

LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

ADMINISTRATIVE RECORD

Volume 18

2019

Bate Stamp Numbers

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Prepared for

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

1976–2019

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

VOLUME 18

2019

- A. Title: Transmittal Letter – Draft Record of Decision for LHAAP-29, Former TNT Production Area, Group 2, April 2019, Longhorn Army Ammunition Plant, Karnack, Texas
Author(s): Department of the Army
Recipient: Environmental Protection Agency
Date: April 24, 2019
Date Stamp: 00937225 – 00937225
- B. Title: Transmittal Letter – Draft Record of Decision for LHAAP-29, Former TNT Production Area, Group 2, April 2019, Longhorn Army Ammunition Plant, Karnack, Texas
Author(s): Department of the Army
Recipient: Texas Commission on Environmental Quality
Date: April 24, 2019
Bate Stamp: 00937226 – 00937226
- C. Title: Transmittal Letter – Draft Record of Decision for LHAAP-18/24, Burning Ground No. 3 and Unlined Evaporation Pond, September 2019, Longhorn Army Ammunition Plant, Karnack, Texas
Author(s): Department of the Army
Recipient: Environmental Protection Agency
Date: September 6, 2019
Date Stamp: 00937227 – 00937227
- D. Title: Transmittal Letter – Draft Record of Decision for LHAAP-18/24, Burning Ground No. 3 and Unlined Evaporation Pond, September 2019, Longhorn Army Ammunition Plant, Karnack, Texas
Author(s): Department of the Army
Recipient: Texas Commission on Environmental Quality
Date: September 6, 2019
Date Stamp: 00937228 – 00937228
- E. Title: Minutes – Final Minutes, Monthly Managers' Meeting (MMM), Longhorn Army Ammunition Plant (LHAAP), September 18, 2019
Author(s): Department of the Army
Recipient: All Parties
Date: October 9, 2019
Bate Stamp: 00937229 – 00937241

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

VOLUME 18 (cont'd)

2019

- F. Title: Minutes – Final Minutes, Quarterly Restoration Advisory Board (RAB) Meeting, Longhorn Army Ammunition Plant (LHAAP), July 25, 2019
Author(s): Bhate Environmental Associates, Inc.
Recipient: All Parties
Date: October 27, 2019
Bate Stamp: 00937242 – 00937281
- G. Title: Report – Draft Final Year 2 Long-Term Management Report for LHAAP-001-R-01 and LHAAP-003-R-01, Longhorn Army Ammunition Plant, Karnack, Texas
Author(s): Bhate Environmental Associates, Inc.
Recipient: Environmental Protection Agency and Texas Commission on Environmental Quality
Date: October 30, 2019
Bate Stamp: 00937282 – 00937313
- H. Title: Transmittal Letter – Draft Remedial Design/Remedial Action Work Plan, LHAAP-50 Former Sump Water Tank, Longhorn Army Ammunition Plant, Karnack, Texas, October 2019
Author(s): Department of the Army
Recipient: Environmental Protection Agency
Date: October 31, 2019
Bate Stamp: 00937314 – 00937314
- I. Title: Transmittal Letter – Draft Remedial Design/Remedial Action Work Plan, LHAAP-50 Former Sump Water Tank, Longhorn Army Ammunition Plant, Karnack, Texas, October 2019
Author(s): Department of the Army
Recipient: Texas Commission on Environmental Quality
Date: October 31, 2019
Bate Stamp: 00937315 – 00937315
- J. Title: Report – Quarterly Evaluation Report, 2nd Quarter (April–June) 2019 Groundwater Treatment Plant, Longhorn Army Ammunition Plant, Karnack, Texas
Author(s): Bhate Environmental Associates, Inc.
Recipient: U.S. Army Corps of Engineers, Tulsa District
Date: November 4, 2019
Bate Stamp: 00937316 – 00939025



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

April 24, 2019

DAIM-ODB-LO

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

Re: Draft Record of Decision for LHAAP-29, Former TNT Production Area, Group 2, April 2019, Longhorn Army Ammunition Plant, Karnack, Texas

Dear Mr. Mayer,

The above-referenced document is being transmitted to you for review. In accordance with the FFA, please provide your comments by May 24, 2019.

The document was revised by HDR Environmental, Operations and Construction, Inc. (HDR) on behalf of the Army as part of HDR's contract for the facility. I ask that Phil Werner, HDR'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,

A handwritten signature in cursive script, reading "Rose M. Zeiler", is positioned above the typed name.

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

Copies furnished:

A. Palmie, TCEQ, Austin, TX
P. Bruckwicki, Caddo Lake NWR, TX
P. Werner, HDR, Englewood, CO
A. Williams, USACE, Tulsa District, OK
A. Maly, USAEC, San Antonio, TX



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

April 24, 2019

DAIM-ODB-LO

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

Re: Draft Record of Decision for LHAAP-29, Former TNT Production Area, Group 2, April 2019, Longhorn Army Ammunition Plant, Karnack, Texas

Dear Ms. Palmie,

The above-referenced document is being transmitted to you for review. In accordance with the FFA, please provide your comments by May 24, 2019.

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Longhorn AAP Site Manager

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P. Bruckwicki, Caddo Lake NWR, TX
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A. Williams, USACE, Tulsa District, OK
A. Maly, USAEC, San Antonio, TX



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

September 6, 2019

DAIM-ODB-LO

Mr. Rich Mayer
US Environmental Protection Agency
Federal Facilities Section R6
1201 Elm Street, Suite 500
Dallas, Texas 75270-2102

Re: Draft Record of Decision for LHAAP-18/24, Burning Ground No. 3 and
Unlined Evaporation Pond, September 2019, Longhorn Army Ammunition Plant,
Karnack, Texas

Dear Mr. Mayer,

The above-referenced document is being transmitted to you for review. In accordance with the FFA, please provide your comments by October 7, 2019.

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P. Werner, HDR, Englewood, CO
A. Williams, USACE, Tulsa District, OK
A. Sherman, USAEC, Fort Sam Houston, TX
K. Nemmers, Bhate, Lakewood, CO (transmittal letter only)



DEPARTMENT OF THE ARMY
LONGHORN ARMY AMMUNITION PLANT
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September 6, 2019

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A. Sherman, USAEC, Fort Sam Houston, TX
K. Nemmers, Bhate, Lakewood, CO (transmittal letter only)

Subject: Final Minutes, Monthly Managers' Meeting (MMM),
Longhorn Army Ammunition Plant (LHAAP)
Location of Meeting: Conference Call
Date of Meeting: 18 September 2019– 1:00PM Central Daylight Time (CDT)

Attendees:

Army BRAC: Rose Zeiler (RMZ)
EPA: Rich Mayer (RM)
TCEQ: April Palmie (AP)
USACE: Aaron Williams (AW)
AEC: Amanda Sherman
USGS: Kent Becher
Bhate: Kim Nemmers (KN)
USFWS: Paul Bruckwicki
APTIM: Praveen Srivastav (PS), Bill Foss (BF) and Susan Watson (SW)

Action Items

Bhate/APTIM: KN stated that the contract for the replacement of water line to extraction well 18WW17 repairs has been signed. KN said that she did not have the work scheduled but would let AW and RMZ know so that they would pass the information along.

Defense Environmental Restoration Program (DERP) Performance Based Remediation (PBR) Update

KN stated the groundwater treatment plant (GWTP) is operating properly. RM asked if the power was fully restored to which KN confirmed. KN stated that the sludge from the filter bed press was sampled and would be profiled for disposal in the coming weeks. KN explained that the last load of sludge was disposed in August 2017 prior to award of the current contract to Bhate.

BF stated that LHAAP-17 had just received rain and was currently shut-down due to lightning in the area with the stockpiles covered. BF explained that five trucks were onsite and that two rounds had been completed. However, BF was not sure much more would be completed with the weather coming into the area. BF explained that the USACE had approved an Ordinance Explosive Safety Specialist (OESS), Mr. Hank Domme, to provide construction support. BF stated that scrap metal and empty munitions debris had been found. RM asked what BF meant by empty to which BF explained that the munitions were verified to not have explosive material present within the item. RM asked what percent complete the project was considered. BF said that the project was more than 50-percent completed and stated that the areas remaining included the deeper excavation in Area H and J and then the three southern areas of G, M and N. Over-excavation was required in areas H and K also. BF stated that the initial planned excavation should be completed by the middle to end of the next week, weather dependent, but that over-excavation and loading of stockpiled material may continue beyond that.

BF discussed the injections at LHAAP-16, which will commence on 24 September 2019. BF explained that all eight pumps for the extraction wells were operational as of 4 September 2019. BF stated that the baseline sampling using select wells was being completed this week. BF explained that mobilization had commenced for the injections with some equipment and tanks being delivered to the site. BF stated that the crew was mobilizing the afternoon of Monday, 23 September 2019. BF stated that work would commence on 24 September at 6:30 am. BF noted that ReDox Tech was

contracted to complete the bayou barrier injections. BF stated that the water source for injection mixing was identified and access was being set up. RMZ asked what the water source was that APTIM had identified. BF stated that Leigh Water Supply in Karnack was being used and that an access point with a meter for the water was being provided. BF explained that the water would not be chlorinated from the access point. BF stated that cross-sections showing the lithology and screened intervals of the newly installed monitoring wells at LHAAP-16 had been sent out to the team. RMZ stated that she felt it was good to provide this information and to be aware of what the data represents. RM stated that the cross-sections appeared to show the wells were screened in the intermediate zone. KB stated that it looks like the silty-sand zone runs continuously through the area. RZ stated that remedial design (RD) was set and that the detection of trichloroethene in the groundwater east of Harrison Bayou was not all bad news because the concentrations will allow assessment of the intermediate aquifer's response to the injections.

BF asked everyone to refer to the Document and Issues Tracking Table dated September 18, 2019.

- **Task 1** (Project Management) -KN stated that the August 2019 MMM minutes were approved. The team discussed the change in date for the RAB and MMM to 23 October 2019 and when to have the MMM. KN stated that she needed to confirm that the RAB would be held at the Community Center. The team determined that having the MMM at 10:30 am on 23 October 2019 was the best choice and that having it at the LHAAP trailer was preferred.
- **Task 3** (LHAAP-03) – BF stated that there are no current documents.
- **Task 4** (LHAAP-04) – BF stated that there are no current documents.
- **Task 5** (LHAAP-12) – BF stated that the monitoring well was installed and developed in August 2019, and that the new monitoring well would be sampled in December 2019 during the annual Remedial Action Operations (RA[O]) event. BF explained that the data would then be provided at the February 2019 MMM and in the next RA(O) Report.
- **Task 6** (LHAAP-16) – BF stated that the baseline sampling data will be provided as soon as validated, which may be as early as the October 2019 MMM or may fall into the November MMM.
- **Task 7** (LHAAP-17) – BF stated that there are no current documents.
- **Task 9** (LHAAP-37) – BF stated that the year 2, 4th quarter quarterly sampling was completed and that validated data will be provided for the October 2019 MMM. The sampling will become semi-annual going forward.
- **Task 10** (LHAAP-46) – BF explained that the obstructed well (LHSMW23) was replaced at LHAAP-46 and not salvaged. The new monitoring well LHSMW23R was installed and developed and water was present. BF stated that the water from LHSMW23R was sampled and the validated data will be provided with the rest of the LHAAP-46 RA(O) data in the October MMM.
- **Task 11** (LHAAP-50) – BF stated that the Explanation of Significant Difference (ESD) was distributed the prior Friday. Everyone confirmed receipt. BF stated that the Draft RA(O) Report should be delivered to the Regulators in November 2019 and that the Draft Remedial Action Work Plan (RAWP)/RD is planned for distribution to the Regulators in October 2019.
- **Task 12** (LHAAP-58) – KN stated that the Year 5 RA(O) Report was just released to the Army and USACE for review and that the draft report should be provided in October 2019 to the Regulators. KN stated that the quarterly RA(O) sampling had been completed in September 2019 and that the validated data would be provided for the October 2019 MMM.

- **Task 13** (LHAAP-67) – BF stated that the two new monitoring wells had been installed and developed in August 2019. BF stated that the monitoring wells would be sampled in November 2019 during the Year 6 Annual sampling event. BF stated that the Draft Year 5 RA(O) Report was planned for submittal to the Regulators in November 2019.
- **Task 14** (LHAAP-001-R and -003-R) - KN stated that the Annual LTM Report was in Bhate's internal quality control (QC) review and was planned for submittal to the Army within the next week so that the draft report could be provided to the Regulators in October 2019.
- **Task 16** (GWTP) –KN indicated that the 2nd Quarter 2019 GWTP was under Bhate's internal QC and is anticipated for delivery to the Regulators in October 2019.
- **Task 17** (LHAAP-18/24) – KN stated that the 2nd Quarter 2019 GWTP Report would have the June and July 2019 groundwater data for LHAAP-18/24.
- **Task 18** (Surface Water) – No discussion.
- **Task 19** (LUC Management Plan) – KN stated that the LUC Management Plan Update was being completed and should be delivered to the Regulators in the next couple of weeks.
- **Administrative Record (AR)** – SW stated that everything through March 2019 will be included in the next distribution for the AR, which is planned for the next week.

Update on other DERP Sites

- **LHAAP 18/24** –AW stated that the Record of Decision (ROD) is with the Regulators. AP stated that she is likely to request an extension. RMZ stated that an extension is fine.
- **LHAAP-29** –AW stated that Proposed Plan (PP) was being included in the AR. AW stated that the ROD was submitted to the Regulators for EPA signature and TCEQ concurrence. AP stated that a letter was prepared, and she would scan and send a copy. RM stated that the EPA was ready to sign the ROD.
- **LHAAP-47** – AW stated that the Post-Screening Investigation (PSI) Report was being included in the next AR distribution. AW stated that the PSI Addendum would be included in the next AR update. AW stated that a modification to the HDR, Inc. contract had been completed and that HDR was preparing a Work Plan for 10 direct push technology (DPT) points around MW25R to a depth of approximately 40 feet below ground surface, with soil samples at three intervals in each well and that grab groundwater samples would be collected. AW stated that 1,4-dioxane would also be analyzed from the grab groundwater samples. AW explained that the HDR period of performance will end in December, so AW was requesting a quick review of the Work Plan. AP asked when the Regulators would receive the Work Plan. AW stated that the Army would receive it the following week and the plan was to have the Work Plan to the Regulators in early October. RMZ stated that she would like to try to find the DPT14 location. AW stated that John Doran will be onsite for the LHAAP-16 injections and has been asked to try to find the DPT14 location.
- **Five Year Review (FYR)** – RMZ asked RM about the answer to AP's question, which has not been addressed. RM stated that he has a meeting to discuss internally. RM said he had forwarded AP's email to his management and had not received a response. RMZ stated that finalizing the FYR and then changing it again is the concern. RMZ suggested that maybe EPA could address their concern in the letter instead of revising the Final document. RM stated that he is going to try to get something worked out.

Backfill Source Discussion

BF explained that backfill soil results had been sent in an email prior to the call. BF explained that while several of the metals exceeded for the potential leaching to groundwater that Synthetic Precipitation Leaching Procedure (SPLP) analysis had been run on the samples with the highest

detections of Arsenic, Chromium, and Lead, and the results were non-detect. BF also stated that the metals are not contaminants of concern (COCs) for the site.

AP asked how many locations were sampled. BF stated that one sample was collected per 1,000 cubic yards and that the composite sample locations had been surveyed using a global positioning system. AP stated that her question was why an alternative provider was not being considered. BF stated that another borrow source is being evaluated and that the plan is collect a sample from that source this week. BF stated that the current borrow provider has told them that the clays in the area naturally have elevated metals and suggested looking at more sandy soils to avoid the clay. AP stated that the ROD and Installation Wide Work Plan requires fill to meet the cleanup criteria that the soil needs to meet background values or the GWP-Ind (TCEQ soil MSC for industrial use based on groundwater protection) values. RM had not had a chance to look at the data.

Schedule Next Managers' Meeting

The next MMM will be held on October 23, 2019 at 10:30 am CDT in the Army trailer at LHAAP.

Meeting concluded at 2:50 pm CDT.

ACRONYM LIST

AP	April Palmie
APTIM	APTIM Federal Services, LLC
AR	Administrative Record
AS	Amanda Sherman
AW	Aaron Williams
BF	Bill Foss
Bhate	Bhate Environmental Associates, Inc.
BRAC	Base Realignment and Closure
CDT	Central Daylight Time
COC	Contaminents of Concern
DERP	Defense Environmental Restoration Program
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FBR	Fluidized Bed Reactor
FYR	Five Year Review
GWTP	Ground Water Treatment Plant
HDR	HDR, Inc.
KN	Kim Nemmers
LHAAP	Longhorn Army Ammunition Plant
MMM	Monthly Managers' Meeting
PBR	Performance-Based Remediation
PP	Proposed Plan
PS	Praveen Srivastav
PSI	Post-Screening Investigation
QC	Quality Control
RAB	Restoration Advisory Board
RA(O)	remedial action – operation
RAWP	Remedial Action Work Plan
RD	Remedial Design
RM	Rich Mayer
RMZ	Rose M. Zeiler

ROD	Record of Decision
RRS	Risk Reduction standards
SPLP	Synthetic Precipitation Leaching Procedure
SW	Susan Watson
TCEQ	Texas Commission on Environmental Quality
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

**LHAAP Data Validated
September MMM Validated Data**

GWTP Effluent	<i>Weekly Perchlorate Sampling – August 2019</i> Perchlorate (6850)
GWTP Effluent	<i>Weekly, Bi-Weekly, and Monthly Sampling – August 2019</i> Ammonia (350.3) Ortho-Phosphate (365.3) Total Organic Carbon (SM5310C) VOC (8260C) Metals (6020A) Hexavalent Chromium (7196A) 1,4-Dioxane (8270D-SIM) Anions (9056)
GWTP Influent	<i>Monthly Sampling – August 2019</i> Metals (6020A) Perchlorate (6850) Hexavalent Chromium (7196A)
LHAAP-18/24	<i>Sampling – August 2019</i> Perchlorate (6850) Metals (6020A) VOCs (8260C) 1,4- Dioxane (8270D SIM)

GWTP Weekly/Effluent Perchlorate Sampling -August 2019

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24- SP650_080619_BIX 8/6/19	LH18/24- SP650_081419_BIX 8/14/19	LH18/24- SP650_081419_BIX 8/14/19	LH18/24- SP650_082019_BIX 8/20/19	LH18/24- SP650_082019_AIX 8/20/19	LH18/24- SP650_082719_AIX 8/27/19
Location Description			Collected from a spigot on the discharge of effluent TK-650.					
			Weekly	Monthly EFF	Weekly	Weekly	Weekly	Weekly
Perchlorate (6850)								
Perchlorate	µg/L	589	< 2.0 U	12	10	< 2.0 U	< 2.0 U	< 2.0 U

µg/L - micrograms per liter

U- Undetected: The analyte was analyzed for, but not detected and reported to the limit of detection.

BIX - before ion exchange

AIX - after ion exchange

GWTP Weekly Sampling - August 2019

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650_080619 8/6/19	LH18/24-SP650_081419 8/14/19	LH18/24-SP650_082019 8/20/19	LH18/24-SP650_082719 8/27/19
Location Description			GWTP—Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.			
Ammonia as N (350.3)						
Ammonia as N	mg/L	NV	11	11	8.9	1
Ortho-Phosphate (365.3)						
Ortho-Phosphate	mg/L	NV	3.16	2.25	2.53	2.04
Organic Carbon (415.1)						
Total Organic Carbon (TOC)	mg/L	NV	2.25	19	2.3	0.72

mg/L - milligrams per liter

NV - No Value

GWTP Bi-Weekly Sampling - August 2019

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650_080619 8/6/19	LH18/24-SP650_082019 8/20/19
Location Description			GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Biweekly.	
Volatile Organic Compounds (8260C)				
1,1,1-Trichloroethane	µg/L	7,230	< 0.5 U	< 0.5 U
1,1,2-Trichloroethane	µg/L	216.9	< 0.5 U	< 0.5 U
1,1-Dichloroethane	µg/L	14,032	< 0.5 U	< 0.5 U
1,1-Dichloroethene	µg/L	253	< 0.5 U	< 0.5 U
1,2-Dichloroethane	µg/L	181	0.42 J	0.53 J
1,2-Dichloropropane	µg/L	5	< 0.5 U	< 0.5 U
Acetone	µg/L	2,395	< 1.0 U	< 1.0 U
Benzene	µg/L	181	< 0.5 U	< 0.5 U
Carbon tetrachloride	µg/L	181	< 0.5 U	< 0.5 U
Chlorobenzene	µg/L	47,180	< 0.5 U	< 0.5 U
Chloroform	µg/L	3,615	< 0.5 U	< 0.5 U
Ethylbenzene	µg/L	57,025	< 0.5 U	< 0.5 U
m,p-Xylene	µg/L	83.6	< 1.0 U	< 1.0 U
Methylene chloride	µg/L	1,699	0.95 J	< 1.0 U
o-Xylene	µg/L	83.6	< 0.5 U	< 0.5 U
Styrene	µg/L	5,987	< 0.5 U	< 0.5 U
Tetrachloroethene	µg/L	180.7	< 0.5 U	< 0.5 U
Toluene	µg/L	4,189	< 0.5 U	< 0.5 U
Trichloroethene	µg/L	181	0.75 J	1.2
Vinyl chloride	µg/L	72	< 0.5 U	< 0.5 U
Anions (9056)				
Chloride	mg/L	NV	338	444
Sulfate	mg/L	NV	37.6	36.7

µg/L - micrograms per liter

mg/L - milligrams per liter

U- Undetected: The analyte was analyzed for, but not detected and reported to the limit of detection.

NV - No Value

J - estimated value between the detection limit and limit of quantitation and/or due to quality control issues

GWTP Monthly Effluent Sampling - August 2019

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650_081419 8/14/19
Location Description			GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled monthly
Volatile Organic Compounds (8260C)			
1,1,1-Trichloroethane	µg/L	7,230	< 0.5 U
1,1,2-Trichloroethane	µg/L	216.9	< 0.5 U
1,1-Dichloroethane	µg/L	14,032	< 0.5 U
1,1-Dichloroethene	µg/L	253	< 0.5 U
1,2-Dichloroethane	µg/L	181	< 0.5 U
1,2-Dichloropropane	µg/L	5	< 0.5 U
Acetone	µg/L	2,395	3.4
Benzene	µg/L	181	< 0.5 U
Carbon tetrachloride	µg/L	181	< 0.5 U
Chlorobenzene	µg/L	47,180	< 0.5 U
Chloroform	µg/L	3,615	< 0.5 U
Ethylbenzene	µg/L	57,025	< 0.5 U
m,p-Xylene	µg/L	83.6	< 1.0 U
Methylene chloride	µg/L	1,699	< 1.0 U
o-Xylene	µg/L	83.6	< 0.5 U
Styrene	µg/L	5,987	< 0.5 U
Tetrachloroethene	µg/L	180.7	< 0.5 U
Toluene	µg/L	4,189	< 0.5 U
Trichloroethene	µg/L	181	0.93 J
Vinyl chloride	µg/L	72	< 0.5 U
Metals (6020A)			
Barium	mg/L	2	0.138
Lead	mg/L	0.0046	< 0.00100 U
Selenium	mg/L	0.012	< 0.00250 U
Silver	mg/L	0.003	< 0.000500 U
Hexavalent Chromium (7196A)			
Hexavalent Chromium	mg/L	0.1244	< 0.0100 U
Semi-Volatile Organic Compounds (8270D SIM)			
1,4-Dioxane	µg/L	134.2	0.49

µg/L - micrograms per liter

mg/L - milligrams per liter

U- Undetected: The analyte was analyzed for, but not detected and reported to the limit of detection.

J - estimated value between the detection limit and limit of quantitation and/or due to quality control issues

GWTP Monthly Influent Sampling - August 2019

Location ID: Sample Date:	Units	LH18/24-SP140_081419 8/14/19
Location Description		GWTP – Collected from a spigot on the influent to TK-140. Sampled Monthly.
Metals (6020A)		
Selenium	mg/L	< 0.00250 U
Silver	mg/L	< 0.00050 U
Hexavalent Chromium (7196A)		
Hexavalent Chromium	mg/L	< 0.0100 U
Perchlorate (6850)		
Perchlorate	µg/L	8,800

mg/L - milligrams per liter

µg/L - micrograms per liter

U- Undetected: The analyte was analyzed for, but not detected and reported to the limit of detection.

LHAAP-18/24 Sampling Event - August 2019

Location ID: Sample Date:	Units	MCL/MSCL/P CL	18WW19 _080819 8/8/19	18WW20 _080819 8/8/19
			Site 18/24-NE, outside the fence line. Outer region.	Site 18/24-N, outside the fence line. Outer region.
Lab Package			HS19080486	HS19080486
Well ID			18WW19	18WW20
Perchlorate	µg/L	17*	< 2.0 U	< 2.0 U
1,1,1,2-Tetrachloroethane	µg/l	110	< 0.5 U	< 0.5 U
1,1,1-Trichloroethane	µg/l	200	< 0.5 U	< 0.5 U
1,1,2,2-Tetrachloroethane	µg/l	14	< 0.5 U	< 0.5 U
1,1,2-Trichloroethane	µg/l	5	< 0.5 U	< 0.5 U
1,1-Dichloroethane	µg/l	10,000	< 0.5 U	< 0.5 U
1,1-Dichloroethene	µg/l	7	< 0.5 U	< 0.5 U
1,1-Dichloropropene	µg/l	2.9	< 0.5 U	< 0.5 U
1,2,3-Trichlorobenzene	µg/l	310	< 0.5 U	< 0.5 U
1,2,3-Trichloropropane	µg/l	0.041	< 0.5 U	< 0.5 U
1,2,4-Trichlorobenzene	µg/l	70	< 0.5 U	< 0.5 U
1,2,4-Trimethylbenzene	µg/l	5,100	< 0.5 U	< 0.5 U
1,2-Dibromo-3-chloropropane	µg/l	0.2	< 0.5 U	< 0.5 U
1,2-Dibromoethane	µg/l	0.05	< 0.5 U	< 0.5 U
1,2-Dichlorobenzene	µg/l	600	< 0.5 U	< 0.5 U
1,2-Dichloroethane	µg/l	5	< 0.5 U	< 0.5 U
1,2-Dichloropropane	µg/l	5	< 0.5 U	< 0.5 U
1,3,5-Trimethylbenzene	µg/l	5,100	< 0.5 U	< 0.5 U
1,3-Dichlorobenzene	µg/l	3,100	< 0.5 U	< 0.5 U
1,3-Dichloropropane	µg/l	29	< 0.5 U	< 0.5 U
1,4-Dichlorobenzene	µg/l	75	< 0.5 U	< 0.5 U
2,2-Dichloropropane	µg/l	42	< 0.5 U	< 0.5 U
2-Butanone	µg/l	61,000	< 1.0 U	< 1.0 U
2-Chlorotoluene	µg/l	2,000	< 0.5 U	< 0.5 U
2-Hexanone	µg/l	6,100	< 1.0 U	< 1.0 U
4-Chlorotoluene	µg/l	2,000	< 0.5 U	< 0.5 U
4-Isopropyltoluene	µg/l	10,000	< 0.5 U	< 0.5 U
4-Methyl-2-pentanone	µg/l	8,200	< 1.0 U	< 1.0 U
Acetone	µg/l	92,000	< 1.0 U	< 1.0 U
Benzene	µg/l	5	< 0.5 U	< 0.5 U
Bromobenzene	µg/l	2,000	< 0.5 U	< 0.5 U
Bromochloromethane	µg/l	4,100	< 0.5 U	< 0.5 U
Bromodichloromethane	µg/l	4.6	< 0.5 U	< 0.5 U
Bromoform	µg/l	36	< 0.5 U	< 0.5 U
Bromomethane	µg/l	140	< 0.5 U	< 0.5 U
Carbon disulfide	µg/l	10,000	< 1.0 U	< 1.0 U
Carbon tetrachloride	µg/l	5	< 0.5 U	< 0.5 U
Chlorobenzene	µg/l	100	< 0.5 U	< 0.5 U
Chloroethane	µg/l	41,000	< 0.5 U	< 0.5 U
Chloroform	µg/l	1,000	< 0.5 U	< 0.5 U
Chloromethane	µg/l	220	< 0.5 U	< 0.5 U
cis-1,2-Dichloroethene	µg/l	70	< 0.5 U	< 0.5 U
cis-1,3-Dichloropropene	µg/l	5.3	< 0.5 U	< 0.5 U
Dibromochloromethane	µg/l	34	< 0.5 U	< 0.5 U
Dibromomethane	µg/l	380	< 0.5 U	< 0.5 U
Dichlorodifluoromethane	µg/l	20,000	< 0.5 U	< 0.5 U
Ethylbenzene	µg/l	700	< 0.5 U	< 0.5 U
Hexachlorobutadiene	µg/l	20	< 1.0 U	< 1.0 U

Isopropylbenzene	µg/l	10,000	< 0.5 U	< 0.5 U
m,p-Xylene	µg/l	10,000**	< 1.0 U	< 1.0 U
Methylene chloride	µg/l	5	< 1.0 U	< 1.0 U
Naphthalene	µg/l	2,000	< 0.5 U	< 0.5 U
n-Butylbenzene	µg/l	4,100	< 0.5 U	< 0.5 U
n-Propylbenzene	µg/l	4,100	< 0.5 U	< 0.5 U
o-Xylene	µg/l	10,000**	< 0.5 U	< 0.5 U
sec-Butylbenzene	µg/l	4,100	< 0.5 U	< 0.5 U
Styrene	µg/l	100	< 0.5 U	< 0.5 U
tert-Butylbenzene	µg/l	4,100	< 0.5 U	< 0.5 U
Tetrachloroethene	µg/l	5	< 0.5 U	< 0.5 U
Toluene	µg/l	1,000	< 0.5 U	< 0.5 U
trans-1,2-Dichloroethene	µg/l	100	< 0.5 U	< 0.5 U
trans-1,3-Dichloropropene	µg/l	29	< 0.5 U	< 0.5 U
Trichloroethene	µg/l	5	< 0.5 U	< 0.5 U
Trichlorofluoromethane	µg/l	31,000	< 0.5 U	< 0.5 U
Vinyl chloride	µg/l	2	< 0.5 U	< 0.5 U
Aluminum	mg/L	100	0.327	0.0246
Antimony	mg/L	0.006	< 0.005000 U	< 0.005000 U
Arsenic	mg/L	0.01	0.000655 J	< 0.005000 U
Barium	mg/L	2	0.119	0.0929
Beryllium	mg/L	0.004	< 0.005000 U	< 0.005000 U
Cadmium	mg/L	0.005	< 0.005000 U	< 0.005000 U
Calcium	mg/L	NV	6.82	2.93
Chromium	mg/L	0.1	0.0100	0.000595 J
Cobalt	mg/L	6.1	0.000430 J	0.00504
Copper	mg/L	1.3	< 0.00100 U	< 0.00100 U
Iron	mg/L	NV	15.8	4.37
Lead	mg/L	0.015	< 0.00100 U	< 0.00100 U
Magnesium	mg/L	NV	3.17	2.08
Manganese	mg/L	1.1*	0.279	0.220
Nickel	mg/L	0.49*	0.00475 J	0.00749
Potassium	mg/L	NV	2.04	1.33
Selenium	mg/L	0.05	< 0.00250 U	< 0.00250 U
Silver	mg/L	0.51	< 0.000500 U	< 0.000500 U
Sodium	mg/L	NV	22.5	26.2
Thallium	mg/L	0.002	< 0.000500 U	< 0.000500 U
Vanadium	mg/L	0.72	0.00202 J	0.000822 J
Zinc	mg/L	31	0.0211	0.0191
Mercury	mg/L	0.002	< 0.000100 U	< 0.000100 U
1,4-Dioxane	µg/l	9.1	NA	0.25

Notes:

Blue highlighting indicates concentrations above the MCL/MSC/PCL

NA - Not Analyzed

µg/L - micrograms per liter

mg/L - milligrams 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.

