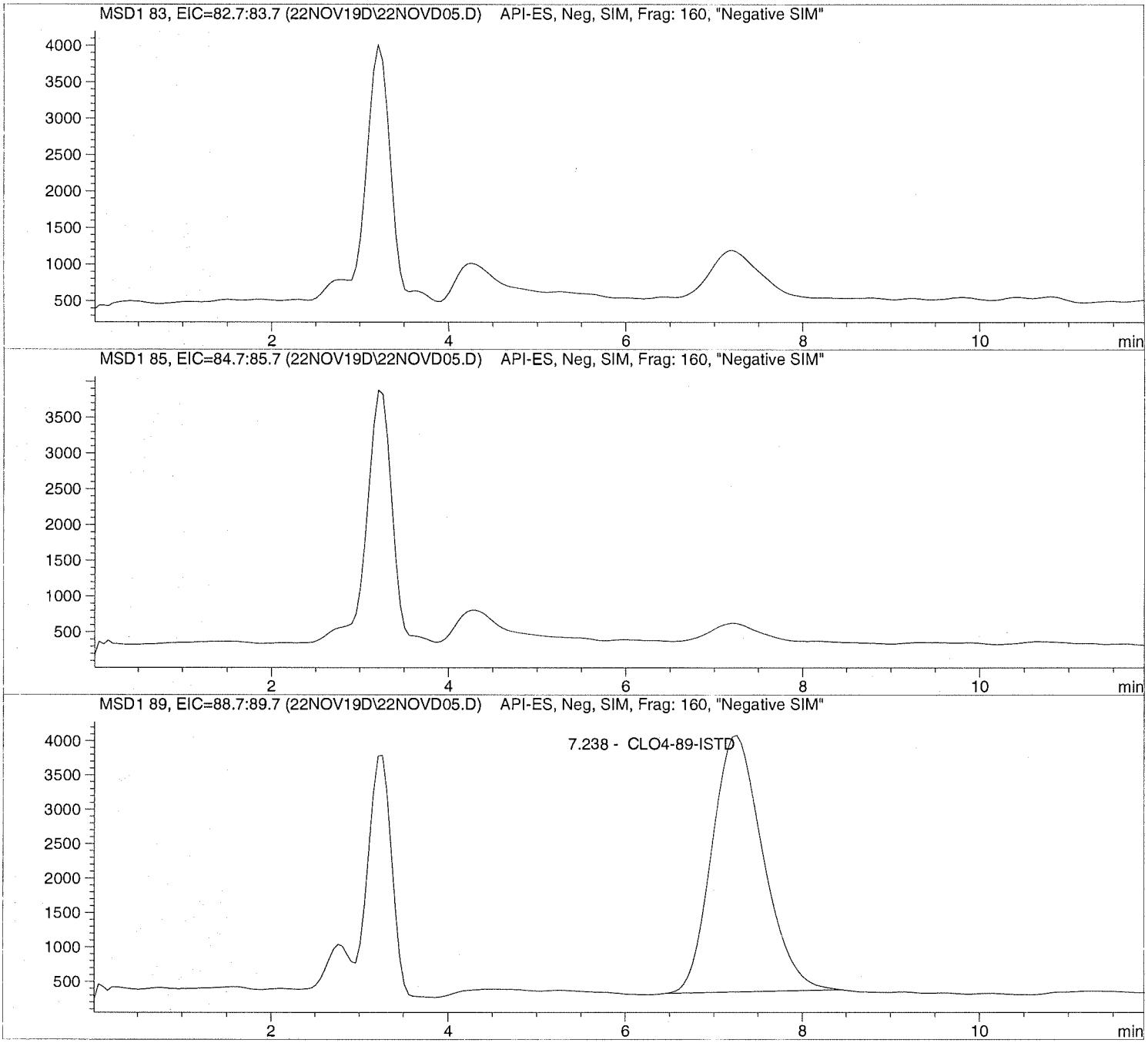
*** End of Report ***

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

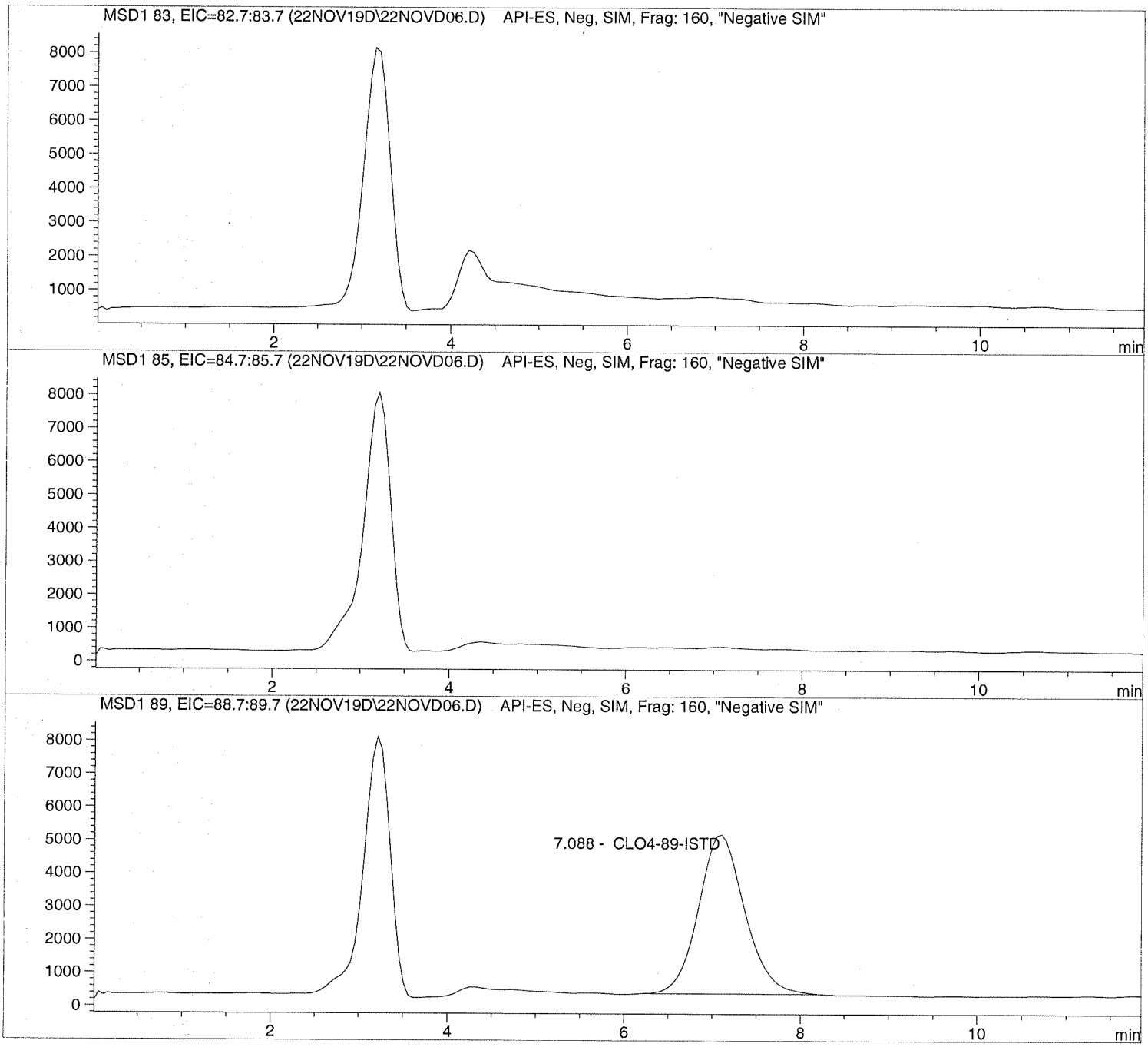
*** End of Report ***

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

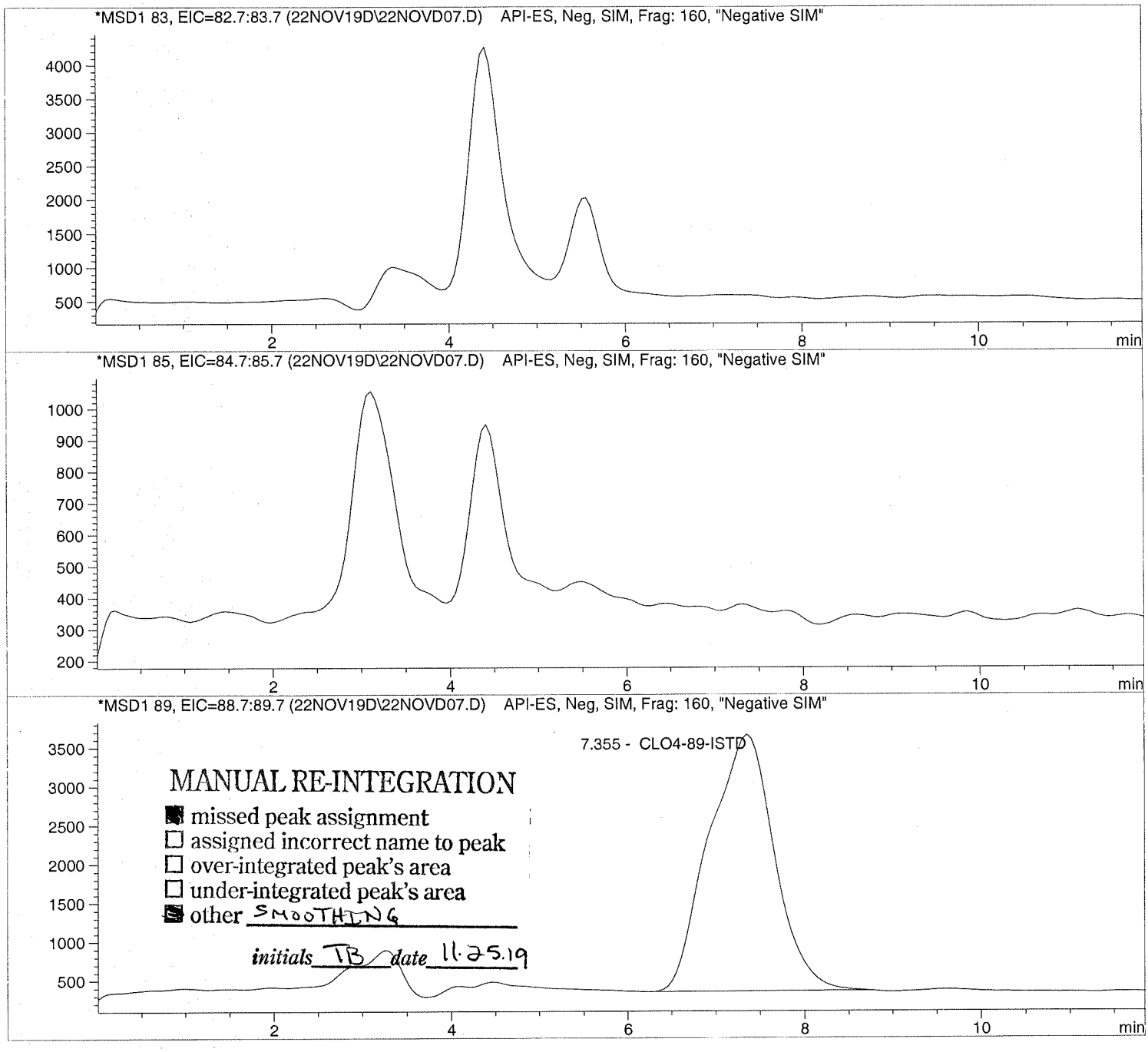
*** End of Report ***

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

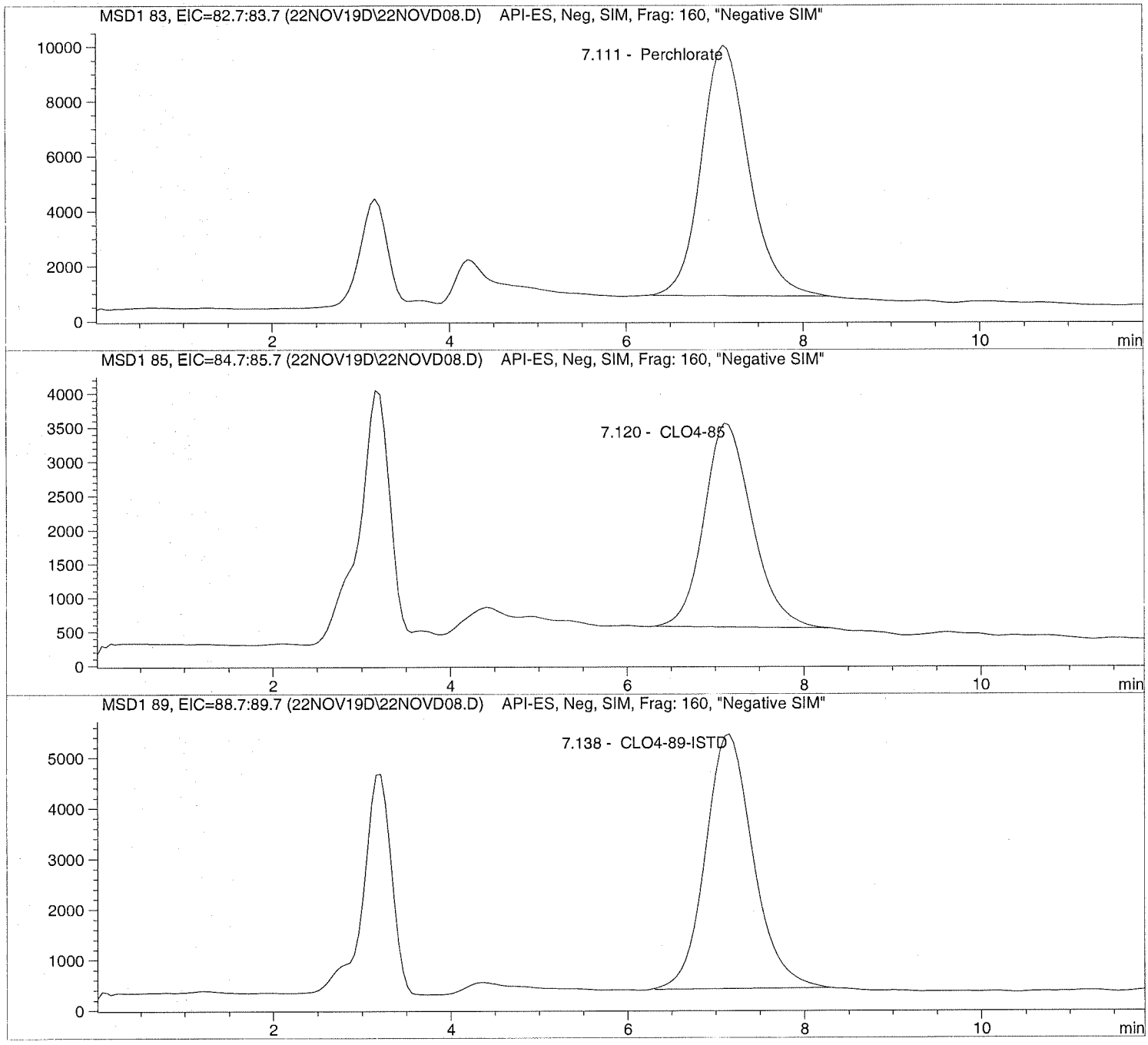
*** End of Report ***

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

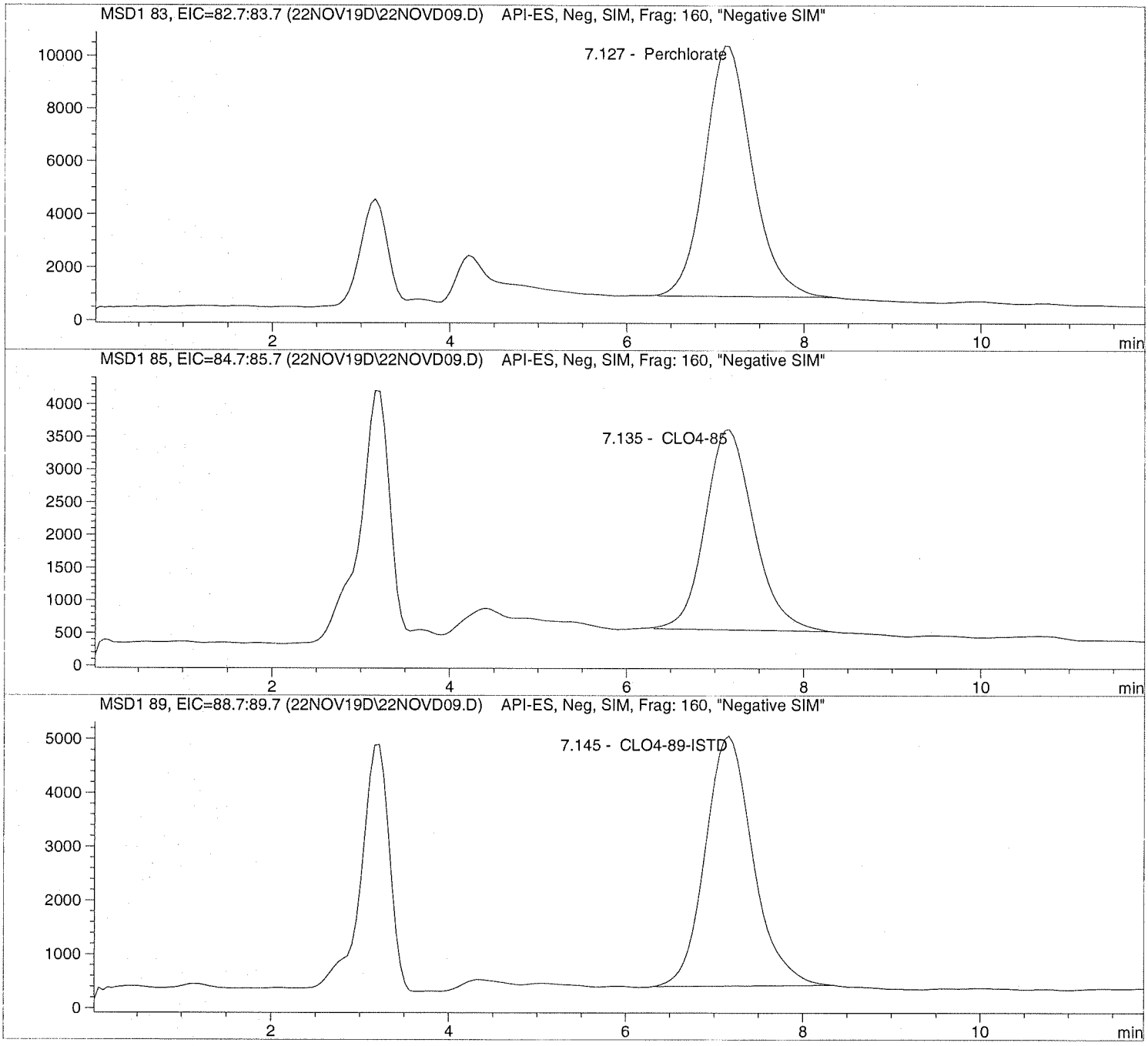
*** End of Report ***

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

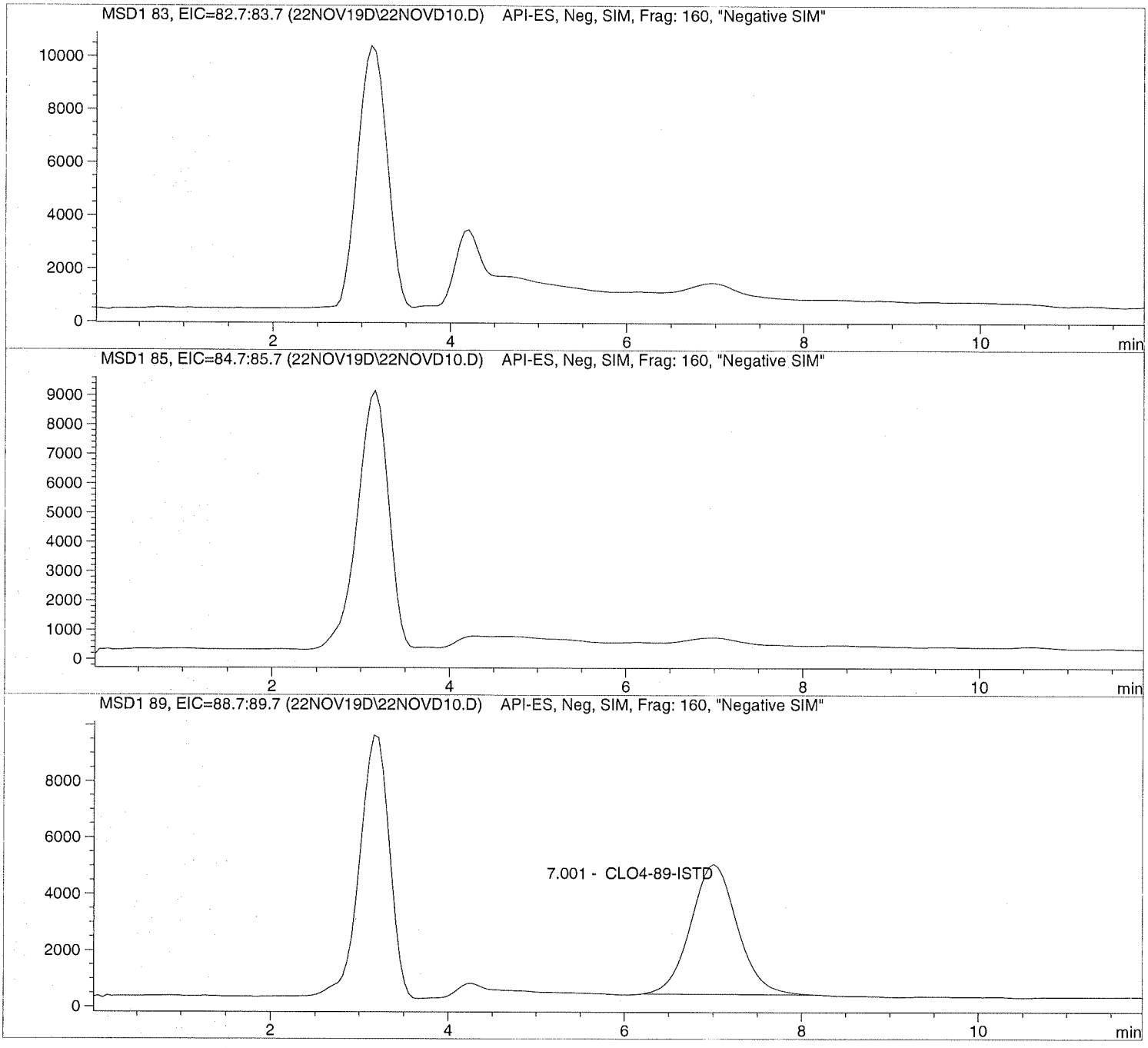
*** End of Report ***

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

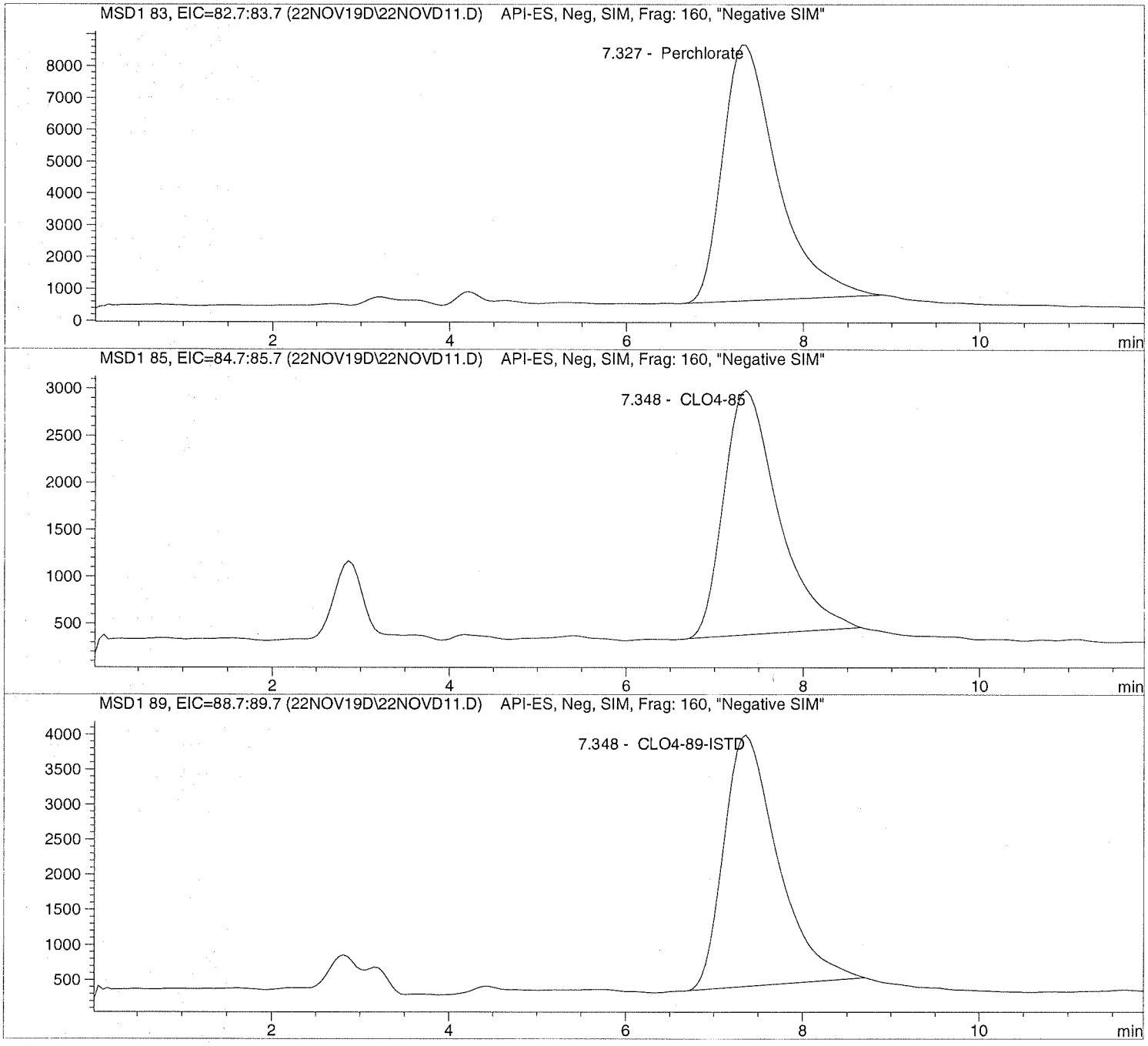
*** End of Report ***

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

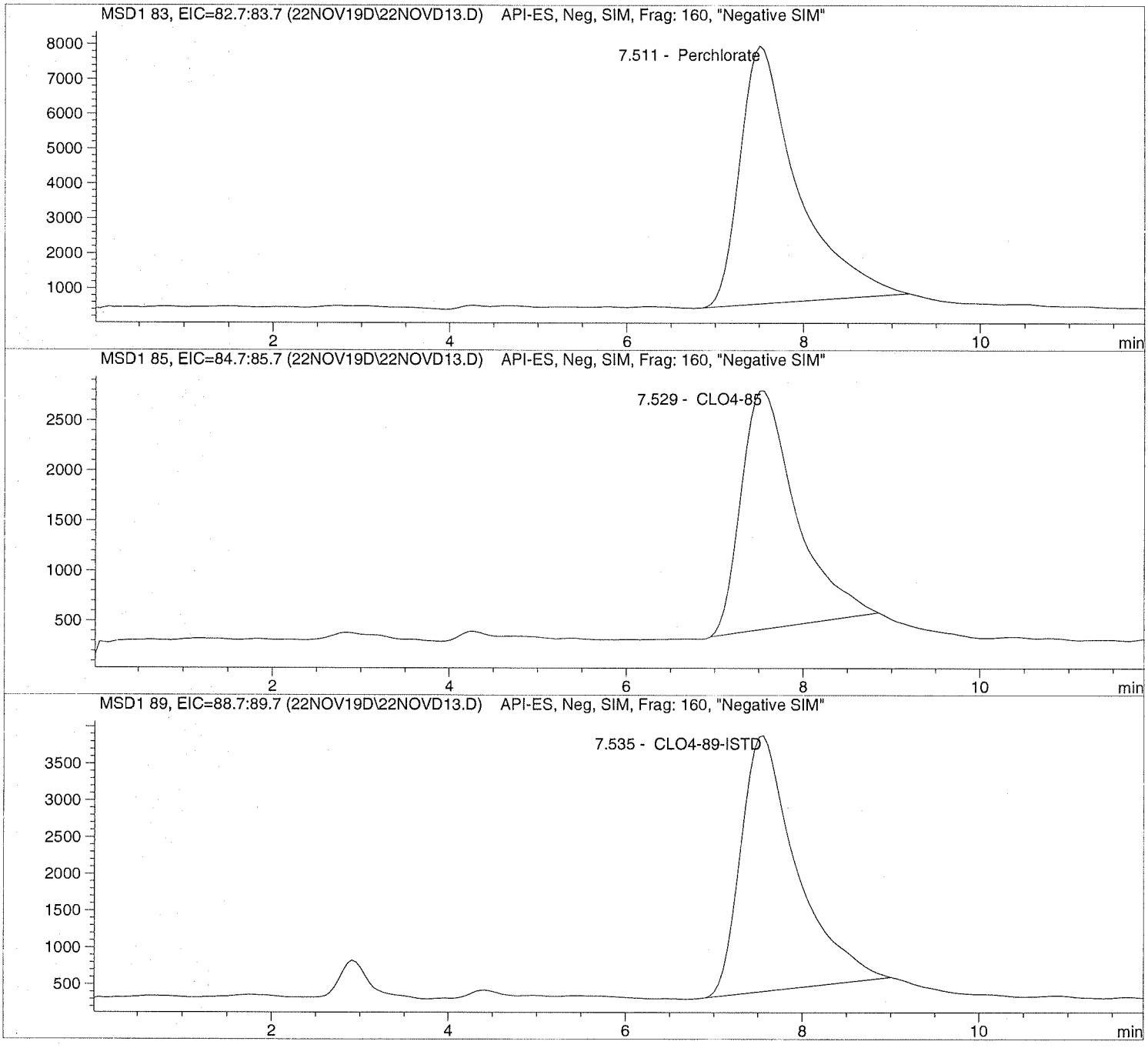
*** End of Report ***

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

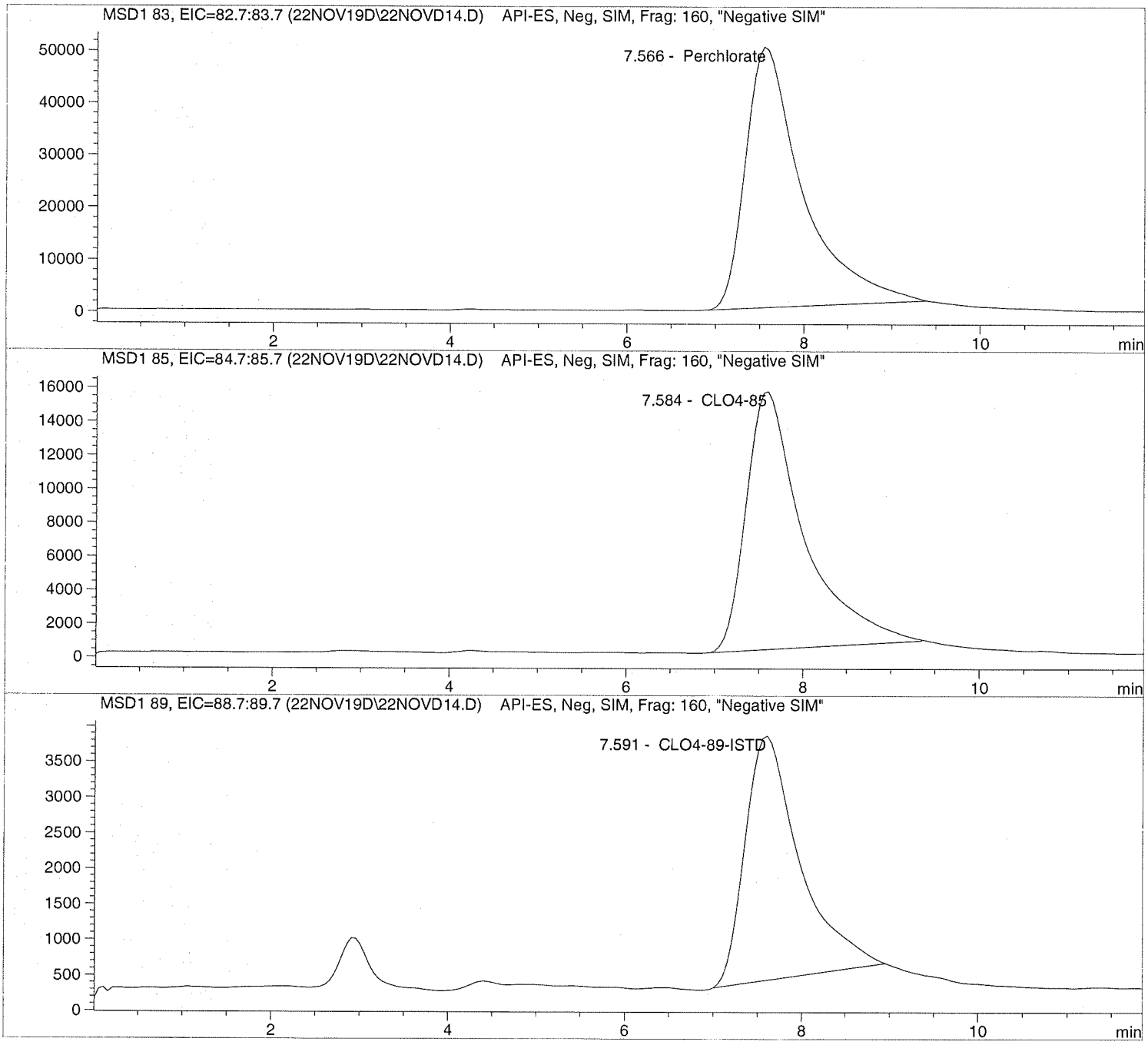
*** End of Report ***

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

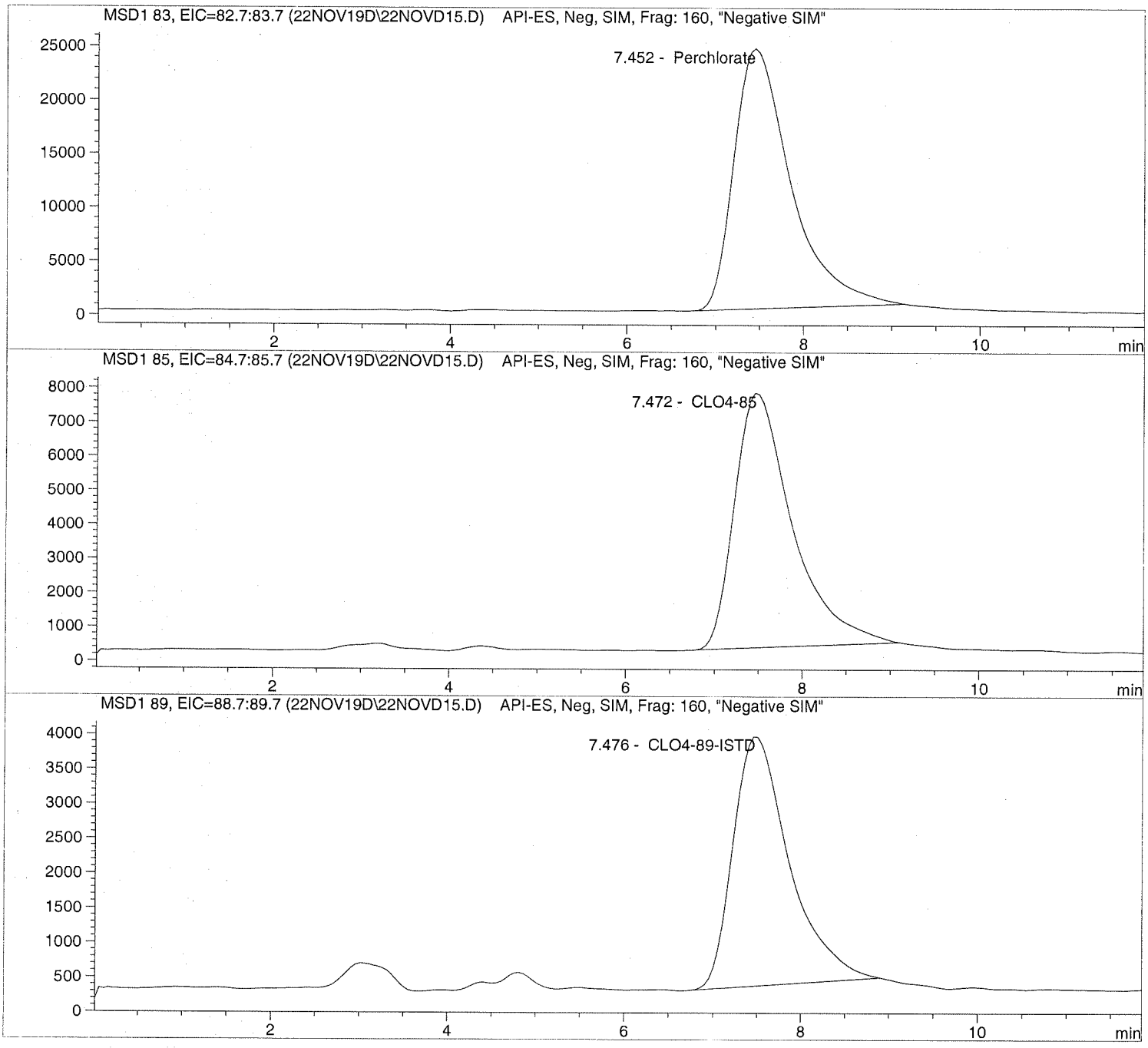
*** End of Report ***

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

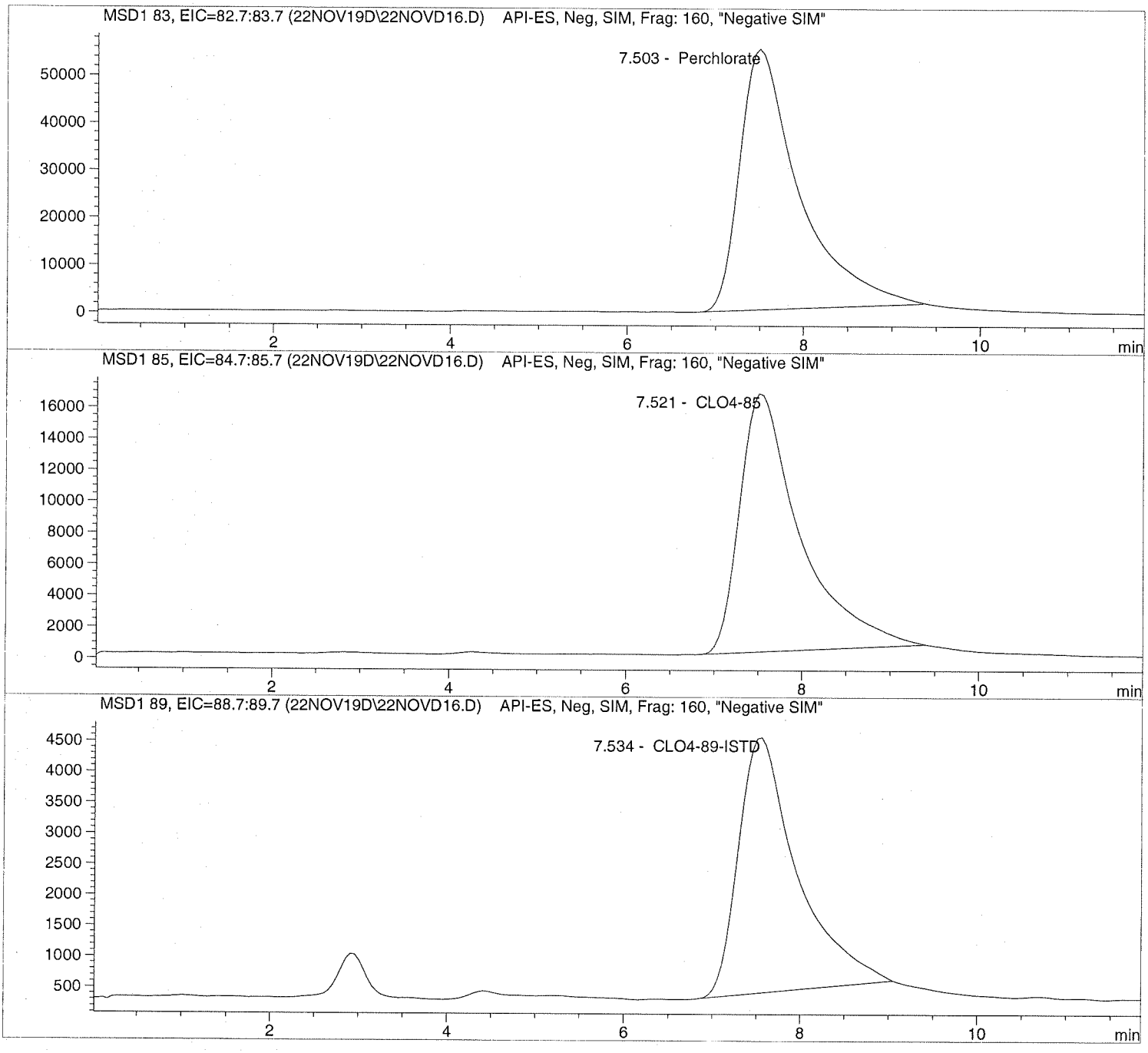
*** End of Report ***

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

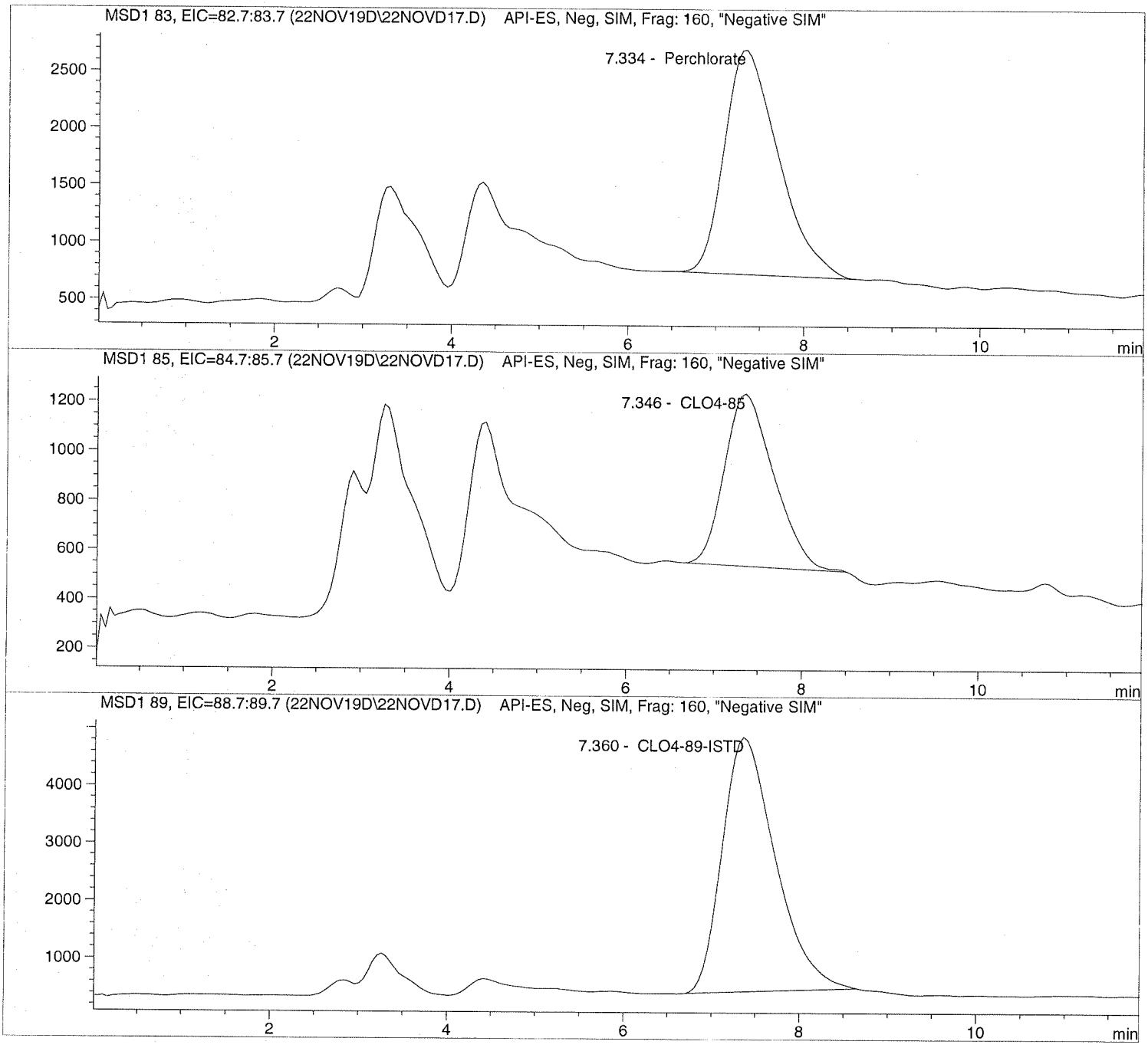
*** End of Report ***

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

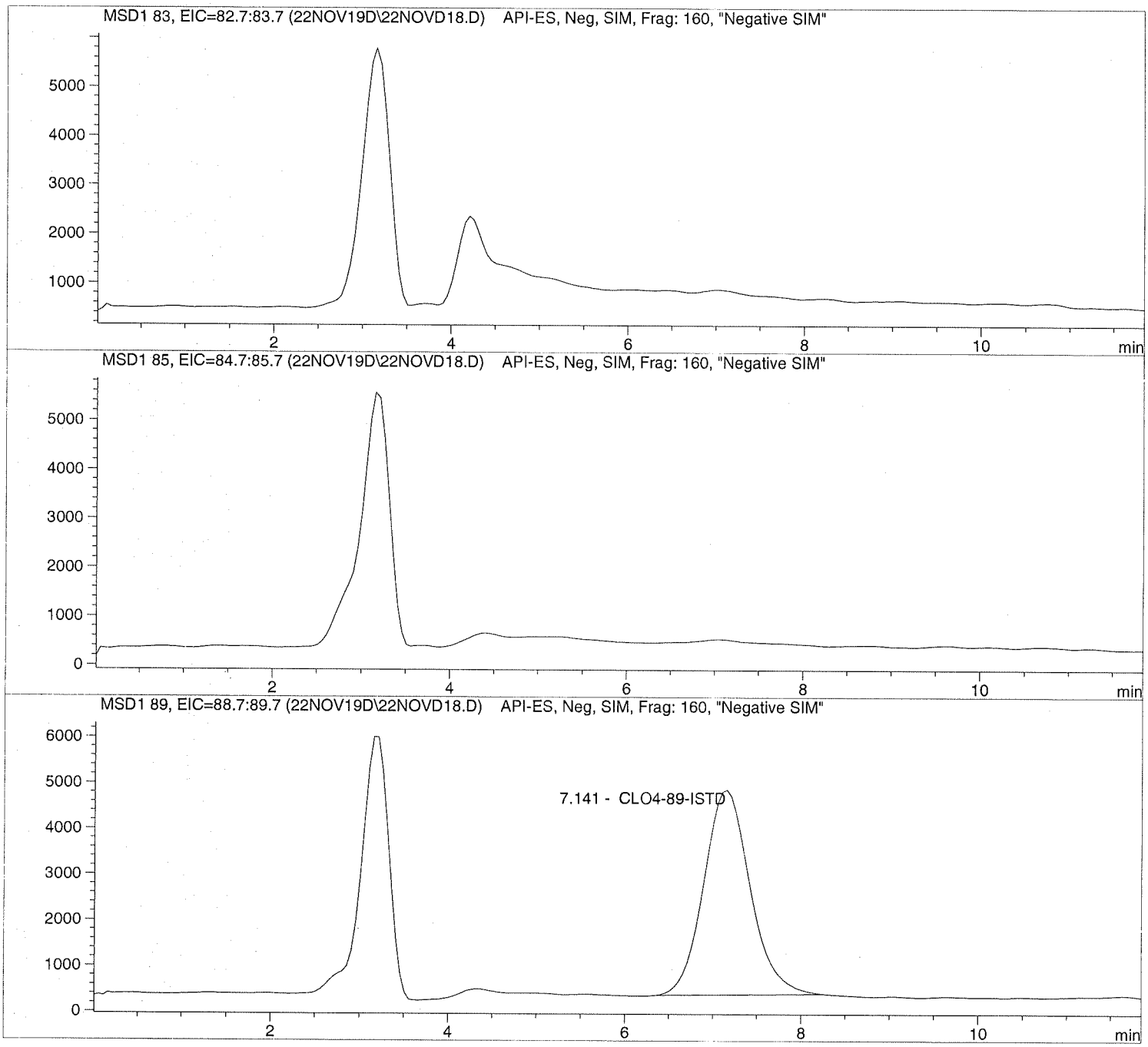
*** End of Report ***

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

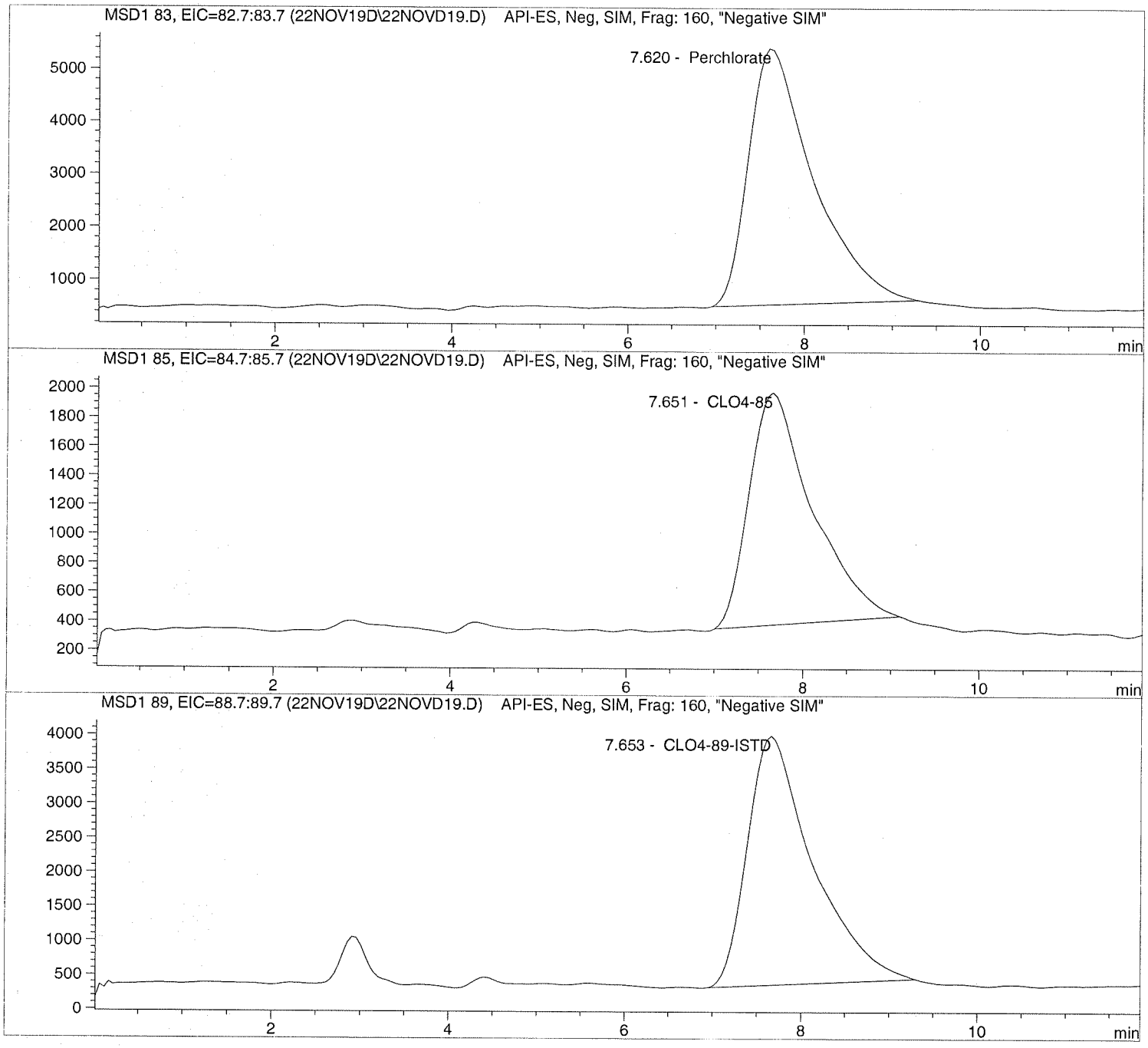
*** End of Report ***

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

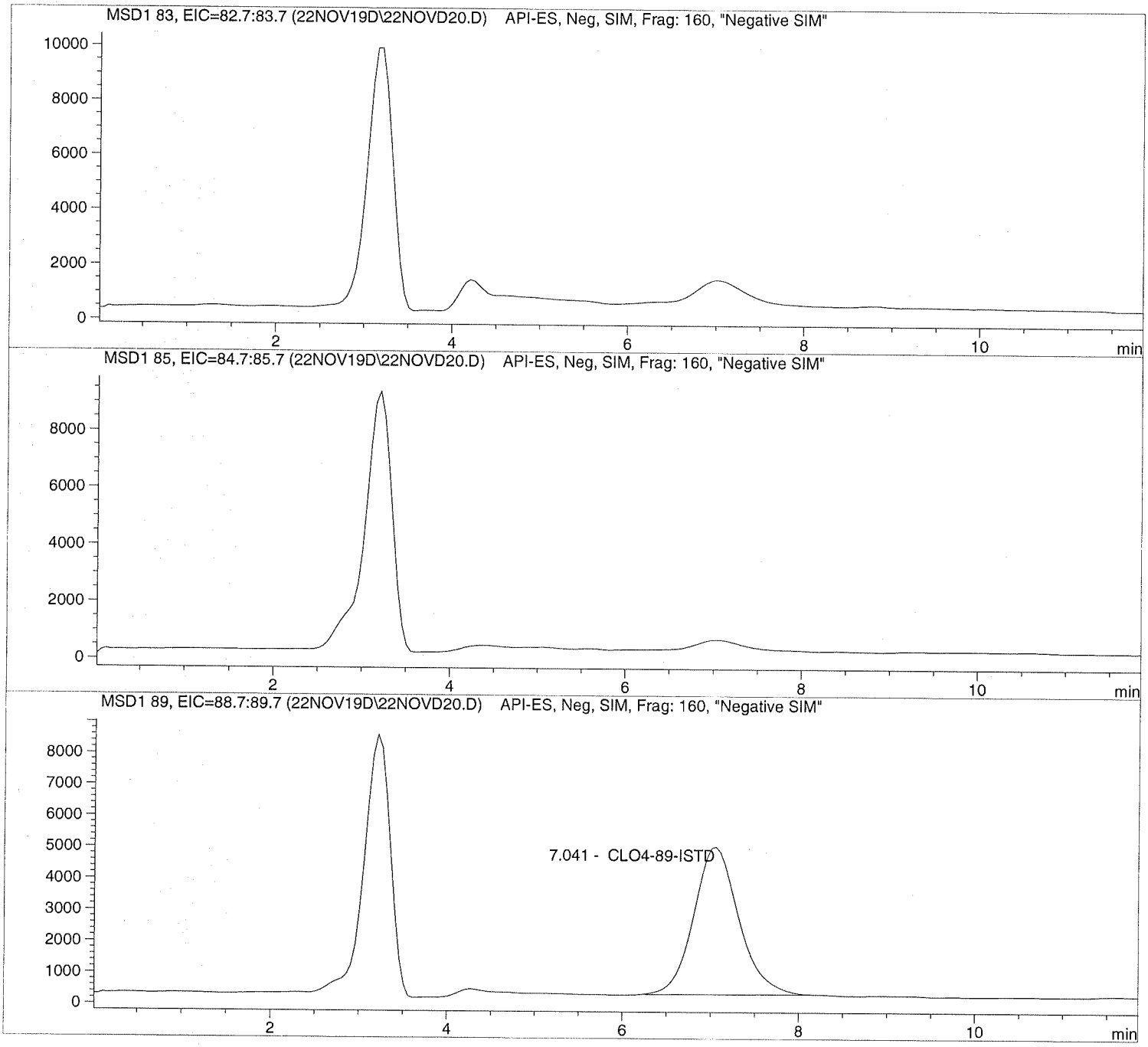
*** End of Report ***

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

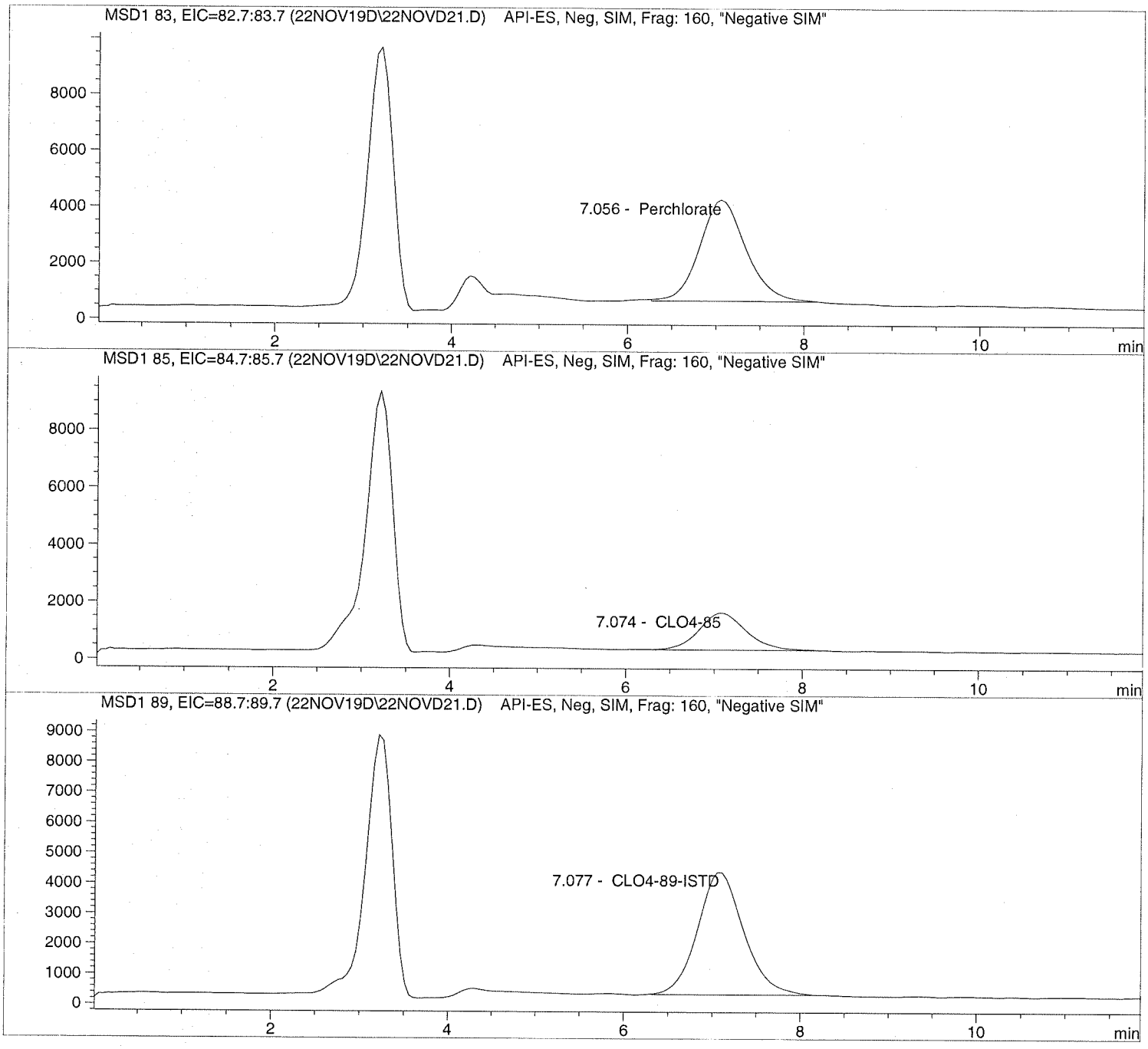
*** End of Report ***

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

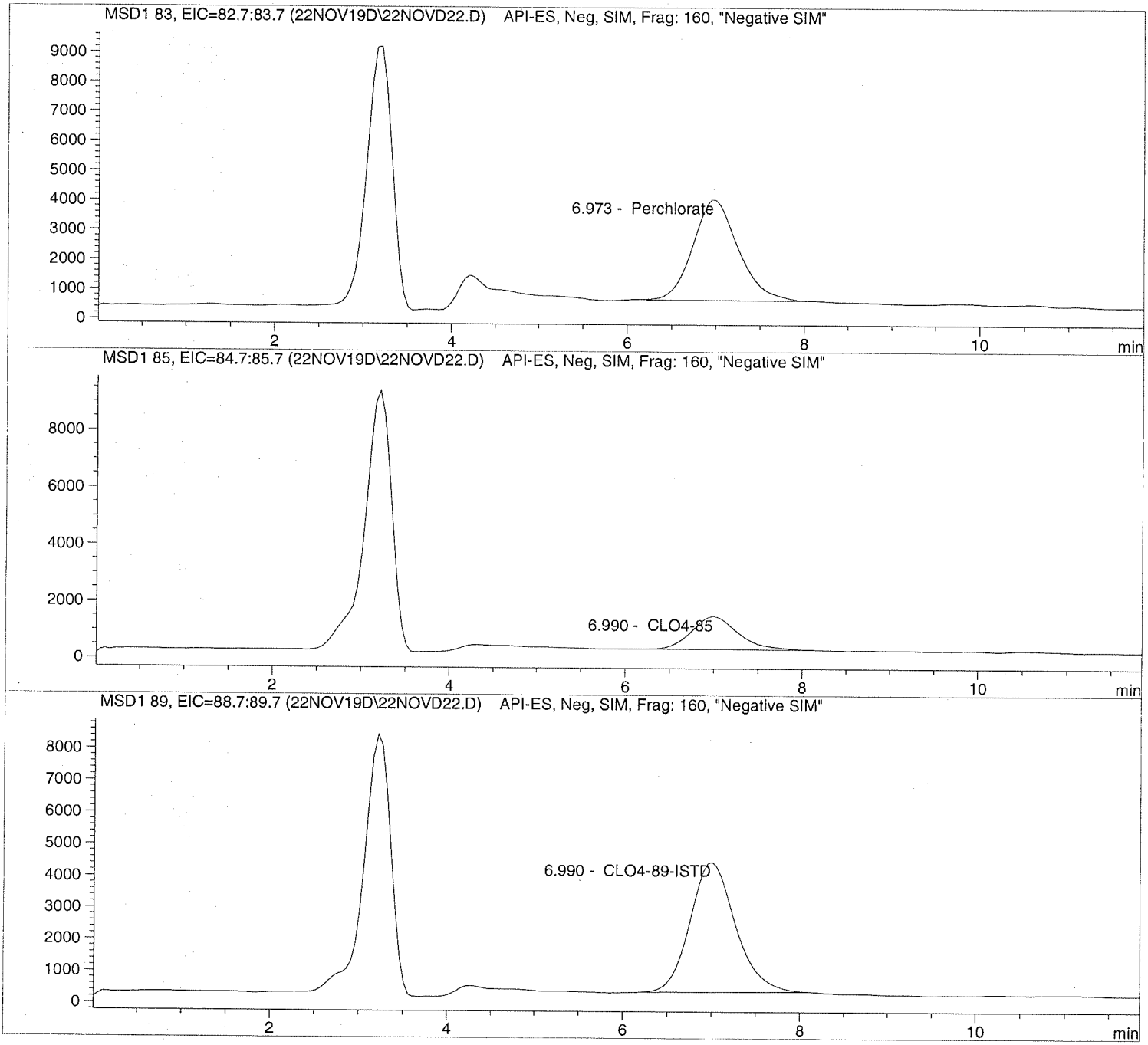
*** End of Report ***

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

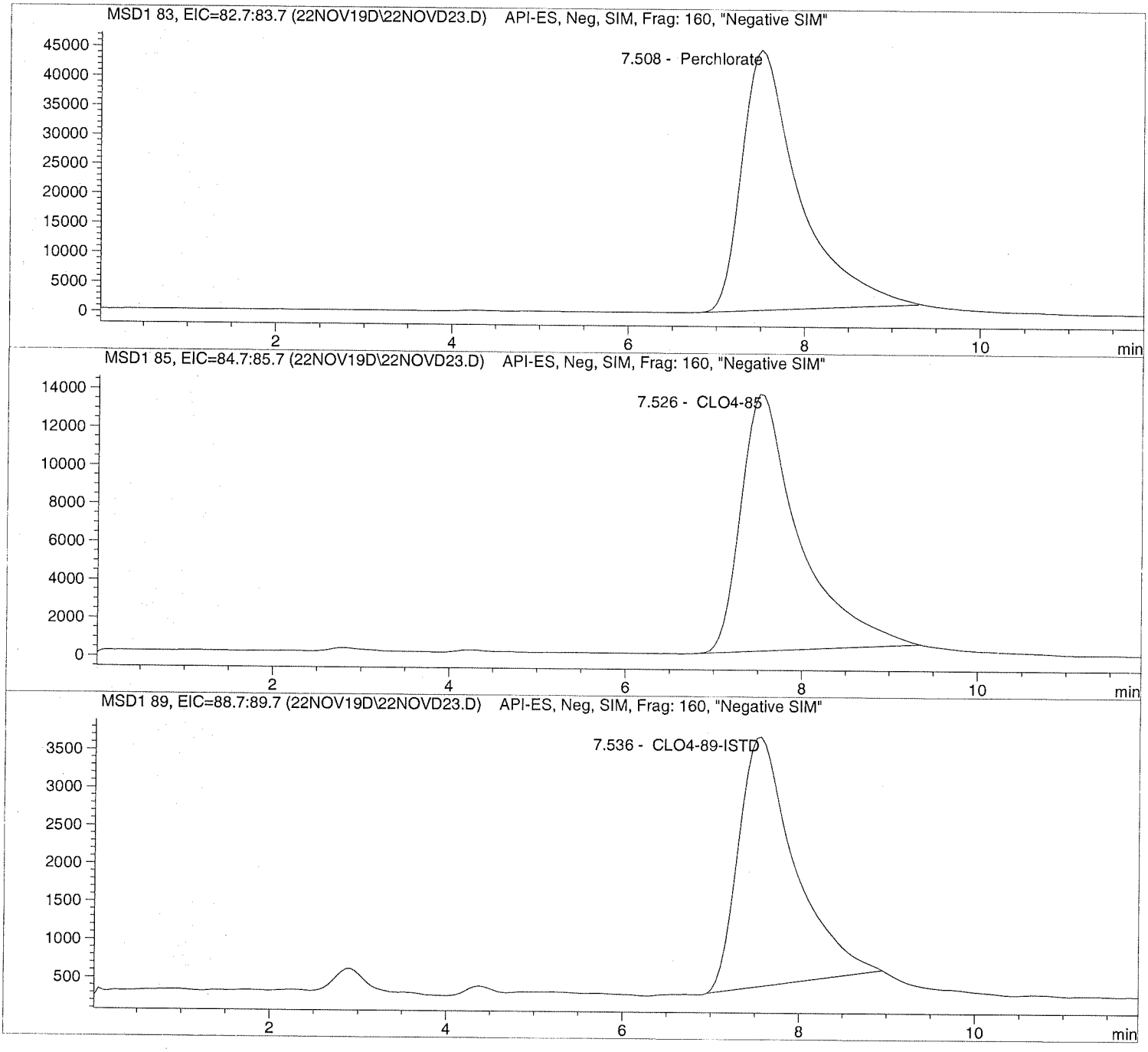