NV - No Value

*Perchlorate, manganese, and nickel compared to the PCL

** Value is for total xylenes

PCL – Texas Risk Reduction Program (TRRP) Tier 1 Groundwater Residential Protective Concentration Level



**Subject: Final Minutes, Quarterly Restoration Advisory Board (RAB) Meeting
Longhorn Army Ammunition Plant (LHAAP)**

Location of Meeting: Karnack Community Center, Karnack, Texas

Date of Meeting: July 25, 2019, 6:00 PM Central Daylight Time (CDT)

Meeting Participants:

Army BRAC:	Rose M. Zeiler
USACE:	Aaron Williams
USAEC:	Amanda Sherman
USGS:	Kent Becher
Bhate:	Kim Nemmers
APTIM:	Susan Watson
USEPA Region 6:	Dorelle Harrison
TCEQ:	April Palmie
USFWS:	Paul Bruckwicki
RAB:	Present: Judy VanDeventer, Paul Fortune, Carol Fortune, John Fortune, Charles Dixon, Nigel R. Shivers, and Sharron McAvoy Absent: Richard LeTourneau; Terry Britt; John Pollard, Jr.; Tom Walker; and Deon Hall
Public:	Laura-Ashley Overdyke (Executive Director of the Caddo Lake Institute [CLI]), Brad Eskue, Robert Speight, and Vicki Pace

An agenda for the RAB meeting, a color copy of the Bhate Environmental Associates, Inc. (Bhate) slide presentation, and handouts (see list at end of meeting minutes) were provided for meeting attendees.

Welcome and Introduction

Mr. Paul Fortune, RAB Installation Co-Chair, called the RAB meeting to order at 6:05 pm CDT. Mr. Fortune welcomed everyone and asked if there was anyone present that had not attended before. Ms. Amanda Sherman stated that she is with the U.S. Army Environmental Command (USAEC). Ms. Rose Zeiler introduced the new RAB members and presented the RAB agenda.

Ms. Zeiler then reviewed the list of RAB members and asked Ms. Laura-Ashley Overdyke if there was any interest in the RAB from the public outreach. Ms. Overdyke stated that the previous outreach did not result in anyone signing up, but that there are three other events scheduled for August 6 and 7, 2019, in Marshall, Jefferson, and Karnack, where the same handouts will be shared. Ms. Zeiler explained the purpose of the RAB. Ms. Zeiler explained that the meeting is held every 3 months and then presented the mission for the RAB. Ms. Zeiler welcomed anyone that might be interested in joining the RAB to complete an application. Ms. Kim Nemmers explained that the RAB member application is available on the website or can be emailed. Ms. Zeiler then explained what information is available on the LHAAP website, including the Administrative Record (AR) updated through December 2018. Ms. Zeiler stated that the website also has a calendar of activities including field activities ongoing at LHAAP.



Open Items

Ms. Zeiler noted that the April 2019 RAB Meeting minutes had been sent out in May 2019. Ms. Judy VanDeventer made a motion to accept the April 2019 RAB Meeting minutes. Ms. Carol Fortune seconded the motion.

Defense Environmental Restoration

LHAAP-50

Ms. Susan Watson discussed the LHAAP-50 Explanation of Significant Difference (ESD). Ms. Watson explained that the Record of Decision (ROD) selects the remedy and that the ESD describes a change in that selected remedy. Ms. Zeiler pointed to where LHAAP-50 is located within the LHAAP. Ms. Watson explained the site history for LHAAP-50. Ms. Watson explained that the site had a 47,000 gallon aboveground storage tank that received industrial waste water from sumps throughout Longhorn AAP. This process continued from 1955 until 1988. Ms. Watson stated that the water, after solids were filtered, was discharged to Goose Prairie Creek. Ms. Watson stated that investigations were conducted and contamination was identified in the area. Specifically, Ms. Watson stated that the contaminants included chlorinated solvents and perchlorate in the groundwater and also perchlorate in the soil. In 2010, the ROD selected monitored natural attenuation (MNA) for the groundwater, excavation of soil contamination that could leach into the groundwater, and land use controls (LUCs). The ROD also had a contingency remedy of enhanced in-situ bioremediation (EISB) if the MNA was not effective.

Ms. Watson explained that the Remedial Action-Operation [RA (O)] evaluated the remedy beginning in 2013. The RA (O) is conducted to reevaluate the remedy. In 2018, MNA was found to be ineffective based upon lines of evidence in a process developed by the USEPA. Ms. Watson explained that the first line of evidence is contaminant concentrations that evaluate changes in concentrations over time and distance. Ms. Watson explained that the concentrations of trichloroethene (TCE) and perchlorate increased from 2013 to 2018. In addition, Ms. Watson explained that the TCE plume expanded. Ms. Watson noted that the perchlorate plume did not expand. Therefore, Ms. Watson explained that the Army, Texas Commission on Environmental Quality (TCEQ), and United States Environmental Protection Agency (USEPA) agreed that the contingency remedy was needed to enhance MNA and address the site plumes. Ms. Watson stated that initiation of the contingency remedy required an ESD to the ROD. Ms. Watson explained that approval is necessary before implementation of the contingency remedy. The draft ESD proposed EISB as the contingency remedy and was submitted in April 2019 for Regulator review. Ms. Watson stated that comment resolution is ongoing. Ms. Watson stated that the next step is then the Contingency Remedial Action Work Plan (RAWP), which is currently being prepared. Ms. Watson explained that, due to the expansion of the plume, an additional well is being installed. Ms. Watson stated that the RAWP will be finalized after the groundwater data from the new well is received. Ms. Watson stated that the remedy is anticipated to be implemented in the Fall of 2019. Ms. Watson pointed out that the additional monitoring well location is in pink on RAB slide 10. Ms. Watson stated that 18 monitoring wells are currently sampled. Ms. Zeiler stated that the schedule for the remedial implementation will be on the LHAAP website.



Ms. Overdyke asked if the plume data at LHAAP-50 was included in the RAB meeting handouts. Ms. Watson stated that the data to define the extent of the plume has not been collected and was not in the handouts. Ms. Watson said that once the remedial design and RAWP were approved the details would be presented at a RAB meeting. Ms. Zeiler also explained that historic results could be found in the AR within the Annual RA (O) Reports, and then Ms. Watson explained how to search the AR online. Ms. Watson stated that the best way to find a document is to search the index for the site, and then go to the year and volume within the AR based upon the site search. Ms. Watson pointed out that each of the volumes have bookmarks labeled with letters to help find documents.

Overview of Sites

Ms. Watson discussed the field work completed the previous 3 months. Ms. Watson stated that groundwater elevation measurements were completed at LHAAP-16 in May 2019 to evaluate groundwater flow. Ms. Watson stated that RA (O) sampling was completed at several sites in May 2019 (LHAAP-37, LHAAP-50, and LHAAP-67) and that RA (O) sampling was completed at LHAAP-58 and LHAAP-18/24 in June 2019. Ms. Watson stated that some repairs and maintenance were also completed at LHAAP-18/24.

Ms. Watson then discussed the documents in process currently. For LHAAP-03, the remedial design and RAWP for the excavation was approved in July 2019. Ms. Zeiler noted that the excavation at LHAAP-03 was planned for the Fall of 2019. Ms. Watson mentioned the ongoing ESD and Contingency RAWP previously discussed, the annual RA (O) Report for LHAAP-58, and the quarterly evaluation reports for the groundwater treatment plant (GWTP).

Excavation and Injection Field Work

Ms. Watson discussed the field work planned for the fall, which includes injections and excavations. Ms. Watson noted that the work plan for the soil excavation at LHAAP-03 is final. Ms. Watson explained that paperwork needs to be filed with the TCEQ for the EISB injections at LHAAP-04, which is in process. For LHAAP-16, Ms. Watson explained that there are monitoring wells that need to be installed, which have not been installed to date due to wet conditions. Ms. Watson stated that once the monitoring wells at LHAAP-16 are installed, baseline samples will be collected and then the EISB injections will be completed. At LHAAP-17, Ms. Watson explained that the site has an excavation component as well as groundwater extraction system installations. Ms. Watson stated that the contingency EISB injections for LHAAP-50 was also planned for implementation in the fall 2019. Ms. Zeiler noted that the field work is approximately 2 months in duration to which Ms. Watson concurred. Ms. Watson noted that the field work for LHAAP-16, LHAAP-17, and LHAAP-50 is behind schedule due primarily to the wet conditions over the past months. Ms. Zeiler pointed out that both LHAAP-16 and LHAAP-17 were sites under the dispute resolution so these sites are now moving forward with the remedy implementation. Ms. Zeiler also noted that LHAAP-03 and LHAAP-04 were also held up by the dispute, but now the remedies are being implemented at those sites. Mr. Nigel Shivers asked if the rain had held up many of these remedies being implemented. Ms. Zeiler responded that the rainfall had held up work especially at the sites near the creeks. Ms. Overdyke asked if the hope is for August to help dry the sites out to which Ms. Zeiler concurred.



Ms. Nemmers then discussed the 3 month look ahead for LHAAP field work. Ms. Nemmers stated that remedy implementation at LHAAP-03, LHAAP-04, LHAAP-16, LHAAP-17 and LHAAP-50 is the primary focus for the next 3 months along with groundwater monitoring to evaluate performance of remedies in place at sites. Ms. Nemmers stated that monitoring wells are planned for installation the following week to begin the implementation of the remedies. Ms. Nemmers stated that the current schedule is for the excavation work at LHAAP-17 and LHAAP-03 to be completed first followed by the injections in September. Ms. Nemmers stated that the field activities completed in the coming months would be presented at the October 2019 RAB meeting.

Ms. Nemmers stated that the RAWP for LHAAP-50 will be finalized once the new well is installed and the groundwater analytical results are received. Ms. Nemmers stated that the plan is also to complete the injections in the coming month at LHAAP-50. Ms. Nemmers indicated that LHAAP-58 was discussed at RAB meetings last year and that the remedy is in place. Currently, quarterly groundwater sampling of the western plume is ongoing. The RA (O) Report for LHAAP-58 will be prepared to evaluate the past year of sampling but Ms. Nemmers stated that the results look good so far. Ms. Nemmers stated that the quarterly evaluation reports for the GWTP are in process with the fourth quarter 2018 report having been issued. Ms. Nemmers noted that these GWTP reports also include the groundwater analytical results for LHAAP-16 and LHAAP-18/24, which is why they are listed in the site name next to the document on the slides.

Groundwater Treatment Plant

Ms. Nemmers stated that there were handouts with the information on the slides for the GWTP that provide more details. Ms. Nemmers pointed out that the chart depicts discharge of treated water that includes water from the INF Pond so the peaks and valleys of the chart do not necessarily represent problems with the GWTP. The increase in flow in a particular month is typically associated with discharge to the Bayou from the INF pond. Ms. Nemmers stated that there were no major issues with the GWTP since the RAB last met but repairs were made at LHAAP-18/24 for the water conveyance line. In addition, Ms. Nemmers noted that a pump for moving water to the air stripper needed to be repaired.

Surface Water Sampling

Ms. Nemmers presented the five locations sampled for surface water and stated that results are usually non-detect and well below the action level. Ms. Nemmers stated that there were no issues to note this past quarter. Ms. Nemmers stated that this information is also provided in a handout.

LHAAP-18/24, LHAAP-29, and LHAAP-47

Mr. Aaron Williams explained that HDR, Inc., has a separate contract for sites that do not have a ROD and is responsible for selection of the final remedy at three sites (LHAAP-18/24, LHAAP-29, and LHAAP-47). Mr. Williams explained that LHAAP-18/24 is now in the ROD phase. Mr. Williams stated that the draft ROD for LHAAP-18/24 is expected to go to the Regulators in September 2019 as the document is currently in Army review. Mr. Williams stated that the Draft Final ROD for LHAAP-29 was submitted to the Regulators on July 15, 2109. If the Regulators have no further



concerns, Mr. Williams indicated that the LHAAP-29 ROD will be ready for signatures on August 15, 2019. For LHAAP-47, Mr. Williams explained that an Addendum to the Post-Screening Investigation (PSI) Report was completed and submitted to the Regulators on July 1, 2019. Mr. Williams discussed that the four surface water samples, collected as part of the PSI Addendum, showed all results were below standards. Mr. Williams also noted that water levels were collected from monitoring wells sampled nearest the surface water samples to determine if the groundwater was contributing to Goose Prairie Creek, and that only one monitoring well had a groundwater elevation higher than the creek. Mr. Williams stated that the revised Draft ROD is planned for submittal to the Regulators in August 2019.

Mr. Williams stated that the Five Year Review (FYR) was completed in May 2019 and will be added to the AR. Mr. Williams stated that the FYR was completed to determine if the interim and final remedies at 12 LHAAP sites are or remain protective of human health and the environment. Mr. Williams stated that the conclusion of the FYR was that all of the remedies are protective or short-term protective. For sites that were short-term protective, recommendations were noted in the FYR. Mr. Williams stated that the recommendations are either being implemented or are in the process of being implemented. More specifically, Mr. Williams stated that the final remedy for LHAAP-16 is being implemented and the final ROD for LHAAP-18/24 is in process. Mr. Williams stated that many of the monitoring wells at LHAAP-46 are dry, but that the contractor is going to the site during heavy rain periods to determine if groundwater is present in the monitoring wells and sample, if so. This data collected, if able, will be used to evaluate declining trends during high recharge periods. Mr. Williams stated that the contingency remedy for LHAAP-50 is being implemented as discussed earlier in the meeting, and that the EISB remedy and performance monitoring at LHAAP-58 has already been completed. Mr. Williams stated that additional wells are being installed at LHAAP-12, LHAAP-50, and LHAAP-67 the following week if the sites remain dry. Mr. Williams pointed out the location for the new monitoring well at LHAAP-12, which is where monitoring well 12WW10 was previously located. The FYR pointed out that no well is located downgradient of the plume to evaluate if the plume is moving. Mr. Williams pointed out the two new monitoring well locations planned at LHAAP-67 to confine the plume boundary based upon 1,1-dichloroethene detections.

Mr. Shivers asked if the draft final ROD for LHAAP-29 had been submitted. Ms. April Palmie explained that the USEPA and TCEQ had issued comments and that if those comments were addressed satisfactorily, then the ROD will be routed for signature. Ms. Palmie explained that the ROD is within the middle of the 30-day review time frame for the regulators because the ROD was submitted on July 15, 2019. Mr. Shivers asked if there was a schedule for the signatures. Ms. Palmie explained that Ms. Zeiler usually obtains the signatures relatively quickly and that the USEPA is hoping the ROD will be finalized by September 30, 2019.

Next RAB Meeting Schedule and Closing Remarks

Ms. Zeiler then discussed the next meeting with the RAB members. It was decided that the next RAB Meeting will be held on **October 17, 2019**, with the **meeting starting at 6:00 pm CDT** at the Karnack Community Center. Ms. Zeiler requested public questions or topics to be discussed at the next RAB meeting.



Adjourn

Ms. VanDeventer made the motion to adjourn and Mr. Paul Fortune seconded the motion. The meeting adjourned at 5:41 pm CDT.

July 2019 Meeting Attachments and Handouts:

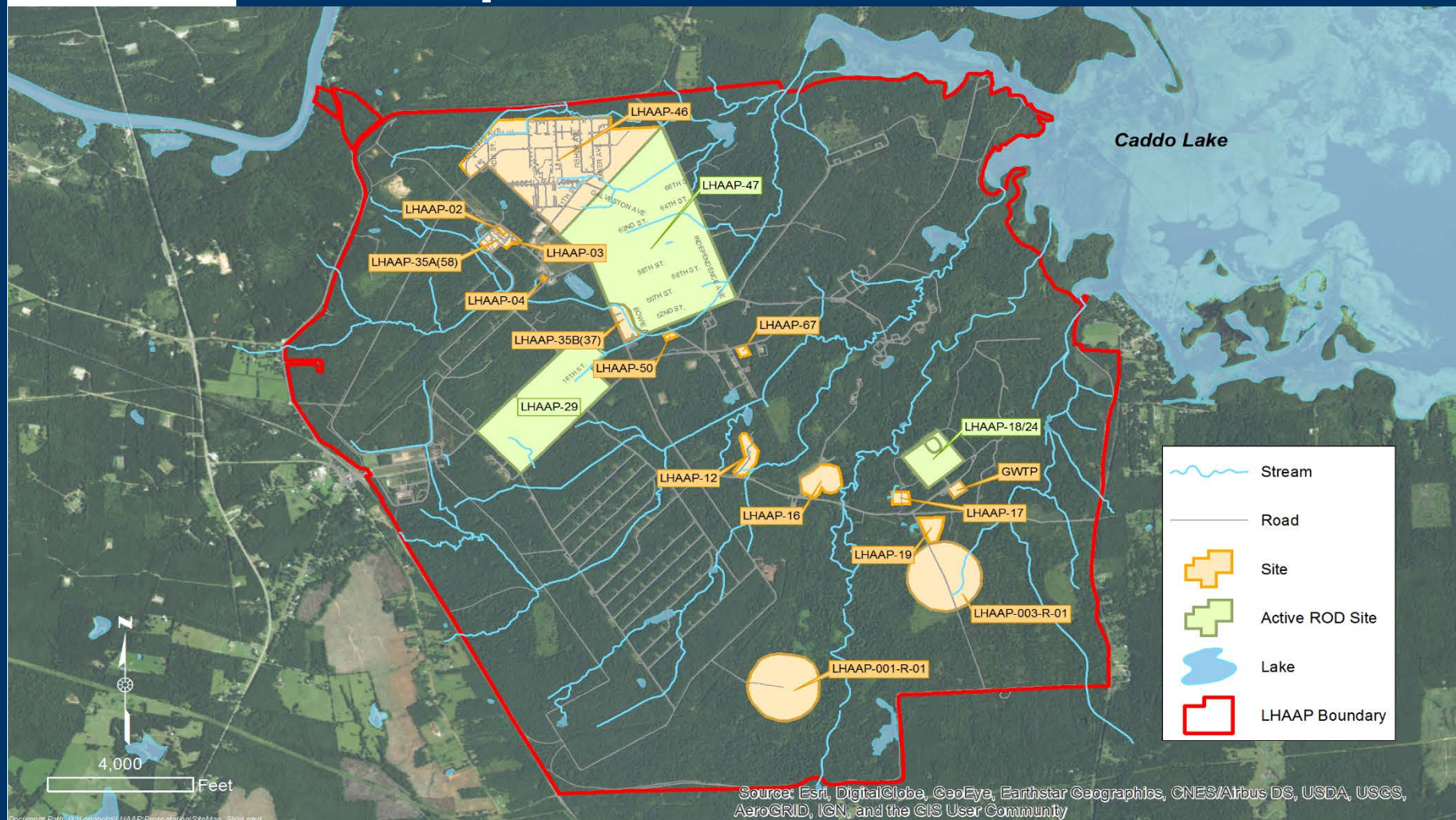
- Meeting Agenda
- Color Copy of Bhate Presentation Slides
- GWTP – Processed Groundwater Volumes Handout
- Surface Water Sampling Handout

Longhorn Army Ammunition Plant Quarterly Restoration Advisory Board Meeting

**Karnack Community Center
July 25, 2019
6:00 PM CDT**

Restoration Advisory Board Meeting

Site Map



Abbreviations and Acronyms

µg/L	Micrograms per liter
DERP	Defense Environmental Restoration Program
ECP	Environmental Condition of Property
EISB	Enhanced In Situ Bioremediation
ESD	Explanation of Significant Differences
ft bgs	Feet below ground surface
GPW	Goose Prairie Creek Water Sample
GW-Res	Residential Groundwater
GWTP	Groundwater Treatment Plant
HBW	Harrison Bayou Water Sample
ISB	In-Situ Bioremediation
LHAAP	Longhorn Army Ammunition Plant
MNA	Monitored natural attenuation

PCL	Protective Concentration Level
PDI	Pre-Design Investigation
PSI	Pre-Screening Investigation
RAB	Restoration Advisory Board
RA(O)	Remedial Action Operation
RAWP	Remedial Action Work Plan
ROD	Record of Decision
TCE	Trichloroethylene
TCEQ	Texas Commission on Environmental Quality
TRRP	Texas Risk Reduction Program
USEPA	U.S. Environmental Protection Agency

Agenda

- 06:00 Welcome and Introduction
- 06:05 Open Items {RMZ}
 - Purpose of the RAB Meeting
 - Ongoing Outreach/Website
 - RAB Administrative Issues
 - o Minutes (April 2019 RAB Meeting)
- 06:15 Defense Environmental Restoration Program (DERP) Update {Bhate}
 - LHAAP-50 ESD to the September 2010 ROD
 - Documents and Field Work Completed since last RAB
 - Upcoming Excavation and Injection Field Work
 - Three Month Look ahead
 - Groundwater Treatment Plant (GWTP) Update
- 06:45 Other Defense Environmental Restoration Program (DERP) Update {RMZ}
 - LHAAP-18/24 Record of Decision and Responsiveness Summary
 - LHAAP-29 Record of Decision and Responsiveness Summary
 - LHAAP-47 Record of Decision and Responsiveness Summary
 - Five Year Review Update – Recommendations for Sites 12, 50 and 67
- 06:55 Next RAB Meeting Schedule and Closing Remarks {RMZ}

Purpose of the RAB Meeting

- Held every 3 months
- The mission of the Longhorn Army Ammunition Plant (LHAAP) RAB is to promote community awareness and obtain constructive community review and comments on environmental restoration activities at the former LHAAP

The Army Wants You to be Informed

- The Army is committed to protecting human health and the environment; key to that commitment is engaging the community and increasing public participation in environmental restoration at LHAAP
- You are encouraged to:
 - Attend RAB Meetings and/or become a member of the RAB
 - Visit the Longhorn environmental website at www.longhornaap.com
 - Website is regularly updated to indicate the upcoming field events at each site including groundwater sampling, monitoring well installations, soil sampling, or remediation activities
 - Make suggestions for improving communication – the Army welcomes and appreciates community feedback

RAB Administrative Issues

- **Welcome our newest RAB Members**
 - Sharron McAvoy
 - Deon Hall
 - John R. Fortune
- **Current RAB Members**

• Judy VanDeventer	• John R. Fortune
• Tom Walker	• Paul Fortune
• Charles Dixon	• John Pollard, Jr.
• Carol Fortune	• Richard LeTourneau
• Sharron McAvoy	• Terry Britt
• Deon Hall	• Nigel Shivers
- **Discussion of April 2019 RAB Meeting minutes/motion to accept**

LHAAP-50 ESD to September 2010 ROD

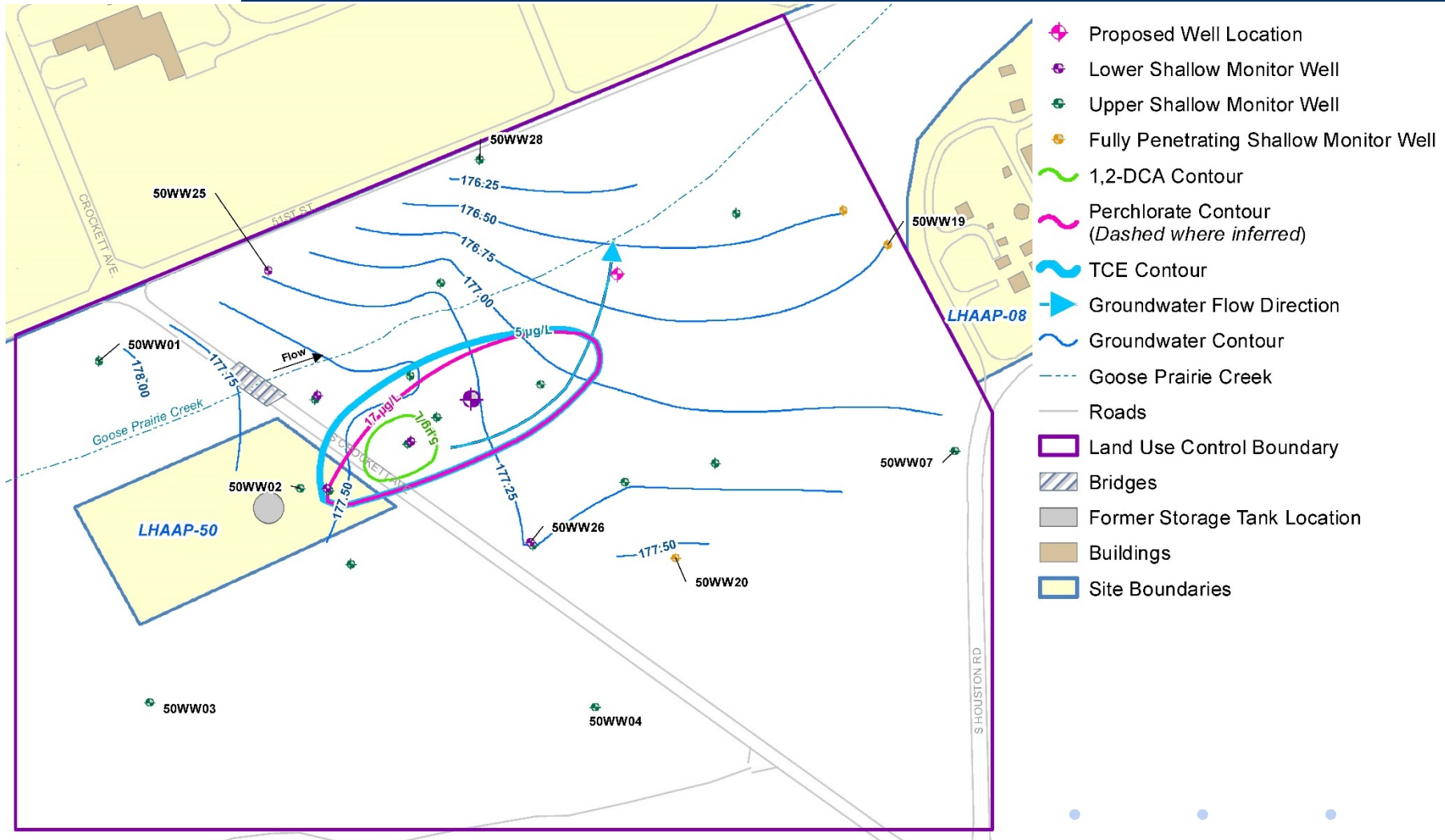
- **Site Background**
 - LHAAP-50 had a 47,000-gallon aboveground storage tank receiving industrial wastewater from various production sumps throughout LHAAP between 1955 and 1988
 - After solids were filtered, the water was discharged to Goose Prairie Creek
 - Constituents of concern at LHAAP-50 were chlorinated solvents and perchlorate in groundwater and perchlorate in soil
 - The selected remedy in the 2010 Record of Decision (ROD) was monitored natural attenuation (MNA), excavation of soil to eliminate groundwater contamination from contaminated soil, and land use controls as the remedy for groundwater. The ROD also included a contingency remedy for groundwater if MNA was not effective.
- **Groundwater Remedial Action Operation (RA[O]) Monitoring**
 - RA(O) groundwater Monitoring began in 2013
 - In 2018, MNA was found to be ineffective based on evaluation of several lines of evidence
 - The first line of evidence is based on contaminant concentrations
 - Concentrations of trichloroethylene (TCE) and perchlorate increased from 2013 to 2018, and the TCE plume has expanded beyond its baseline footprint



LHAAP-50 ESD to September 2010 ROD

- **Explanation of Significant Differences**
 - The Army, USEPA, and TCEQ agree that the contaminant plume has expanded in groundwater at LHAAP-50 and that a contingency remedy to enhance MNA is needed to address the chlorinated solvents and perchlorate in groundwater
 - To initiate the contingency remedy, an ESD to the approved ROD is required
 - The Draft ESD, proposing in situ bioremediation as a contingency remedy, was submitted for regulatory review in April 2018 and comment resolution is ongoing
 - A Contingency Remedial Action Work Plan (RAWP) is being prepared for the implementation of the contingency remedy
 - One additional shallow zone groundwater monitoring well is proposed to better define the plume as part of the contingency remedial action
 - Implementation of the Contingency RAWP is anticipated in Fall 2019

LHAAP-50 New Well Location



Completed Field Work Since Last RAB Meeting

Site	Activity
LHAAP-16	Groundwater Elevation Measurements – May 2019
LHAAP-37	RA(O) Sampling – May 2019
LHAAP-50	RA(O) Sampling – May 2019
LHAAP-58	RA(O) Sampling – June 2019
LHAAP-67	RA(O) Sampling – May 2019
LHAAP-18/24	RA(O) Sampling – June 2019 and maintenance/repairs

Documents in Process

Site	Document
LHAAP-03	Remedial Design and RAWP (Approved July 2019)
LHAAP-50	ESD Contingency RAWP
LHAAP-58	Annual RA(O) Report
GWTP	Quarterly Evaluation 4 th Quarter (October - December 2018) Quarterly Evaluation 1 st Quarter (January – March 2019) Quarterly Evaluation 2 nd Quarter (April – June 2019)

Excavation and Injection Field Work

- **Planned Major Remedial Field Work Activities for Summer/Fall 2019**
 - LHAAP-03 Soil Excavation
 - LHAAP-04 ISB Injections
 - LHAAP-16 Well Installations and In Situ Bioremediation (ISB) Injections
 - LHAAP-17 Excavation and Groundwater Extraction System Installation
 - LHAAP-50 Contingency ISB Injections
- **Challenges**
 - Key LHAAP-16 well installations delayed by wet conditions along Harrison Bayou
 - LHAAP-17 excavation area requires dryer conditions to allow large trucks and equipment to access site
 - LHAAP-50 injection plan is dependent upon data from a new well, which cannot be installed until the site dries out

3 Month Look Ahead - Field Work by Bhate Team

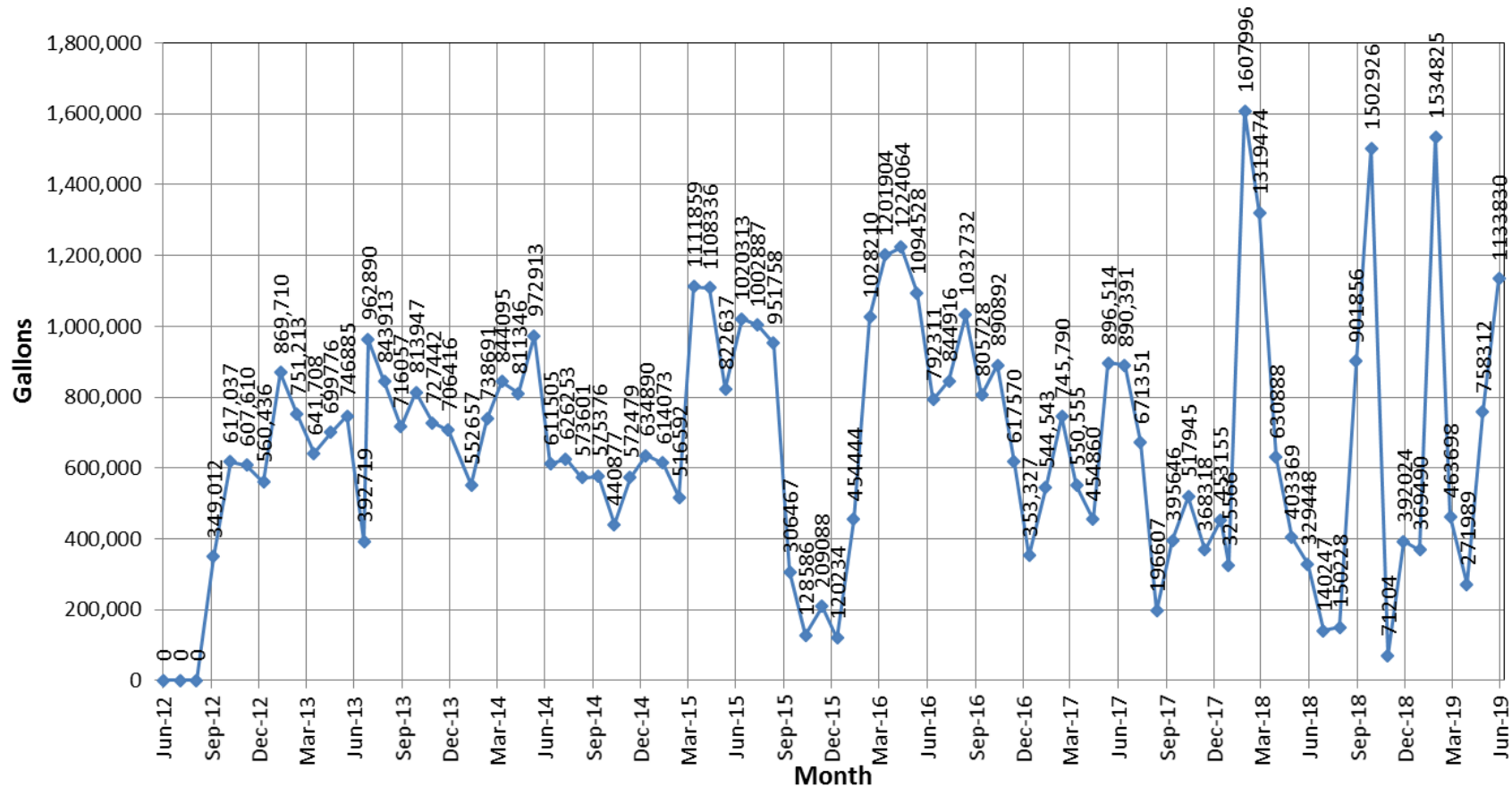
Site	Activity
LHAAP-03	Complete soil excavation
LHAAP-04	Complete ISB injections
LHAAP-16	Complete well installations and ISB injections
LHAAP-17	Complete soil excavation and extraction system installation
LHAAP-37	RA(O) Sampling – August 2019
LHAAP-58	RA(O) Sampling – September 2019

3 Month Look Ahead – Documents by Bhate Team

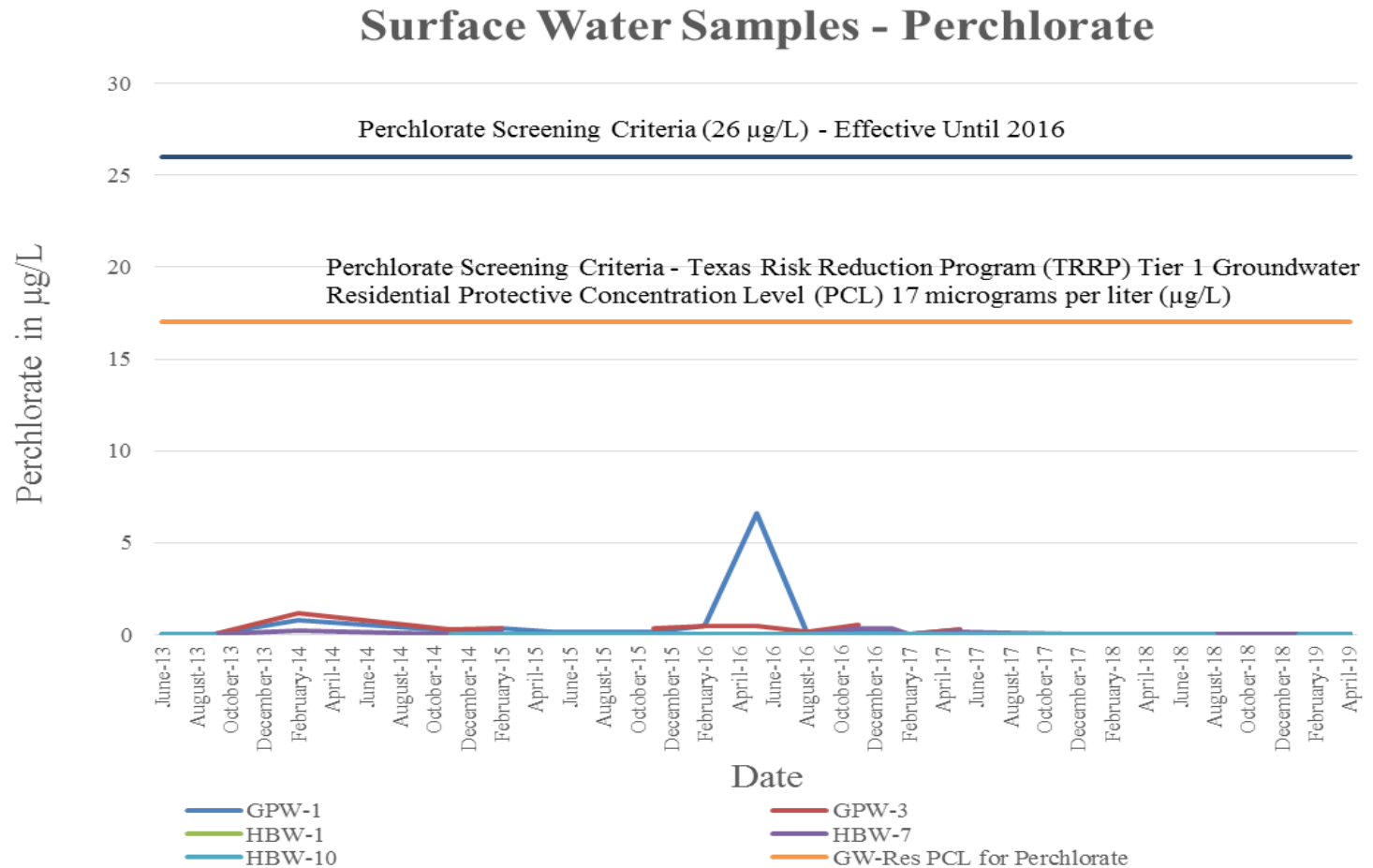
Site	Document
LHAAP-50	Explanation of Significant Differences Remedial Action Work Plan
LHAAP-58	RA(O) Report
GWTP, LHAAP-16, and LHAAP-18/24	Quarterly Evaluation Report: Fourth Quarter (October – December) 2018 Quarterly Evaluation Report: First Quarter (January – March 2019) Quarterly Evaluation Report: Second Quarter (April – June 2019)

GWTP Update

Treated Groundwater Discharged Monthly from June 2012 through June 2019



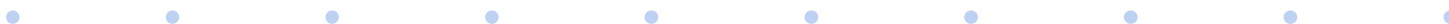
Surface Water Sample Results

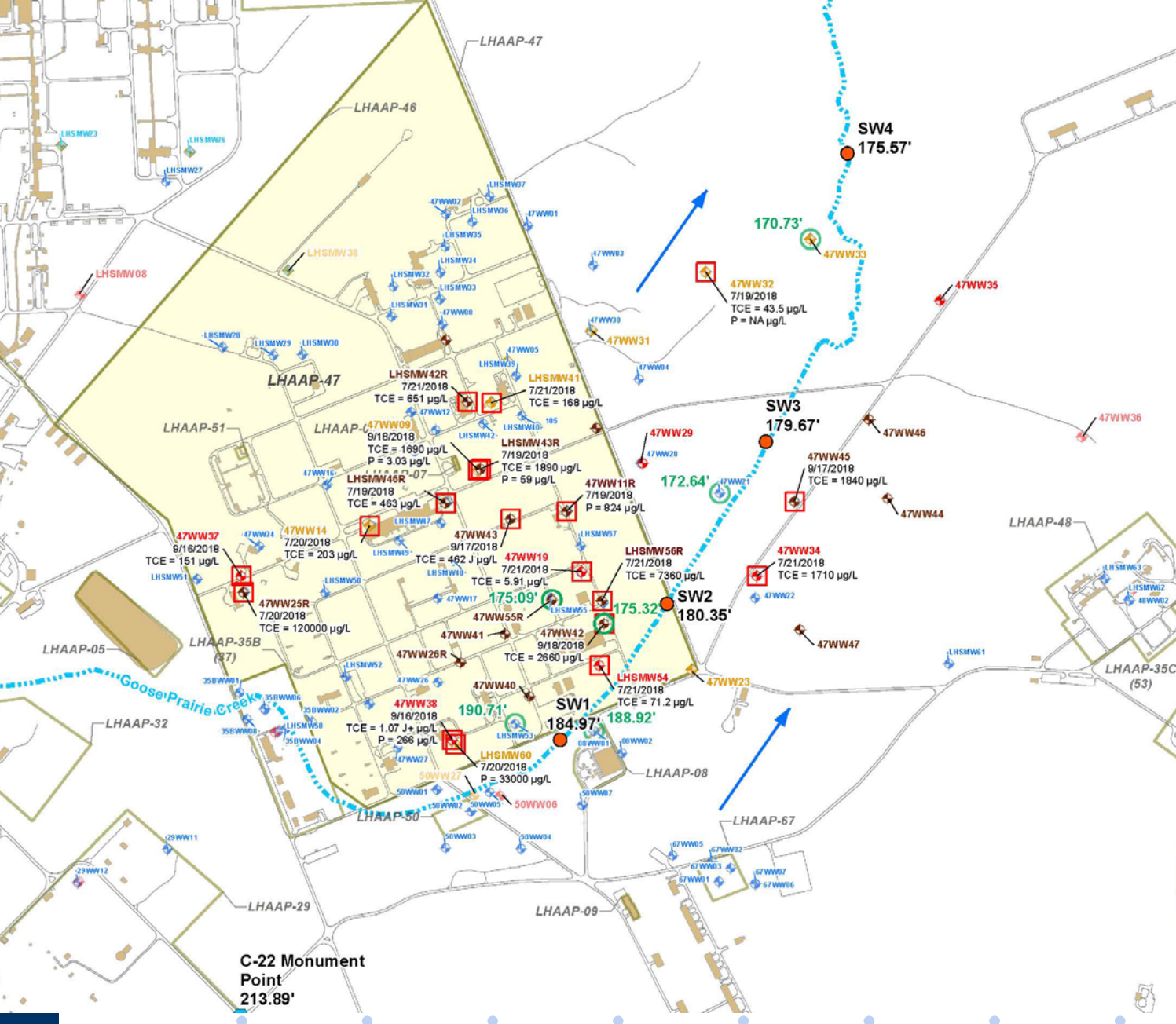




LHAAP-18/24, 29 & 47 HDR Document Status

- **LHAAP-18/24**
 - **Draft Record of Decision submittal planned for September 2019**
- **LHAAP-29**
 - **Draft Final Record of Decision submitted to Regulators on July 15, 2019**
- **LHAAP-47**
 - **Draft Addendum Post Screening Investigation Report submitted to regulators on July 1, 2019**
 - **Revised Draft Final Record of Decision planned for August 2019**





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LEGEND

LHAAP47 Surface Water Samples

- C-22 Monument Point Surface Water Samples (184.97' = elevation above mean sea level)
- Nearby Ground Water Elevations (170.93' = elevation above mean sea level)
- Monitoring Well With Contaminant That Exceeds Cleanup Criteria
- Sampled Shallow/Intermediate Monitoring Well
- Shallow/Intermediate Monitoring Well (Not Sampled)
- Intermediate Monitoring Well (Not Sampled)
- Sampled Intermediate Monitoring Well
- Sampled Intermediate (Upper) Monitoring Well
- 2010 Shallow Monitoring Well
- 2010 Shallow/Intermediate Monitoring Well
- Goose Prairie Creek
- Roads
- Building
- LHAAP-47
- Site LHAAP
- Groundwater Flow Direction

The coordinates for sample location SW2 were revisited April 25, 2019 due to irregular readings originally recorded.

SURFACE WATER SAMPLE LOCATIONS AND NEARBY MONITORING WELLS

LHAAP 47
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

0 500 1,000
FEET

LHAAP 2019 Five Year Review Summary

Purpose: Evaluate whether the Interim Remedial Action or Final Remedial Actions implemented at twelve LHAAP sites are or remain protective of human health and the environment

Sites Evaluated: LHAAP-12, LHAAP-16, LHAAP-18/24, LHAAP-37, LHAAP-46, LHAAP-49, LHAAP-50, LHAAP-58, LHAAP-67, LHAAP-001-R-01, LHAAP-003-R-01 and LHAAP-004-R-01

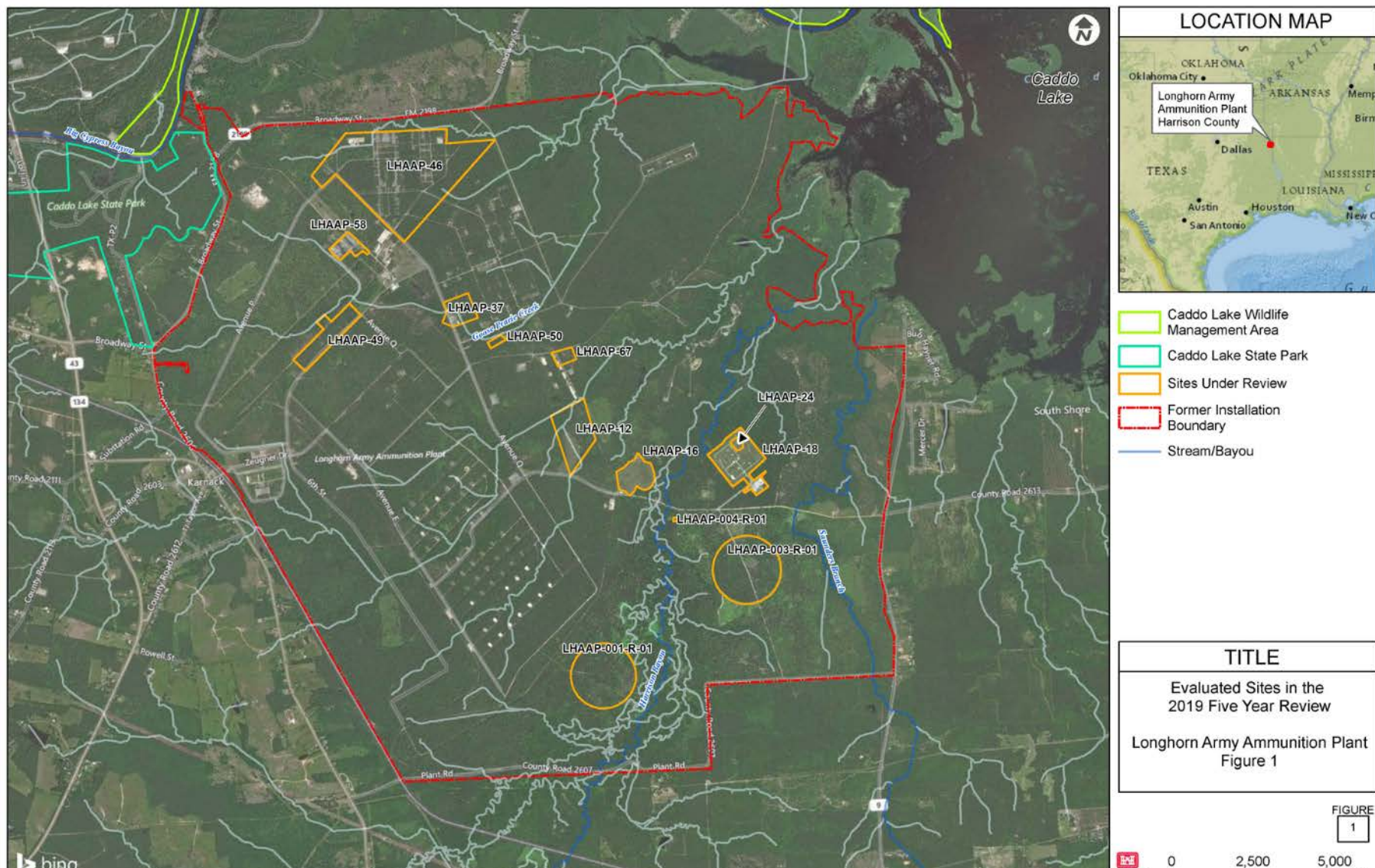
Conclusions: The remedial actions for all sites are either protective or short-term protective

For sites that were found to be short-term protective, issues were identified that could affect future protectiveness

Recommendations to address issues include: implement the final remedy (LHAAP-16 and LHAAP-18/24), evaluate declining trends during high recharge periods (LHAAP-46), implement contingency remedy (LHAAP-50), implement EISB performance monitoring (LHAAP-58), install additional well/wells (LHAAP-12 and LHAAP-67)



LHAAP Five Year Review Summary

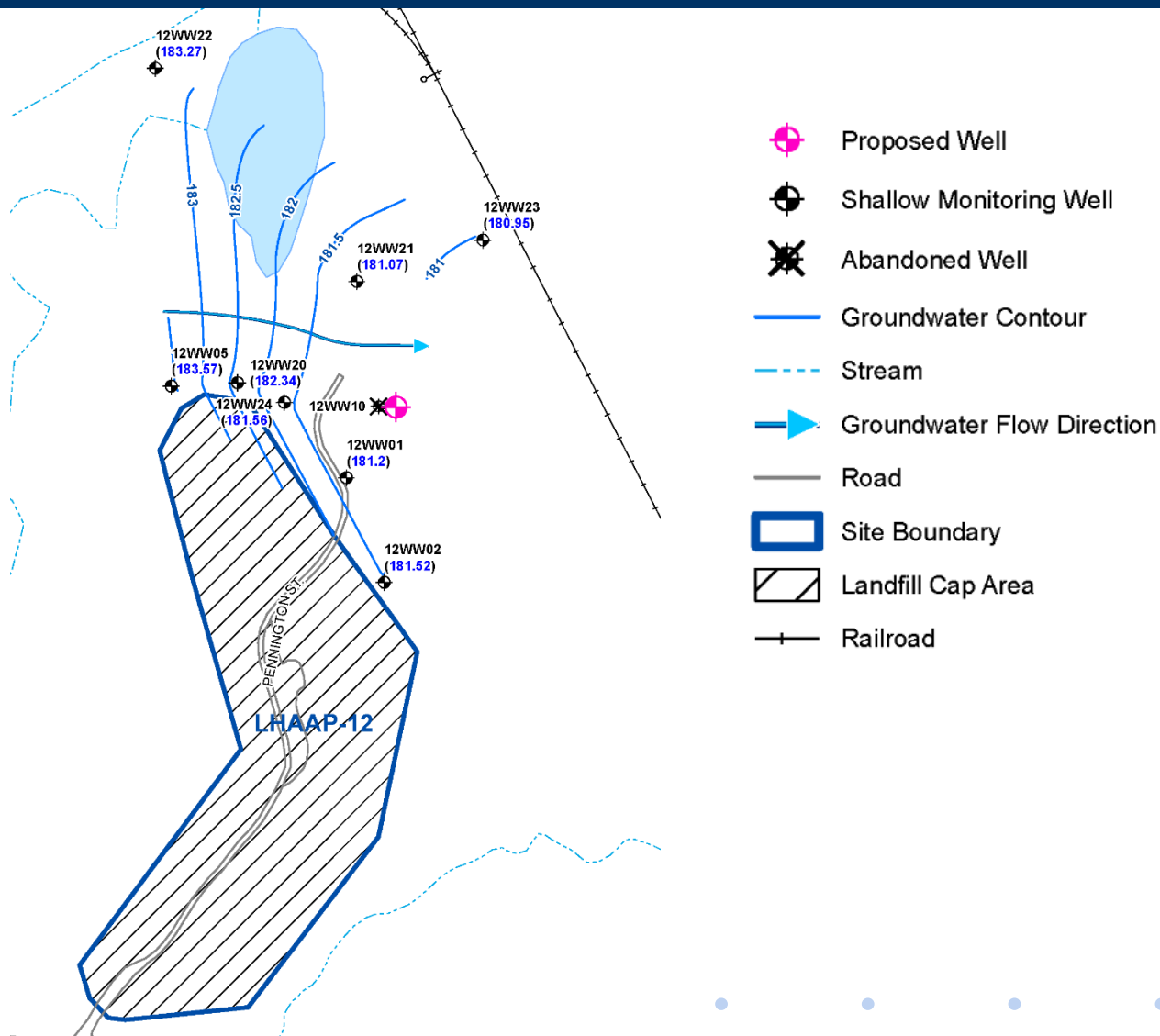


LHAAP-12, -50, and -67 Recommendations

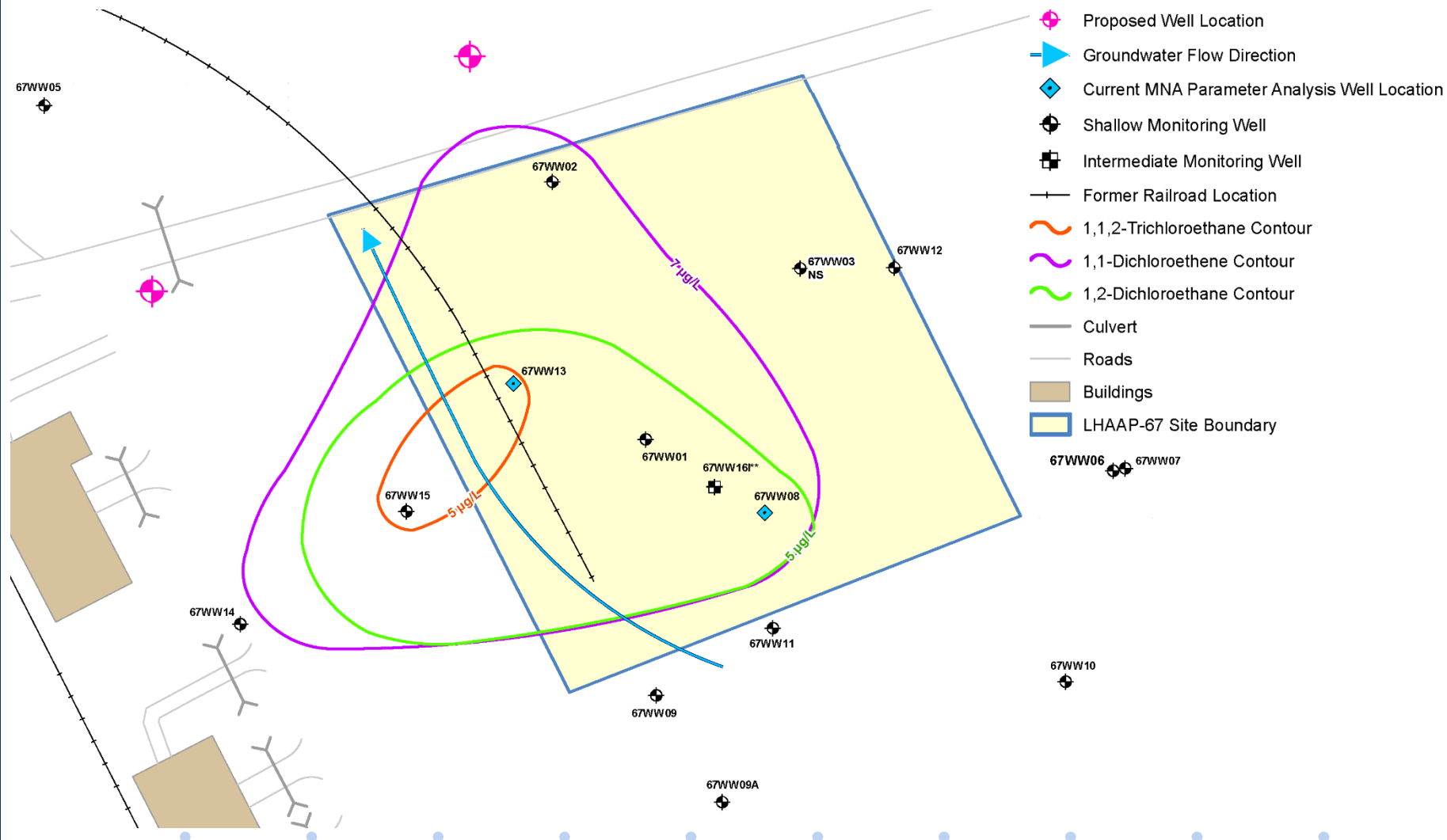
- LHAAP-12 FYR Recommendation:
 - Establish a well network that captures seasonal and spatial variations in Chemical of Concern-impacted groundwater flow direction by adding a well to the southeast.
- LHAAP-50 FYR Recommendation:
 - Implement Enhanced In Situ Bioremediation (EISB) performance monitoring and assess if additional monitoring wells are required to delineate the plume to the south and southwest.
- LHAAP-67 Recommendation:
 - Evaluate data in the north area of the plume to determine if temporary exceedances indicate plume migration or require extension of the plume boundary well monitoring system



LHAAP-12 New Monitoring Well Location



LHAAP-67 New Monitoring Well Locations



Next RAB Meeting Schedule & Closing Remarks

- Schedule October 2019 RAB Meeting
- Other Issues/Remarks
- Thank you for coming

Groundwater Treatment Plant - Processed Groundwater Volumes

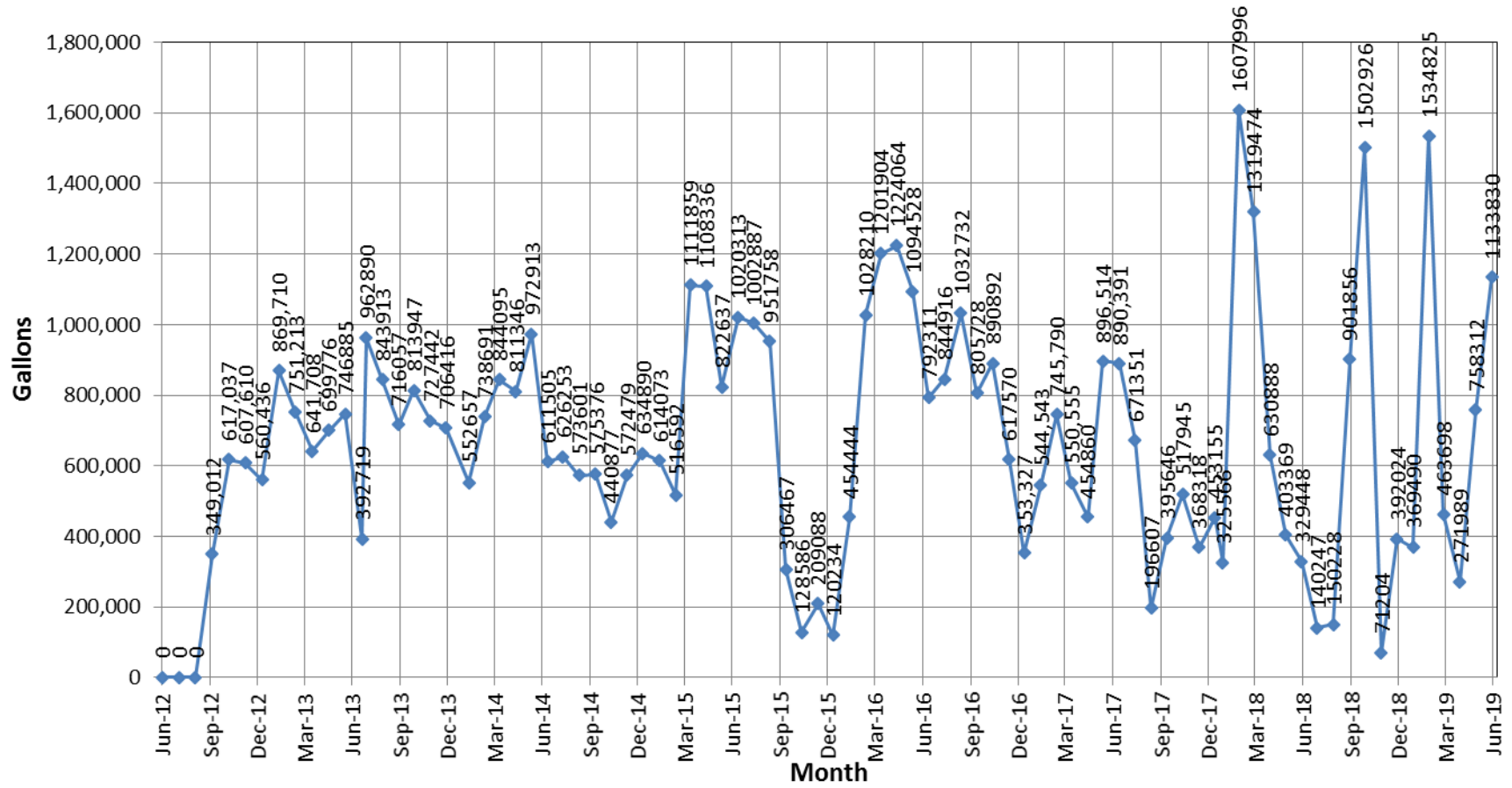
The amount of groundwater treated is determined by measuring the number of gallons of processed water discharged.