*** End of Report ***

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

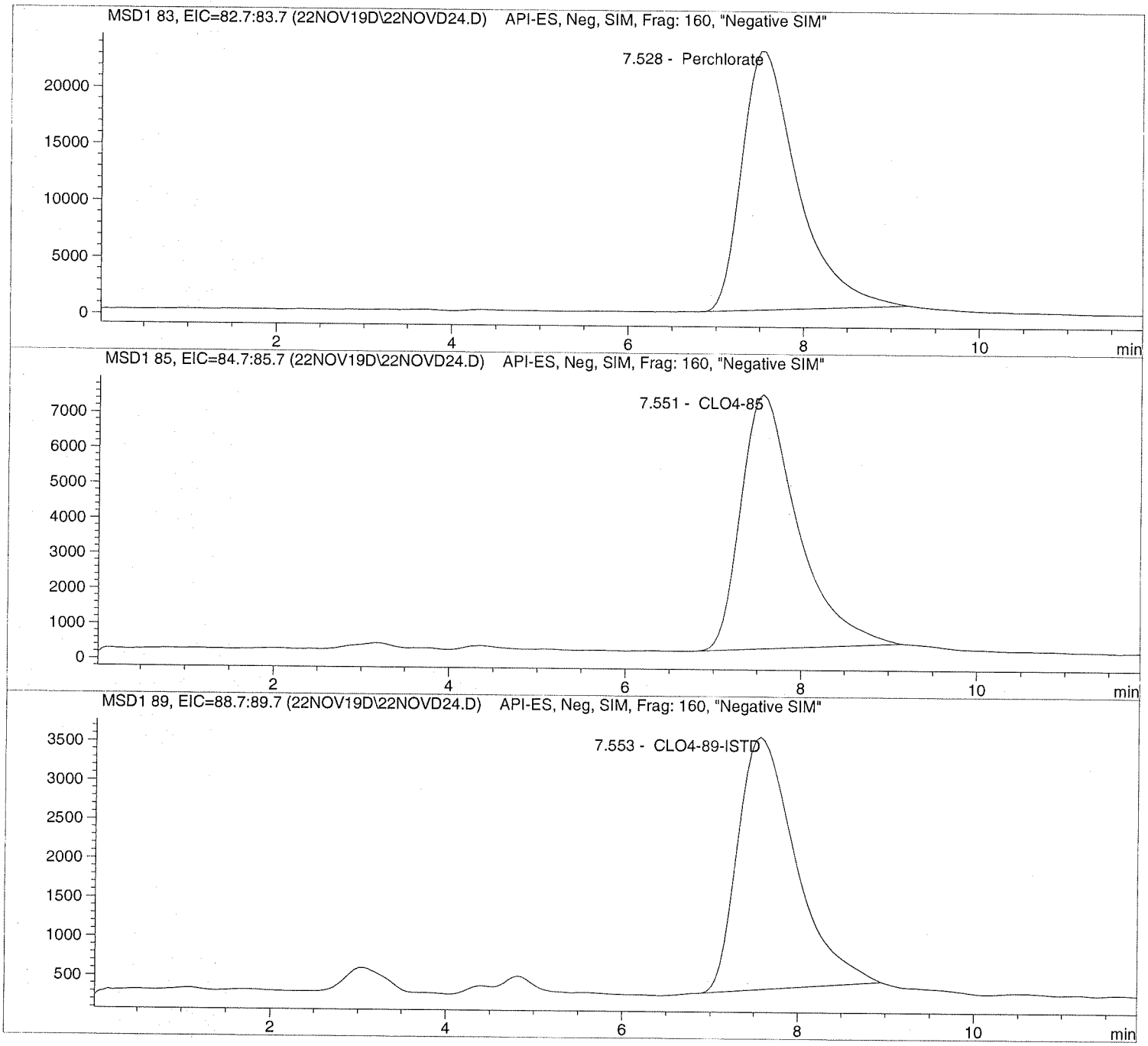
*** End of Report ***

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

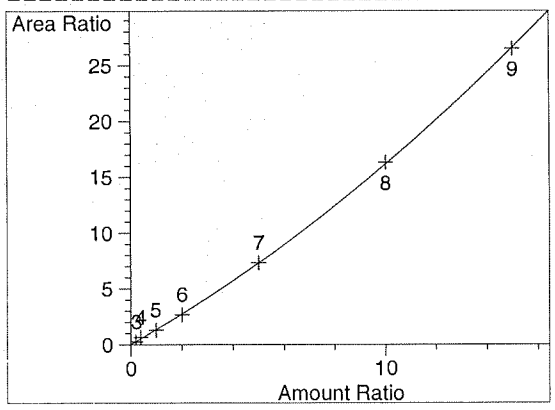
Compound: CLO4-89-ISTD
- Time Window : From 3.581 min To 11.896 min
- Curve Type : Linear
- Origin : Included
- Calibration Level Weights:/
  - Level 3 : 1
  - Level 4 : 1
  - Level 5 : 1
  - Level 6 : 1
  - Level 7 : 1
  - Level 8 : 1
  - Level 9 : 1

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

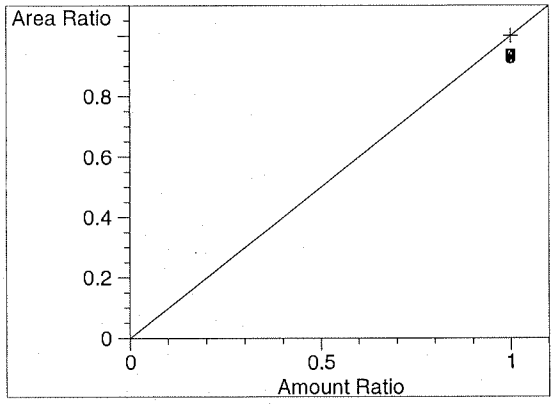
Peak Sum Table

No Entries in table

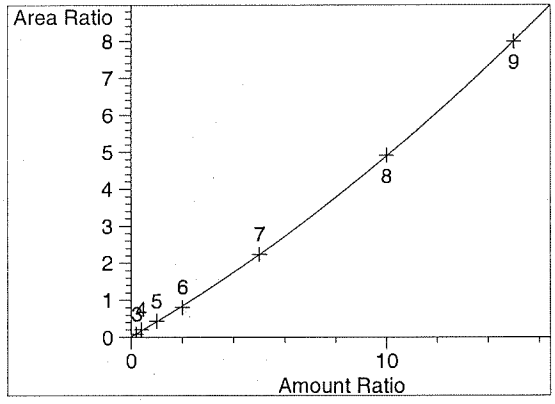
Calibration Curves



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:

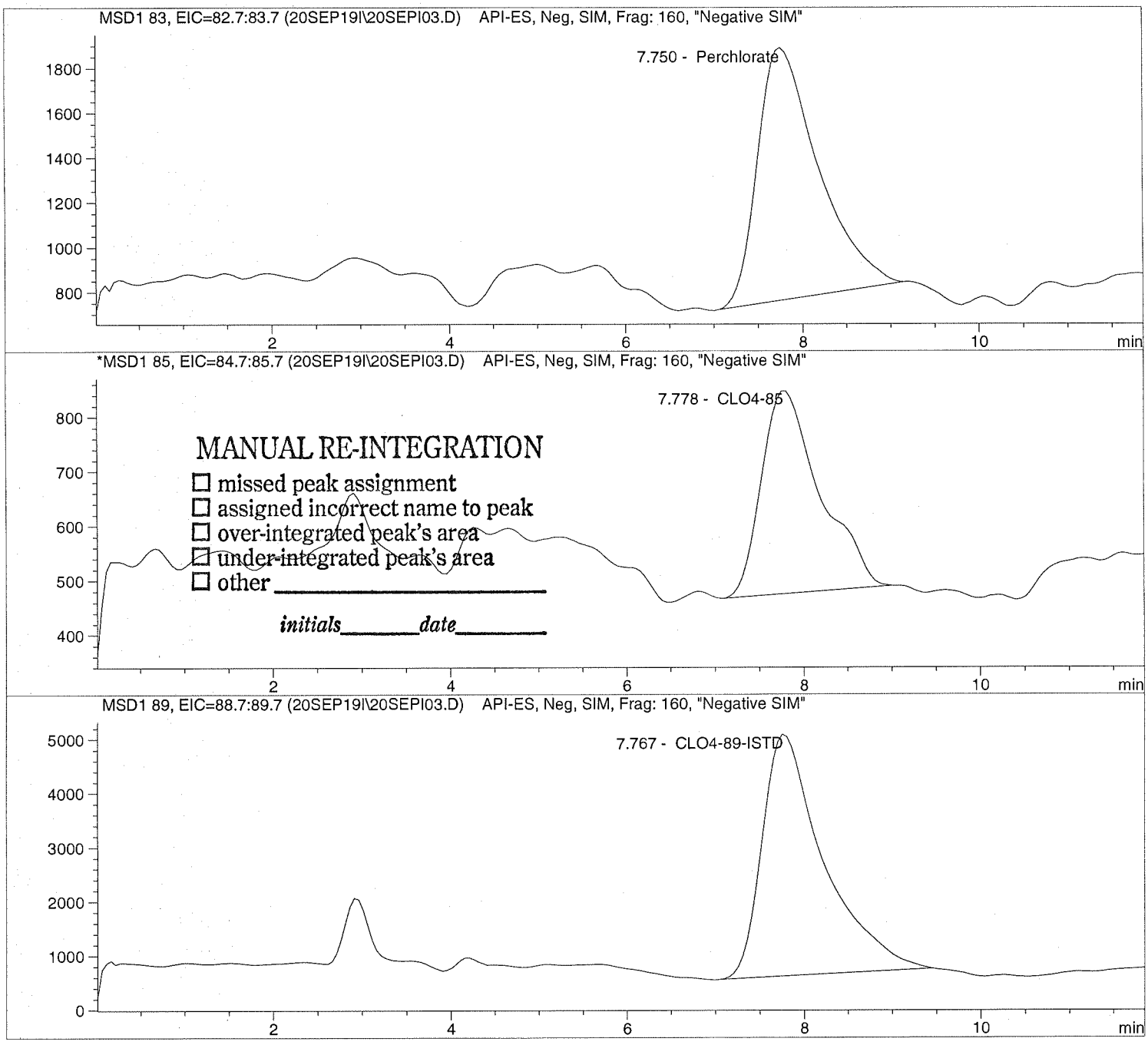
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	CLO4@ 5.0ug/L	CLO4-AQN	1	Ctrl Samp		
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

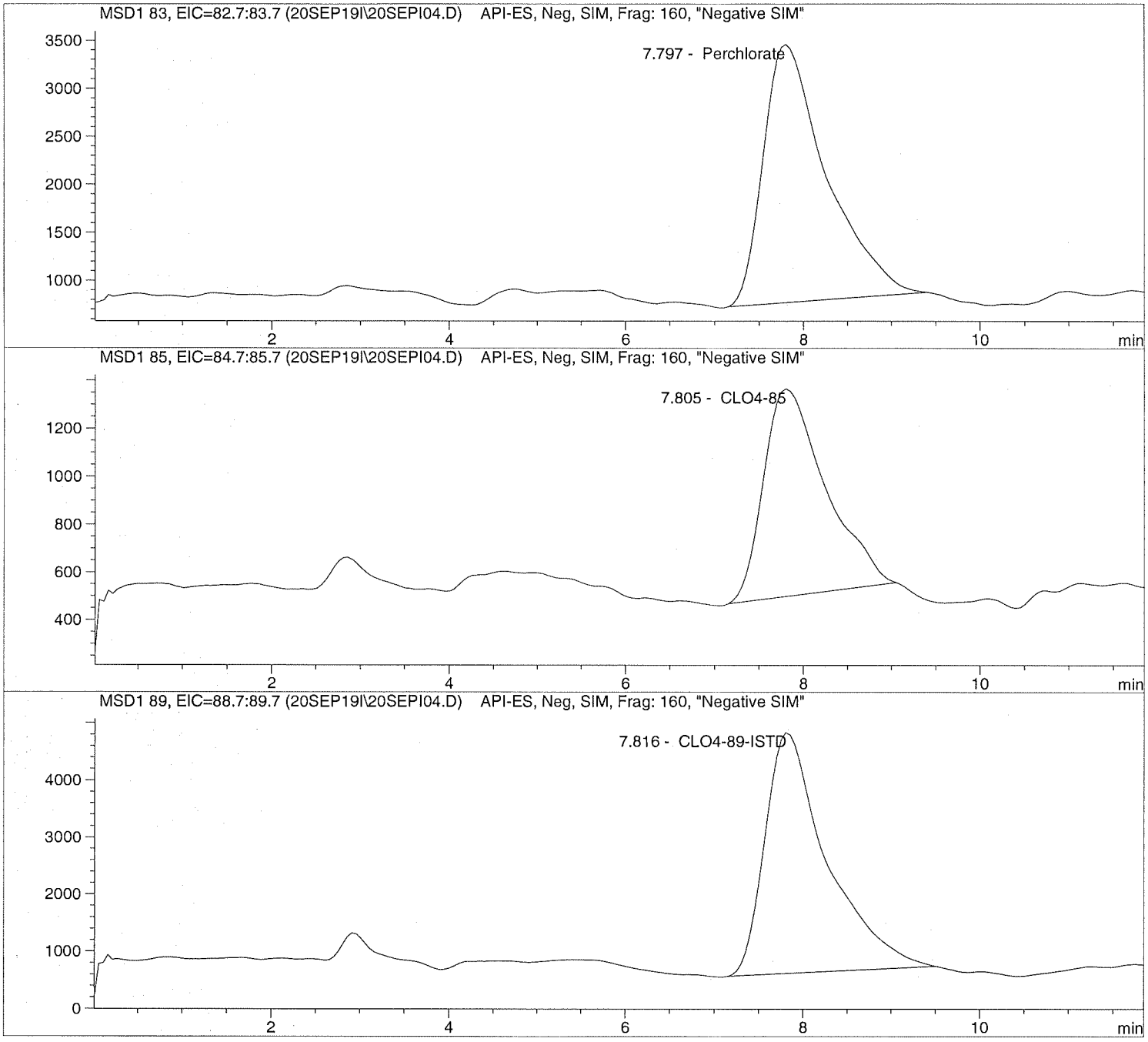
*** End of Report ***

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

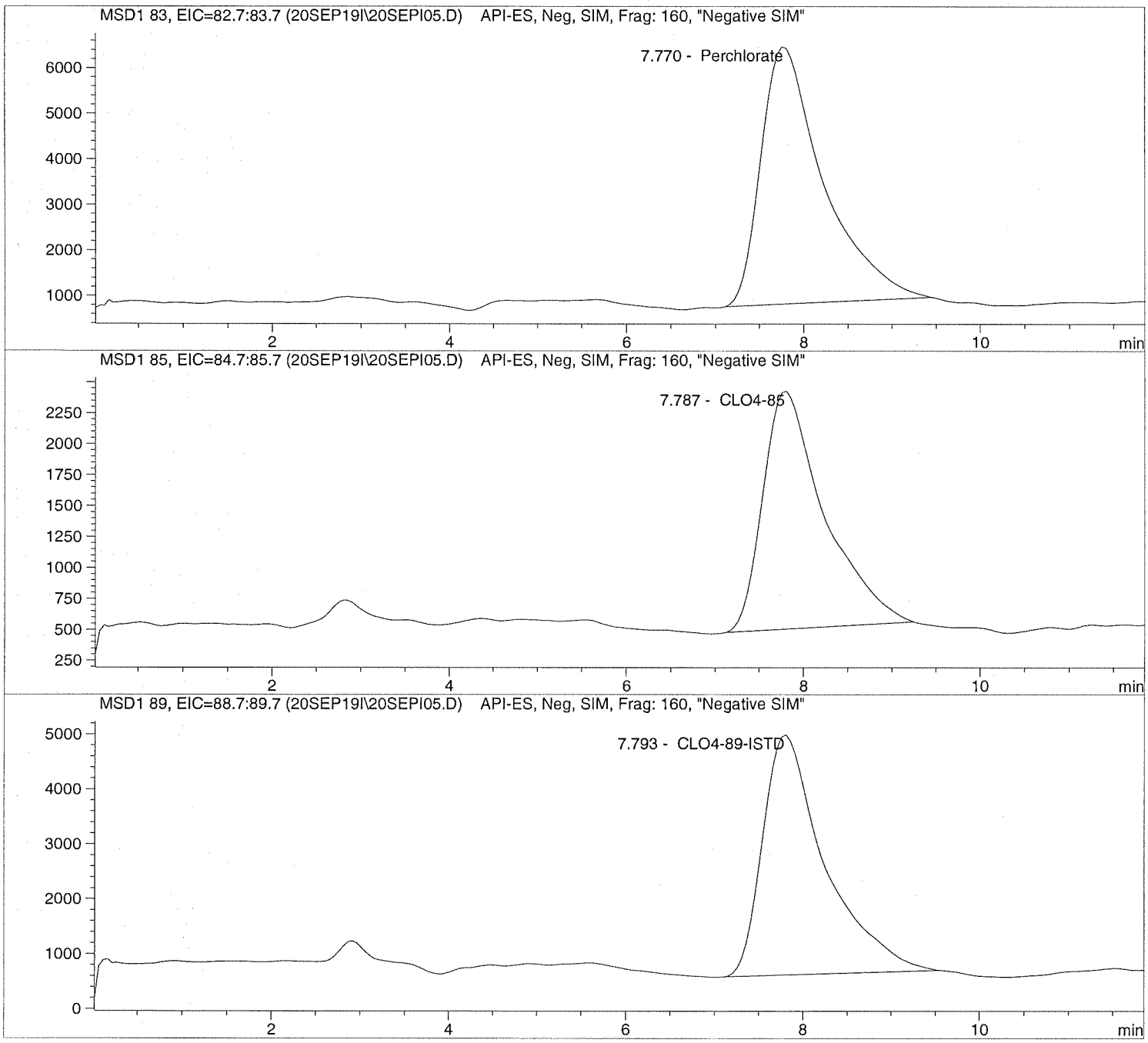
*** End of Report ***

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

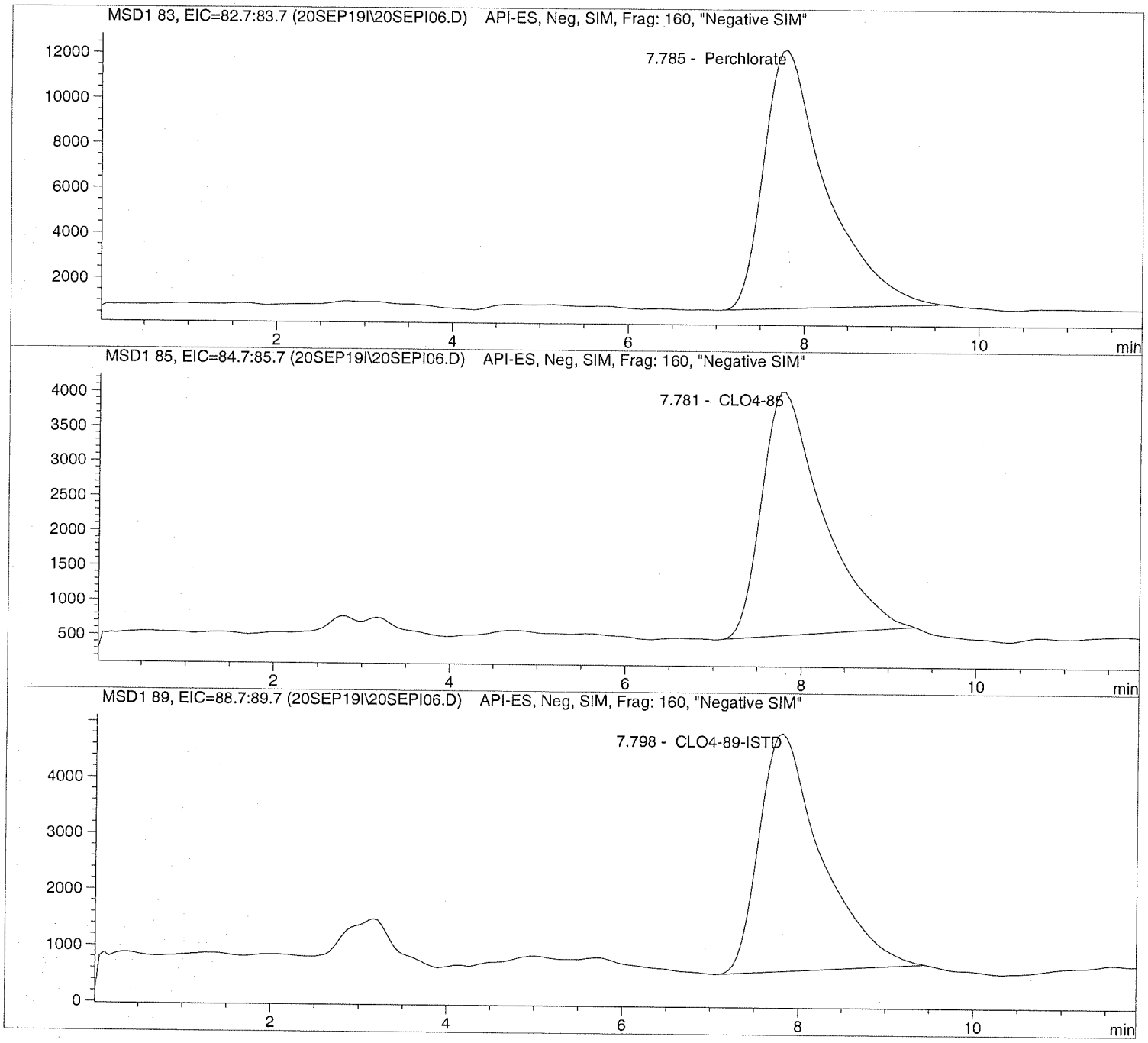
*** End of Report ***

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

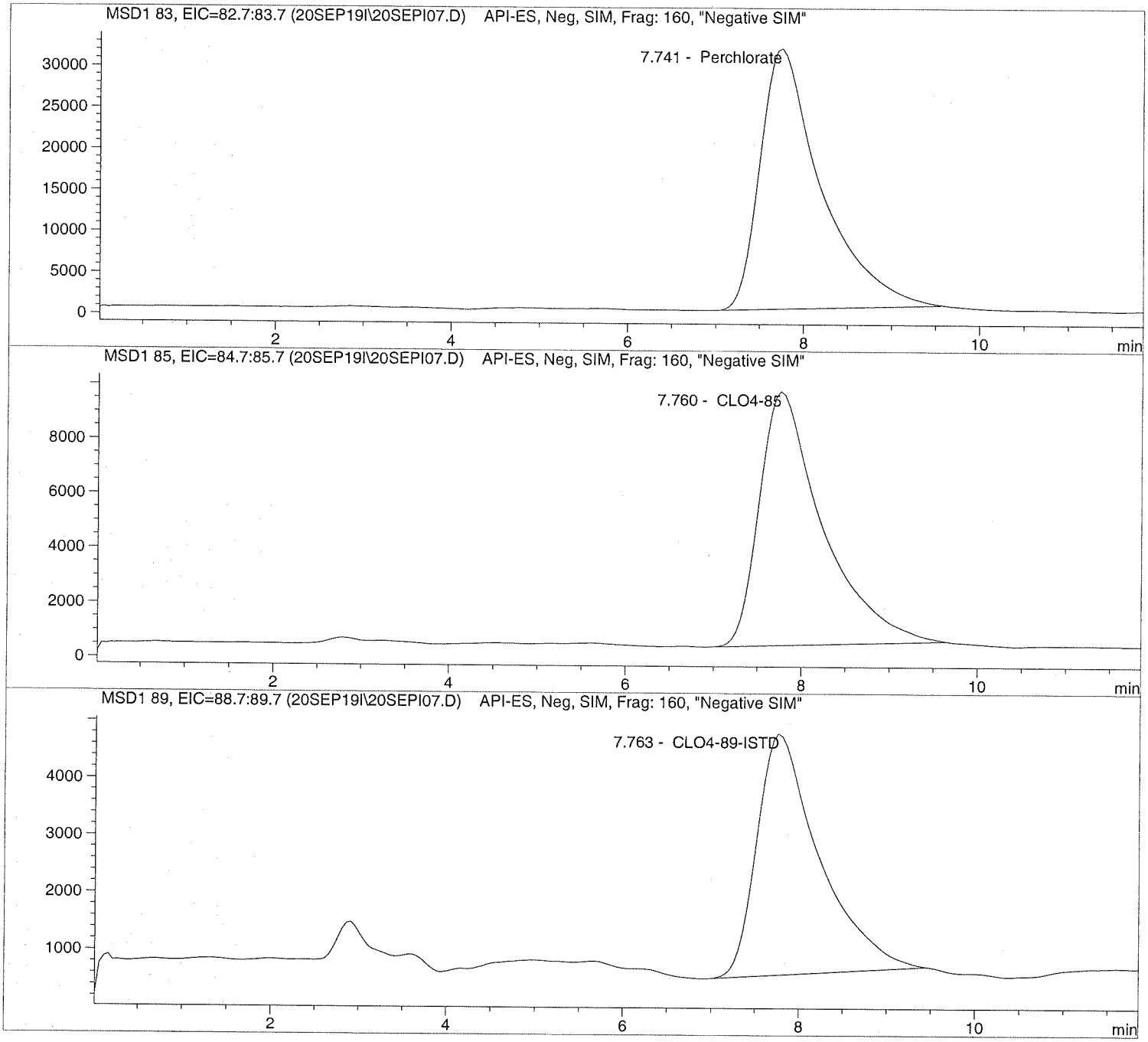
*** End of Report ***

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

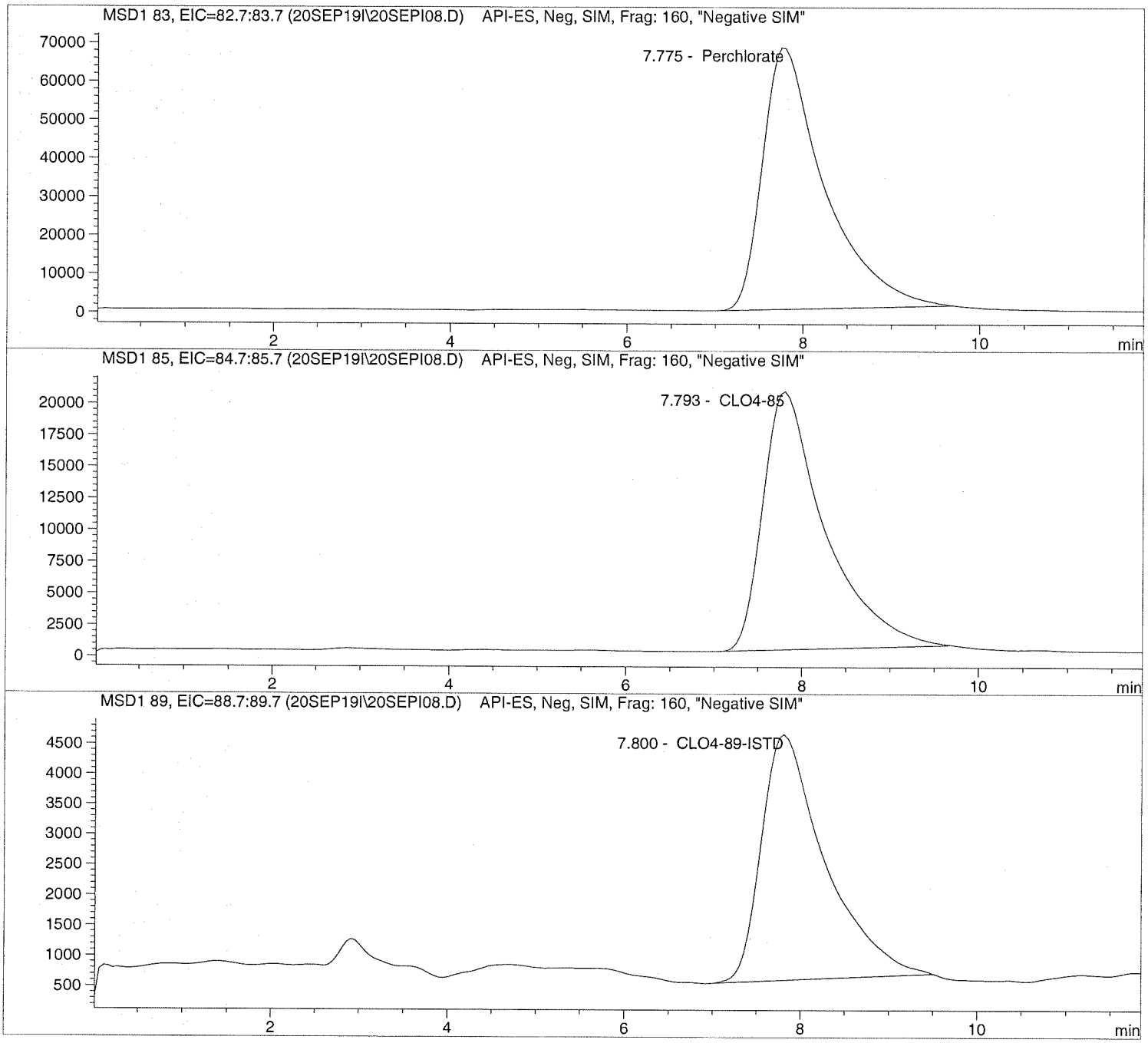
*** End of Report ***

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

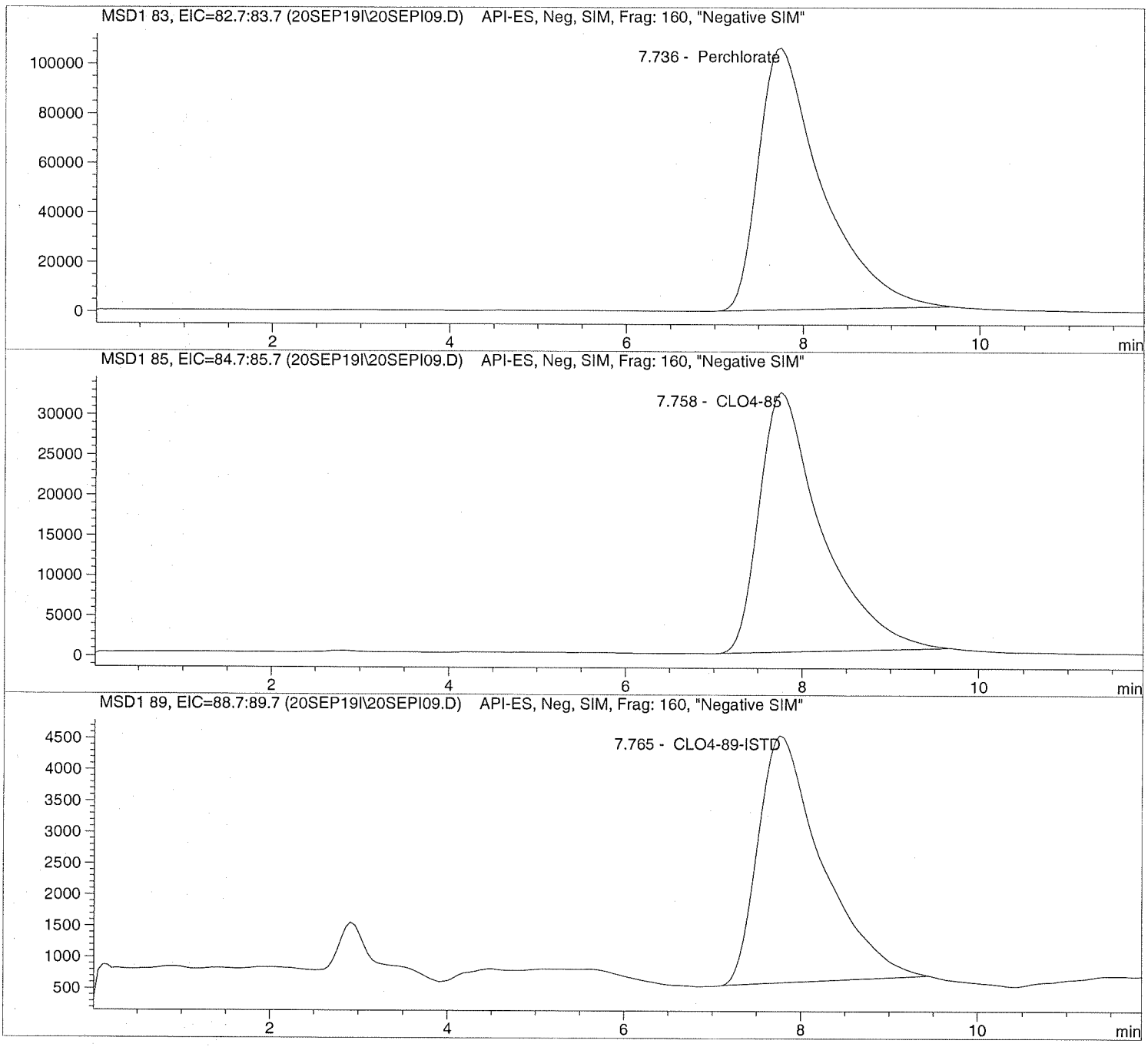
*** End of Report ***

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

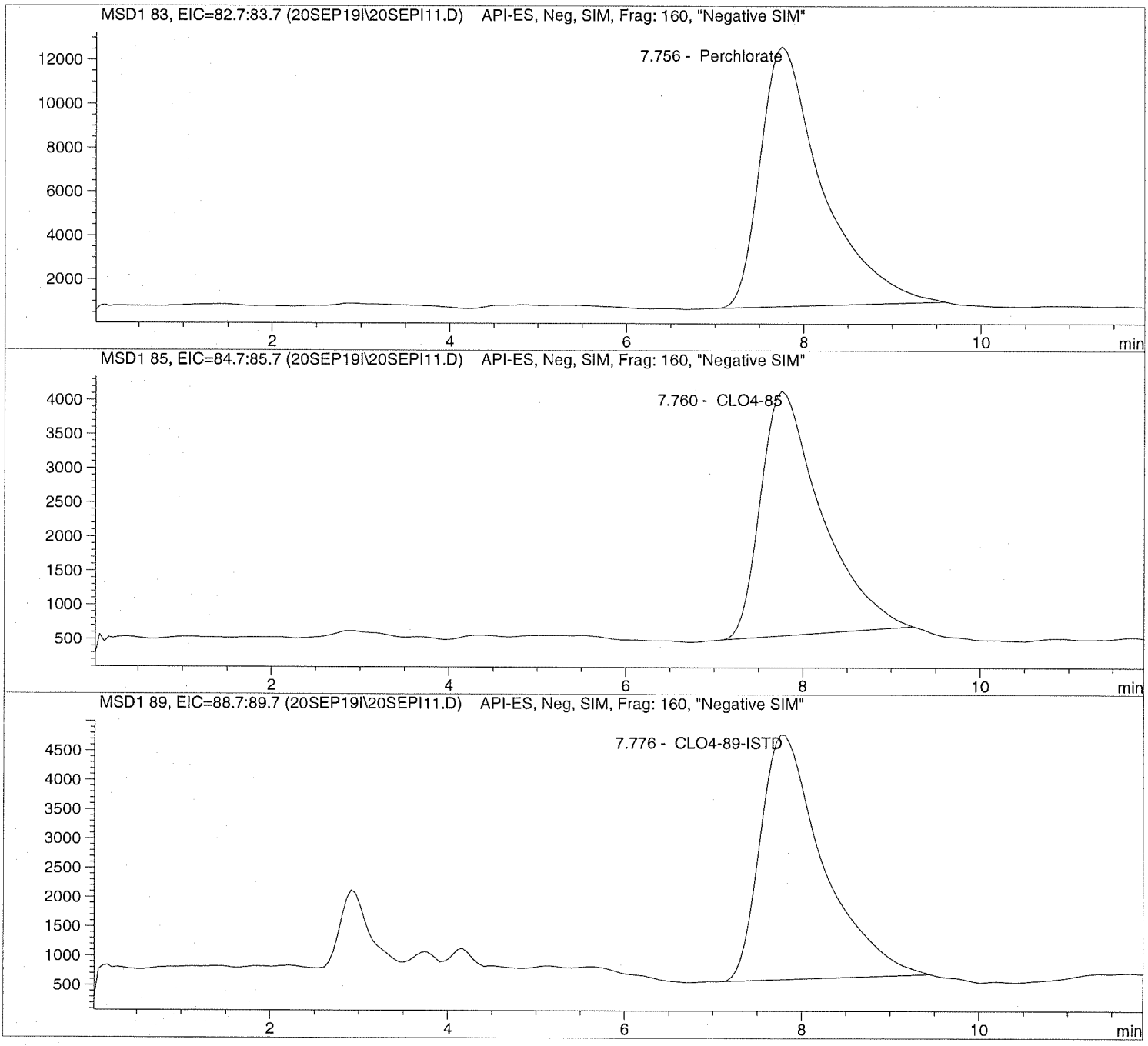
*** End of Report ***

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

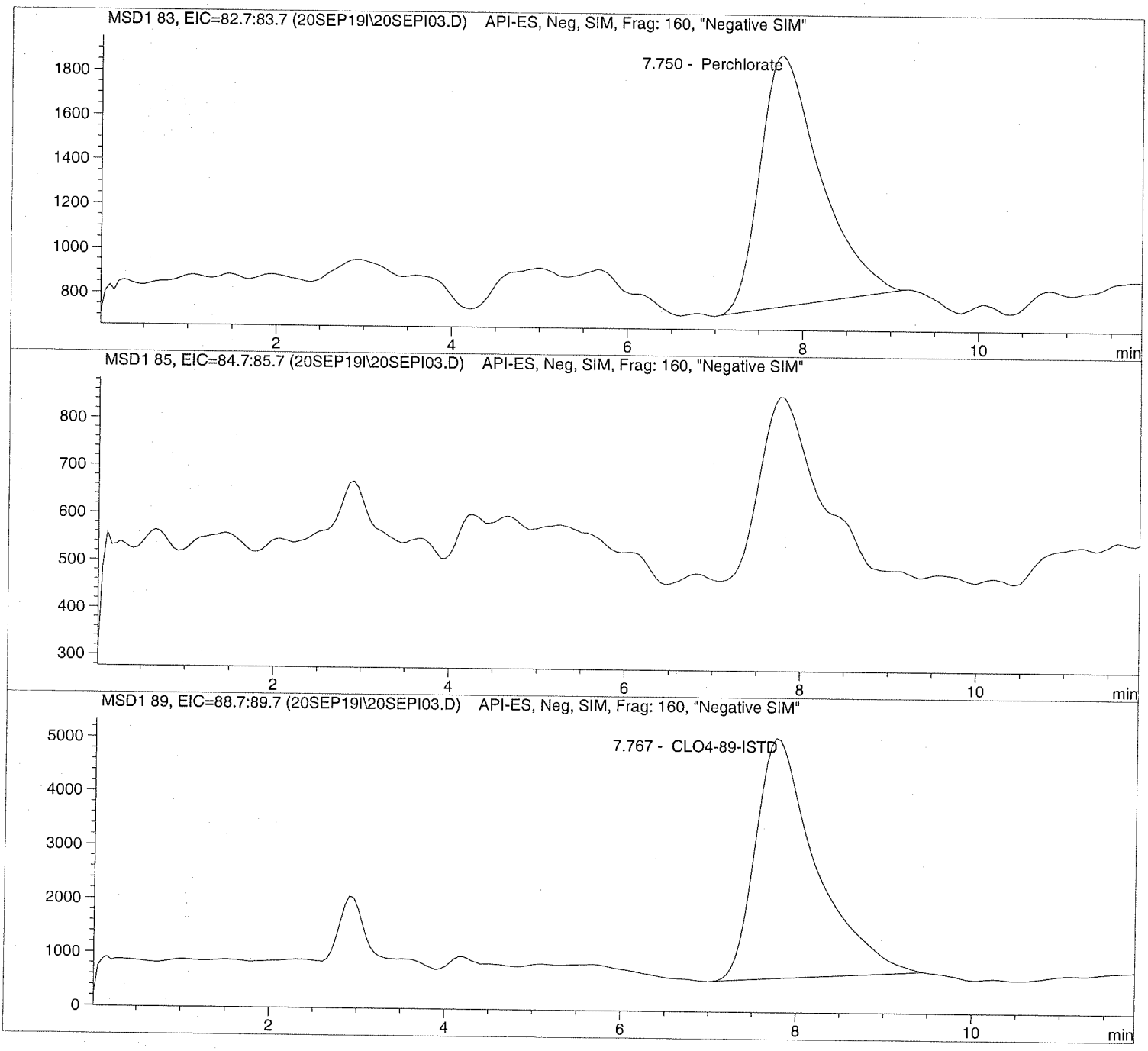
Unmodified

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

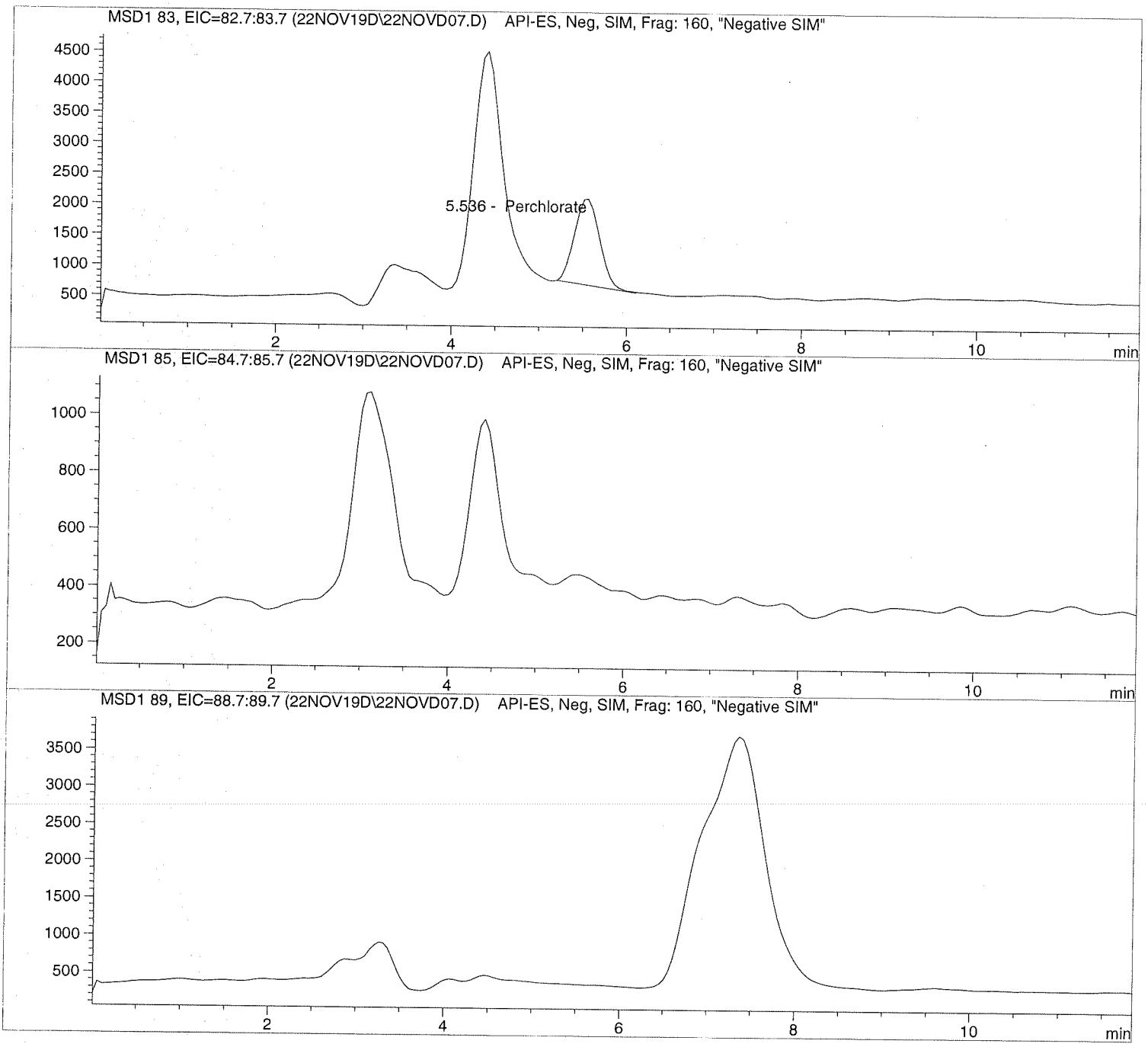
*** End of Report ***

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 ***

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 Service Request No: P1907040
Project: HS19110684-01