Processed Water Discharged Data (in gallons)

Oct-07	Nov-07	Dec-07	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08
1,041,491	848,356	804,822	792,148	665,883	818,872	791,306	568,812	776,904	748,377	690,052	617,199
Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09
655,059	619,274	726,118	552,299	598,144	433,800	488,807	526,958	387,644	0	414,853	735,716
Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10
808,322	636,306	727,492	391,898	695,343	802,656	894,731	962,121	1,257,977	1,314,924	1,041,495	1,136,547
Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11
956,567	705,805	849,712	811,679	668,281	1,090,348	817,325	900,338	916,552	784,369	652,524	733,456
Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12
748,102	658,250	684,903	865,453	725,000*	730,000*	980,000*	630,000*	0	0	0	349,012
Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
617,037	607,610	560,436	869,710	751,213	641,708	699,776	746,885	392,719	962,890	843,913	716,057
Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14
813,974	727,442	706,416	552,657	738,691	844,095	811,346	972,913	611,505	626,253	573,601	575,376
Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15
440,877	572,479	634,890	614,073	516,592	1,111,859	1,108,336	822,637	1,020,313	1,002,887	951,758	306,467
Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16
128,586	209,088	120,234	454,444	1,028,210	1,201,904	1,224,064	1,094,528	792,311	844,916	1,032,732	805,728
Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17
890,892	617,570	353,327	544,543	745,790	550,555	454,860	896,514	890,391	528,538	195,198	961,324
Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul - 18	Aug-18	Sep-18
517,945	368,318	453,155	325,566	1,607,996	1,319,474	630,888	403,369	329,448	140,247	150,228	901,856
Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	June-19			
1,502,926	71,204	392,024	369,490	1,534,825	463,698	271,989	758,312	1,133,830			

*Indicates Estimate

Treated Groundwater Discharged Monthly from June 2012 through June 2019



Water Discharge Location and Volume (Gallons)

Month	Total Combined to Harrison Bayou	LHAAP-18/24 Sprinklers	GWTP To INF Pond	INF Pond to Harrison Bayou	Contract Hauled Off-Site
Dec-16	0	236,688	0	0	0
Jan-17	0	0	0	0	0
Feb-17	0	0	0	0	14,355
Mar-17	127,242	0	0	0	14,400
Apr-17	113,038	0	236,821	0	0
May-17	0	0	534,155	0	0
Jun-17	958,404	0	294,550	490,574	0
Jul-17	0	0	528,538	0	0
Aug-17	0	0	195,197	0	0
Sep-17	651,434	0	309,980	651,434	0
Oct-17	0	0	517,945	0	0
Nov-17	0	0	368,318	0	0
Dec-17	560,350	0	453,155	560,350	0
Jan-18	325,566	0	253,177	325,566	0
Feb-18	1,607,996	0	62,017	1,430,634	0
Mar-18	1,319,474	0	0	870,816	0
Apr-18	630,888	0	0	630,888	0
May-18	403,369	0	0	403,369	0
Jun-18	193,669	0	135,779	0	0
Jul -18	0	0	140,247	0	0
Aug -18	49,409	0	100,819	0	0
Sep-18	585,397	0	316,459	524,484	0
Oct-18	1,409,106	0	93,820	1,016,285	0
Nov-18	71,204	0	0	0	0
Dec-18	392,024	0	0	0	0
Jan-19	369,490	0	0	369,490	0
Feb-19	1,534,825	0	0	1,326,485	0
Mar-19	463,698	0	0	83,250	0
Apr-19	271,989	0	0	0	0
May-19	758,312	0	0	253,817	0

Month	Total Combined to Harrison Bayou	LHAAP-18/24 Sprinklers	GWTP To INF Pond	INF Pond to Harrison Bayou	Contract Hauled Off-Site
Jun-19	1,133,830	0	0	847,918	0

Harrison Bayou and Goose Prairie Creek – Perchlorate Data

Surface water samples are collected quarterly from each location in Harrison Bayou and Goose Prairie

Creek, unless the sampling location is dry.

Surface Water Sample Data (in micrograms per liter)

Quarter	3 rd	4 th	1 st	2 nd	3 rd	4 th	1 st	2 nd	3 rd	4 th	1 st
Creek Sample ID	Jul 1999	Sep 1999	Feb 2000	Apr 2000	Aug 2000	Dec 2000	Feb 2001	Apr 2001	July 2001	Oct 2001	Jan 2002
GPW-1	<1.0U	-	4	<4.0 U	<4.0 U	<4.0 U	-	2.65	<4.0 U	<4.0 U	<4.0 U
GPW-3	<1.0U	<4.0 U	17	8	<4.0 U	<4.0 U	-	2.28	<4.0 U	<4.0 U	<4.0 U
HBW-1	-	<80.0 U	310	23	-	-	<4.0 U	-	<4.0 U	<4.0 U	<4.0 U
HBW-7	-	<8.0 U	370	110	-	-	<4.0 U	-	<4.0 U	<4.0 U	<4.0 U
HBW-10	-	<8.0 U	905	650	<4.0 U	-	<4.0 U	-	<4.0 U	-	-

Quarter	2 nd	3 rd	4 th	1 st	2 nd	3 rd	3 rd	4 th	2 nd	3 rd	4 th
Creek Sample ID	June 2002	Sept 2002	Dec 2002	Feb 2003	June 2003	Aug 2003	July 2004	Dec 2006	May 2007	Aug 2007	Dec 2007
GPW-1	<4.0 U	<4.0 U	18.3	18.6	59.9	-	2.25	-	<1.0 U	<1.0 U	10.7
GPW-3	<4.0 U	<4.0 U	5.49	12.6	14.7	-	2.2	-	<1.0 U	<1.0 U	7.48
HBW-1	<4.0 U	<4.0 U	<4.0 U	-	<4.0 U	99.3	<0.2U	<1.0 U	<1.0 U	122	<1.0 U
HBW-7	<4.0 U	<4.0 U	<4.0 U	-	<4.0 U	<4.0 U	<0.2U	<1.0 U	<1.0 U	1.02	<1.0 U
HBW-10	<4.0 U	<4.0 U	<4.0 U	-	<4.0 U	-	<0.2U	<1.0 U	<1.0 U	<1.0 U	<1.0 U

Quarter	1 st	2 nd	3 rd	4 th	2 nd	3 rd	3 rd	3 rd	4 th	1 st	2 nd
Creek Sample ID	Mar 2008	Jun 2008	Sep 2008	Dec 2008	May 2009	Jul 2009	Aug 2009	Sep 2009	Dec 2009	Mar 2010	Jun 2010
GPW-1	27	<0.5U	<0.5U	<0.22U	16	<4U	NS	<1.2U	3.7	1.3J	<0.6U
GPW-3	21.9	9.42	1.1	<0.22U	8.9	<4U	NS	<0.6U	2.8	1.8J	<0.6U
HBW-1	<0.5U	<0.5U	<0.5U	<0.22U	<0.55U	<4U	NS	<1.5U	<0.275U	1.5U	<0.6U
HBW-7	<0.5U	<0.5U	<0.5U	<0.22U	<0.55U	<4U	24	<1.2U	<0.275U	1.5U	<0.6U
HBW-10	<0.5U	<0.5U	<0.5U	<0.22U	<0.55U	<4U	NS	<1.5U	<0.275U	1.2U	<0.6U

Quarter	3 rd	4 th	1 st	2 nd	3 rd	4 th	1 st	2 nd	3 rd	4 th	1 st
Creek Sample ID	Sep 2010	Dec 2010	Mar 2011	Jun 2011	Sep 2011	Dec 2011	Mar 2012	Jun 2012	Not Applicable	Jan & Feb 2013	Mar 2013
GPW-1	dry	<0.1U	8.7	dry	dry	1.76	0.163J	dry	NS	1.65	0.735
GPW-3	dry	0.199J	0.673	dry	dry	1.31	0.261	dry	NS	1.74	0.754
HBW-1	dry	<0.1U	<0.2U	dry	dry	<0.1U	0.1U	dry	NS	<0.2U	<0.2U
HBW-7	dry	<0.1U	<0.2U	dry	dry	0.171J	0.1U	dry	NS	<0.2U	<0.2U
HBW-10	dry	<0.1U	<0.2U	dry	dry	<0.1U	0.1U	dry	NS	<0.2U	<0.2U

Quarter	2 nd	3 rd	4 th	1 st	2 nd	3 rd	4 th	1 st	2 nd	3 rd	4 th
Creek Sample ID	Jun 2013	Sept 2013	Dec 2013	Feb 2014	May 2014	Aug 2014	Nov 2014	Feb 2015	May 2015	Aug 2015	Nov 2015
GPW-1	dry	<0.2 U	dry	0.766	dry	dry	0.244 J	0.311 J	0.156J	dry	0.142 J
GPW-3	dry	<0.2 U	dry	1.15	dry	dry	0.276 J	0.344 J	dry	dry	0.311 J
HBW-1	<0.2U	<0.2 U	dry	<0.2 U	dry	dry	<0.2 U	<0.2 U	dry	dry	<0.2 U
HBW-7	<0.2U	<0.2 U	dry	0.201 J	dry	dry	<0.2 U	0.124 J	dry	dry	<0.2 U
HBW-10	<0.2U	<0.2 U	dry	<0.2 U	dry	dry	<0.2 U	<0.2 U	dry	dry	<0.2 U

Quarter	1 st	2 nd	3 rd	4 th	1 st	2 nd	3 rd	4 th	1 st	2 nd	3 rd
Creek Sample ID	Feb 2016	May 2016	Aug 2016	Nov 2016	Feb 2017	May 2017	Aug 2017	Dec 2017	Mar 2018	June 2018	August 2018
GPW-1	0.447	6.59	<0.2 U	0.301 J	<1 U	0.263	dry	<4.0 U	<4.0 U	dry	<2.0 U
GPW-3	0.474	0.457	0.141	0.563	<1 U	0.274	dry	<4.0 U	<4.0 U	dry	<2.0 U
HBW-1	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<1 U	<0.2 U	<0.2 U	1.1 J	<4.0 U	dry	<2.0 U
HBW-7	<0.2 U	<0.2 U	<0.2 U	0.318 J	<1 U	0.155	<0.2 U	<4.0 U	<4.0 U	dry	<2.0 U
HBW-10	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<1 U	<0.2 U	0.111J	<4.0 U	<4.0 U	dry	<2.0 U

NS – not sampled

U – non-detect

J – Estimated

Dry – no surface water

Quarter	4th	1st	2nd
Creek Sample ID	Oct 2018	Jan 2019	April 2019
GPW-1	<2.0 U	<2.0 U	<2.0 U
GPW-3	<2.0 U	<2.0 U	<2.0 U
HBW-1	<2.0 U	<2.0 U	<2.0 U
HBW-7	<2.0 U	<2.0 U	<2.0 U
HBW-10	<2.0 U	<2.0 U	<2.0 U

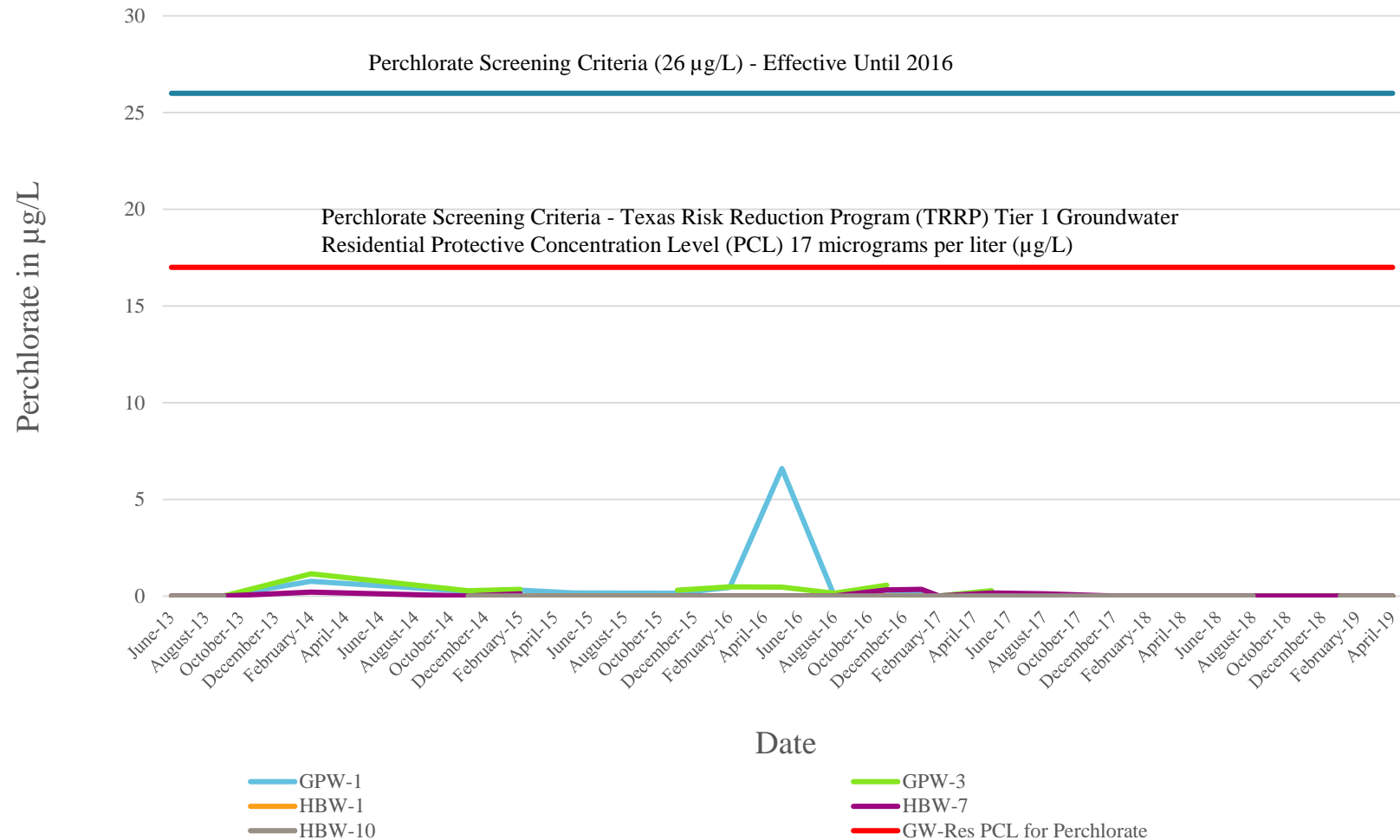
NS – not sampled

U – non-detect

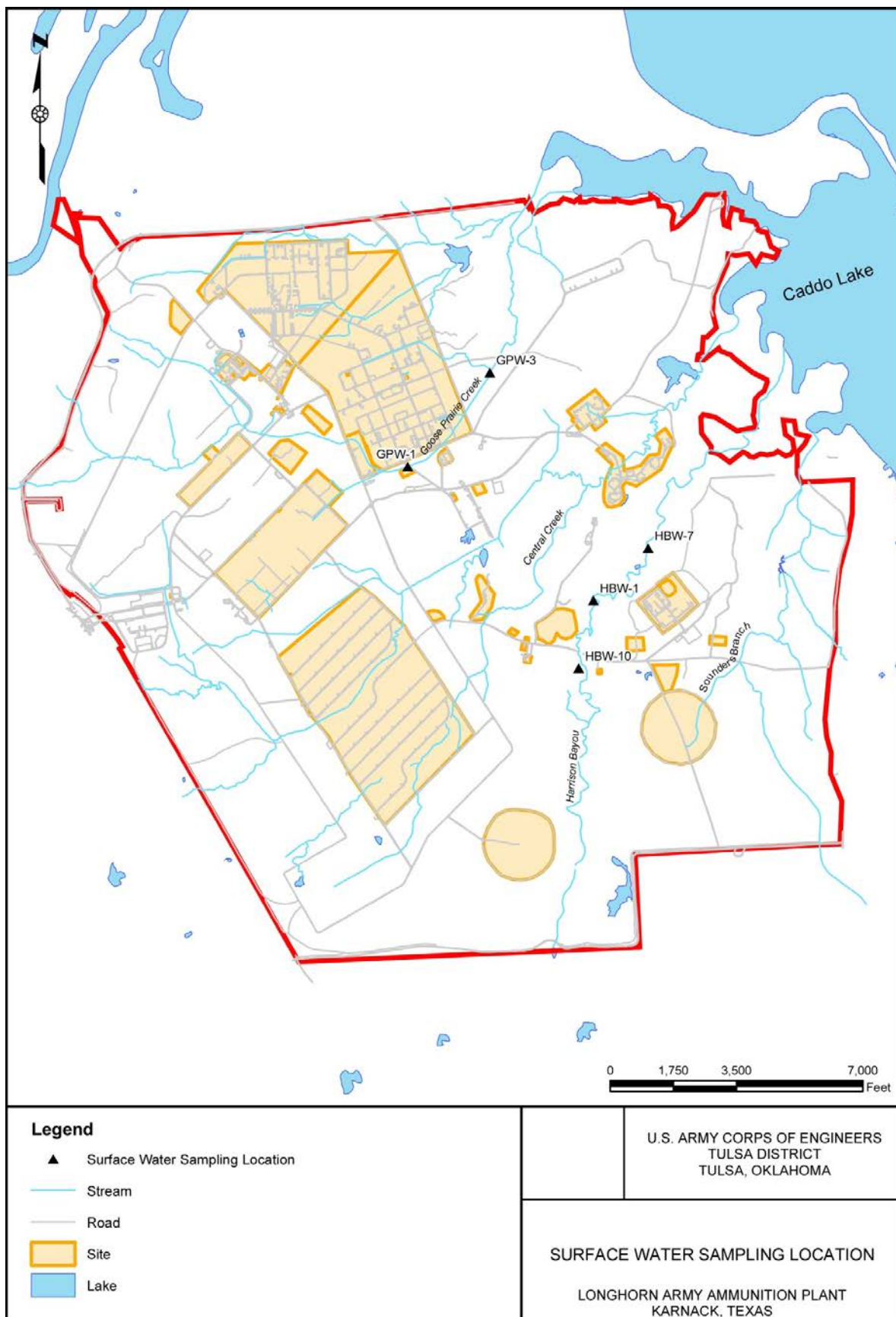
J – Estimated

Dry – no surface water

Surface Water Samples - Perchlorate



Longhorn Army Ammunition Plant Creek Sampling Locations





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

October 29, 2019

DAIM-ODB-LO

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

**Re: Draft Final Year 2 Long-Term Management Report for LHAAP-001-R-01 and
LHAAP-003-R-01 Longhorn Army Ammunition Plant, Karnack Texas**

Dear Mr. Mayer,

One hard copy and one compact disc (CD) of the above-referenced document is being transmitted to you for your records. As noted in your October 22, 2019, the Land Use Control Compliance Certification Form page was updated to include the Land Use Control Plan date of July 2008.

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,

A handwritten signature in cursive script, reading "Rose M. Zeiler", is positioned above the typed name.

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

Copies furnished:

- A. Palmie, TCEQ, Austin, TX (1 hard copy and 1 CD)
- P. Bruckwicki, Caddo Lake NWR, TX (1 hard copy and 1 CD)
- A. Williams, USACE, Fort Worth, TX District (1 CD)
- R. Smith, USACE, Fort Worth, TX District (Transmittal Letter)
- A. Sherman, USAEC, San Antonio, TX (1 CD)
- K. Nemmers, Bhate, Lakewood, CO (1 CD)



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

October 29, 2019

DAIM-ODB-LO

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

**Re: Draft Final Year 2 Long-Term Management Report for LHAAP-001-R-01 and
LHAAP-003-R-01 Longhorn Army Ammunition Plant, Karnack Texas**

Dear Ms. Palmie,

One hard copy and one compact disc (CD) of the above-referenced document is being transmitted to you for your records.

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,

A handwritten signature in cursive script, reading "Rose M. Zeiler", is positioned above the typed name.

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

Copies furnished:

R. Mayer, USEPA Region 6, Dallas, TX (1 hard copy and 1 CD)
P. Bruckwicki, Caddo Lake NWR, TX (1 hard copy and 1 CD)
A. Williams, USACE, Fort Worth, TX District (1 CD)
R. Smith, USACE, Fort Worth, TX District (Transmittal Letter)
A. Sherman, USAEC, San Antonio, TX (1 CD)
K. Nemmers, Bhate, Lakewood, CO (1 CD)

**DRAFT FINAL
YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT**

October 2019

Contract Number: W9128F-13-D-0012

Task Order Number: W912BV17F0150

Performance Based Remediation (PBR)

Longhorn Army Ammunition Plant

Karnack, Texas

Prepared For:



**Longhorn Army Ammunition Plant
Karnack, Texas**

Under Contract To:



**U.S. Army Corps of Engineers
Tulsa District
Tulsa, Oklahoma**

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**YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

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**YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

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YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS

ACRONYMS AND ABBREVIATIONS

§	Section
EODT	EOD Technology, Inc.
IRP	Installation Restoration Program
LHAAP	Longhorn Army Ammunition Plant
LTM	Long-Term Management
LUC(s)	Land use control(s)
MEC	Munitions and explosives of concern
MMRP	Military Munitions Response Program
MPPEH	Material potentially presenting explosive hazard
MRS	Munitions response site
RAO	Remedial action objective
ROD	Record of Decision
Shaw	Shaw Environmental & Infrastructure, Inc.
TAC	Texas Administrative Code
U.S.	United States
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WP	White phosphorus

**YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

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1 INTRODUCTION

This document presents the monitoring of land use controls (LUCs) associated with the remedy set forth in the Final Longhorn Army Ammunition Plant (LHAAP) Record of Decision (ROD) (Shaw Environmental & Infrastructure, Inc. [Shaw], August 2016) for Military Munitions Response Program (MMRP) sites LHAAP-001-R-01 (South Test Area/Bomb Test Area) and LHAAP-003-R-01 (Ground Signal Test Area). This Year 2 LUC Monitoring Report was prepared for the United States (U.S.) Army under the Worldwide Environmental Remediation Services Contract No. W9128F-13-D-0012 managed by the U.S. Army Corps of Engineers (USACE), Tulsa District.

1.1 Facility Background

The LHAAP is an inactive, government-owned, formerly contractor-operated and maintained industrial facility located in central-east Texas, in the northeastern corner of Harrison County. The facility occupies approximately 1,200 of its former 8,416 acres located between State Highway 43 in Karnack, Texas, and the southwestern shore of Caddo Lake, as shown on **Figure 1-1**. The LHAAP was listed as a National Priorities List site on August 9, 1990, due to threatened releases of hazardous substances, pollutants, or contaminants. The U.S. Environmental Protection Agency (USEPA), the Texas Water Commission (now the Texas Commission on Environmental Quality), and the U.S. Army signed a Federal Facility Agreement on December 30, 1991, to address the contamination at LHAAP.

1.2 Munitions Response Sites LHAAP-001-R-01 and LHAAP-003-R-01 Site Descriptions

Munitions response site (MRS) LHAAP-001-R-01 (South Test Area/Bomb Test Area) is co-located with Installation Restoration Program (IRP) site LHAAP-27 and is situated in the southern portion of LHAAP and covers an area of approximately 79 acres (**Figure 1-2**). Site LHAAP-001-R-01 was constructed in 1954 and used for testing photoflash bombs produced at the facility until approximately 1956. During the late 1950s, illuminating signal devices were also demilitarized within pits excavated in the vicinity of the test pad. During the 1960s, leaking production items may have been demilitarized by detonation. Leaking white phosphorus (WP) munitions were supposedly disposed of, although no primary source documentation concerning this effort has been located. In 1984, a LHAAP Contamination Survey indicated that the area had been relatively inactive since the early 1960s and no disposal or testing activities have been carried out in this area since that time. LHAAP-001-R-01 was identified as a munitions and explosives of concern (MEC) area based on the visual confirmation of MEC.

Site LHAAP-003-R-01 (Ground Signal Test Area), is co-located with IRP site LHAAP-54 and is situated in the southeastern portion of LHAAP and covers an area of approximately 80 acres (**Figure 1-3**). Site LHAAP-003-R-01 was used intermittently in April 1963 for aerial and on-ground

YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS

testing and destruction of a variety of devices, including pyrotechnic signal devices, red phosphorus smoke wedges, infrared flares, illuminating mortar shells and cartridges, button bombs, and various types of explosive simulators. The site was also used intermittently over a 20-year period for testing and burn-out of rocket motors. From late 1988 through 1991, the site was also used for the burn-out of Pershing missile rocket motors. Occasionally, leaking WP munitions were burned at the site as a demilitarization activity. LHAAP-003-R-01 was identified as a MEC area based on the reported presence of MEC.

1.3 Land Use Controls

Following the 2008 non-time critical removal action surface clearance activities, LUCs were prepared and constructed for both sites (EOD Technology, Inc. [EODT], September 2009). LUCs were designed and constructed to promote ongoing protection of human safety against potential explosive hazards that may remain at the MMRP sites. The LUCs' performance objectives are to prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities, and playgrounds; and to prohibit intrusive activities such as digging or any other activity which could result in explosive safety risks. The boundary of the LUCs encloses the site boundaries shown on **Figures 1-2 and 1-3**.

The 2008 LUCs included:

- Restriction against intrusive activities, including digging. A legal description survey and plat of the LUC boundaries and locations of MEC warning signs was prepared in accordance with 30 Texas Administrative Code (TAC) Section (§) 335.569, Appendix III, for recordation in the Harrison County Clerk's Office.
- Placement of MEC warning signage along the perimeter of LHAAP-001-R-01 and LHAAP-003-R-01 to serve as the physical demarcation of the controlled areas. The signs have visibility from one sign to the next, with a maximum spacing of 100 feet. The signs include warning of the potential presence of MEC, state the restriction against intrusive activities, and provide a contact number.
- Education program for future refuge visitors, staff, and volunteers. The program includes informational pamphlets and a safety video warning of the potential presence of MEC and presenting examples of MEC that were or may be found at the sites.

The LUC to prohibit residential land use will remain in place until it is demonstrated that the MEC no longer presents a threat to public/human safety. A LUC to prohibit intrusive subsurface activities, including digging, will remain in place until it is demonstrated that the MEC no longer presents an explosive hazard. However, intrusive subsurface activities may occur provided that the Army and the USEPA approve such intrusive subsurface activities before they are commenced and provided that they are undertaken by qualified personnel who are trained in explosives safety measures.

**YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

The Final ROD for LHAAP-001-R-01 and LHAAP-003-R-01 was issued in August 2016 and documents the final selected remedy for the sites (Shaw, August 2016). The ROD found that although the removal actions provided an effective solution for reducing risk of exposure by reducing the potential for any direct contact with MEC or material potentially presenting explosive hazard (MPPEH), there is the potential that some MEC remains. A summary of the LUC remedial action objective (RAO) and the selected remedy for LHAAP-001-R-01 and LHAAP-003-R-01, identified in the Final ROD, is presented in the following sections.

1.4 Land Use Control Remedial Action Objective

The LUC RAO developed for LHAAP-001-R-01 and LHAAP-003-R-01, as outlined in the ROD (Shaw, August 2016) is:

- Protection of human health and safety from explosive hazards that may have remained at the sites after the MEC removal action.

1.5 Land Use Control Selected Remedy

The LUC selected remedy for MEC at LHAAP-001-R-01 and LHAAP-003-R-01 is comprised of the following elements:

- LUC to prohibit residential use
- LUC to restrict land use to non-residential
- LUC to restrict intrusive activities (e.g., digging)
- Signage to convey MEC warning
- Education Program

The Educational Program materials, including pamphlets and video, were delivered to the U. S. Fish and Wildlife Service (USFWS) in hard copy and electronic form as part of the Site Specific Final Report for the MEC Removal Action (EODT, September 2009). There is no recurring requirement associated with this LUC and it will not be discussed further in this document.

**YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

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2 LAND USE CONTROL MONITORING

The RAO for LHAAP-001-R-01 and LHAAP-003-R-01 is protection of human health and safety from explosive hazards that may have remained at the sites after the MEC removal action. The duration for the LUCs specified in the MEC ROD for this purpose must remain in place until it is demonstrated that the MEC no longer presents a threat to public/human safety. Per the Final ROD, the LUCs' performance objectives are to:

- Prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities, and playgrounds.
- Restrict land use to non-residential.
- Prohibit intrusive activities such as digging or any other activity which could result in explosive safety risk.
- Maintain existing MEC warning signs at the perimeter of each site to physically demarcate controlled areas.

For portions of LHAAP-001-R-01 and LHAAP-003-R-01 subject to LUCs that are not owned by the Army, the Army will monitor and report on the implementation, maintenance, and enforcement of LUCs, and coordinate with federal, state, and local governments and owners and occupants of properties subject to LUCs. The Army remains responsible for ensuring that the remedy remains protective of human health and safety. This section presents the maintenance and monitoring of the LUCs at both sites in accordance with the final LUC Remedial Design/Remedial Action Construction Report (U.S. Army, May 2018).

2.1 Maintenance of Existing MEC Warning Signs

MEC warning signs have been installed at the perimeter of LHAAP-001-R-01 and LHAAP-003-R-01 (64 signs at each site), that serve as a physical demarcation of the controlled areas. The signs have visibility from one sign to the next with a maximum spacing of 100 feet. The signs include warning of potential presence of MEC and state the restriction against intrusive activities. **Figures 1-2 and 1-3** present the location of the MEC warning signs. These signs are required to be visually inspected annually, or as needed, to ensure they remain intact, undamaged, and visible from one sign to the next. Maintenance is conducted, as needed, and may include the following activities:

- Mowing and brush clearing around MEC warning signs to ensure that they are visible from one sign location to the next sign location.
- Rehanging/affixing MEC warning sign(s) or replacing MEC warning sign(s), if they become damaged or illegible.
- Repairing existing MEC warning sign posts, which may require the reestablishment of the concrete base or post replacement.

YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS

2.2 Monitoring Activities

The [Long-Term Management] LTM Inspection and Maintenance Checklists for both LHAAP-001-R-01 and LHAAP-003-R-01, completed in 2019, are provided in **Appendix A**. No repairs were required. The checklists are the same as included in the LUC Remedial Design/Remedial Action Construction Report (U.S. Army, May 2018).

Appendix A also contains the annual certification from the remedial design to document that no LUC-restricted activities have been authorized and that LHAAP-001-R-01 and LHAAP-003-R-01 conditions and use are consistent with the LUCs. **Appendix B** contains a photograph log of the LUCs at each site.

3 CONCLUSIONS

The LUCs are being maintained and managed in accordance with the ROD and the LUC Remedial Design/Remedial Action Construction Report as follows:

- Neither site is being developed or used for residential housing, elementary and secondary schools, child care facilities, and playgrounds.
- Land use is non-residential.
- No digging or any other activity which could result in explosive safety risk was noted during the LUC inspections completed.
- Existing MEC warning signs at the perimeter of each site to physically demarcate controlled areas are being maintained per the ROD.