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 1C15

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** ALS Project ID: P1907040
Client Project ID: **HS19110684-01** ALS Sample ID: P191125-MB

Test Code: RSK 175 Date Collected: NA
Instrument ID: HP5890A/GC10/FID Date Received: NA
Analyst: Li Donghao/Wade Henton Date Analyzed: 11/25/19
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	1.0	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 :

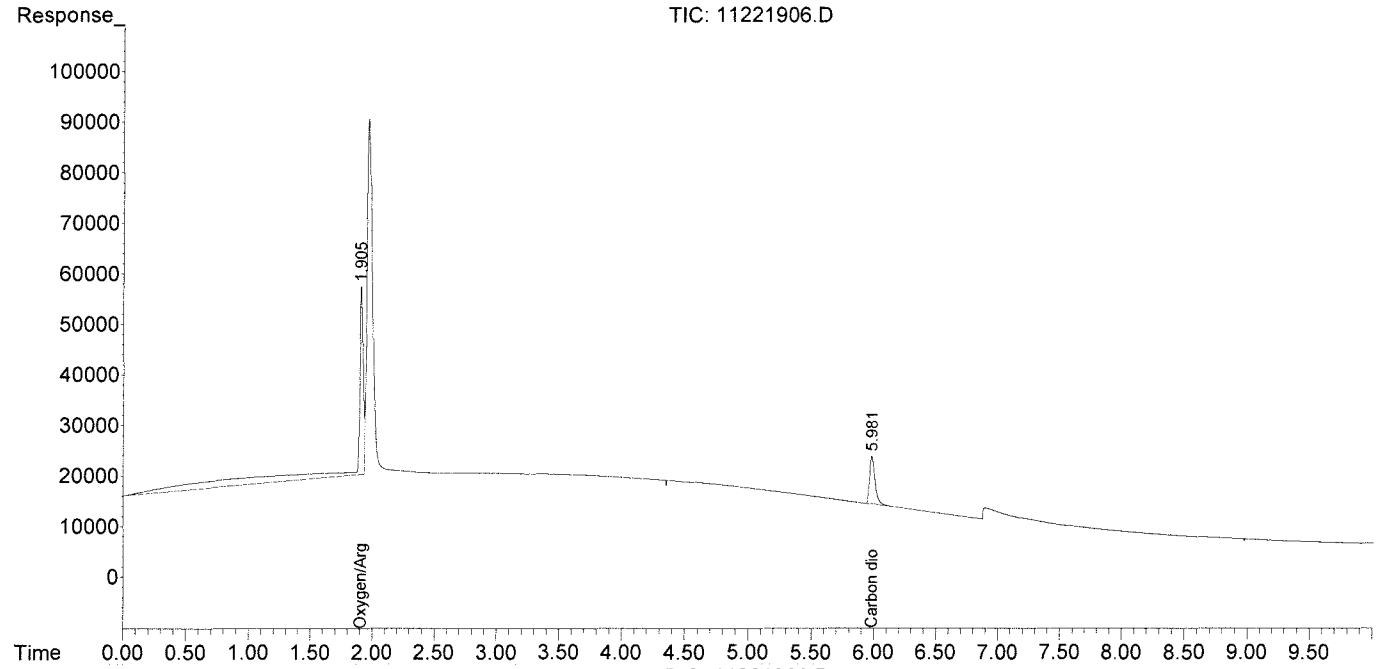
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.906f	1762438	0.370	ppm
2)	Carbon monoxide	1.906f	1762438	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.982	284121	1210.421	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	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

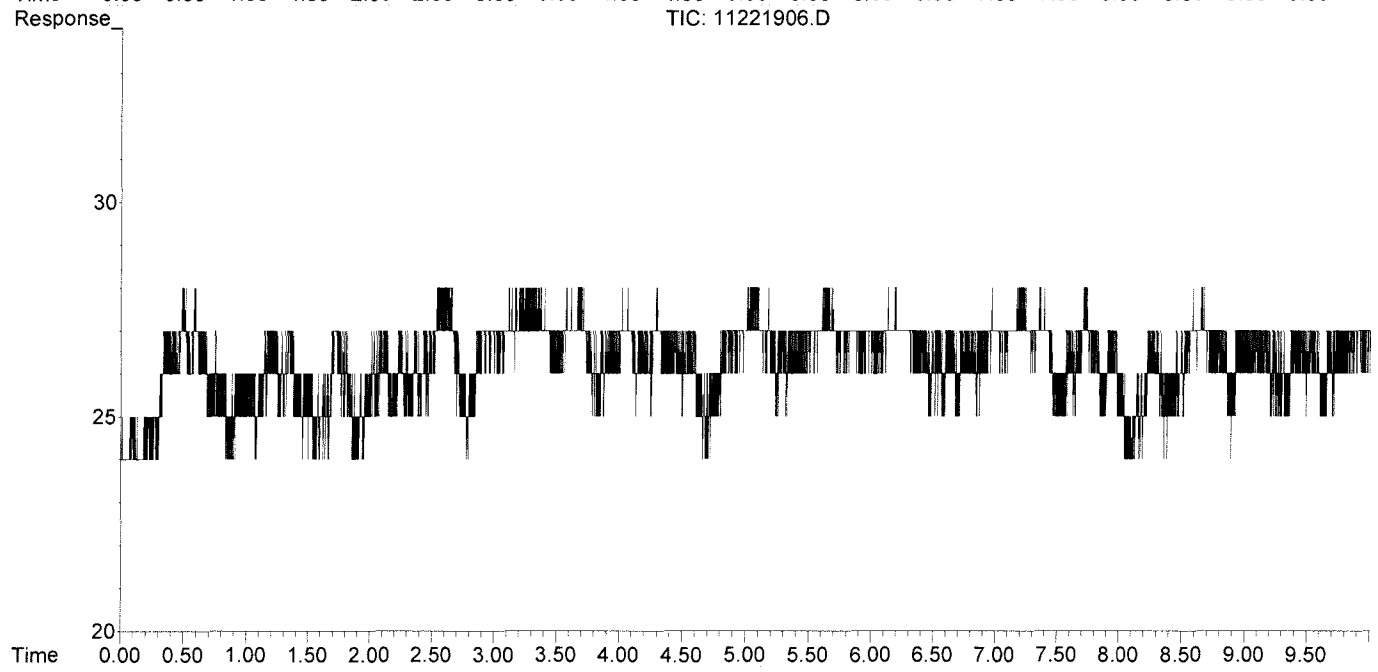
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





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 :

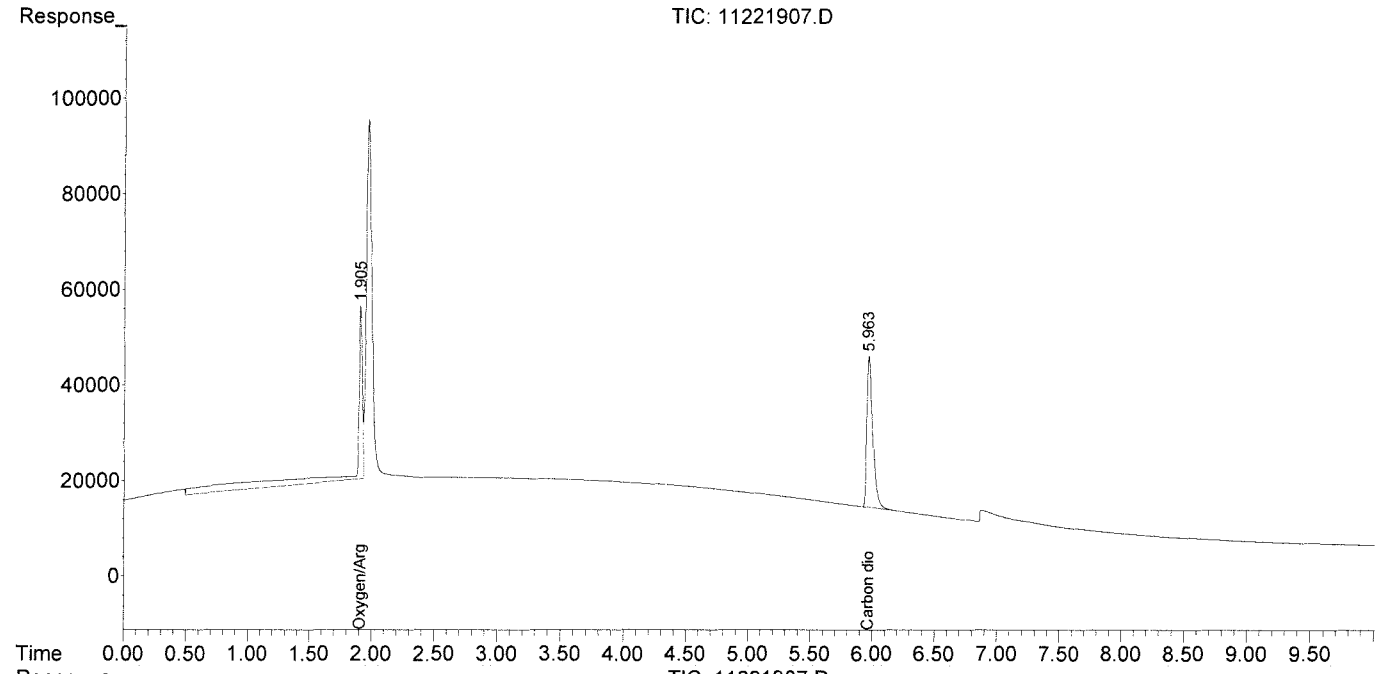
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.906f	1610984	0.338	ppm
2)	Carbon monoxide	1.906f	1610984	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.964	1047117	4460.958	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	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

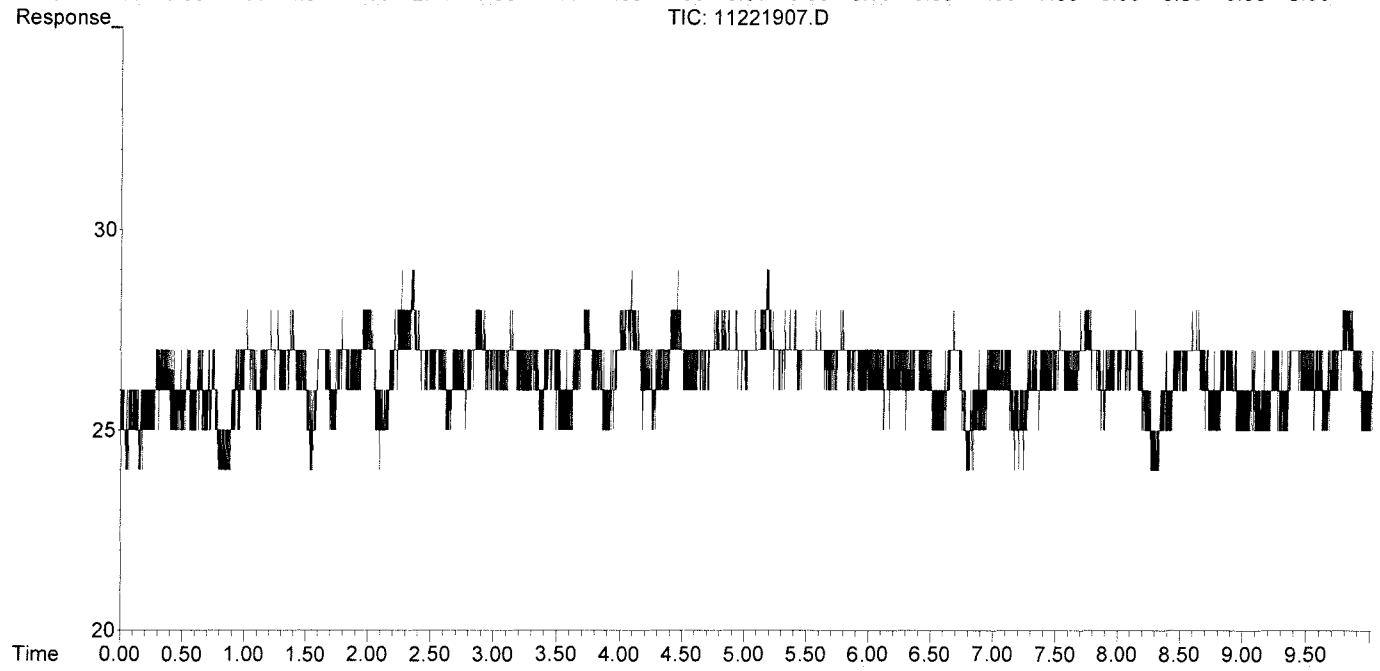
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

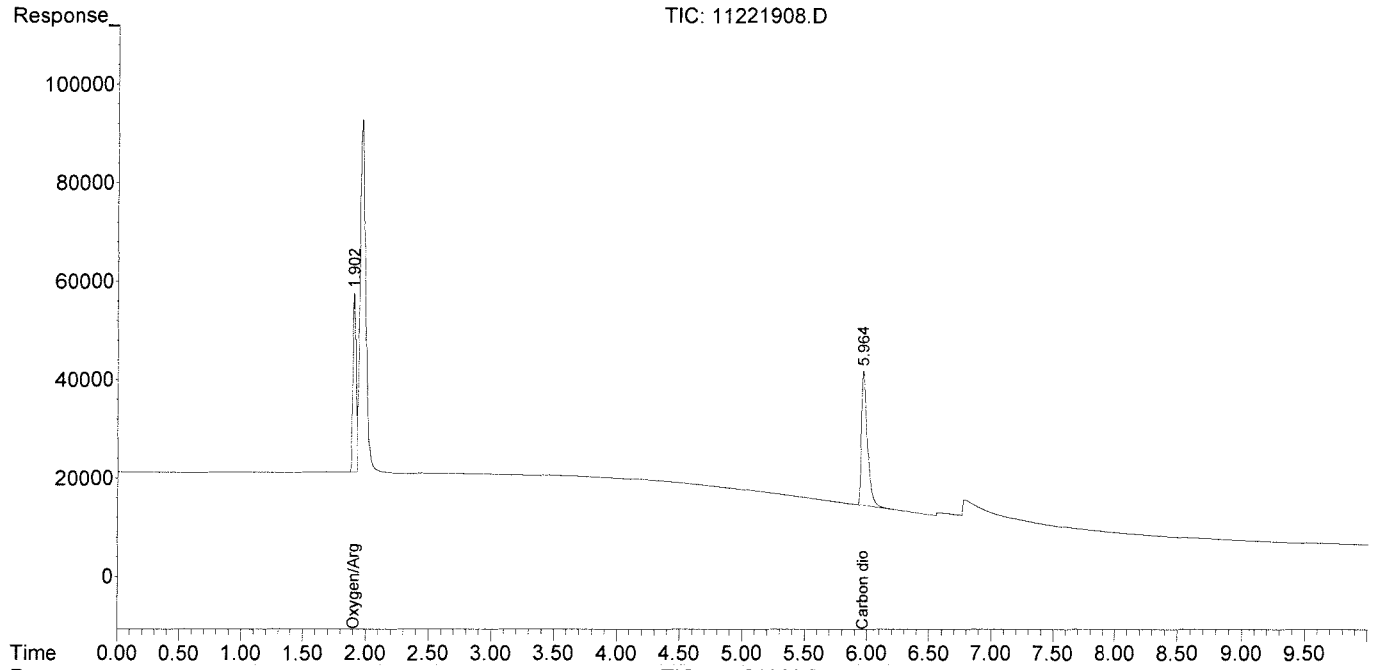
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.903	619369	0.130	ppm
2)	Carbon monoxide	1.903	619369	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.964	923180	3932.958	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
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

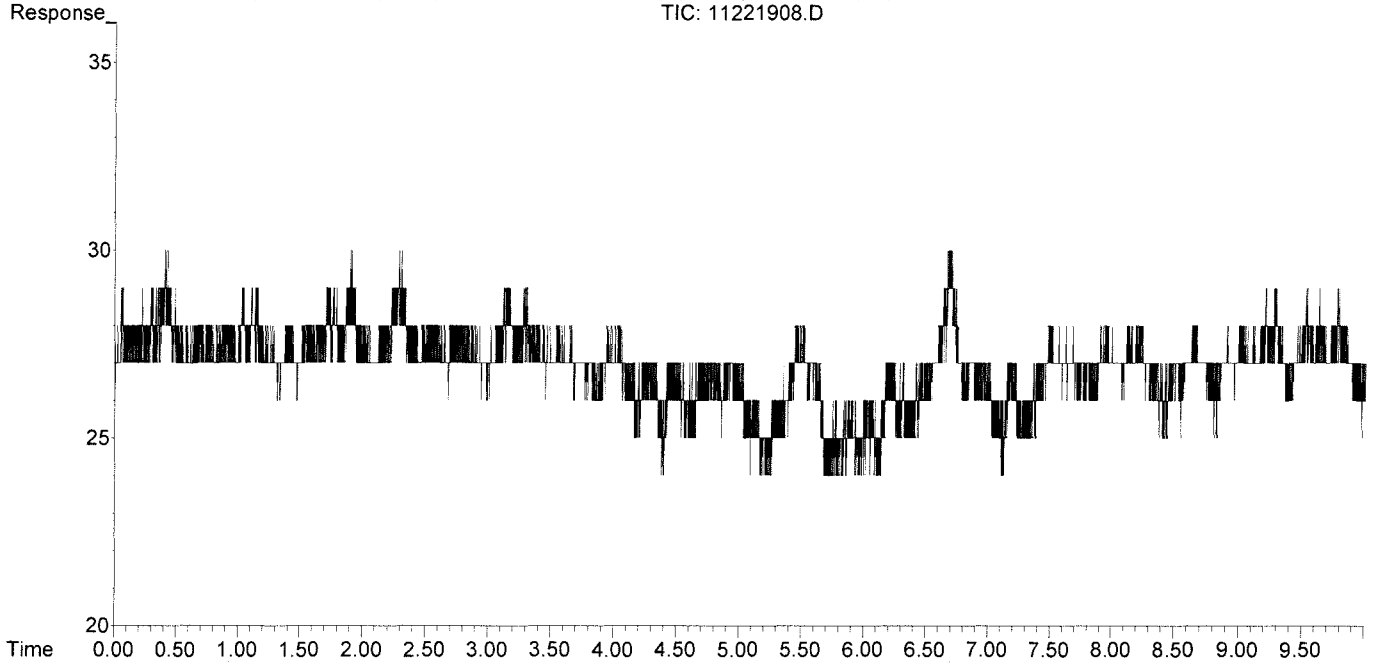
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

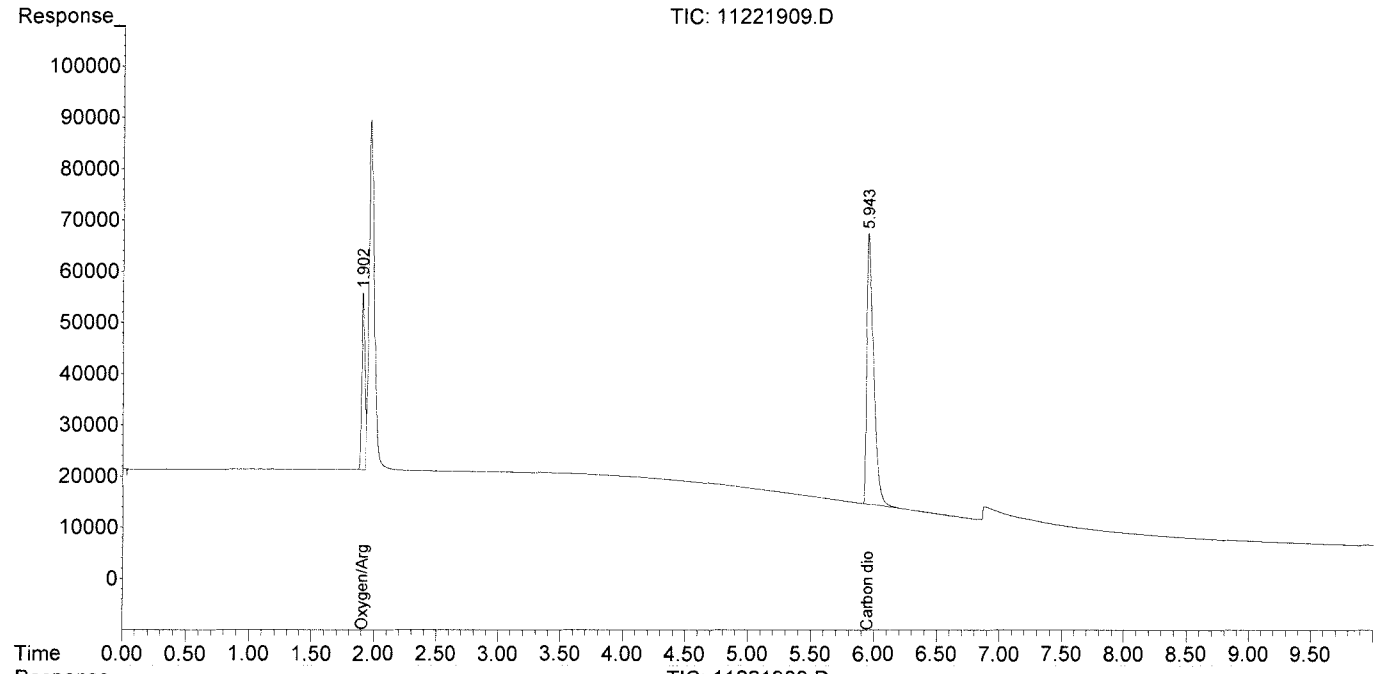
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.903	588229	0.124	ppm
2)	Carbon monoxide	1.903	588229	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	5.944	1993576	8493.089	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	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

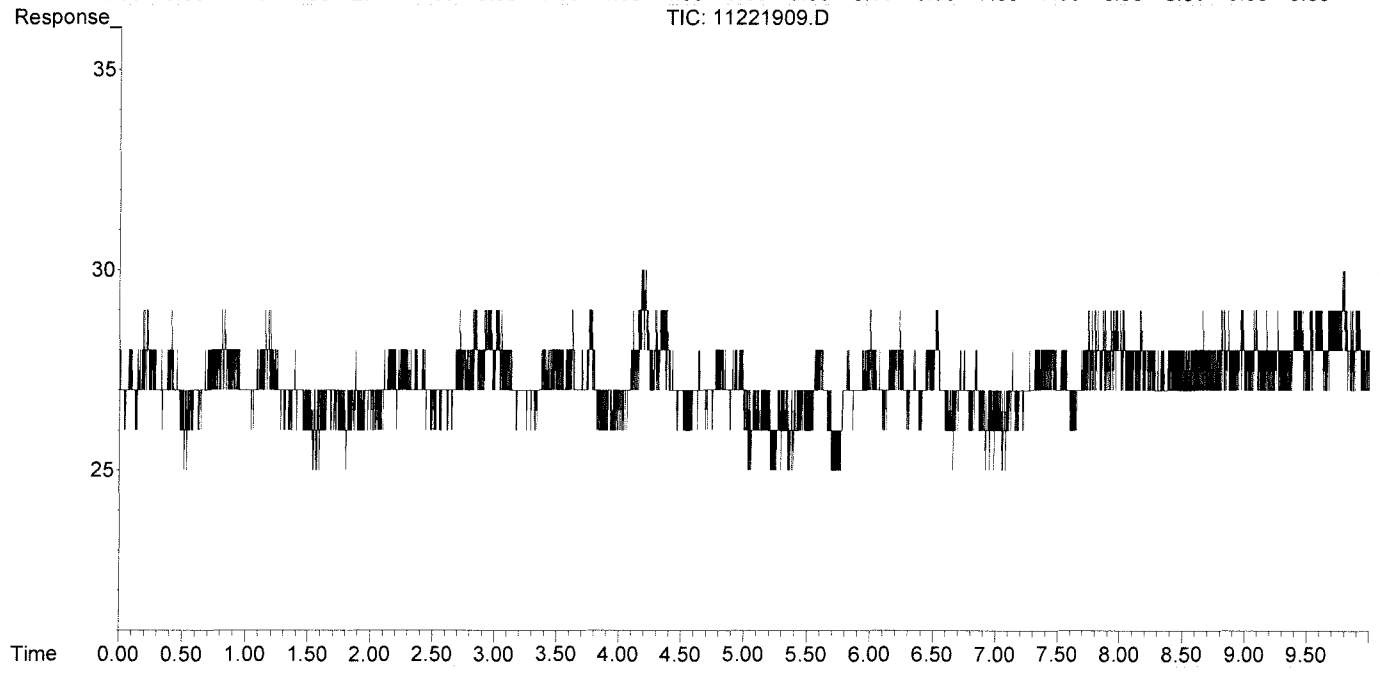
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

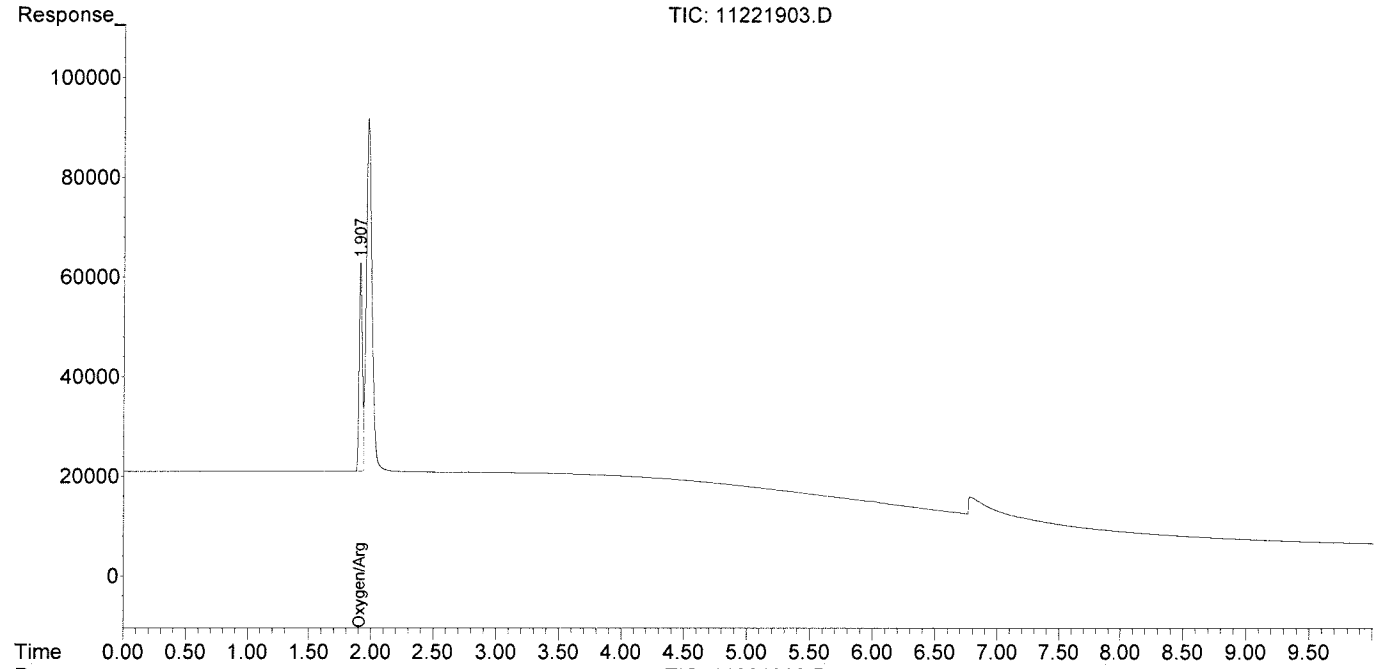
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.907f	727601	0.153	ppm
2)	Carbon monoxide	1.907f	727601	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	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

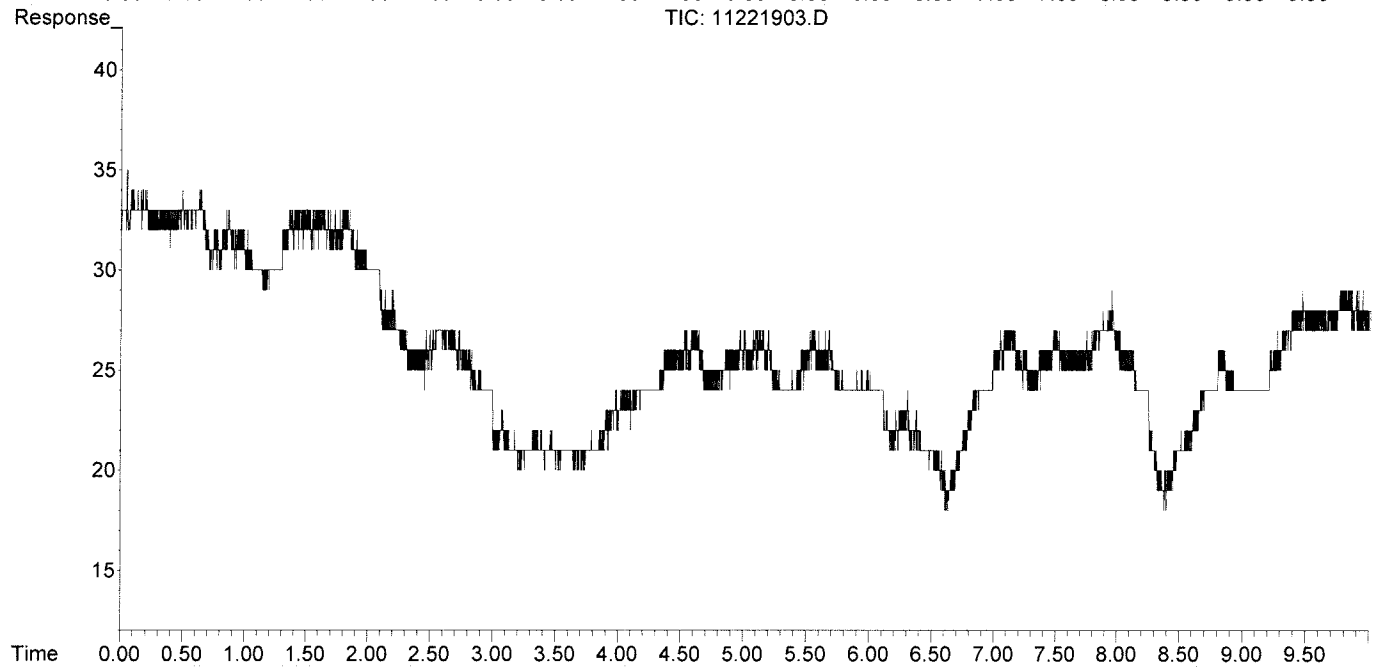
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

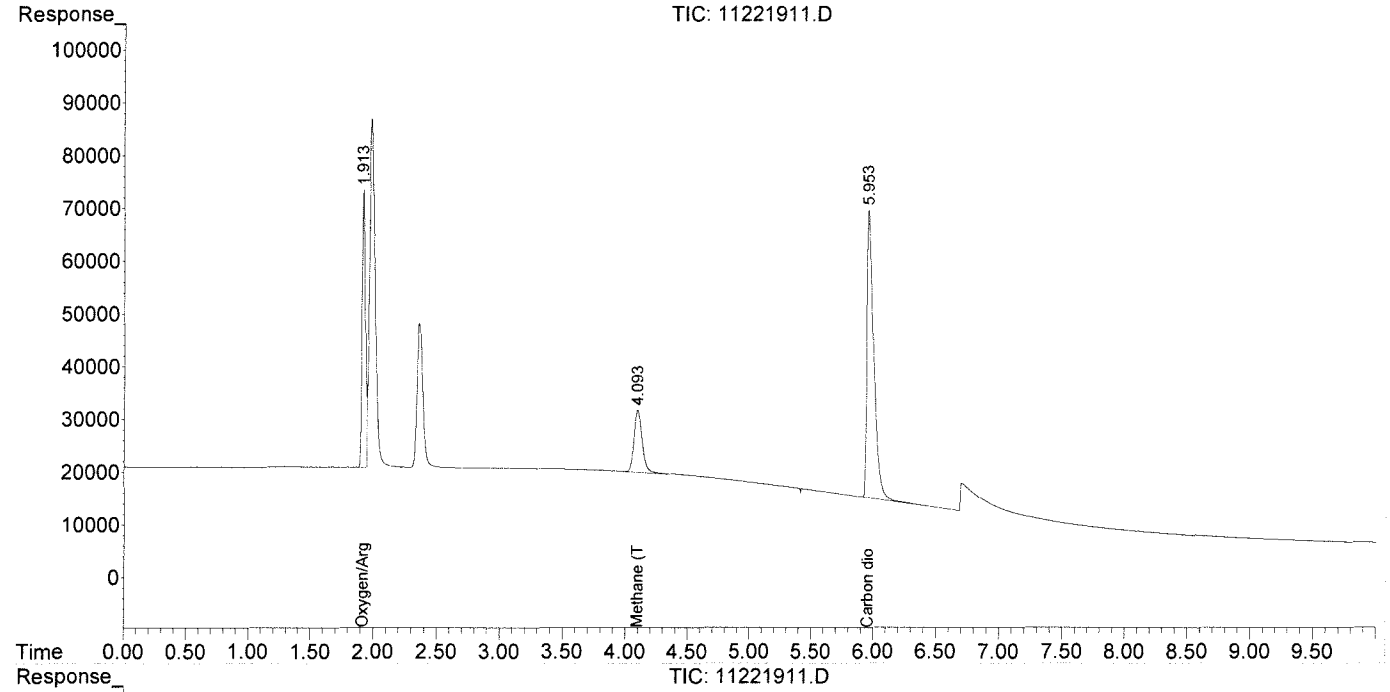
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.914f	931313	0.196	ppm
2)	Carbon monoxide	1.914f	931313	N.D.	ppm
3)	Methane (TCD)	4.094f	538764	56967.771	ppm
4)	Carbon dioxide	5.955	2096703	8932.435	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	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

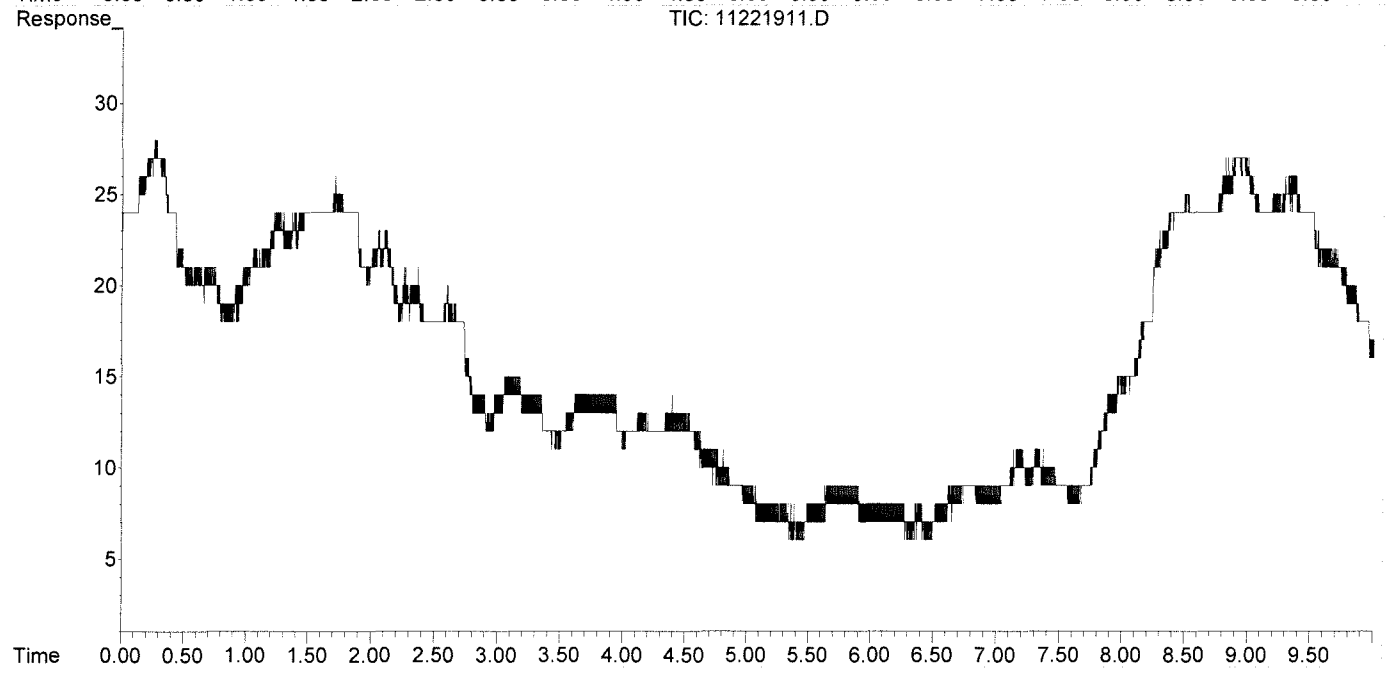
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

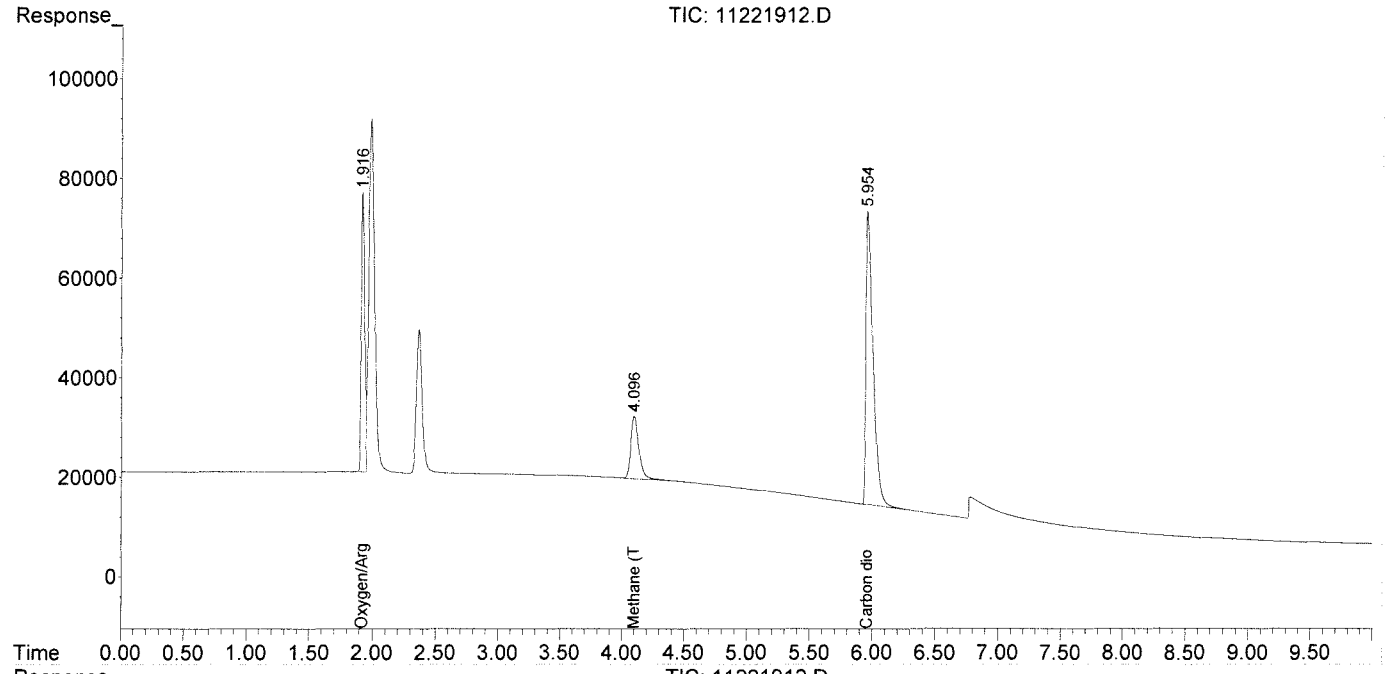
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.916f	1007402	0.212	ppm
2)	Carbon monoxide	1.916f	1007402	N.D.	ppm
3)	Methane (TCD)	4.097f	578385	61157.149	ppm
4)	Carbon dioxide	5.955	2287950	9747.190	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	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

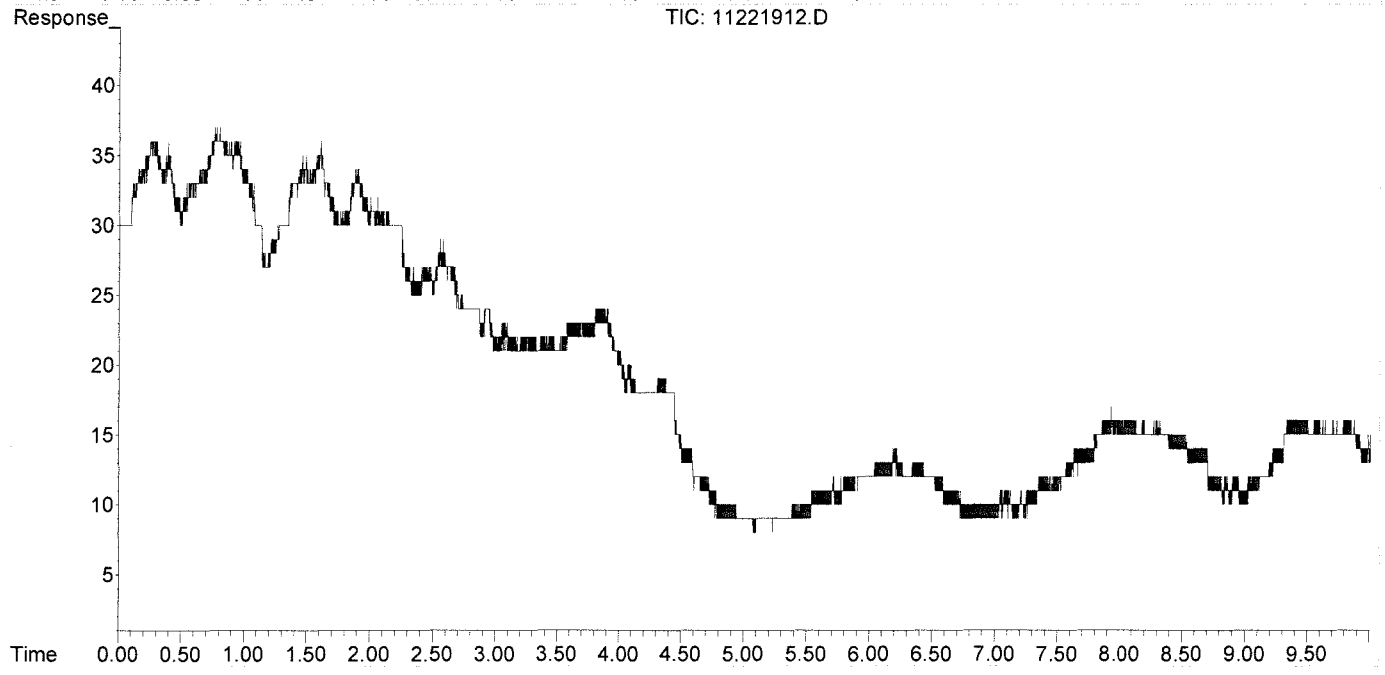
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





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 :

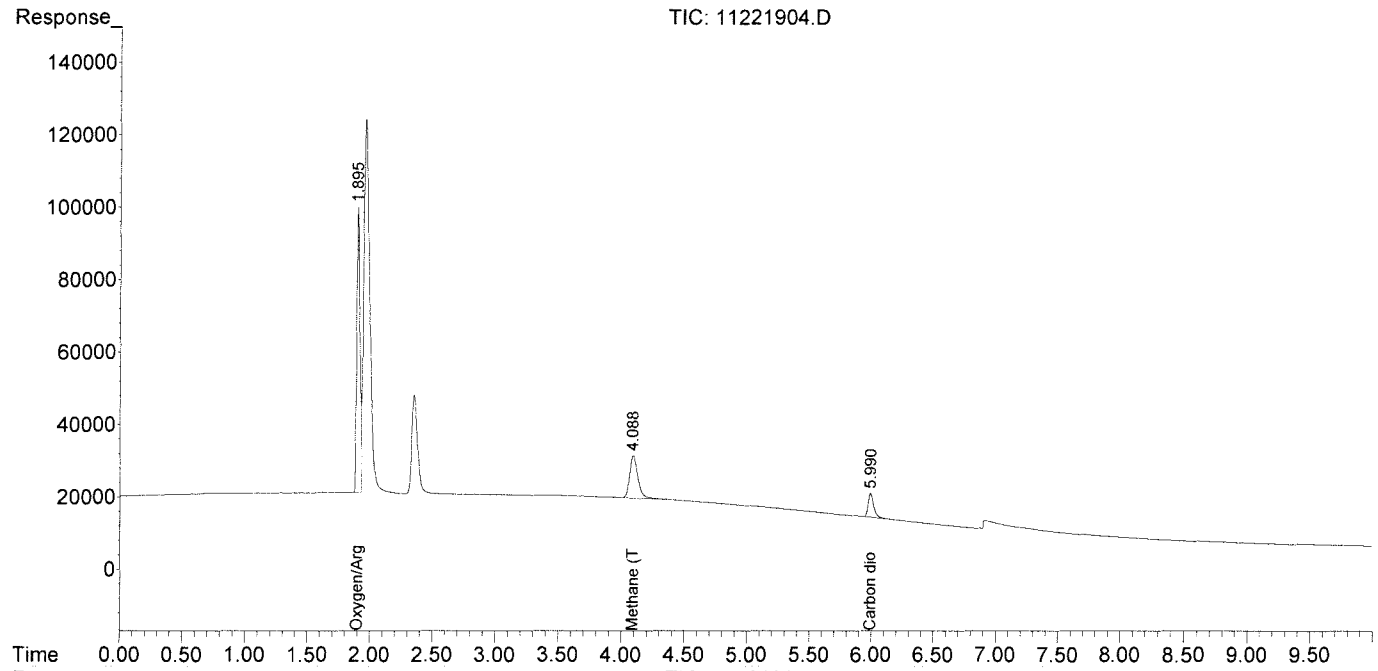
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.895	1404792	0.295	ppm	
2)	Carbon monoxide	1.895	1404792	N.D.	ppm	
3)	Methane (TCD)	4.089f	541798	57288.555	ppm	
4)	Carbon dioxide	5.990	203565	867.235	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	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	