Mowing and brush clearing around MEC warning signs was completed on July 31, 2019, to ensure that they are visible from one sign location to the next sign location. No repairs to signage were needed for either site during the LUC inspections.

**YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

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YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS

4 REFERENCES

- EODT. September 2009. *Final Site Specific Final Report for the MEC Removal Action at the Former Longhorn Army Ammunition Plant LHAAP-001-R (Site 27) and LHAAP-003-R (Site 54) Karnack, Texas.*
- Shaw. August 2016. *Final Record of Decision LHAAP-001-R (South Test Area/Bomb Test Area) and LHAAP-003-R (Ground Signal Test Area) Longhorn Army Ammunition Plant, Karnack, Texas.*
- U.S. Army. April 2004. *Memorandum of Agreement Between the Department of the Army and the Department of the Interior for the Interagency Transfer of Lands at the Longhorn Army Ammunition Plant for the Caddo Lake National Wildlife Refuge, Harrison County, Texas.*
- U.S. Army. May 2018. *Final Land Use Control Remedial Design/Remedial Action Construction Report LHAAP-001-R-01 and LHAAP-003-R-01, Longhorn Army Ammunition Plant.*

**YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

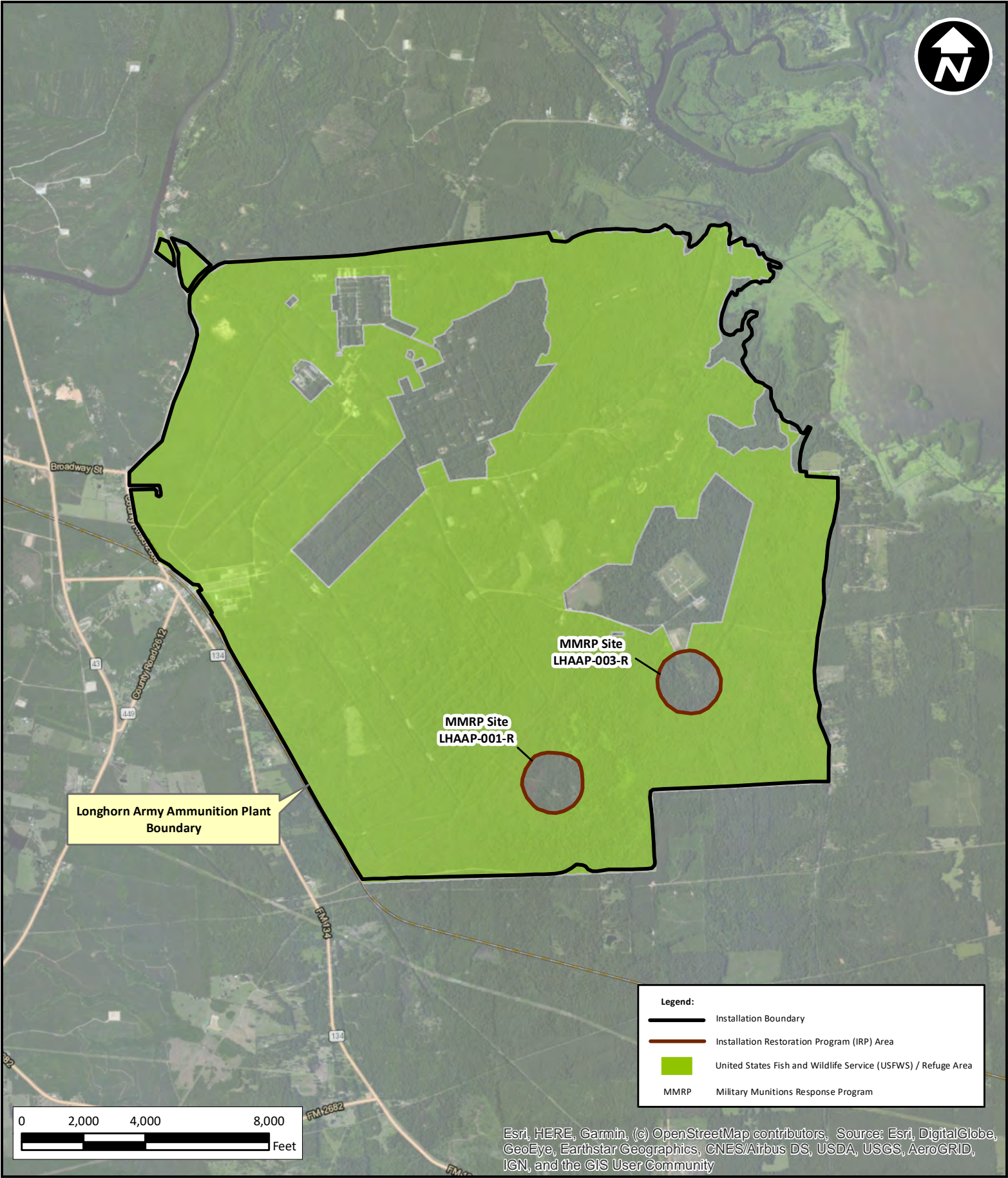
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**YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

FIGURES

**YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

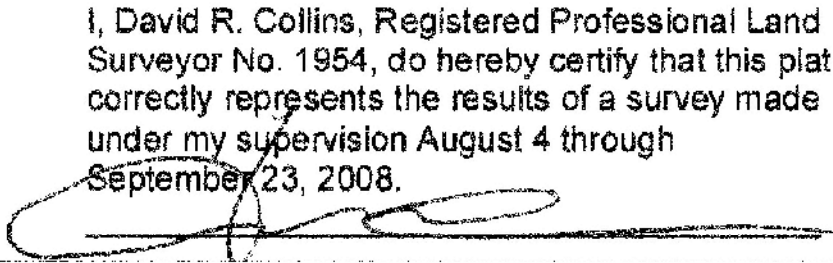
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LHAAP Site Map

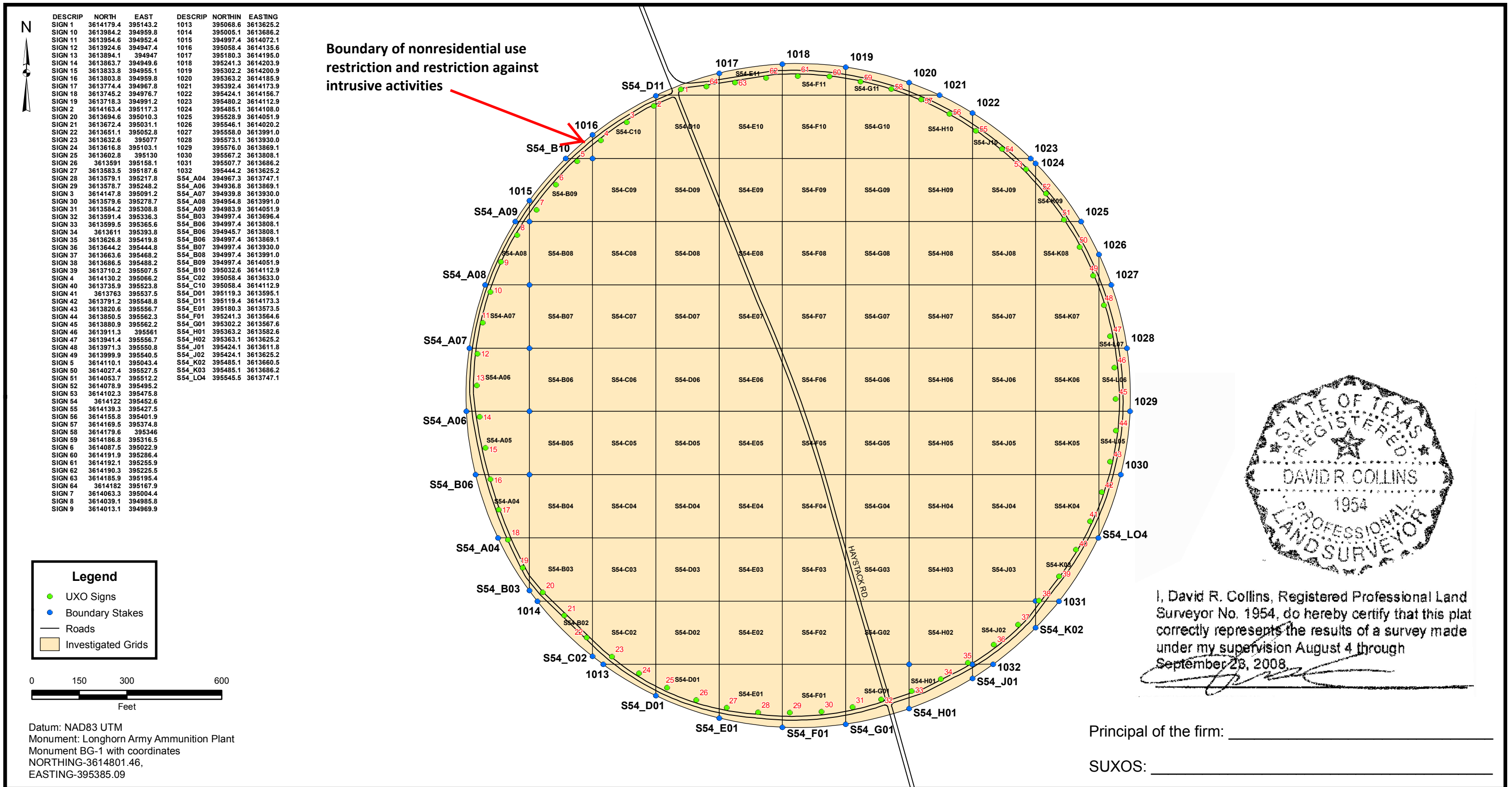
Figure 1-1

Year 2 Land Use Control Monitoring Report for LHAAP-001-R-01 AND LHAAP-003-R-01 Longhorn Army Ammunition Plant Karnack, Texas	PROJECT NO: NWO13-12.0150. 014.0001.04	SCALE: As Shown	DATE: 9/19/2019	DRAWN BY: MRM



Principal of the firm: _____

SUXOS: _____



**YEAR 1 LONG TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

APPENDIX A

**LTM INSPECTION AND MAINTENANCE CHECKLISTS AND LAND USE
CONTROL COMPLIANCE CERTIFICATION FORM**

**YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

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LTM Inspection and Maintenance Checklist

General Information	
Project Name	LTM Inspection and Maintenance, LHAAP-001-R and LHAAP-003-R MMRP, Longhorn Army Ammunition Plant, Karnack, TX
Contractor	BHATE ENVIRONMENTAL
Inspector's Name	SCOTT BEESINGER
Inspector's Title	SENIOR FIELD TECH
Inspector's Signature	<i>Scott Beesinger</i>
Inspector's Contact Number	903-930-6193
Inspection Date	7/31/19
Type of Inspection	<input type="checkbox"/> Quarterly <input type="checkbox"/> Semiannual <input checked="" type="checkbox"/> Annual <input type="checkbox"/> Prior to forecast rain <input type="checkbox"/> After rain event <input type="checkbox"/> Other _____

Description	Yes	No	N/A	Comments (Attach photos/location sketches)	Corrective Action (Attach photos)
A. Perimeter Signage					
A.1 Are there any damaged signs?		X			
A.2 Are there any missing signs?		X			
A.3 Are all signs legible?	X				
A.4 Is perimeter boundary mowed?	X				

A.5	Are signs visible from one sign to the next sign?	X				
B. LUC Boundary						
B.1	Is the LUC Boundary identifiable?	X				
C. Dig and Intrusive Activities restriction						
C.1	Any observed digging activities or similar intrusive activities within the site boundaries?		X			

Note: Annual compliance inspections shall be conducted no later than March 1 of each year for the previous calendar year and filed onsite.

LAND USE CONTROL COMPLIANCE CERTIFICATION FORM

In accordance with the LUC Plan dated July 2008 for LHAAP-001-R and LHAAP-003-R, an inspection of the sites was conducted by BHATE ENVIRONMENTAL on 7/31/19

A summary of land use control mechanisms is as follows:

- Land use restrictions - restrict land use to non-residential.
- Integrity of LUC signage by ensuring signs are present, legible and have visibility from one sign to the next.

A summary of compliance with land use and restriction covenants is as follows:

- The posted signs are properly maintained at LHAAP-001-R and LHAAP-003-R.
- No digging or intrusive activities have taken place within the boundaries identified for LHAAP-001-R and LHAAP-003-R.
- No land use other than non-residential.
- Pamphlets and safety awareness video are being used to educate visitors.

I, the undersigned, do document that the inspections were performed as indicated above, and that the above information is true and correct to the best of my knowledge, information, and belief.

Date: 7/31/19

Name: Scott Beesinger

Signature: 

Completed annual compliance inspections shall be conducted no later than March 1 of each year for the previous calendar year and filed on site.

**YEAR 2 LONG TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

APPENDIX B
PHOTOGRAPH LOG

**YEAR 2 LONG-TERM MANAGEMENT REPORT
FOR LHAAP-001-R-01 AND LHAAP-003-R-01
LONGHORN ARMY AMMUNITION PLANT, TEXAS**

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Longhorn Army Ammunition Plant Sites LHAAP-001-R-01 and LHAAP-003-R-01
Photograph Log August 2019



Photo 1: LHAAP-001-R-01 Signage in place and readable



Photo 2: LHAAP-001-R-01 Pathway around the site

**Longhorn Army Ammunition Plant Sites LHAAP-001-R-01 and LHAAP-003-R-01
Photograph Log August 2019**



Photo 3: LHAAP-003-R-01 Signage in place and readable



Photo 4: LHAAP-003-R-01 Pathway around the site



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

October 31, 2019

DAIM-ODB-LO

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

Re: Draft Remedial Design/Remedial Action Work Plan, LHAAP-50 Former Sump Water Tank, Longhorn Army Ammunition Plant, Karnack, Texas, October 2019

Dear Mr. Mayer,

The above-referenced document is being transmitted to you for your review. Review comments are requested by November 30, 2019.

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 (1 hard copy and 1 CD)
 P. Bruckwicki, Caddo Lake NWR, TX (1 hard copy and 1 CD)
 R. Smith, USACE, Tulsa District, OK (Electronic only)
 A. Williams, USACE, Tulsa District, OK (1 CD)
 N. Smith, USAEC, San Antonio, TX (1 CD)
 K. Nemmers, Bhate, Lakewood, CO (1 CD)
 P. Srivastav, APTIM, Houston, TX



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

October 31, 2019

DAIM-ODB-LO

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

Re: Draft Remedial Design/Remedial Action Work Plan, LHAAP-50 Former Sump Water Tank, Longhorn Army Ammunition Plant, Karnack, Texas, October 2019

Dear Ms. Palmie,

The above-referenced document is being transmitted to you for your review. Review comments are requested by November 30, 2019.

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:

R. Mayer, USEPA Region 6, Dallas, TX (1 hard copy and 1 CD)
 P. Bruckwicki, Caddo Lake NWR, TX (1 hard copy and 1 CD)
 R. Smith, USACE, Tulsa District, OK (Electronic only)
 A. Williams, USACE, Tulsa District, OK (1 CD)
 N. Smith, USAEC, San Antonio, TX (1 CD)
 K. Nemmers, Bhate, Lakewood, CO (1 CD)
 P. Srivastav, APTIM, Houston, TX

**QUARTERLY EVALUATION REPORT
2ND QUARTER (APRIL - JUNE) 2019
GROUNDWATER TREATMENT PLANT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS**

November 2019

Prepared For:



**U.S. Army Corps of Engineers
Tulsa District**

**Contract No. W9128F-13-D-0012
Task Order No. W912BV17F0150
Bhate Project No. NWO1312.0150.016.0001.03**

Prepared By:



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GWTP QUARTERLY EVALUATION REPORT – 2ND QUARTER 2019
LONGHORN ARMY AMMUNITION PLANT

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GWTP QUARTERLY EVALUATION REPORT – 2ND QUARTER 2019
LONGHORN ARMY AMMUNITION PLANT

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GWTP QUARTERLY EVALUATION REPORT – 2ND QUARTER 2019

LONGHORN ARMY AMMUNITION PLANT

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Appendix D Isopleth Contour Maps
Appendix E Monitoring Well Trend Charts
Appendix F GWTP Water Sampling Laboratory Analytical Results (Provided on CD Only)
Appendix G Quality Control Summary Report
Appendix H Air Monitoring Analytical Laboratory Report (Provided on CD Only)
Appendix I Protocol for Discharging GWTP Effluent
Appendix J Air Data Tables, PID Readings, and Calibration Logs

GWTP QUARTERLY EVALUATION REPORT – 2ND QUARTER 2019
LONGHORN ARMY AMMUNITION PLANT

ACRONYMS AND ABBREVIATIONS

AMCV(s)	Air Monitoring Comparison Value(s)
amsl	Above mean sea level
bgs	Below ground surface
Bhate	Bhate Environmental Associates, Inc.
CD	Compact disc
COC(s)	Chemical(s) of concern
COD	Chemical oxygen demand
DCE	Dichloroethene
ESD	Explanation of Significant Difference
ESL(s)	Effects Screening Level(s)
FBR	Fluidized bed reactor
ft	Feet or foot
gpd	Gallons per day
gph	Gallons per hour
gpm	Gallons per minute
GWTP	Groundwater Treatment Plant
HCl	Hydrochloric acid
HDPE	High density polyethylene
ICT(s)	Interception-collection trench(es)
IRA	Interim Remedial Action
J	Estimated concentration
lbs/hr	Pounds per hour
LHAAP	Longhorn Army Ammunition Plant
MCL(s)	Maximum Contaminant Level(s)
µg/L	Micrograms per liter
Mg(OH) ₂	Magnesium hydroxide
MSC(s)	Medium Specific Concentration(s)
mV	Millivolts
NA	Not applicable
NaOH	Sodium hydroxide

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No.	Number
ORP	Oxidation-reduction potential
PCL(s)	Protective Concentration Level(s)
PID	Photoionization detector
ppmv	Parts per million by volume
psi	Pounds per square inch
ROD	Record of Decision
TAC	Texas Administrative Code
TCE	Trichloroethene
TCEQ	Texas Commission on Environmental Quality
tpy	Tons per year
UEP	Unlined Evaporation Pond
USEPA	United States Environmental Protection Agency
VC	Vinyl chloride
VOC(s)	Volatile Organic Compound(s)

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EXECUTIVE SUMMARY

The operation of the Groundwater Treatment Plant (GWTP) is part of the Interim Remedial Action (IRA) at Burning Ground Number (No.) 3, also referred to as Longhorn Army Ammunition Plant (LHAAP)-18/24. A historical pilot test for nearby landfill LHAAP-16 resulted in the installation of eight extraction wells which also contribute groundwater to the GWTP. Groundwater extraction, treatment, and monitoring activities consist of:

- Continuous extraction of groundwater from multiple interception-collection trenches (ICTs) and extraction wells at both LHAAP-18/24 and LHAAP-16;
- Treatment of extracted groundwater for heavy metals, chlorinated compounds, and perchlorate using precipitation, air stripping, and biological methods, respectively;
- Evaluation of the hydraulic effectiveness of the extraction system by groundwater monitoring;
- Monitoring of treated groundwater to ensure compliance with the discharge limits; and
- Discharge of treated water to Harrison Bayou, or to a holding pond (INF Pond), or the treated water may be released as irrigation water on LHAAP-18/24.

The location of the extraction wells and ICTs are shown on **Figure A-1** in **Appendix A**. The process flow diagram of the GWTP is shown on **Figure A-2** in **Appendix A**.

Figure ES-1 depicts the monthly total volume of groundwater that was extracted from the ICTs and extraction wells at LHAAP-18/24 and LHAAP-16 between September 2012 and June 2019.

The GWTP was not operational during June, July, and August 2012. This was related to meltdown of the scrubber system, associated with the catalytic oxidizer, due to system overheating. Overheating occurred when the blower became inoperable after the bearing on the scrubber blower unit was shattered and damaged the blower. This occurred around 1:00 PM on 21 May 2012.

After developing an interim air monitoring plan and obtaining concurrence from the Texas Commission on Environmental Quality (TCEQ) and the United States Environmental Protection Agency (USEPA) to operate the GWTP without use of air abatement equipment, a pilot run of the GWTP was conducted on 6 September 2012. In that first pilot run, 85,170 gallons of water that had been stored in the influent equalization tank (TK-140) were treated. The treated water was re-circulated through the fluidized bed reactor (FBR) to revive the FBR after 3 months of dormancy. Treated groundwater and air samples were collected and analyzed respectively for perchlorate, metals, and Volatile Organic Compounds (VOCs); and VOCs only. On 19 September 2012, a second pilot run was performed at the GWTP and 107,264 gallons of water were treated. Based on the successful re-start of the GWTP, continuous groundwater extraction began again on 24 September 2012. While groundwater extraction occurs on a continuous basis, operation of the GWTP occurs intermittently due to the low volume of water available for treatment with respect to the design capacity of the GWTP. During the 3rd quarter of 2012, groundwater extraction occurred only from LHAAP-18/24. Groundwater extraction from LHAAP-16 was not

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performed due to equipment failure. However, extraction from LHAAP-16 began in October 2012 and the extraction volumes increased steadily throughout the 4th quarter of 2012, as pumping equipment was gradually repaired/replaced. The GWTP operated under normal conditions until September 2015.

On 14 September 2015, at 11:15 AM, the blower on the air stripper (BL-340) malfunctioned during routine operation. The wiring on the blower was repaired and the blower operated for less than 2 hours on 17 September 2015, when the blower malfunctioned again. It was determined that the blower needed to be replaced, and groundwater extraction and operation of the GWTP ceased beginning 18 September 2015, as the influent equalization tank (TK-140) became full. Beginning on 2 October 2015, it was determined that the GWTP could operate without the blower at a reduced extraction rate. The operation of the GWTP allowed extraction of groundwater from ICTs 12E, 13A, 13B, and 13C (13C was changed to ICT 13E on 12 October 2015), which were considered critical ICTs to prevent migration of contaminants to Harrison Bayou. Groundwater extraction was switched frequently between ICTs 12E, 13A, 13B, and 13E to ICTs 14B, 14C, and 14D beginning on 14 December 2015.

On 12 December 2016, flange bolts at TK-380 failed and allowed hydrochloric acid (HCl) to drain into the sump. The containment area was washed down and the sump contents were transferred into the equalization tank (TK-140). Because of the acid release, extraction of groundwater from the ICTs was halted, and the GWTP was put into recycle mode (effluent sent back as influent) until the acid was neutralized and perchlorate, metals, and VOCs were below discharge criteria on 17 March 2017.

On 12 August 2017, severe storms caused a power outage at LHAAP-18/24. When electrical service was restored, the main transformer failed due to a manufacturing defect. A portable emergency generator was brought on-site on 21 August 2017, to allow the FBR to operate in full recycle mode. After a replacement transformer was installed on 12 September 2017, extraction began from ICT-13B, 13C, 13D, 13E, 13F, 7, and EW01 and the FBR was put into normal operation. Beginning on 21 September 2017, groundwater was extracted from all of the ICTs.

On 27 December 2018, severe storms caused a power outage in Karnack, Texas including LHAAP. When electrical service was restored, the main transformer failed due to a manufacturing defect. A portable emergency generator was brought on-site on 28 December 2018, to allow the FBR to operate in full recycle mode. After a temporary generator was connected to the well field on 11 February 2019, extraction began from LHAAP-18/24, and the GWTP was put into normal operation. No extraction from LHAAP-16 occurred during the 2nd Quarter 2019 due to the main transformer being down.

On 13 June 2019, the P-320 pump (Air Stripper Feed Pump) locked up and was not repaired until 2 July 2019. The GWTP was last run on 13 June 2019. As a result, sampling was not conducted during the last 2 weeks of June 2019.

On 11 June 2019, Smith Energy was on site to repair a double walled pipe in the burning grounds. They returned to finish the repair on 17 June 2019. Currently, the line to 18WW17 is still down because of another leak in the double walled pipe and the ground has been too wet to dig.

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As shown on **Figure ES-1**, the total extracted groundwater volume from LHAAP-18/24 during the 2nd quarter of 2019 was 2,215,494 gallons. The extracted groundwater volume was measured on a monthly basis as the sum of the difference between the flow meter totalizer reading at each ICT between the beginning and end of each month. Extraction quantities in LHAAP-18/24 were 681,206 gallons in April 2019, 1,087,813 gallons in May 2019, and 446,475 gallons in June 2019.

No groundwater was extraction from LHAAP-16 in 2nd Quarter 2019. Approximately 2,215,494 gallons of groundwater were extracted from LHAAP-18/24 during the 2nd quarter of 2019 compared to approximately 1,873,388 gallons extracted during the 2nd quarter 2018 (year prior).

No treated water was returned to ICTs 6 and 9 during the 2nd quarter of 2019 because this practice was discontinued after system restart in September 2012.

The typical discharged flowrate from the GWTP was calculated as 11 gallons per minute (gpm) during the 2nd quarter of 2019. Water discharge from the INF Pond averaged to 77 gpm. Approximately 1,062,336 gallons of groundwater was discharged from the GWTP to the Harrison Bayou, and 1,101,795 gallons was discharged from the INF Pond to the Harrison Bayou (see **Figure ES-2** below).

Grab perchlorate samples from the GWTP influent were collected monthly on 10 April, 7 May, and 4 June 2019, and the following concentrations were reported: 5,600 micrograms per liter ($\mu\text{g/L}$), 4,200 $\mu\text{g/L}$, and 6,800 $\mu\text{g/L}$, respectively. In addition, a quarterly influent sample was collected and analyzed for perchlorate on 29 May 2019, with a result of 4,900 $\mu\text{g/L}$. The average perchlorate concentration using these four values from the GWTP influent during the quarter was 5,375 $\mu\text{g/L}$. No perchlorate was detected in the effluent (TK-650) samples during the 2nd quarter of 2019.

As shown in **Table ES-1**, treated water was discharged directly from the GWTP to Harrison Bayou in 2nd Quarter 2019. In addition, 1,101,795 gallons of treated water was discharged from the INF Pond to Harrison Bayou.

The groundwater volume extracted for treatment at LHAAP-18/24 increased from 681,206 gallons in April 2019 to 1,087,813 in May 2019, and then decreased to 446,475 in June 2019. The totals were lower for June because the GWTP did not operate after 13 June 2019. No groundwater was extracted from LHAAP-16 during the 2nd quarter of 2019. The total water extracted for treatment by the GWTP for the 2nd quarter of 2019 was approximately 2,215,494 gallons. The water quantities treated each month since June 2012 are shown on **Figure ES-2**. The total volume of water extracted from LHAAP-18/24 in the 2nd quarter of 2019 (2,215,494 gallons) is higher than the volume of water discharged to the Harrison Bayou from the GWTP (1,062,336 gallons). Typically the reason for the difference is identified as the change in volume stored in the GWTP, the amount of water lost with the removed metals precipitation sludge, and the amount of evaporative water lost in the air stripper (which is included in the volume processed, but not in the volume discharged). However, piping leaks were identified along the 14 ICTs and out to 18WW17. The line associated with the 14 ICTs has since been repaired but the line to 18WW17 has not yet been repaired. The line out to 18WW17 was capped and is not currently connected to the extraction system at LHAAP-18/24.