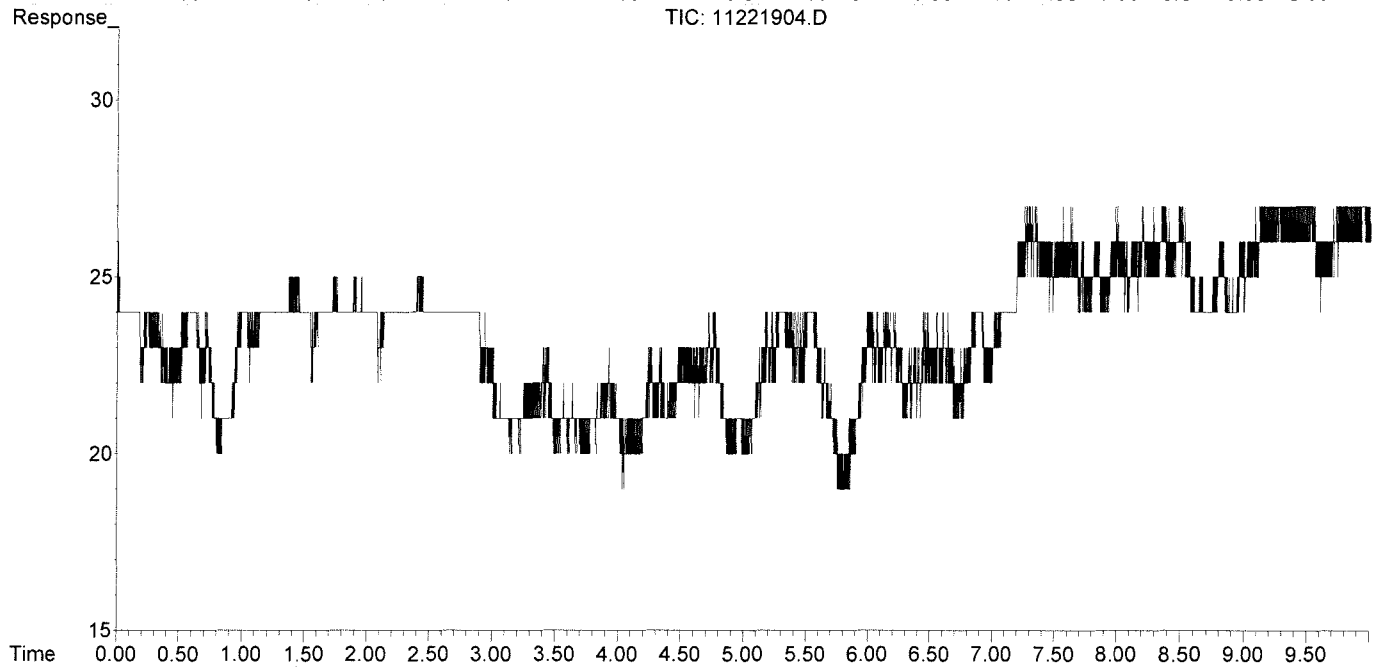
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :



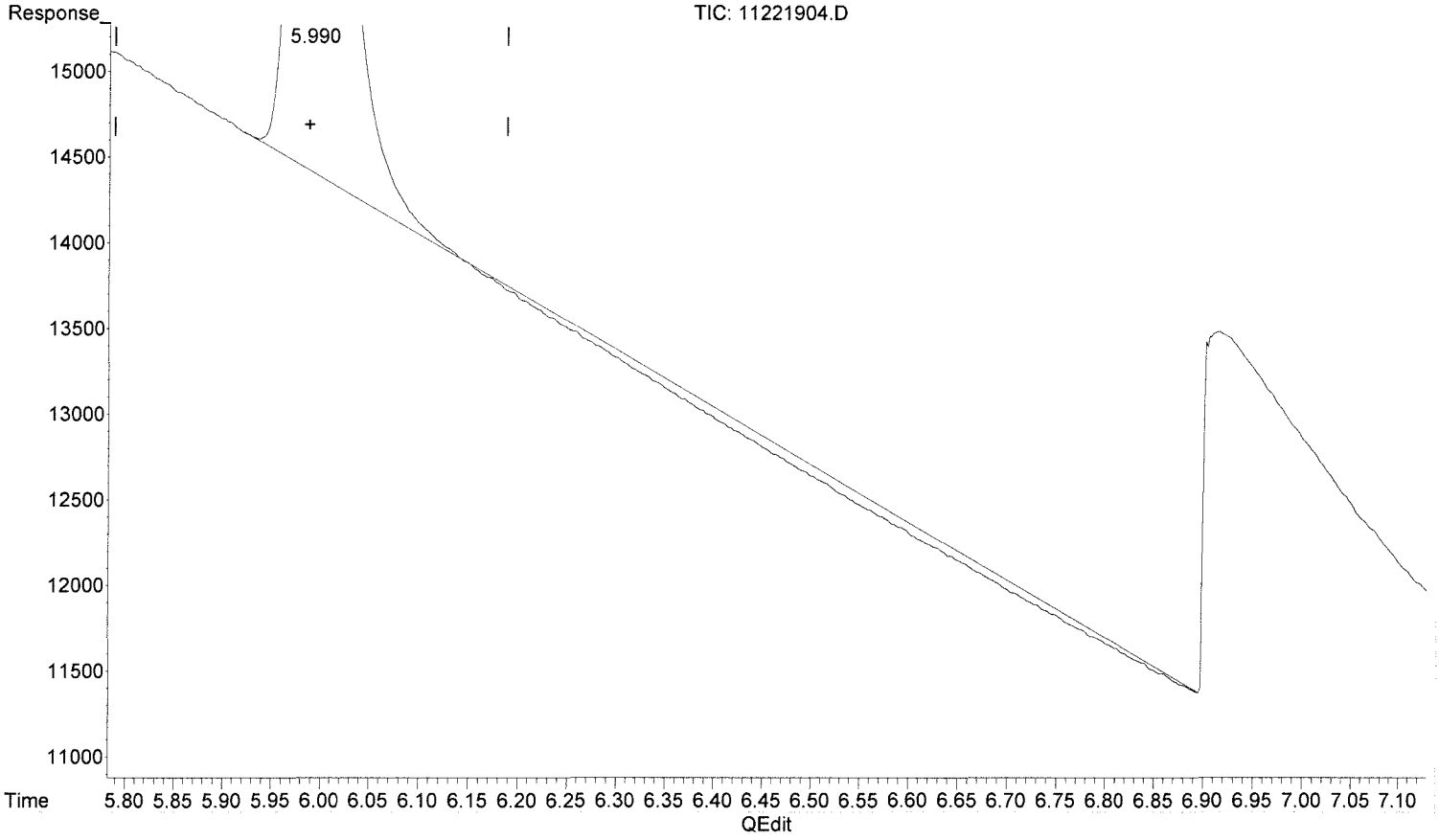


Quantitation Report (Qedit)

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

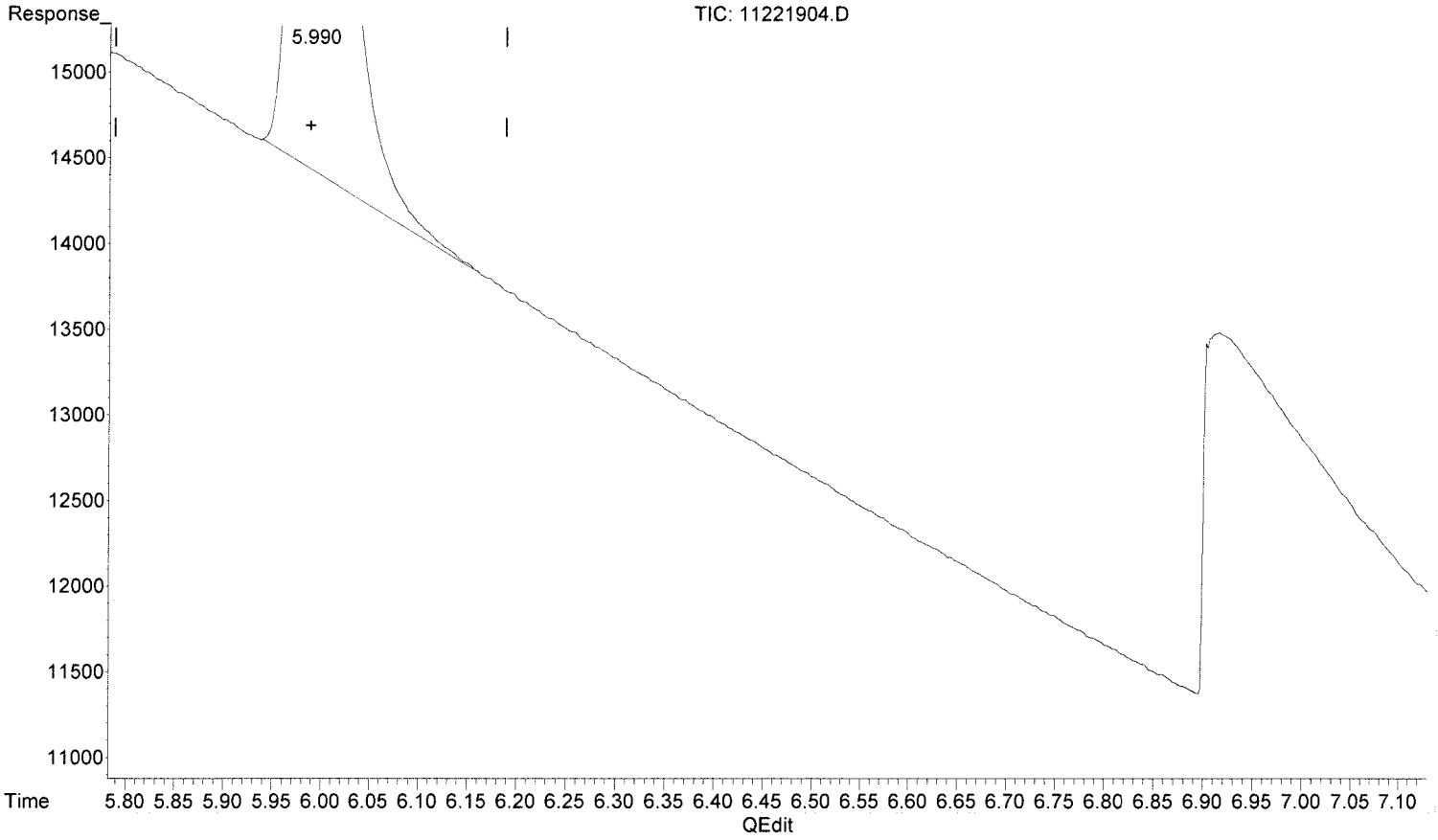
Quantitation Report (Qedit)

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

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 :

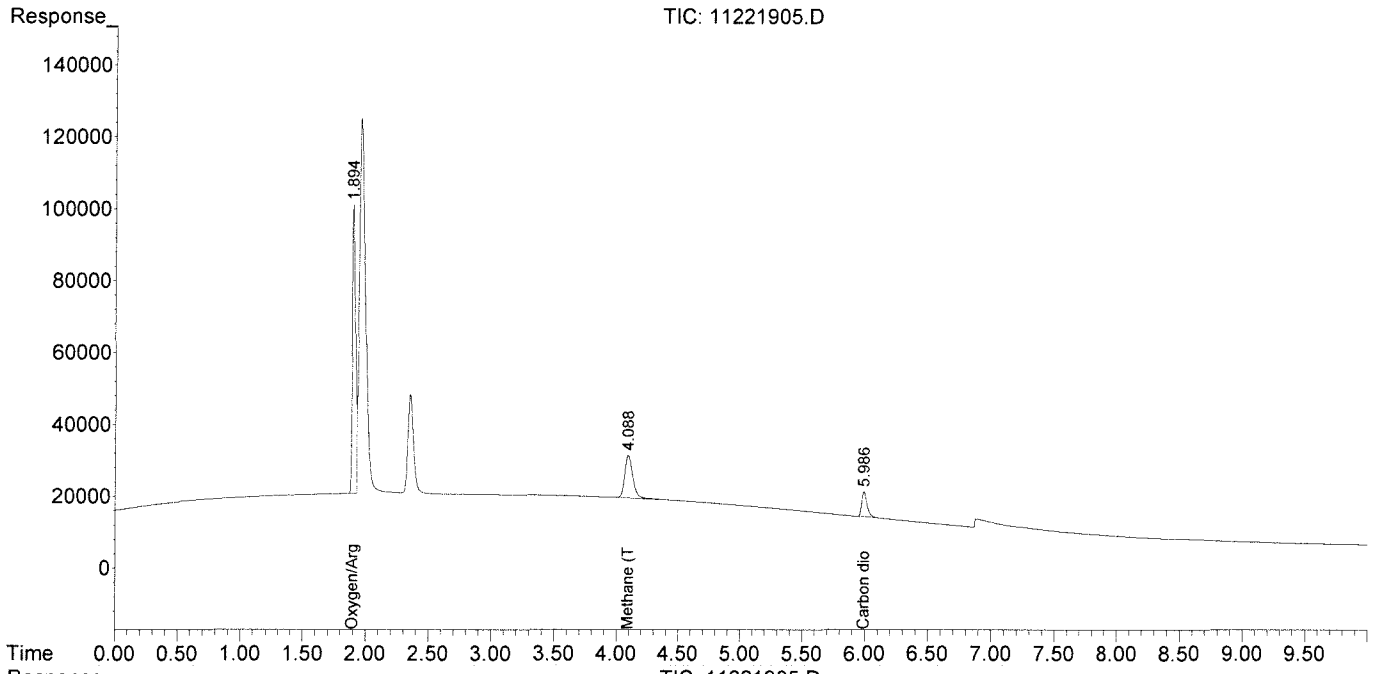
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.895	1431820	0.301	ppm	
2)	Carbon monoxide	1.895	1431820	N.D.	ppm	
3)	Methane (TCD)	4.089f	545387	57668.031	ppm	
4)	Carbon dioxide	5.986	209057	890.632	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	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	

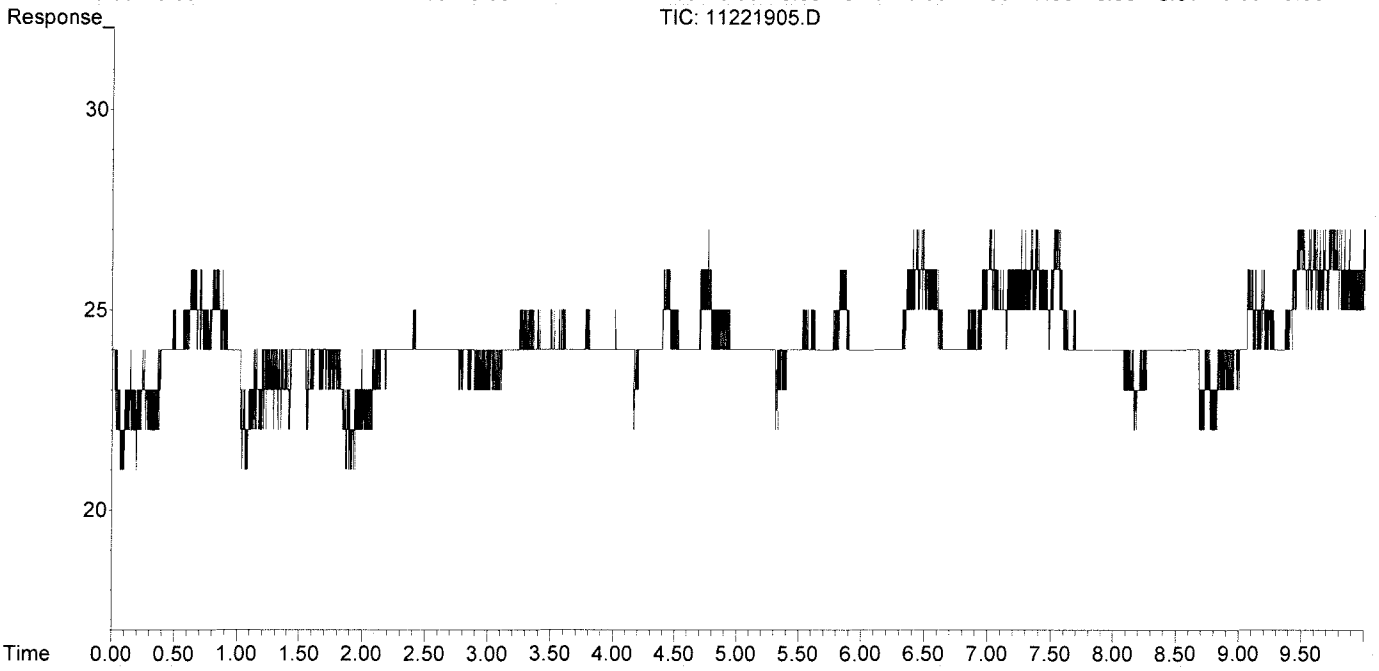
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :



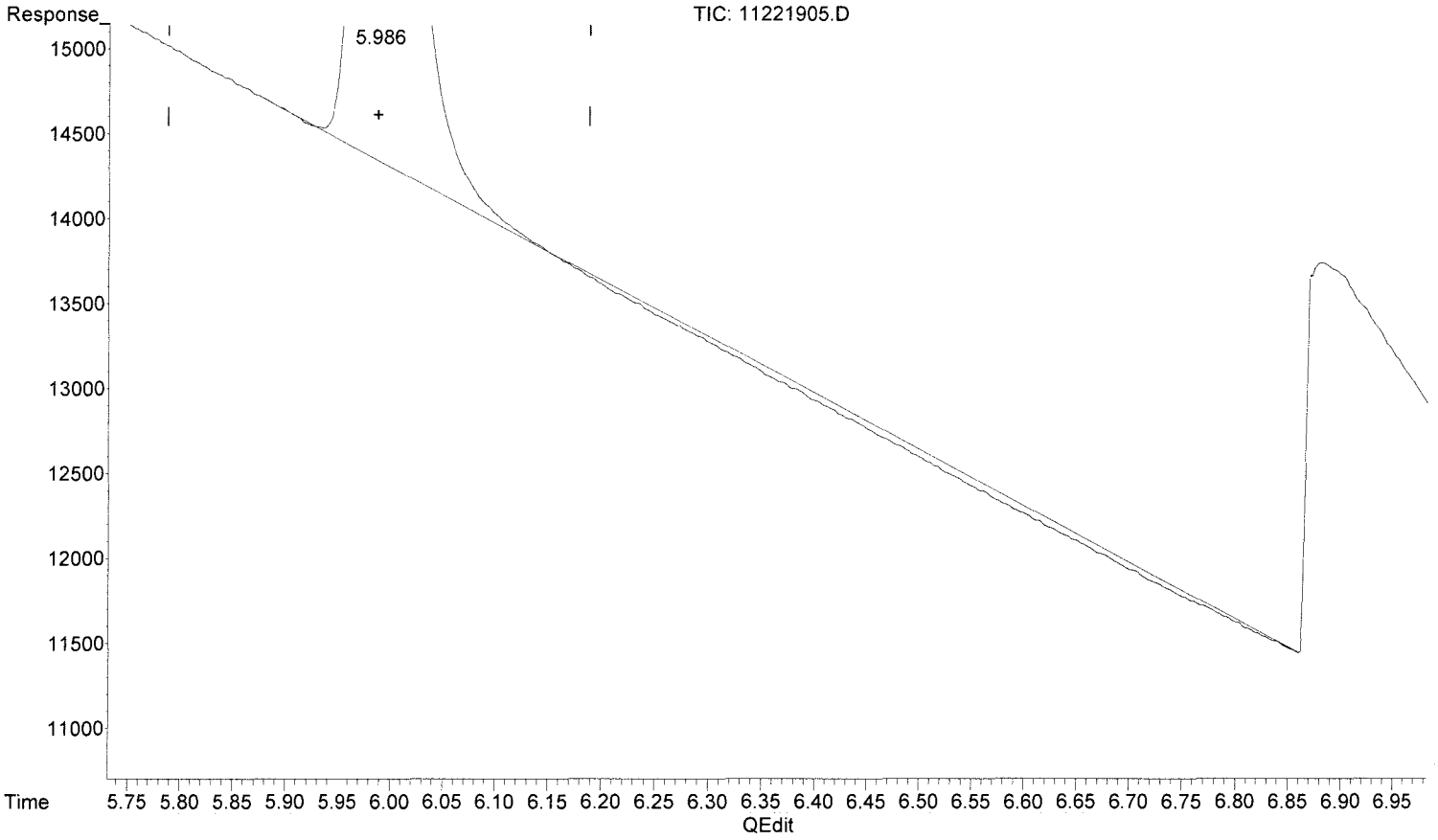


Quantitation Report (Qedit)

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

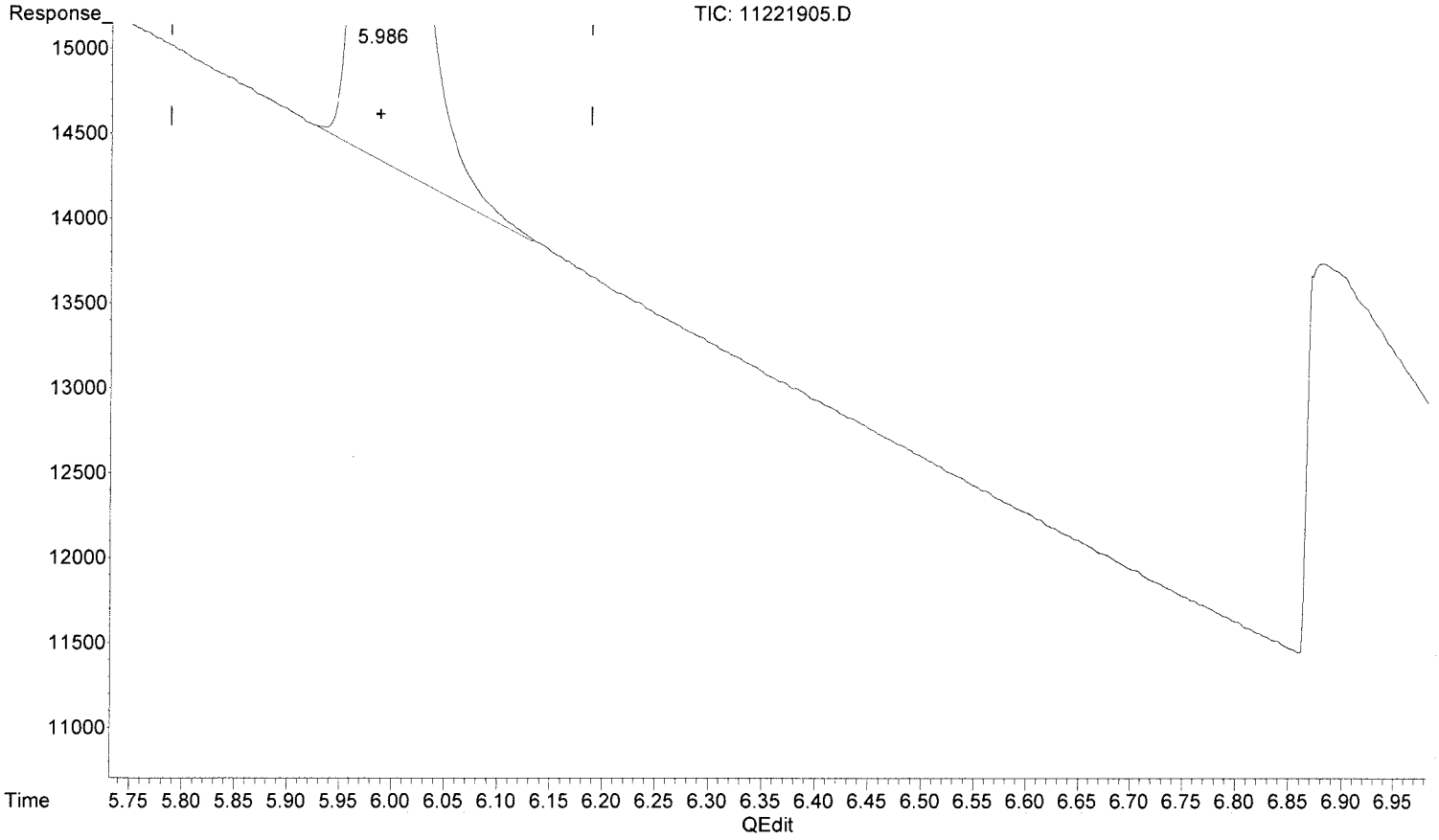
Quantitation Report (Qedit)

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

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

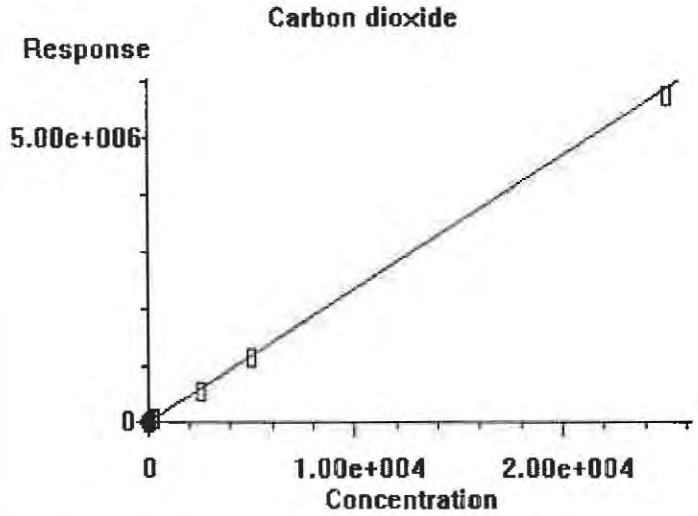
Search by: Ret Time | Name | Index — Find Compound

- 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	

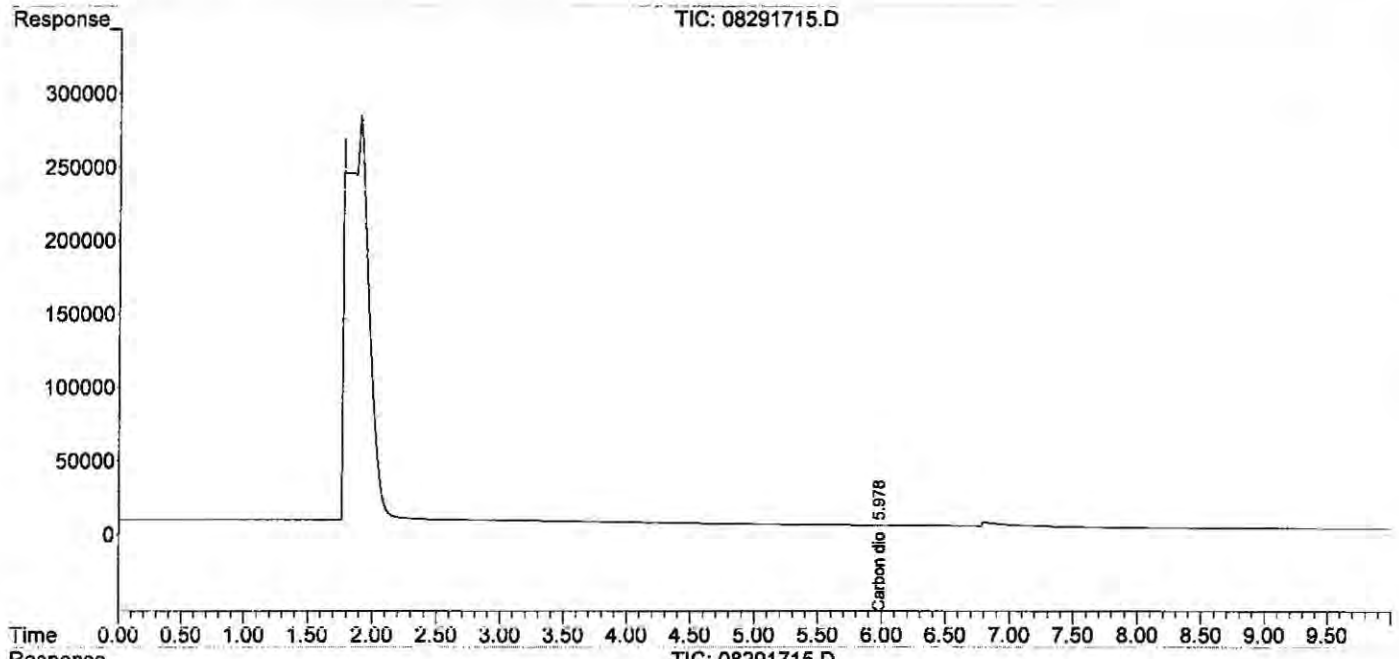
(f)=RT Delta > 1/2 Window (m)=manual int.

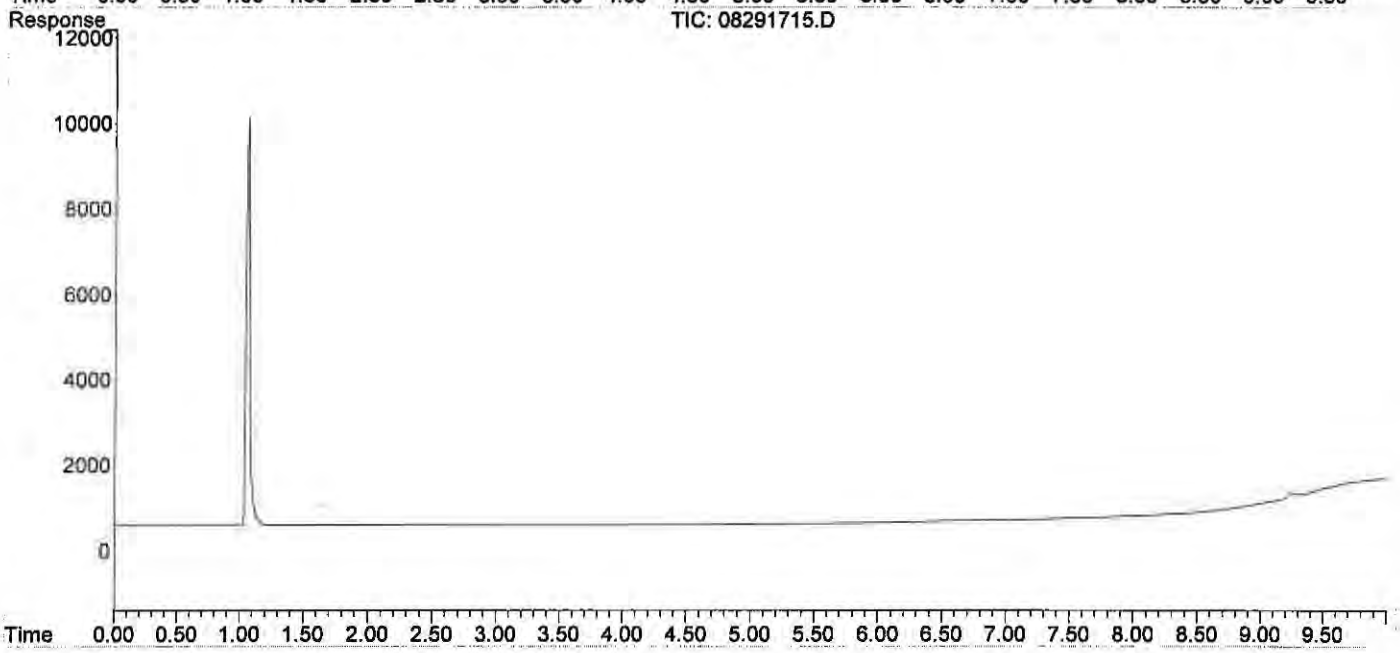
Quantitation Report (QT Reviewed)

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 :



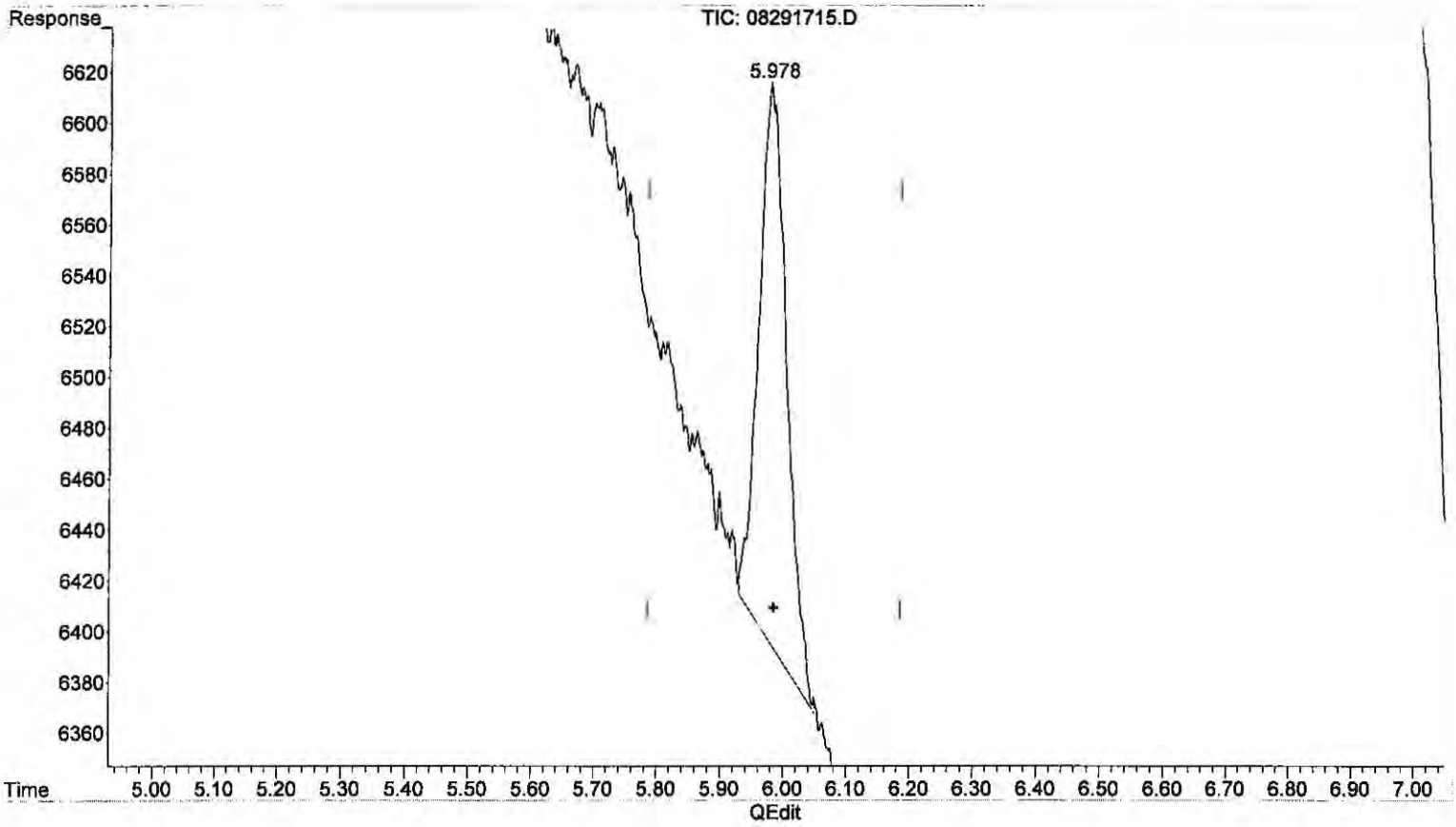


Quantitation Report (Qedit)

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

(+) = 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	

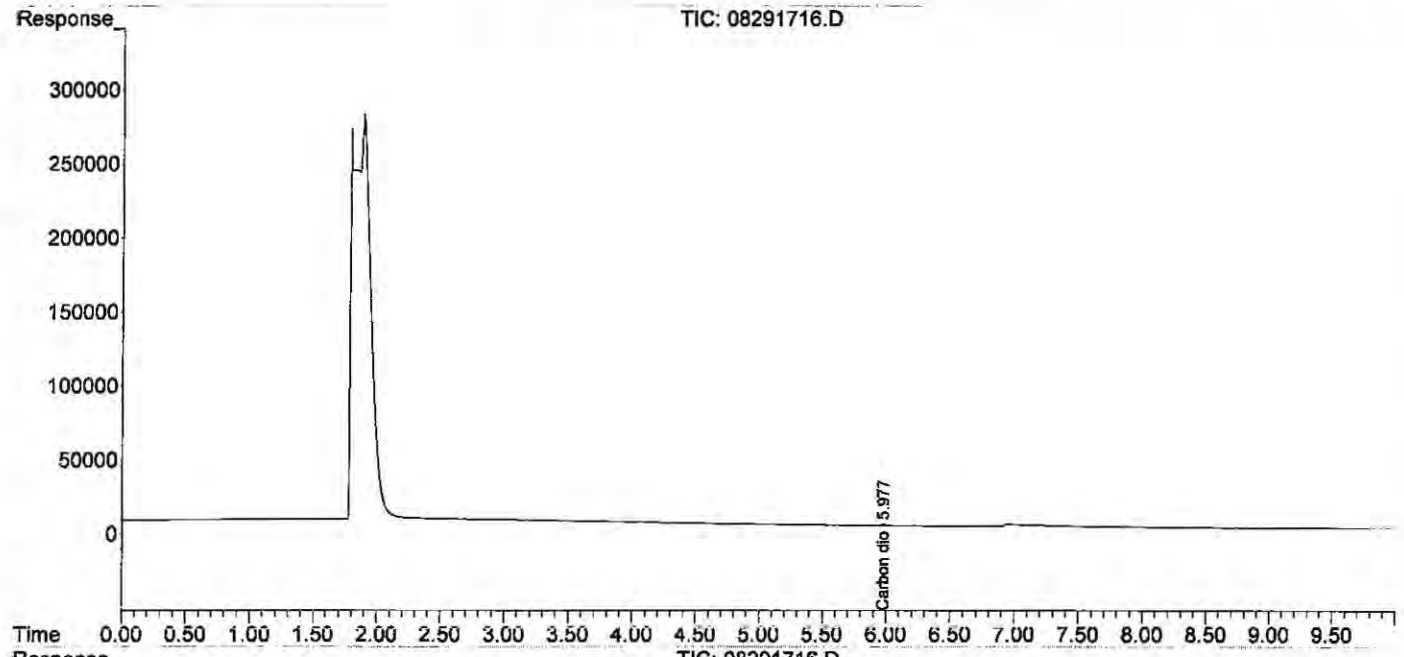
(f)=RT Delta > 1/2 Window (m)=manual int.

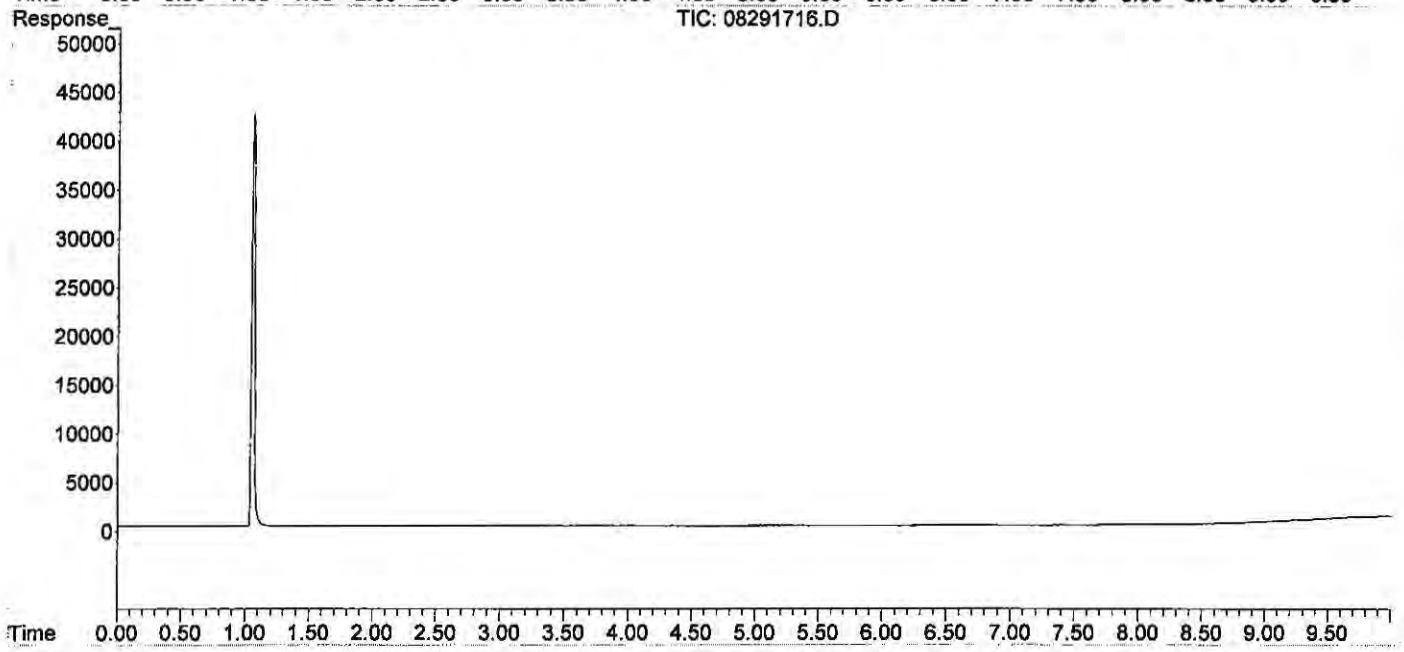
Quantitation Report (QT Reviewed)

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	

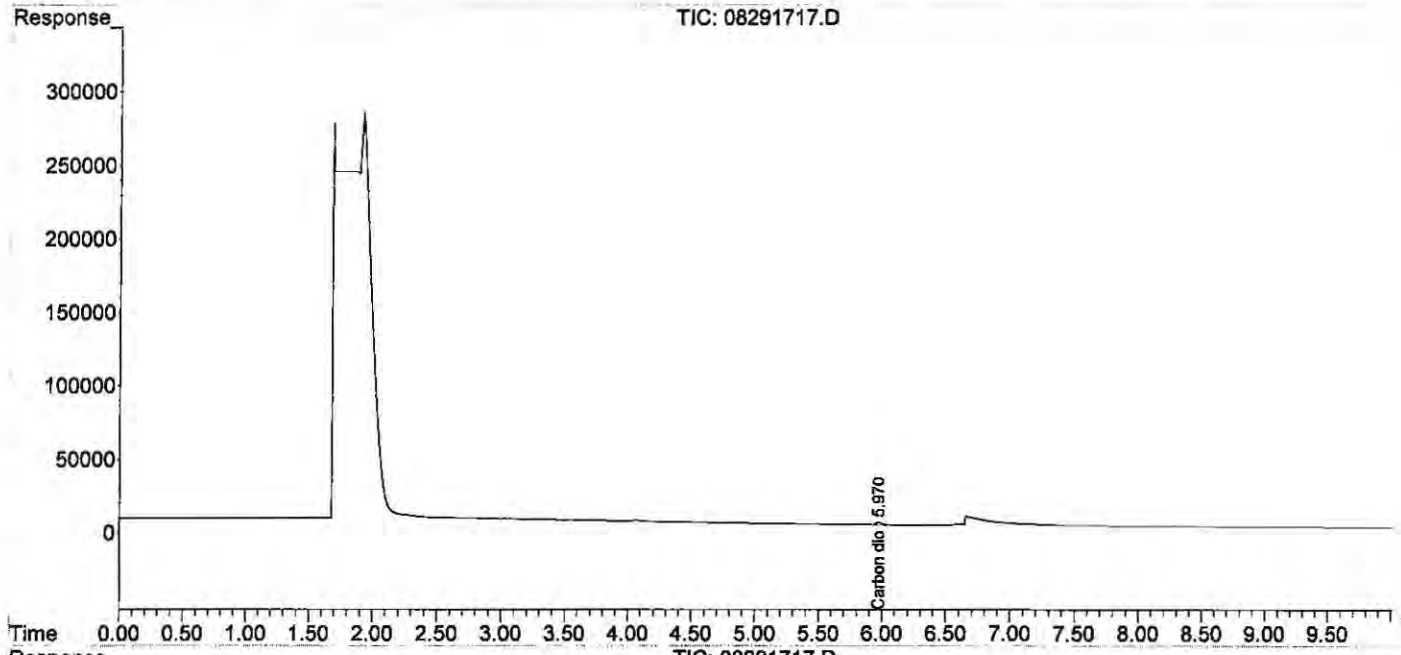
(f)=RT Delta > 1/2 Window (m)=manual int.

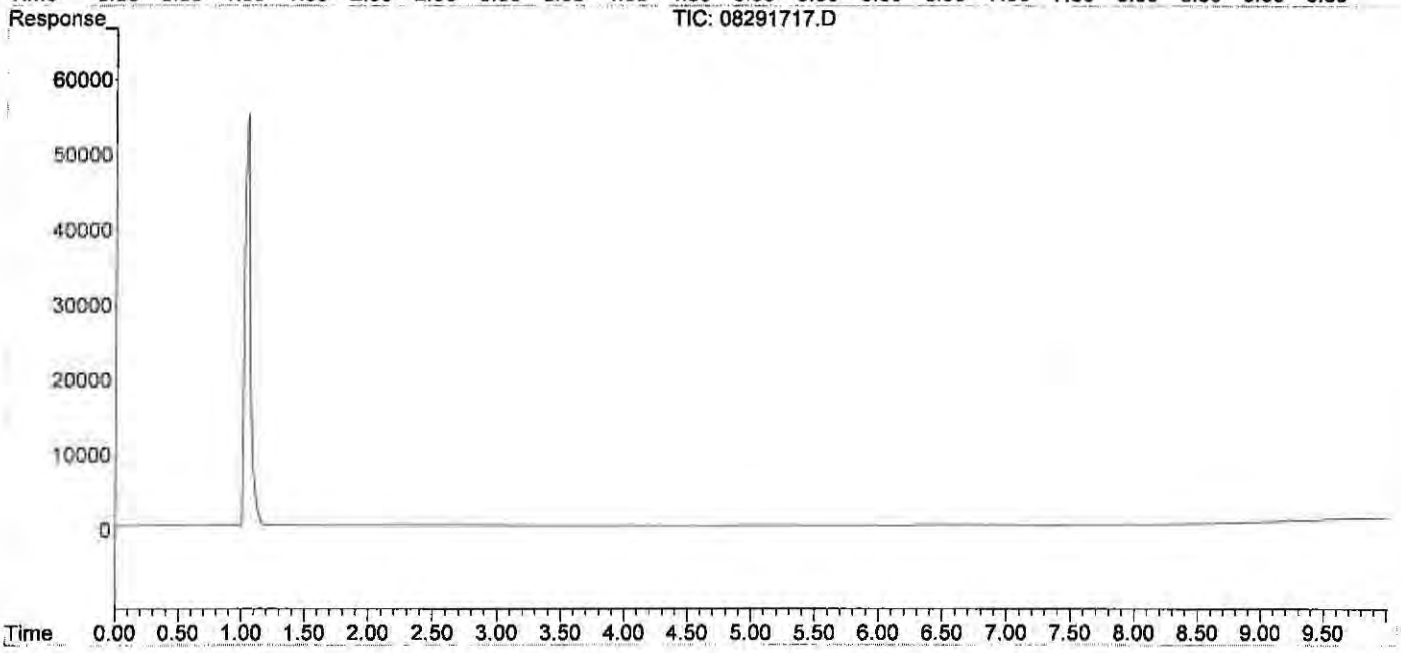
Quantitation Report (QT Reviewed)

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 :



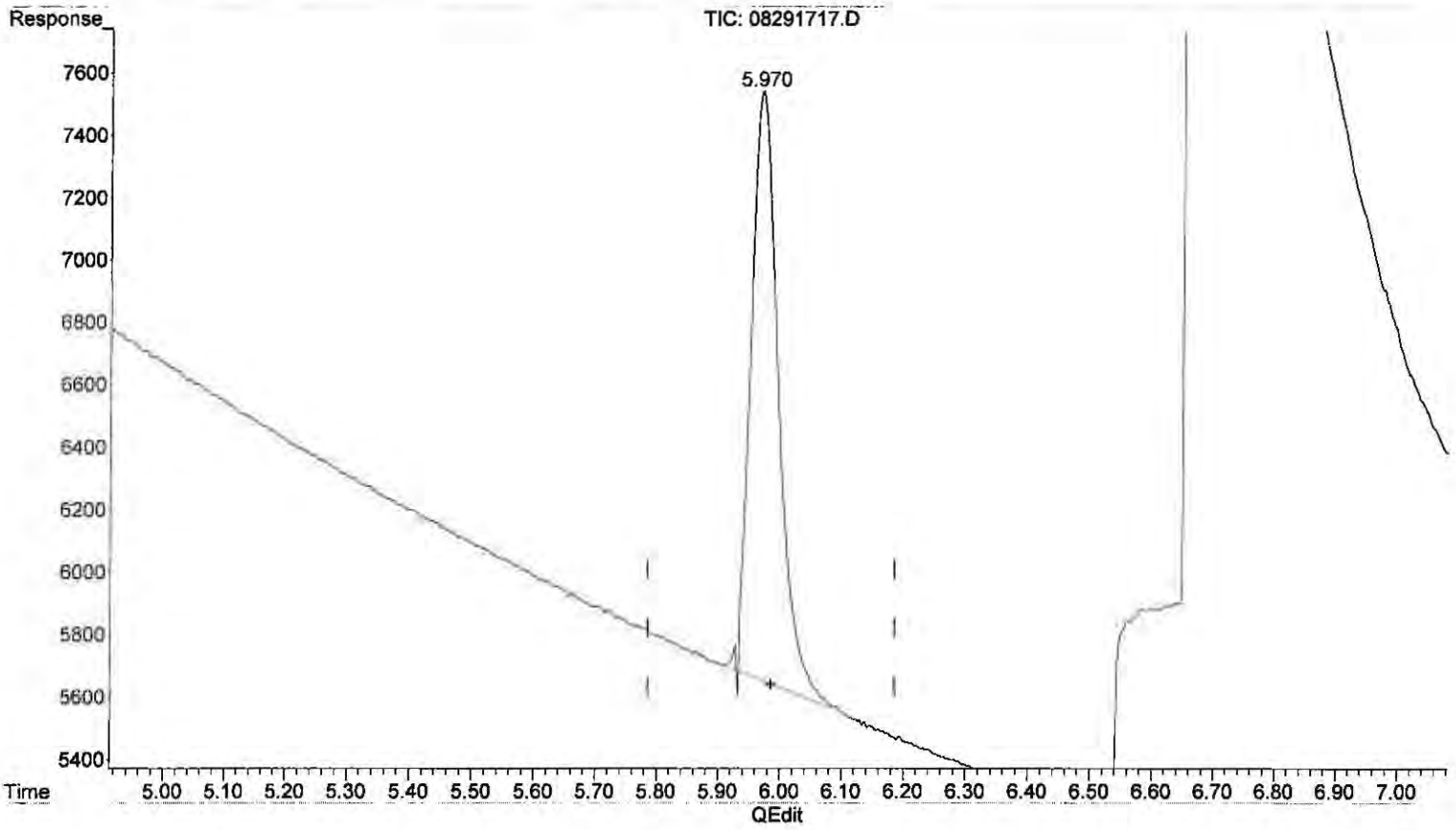


Quantitation Report (Qedit)

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 #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	

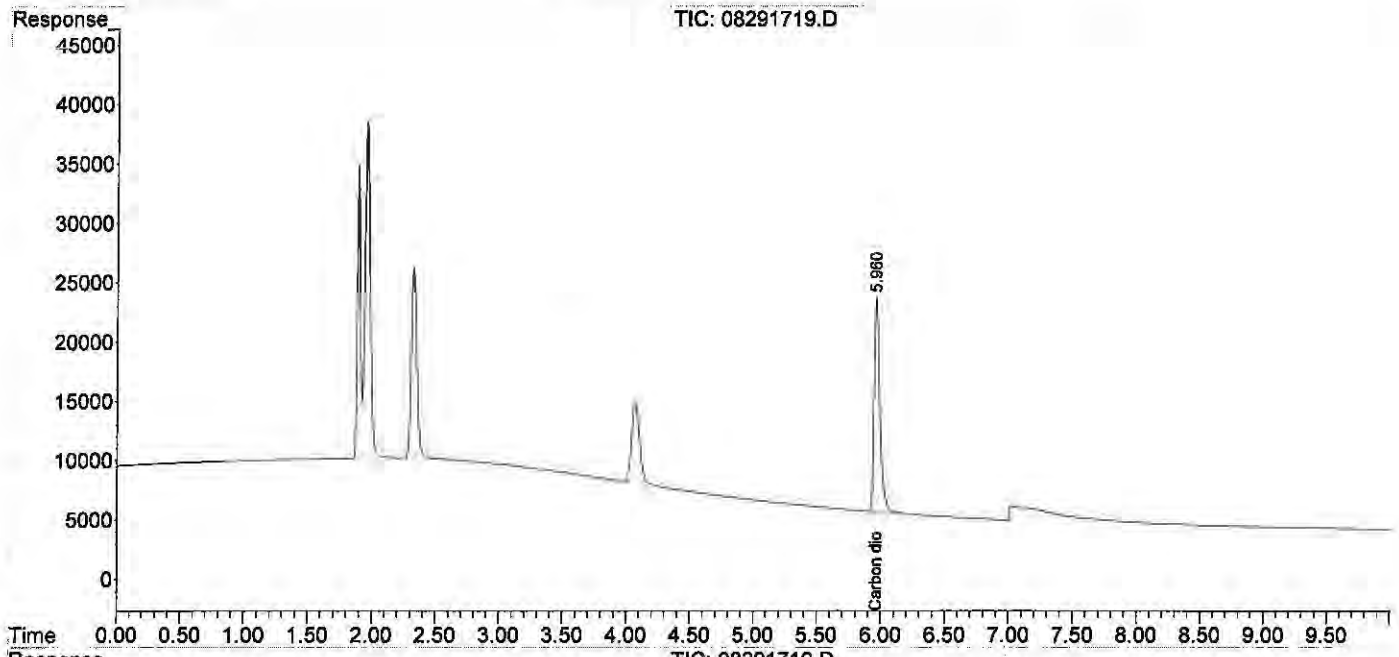
(f)=RT Delta > 1/2 Window (m)=manual int.

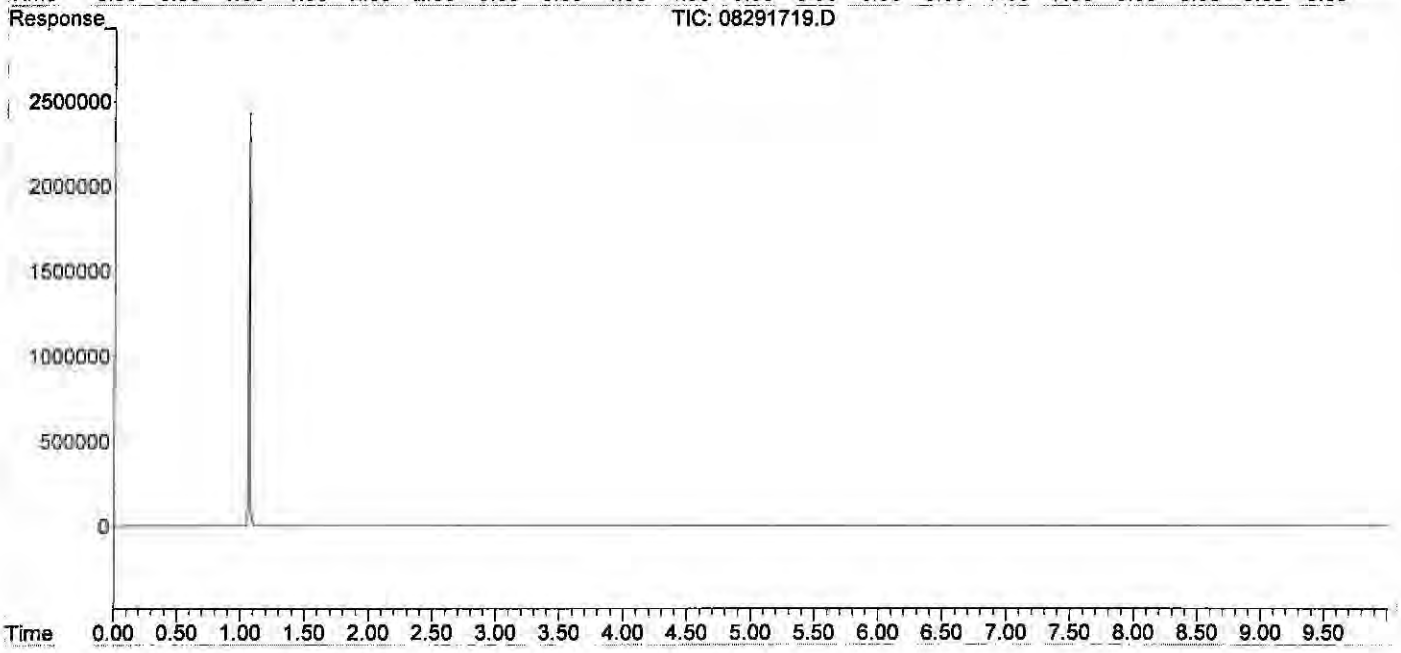
Quantitation Report (QT Reviewed)

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 :





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	

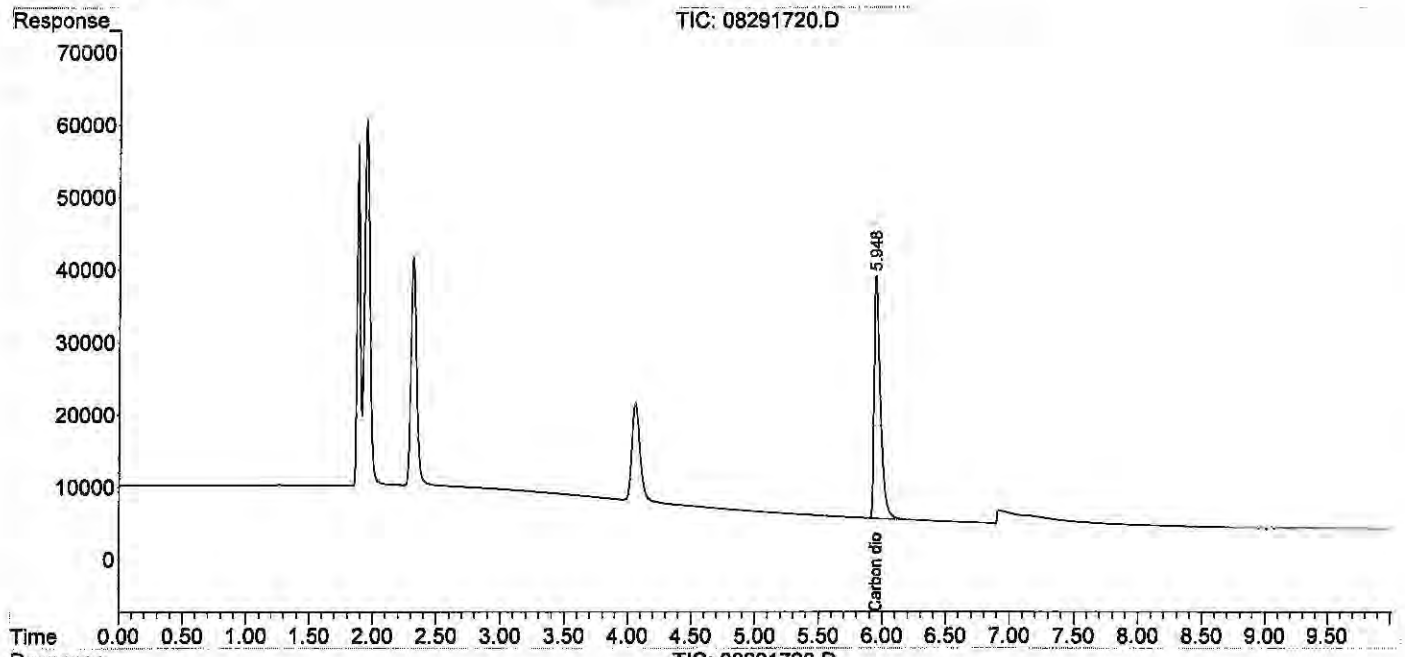
(f)=RT Delta > 1/2 Window (m)=manual int.

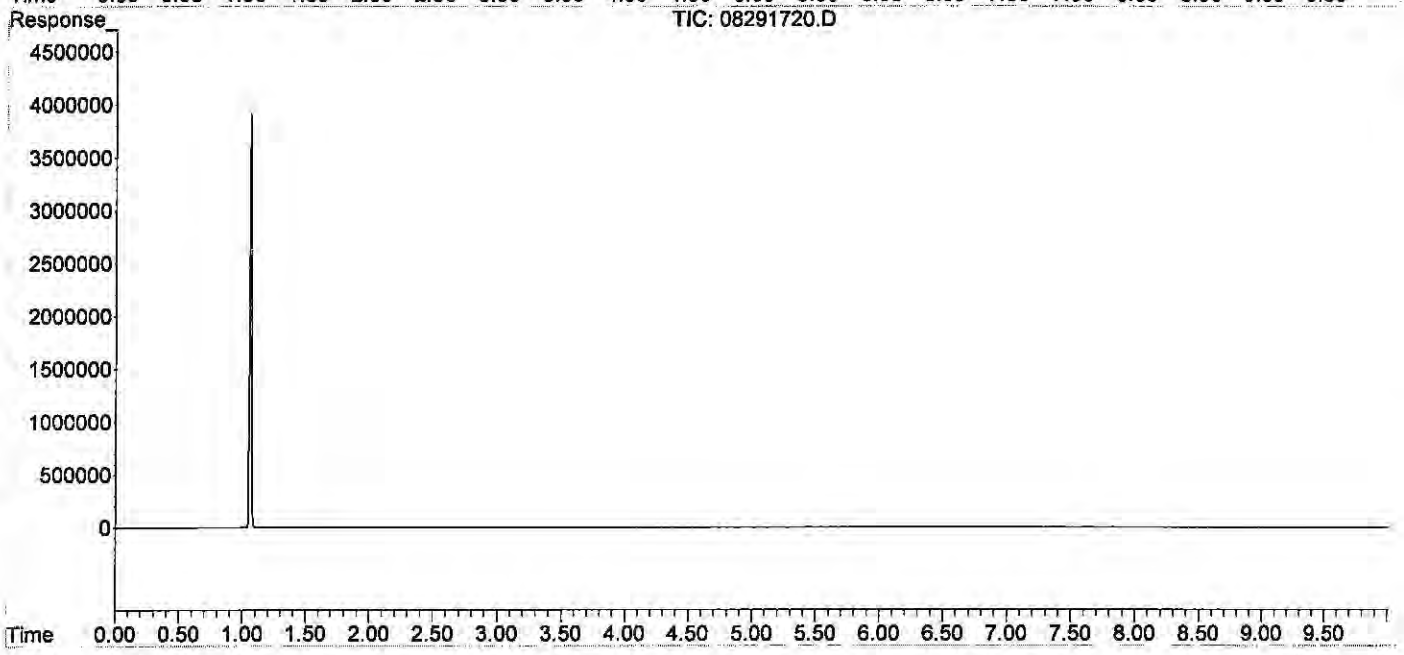
Quantitation Report (QT Reviewed)

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 :





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	

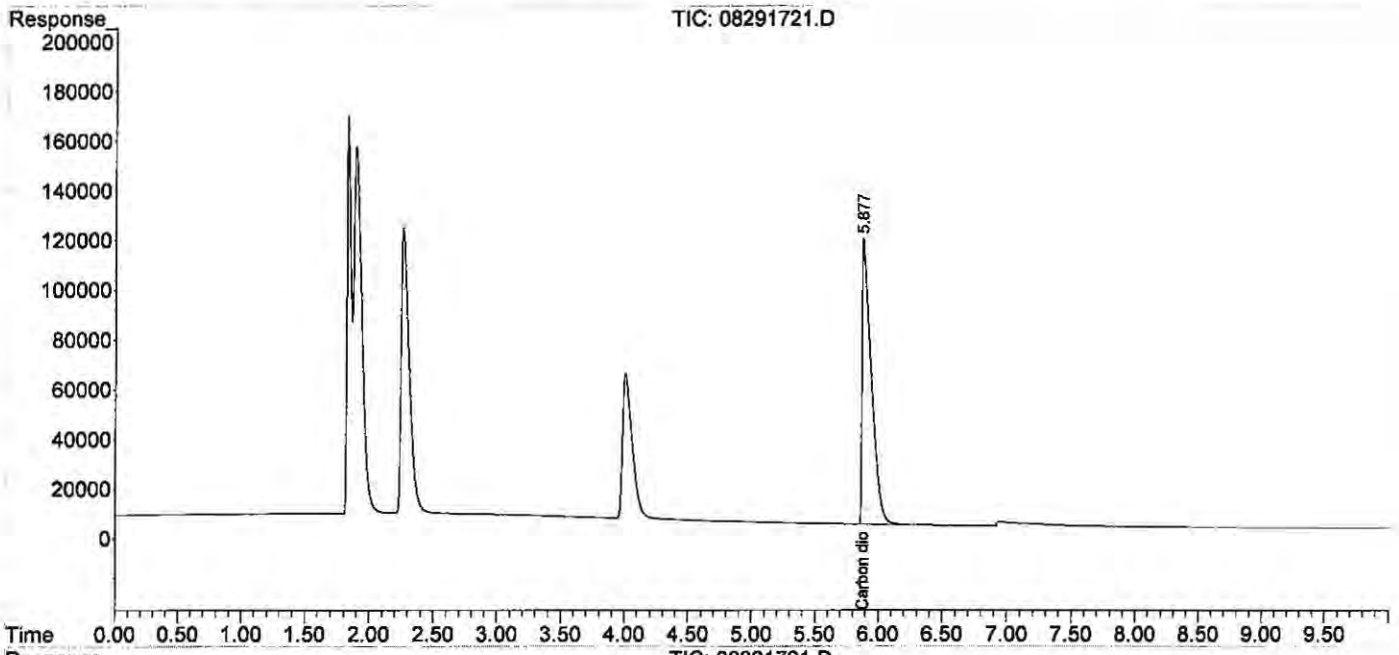
(f)=RT Delta > 1/2 Window (m)=manual int.

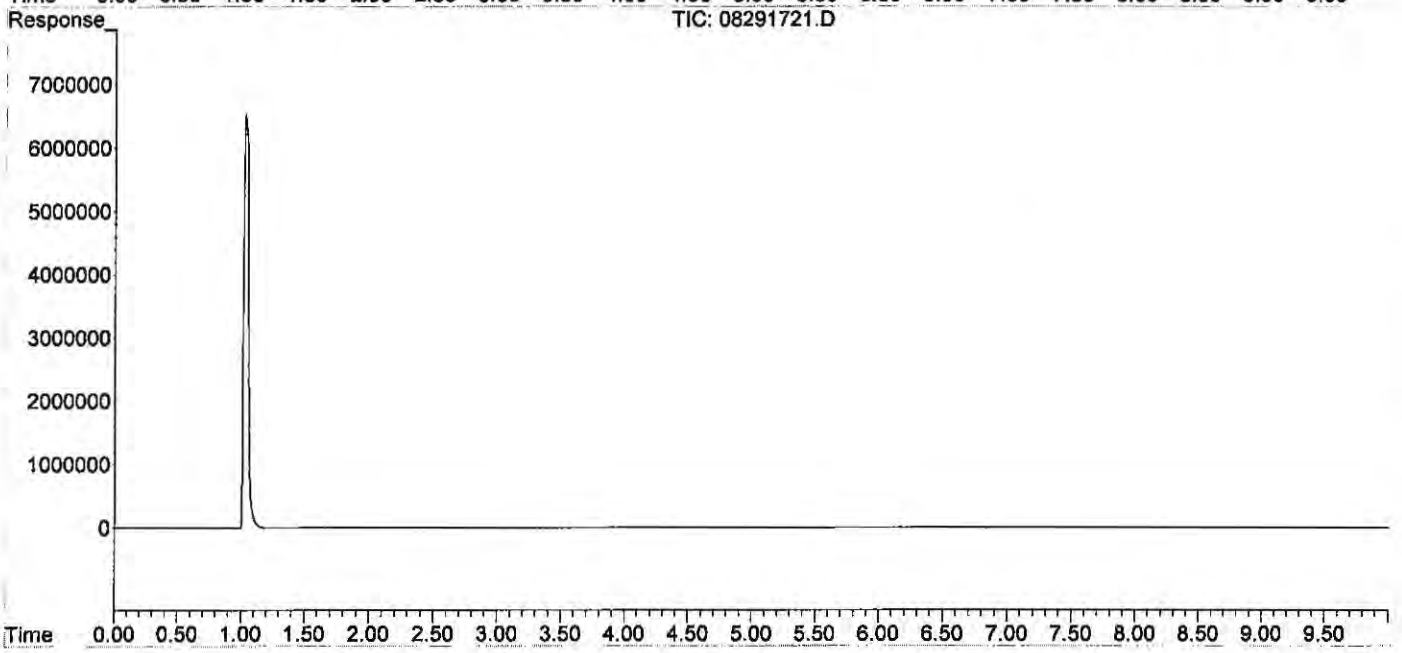
Quantitation Report (QT Reviewed)

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
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
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.

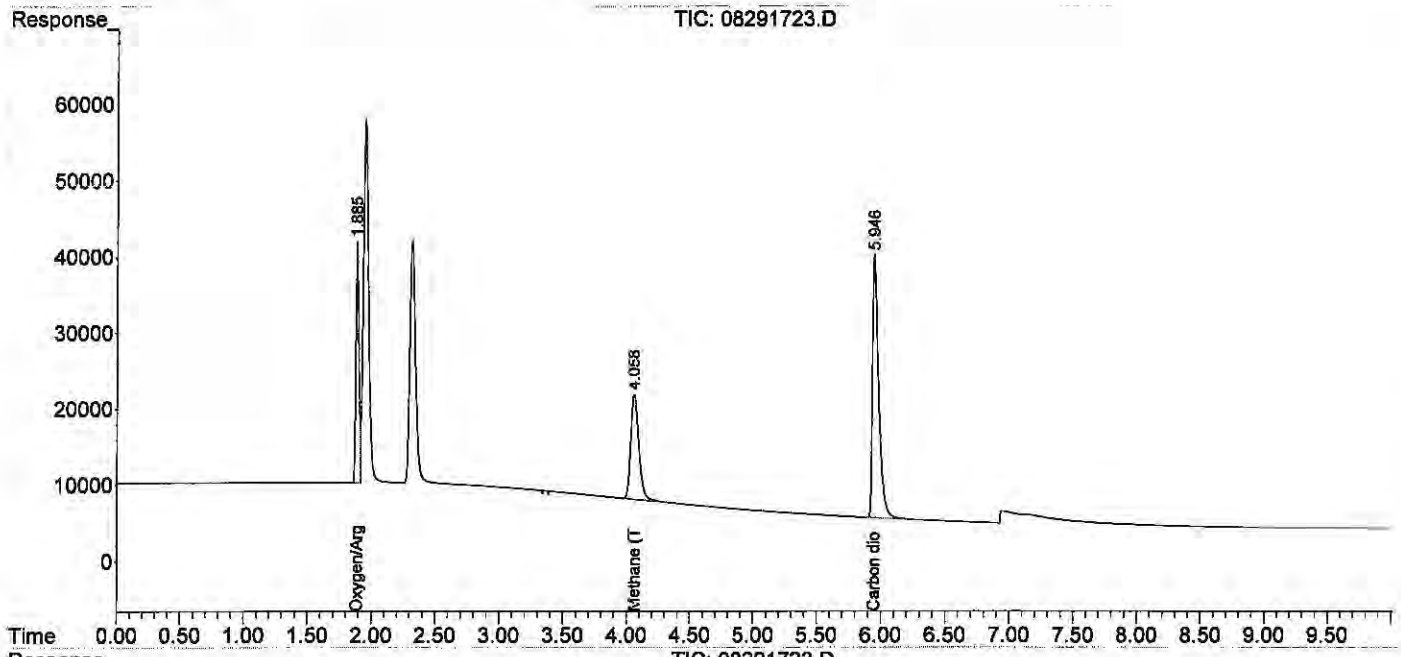
actual %D
5000 99.16

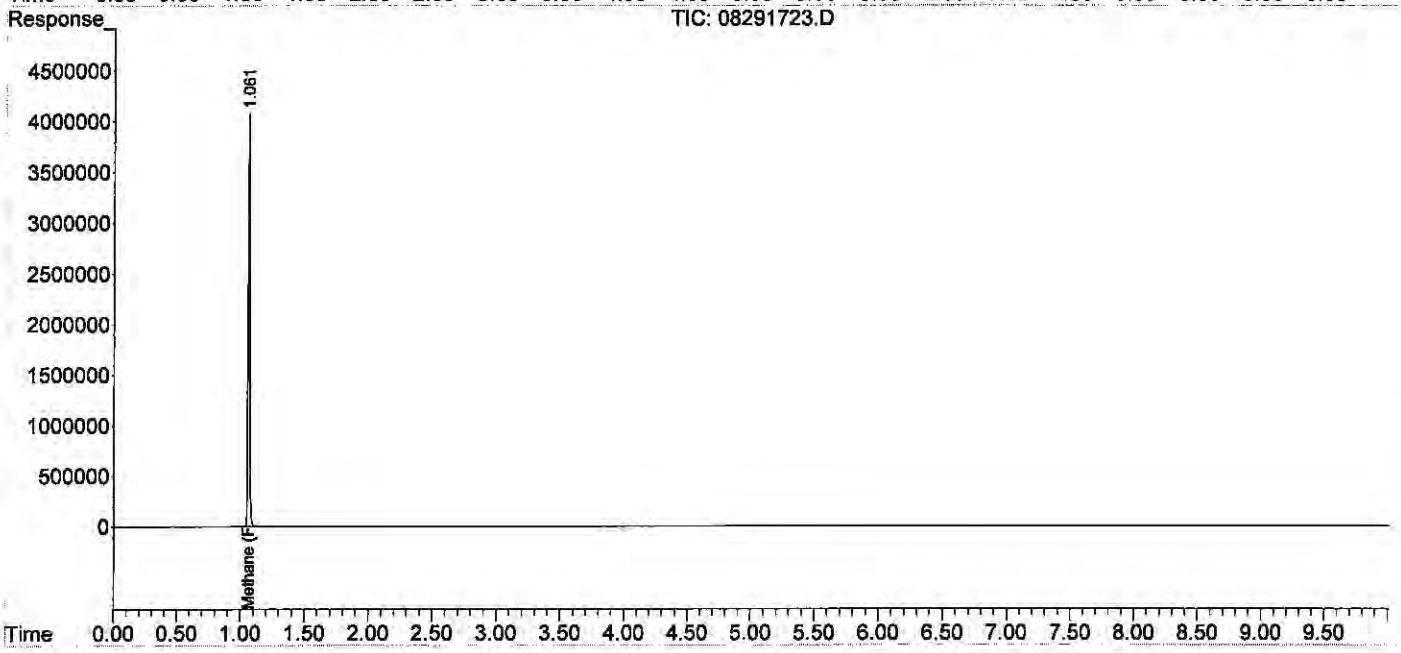
9/4/17

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 :





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 :

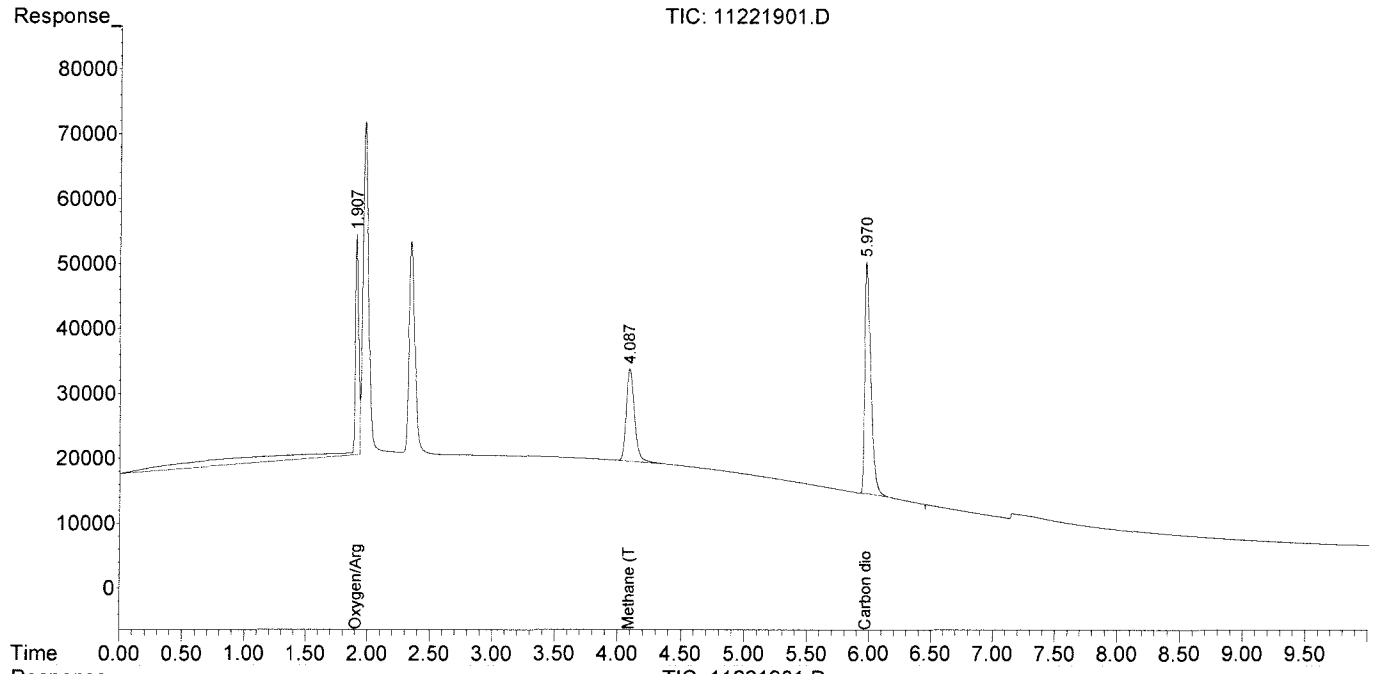
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.907f	1333782	0.280	ppm	
2)	Carbon monoxide	1.907f	1333782	N.D.	ppm	
3)	Methane (TCD)	4.088f	657984	69573.756	ppm	
4)	Carbon dioxide	5.970	1203097	5125.467	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
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	

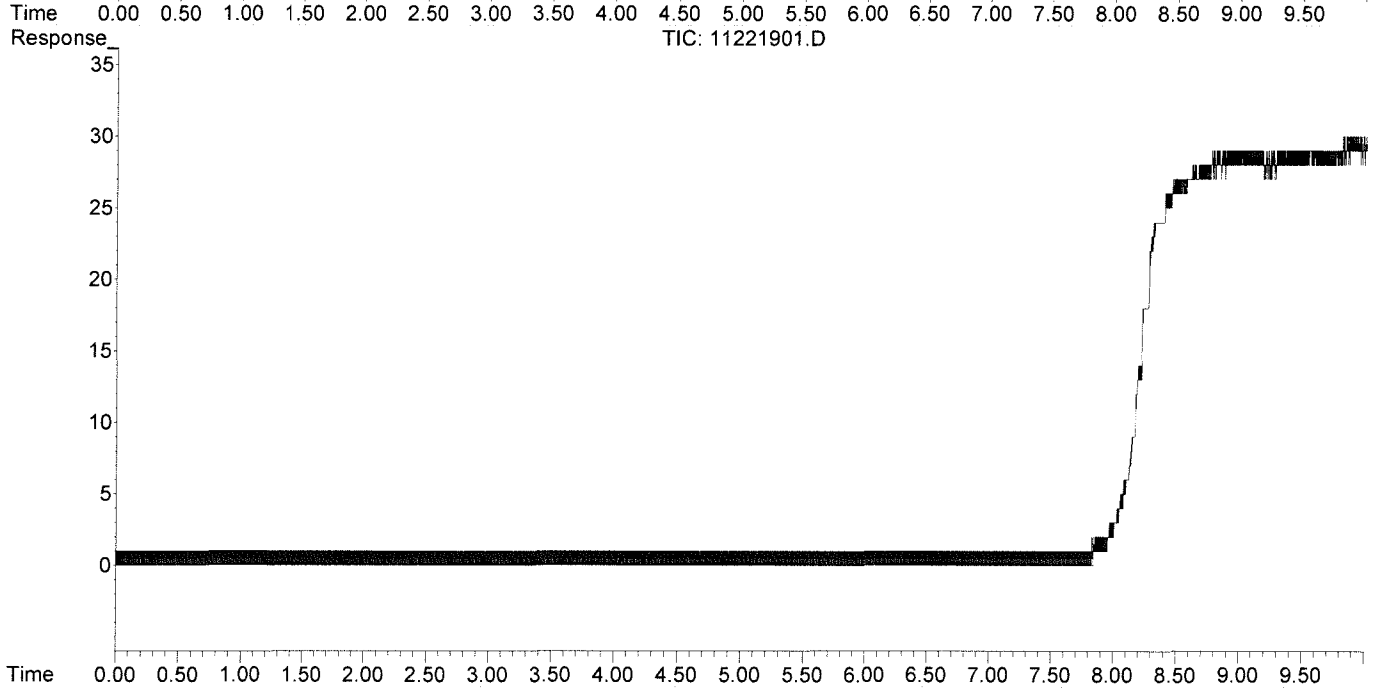
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :



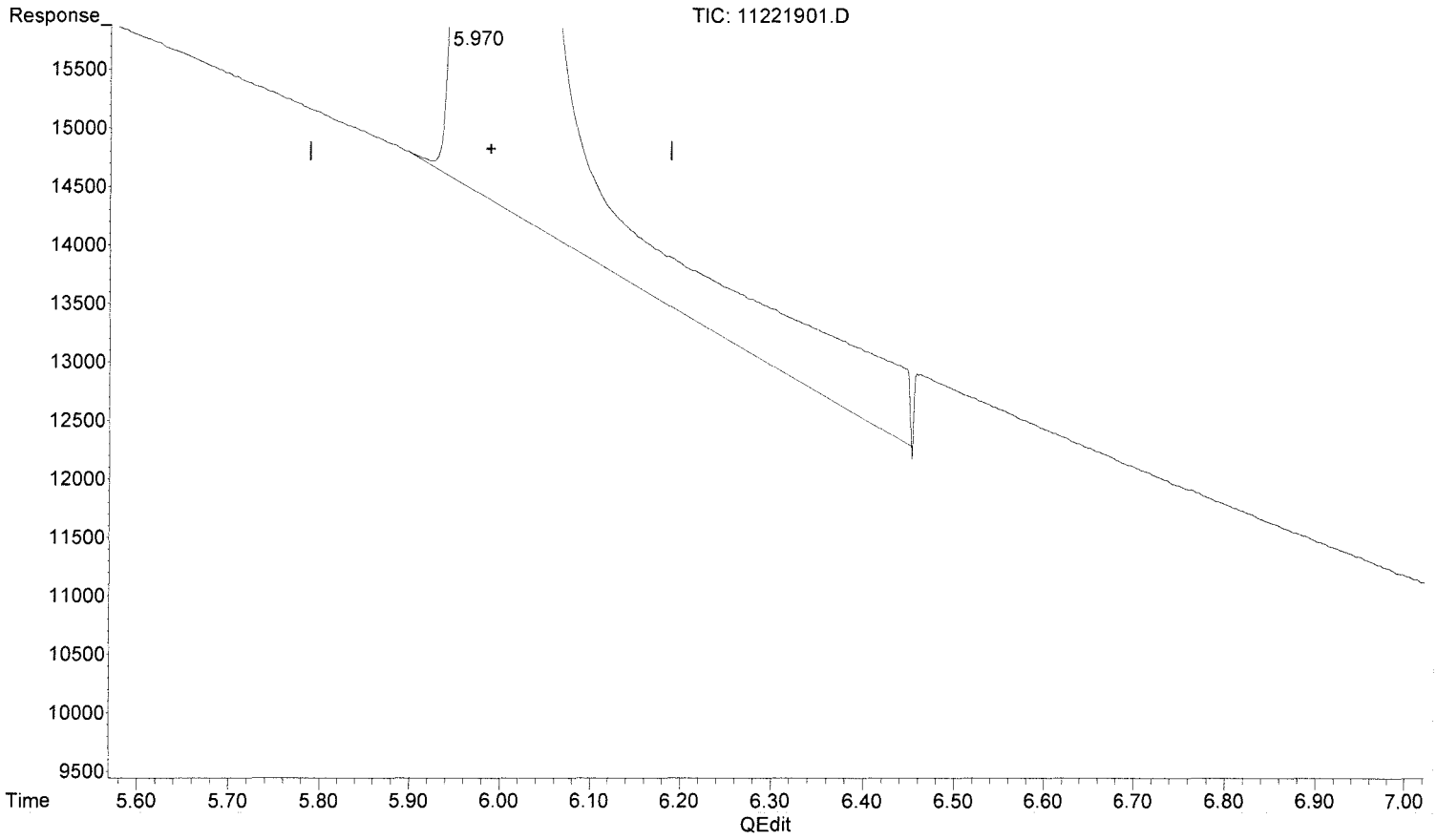


Quantitation Report (Qedit)

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

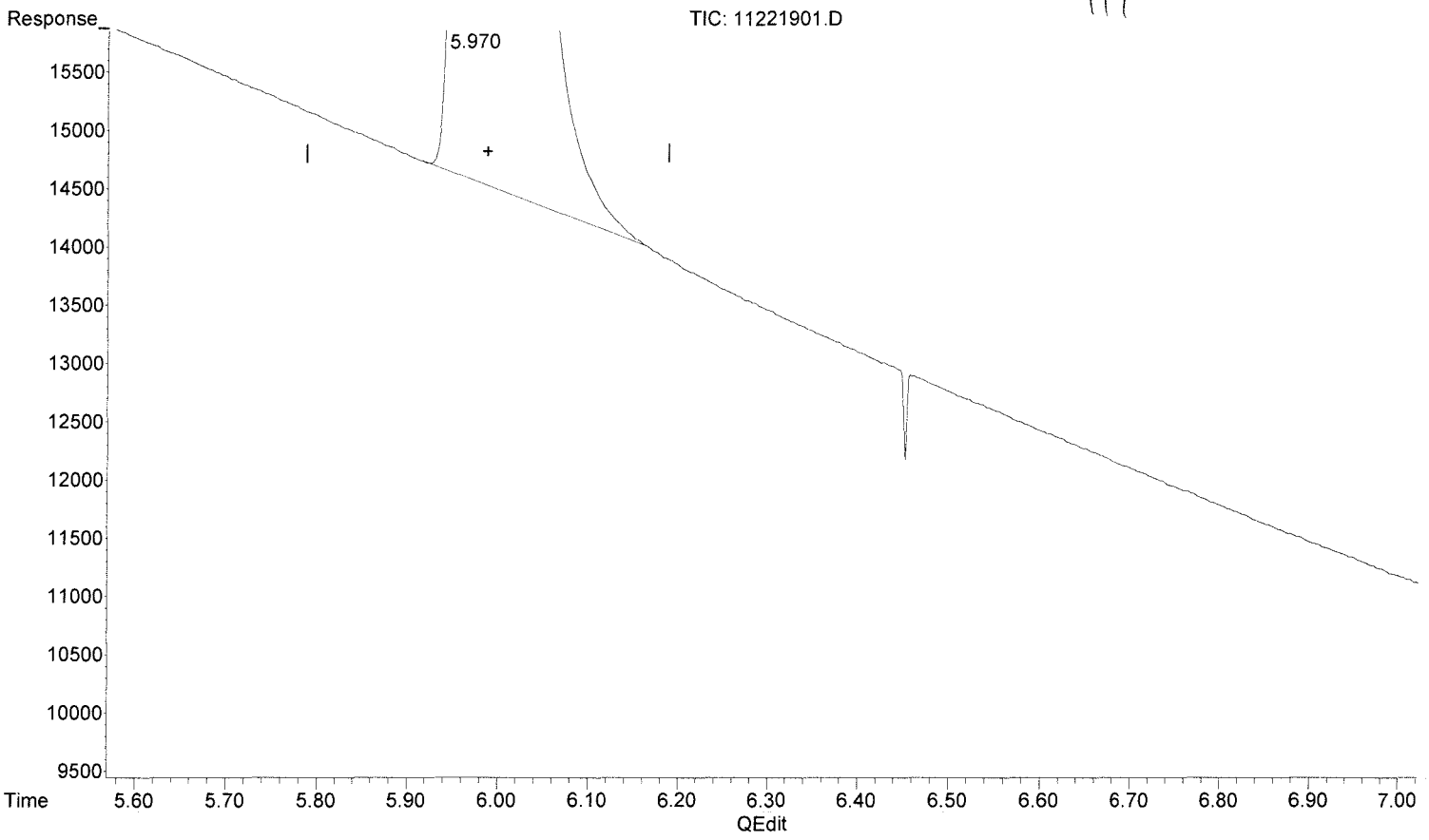
Quantitation Report (Qedit)

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
BLC
11/22

Volume Inj. :
Signal #1 Phase : Signal #2 Phase:
Signal #1 Info : Signal #2 Info :



(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 :

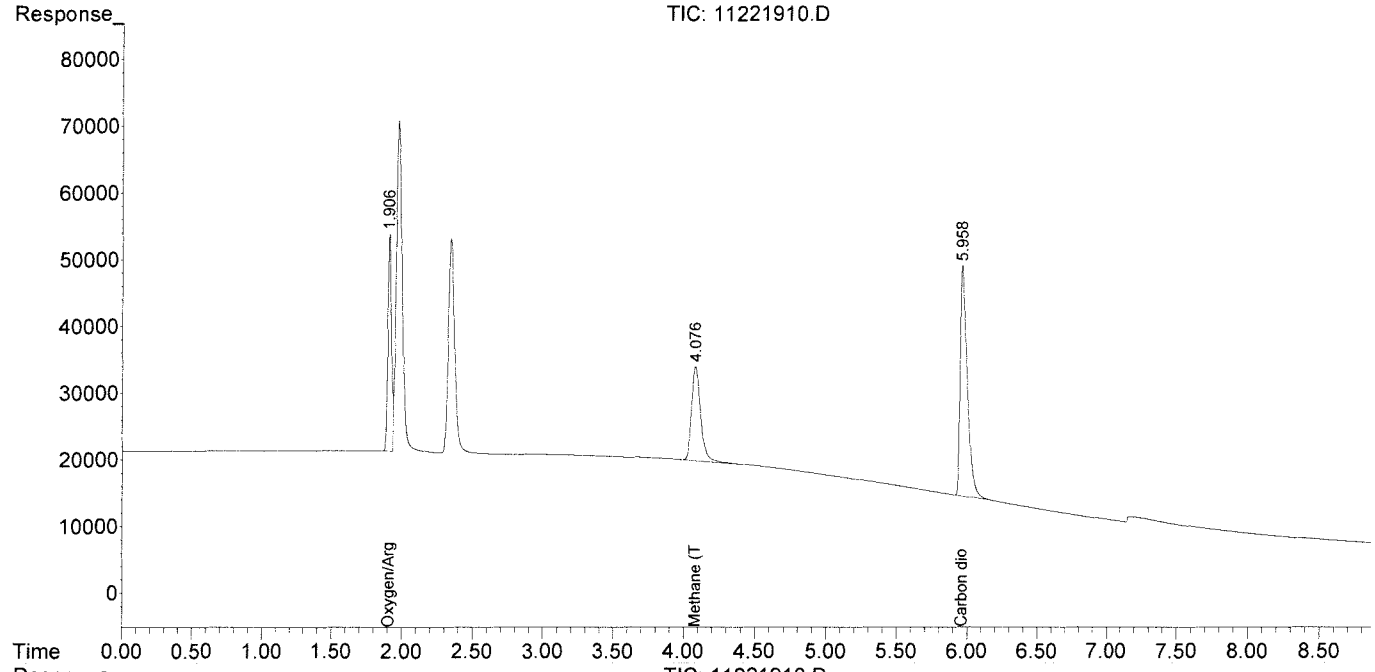
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.907f	567230	0.119	ppm	
2)	Carbon monoxide	1.907f	567230	N.D.	ppm	
3)	Methane (TCD)	4.077f	652521	68996.127	ppm	
4)	Carbon dioxide	5.958	1188740	5064.306	ppm	m
6)	Methane (FID)	0.000	0	N.D.	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	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	

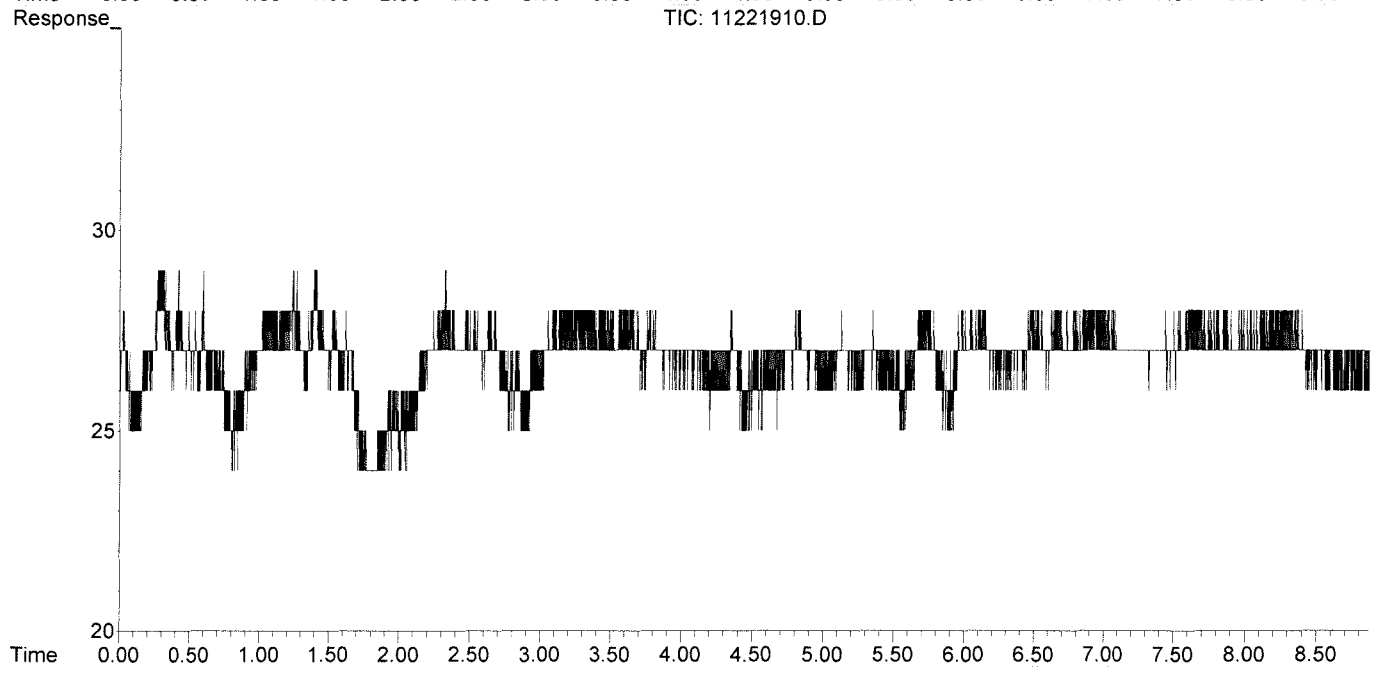
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :



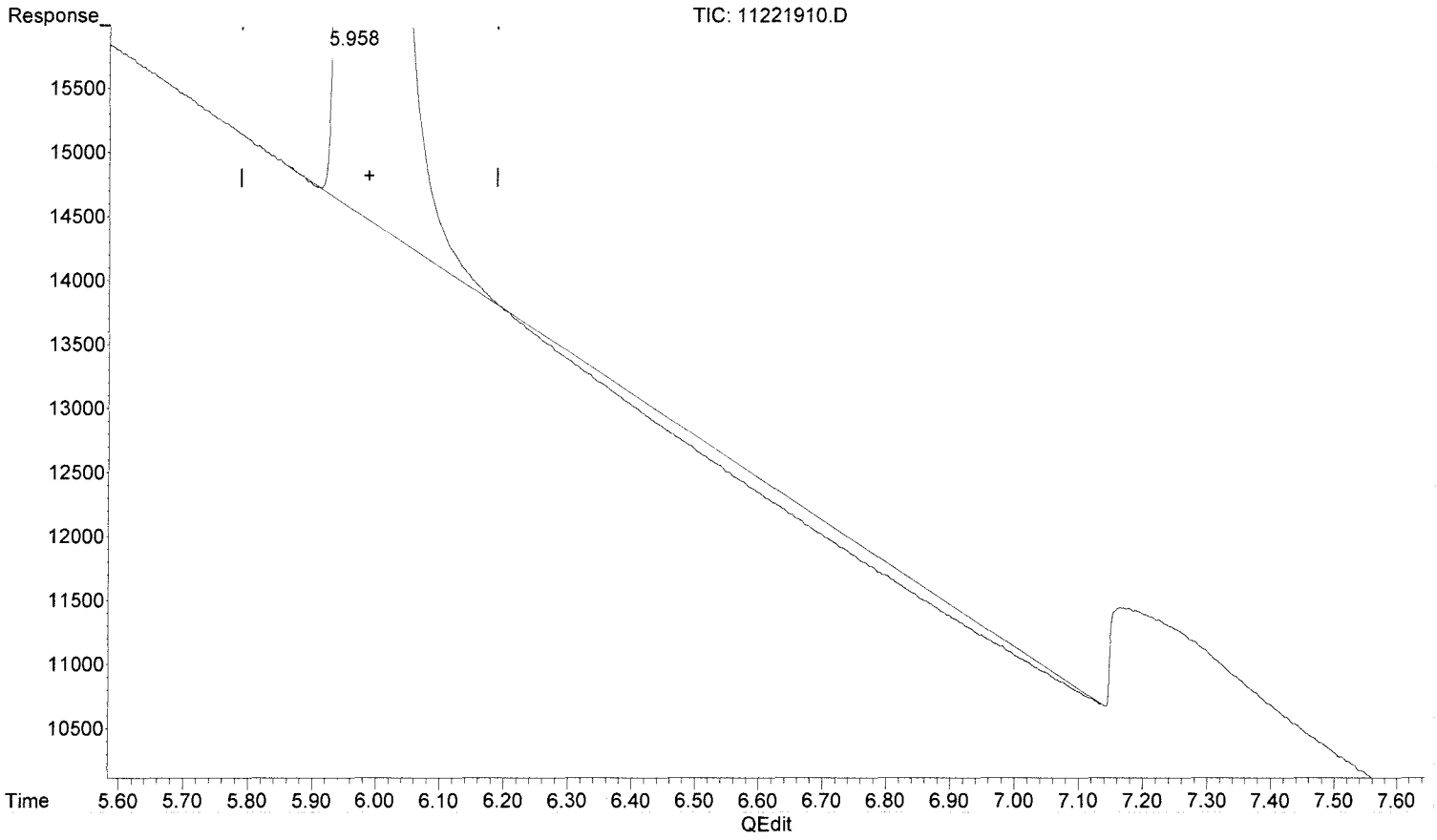


Quantitation Report (Qedit)

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

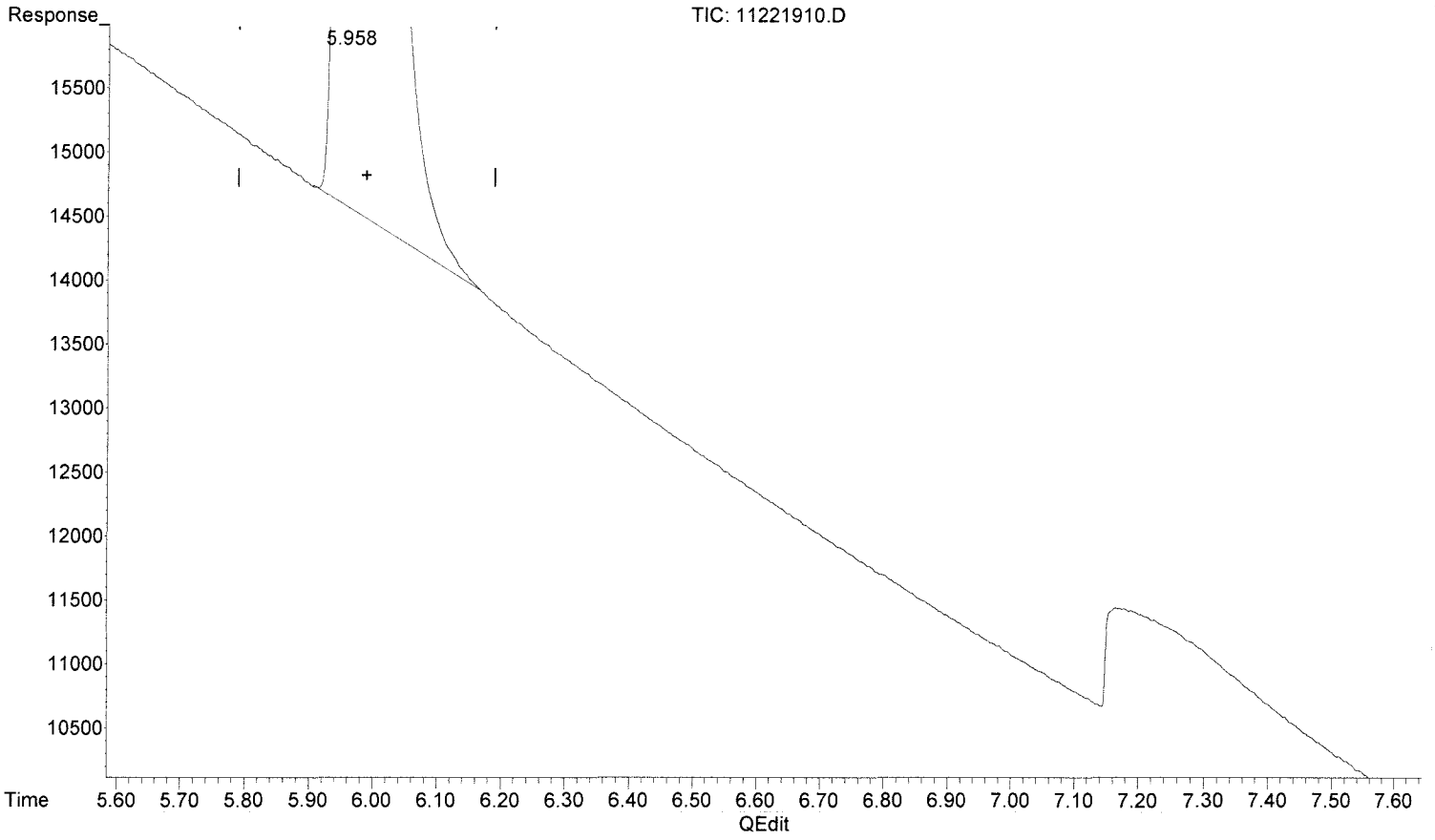
Quantitation Report (Qedit)

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 Page: 1

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 :

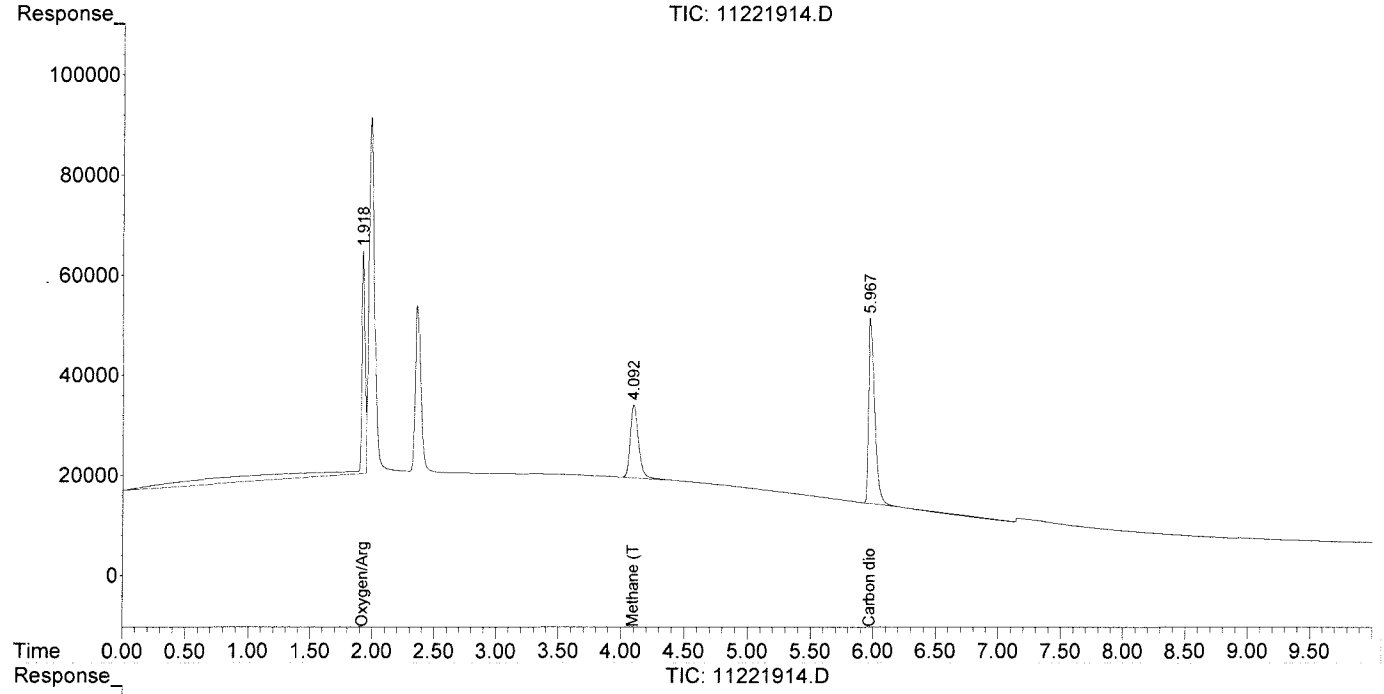
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.919f	1733540	0.364	ppm
2)	Carbon monoxide	1.919f	1733540	N.D.	ppm
3)	Methane (TCD)	4.093f	671120	70962.798	ppm
4)	Carbon dioxide	5.968	1199860	5111.680	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	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