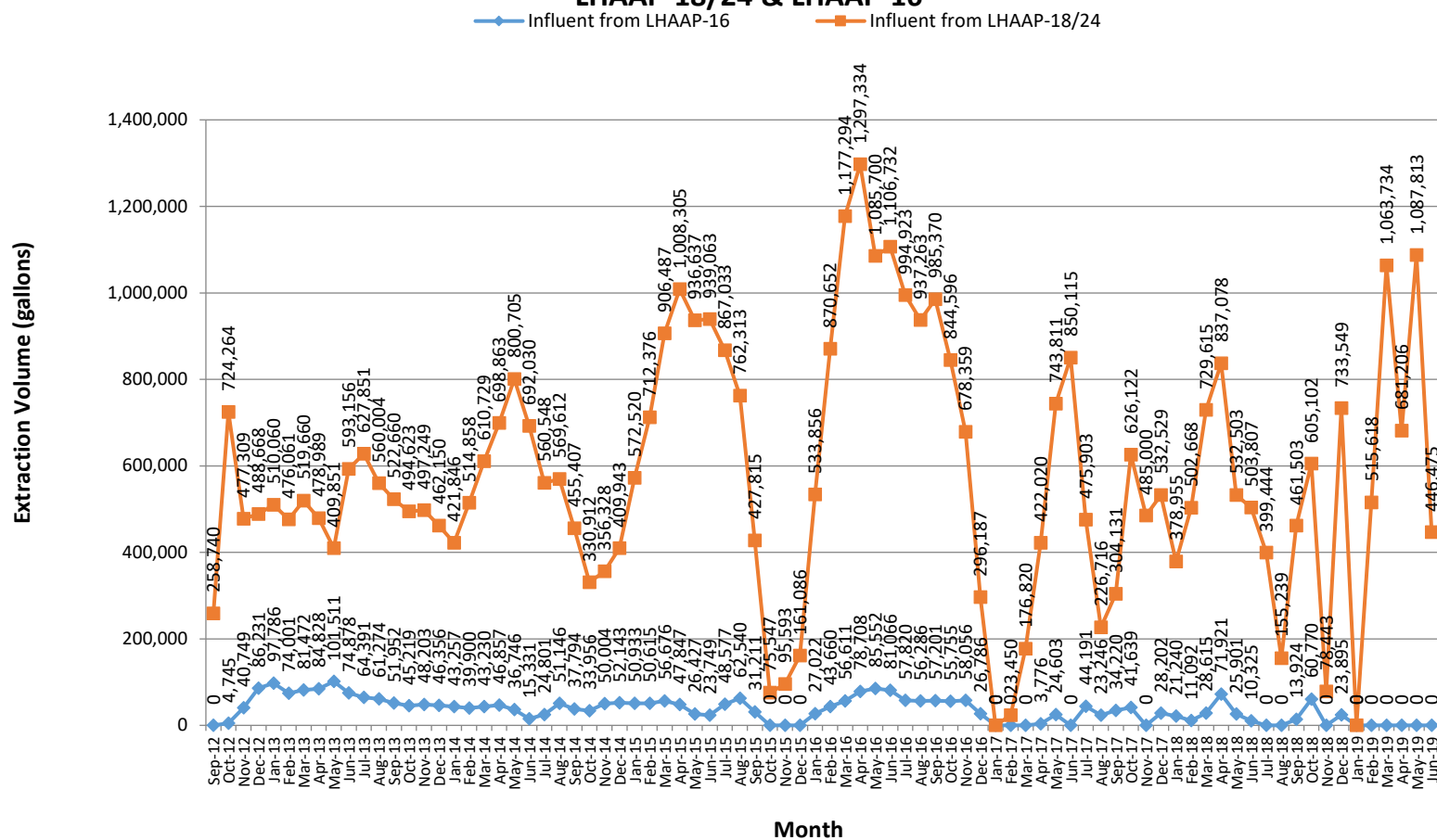
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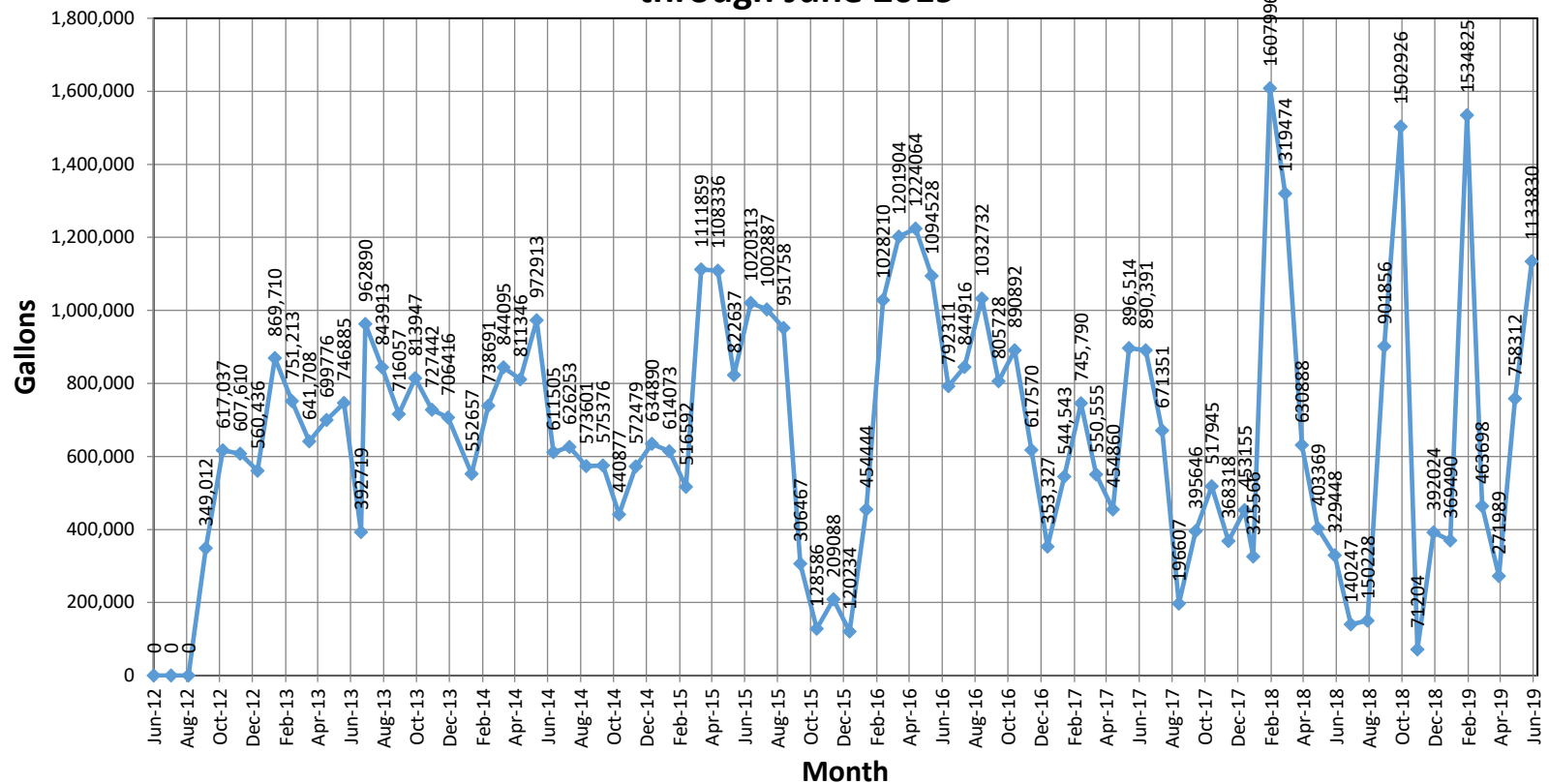
Figure ES-1: Groundwater Recovery Between September 2012 & June 2019

LHAAP-18/24 & LHAAP-16



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Figure ES-2: Treated Groundwater Discharged Monthly from June 2012 through June 2019



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Table ES-1: Discharge Information to Harrison Bayou During 2nd Quarter 2019

DATE	Harrison Bayou Flow (GPM)	Calculated Maximum Rate Allowable (GPM)	Released From GWTP To Harrison Bayou	Released From INF Pond to Harrison Bayou	Released From GWTP to INF Pond	Combined Total Released from GWTP	Combined Total Released to Harrison Bayou	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
04/01/2019	5,096	1,489	2,731	0	0	2,731	2,731	2.59
04/02/2019	4,387	1,282	10,042	0	0	10,042	10,042	2.58
04/03/2019	3,767	1,100	12,251	0	0	12,251	12,251	2.58
04/04/2019	3,137	916	11,571	0	0	11,571	11,571	2.57
04/05/2019	5,937	1,734	11,289	0	0	11,289	11,289	2.57
04/06/2019	5,123	1,485	0	0	0	0	0	2.57
04/07/2019	FLOOD STAGE	MAXIMUM	0	0	0	0	0	2.75
04/08/2019	FLOOD STAGE	MAXIMUM	37,932	0	0	37,932	37,932	3.46
04/09/2019	FLOOD STAGE	MAXIMUM	15,102	0	0	15,102	15,102	3.46
04/10/2019	FLOOD STAGE	MAXIMUM	12,608	0	0	12,608	12,608	3.45
04/11/2019	FLOOD STAGE	MAXIMUM	12,358	0	0	12,358	12,358	3.45
04/12/2019	32,529	9,505	11,428	0	0	11,428	11,428	3.45
04/13/2019	FLOOD STAGE	MAXIMUM	0	0	0	0	0	3.50
04/14/2019	FLOOD STAGE	MAXIMUM	0	0	0	0	0	4.08
04/15/2019	FLOOD STAGE	MAXIMUM	46,815	0	0	46,815	46,815	4.08
04/16/2019	FLOOD STAGE	MAXIMUM	11,952	0	0	11,952	11,952	4.08
04/17/2019	FLOOD STAGE	MAXIMUM	12,522	0	0	12,522	12,522	4.07
04/18/2019	FLOOD STAGE	MAXIMUM	12,033	0	0	12,033	12,033	4.07
04/19/2019	FLOOD STAGE	MAXIMUM	8,208	0	0	8,208	8,208	4.48
04/20/2019	FLOOD STAGE	MAXIMUM	0	0	0	0	0	4.48
04/21/2019	FLOOD STAGE	MAXIMUM	0	0	0	0	0	4.47
04/22/2019	28,975	8,466	38,525	0	0	38,525	38,525	4.47

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DATE	Harrison Bayou Flow (GPM)	Calculated Maximum Rate Allowable (GPM)	Released From GWTP To Harrison Bayou	Released From INF Pond to Harrison Bayou	Released From GWTP to INF Pond	Combined Total Released from GWTP	Combined Total Released to Harrison Bayou	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
04/23/2019	No Release	NA	0	0	0	0	0	4.46
04/24/2019	No Release	NA	0	0	0	0	0	4.45
04/25/2019	No Release	NA	0	0	0	0	0	4.86
04/26/2019	No Release	NA	0	0	0	0	0	4.85
04/27/2019	No Release	NA	0	0	0	0	0	4.83
04/28/2019	No Release	NA	0	0	0	0	0	4.81
04/29/2019	No Release	NA	0	0	0	0	0	4.80
04/30/2019	4,621	1,350	4,622	0	0	4,622	4,622	4.79
05/01/2019	3,936	1,150	13,445	0	0	13,445	13,445	4.78
05/02/2019	7,368	2,153	14,393	0	0	14,393	14,393	4.97
05/03/2019	FLOOD STAGE	MAXIMUM	10,904	0	0	10,904	10,904	4.96
05/04/2019	FLOOD STAGE	MAXIMUM	0	0	0	0	0	5.08
05/05/2019	FLOOD STAGE	MAXIMUM	0	0	0	0	0	5.07
05/06/2019	22,920	6,697	43,253	0	0	43,253	43,253	5.06
05/07/2019	14,834	4,334	12,393	0	0	12,393	12,393	5.05
05/08/2019	FLOOD STAGE	MAXIMUM	12,032	0	0	12,032	12,032	5.04
05/09/2019	FLOOD STAGE	MAXIMUM	11,328	0	0	11,328	11,328	5.74
05/10/2019	FLOOD STAGE	MAXIMUM	11,064	0	0	11,064	11,064	5.78
05/11/2019	FLOOD STAGE	MAXIMUM	0	0	0	0	0	6.04
05/12/2019	FLOOD STAGE	MAXIMUM	0	0	0	0	0	6.03
05/13/2019	FLOOD STAGE	MAXIMUM	37,841	0	0	37,841	37,841	6.02
05/14/2019	FLOOD STAGE	MAXIMUM	11,270	0	0	11,270	11,270	6.01
05/15/2019	FLOOD STAGE	MAXIMUM	12,397	0	0	12,397	12,397	6.00
05/16/2019	FLOOD STAGE	MAXIMUM	12,039	0	0	12,039	12,039	5.99

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DATE	Harrison Bayou Flow (GPM)	Calculated Maximum Rate Allowable (GPM)	Released From GWTP To Harrison Bayou	Released From INF Pond to Harrison Bayou	Released From GWTP to INF Pond	Combined Total Released from GWTP	Combined Total Released to Harrison Bayou	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
05/17/2019	FLOOD STAGE	MAXIMUM	9,821	0	0	9,821	9,821	5.98
05/18/2019	FLOOD STAGE	MAXIMUM	0	0	0	0	0	5.97
05/19/2019	FLOOD STAGE	MAXIMUM	0	0	0	0	0	6.63
05/20/2019	FLOOD STAGE	MAXIMUM	47,380	0	0	47,380	47,380	6.62
05/21/2019	FLOOD STAGE	MAXIMUM	24,309	0	0	24,309	24,309	6.61
05/22/2019	FLOOD STAGE	MAXIMUM	26,501	0	0	26,501	26,501	6.74
05/23/2019	FLOOD STAGE	MAXIMUM	24,989	0	0	24,989	24,989	6.71
05/24/2019	FLOOD STAGE	MAXIMUM	16,366	0	0	16,366	16,366	6.68
05/25/2019	4,156	1,206	0	0	0	0	0	6.67
05/26/2019	3,568	1,035	0	0	0	0	0	6.65
05/27/2019	3,155	915	0	0	0	0	0	6.63
05/28/2019	2,595	758	74,502	0	0	74,502	74,502	6.62
05/29/2019	2,269	663	28,909	0	0	28,909	28,909	6.60
05/30/2019	2,087	609	28,174	165,172	0	28,174	193,346	6.35
05/31/2019	1,784	521	21,125	88,705	0	21,125	109,830	6.18
06/01/2019	1,523	441	0	0	0	0	0	6.14
06/02/2019	1,396	404	0	0	0	0	0	6.13
06/03/2019	7,126	2,082	71,295	0	0	71,295	71,295	6.22
06/04/2019	24,416	7,134	21,045	0	0	21,045	21,045	6.32
06/05/2019	21,146	6,179	21,493	132,525	0	21,493	154,018	6.15
06/06/2019	FLOOD STAGE	MAXIMUM	21,821	117,260	0	21,821	139,081	5.96
06/07/2019	FLOOD STAGE	MAXIMUM	20,197	119,475	0	20,197	139,672	5.82
06/08/2019	18,543	5,377	0	0	0	0	0	5.80
06/09/2019	10,698	3,102	0	0	0	0	0	5.78

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DATE	Harrison Bayou Flow (GPM)	Calculated Maximum Rate Allowable (GPM)	Released From GWTP To Harrison Bayou	Released From INF Pond to Harrison Bayou	Released From GWTP to INF Pond	Combined Total Released from GWTP	Combined Total Released to Harrison Bayou	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
06/10/2019	6,091	1,779	70,519	0	0	70,519	70,519	5.76
06/11/2019	5,347	1,562	22,245	0	0	22,245	22,245	5.75
06/12/2019	3,804	1,111	20,421	85,137	0	20,421	105,558	5.55
06/13/2019	3,304	965	16,876	46,081	0	16,876	62,957	5.38
06/14/2019	2,300	103,501	0	114,751	0	0	114,751	5.18
06/15/2019	NA	NA	0	0	0	0	0	5.16
06/16/2019	NA	NA	0	0	0	0	0	5.15
06/17/2019	9,679	435,587	0	0	0	0	0	5.24
06/18/2019	7,980	359,129	0	122,800	0	0	122,800	5.06
06/19/2019	5,812	261,554	0	109,889	0	0	109,889	4.80
06/20/2019	NA	NA	0	0	0	0	0	4.86
06/21/2019	NA	NA	0	0	0	0	0	4.84
06/22/2019	NA	NA	0	0	0	0	0	4.82
06/23/2019	NA	NA	0	0	0	0	0	4.80
06/24/2019	NA	NA	0	0	0	0	0	5.10
06/25/2019	NA	NA	0	0	0	0	0	5.18
06/26/2019	NA	NA	0	0	0	0	0	5.16
06/27/2019	NA	NA	0	0	0	0	0	5.14
06/28/2019	NA	NA	0	0	0	0	0	5.12
06/29/2019	NA	NA	0	0	0	0	0	5.42
06/30/2019	NA	NA	0	0	0	0	0	5.40
			1,062,336	1,101,795	0	1,062,336	2,164,131	

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1 EVALUATION OF GROUNDWATER TREATMENT PLANT

The Groundwater Treatment Plant (GWTP) was constructed as part of the Interim Remedial Action (IRA) at Burning Ground Number (No.) 3, also referred to as Longhorn Army Ammunition Plant (LHAAP)-18/24, to treat groundwater extracted from interception-collection trenches (ICTs) and extraction wells. **Figure A-1** located in **Appendix A** presents the layout of the ICTs and extraction wells at LHAAP-18/24. The groundwater contamination at LHAAP-18/24 likely resulted from infiltration from an Unlined Evaporation Pond (UEP) that was used to store manufacturing wastewater, and from burning trenches and other industrial processes used to flash pyrotechnic, propellant, and explosive waste streams. The groundwater at LHAAP-18/24 is contaminated mainly with chlorinated ethenes and perchlorate, with lesser concentrations of 1,4-dioxane.

The GWTP also receives flow from eight extraction wells installed at LHAAP-16 as part of a historical treatability study. The extraction wells were installed in 1996 and 1997. The wells are located between the landfill at LHAAP-16 and Harrison Bayou. The groundwater at LHAAP-16 is also contaminated mainly with chlorinated ethenes and perchlorate.

1.1 Treatment Configuration

The process flow diagram for the GWTP is presented in **Appendix A, Figure A-2**. The GWTP was not operational between 24 May 2012, and 6 September 2012, due to malfunction of the scrubber unit associated with the catalytic oxidizer. Since 6 September 2012, the GWTP has operated without air abatement equipment. Although major repairs were conducted on the GWTP (e.g., replacement of level alarms, repair of the hydrochloric acid [HCl] tank, replacement of TK-650, replacement of malfunctioning valves and flow meters, replacement of metering pumps, repair or replacement of various system pumps, rust removal and repainting of various tanks, and replacement and repair of various extraction pumps, motors, and level switches), the GWTP treatment configuration has remained unchanged.

Malfunction of the blower on the air stripper (BL-340) on 14 September 2015, and on 17 September 2015, disrupted continuous extraction and routine operations of the GWTP, which lasted through 7 January 2016. Prior to this occurrence, the GWTP performed as designed and the GWTP was operated on an as needed basis (i.e., semi-continuous operational basis). During the 4th quarter of 2015, groundwater was extracted from a limited number of ICTs (ICTs 12E, 13A, 13B, 13C, and/or 13E, or ICTs 14B, 14C, and 14D). Operation of the GWTP occurred on a batch basis through the fluidized bed reactor (FBR). After replacement of the blower, attempts were made to restore continuous operations to the FBR but remained predominantly on a batch basis throughout January 2016.

In December 2016, an HCl spill caused plant operations to shut down until the issue could be properly addressed. The FBR performance was challenged by the increased chlorides in the neutralized wastewater, but performance gradually returned to normal in the 1st quarter of 2017. Groundwater extraction was gradually increased to full rates during the 2nd quarter of 2017.

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On 12 August 2017, severe storms caused a power outage at LHAAP-18/24. When electrical service was restored, the main transformer failed due to a manufacturing defect. A portable emergency generator was brought on-site on 21 August 2017, to allow the FBR to operate in full recycle mode. After a replacement transformer was installed on 12 September 2017, extraction began from ICT-13B, 13C, 13D, 13E, 13F, 7, and EW01 and the FBR was put into normal operation. Beginning on 21 September 2017, groundwater was extracted from all of the ICTs.

On 27 December 2018, severe storms caused a power out in Karnack, Texas. When electrical service was restored, the main was determined to have failed. A portable emergency generator was brought on-site on 28 December 2018, to allow the FBR to operate in full recycle mode. On 5 February 2019, the smaller generator mobilized in December 2018 was replaced with a larger generator capable of powering the LHAAP-18/24 well field as well as the entire GWTP. On 8 February 2019, the transformer at the GWTP was tested to ensure that it could handle backfeeding necessary to power the LHAAP-18/24 well field due to the necessary step-down in power from the generator. Following additional system modifications based upon the testing, the well field at LHAAP-18/24 had power restored on 11 February 2019, using the generator and transformer at the GWTP.

On 13 June 2019, the P-320 pump (Air Stripper Feed Pump) locked up and was not repaired until 2 July 2019. The GWTP was last run on 13 June 2019. As a result, sampling was not conducted during the last 2 weeks of June 2019.

On 11 June 2019, Smith Energy was on site to repair a double walled pipe in the burning grounds. They returned to finish the repair on 17 June 2019. Currently, the line to 18WW17 is still down because of another leak in the double walled pipe and the ground has been too wet to dig.

Flow rates for the treatment processes for metals and Volatile Organic Compounds (VOCs) ranged between 180 and 200 gallons per minute (gpm) with an average of approximately 190 gpm for the operating hours (i.e., this flow rate does not represent continuous flows). The GWTP operated for 113.75 hours during the quarter. The treatment configuration of the plant at these rates (with minor variations) is as follows:

GWTP Metals Precipitation Operating Parameters

Pretreatment Settings	Tank 200-A Mg(OH) ₂ Mixing	Tank 200-B NaOH Mixing	Tank 200-C Polymer Mixing	Tank 300 feed line to Air Stripper
pH Adjustment	9.0	10.5	NA	5.0 to meet ≤ 8.0 release from stripper
Feed Pump Settings	Speed 100% Stroke 100% 10 gph Mg(OH) ₂	Speed 100% Stroke 100% 9.0 gph NaOH	Speed 90% Stroke 100% 40 gph water	Speed 80% Stroke 80% 10 gph HCl
Notes: gph - gallons per hour, NaOH - sodium hydroxide, Mg(OH) ₂ - magnesium hydroxide, NA - not applicable				

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GWTP Air Compressors Operating Parameters

Air Compressors	K-700A	K-700B	K-701
Air Pressure Settings	88 psi	88 psi	105 psi
Note: psi - pounds per square inch			

GWTP Stripper Operating Parameters

pH Setting	7.4
Inlet Pressure Gauge	Not operational
Stripper Pressure Gauge	Not operational
Air Flow Rate	Not operational

GWTP Fluidized Bed Reactor Operating Parameters

Carbon Bed Height	12 feet & 8 to 11 inches
Recycle Flow Rate	200 gpm
pH	7.1 to 7.4
Recycle oxidation-reduction potential (ORP)	<-430 mV
Note: mV – millivolts	

1.2 Work Performed at the GWTP

Work performed at the GWTP during the 2nd quarter of 2019 is described in the following subsections.

1.2.1 Major Maintenance

The major maintenance items that were completed at the GWTP during this quarterly reporting period are:

- 9 April 2019: Bloc Design was on site to repair a problem with panel #3 in the burning grounds
- 29 April 2019: Ark-La-Tex Electric was on site to replace broken power poles in the burning grounds
- 16 May 2019: Bloc Design was on site to repair broken underground electrical wires by panel #3 in the burning grounds
- 11 June 2019: Smith Energy was on site to repair double walled pipe in the burning grounds
- 13 June 2019: Pump P-320 locked up and the pump was removed and taken to the repair shop
- 17 June 2019: Smith Energy was on site to finish repairing double walled pipe in the burning grounds

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1.2.2 Routine Maintenance

The following routine maintenance items were completed at the GWTP during this quarterly reporting period:

- Performed bush-hogging and weed eating activities around monitoring wells in Site 18/24
- Cleared fallen trees throughout Site 18/24
- Collected quarterly surface water samples and annual ICT well samples
- Completed sampling at Site 18/24 with the exception of wells 18WW19 and 18WW20 due to fallen trees making the entrance to these wells impassable
- Cut and removed fallen tree from power lines on Avenue P at Central Creek
- Installed repaired electric motor on P-101A
- Mowed grass around GWTP, GWTP office, Army trailer, decon pad, and storage conex boxes
- Performed housekeeping in GWTP office, Army trailer, GWTP Shop, and around GWTP and containment area
- Rebuilt one grundfos pump
- Repaired leaking 1-inch potable water pipe in GWTP
- Repaired sign at entrance of GWTP
- Replaced broken water spigot in GWTP
- Replaced bad check valve on suction tubing of P-104 as well as O-ring in sensitivity switch
- Replaced Woods #8 coupling on 3-inch piping, check valve, and ball valve on discharge on P-320
- Uncovered double walled pipe between ICTs 14C and 14D to find leak

1.2.2.1 Safety

The GWTP Operators, Mr. Scott Beesinger and Mr. Kennie Moore, did not have any safety incidents. Both GWTP Operators completed their annual 8-hour Hazardous Waste Operations and Emergency Response refresher course on 8 April 2019.

1.2.2.2 Lubrication

No lubrication maintenance was conducted during the reporting period.

1.2.2.3 Air Compressors

No maintenance activities were completed on the air compressor in the 2nd quarter 2019.

1.2.2.4 Belt Press and Waste Disposal

No belt press or waste disposal was conducted during the reporting period.

1.2.2.5 Sand Filter

No maintenance or repairs were conducted on the sand filter during the reporting period.

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1.2.2.6 Well Field at LHAAP-18/24

- Cleaned level probes on ICTs 8, 12C, 13C, 13D, and 14C
- Collected monthly flow meter readings
- Collected monthly water levels
- Replaced flow meters on ICTs 13F and 12A
- Replaced low level probe on ICT 13D
- Replaced a bad relay in ICT 14E and 12D

1.2.2.7 Miscellaneous Activities

- 7 April 2019: The acetic acid feed pump lost prime and the nutrient pump shut off. The acetic acid feed pump was primed and nutrient pump was restarted.
- 20 April 2019: The acetic acid pump was not pumping and it was discovered that the suction tubing was plugged. The plug was removed and acetic acid pump was restarted.
- 12 May 2019: The acetic acid feed shut off and the nutrient pump shut off. Both pumps were restarted.
- 19 May 2019: The acetic acid pump shut off and it was restarted.
- 29 June 2019: The acetic acid feed shut off. The pump was restarted and primed.

1.2.3 Routine Maintenance at LHAAP-16

- Checked site daily
- Collected monthly water levels

1.2.4 Routine Maintenance (Potable Water Wells)

- Flushed potable water lines.

1.3 Filter Cake Operations and Management

No filter cake operations took place during this reporting period.

1.4 Fluidized Bed Reactor Operations

The operating parameters for the GWTP FBR are presented in **Table 1**. With the exception of ORP on 11 June 2019 and the pH from 25 April 2019 through 2 May 2019, and again from 19 June 2019 through 30 June 2019, none of the operating parameters were outside of the optimal ranges in the 2nd quarter of 2019. The ORP ranged between -429 mV and -596 mV, and the pH ranged between 7.0 and 7.4 standard units. The ORP was just outside of optimal range on one day only.

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Table 1. Enhanced Fluidized Bed Reactor Operating Parameters – 2nd Quarter 2019

Date	pH (7.1-7.4)	ORP (<-430 mV)	Temperature (Degrees Fahrenheit)
4/1/2019	7.4	-525	62
4/2/2019	7.4	-529	63
4/3/2019	7.4	-503	63
4/4/2019	7.3	-521	62
4/5/2019	7.4	-525	63
4/6/2019	7.3	-526	64
4/7/2019	7.3	-523	64
4/8/2019	7.3	-525	66
4/9/2019	7.2	-522	68
4/10/2019	7.2	-523	70
4/11/2019	7.2	-525	70
4/12/2019	7.2	-500	68
4/13/2019	7.2	-510	67
4/14/2019	7.2	-513	67
4/15/2019	7.2	-514	67
4/16/2019	7.4	-524	68
4/17/2019	7.3	-528	68
4/18/2019	7.2	-522	67
4/19/2019	7.3	-527	67
4/20/2019	7.3	-528	68
4/21/2019	7.2	-525	68
4/22/2019	7.2	-537	70
4/23/2019	7.1	-540	72
4/24/2019	7.1	-536	73
4/25/2019	7.0	-531	73
4/26/2019	7.0	-527	74
4/27/2019	7.0	-534	75
4/28/2019	7.0	-529	75
4/29/2019	7.0	-540	78
4/30/2019	7.0	-497	77
5/1/2019	7.0	-515	75
5/2/2019	7.0	-524	75
5/3/2019	7.1	-526	75
5/4/2019	7.1	-530	75
5/5/2019	7.1	-531	75
5/6/2019	7.1	-527	75

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Date	pH (7.1-7.4)	ORP (<-430 mV)	Temperature (Degrees Fahrenheit)
5/7/2019	7.1	-531	76
5/8/2019	7.2	-539	75
5/9/2019	7.1	-543	75
5/10/2019	7.1	-545	74
5/11/2019	7.1	-538	73
5/12/2019	7.1	-540	72
5/13/2019	7.1	-522	73
5/14/2019	7.1	-535	73
5/15/2019	7.2	-529	74
5/16/2019	7.2	-545	75
5/17/2019	7.2	-557	74
5/18/2019	7.2	-543	76
5/19/2019	7.1	-545	77
5/20/2019	7.1	-541	77
5/21/2019	7.1	-535	77
5/22/2019	7.1	-504	77
5/23/2019	7.1	-533	78
5/24/2019	7.1	-532	78
5/25/2019	7.1	-547	80
5/26/2019	7.1	-553	80
5/27/2019	7.1	-556	80
5/28/2019	7.2	-531	79
5/29/2019	7.3	-530	79
5/30/2019	7.3	-537	78
5/31/2019	7.3	-545	78
6/1/2019	7.3	-558	78
6/2/2019	7.3	-563	79
6/3/2019	7.3	-495	79
6/4/2019	7.4	-481	79
6/5/2019	7.2	-525	79
6/6/2019	7.2	-530	77
6/7/2019	7.2	-521	77
6/8/2019	7.2	-541	79
6/9/2019	7.2	-541	80
6/10/2019	7.2	-457	79
6/11/2019	7.3	-429	79
6/12/2019	7.4	-433	79
6/13/2019	7.4	-458	81

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Date	pH (7.1-7.4)	ORP (<-430 mV)	Temperature (Degrees Fahrenheit)
6/14/2019	7.4	-460	81
6/15/2019	7.4	-567	84
6/16/2019	7.3	-570	82
6/17/2019	7.1	-596	83
6/18/2019	7.1	-568	84
6/19/2019	7.0	-558	85
6/20/2019	7.0	-530	85
6/21/2019	7.0	-552	86
6/22/2019	7.0	-533	86
6/23/2019	7.0	-547	86
6/24/2019	7.0	-549	87
6/25/2019	7.0	-544	87
6/26/2019	7.0	-542	87
6/27/2019	7.0	-543	88
6/28/2019	7.0	-542	88
6/29/2019	7.0	-539	88
6/30/2019	7.0	-536	87

1.5 Process Chemical Usage at GWTP

Approximate chemical consumption and the quantity delivered during the 2nd quarter of 2019 are shown in **Table 2**.

Table 2. Process Chemicals Delivered and Used

Chemical	Usage 2 nd Quarter 2019	Quantity Delivered 2 nd Quarter 2019
Hydrochloric acid	345 gallons	0
Sodium hydroxide (35%)	575 gallons	0
Acetic acid (50%)	4 drums = 220 gallons	0
Phosphoric acid (75%)	47.7 liters	0
Magnesium hydroxide	170 gallons	0
Urea	353.5 pounds	0
Polymer (magnafloc 110-L)	5.8 liters	0

2 EVALUATION OF LHAAP-18/24 ICT EFFECTIVENESS

The ICT system at Burning Ground No. 3 is composed of 14 sections ranging in length from 100 feet (ft) to 1,300 ft. A total of approximately 5,000 linear ft of trench was installed within and around three sides of Burning Ground No. 3. The trench sections extend approximately 22 ft to 45 ft below ground surface (bgs). Most, but not all of the trenches are as deep as the confining clay layer of the shallow groundwater zone. High density polyethylene (HDPE) liners were installed in ICTs 12 and 13, located on the western and northern boundaries of LHAAP-18/24, respectively. The locations of the liners are shown on **Figure A-1** in **Appendix A**. **Table A-1** in **Appendix A** presents the depths of the ICTs.

2.1 Groundwater Elevation

Water levels from 94 monitoring wells and 11 piezometers (piezometer 12 was damaged and plugged and abandoned in May 2013) are measured monthly to generate potentiometric surface maps that assist in monitoring the effectiveness of the groundwater extraction system on plume containment. The groundwater contours are generated using the water levels from the shallow zone and Wilcox Formation wells. The water level data are presented in **Table 3**. No reinjection of treated groundwater or reapplication to LHAAP-18/24 grounds via the existing irrigation system occurred during the 2nd quarter of 2019. Potentiometric surface maps are presented in **Appendix B** and groundwater elevations from the 2nd quarter of 2019 are discussed in Section 2.2.

2.2 Performance of Plume Capture

The intent of the ICTs is to control groundwater gradients, prevent off-site migration of contaminated groundwater, extract the most highly contaminated groundwater, and reduce the mass of contaminants in groundwater. Liners were installed in the ICTs on the northern (ICT 13) and western (ICT 12) site boundaries to limit migration of contaminated water from the site towards Harrison Bayou. At the same time, the liners reduce or prevent removal of contaminated groundwater that is outside the containment zone, between the site and Harrison Bayou. The ICTs are installed within the shallow subsurface at the site and capture primarily shallow groundwater (e.g., < 40 ft bgs).