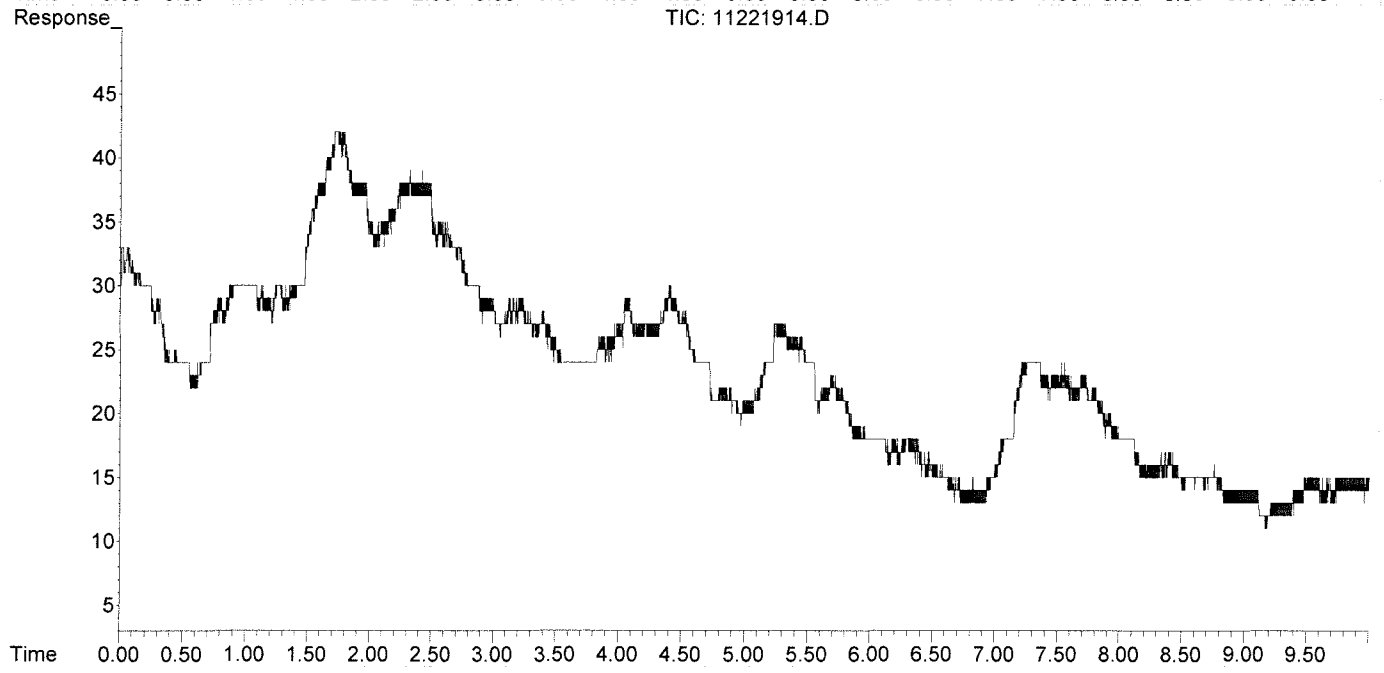
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

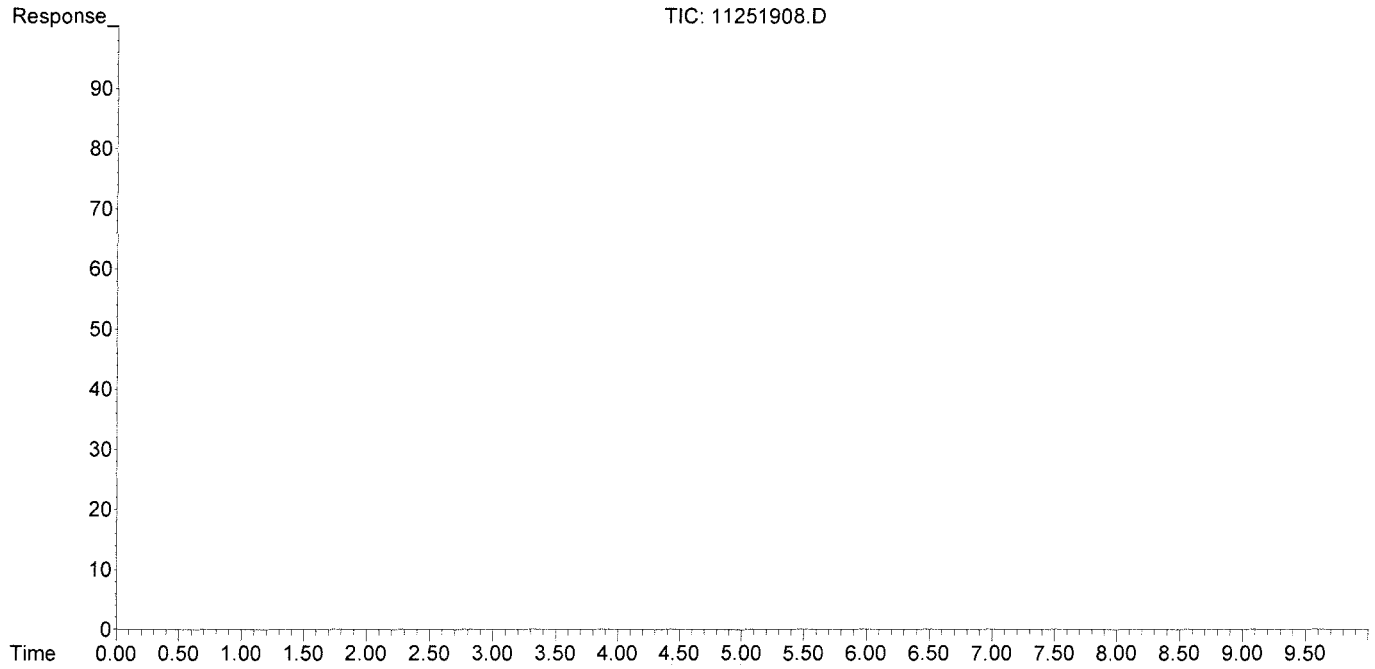
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.123	14169	1.562	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	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

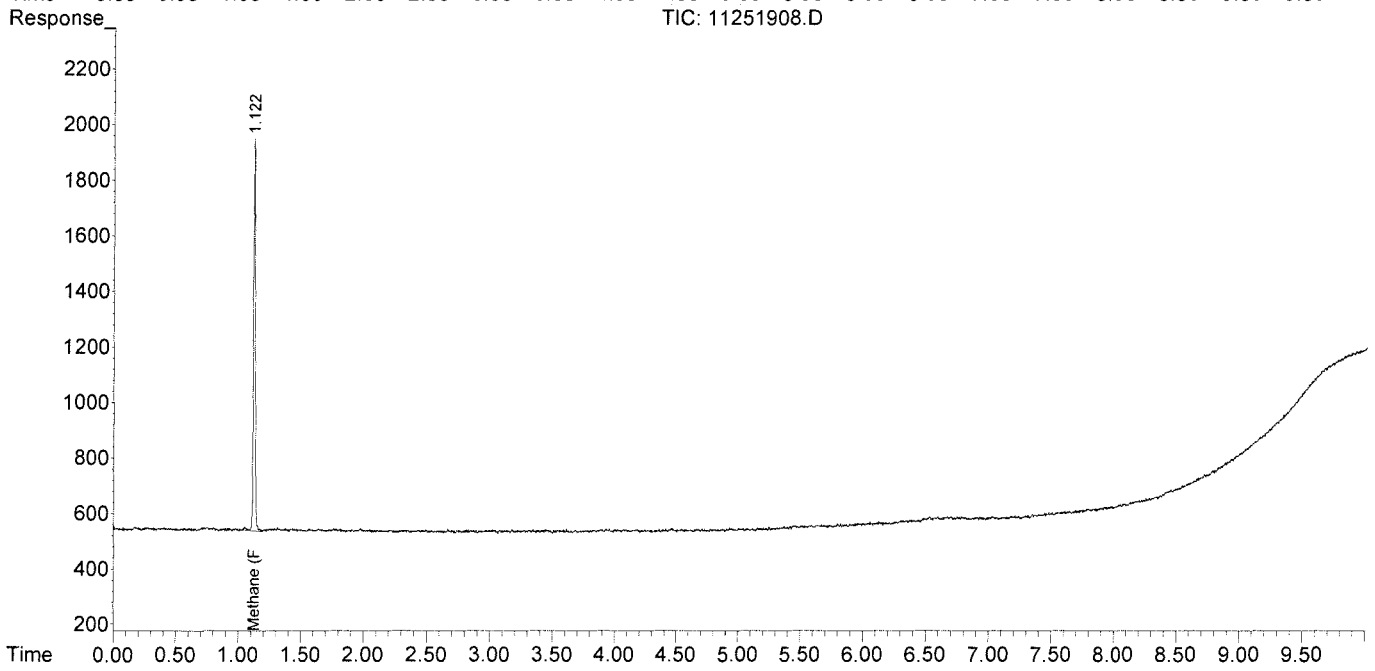
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

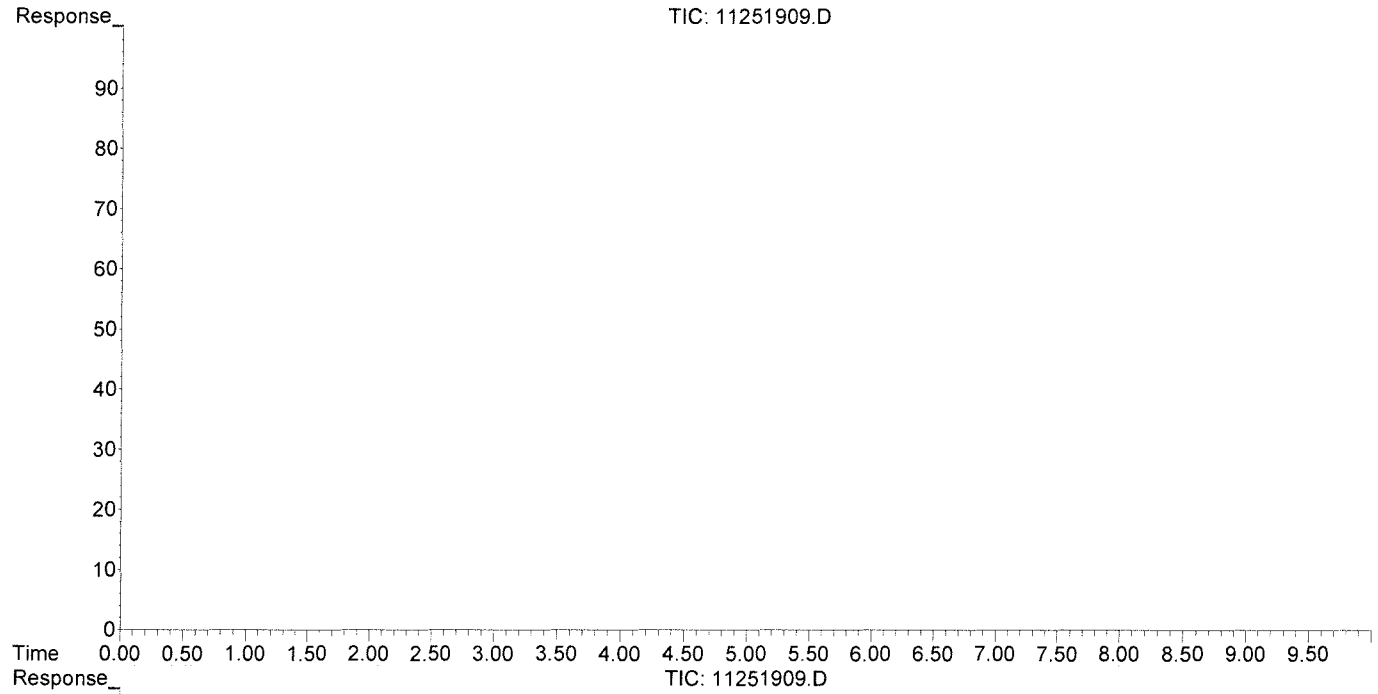
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.122	8793	0.969	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	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

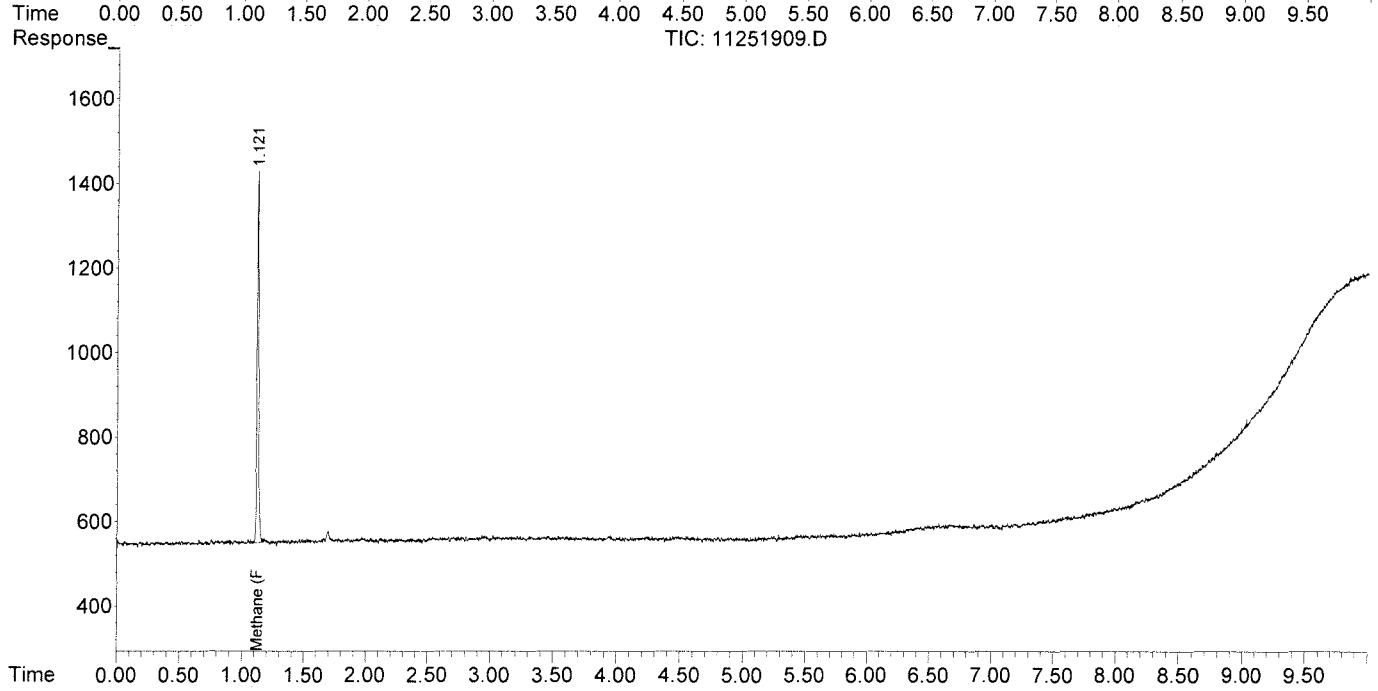
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

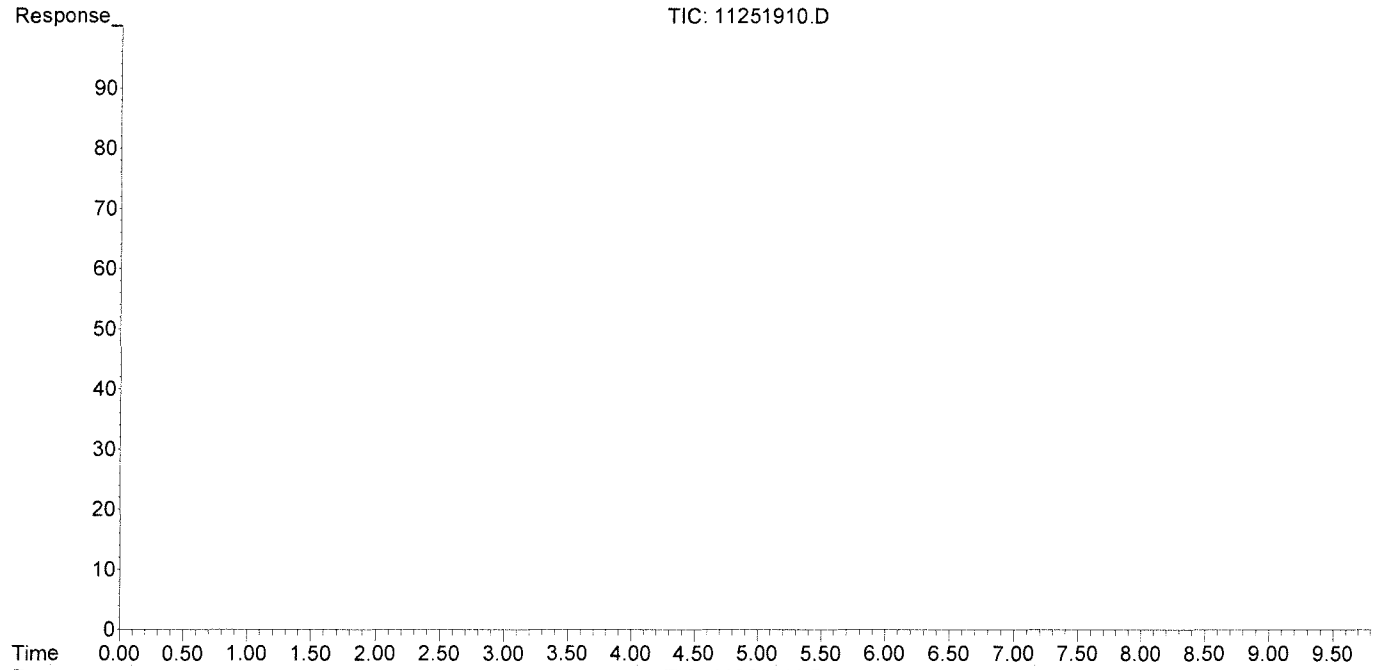
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.120	22318	2.460	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	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

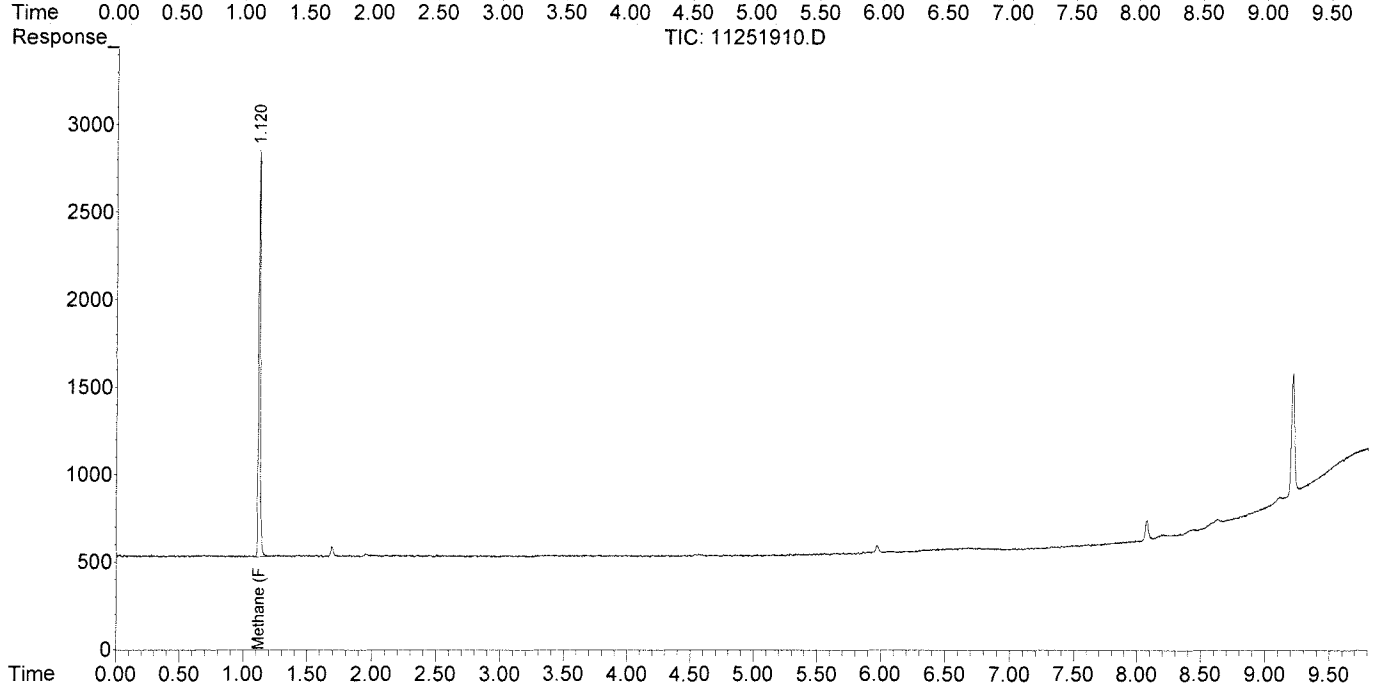
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

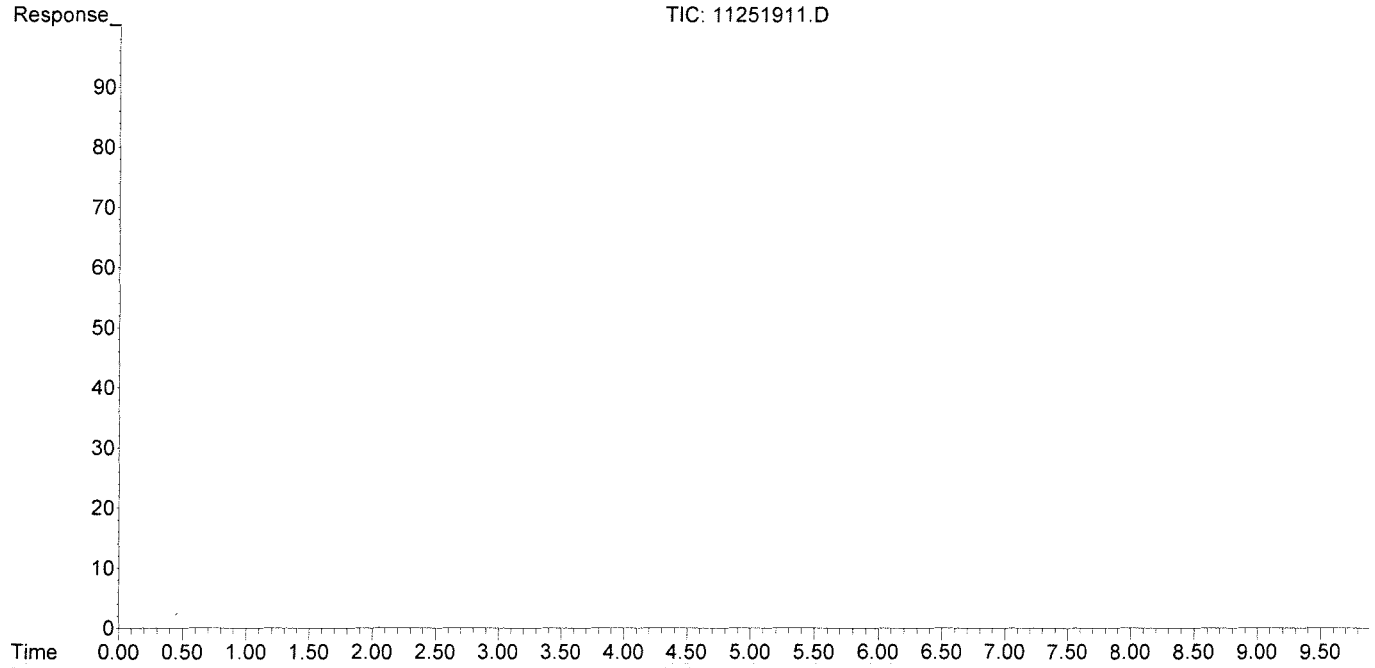
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	0.000	0	N.D.	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	4.431	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

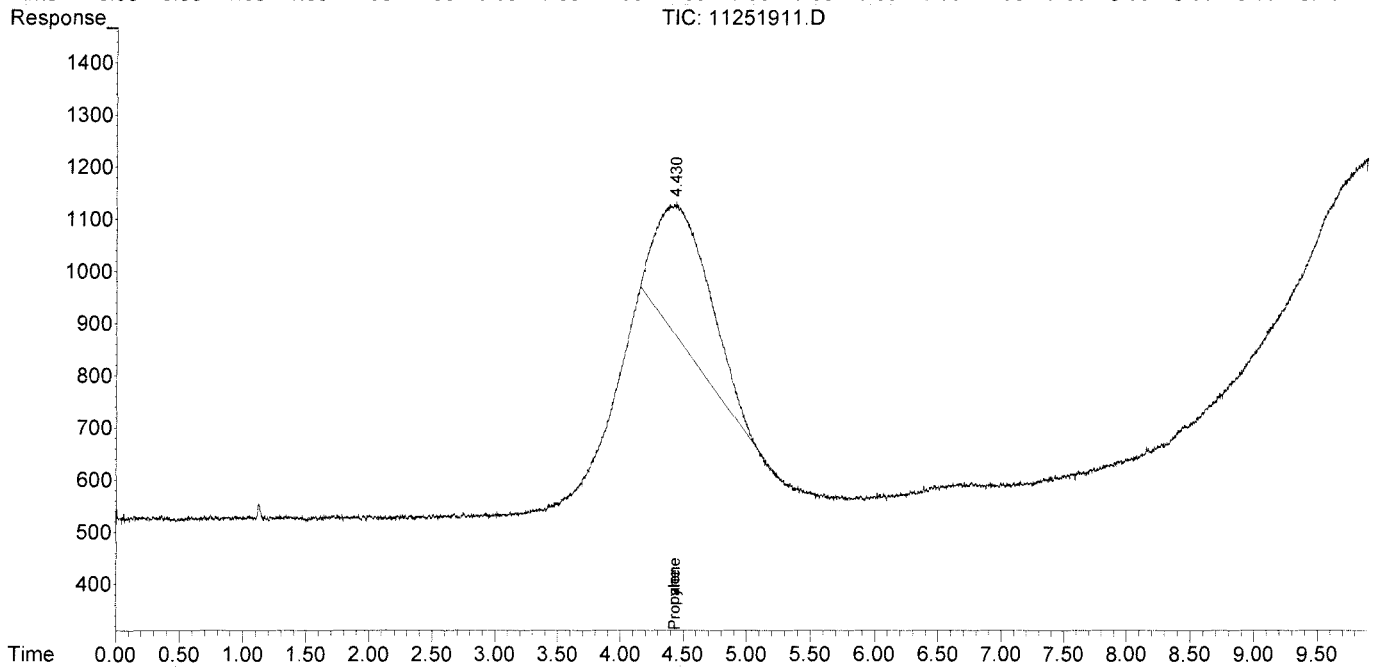
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

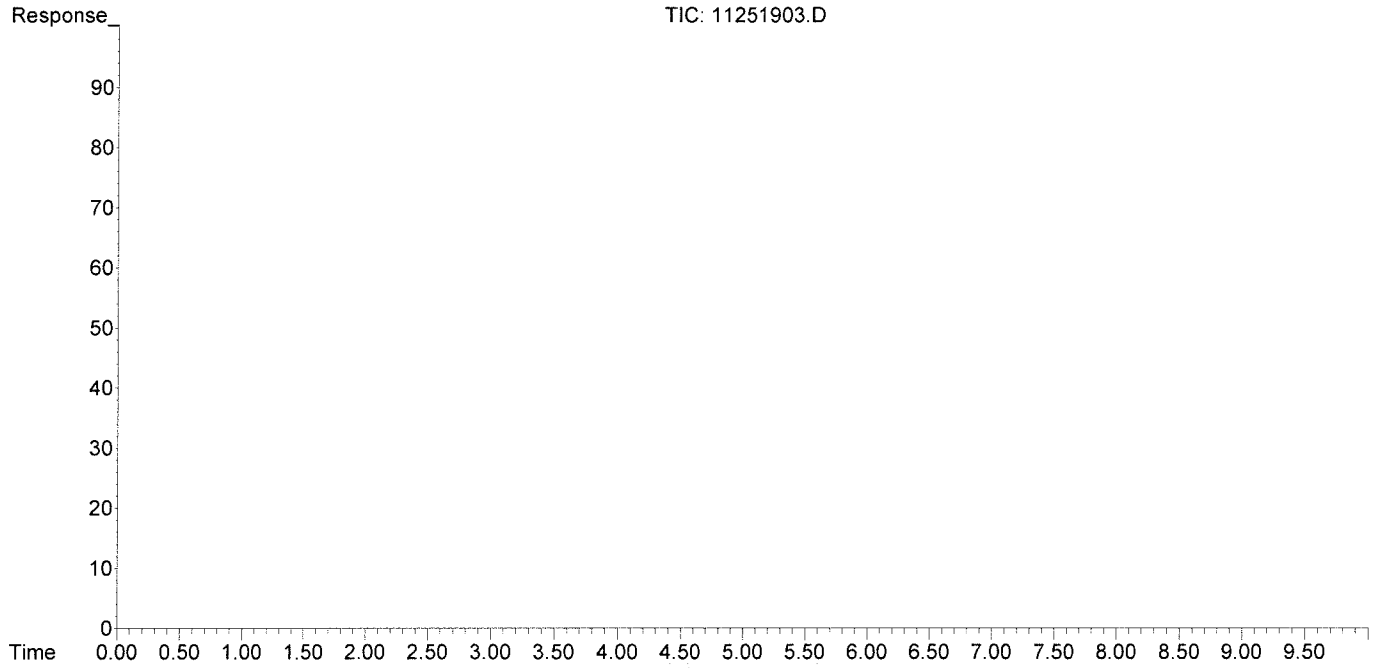
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.120	1262	0.139	ppm
7)	Ethylene	0.000	0	N.D.	ppm
8)	Ethane	0.000	0	N.D.	ppm
9)	Propylene	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

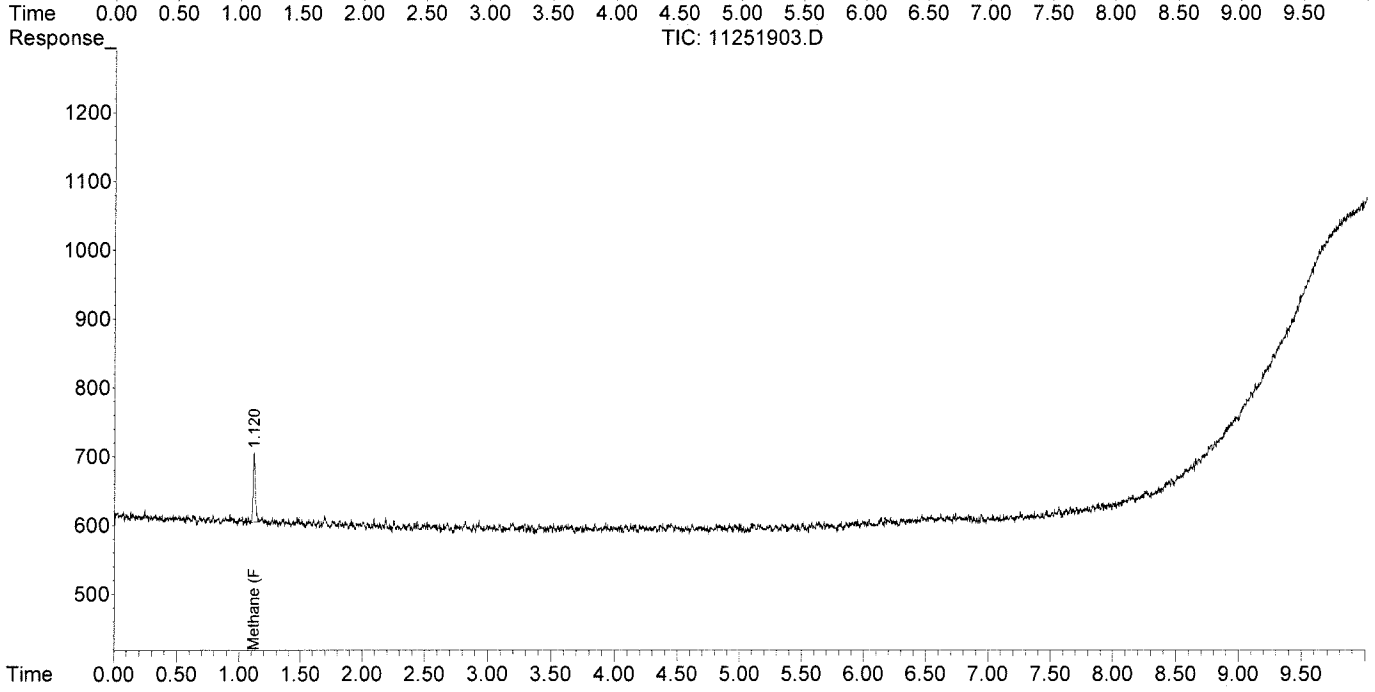
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

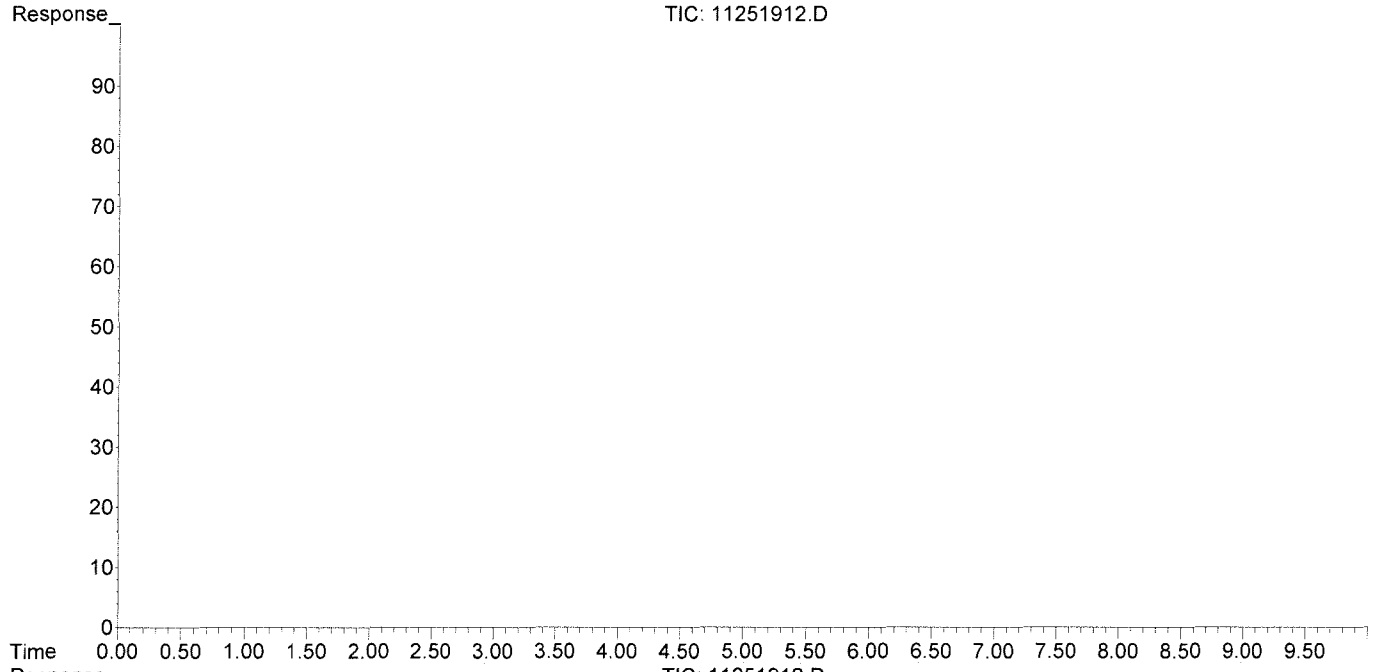
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.122	11325	1.249	ppm
7)	Ethylene	1.693	15254	0.912	ppm
8)	Ethane	1.960	19061	1.125	ppm
9)	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

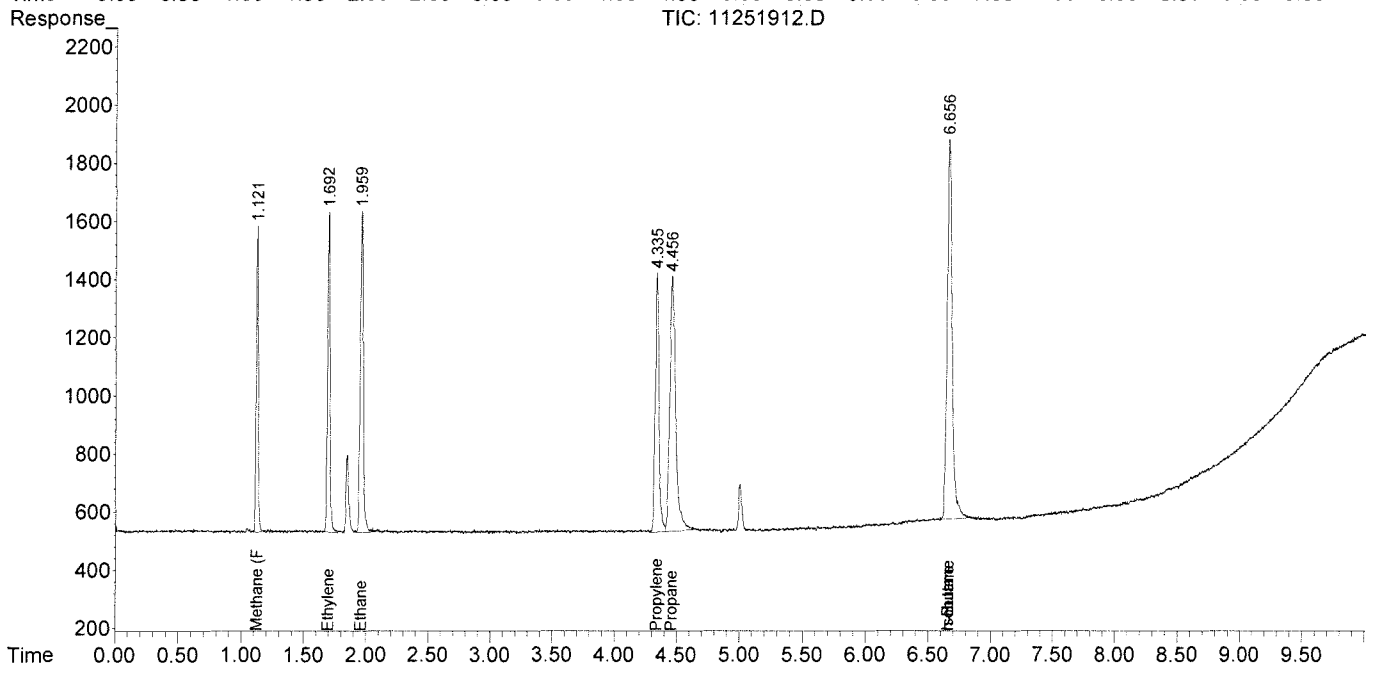
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :





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 :

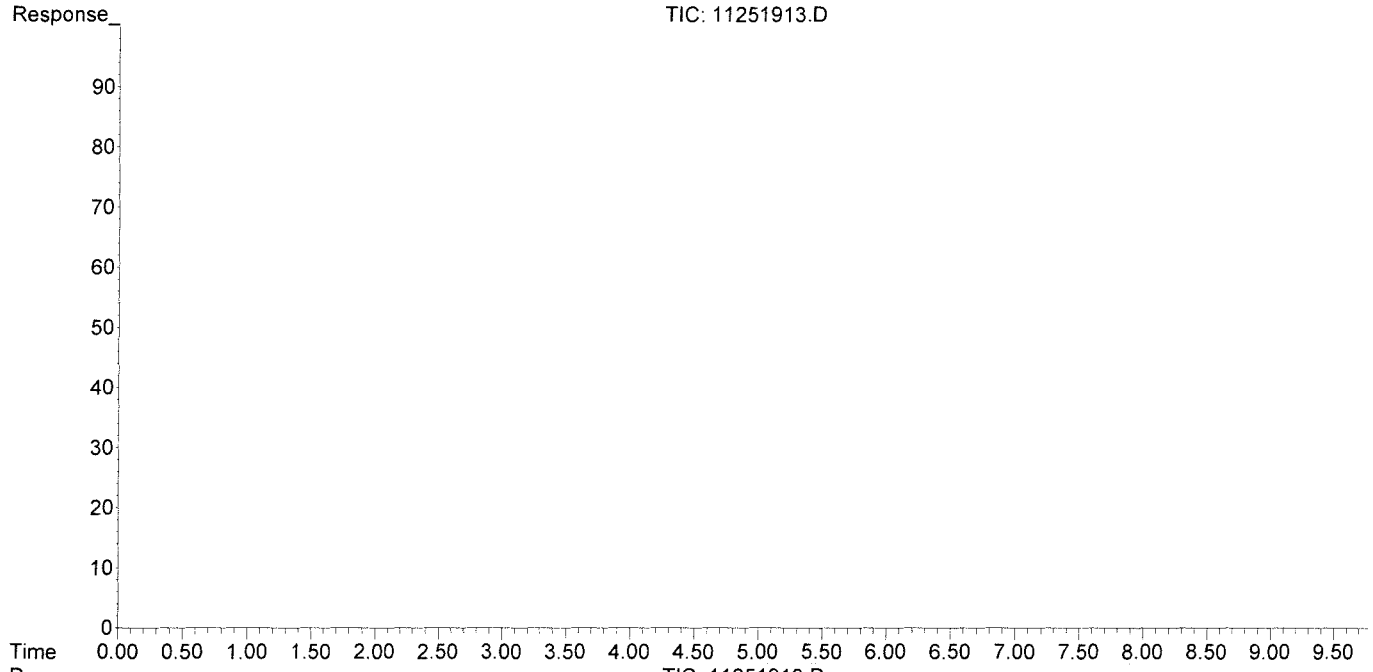
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.122	11178	1.232	ppm
7)	Ethylene	1.694	15965	0.954	ppm
8)	Ethane	1.962	19742	1.165	ppm
9)	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

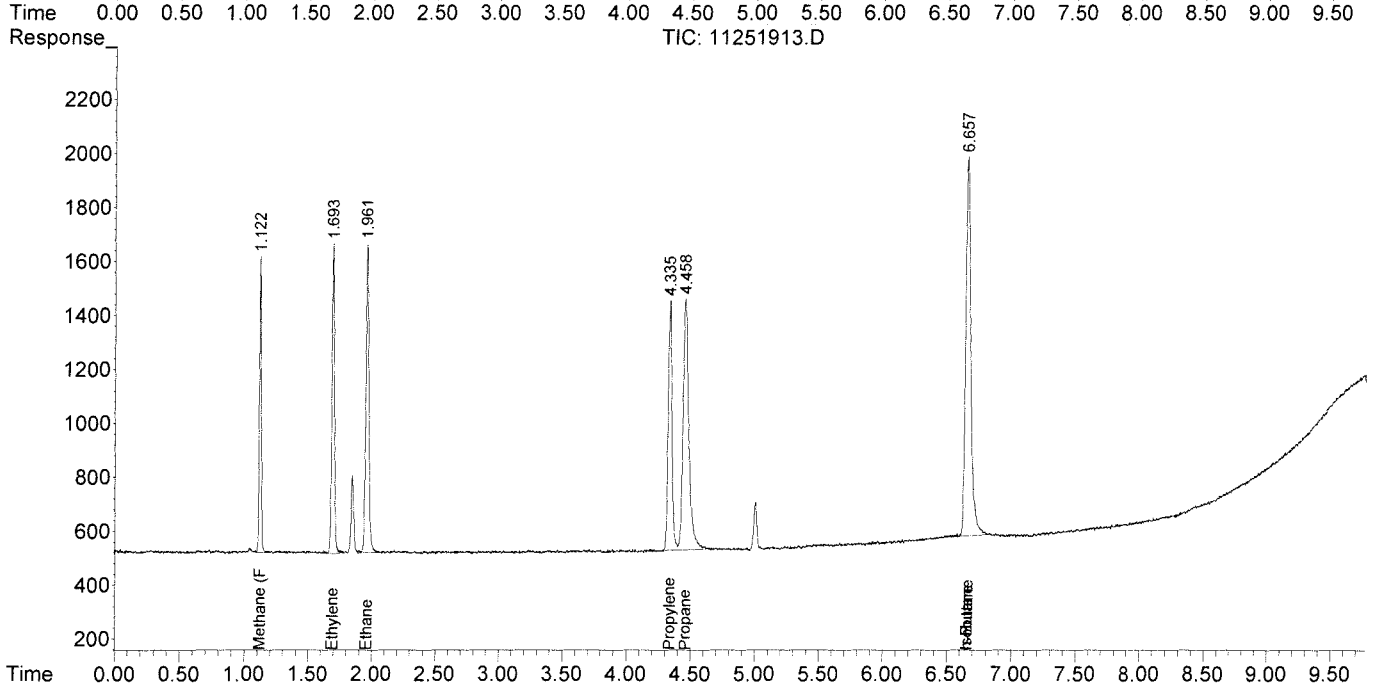
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

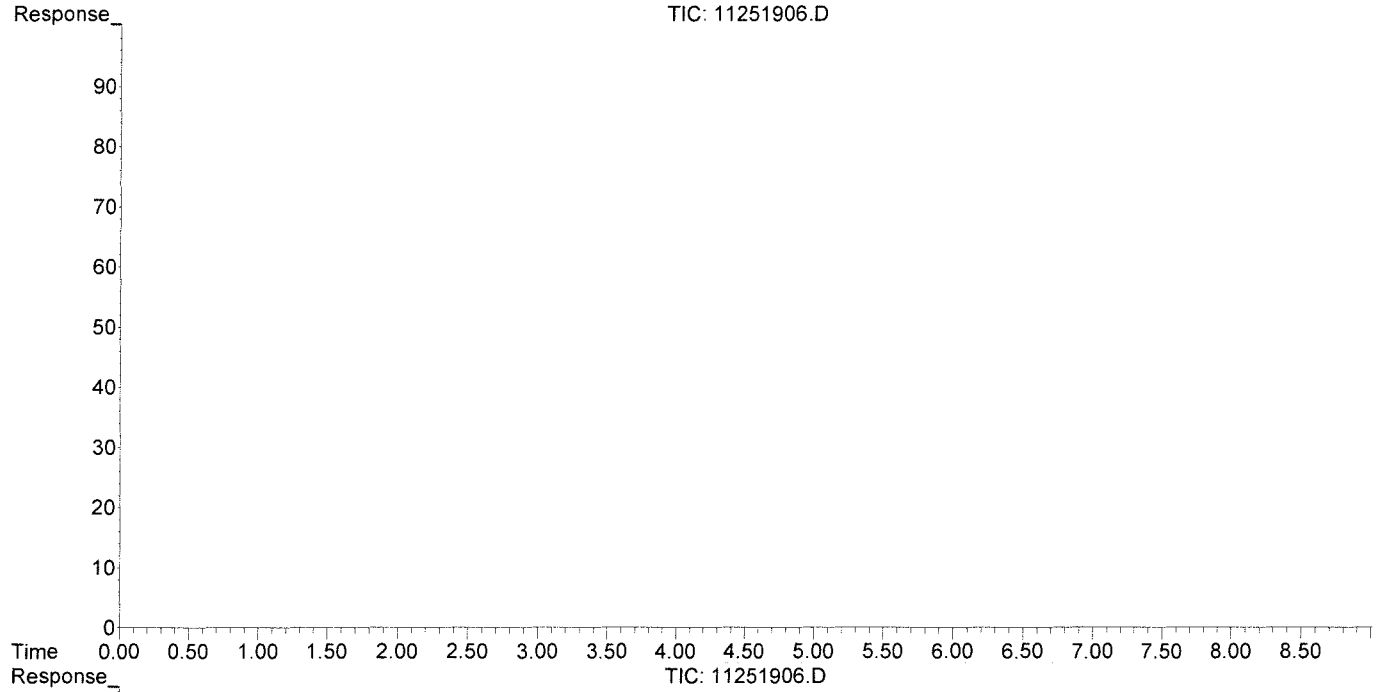
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.118	13110	1.445	ppm
7)	Ethylene	1.691	16736	1.000	ppm
8)	Ethane	1.958	20791	1.227	ppm
9)	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

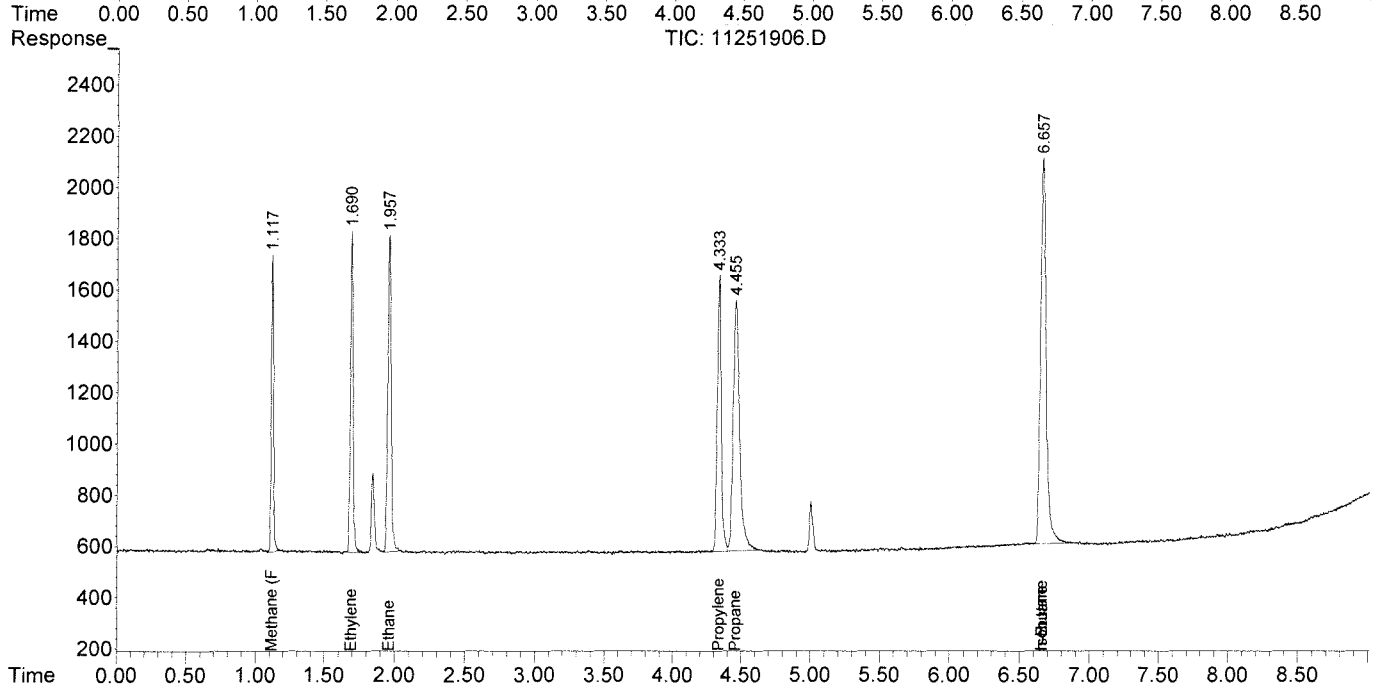
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

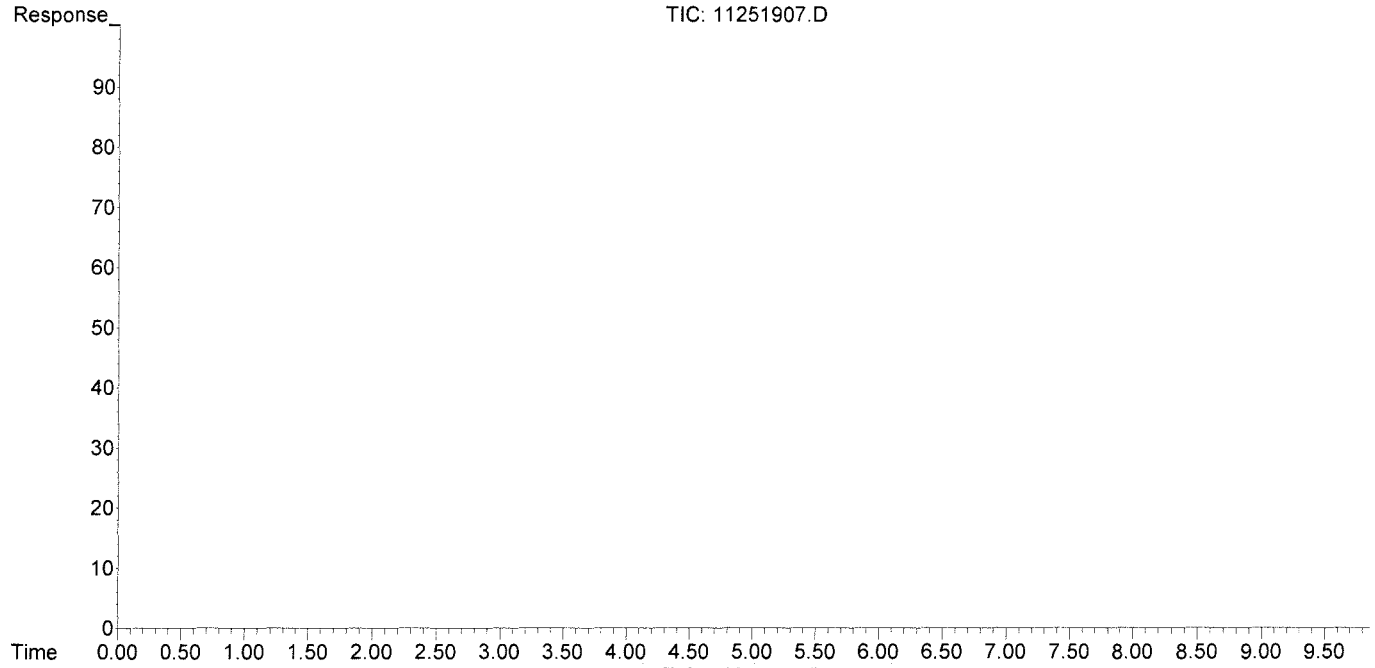
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.125	13333	1.470	ppm
7)	Ethylene	1.699	16844	1.007	ppm
8)	Ethane	1.966	20783	1.226	ppm
9)	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

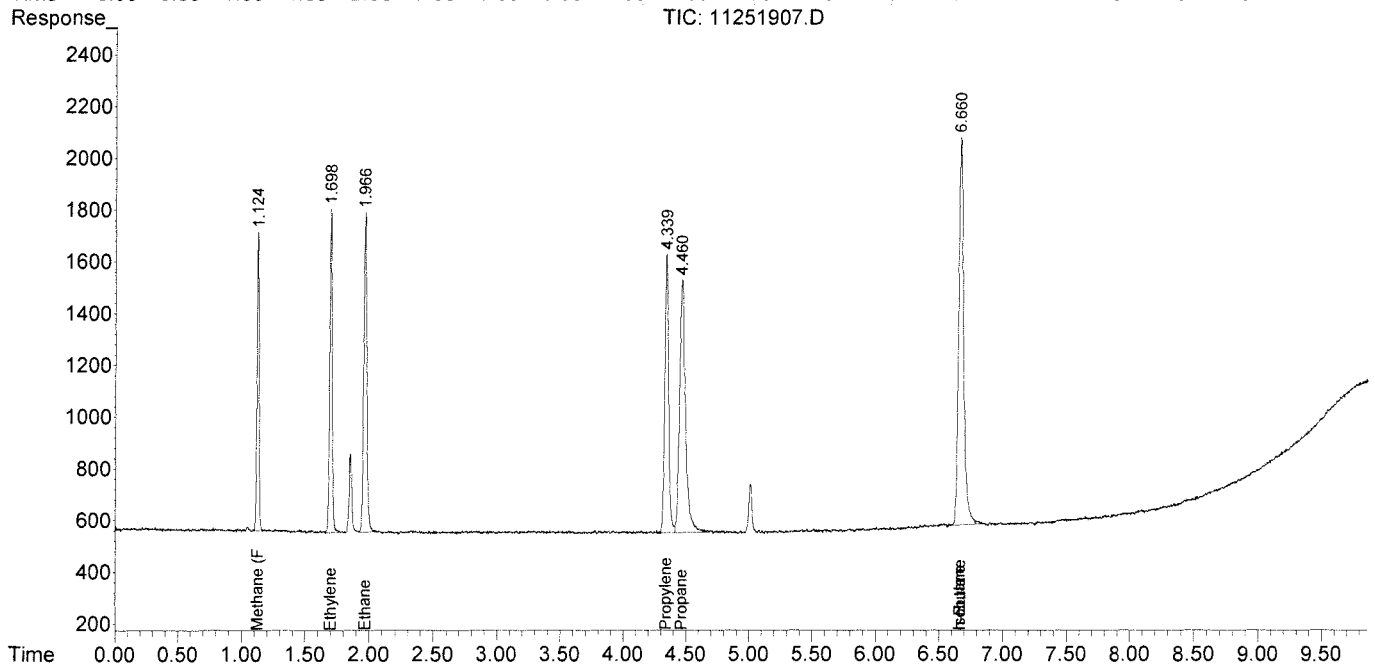
(f)=RT Delta > 1/2 Window (m)=manual int.