In 2007 and 2008, in consultation with the Texas Commission on Environmental Quality (TCEQ) and the United States Environmental Protection Agency (USEPA), the Army ceased operations of ICTs 1, 3, 5, 10, and 12A for groundwater extraction (note that extraction from ICT 12A was resumed after pump replacement in December 2012). Two other ICTs (ICT 6 and ICT 9) were changed from extraction ICTs to re-injection ICTs. Groundwater extraction from well EW-1 located in the northeast central portion of the site began in October 2008 and well 18WW17 located to the northeast of the ICT containment area began in January 2008. **Table B-1** in **Appendix B** presents a summary of extraction equipment replacement since 2011, as dictated by poor extraction performance (malfunctioning pumps, poor pump positioning with respect to

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groundwater, non-operational level probes, scale build up, etc.). Further discussion of extraction performance of various ICTs and extraction wells is presented in Section 2.3.

Potentiometric surface maps of the shallow zone groundwater in the vicinity of LHAAP-18/24, based on groundwater elevations measured on 26 April, 29 May, and 28 June 2019, are shown on **Figures B-1, B-2, and B-3 in Appendix B**, respectively. The potentiometric surface maps of the shallow zone were contoured using the Kriging geostatistical interpolation method included in the Golden Software Surfer® data analysis software.

The HDPE liners in the ICTs, where present, were interpreted as groundwater flow barriers. The potentiometric surface maps for April through June 2019 continue to reflect high groundwater elevations in the northern/northwestern portion of the site with groundwater flow occurring radially from groundwater highs at monitoring well AWD-2 (175.01 feet above mean sea level [amsl] in April 2019, 175.23 feet amsl in May 2019, and 175.42 feet amsl in June 2019) inside the ICT containment area. An additional high point in June 2019 was 18CPTMW19 where the level measured 175.14.

The elevated potentiometric surface contours within the ICTs compared to the lower potentiometric surface contours on the outside of the ICTs is likely due to a no flow boundary condition caused by the ICT liners and groundwater extraction along the ICTs. From the groundwater high at monitoring well AWD-2, groundwater flows radially towards the surrounding ICTs which include ICT 13 to the north and northwest, and ICT 12 to the west and southwest.

Groundwater extraction rates from the ICTs were 681,206 gallons in April 2019; 1,087,813 gallons in May 2019; and 446,475 gallons in June 2019. Rainfall amounts recorded at the GWTP were 13.00 inches in April 2019, 13.14 inches in May 2019, and 12.29 inches in June 2019. This amount of rainfall resulted in 287,504 gallons of additional water treated and discharged but not metered with the influent totals.

During the reporting period, approximately 2.1-million gallons of treated groundwater was discharged to Harrison Bayou from either the GWTP or the INF Pond. No treated groundwater from the GWTP was returned to LHAAP-18/24 via the sprinkler system. Overall groundwater levels increased between April and May 2019 with an average shallow zone groundwater elevation rise of 0.2 ft. Groundwater levels also increased between May and June 2019 with an average shallow groundwater elevation rise of 0.4 ft.

Groundwater levels in Wilcox Formation wells (generally > 40 to 50 ft bgs) were measured during the 2nd quarter of 2019 groundwater gauging events. Wilcox Formation wells correspond generally to those wells previously identified as “Intermediate” and “Deep” wells. “Intermediate” wells are designated as Upper Wilcox Formation wells and “Deep” wells are designated as Lower Wilcox Formation wells. Generally, groundwater in the Upper and Lower Wilcox Formation wells are in hydraulic communication and so can be treated as a single hydrogeologic unit. Therefore, the groundwater elevations in Upper Wilcox wells were used to construct the potentiometric surface maps for the Wilcox Formation. **Figures B-4, B-5, and B-6 in Appendix B** show the locations of the Wilcox Formation monitoring wells and the

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potentiometric surface of the Wilcox Formation, based on static water levels measured during the April, May, and June 2019 gauging events, respectively. Groundwater in the Wilcox Formation generally flows in a north-northeasterly direction, towards Caddo Lake and there is a downward vertical gradient between the overlying shallow zone and the Wilcox Formation. However, a groundwater high in the Wilcox Formation occurs in the area of MW-14.

2.3 Quantity of Water Extracted from LHAAP-18/24

The average daily extraction rates from the ICTs were 22,707 gallons per day (gpd) in April 2019, 35,091 gpd in May 2019, and approximately 14,883 gpd in June 2019.

The volume of groundwater removed from LHAAP-18/24 during the 2nd Quarter 2019 measured approximately 2,215,494 gallons, based on total flow measured from the extraction wells and ICT wells. However, the influent totalizer (FIT-140) readings, as presented on **Figure 2-1**, only indicate 1,077,523 gallons were extracted. No groundwater was extracted from LHAAP-16 during the 2nd quarter of 2019 due to the main transformer not being operational. **Figure 2-1** shows the historical trends of extracted volumes by quarter based upon the influent totalizer (FIT-140). It is noted that there is a significant difference between the totalizer readings at FIT-140 and the total obtained from the individual units observed this quarter, which has been further evaluated this quarter. Two leaks were found and one has been repaired. The second leak will be repaired when the ground is dry enough to dig.

In contrast to the approximate total extracted volume based on total flow measured at the GWTP, the total estimated volume discharged to Harrison Bayou following treatment by the GWTP (FIT-686) was 271,989 gallons in April 2019; 504,435 gallons in May 2019; and 285,912 gallons in June 2019 for a total of 1,062,036 gallons discharged in 2nd Quarter 2019 (**Table 4**). However, this volume does not account for water present in the decant tank at the end of June or the influent that was not treated after the GWTP last ran on 13 June 2019. The difference between the influent volume determined from the individual meters on the ICTs and extraction wells and effluent volume determined from FIT-686 is approximately 70%. As of 28 June 2019, the total volume of water within the GWTP from tanks TK-300, TK-140, and TK-630 was approximately 360,000 gallons. However, considering the volume of unprocessed water within the treatment plant as of the end of the 2nd quarter, this percent difference is closer to 43% variation, which is contributable to variations in the flow meter recordings and the leak identified and repaired in the 2nd quarter. The 3rd quarter evaluation of influent versus effluent will allow for further determination of the effects of these leaks.

As indicated by Table 5, 23 of 27 ICTs and wells produced water during the 2nd quarter of 2019. ICTs 13A and 13D did not operate in May or June 2019 due to iron fouling of the pumps. Due to line leak repairs noted previously, ICTs 14A, 14B, and 14C did not operate in June 2019.

2.4 Sampling Activities at LHAAP-18/24

Groundwater sampling was completed at LHAAP-18/24 in accordance with the requirements documented in the Final Revised Installation-Wide Work Plan (Bhate Environmental Associates, Inc. [Bhate], May 2018). The following 79 monitoring wells were sampled for the 2nd quarter 2019: AWD-1, AWD-3, AWD-4, MW-1, MW-2, MW-3, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-12, MW-13, MW-14, MW-16, MW-17, MW-18, MW-19, MW-20, MW-21, MW-22, MW-

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23, 102, 109, 120, 125, 126, 129, 130, C-01, C-02, C-03, C-04, C-06, C-08, C-09, 17WW08, 18WW02, 18WW03, 18WW06, 18WW08, 18WW09, 18WW10, 18WW14, 18WW16, 18WW17, 18WW18, 18WW19, 18WW20, 18WW22, 18WW24, 18WW25, 18CPTMW01SW, 18CPTMW01DW, 18CPTMW03SW, 18CPTMW04, 18SPTMW04SW, 18CPTMW06, 18CPTMW07, 18CPTMW08SW, 18CPTMW08DW, 18CPTMW10SW, 18CPTMW10DW, 18CPTMW12SW, 18CPTMW12DW, 18CPTMW14, 18CPTMW15, 18CPTMW16, 18CPTMW18, 18CPTMW19, 18CPTMW19SW, 18CPTMW22SW, 18CPTMW22R, 18CPTMW22DW, 18CPTMW23, 18CPTMW23SW, 18CPTMW24, and 18CPTMW26SW. The ICTs sampled in the 2nd quarter 2019 included ICT-2, 4, 7, 8, 11, 12B, 12C, 12D, 12E, 13A, 13B, 13D, 13E, 13F, 14B, 14C, and 14D. Due to access issues, wells 18WW19 and 18WW20 were sampled on 8 August 2019, whereas the other 77 monitoring wells were sampled in June 2019. Similarly ICT-13A was sampled on 11 July 2019 due to access issues where as the other 16 ICTs were sampled in June 2019. Note also that monitoring well 123 was not sampled based upon the response to comments for the LHAAP-17 Pre-Design Investigation Report. Monitoring well 18WW10 replaced 123 per the response to comments.

The analytical results are presented in **Table 6**. Laboratory data packages are provided within **Appendix C**. Parameters exceeding their respective Maximum Contaminant Levels (MCLs), Medium Specific Concentrations (MSCs), or Protective Concentration Levels (PCLs) are as follows: perchlorate; 1,1,2-trichloroethane; 1,1-dichloroethene (DCE); 1,2,3-trichloropropane; 1,2-dichloroethane; benzene; carbon tetrachloride; cis-1,2-DCE; trans-1,2-DCE; methylene chloride; tetrachloroethene; trichloroethene (TCE); vinyl chloride (VC); arsenic; barium; cadmium; chromium; lead; manganese; and nickel.

Groundwater chemicals of concern (COCs) maps depicting the results of the June 2019 groundwater sampling event for perchlorate, TCE, and methylene chloride are presented as **Figures D-1 through D-6** in **Appendix D**.

2.4.1 LHAAP-18/24 Analytical Results

The highest perchlorate concentrations in the shallow zone are observed in MW23, MW5, MW7, MW21, 18WW17, 120, and MW3, with concentrations in these wells ranging between 11,000 µg/L in MW3 and 85,000 µg/L in 18WW17 (**Figure D-1**). Perchlorate in groundwater has migrated off-site in all directions. The perchlorate concentration in 18CPTMW23, which is located northwest just outside of the LHAAP-18/24 boundary, was reported at 2,500 µg/L in June 2019 which is comparable the detection of 4,200 µg/L in December 2018. Typically, the December detections are more than 10 times lower but, with the higher rainfall over the past 9 months, the December 2018 detection was elevated. Historical data demonstrates the more typical fluctuation with measurements of perchlorate as follows: 140 µg/L in December 2017, 3,220 µg/L in June 2017, 91.3 µg/L in December 2016, and 2,310 µg/L in June 2016. These changes in concentration are likely influenced by groundwater level fluctuations, rain amounts, and performance of the ICTs.

Perchlorate in the Wilcox Formation was detected in monitoring well 18CPTMW08SW at a concentration of 23,000 µg/L (**Figure D-2**), which is comparable to the concentration reported in December 2018 (22,000 µg/L). Perchlorate concentration decreases rapidly away from this well.

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Another area where perchlorate in the Wilcox Formation was identified at an elevated concentration is in MW-14, with a reported concentration of 240,000 µg/L (primary sample) / 230,000 µg/L (duplicate sample) compared to 76,000 µg/L in December 2018. Monitoring well 18CPTMW22SW also contained an elevated concentration of perchlorate with 590 µg/L in June 2019, which is significantly less than the detection of 1,900 µg/L in December 2018 and historical detections in this monitoring well.

The TCE plume in the shallow zone remained stable compared to that depicted in December 2018. However, the highest TCE detection was 15,000 µg/L in monitoring well MW-1 (**Figure D-3**), which was not sampled in December 2018. Monitoring well 120 was sampled in both December 2018 and June 2019. In December 2018, monitoring well 120 had the highest concentration of TCE at 22,000 µg/L and this concentration decreased to 7,900 µg/L in June 2019. This observed fluctuation of TCE within well 120 is likely due to fluctuations in groundwater elevations coupled with the increased and continued rainfall over the prior 9 months.

TCE in the Wilcox Formation is generally present at low concentrations (**Figure D-4**). The highest concentration of 11,000 µg/L was observed in MW-14. This concentration increased from a concentration of 9,000 µg/L in December 2018. In December 2017, 13,000 µg/L was measured at this well. A concentration of 32 µg/L was reported in 18CPTMW01SW in June 2019, which is less than half of what was measured in June 2018 (81 µg/L).

The concentrations of methylene chloride in the shallow zone remain centered on MW-2 with a concentration of 510,000 µg/L which is double the concentration of 170,000 µg/L detected in December 2018 and more than triple the 140,000 µg/L detected in December 2017, but lower than the detection of 604,000 µg/L measured in June 2017. The extent of methylene chloride in the shallow formation is depicted on **Figure D-5**.

Methylene chloride in the Wilcox Formation is present at a concentration of 100 µg/L identified in 18CPTMW01SW in June 2019, which is lower than the concentration reported in December 2018 of 1,600 µg/L and December 2017 of 1,500 µg/L. This fluctuation is similar to that observed in June 2017 which had a detection of 913 µg/L and a detection of 1,590 µg/L in December 2016. Methylene chloride in MW-14 was not detected (< 20 µg/L) in June 2019, December 2018, or June 2018. The extent of methylene chloride in the Wilcox Formation is depicted on **Figure D-6**.

2.4.2 LHAAP-18/24 Trend Analysis

Time-series graphs for the shallow zone and Wilcox Formation wells are presented in **Appendix E**. Graphs for shallow zone wells C-08, MW-2, MW-7, MW-8, MW-16, MW-17, MW-20, MW-21, MW-22, MW-23, 18WW08, 109, 120, 126, and AWD-3 are included. Graphs for Wilcox wells C-03 and MW-14 are also included. The following observations were made, based on the June 2019 groundwater monitoring results:

- MW-2 is located inside the containment in the shallow zone. Methylene chloride increased to 510,000 µg/L (duplicate) in June 2019 compared to a detection of 170,000 µg/L in December 2018. The concentration of methylene chloride is within the recent range of detections in MW-2 (detected at 604,000 µg/L in June 2017). The TCE

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concentration in June 2019 decreased to 1,400 µg/L from 2,300 µg/L in December 2018. Perchlorate was non-detected in both June 2019 and December 2018.

- The perchlorate concentration in MW-21 remained relatively stable in June 2019 with a detection of 24,000 µg/L compared to 23,000 µg/L in December 2018. TCE in MW-21 decreased to 6,300 µg/L in June 2019 from 9,800 µg/L in December 2018. Methylene chloride remained below the detection limit.
- The TCE concentration in MW-22 (230 µg/L) was approximately 50-percent lower than the December 2018 result of 680 µg/L. Methylene chloride remained below the detection limit. Perchlorate remained stable with a detection of 95 µg/L in June 2019 and a detection of 84 µg/L in December 2018. In addition, these detections remain lower when compared to concentrations greater than 200 µg/L in prior sampling events at MW-22.
- Perchlorate detected in groundwater at MW-23 increased slightly to 67,000 µg/L in June 2019, from 52,000 µg/L in December 2018. TCE decreased to 2,600 µg/L from 4,800 µg/L in December 2018.
- Perchlorate in monitoring well 120 decreased from 47,000 µg/L in December 2018 to 13,000 µg/L in June 2019. TCE also decreased from 22,000 µg/L in December 2018 to 7,900 µg/L in June 2019.
- Methylene chloride and perchlorate remained below the detection limits in C-08, to the northeast of the containment area. TCE decreased slightly to 1.1 µg/L in June 2019 from 2.2 µg/L in December 2018.
- The northeastern well, 109, saw an increase in perchlorate from the December 2018 detection of 3,200 µg/L to 10,000 µg/L in June 2019. The recent detection is within the historical range and is less than the detection of 19,000 µg/L in December 2017. TCE detected in monitoring well 109 decreased from 420 µg/L in December 2018 to 130 µg/L in June 2019. Methylene chloride remained below the detection limit.
- Wells to the southwest of the containment area include MW-7, MW-8, and MW-17. Perchlorate increased in MW-7 to 26,000 µg/L in June 2019 from 14,000 µg/L December 2018. This well has seen a decreasing trend in TCE that continued from the December 2018 sampling (2,000 µg/L) to the June 2019 sampling (1,300 µg/L). Perchlorate increased in MW-8 to 7,100 µg/L from 6,700 µg/L in December 2018. This well's decreasing trend in TCE has continued with a detection of 480 µg/L in December 2018 and a detection of 120 µg/L in June 2019. The perchlorate concentration in MW-17 has remained below the detection limit since June 2016. Methylene chloride remained below the detection limit in each of these three monitoring wells.
- Perchlorate in MW-16 increased to 2,900 µg/L in June 2019 from 90 µg/L in December 2018. While this detection is within the historical range, this is the highest detected concentration of perchlorate since June 2015. As presented in Table 5, ICT-13A is the nearest extraction point to MW-16, and it was not operational in May or June 2019, which could have resulted in the increased perchlorate detection during the June 2019 sampling event. TCE also increased to 1,200 µg/L in June 2019

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2019 from 780 µg/L in December 2018. This variability in the TCE detection has been observed since 2014. However, this detection of TCE is the highest observed in this monitoring well. Methylene chloride remained below the detection limit.

- Perchlorate in AWD-3 decreased from 6.9 µg/L in December 2018 to 1.8 J (estimated concentration) µg/L in June 2019. TCE increased from 160 µg/L in December 2018 to 580 µg/L in June 2019. Methylene chloride remained below the detection limit.
- C-03 is a Wilcox Formation well located northeast of the containment area, which has remained non-detect for TCE and methylene chloride since December 2014. Perchlorate increased from 15 µg/L in December 2018 to 54 µg/L in June 2019.
- The concentration of perchlorate in Wilcox Formation well MW-14 increased from 76,000 µg/L in December 2018 to 240,000 µg/L in June 2019. These detections of perchlorate in MW-14 are consistent with those results obtained from December 2013 through June 2016. The concentration of TCE also increased from 9,000 µg/L in December 2018 to 11,000 µg/L in June 2019. Methylene chloride remained below the detection limit.
- The concentration of methylene chloride and TCE continue to be non-detect for 18WW08. Perchlorate decreased from 130 µg/L in June 2018 to 45 µg/L in December 2018 and then non-detect in June 2019.

Monitoring wells MW-20 and 126 continue to have no or low level detections of methylene chloride, TCE, and perchlorate. These wells should be considered for removal from the monitoring program.

In general, other than the changes observed above in perchlorate, TCE, and methylene chloride concentrations, the COC concentration trends indicate that the plumes are stable, suggesting that the extraction system is effective in containing the plumes. The increase in perchlorate detections in MW-16, which is a shallow monitoring well near the Harrison Bayou, need to be monitored and evaluated compared to the surface water detections.

2.5 Groundwater Treatment Plant Sampling and Analysis

Sampling and analysis is completed in accordance with the requirements documented in the Final Revised Sampling and Analysis Plan (AECOM Technical Services, Inc., September 2017). Besides the Record of Decision (ROD) sampling requirement, additional sample analyses are typically performed on the influent and effluent samples to monitor the effectiveness of the perchlorate treatment (FBR and/or ion exchange vessels) process. Sections 2.5.1 through 2.5.4 present the results of analyses conducted during the 2nd quarter of 2019. The complete laboratory results are provided on a compact disc (CD) (**Appendix F**).

2.5.1 Perchlorate Sampling

Table 7 presents the weekly effluent perchlorate results for the 2nd quarter of 2019. Due to the repairs being completed on pump P-320, the GWTP was not operated from 13 June 2019 until

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early July 2019. Therefore, the last effluent sample for the 2nd quarter 2019 was collected on 12 June 2019. The effluent results were non-detect for perchlorate in the 2nd Quarter 2019.

2.5.2 VOC Sampling

Tables 8, 9, and 10 present the effluent VOC results for April, May, and June 2019. Sampling of the effluent for VOCs was conducted on a biweekly basis. The results, where applicable, were below the discharge limits. The tables also provide monthly influent concentrations for VOCs and perchlorate.

2.5.3 Monthly Metals Sampling

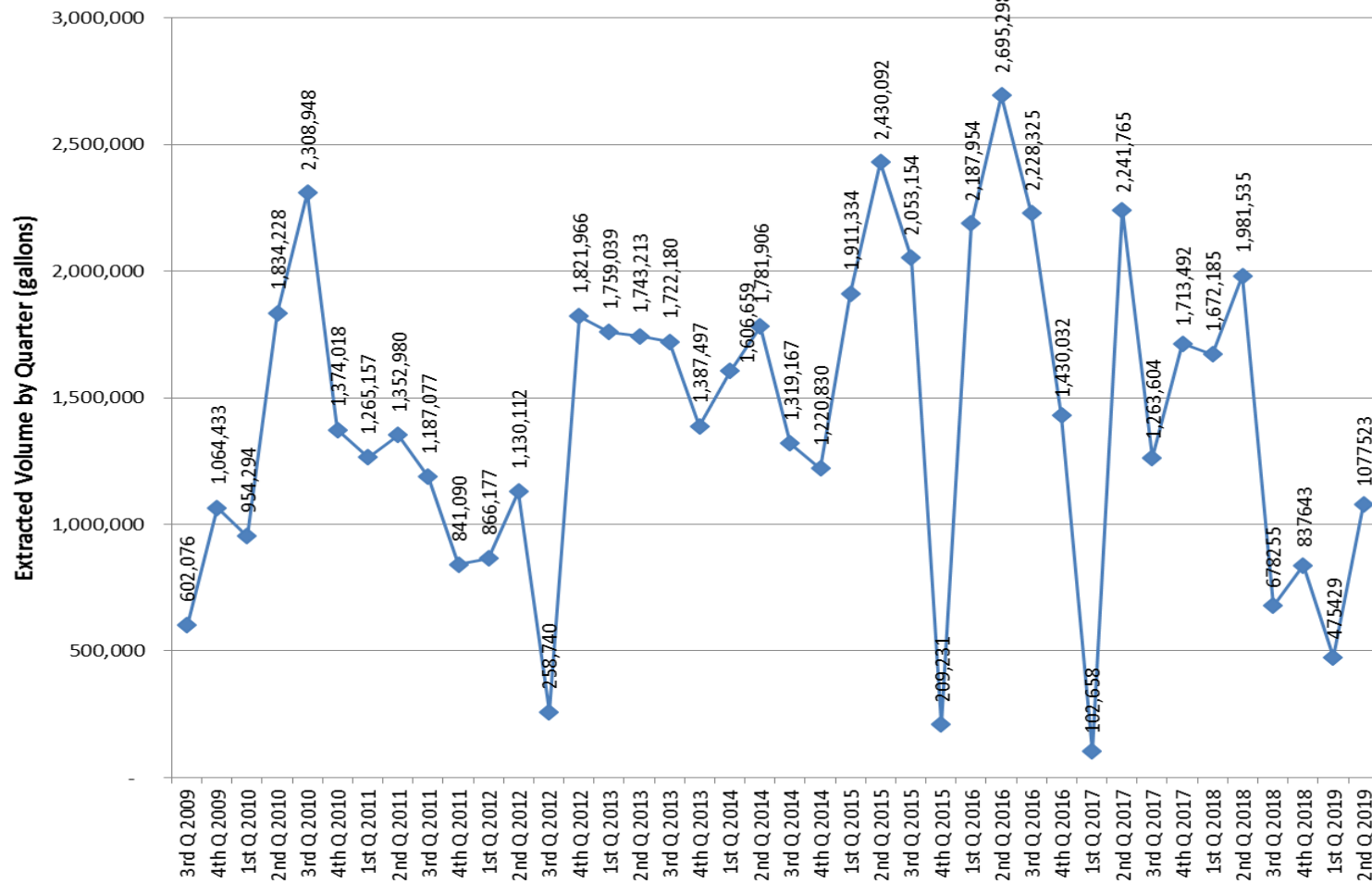
As per the Final Installation-Wide Work Plan (Bhate, May 2018), the monthly metals sampling is reported in **Tables 8, 9, and 10**. None of the metals exceeded the effluent discharge limits.

2.5.4 Quarterly Sampling

Sampling of the effluent for VOCs, anions, chemical oxygen demand (COD), oil and grease, perchlorate, and metals was conducted during this quarter and the results were below the discharge limits. **Table 11** presents the analytical results for the 2nd quarter of 2019.

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Figure 2-1
Quarterly Extraction Rate



Extraction rate beginning at 3rd Q 2013 is based in FIT-140 (influent totalizer)

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Table 3: Groundwater Elevations at LHAAP-18/24 Piezometers, Monitoring Wells, and Surface Water

Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 4/26/2019	Groundwater Elevation (feet amsl) 4/26/2019	Depth to Water (feet) 5/29/2019	Groundwater Elevation (feet amsl) 5/29/2019	Depth to Water (feet) 6/28/2019	Groundwater Elevation (feet amsl) 6/28/2019
BGPZ-1	Piezometer	184.99	4.63	180.36	4.77	180.22	4.59	180.40
BGPZ-2	Piezometer	184.39	12.70	171.69	12.58	171.81	12.50	171.89
BGPZ-3	Piezometer	180.35	6.37	173.98	6.30	174.05	6.35	174.00
BGPZ-4	Piezometer	177.77	6.29	171.48	6.17	171.60	6.08	171.69
BGPZ-5	Piezometer	180.76	10.27	170.49	10.14	170.62	10.05	170.71
BGPZ-6	Piezometer	197.82	26.69	171.13	26.45	171.37	26.31	171.51
BGPZ-7	Piezometer	195.96	26.30	169.66	26.07	169.89	25.90	170.06
BGPZ-8	Piezometer	197.08	28.50	168.58	28.22	168.86	28.04	169.04
BGPZ-9	Piezometer	196.45	27.08	169.37	26.82	169.63	26.60	169.85
BGPZ-10	Piezometer	197.00	27.15	169.85	26.87	170.13	26.65	170.35
BGPZ-11	Piezometer	196.99	27.20	169.79	26.93	170.06	26.75	170.24
BGPZ-12	Piezometer	188.17	NA	Plugged	NA	Plugged	NA	Plugged
AWD-1	Monitoring Well	182.27	8.75	173.52	8.45	173.82	7.74	174.53
AWD-2	Monitoring Well	186.78	11.77	175.01	11.55	175.23	11.36	175.42
AWD-3	Monitoring Well	200.13	27.16	172.97	26.91	173.22	26.38	173.75
AWD-4	Monitoring Well	193.89	23.73	170.16	23.40	170.49	19.57	174.32
MW-1	Monitoring Well	199.22	26.32	172.90	26.00	173.22	25.50	173.72
MW-2	Monitoring Well	196.73	25.75	170.98	25.37	171.36	25.18	171.55
MW-3	Monitoring Well	196.54	25.62	170.92	25.29	171.25	24.64	171.90
MW-4	Monitoring Well	197.27	25.92	171.35	25.60	171.67	24.96	172.31
MW-5	Monitoring Well	194.97	24.43	170.54	24.10	170.87	22.61	172.36
MW-6	Monitoring Well	192.18	22.70	169.48	22.40	169.78	20.38	171.80

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Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 4/26/2019	Groundwater Elevation (feet amsl) 4/26/2019	Depth to Water (feet) 5/29/2019	Groundwater Elevation (feet amsl) 5/29/2019	Depth to Water (feet) 6/28/2019	Groundwater Elevation (feet amsl) 6/28/2019
MW-7	Monitoring Well	188.47	17.80	170.67	17.53	170.94	16.89	171.58
MW-8	Monitoring Well	187.13	16.50	170.63	16.12	171.01	14.62	172.51
MW-9	Monitoring Well	184.73	13.44	171.29	13.15	171.58	11.98	172.75
MW-10	Monitoring Well	178.12	6.95	171.17	6.88	171.24	6.32	171.80
MW-11	Monitoring Well	184.65	12.81	171.84	12.72	171.93	12.59	172.06
MW-12	Monitoring Well	178.33	6.96	171.37	6.81	171.52	6.02	172.31
MW-13	Monitoring Well	176.72	6.21	170.51	6.03	170.69	5.10	171.62
MW-14	Monitoring Well	186.19	12.45	173.74	12.26	173.93	11.33	174.86
MW-16	Monitoring Well	178.59	6.93	171.66	7.08	171.51	6.32	172.27
MW-17	Monitoring Well	179.03	8.41	170.62	8.15	170.88	7.30	171.73
MW-18	Monitoring Well	178.58	7.94	170.64	7.67	170.91	6.87	171.71
MW-19	Monitoring Well	178.60	7.98	170.62	7.70	170.90	7.00	171.60
MW-20	Monitoring Well	186.64	8.69	177.95	8.42	178.22	8.52	178.12
MW-21	Monitoring Well	198.70	29.12	169.58	28.85	169.85	29.61	169.09
MW-22	Monitoring Well	197.51	26.85	170.66	26.52	170.99	27.30	170.21
MW-23	Monitoring Well	198.79	26.50	172.29	26.19	172.60	27.10	171.69
101	Monitoring Well	197.53	5.79	191.74	5.71	191.82	5.60	191.93
102	Monitoring Well	193.94	18.91	175.03	18.77	175.17	18.11	175.83
109	Monitoring Well	197.02	26.65	170.37	26.32	170.70	27.48	169.54
120	Monitoring Well	184.19	11.31	172.88	11.03	173.16	10.48	173.71
123	Monitoring Well	186.21	11.49	174.72	11.22	174.99	11.09	175.12
125	Monitoring Well	196.28	24.51	171.77	24.30	171.98	22.03	174.25
126	Monitoring Well	199.37	28.73	170.64	28.45	170.92	28.41	170.96
129	Monitoring Well	197.24	25.40	171.84	25.05	172.19	24.76	172.48

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Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 4/26/2019	Groundwater Elevation (feet amsl) 4/26/2019	Depth to Water (feet) 5/29/2019	Groundwater Elevation (feet amsl) 5/29/2019	Depth to Water (feet) 6/28/2019	Groundwater Elevation (feet amsl) 6/28/2019
130	Monitoring Well	177.73	5.31	172.42	5.17	172.56	5.42	172.31
C-01	Monitoring Well	193.89	22.92	170.97	22.59	171.30	22.37	171.52
C-02	Monitoring Well	175.95	4.89	171.06	5.02	170.93	3.72	172.23
C-03	Monitoring Well	196.34	25.63	170.71	25.30	171.04	24.96	171.38
C-04	Monitoring Well	194.64	24.00	170.64	23.81	170.83	22.96	171.68
C-04A	Monitoring Well	194.61	23.78	170.83	23.56	171.05	22.67	171.94
C-05	Monitoring Well	180.74	11.05	169.69	10.92	169.82	10.49	170.25
C-06	Monitoring Well	192.22	22.90	169.32	22.75	169.47	22.92	169.30
C-07	Monitoring Well	196.80	26.28	170.52	26.02	170.78	26.10	170.70
C-08	Monitoring Well	193.10	23.54	169.56	23.24	169.86	23.65	169.45
C-09	Monitoring Well	202.35	32.22	170.13	32.01	170.34	31.91	170.44
C-10	Monitoring Well	201.86	31.50	170.36	31.28	170.58	31.19	170.67
17WW08	Monitoring Well	179.72	7.81	171.91	7.69	172.03	8.40	171.32
18WW01	Monitoring Well	201.31	30.69	170.62	30.40	170.91	30.29	171.02
18WW02	Monitoring Well	179.30	7.71	171.59	7.62	171.68	7.47	171.83
18WW03	Monitoring Well	195.59	25.40	170.19	25.15	170.44	24.93	170.66
18WW04	Monitoring Well	183.74	14.43	169.31	14.21	169.53	14.05	169.69
18WW05	Monitoring Well	189.59	19.40	170.19	19.22	170.37	19.18	170.41
18WW06	Monitoring Well	179.70	8.25	171.45	8.13	171.57	8.18	171.52
18WW07	Monitoring Well	183.67	NM	NM	NM	NM	NM	NM
18WW08	Monitoring Well	177.77	5.97	171.80	6.09	171.68	5.77	172.00
18WW09	Monitoring Well	177.51	6.33	171.18	6.30	171.21	5.95	171.56
18WW10	Monitoring Well	182.26	9.91	172.35	9.82	172.44	10.08	172.18
18WW11	Monitoring Well	182.29	11.39	170.90	11.27	171.02	11.39	170.90