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)

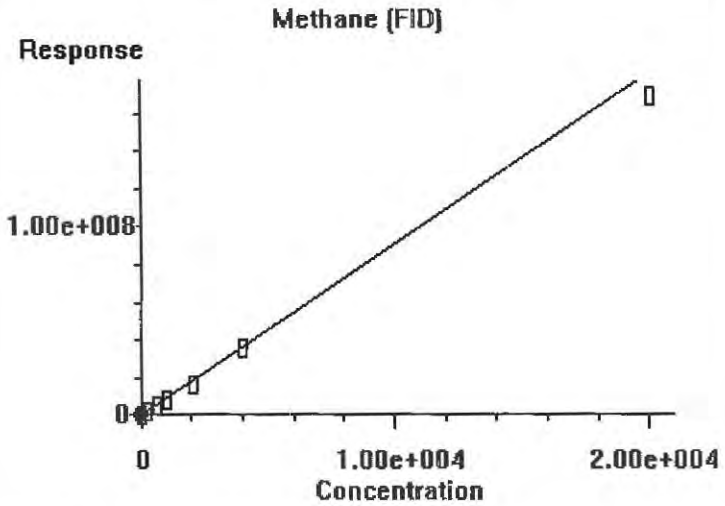
Search by: Ret Time | Name | Index | Find Compound

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



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

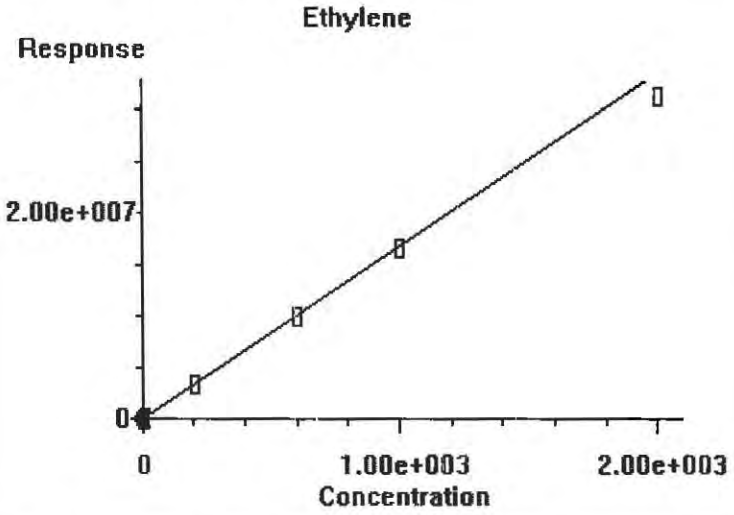
Search by: Ret Time | Name | Index | Find Compound

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

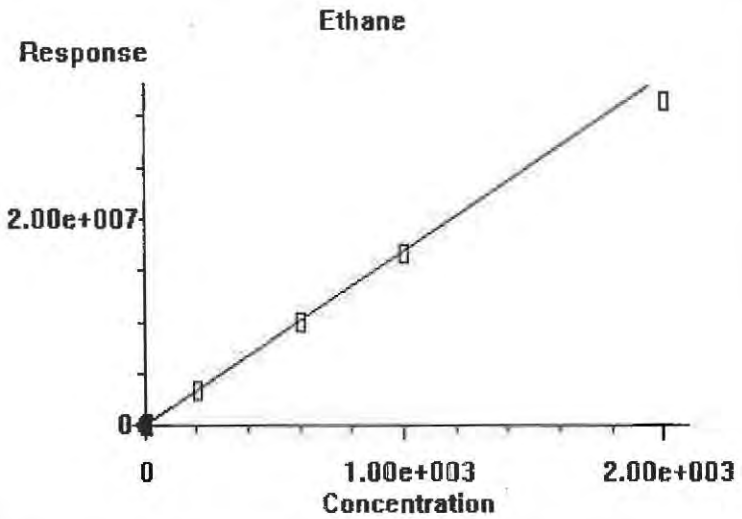
Search by: Ret Time | Name | Index — Find Compound

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	



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

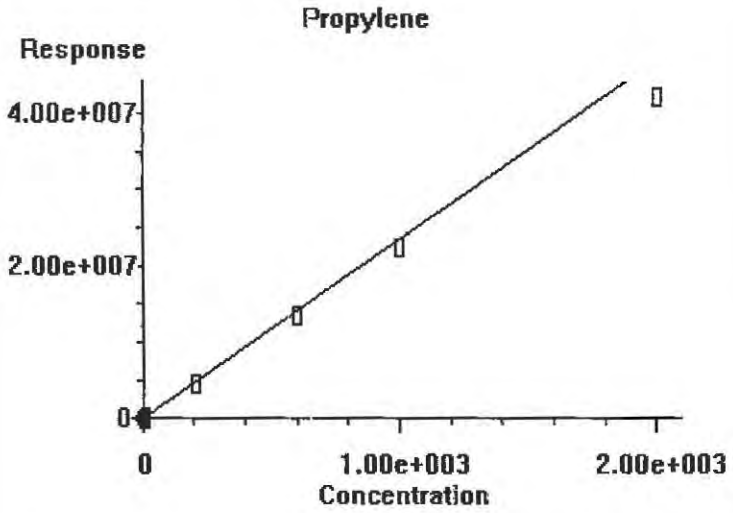
Search by: Ret Time | Name | Index | Find Compound

- 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

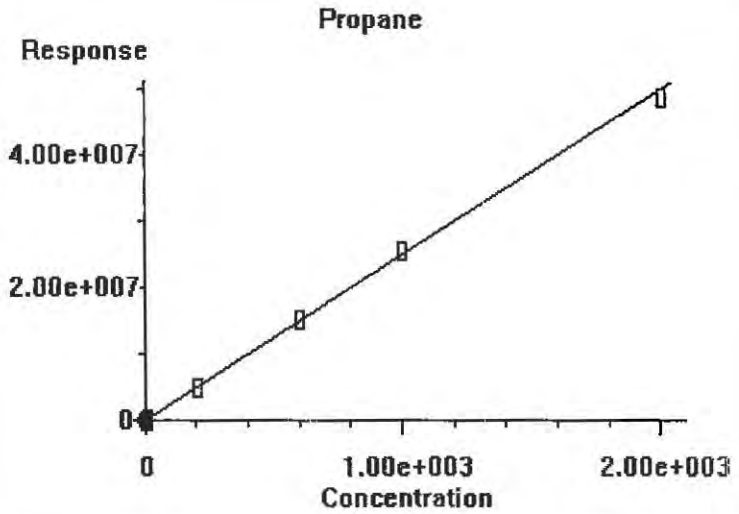
Search by ◉ Ret Time ○ Name ○ Index | Find Compound

- 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	

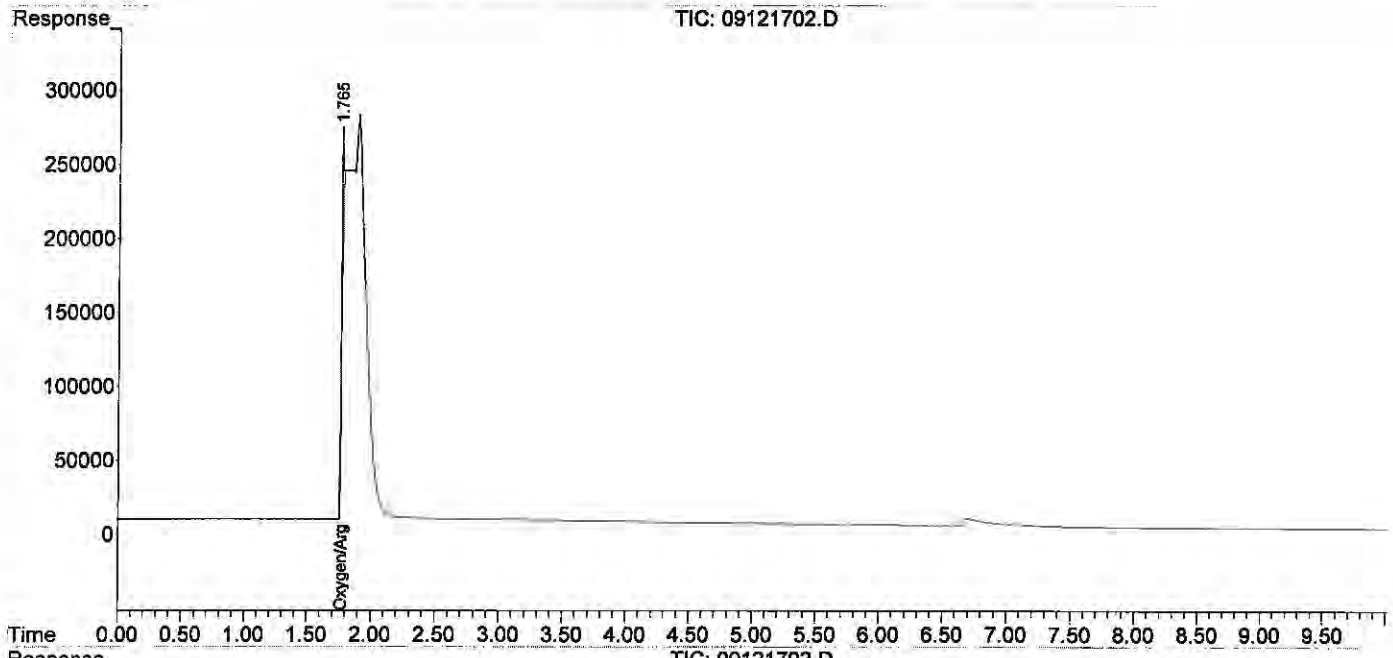
(f)=RT Delta > 1/2 Window (m)=manual int.

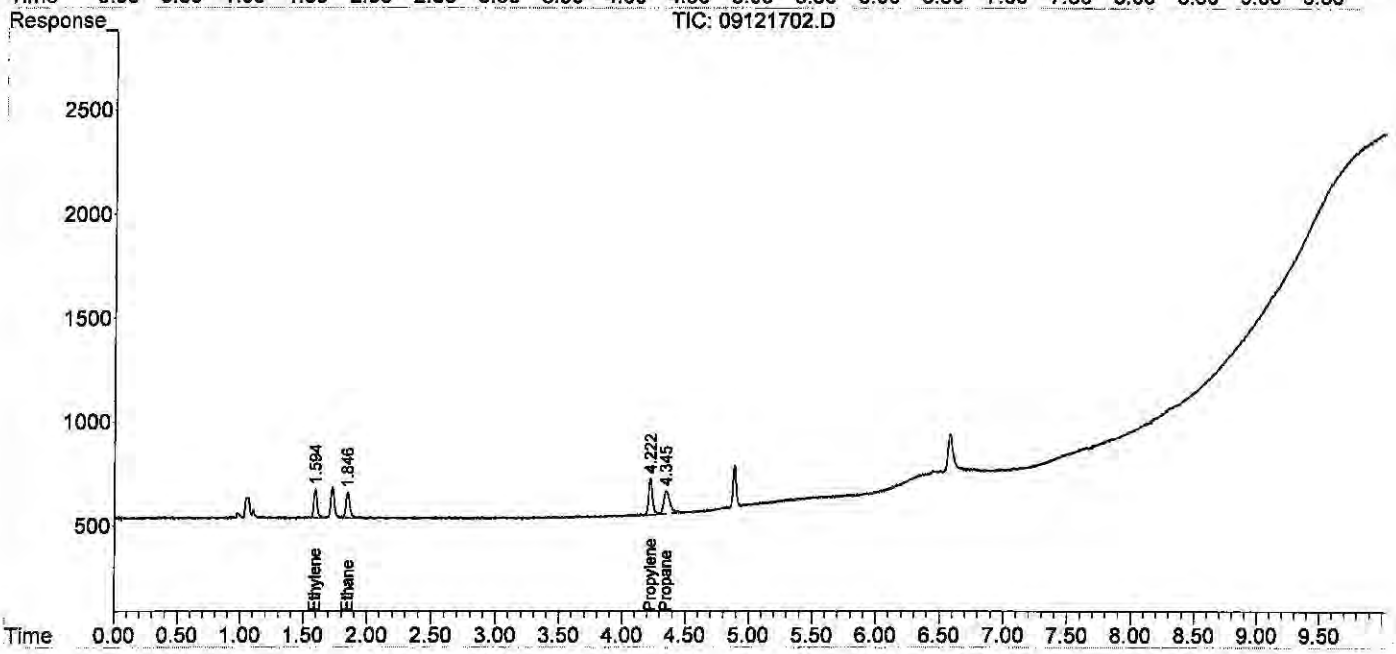
9/13/17

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 #1 Info :
Signal #2 Phase:
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	

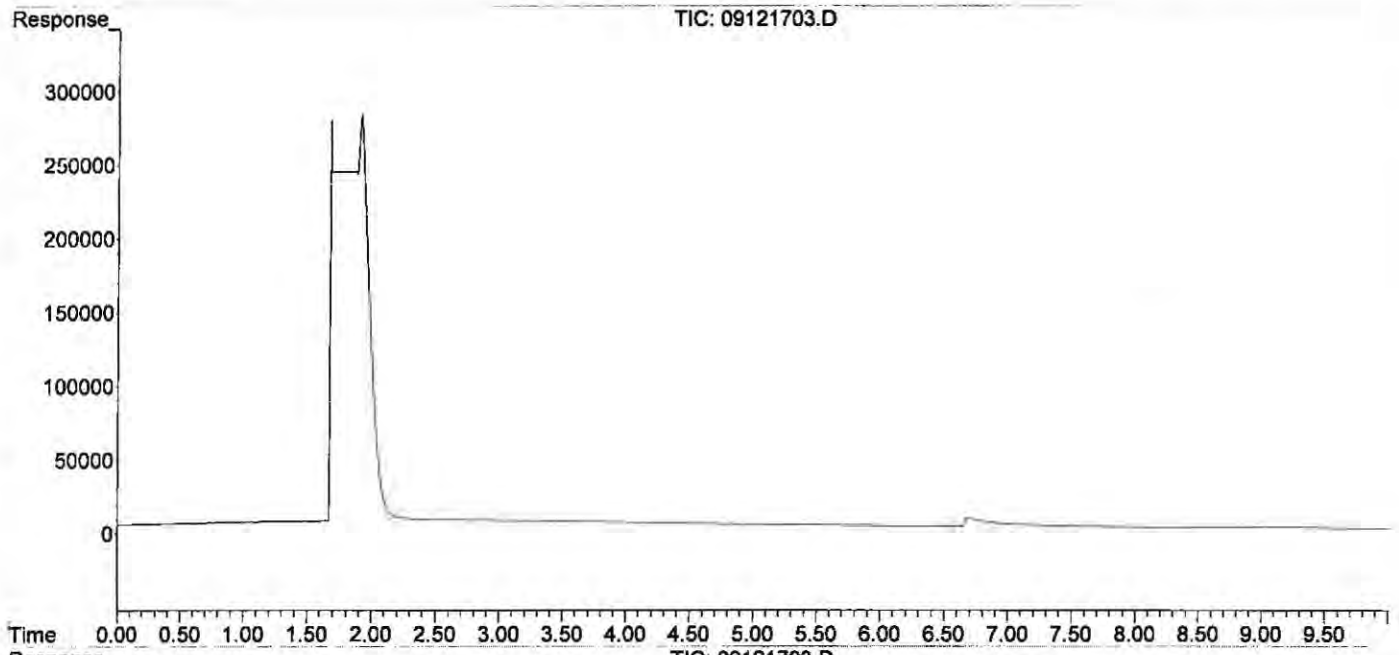
(f)=RT Delta > 1/2 Window (m)=manual int.

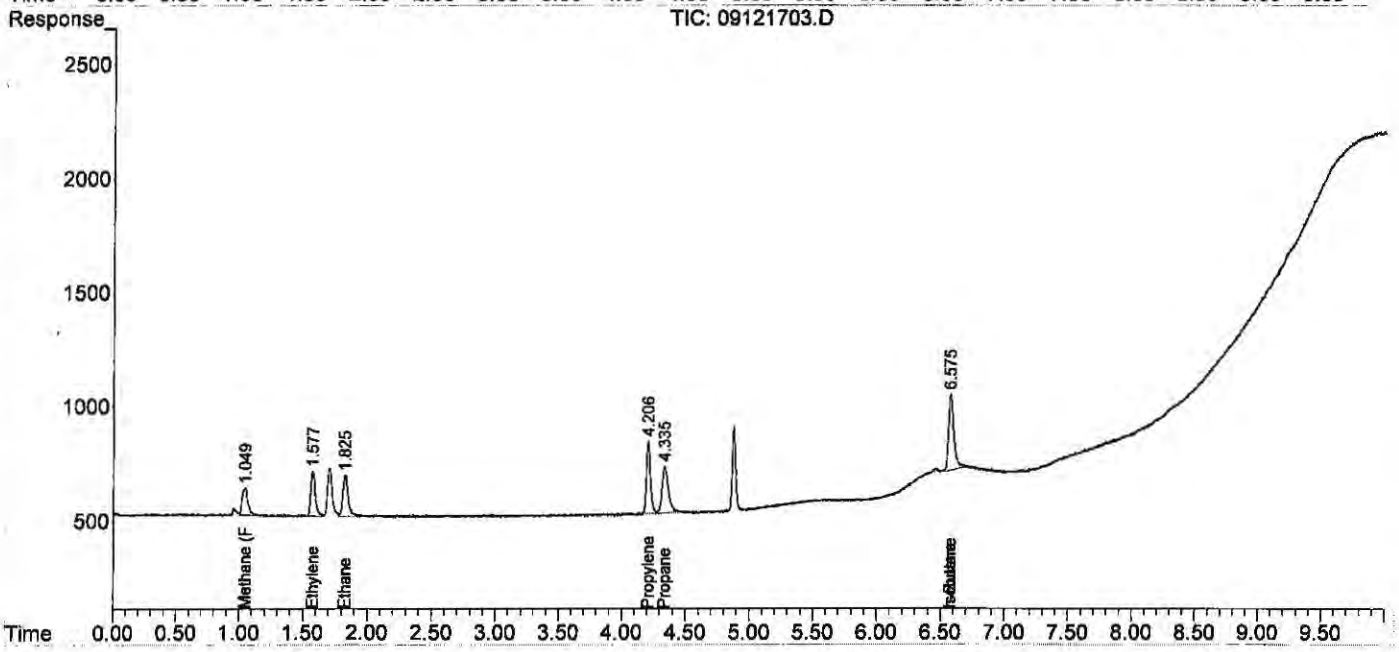
Quantitation Report (QT Reviewed)

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 :



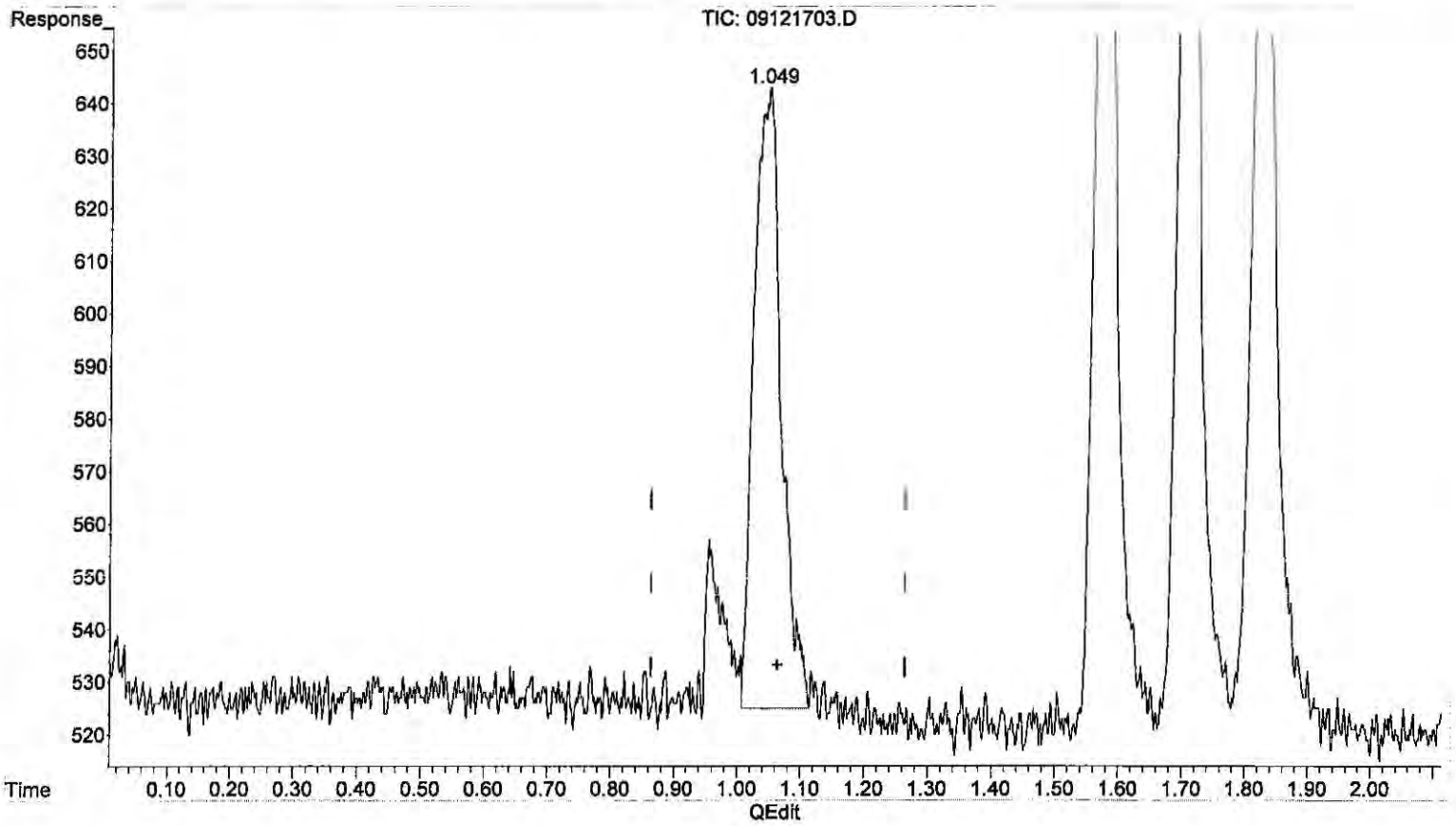


Quantitation Report (Qedit)

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 #2 Phase:
Signal #1 Info : 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 :

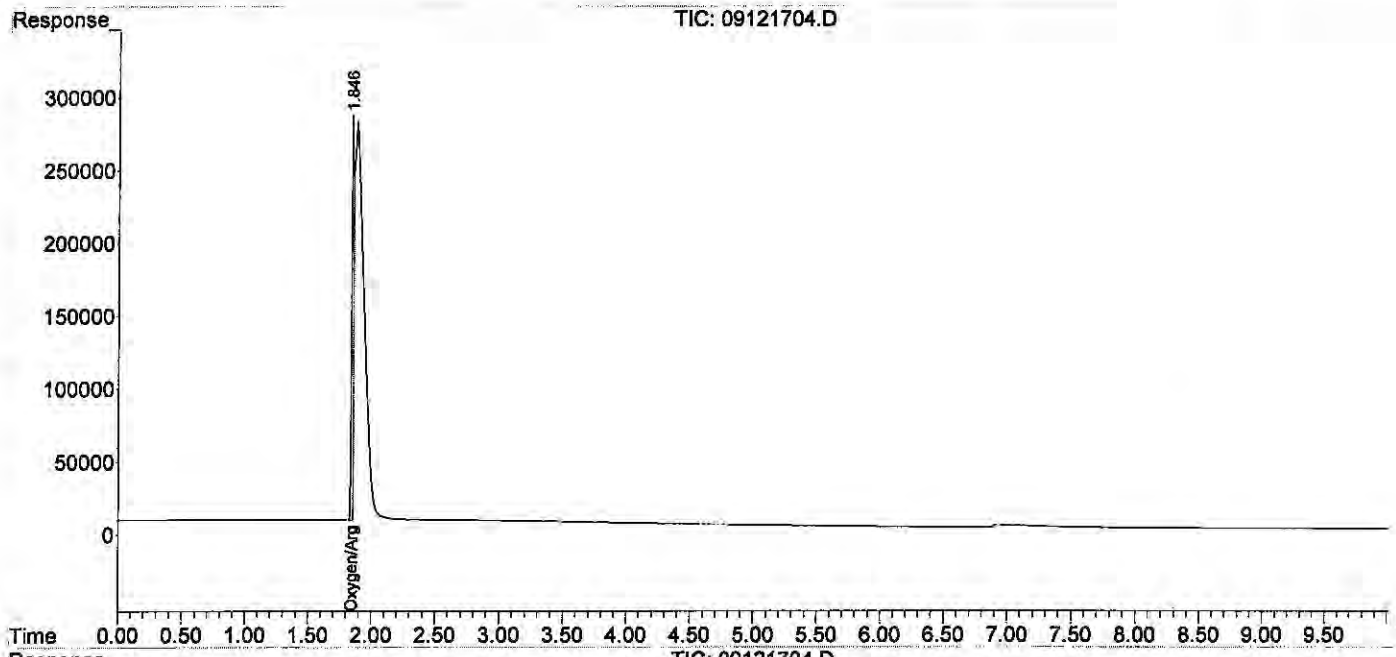
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.847	2536230	1.056	ppm
2)	Carbon monoxide	1.847	2536230	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.064	14725	1.613	ppm
7)	Ethylene	1.598	26885	1.582	ppm
8)	Ethane	1.851	26944	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

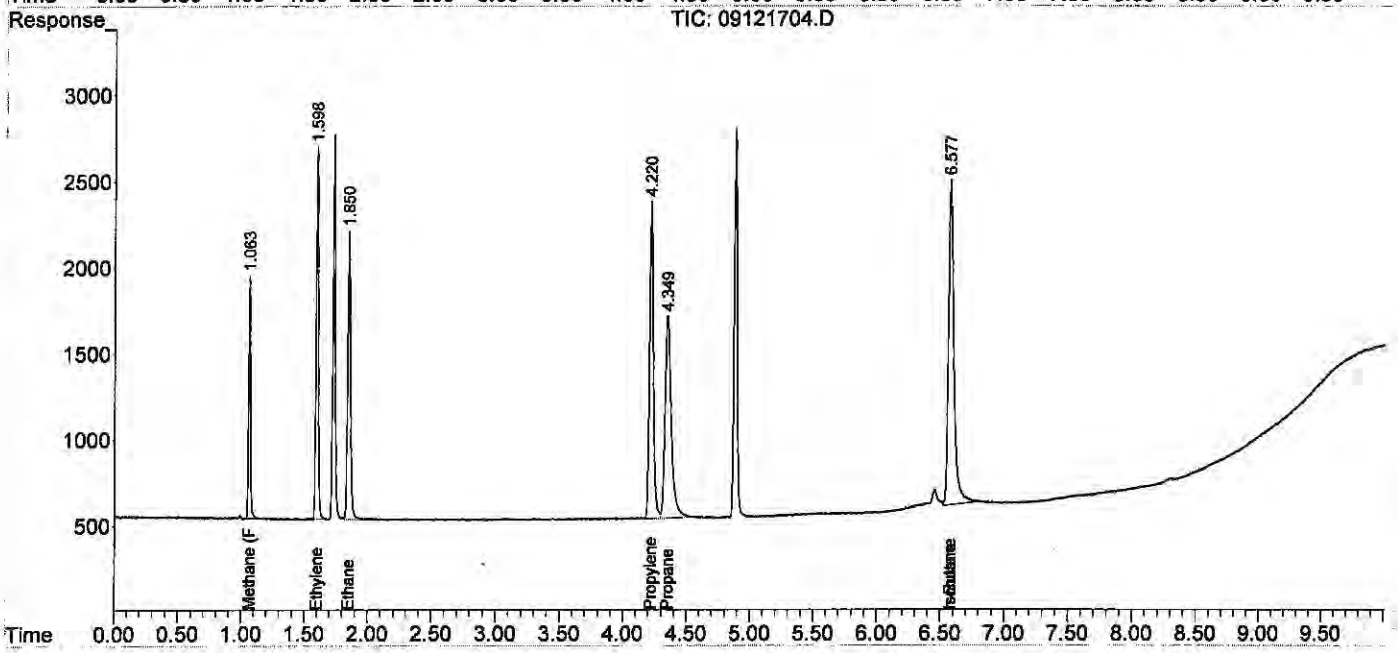
(f)=RT Delta > 1/2 Window (m)=manual int.

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

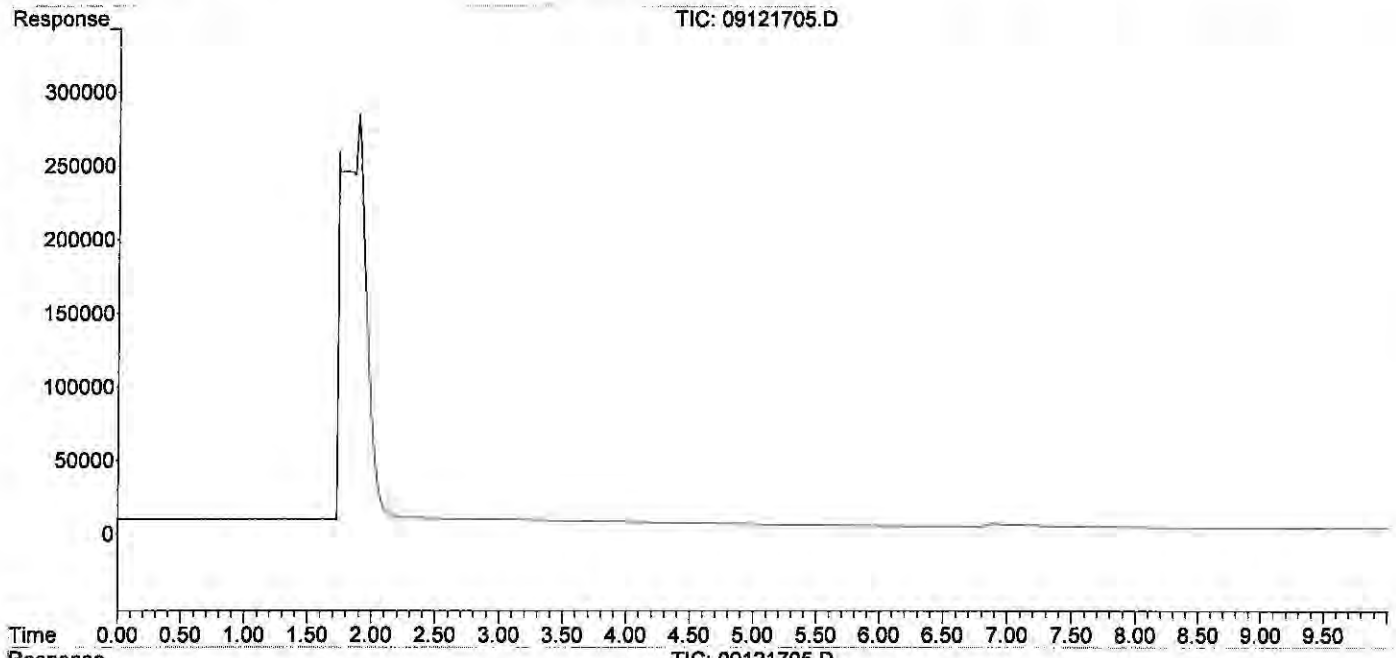
(f)=RT Delta > 1/2 Window (m)=manual int.

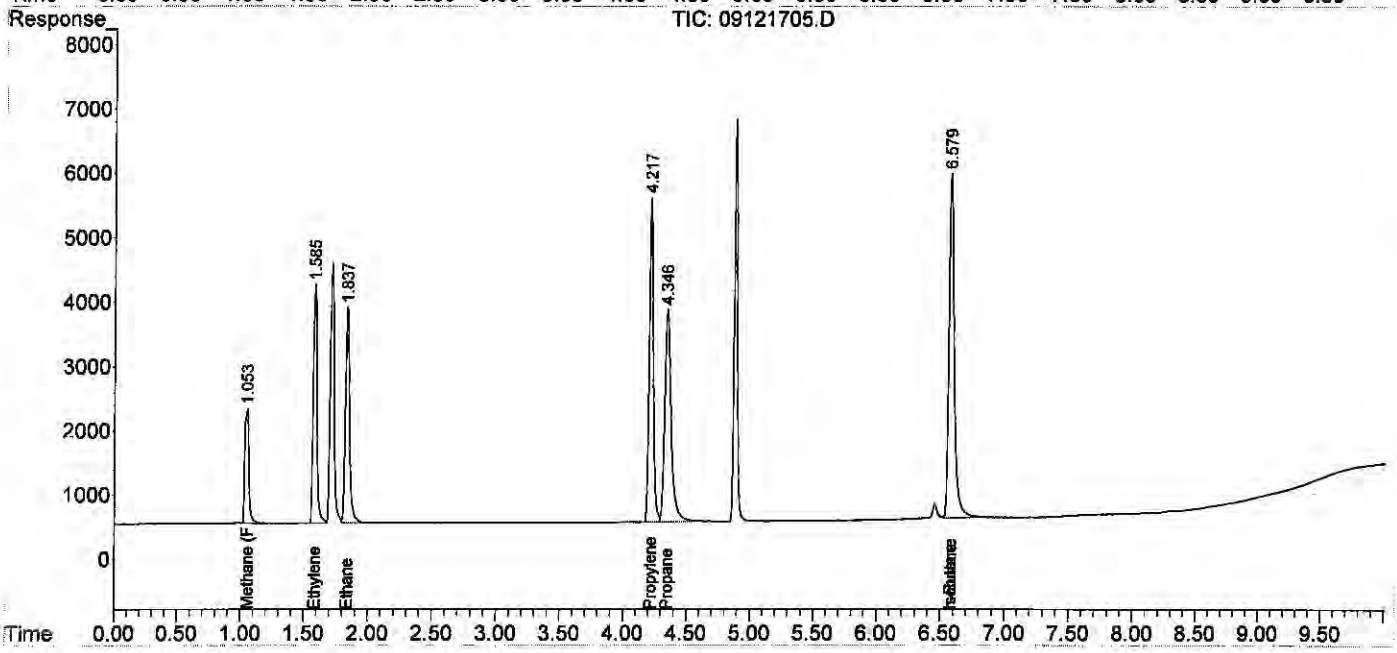
Quantitation Report (QT Reviewed)

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 :





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

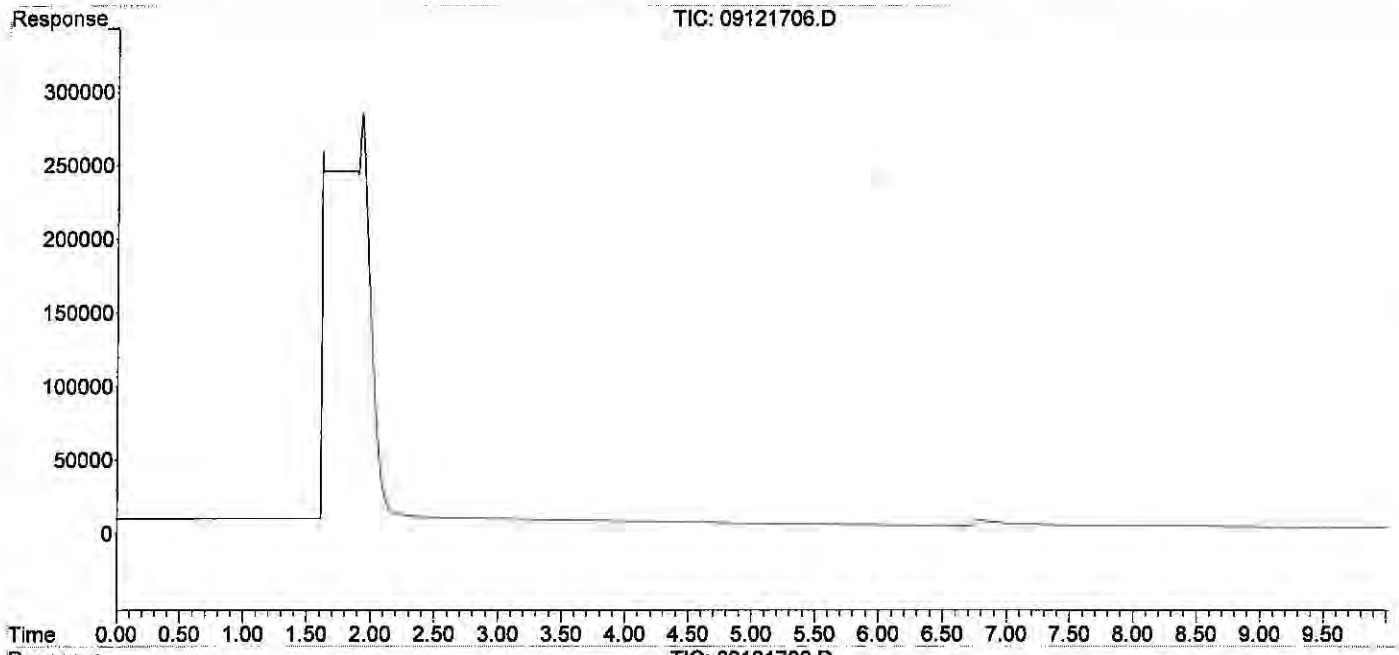
(f)=RT Delta > 1/2 Window (m)=manual int.

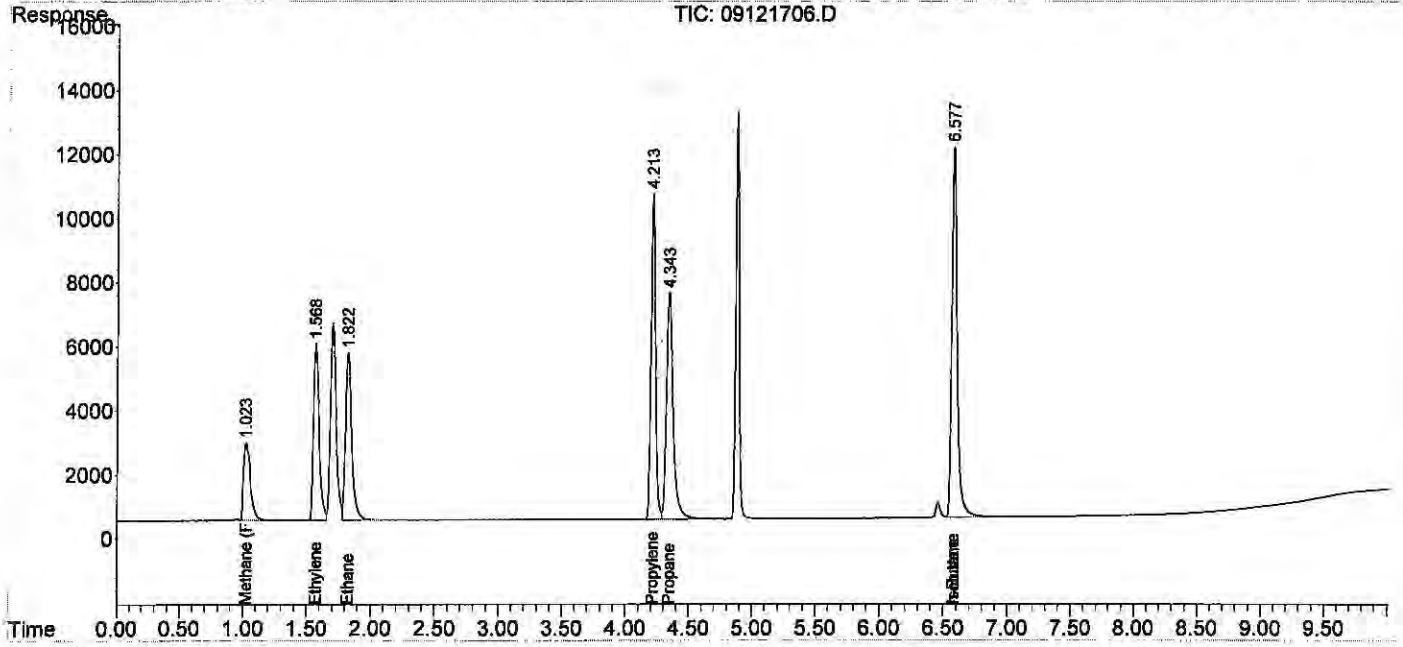
Quantitation Report (QT Reviewed)

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 :

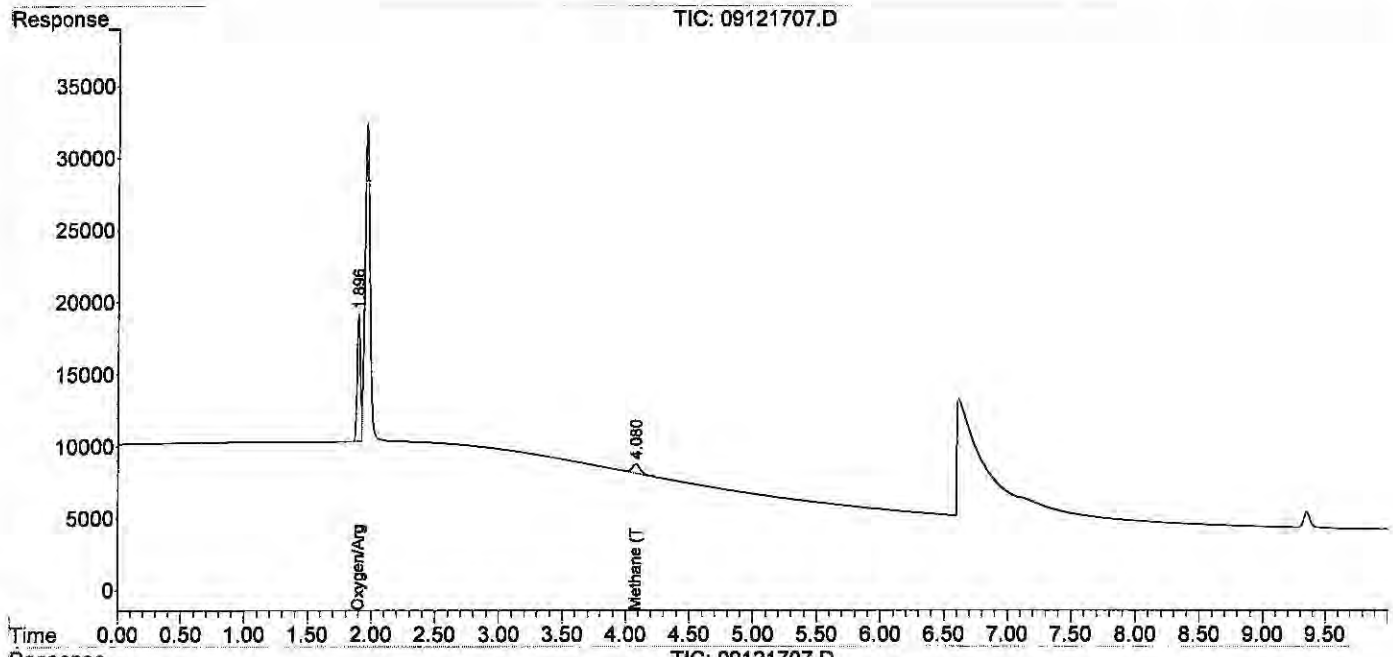
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.897	155286	0.065	ppm
2)	Carbon monoxide	1.897	155286	N.D.	ppm
3)	Methane (TCD)	4.079f	27015	2856.472	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.063	1735997	190.792	ppm
7)	Ethylene	1.597	3339702	198.758	ppm
8)	Ethane	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

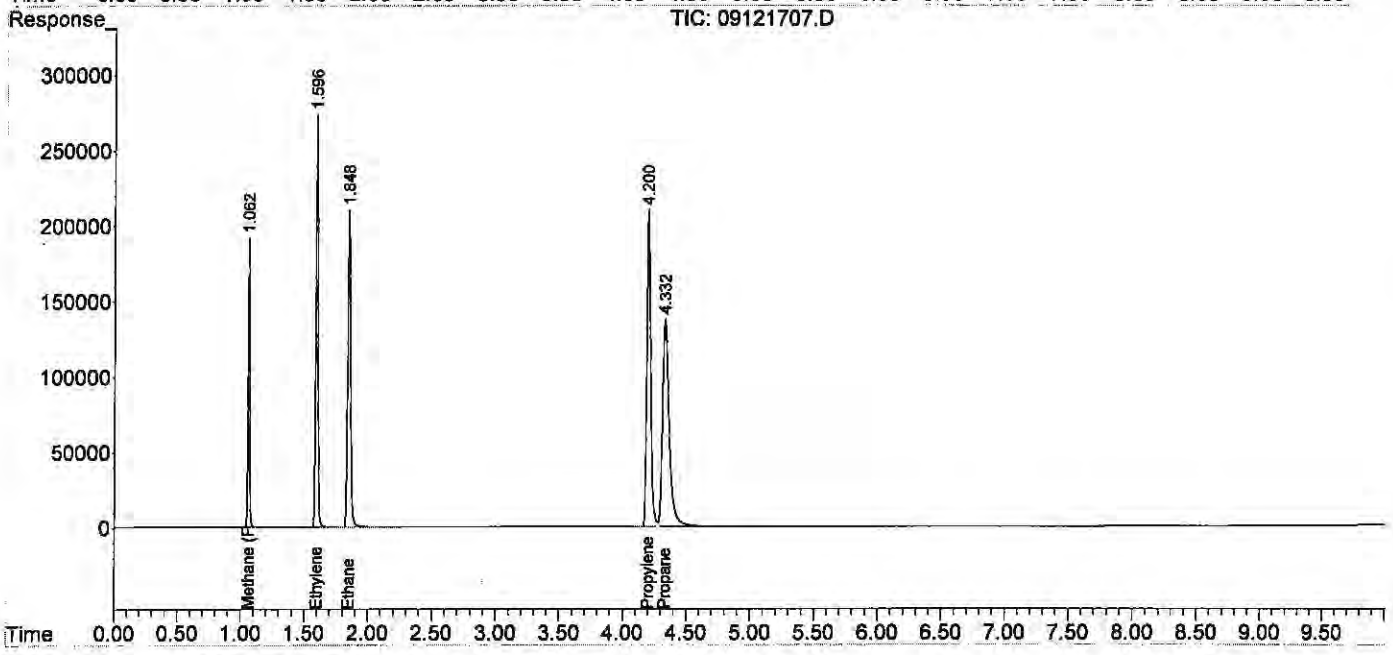
(f)=RT Delta > 1/2 Window (m)=manual int.

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

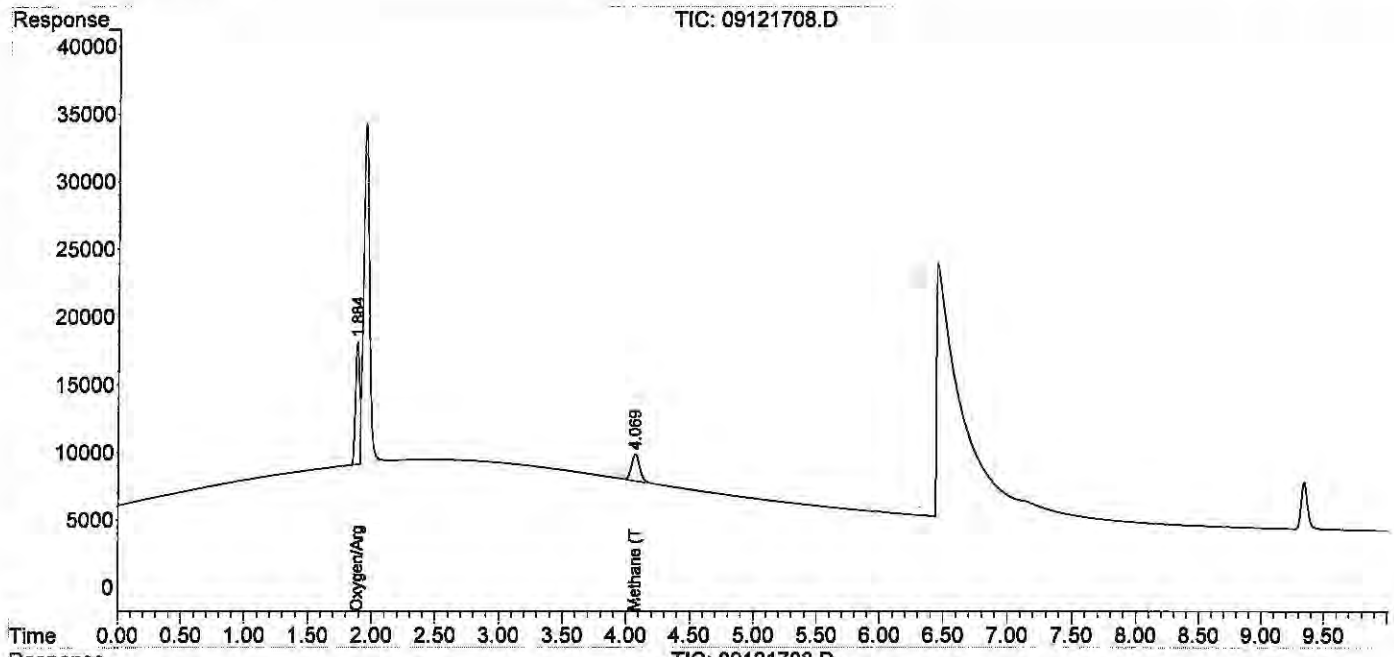
(f)=RT Delta > 1/2 Window (m)=manual int.

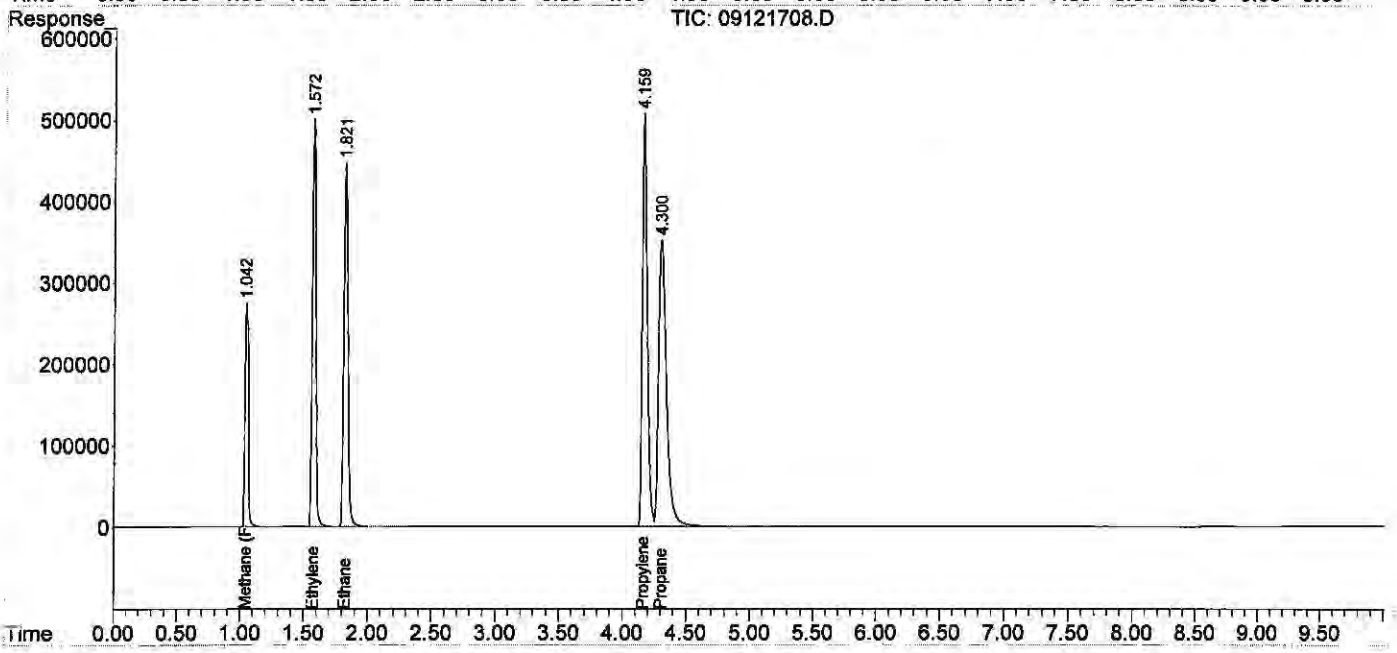
Quantitation Report (QT Reviewed)

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 #1 Info :
Signal #2 Phase:
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 :

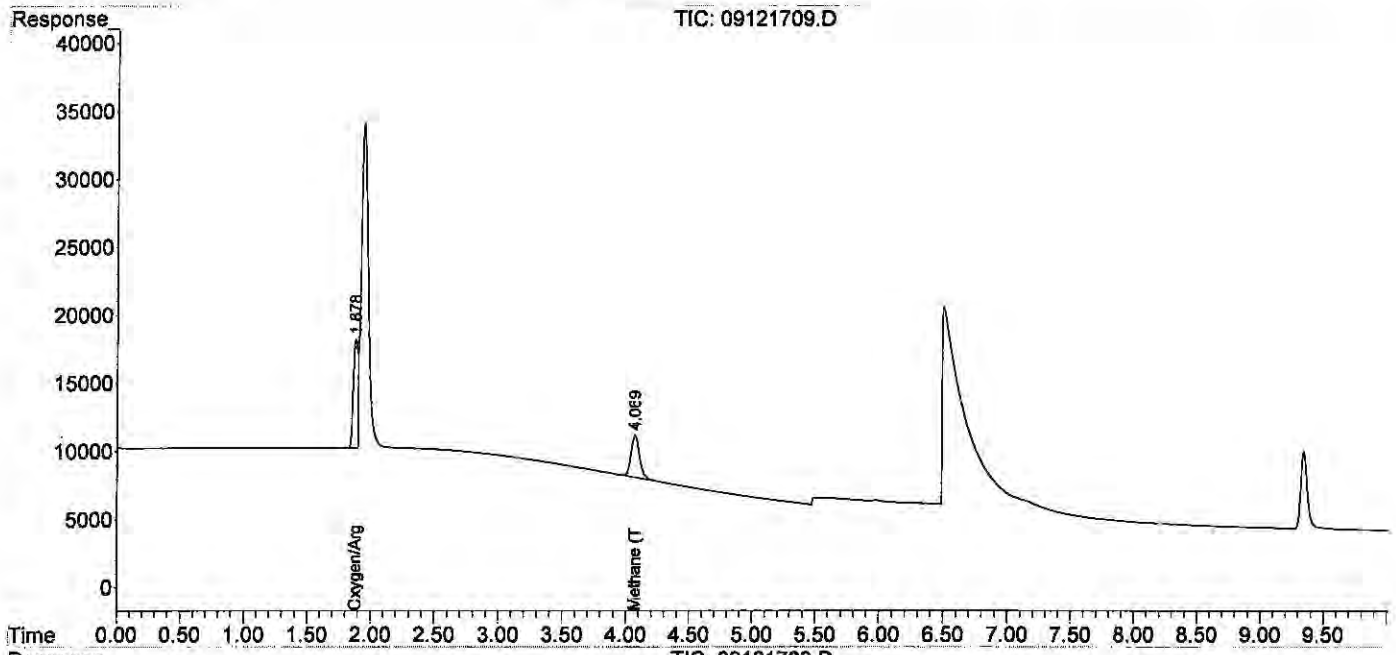
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	1.879	192611	0.162	ppm
2)	Carbon monoxide	1.879	192611	N.D.	ppm
3)	Methane (TCD)	4.070f	145492	1244.729	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.039	8598534	945.644	ppm
7)	Ethylene	1.576	16608504	981.887	ppm
8)	Ethane	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

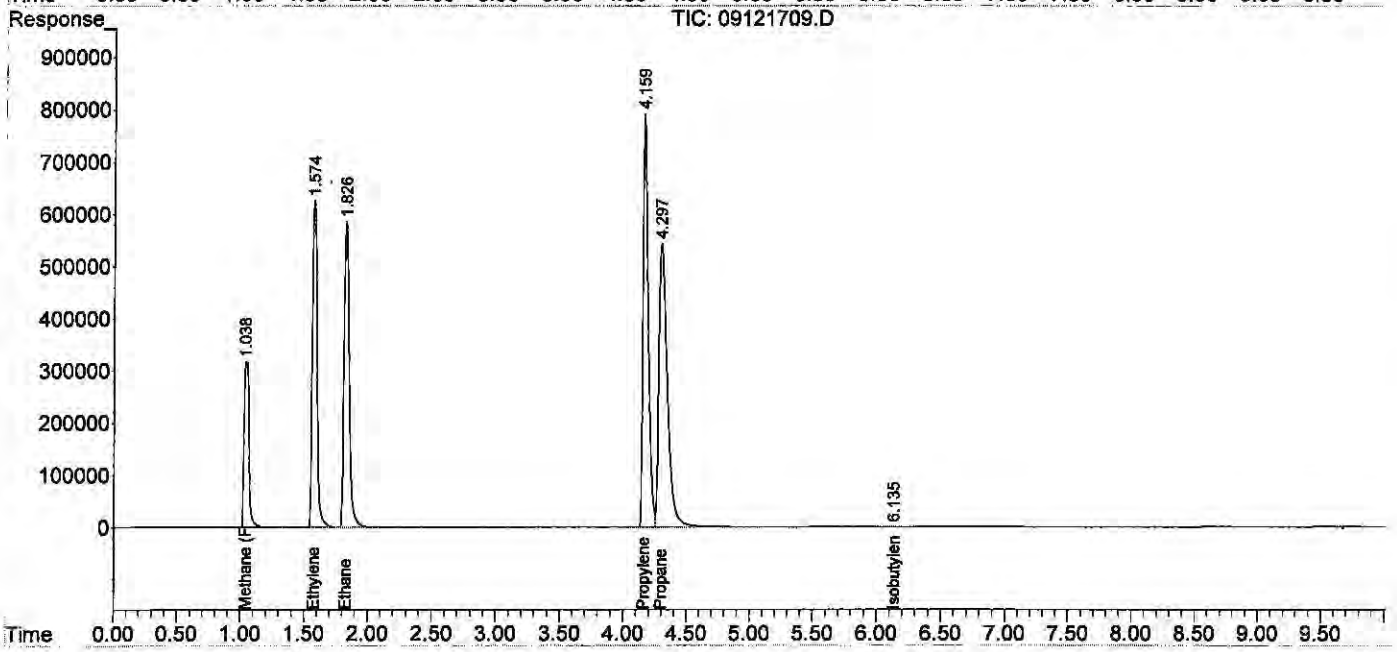
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

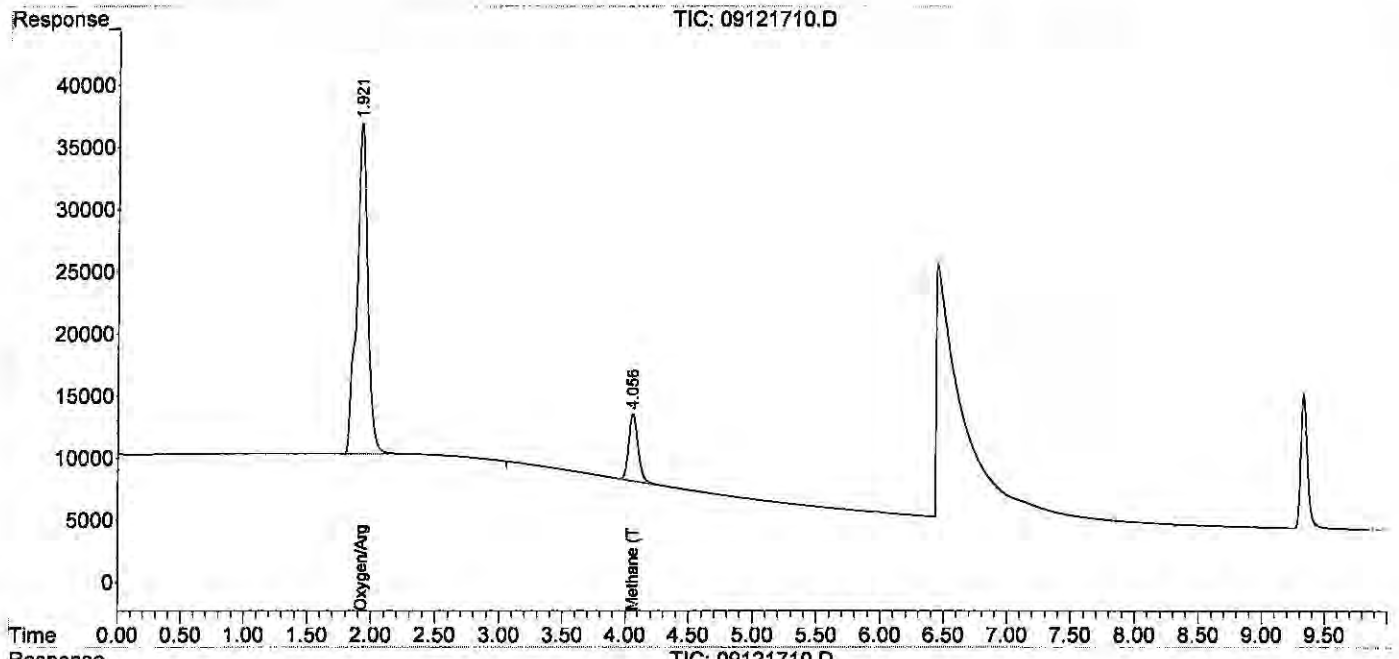
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	1.922f	1578147	1.659	ppm	
2)	Carbon monoxide	1.922f	1578147	N.D.	ppm	
3)	Methane (TCD)	4.057f	281651	3526.607	ppm	
4)	Carbon dioxide	0.000	0	N.D.	ppm	
6)	Methane (FID)	1.016	16098209	1763.622	ppm	
7)	Ethylene	1.552	31192444	1848.268	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	

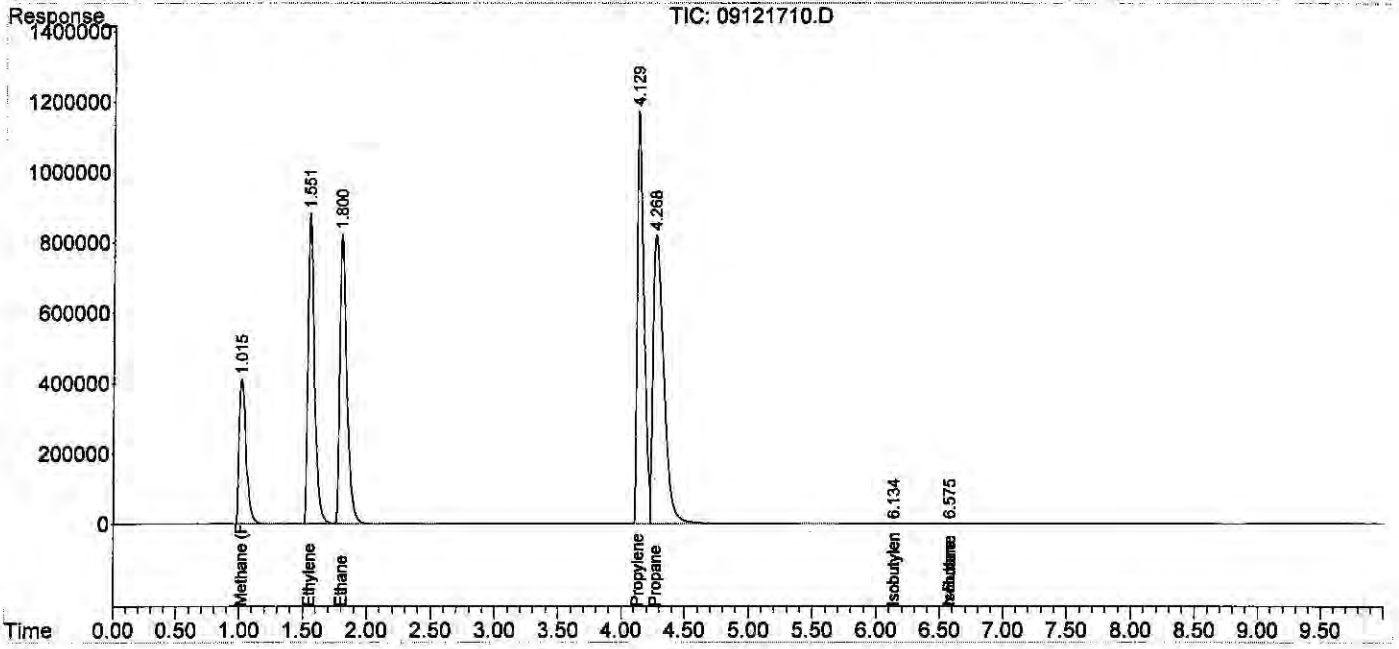
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :



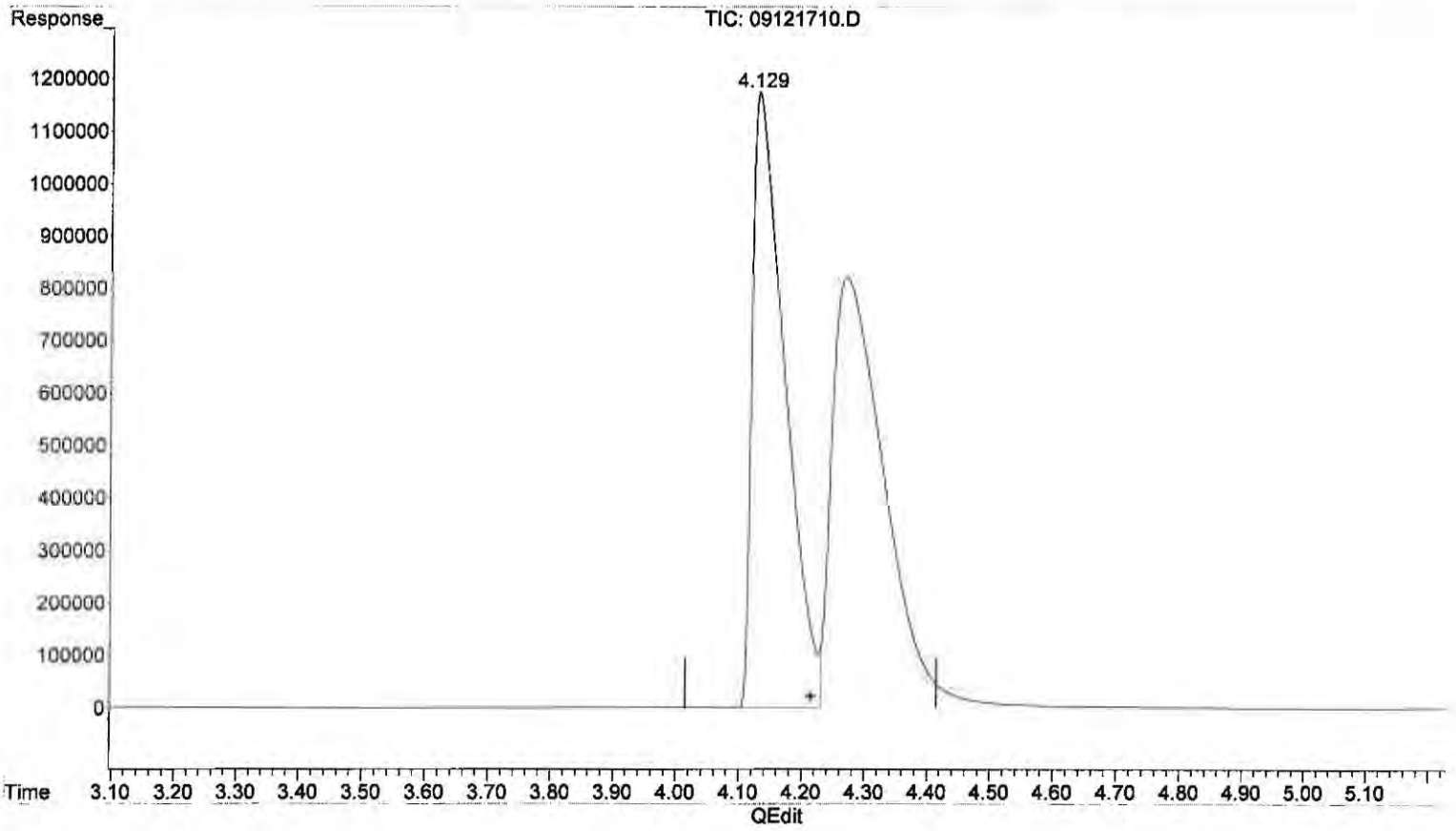


Quantitation Report (Qedit)

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

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 :

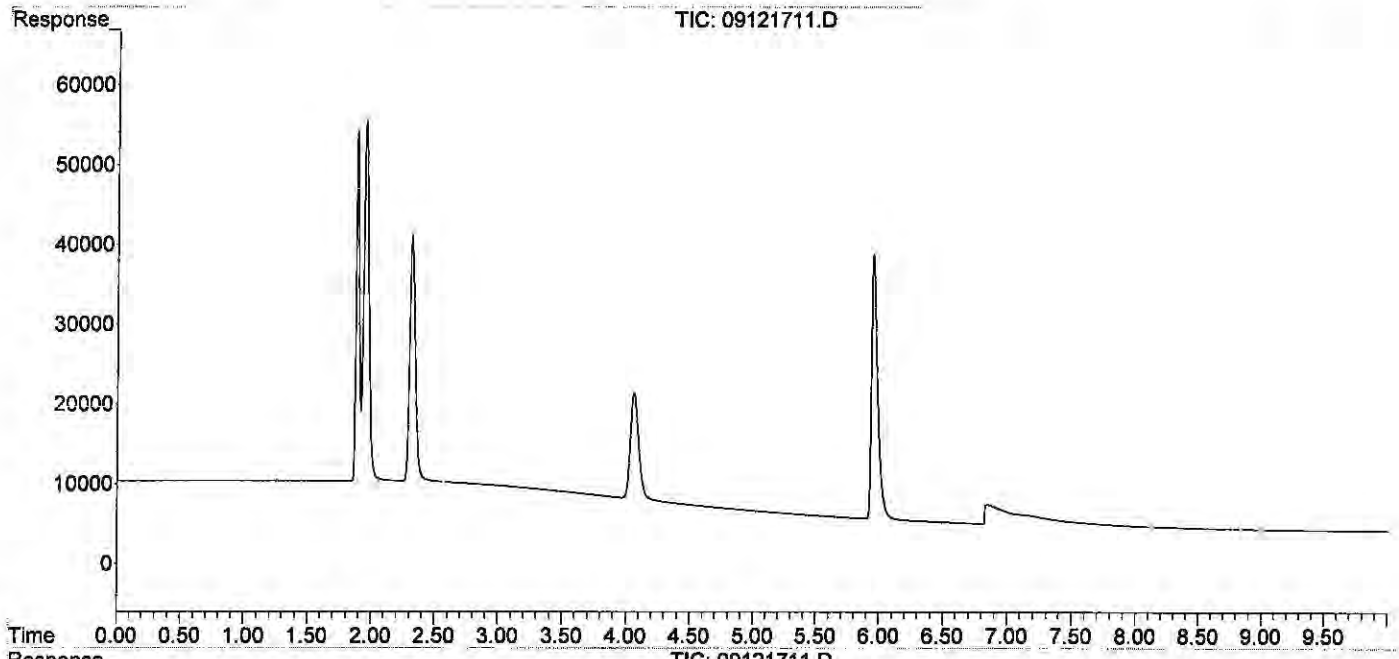
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Oxygen/Argon	0.000	0	N.D.	ppm	d
2)	Carbon monoxide	0.000	0	N.D.	ppm	d
3)	Methane (TCD)	0.000	0	N.D.	ppm	d
4)	Carbon dioxide	0.000	0	N.D.	ppm	d
6)	Methane (FID)	1.059	35776839	3925.122	ppm	
7)	Ethylene	0.000	0	N.D.	ppm	
8)	Ethane	0.000	0	N.D.	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	

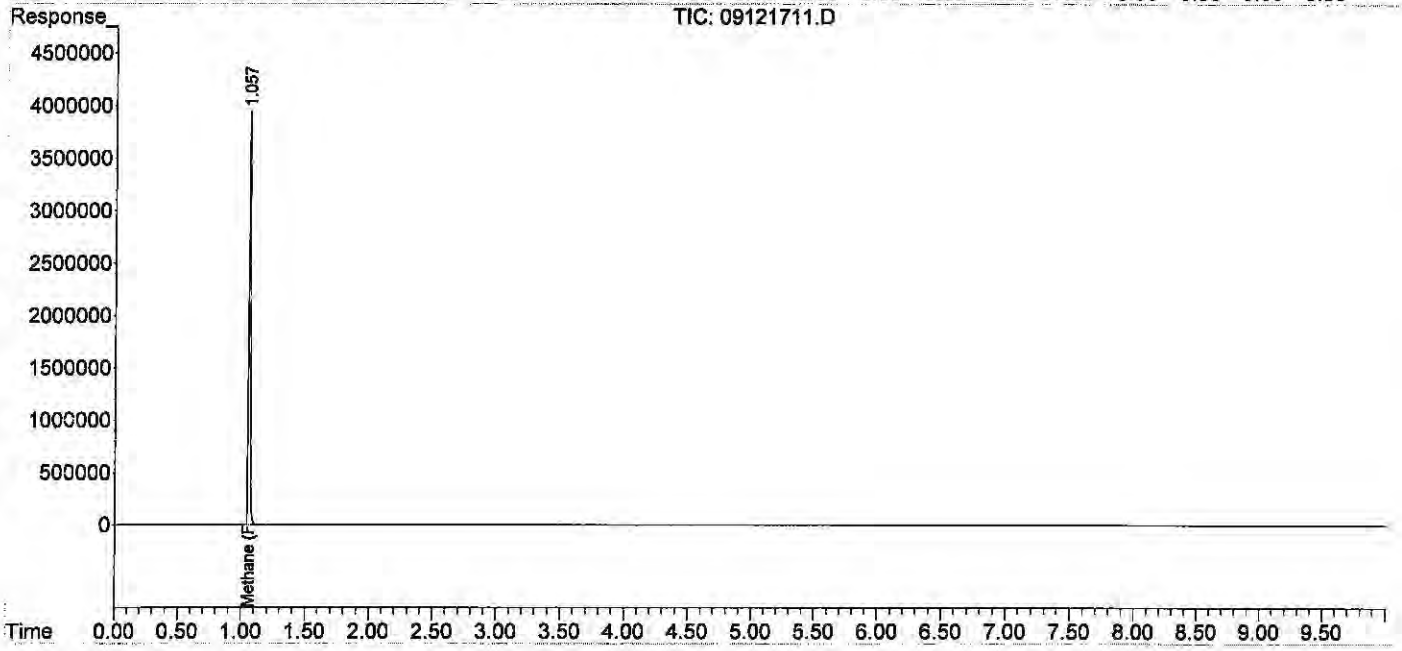
(f)=RT Delta > 1/2 Window (m)=manual int.

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	

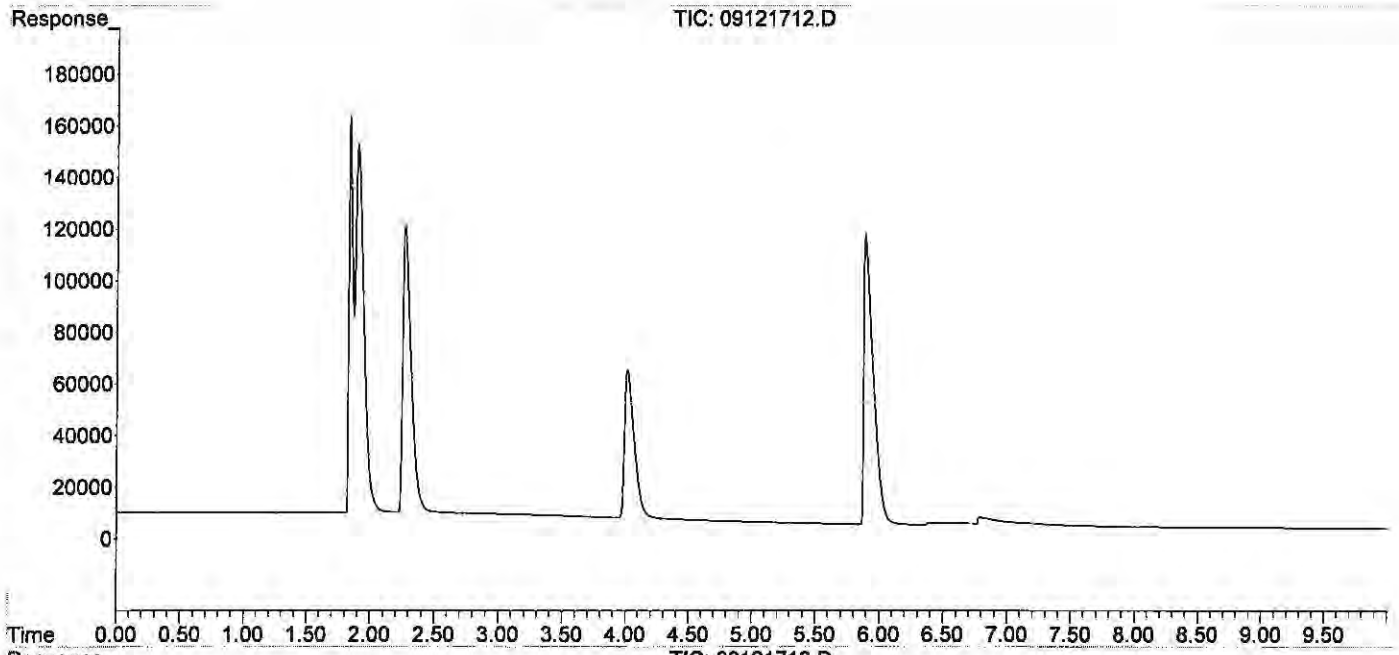
(f)=RT Delta > 1/2 Window (m)=manual int.

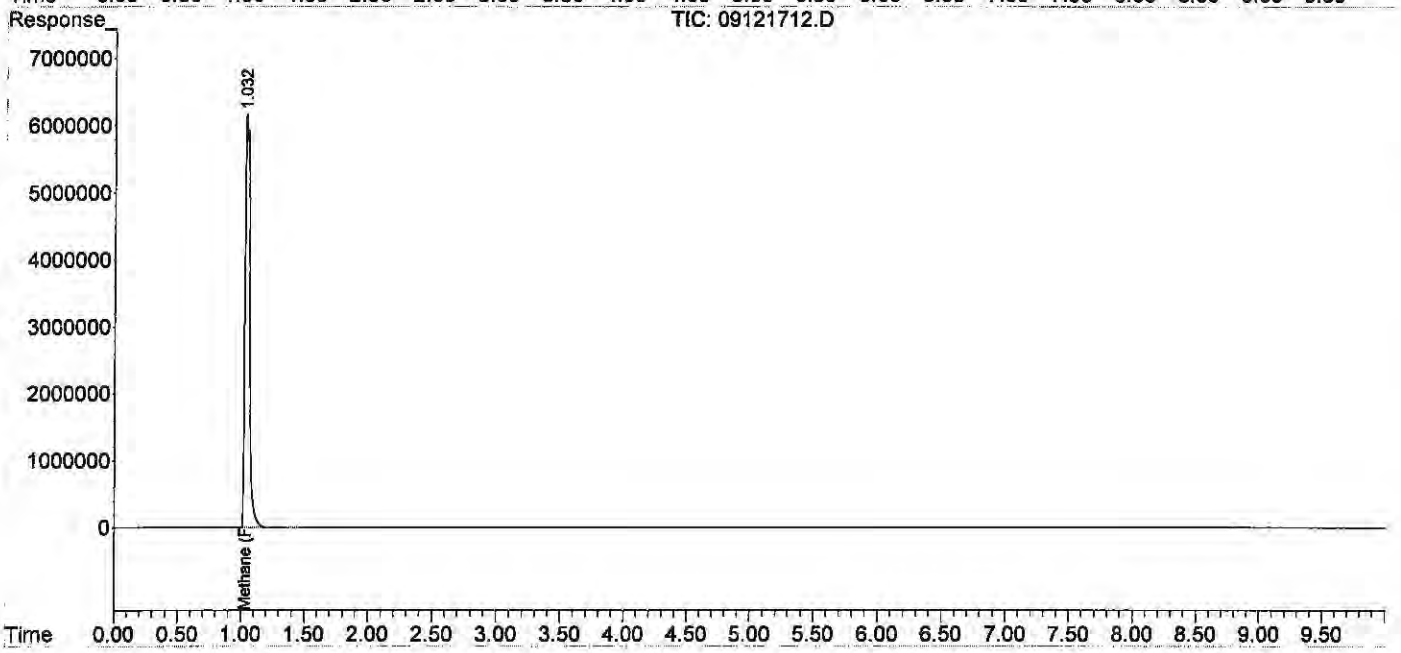
Quantitation Report (QT Reviewed)

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	1.50 101.1
7)	Ethylene	1.598	24153	1.443	ppm	1.50 96.2
8)	Ethane	1.850	24488	1.445	ppm	1.50 96.3
9)	Propylene	4.221	36004	1.537	ppm	1.50 102.5
10)	Propane	4.350	37738	1.517	ppm	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.

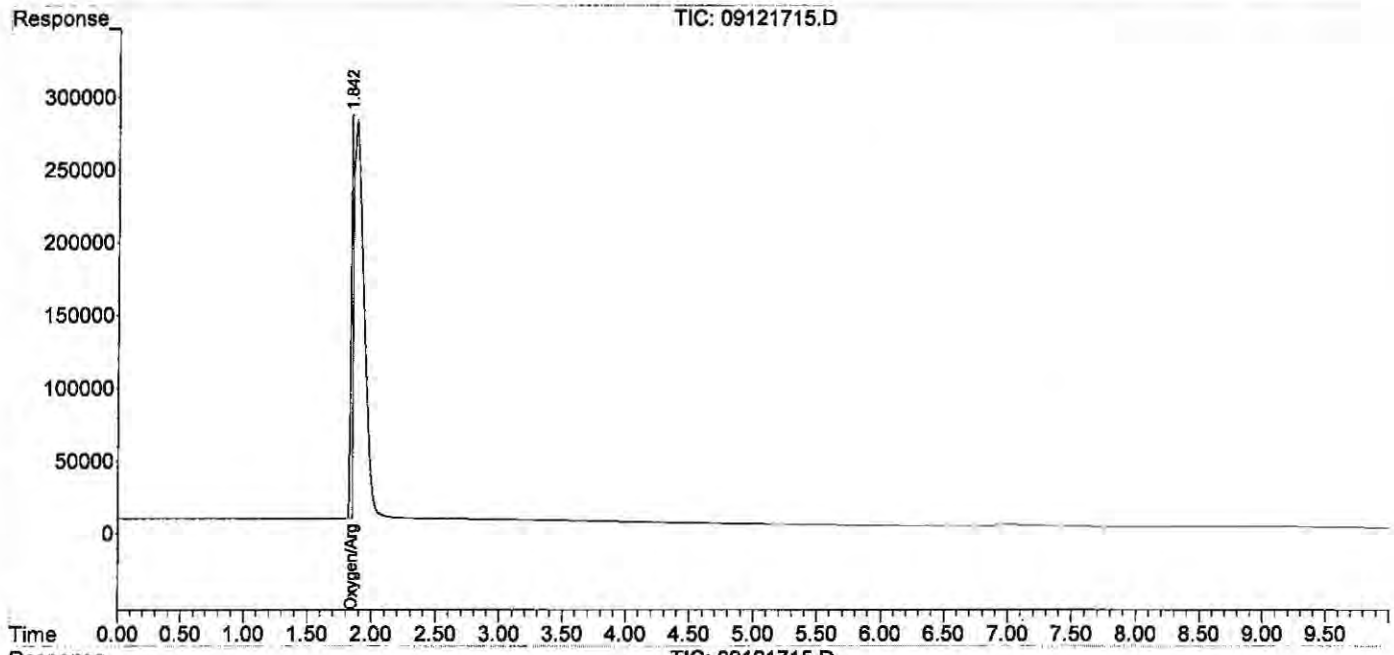
9/14/2017

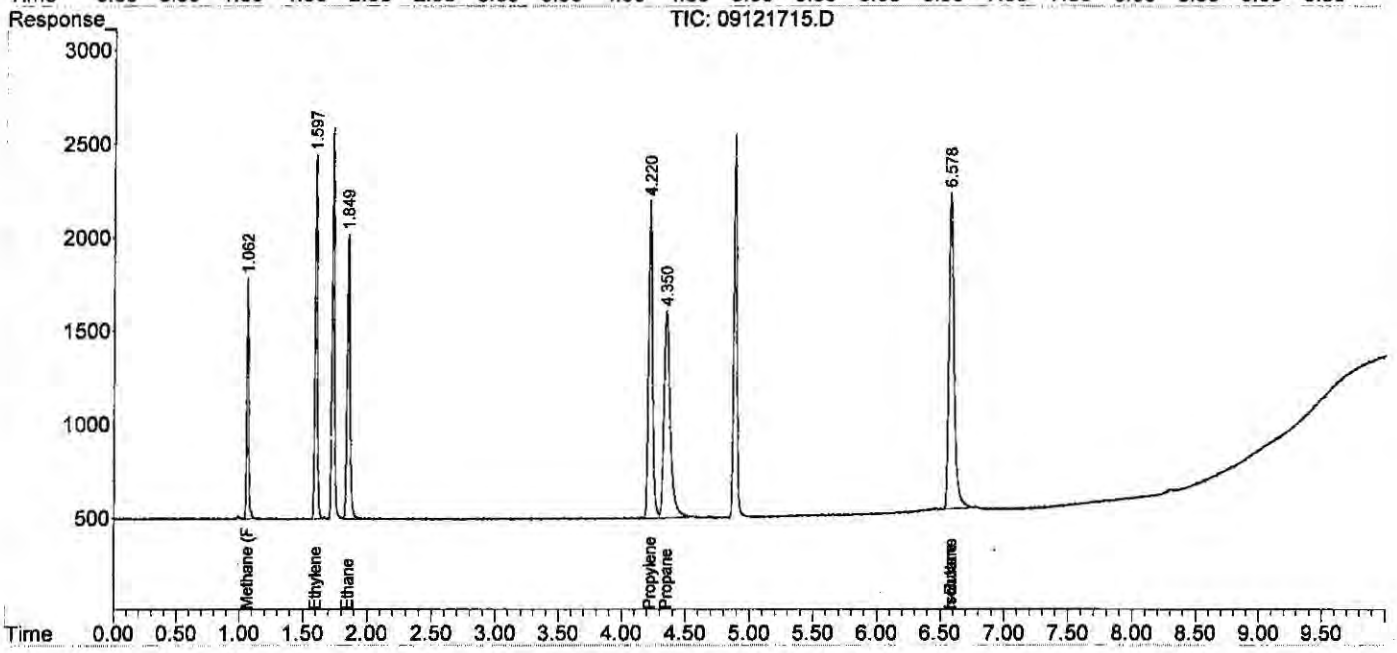
Quantitation Report (QT Reviewed)

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 :





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 :

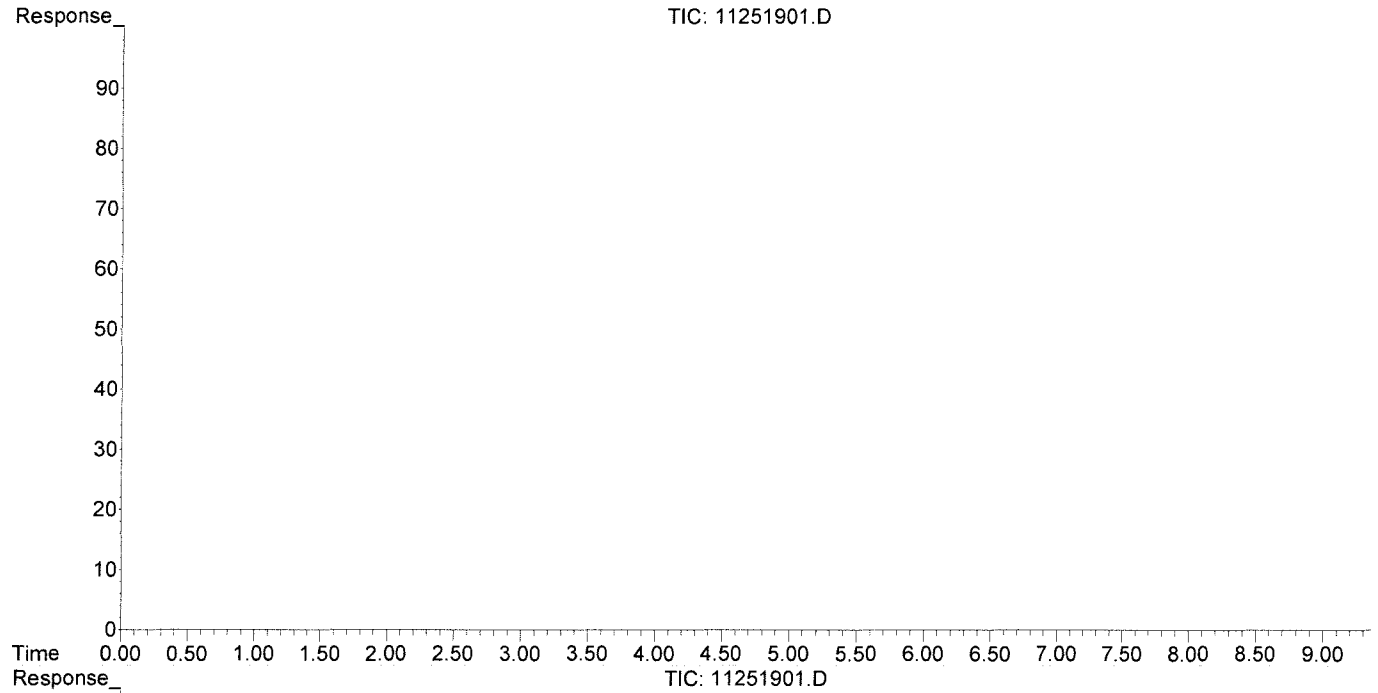
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.122	811249	89.437	ppm
7)	Ethylene	1.697	1587999	94.895	ppm
8)	Ethane	1.965	1595980	94.157	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

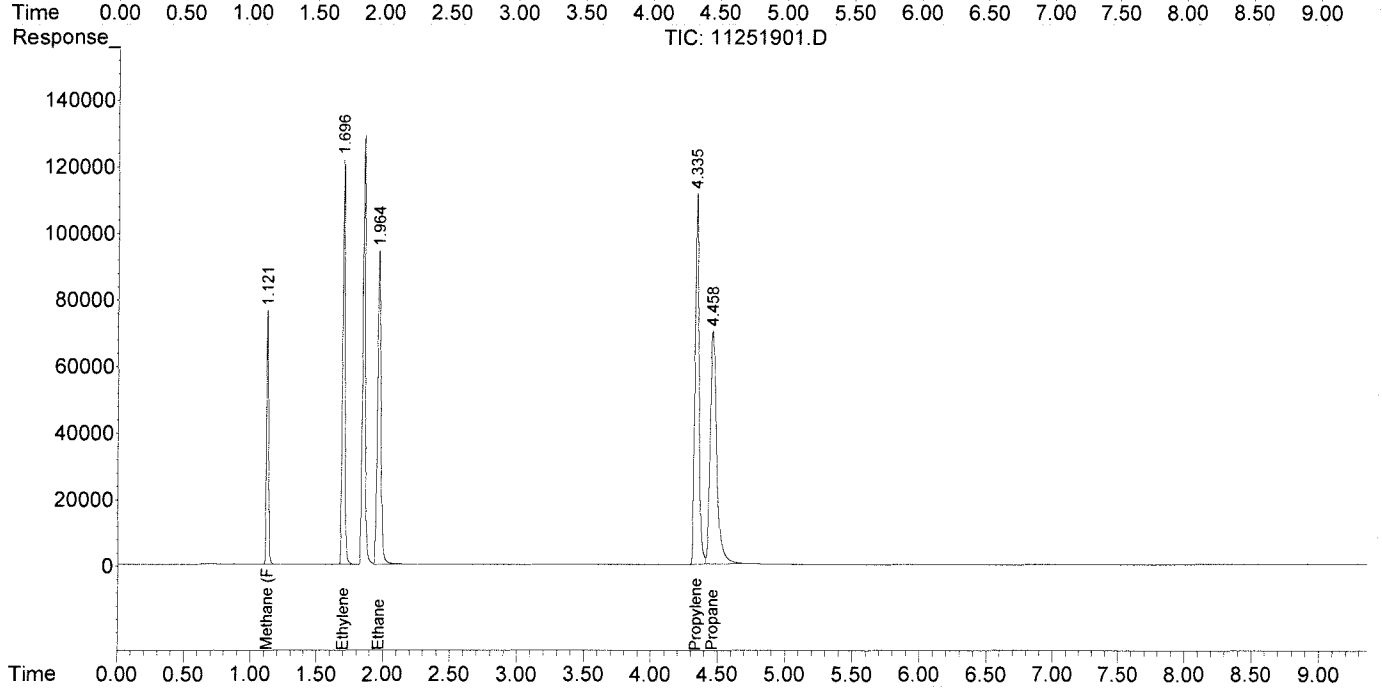
(f)=RT Delta > 1/2 Window (m)=manual int.

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 :

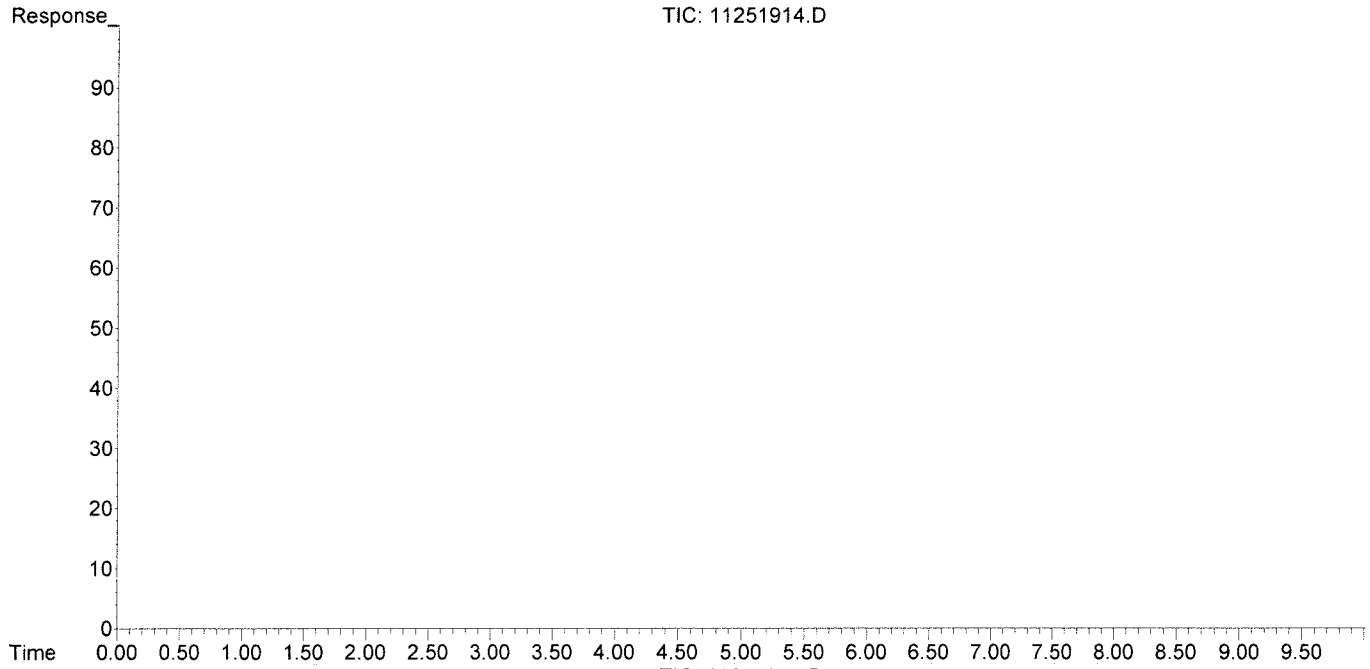
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Oxygen/Argon	0.000	0	N.D.	ppm
2)	Carbon monoxide	0.000	0	N.D.	ppm
3)	Methane (TCD)	0.000	0	N.D.	ppm
4)	Carbon dioxide	0.000	0	N.D.	ppm
6)	Methane (FID)	1.120	824669	90.916	ppm
7)	Ethylene	1.688	1611008	96.270	ppm
8)	Ethane	1.954	1619948	95.571	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

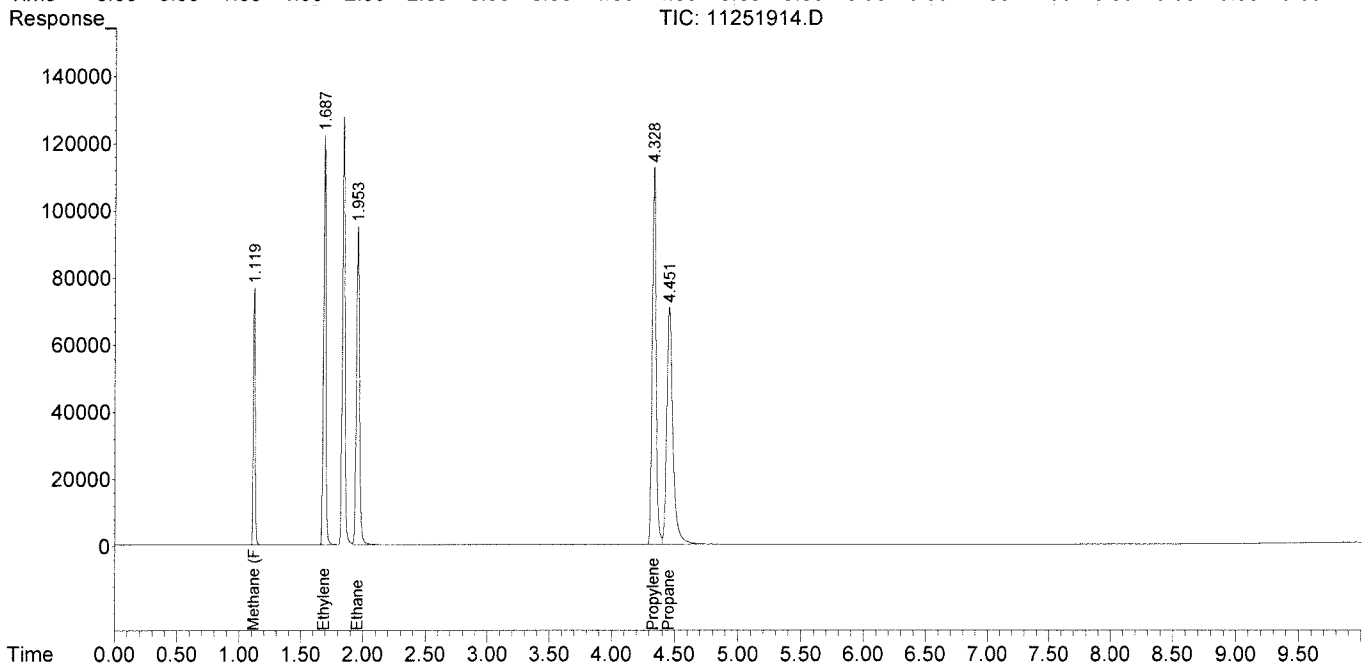
(f)=RT Delta > 1/2 Window (m)=manual int.

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

List of Tables

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