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Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 4/26/2019	Groundwater Elevation (feet amsl) 4/26/2019	Depth to Water (feet) 5/29/2019	Groundwater Elevation (feet amsl) 5/29/2019	Depth to Water (feet) 6/28/2019	Groundwater Elevation (feet amsl) 6/28/2019
18WW14	Monitoring Well	186.47	15.75	170.72	15.44	171.03	14.60	171.87
18WW15	Monitoring Well	186.24	15.01	171.23	14.79	171.45	14.23	172.01
18WW16	Monitoring Well	201.88	31.57	170.31	31.25	170.63	31.62	170.26
18WW18	Monitoring Well	196.82	26.44	170.38	26.17	170.65	25.72	171.10
18WW19	Monitoring Well	179.56	10.58	168.98	10.40	169.16	10.20	169.36
18WW20	Monitoring Well	180.42	11.39	169.03	11.19	169.23	11.03	169.39
18WW21	Monitoring Well	195.20	25.21	169.99	24.95	170.25	24.83	170.37
18WW22	Monitoring Well	195.37	24.82	170.55	24.53	170.84	23.81	171.56
18WW24	Monitoring Well	176.40	4.15	172.25	4.25	172.15	4.10	172.30
18WW25	Monitoring Well	175.15	3.90	171.25	4.08	171.07	4.01	171.14
18CPTMW01SW	Monitoring Well	198.20	26.77	171.43	26.58	171.62	25.72	172.48
18CPTMW01DW	Monitoring Well	197.92	26.74	171.18	26.53	171.39	26.94	170.98
18CPTMW03SW	Monitoring Well	198.53	27.69	170.84	27.40	171.13	27.15	171.38
18CPTMW04	Monitoring Well	196.60	23.35	173.25	23.03	173.57	22.37	174.23
18CPTMW04SW	Monitoring Well	196.42	26.10	170.32	25.81	170.61	24.85	171.57
18CPTMW06	Monitoring Well	198.12	26.85	171.27	26.55	171.57	26.87	171.25
18CPTMW07	Monitoring Well	197.32	26.20	171.12	25.96	171.36	26.03	171.29
18CPTMW08SW	Monitoring Well	196.38	26.09	170.29	25.79	170.59	24.65	171.73
18CPTMW08DW	Monitoring Well	196.59	26.45	170.14	26.17	170.42	25.15	171.44
18CPTMW10SW	Monitoring Well	186.98	16.25	170.73	16.04	170.94	15.35	171.63
18CPTMW10DW	Monitoring Well	187.38	17.18	170.20	16.97	170.41	16.22	171.16
18CPTMW12SW	Monitoring Well	190.90	19.81	171.09	19.54	171.36	19.65	171.25
18CPTMW12DW	Monitoring Well	190.25	19.63	170.62	19.37	170.88	19.07	171.18
18CPTMW14	Monitoring Well	196.69	25.80	170.89	25.49	171.20	26.50	170.19

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Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 4/26/2019	Groundwater Elevation (feet amsl) 4/26/2019	Depth to Water (feet) 5/29/2019	Groundwater Elevation (feet amsl) 5/29/2019	Depth to Water (feet) 6/28/2019	Groundwater Elevation (feet amsl) 6/28/2019
18CPTMW15	Monitoring Well	179.79	7.19	172.60	7.03	172.76	7.90	171.89
18CPTMW16	Monitoring Well	175.37	3.98	171.39	4.20	171.17	4.00	171.37
18CPTMW18	Monitoring Well	194.53	26.67	167.86	26.39	168.14	26.82	167.71
18CPTMW19	Monitoring Well	193.59	23.90	169.69	23.62	169.97	18.45	175.14
18CPTMW19SW	Monitoring Well	193.29	24.34	168.95	24.01	169.28	21.65	171.64
18CPTMW22SW	Monitoring Well	187.79	17.33	170.46	17.07	170.72	16.96	170.83
18CPTMW22R	Monitoring Well	187.23	4.89	182.34	5.05	182.18	6.27	180.96
18CPTMW22DW	Monitoring Well	188.00	17.29	170.71	16.98	171.02	17.00	171.00
18CPTMW23	Monitoring Well	177.47	5.91	171.56	5.82	171.65	5.81	171.66
18CPTMW23SW	Monitoring Well	177.43	5.80	171.63	5.69	171.74	6.12	171.31
18CPTMW24	Monitoring Well	194.89	25.51	169.38	25.23	169.66	26.00	168.89
18CPTMW26	Monitoring Well	182.60	14.09	168.51	14.15	168.45	14.29	168.31
18CPTMW26SW	Monitoring Well	182.00	11.25	170.75	11.12	170.88	10.81	171.19
1824HBSW7	Surface Water Sample	167.92	5.62	162.30	2.18	165.74	3.56	164.36

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Table 4: Treated Groundwater Discharged –April through June 2019

Date	Harrison Bayou Flow (GPM)	Calculated Maximum Rate Allowable (GPM)	Released From GWTP To Harrison Bayou	Released From INF Pond to Harrison Bayou	Released From GWTP to INF Pond	Combined Total Released from GWTP	Combined Total Released to Harrison Bayou	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
04/01/2019	5,096	1,489	2,731	0	0	2,731	2,731	2.59
04/02/2019	4,387	1,282	10,042	0	0	10,042	10,042	2.58
04/03/2019	3,767	1,100	12,251	0	0	12,251	12,251	2.58
04/04/2019	3,137	916	11,571	0	0	11,571	11,571	2.57
04/05/2019	5,937	1,734	11,289	0	0	11,289	11,289	2.57
04/06/2019	5,123	1,485	0	0	0	0	0	2.57
04/07/2019	Flood Stage	Maximum	0	0	0	0	0	2.75
04/08/2019	Flood Stage	Maximum	37,932	0	0	37,932	37,932	3.46
04/09/2019	Flood Stage	Maximum	15,102	0	0	15,102	15,102	3.46
04/10/2019	Flood Stage	Maximum	12,608	0	0	12,608	12,608	3.45
04/11/2019	Flood Stage	Maximum	12,358	0	0	12,358	12,358	3.45
04/12/2019	32,529	9,505	11,428	0	0	11,428	11,428	3.45
04/13/2019	Flood Stage	Maximum	0	0	0	0	0	3.50
04/14/2019	Flood Stage	Maximum	0	0	0	0	0	4.08
04/15/2019	Flood Stage	Maximum	46,815	0	0	46,815	46,815	4.08
04/16/2019	Flood Stage	Maximum	11,952	0	0	11,952	11,952	4.08
04/17/2019	Flood Stage	Maximum	12,522	0	0	12,522	12,522	4.07
04/18/2019	Flood Stage	Maximum	12,033	0	0	12,033	12,033	4.07
04/19/2019	Flood Stage	Maximum	8,208	0	0	8,208	8,208	4.48
04/20/2019	Flood Stage	Maximum	0	0	0	0	0	4.48
04/21/2019	Flood Stage	Maximum	0	0	0	0	0	4.47
04/22/2019	28,975	8,466	38,525	0	0	38,525	38,525	4.47
04/23/2019	No Release	NA	0	0	0	0	0	4.46
04/24/2019	No Release	NA	0	0	0	0	0	4.45
04/25/2019	No Release	NA	0	0	0	0	0	4.86
04/26/2019	No Release	NA	0	0	0	0	0	4.85
04/27/2019	No Release	NA	0	0	0	0	0	4.83
04/28/2019	No Release	NA	0	0	0	0	0	4.81
04/29/2019	No Release	NA	0	0	0	0	0	4.80
04/30/2019	4,621	1,350	4,622	0	0	4,622	4,622	4.79
05/01/2019	3,936	1,150	13,445	0	0	13,445	13,445	4.78
05/02/2019	7,368	2,153	14,393	0	0	14,393	14,393	4.97
05/03/2019	Flood Stage	Maximum	10,904	0	0	10,904	10,904	4.96
05/04/2019	Flood Stage	Maximum	0	0	0	0	0	5.08

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Date	Harrison Bayou Flow (GPM)	Calculated Maximum Rate Allowable (GPM)	Released From GWTP To Harrison Bayou	Released From INF Pond to Harrison Bayou	Released From GWTP to INF Pond	Combined Total Released from GWTP	Combined Total Released to Harrison Bayou	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
05/05/2019	Flood Stage	Maximum	0	0	0	0	0	5.07
05/06/2019	22,920	6,697	43,253	0	0	43,253	43,253	5.06
05/07/2019	14,834	4,334	12,393	0	0	12,393	12,393	5.05
05/08/2019	Flood Stage	Maximum	12,032	0	0	12,032	12,032	5.04
05/09/2019	Flood Stage	Maximum	11,328	0	0	11,328	11,328	5.74
05/10/2019	Flood Stage	Maximum	11,064	0	0	11,064	11,064	5.78
05/11/2019	Flood Stage	Maximum	0	0	0	0	0	6.04
05/12/2019	Flood Stage	Maximum	0	0	0	0	0	6.03
05/13/2019	Flood Stage	Maximum	37,841	0	0	37,841	37,841	6.02
05/14/2019	Flood Stage	Maximum	11,270	0	0	11,270	11,270	6.01
05/15/2019	Flood Stage	Maximum	12,397	0	0	12,397	12,397	6.00
05/16/2019	Flood Stage	Maximum	12,039	0	0	12,039	12,039	5.99
05/17/2019	Flood Stage	Maximum	9,821	0	0	9,821	9,821	5.98
05/18/2019	Flood Stage	Maximum	0	0	0	0	0	5.97
05/19/2019	Flood Stage	Maximum	0	0	0	0	0	6.63
05/20/2019	Flood Stage	Maximum	47,380	0	0	47,380	47,380	6.62
05/21/2019	Flood Stage	Maximum	24,309	0	0	24,309	24,309	6.61
05/22/2019	Flood Stage	Maximum	26,501	0	0	26,501	26,501	6.74
05/23/2019	Flood Stage	Maximum	24,989	0	0	24,989	24,989	6.71
05/24/2019	Flood Stage	Maximum	16,366	0	0	16,366	16,366	6.68
05/25/2019	4,156	1,206	0	0	0	0	0	6.67
05/26/2019	3,568	1,035	0	0	0	0	0	6.65
05/27/2019	3,155	915	0	0	0	0	0	6.63
05/28/2019	2,595	758	74,502	0	0	74,502	74,502	6.62
05/29/2019	2,269	663	28,909	0	0	28,909	28,909	6.60
05/30/2019	2,087	609	28,174	165,172	0	28,174	193,346	6.35
05/31/2019	1,784	521	21,125	88,705	0	21,125	109,830	6.18
06/01/2019	1,523	441	0	0	0	0	0	6.14
06/02/2019	1,396	404	0	0	0	0	0	6.13
06/03/2019	7,126	2,082	71,295	0	0	71,295	71,295	6.22
06/04/2019	24,416	7,134	21,045	0	0	21,045	21,045	6.32
06/05/2019	21,146	6,179	21,493	132,525	0	21,493	154,018	6.15
06/06/2019	Flood Stage	Maximum	21,821	117,260	0	21,821	139,081	5.96
06/07/2019	Flood Stage	Maximum	20,197	119,475	0	20,197	139,672	5.82
06/08/2019	18,543	5,377	0	0	0	0	0	5.80
06/09/2019	10,698	3,102	0	0	0	0	0	5.78

GWTP QUARTERLY EVALUATION REPORT – 2ND QUARTER 2019
LONGHORN ARMY AMMUNITION PLANT

Date	Harrison Bayou Flow (GPM)	Calculated Maximum Rate Allowable (GPM)	Released From GWTP To Harrison Bayou	Released From INF Pond to Harrison Bayou	Released From GWTP to INF Pond	Combined Total Released from GWTP	Combined Total Released to Harrison Bayou	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
06/10/2019	6,091	1,779	70,519	0	0	70,519	70,519	5.76
06/11/2019	5,347	1,562	22,245	0	0	22,245	22,245	5.75
06/12/2019	3,804	1,111	20,421	85,137	0	20,421	105,558	5.55
06/13/2019	3,304	965	16,876	46,081	0	16,876	62,957	5.38
06/14/2019	2,300	103,501	0	114,751	0	0	114,751	5.18
06/15/2019	NA	NA	0	0	0	0	0	5.16
06/16/2019	NA	NA	0	0	0	0	0	5.15
06/17/2019	9,679	435,587	0	0	0	0	0	5.24
06/18/2019	7,980	359,129	0	122,800	0	0	122,800	5.06
06/19/2019	5,812	261,554	0	109,889	0	0	109,889	4.80
06/20/2019	NA	NA	0	0	0	0	0	4.86
06/21/2019	NA	NA	0	0	0	0	0	4.84
06/22/2019	NA	NA	0	0	0	0	0	4.82
06/23/2019	NA	NA	0	0	0	0	0	4.80
06/24/2019	NA	NA	0	0	0	0	0	5.10
06/25/2019	NA	NA	0	0	0	0	0	5.18
06/26/2019	NA	NA	0	0	0	0	0	5.16
06/27/2019	NA	NA	0	0	0	0	0	5.14
06/28/2019	NA	NA	0	0	0	0	0	5.12
06/29/2019	NA	NA	0	0	0	0	0	5.42
06/30/2019	NA	NA	0	0	0	0	0	5.40
			1,062,336	1,101,795	0	1,062,336	2,164,131	

GWTP QUARTERLY EVALUATION REPORT –2ND QUARTER 2019
LONGHORN ARMY AMMUNITION PLANT

Table 5: Monthly Groundwater Extraction Quantities

ICT or Well Number	April 2019 (gallons)	May 2019 (gallons)	June 2019 (gallons)	Total
1	0	0	0	0
2	33,789	74,910	32,618	141,317
3	0	0	0	0
4	45,598	49,562	5,106	100,266
5	0	0	0	0
EW-1	10	0	0	10
7	14,013	32,516	29,556	76,085
8	80,978	162,327	130,095	373,400
18WW17	8,213	6,977	0	15,190
10	0	0	0	0
11	30,038	29,681	2,542	62,261
12A	4,218	8,212	2,976	15,406
12B	19,027	39,747	14,417	73,191
12C	21,578	56,536	20,809	98,923
12D	45,145	6,028	294	51,467
12E	22,909	47,400	14,363	84,672
13A	35,200	0	0	35,200
13B	98,131	225,648	116,824	440,603
13C	51,729	137,235	30,722	219,686
13D	1,469	0	0	1,469
13E	17,131	25,788	5,349	48,268
13F	13,612	10,557	777	24,946
14A	1,952	1,650	0	3,602
14B	18,771	9,917	0	28,688
14C	53,507	44,805	0	98,312
14D	33,243	69,665	25,410	128,318
14E	30,945	48,652	14,617	94,214
Total LHAAP-18/24	681,206	1,087,813	446,475	2,215,494
LHAAP-16	0	0	0	
Total LHAAP-16	0	0	0	0
TOTAL	681,206	1,087,813	446,475	2,215,494

Table 6. LHAAP-18/24 Analytical Results - June 2019

Location Identification: Sample Date:		MCL/MS/CL	AWD1_062019 6/20/19	AWD3_062119 6/21/19	AWD4_062619 6/26/19	AWD4_062619_a 6/26/19	18CPTMW01DW _061919 6/19/19	18CPTMW01SW _061919 6/19/19	18CPTMW03SW _062119 6/21/19	18CPTMW04 _061919 6/19/19	18CPTMW04SW _061919 6/19/19	18CPTMW06 _062119 6/21/19	18CPTMW06 _062119_a 6/21/19	18CPTMW07 _062519 6/25/19	18CPTMW08SW -061819 6/18/19	18CPTMW08DW -061819 6/18/19	18CPTMW10SW _062019 6/20/19	18CPTMW10DW _062019 6/20/19	18CPTMW12SW _061719 6/17/19	18CPTMW12SW _061719_a 6/17/19
Lab Package:			HS19061164	HS19061210	HS19061482	HS19061482	HS19061083	HS19061083	HS19061210	HS19061083	HS19061083	HS19061210	HS19061210	HS19061383	HS19060986	HS19060986	HS19061157	HS19061157	HS19060929	HS19060929
Well Identification:			AWD-1	AWD-3	AWD-4	AWD-4	18CPTMW01DW	18CPTMW01SW	18CPTMW03SW	18CPTMW04	18CPTMW04SW	18CPTMW06	18CPTMW06	18CPTMW07	18CPTMW08SW	18CPTMW08DW	18CPTMW10SW	18CPTMW10DW	18CPTMW12SW	18CPTMW12SW
Perchlorate (6850)																				
Perchlorate	µg/L	17*	NA	1.8 J	23	27	< 2.0 U	< 2.0 U	9.9	620	< 2.0 U	1.7 J	< 2.0 U	1.4 J	23,000	4,300	< 2.0 U	9.1	< 2.0 U	< 2.0 U
Volatile Organic Compounds (8260C)																				
1,1,1,2-Tetrachloroethane	µg/L	110	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1,1-Trichloroethane	µg/L	200	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1,2,2-Tetrachloroethane	µg/L	14	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1,2-Trichloroethane	µg/L	5	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1-Dichloroethane	µg/L	10,000	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	2.1	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1-Dichloroethene	µg/L	7	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1-Dichloropropene	µg/L	2.9	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2,3-Trichlorobenzene	µg/L	310	NA	< 5.0 U	< 0.5 UJ	< 0.5 UJ	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2,3-Trichloropropane	µg/L	0.041	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2,4-Trichlorobenzene	µg/L	70	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2,4-Trimethylbenzene	µg/L	5,100	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	NA	< 5.0 UJ	< 0.5 UJ	< 0.5 UJ	< 0.5 U	< 12 U	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.5 UJ	< 0.5 UJ	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dibromoethane	µg/L	0.05	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dichlorobenzene	µg/L	600	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dichloroethane	µg/L	5	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	1.3	0.75 J	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dichloropropane	µg/L	5	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,3,5-Trimethylbenzene	µg/L	5,100	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,3-Dichlorobenzene	µg/L	3,100	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,3-Dichloropropane	µg/L	29	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,4-Dichlorobenzene	µg/L	75	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
2,2-Dichloropropane	µg/L	42	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
2-Butanone	µg/L	61,000	NA	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 25 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	NA	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
2-Chlorotoluene	µg/L	2,000	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
2-Hexanone	µg/L	6,100	NA	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 25 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	NA	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
4-Chlorotoluene	µg/L	2,000	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
4-Isopropyltoluene	µg/L	10,000	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
4-Methyl-2-pentanone	µg/L	8,200	NA	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 25 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	NA	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Acetone	µg/L	92,000	NA	< 10 U	< 1.0 U	6.8	5.1 UB	< 25 U	5.2	4.6 UB	5.0 UB	3.1	< 1.0 U	< 1.0 U	2.7 UB	NA	5.4 UB	3.3 UB	2.9 UB	3.0 UB
Benzene	µg/L	5	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Bromobenzene	µg/L	2,000	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Bromochloromethane	µg/L	4,100	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Bromodichloromethane	µg/L	4.6	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Bromoform	µg/L	36	NA	< 5.0 UJ	< 0.5 UJ	< 0.5 UJ	< 0.5 U	< 12 U	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.5 UJ	< 0.5 UJ	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Bromomethane	µg/L	140	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Carbon disulfide	µg/L	10,000	NA	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 25 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	NA	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Carbon tetrachloride	µg/L	5	NA	35	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chlorobenzene	µg/L	100	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chloroethane	µg/L	41,000	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chloroform	µg/L	1,000	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chloromethane	µg/L	220	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
cis-1,2-Dichloroethene	µg/L	70	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	1.7	16	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	11	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
cis-1,3-Dichloropropene	µg/L	5.3	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Dibromochloromethane	µg/L	34	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Dibromomethane	µg/L	380	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Dichlorodifluoromethane	µg/L	20,000	NA	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 12 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	NA	< 0.5 U	< 0.5 U	< 0.5 U	< 0.

Table 6. LHAAP-18/24 Analytical Results - June 2019

Location Identification: Sample Date:		MCL/MS/ PCL	AWD1_062019 6/20/19	AWD3_062119 6/21/19	AWD4_062619 6/26/19	AWD4_062619_a 6/26/19	18CPTMW01DW _061919 6/19/19	18CPTMW01SW _061919 6/19/19	18CPTMW03SW _062119 6/21/19	18CPTMW04 _061919 6/19/19	18CPTMW04SW _061919 6/19/19	18CPTMW06 _062119 6/21/19	18CPTMW06 _062119_a 6/21/19	18CPTMW07 _062519 6/25/19	18CPTMW08SW -061819 6/18/19	18CPTMW08DW -061819 6/18/19	18CPTMW10SW _062019 6/20/19	18CPTMW10DW _062019 6/20/19	18CPTMW12SW _061719 6/17/19	18CPTMW12SW _061719_a 6/17/19
Metals (6020A)																				
Aluminum	mg/L	100	NA	0.157	20.1 J	9.41 J	0.110	0.0504	0.0446	NA	0.0645	NA	NA	NA	NA	NA	NA	0.611	0.0204	0.0248
Antimony	mg/L	0.006	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	0.000408 J	< 0.000500 U	< 0.000500 U	NA	< 0.000500 U	NA	NA	NA	NA	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U
Arsenic	mg/L	0.01	NA	< 0.000500 U	0.00257 J	0.00158 J	0.00152 J	0.00871	0.00272 J	NA	0.00326 J	NA	NA	NA	NA	NA	NA	0.00262 J	0.000866 J	0.00106 J
Barium	mg/L	2	NA	0.0352	0.267	0.239	0.412	1.07	0.172	NA	0.911	NA	NA	NA	NA	NA	NA	0.108	0.803	0.825
Beryllium	mg/L	0.004	NA	< 0.000500 U	0.000982 J	0.000691 J	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	< 0.000500 U	NA	NA	NA	NA	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U
Cadmium	mg/L	0.005	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	0.000345 J	< 0.000500 U	0.000367 J	NA	< 0.000500 U	NA	NA	NA	NA	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U
Calcium	mg/L	NV	NA	0.817	11.3	10.7	40.3	32.9	21.0	NA	30.3	NA	NA	NA	NA	NA	NA	6.74	58.5	58.7
Chromium	mg/L	0.1	NA	0.0808	0.387 J	0.193 J	0.0949	0.00638	0.0163	NA	0.0219	NA	NA	NA	NA	NA	NA	0.00736	0.0159	0.0160
Cobalt	mg/L	6.1	NA	0.000846 J	0.0121 J	0.00828 J	0.00121 J	0.000511 J	0.00263 J	NA	0.00473 J	NA	NA	NA	NA	NA	NA	0.000393 J	0.00248 J	0.00304 J
Copper	mg/L	1.3	NA	< 0.00100 U	0.0215 J	0.0140 J	0.00332 UB	< 0.00100 U	< 0.00100 U	NA	< 0.00100 U	NA	NA	NA	NA	NA	NA	0.00188 UB	< 0.00100 U	< 0.00100 U
Iron	mg/L	NV	NA	0.430	22.3 J	11.0 J	1.65	51.3	1.75	NA	10.4	NA	NA	NA	NA	NA	NA	2.80	0.540	0.669
Lead	mg/L	0.015	NA	< 0.00100 U	0.00842 J	0.00448 J	0.00104 J	< 0.00100 U	< 0.00100 U	NA	< 0.00100 U	NA	NA	NA	NA	NA	NA	0.000967 J	< 0.00100 U	< 0.00100 U
Magnesium	mg/L	NV	NA	0.586	5.94	5.31	11.7	22.6	7.22	NA	18.3	NA	NA	NA	NA	NA	NA	5.34	38.8	39.2
Manganese	mg/L	1.1*	NA	0.00771	0.0703	0.0536	0.115	0.635	0.0478	NA	0.455	NA	NA	NA	NA	NA	NA	0.0448	0.181	0.232
Nickel	mg/L	0.49*	NA	0.0253	0.240	0.227	0.00669	0.00112 J	0.00956	NA	0.00641	NA	NA	NA	NA	NA	NA	0.00202 J	0.00382 J	0.00361 J
Potassium	mg/L	NV	NA	0.746	1.29 J	0.827 J	147	18.4	233	NA	108	NA	NA	NA	NA	NA	NA	111	75.5	75.0
Selenium	mg/L	0.05	NA	0.00434 J	0.00245 J	0.00328 J	< 0.00250 U	< 0.00250 U	< 0.00250 U	NA	< 0.00250 U	NA	NA	NA	NA	NA	NA	< 0.00250 U	< 0.00250 U	< 0.00250 U
Silver	mg/L	0.51	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	< 0.000500 U	NA	NA	NA	NA	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U
Sodium	mg/L	NV	NA	30.1	62.6	62.3	370	115	265	NA	130	NA	NA	NA	NA	NA	NA	184	234	229
Thallium	mg/L	0.002	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	< 0.000500 U	NA	NA	NA	NA	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U
Vanadium	mg/L	0.72	NA	0.00191 UB	0.0366 J	0.0207 J	0.00102 UB	< 0.00100 U	0.00183 UB	NA	< 0.00100 U	NA	NA	NA	NA	NA	NA	0.00163 UB	0.00102 UB	0.00150 UB
Zinc	mg/L	31	NA	0.0177	0.0883 J	0.0588 J	0.0266	0.0209	0.0987	NA	0.0400	NA	NA	NA	NA	NA	NA	0.0244	0.0181	0.0159
Mercury	mg/L	0.002	NA	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	NA	< 0.000100 U	NA	NA	NA	NA	NA	NA	< 0.000100 U	< 0.000100 U	< 0.000100 U
1,4-Dioxane (8270D SIM)																				
1,4-Dioxane	µg/L	9.1	0.99	NA	< 0.010 U	< 0.010 U	0.27	< 0.010 U	0.67	1.3	< 0.010 U	0.46 J	0.052 J	0.077	1.7	0.38	< 0.010 U	NA	0.073 J	0.18 J

Notes:

Blue highlighting indicates concentrations above the MCL/MS/PCL

MCL/MS/ - Maximum Contaminant Limit/Medium-Specific Concentrations/Protective Concentration Level

NA - Not Analyzed

µg/L - micrograms per liter a - duplicate sample

mg/L - milligrams 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.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

U - Undetected: The analyte was analyzed for, but not detected. Value presented is the limit of detection.

NV - No Value

UB - considered a non-detect due to blank contamination

*Perchlorate, manganese, and nickel compared to the PCL

** Value is for total xylenes

PCL – Texas Risk Reduction Program (TRRP) Tier 1 Groundwater Residential Protective Concentration Level

Table 6. LHAAP-18/24 Analytical Results - June 2019

Location Identification: Sample Date:		MCL/MSCL/ PCL	18CPTMW12DW _061719 6/17/19	18CPTMW14 _062519 6/25/19	18CPTMW15 _062119 6/21/19	18CPTMW16 _062719 6/27/19	18CPTMW18 _062619 6/26/19	18CPTMW19 _062019 6/20/19	18CPTMW19SW _062019 6/20/19	18CPTMW22R_ 061319 6/13/19	18CPTMW22SW_ 061319 6/13/19	18CPTMW22DW_ 061319 6/13/19	18CPTMW23 -061719 6/17/19	18CPTMW23SW -061719 6/17/19	18CPTMW24 _062519 6/25/19	18CPTMW26SW_ 061319 6/13/19	17WW08 _062519 6/25/19	18WW02 _062019 6/20/19	18WW03 _062419 6/24/19	18WW03 _062419_a 6/24/19	18WW06 _062019 6/20/19
Lab Package:			HS19060929	HS19061383	HS19061210	HS19061547	HS19061486	HS19061157	HS19061157	HS19060835	HS19060835	HS19060835	HS19060929	HS19060929	HS19061383	HS19060835	HS19061386	HS19061157	HS19061279	HS19061279	HS19061157
Well Identification:			18CPTMW12DW	18CPTMW14	18CPTMW15	18CPTMW16	18CPTMW18	18CPTMW19	18CPTMW19SW	18CPTMW22R	18CPTMW22SW	18CPTMW22DW	18CPTMW23	18CPTMW23SW	18CPTMW24	18CPTMW26SW	17WW08	18WW02	18WW03	18WW03	18WW06
Perchlorate (6850)																					
Perchlorate	µg/L	17*	1.2 J	1,300	410	<2.0 U	<2.0 U	4.1	39	<2.0 U	590	<2.0 U	2,500	<2.0 U	89	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	
Volatile Organic Compounds (8260C)																					
1,1,1,2-Tetrachloroethane	µg/L	110	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,1,1-Trichloroethane	µg/L	200	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,1,2,2-Tetrachloroethane	µg/L	14	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,1,2-Trichloroethane	µg/L	5	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,1-Dichloroethane	µg/L	10,000	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,1-Dichloroethene	µg/L	7	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,1-Dichloropropene	µg/L	2.9	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,2,3-Trichlorobenzene	µg/L	310	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,2,3-Trichloropropane	µg/L	0.041	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,2,4-Trichlorobenzene	µg/L	70	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,2,4-Trimethylbenzene	µg/L	5,100	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,2-Dibromo-3-chloropropane	µg/L	0.2	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,2-Dibromoethane	µg/L	0.05	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,2-Dichlorobenzene	µg/L	600	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<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	<0.5 U	2.1	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	150	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,2-Dichloropropane	µg/L	5	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,3,5-Trimethylbenzene	µg/L	5,100	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,3-Dichlorobenzene	µg/L	3,100	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,3-Dichloropropane	µg/L	29	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
1,4-Dichlorobenzene	µg/L	75	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
2,2-Dichloropropane	µg/L	42	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
2-Butanone	µg/L	61,000	<1.0 U	<1.0 U	<1.0 U	NA	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<10 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	
2-Chlorotoluene	µg/L	2,000	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
2-Hexanone	µg/L	6,100	<1.0 U	<1.0 U	<1.0 U	NA	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<10 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	
4-Chlorotoluene	µg/L	2,000	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
4-Isopropyltoluene	µg/L	10,000	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
4-Methyl-2-pentanone	µg/L	8,200	<1.0 U	<1.0 U	<1.0 U	NA	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<10 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	
Acetone	µg/L	92,000	3.2 UB	<1.0 U	5.0	NA	5.6	4.8 UB	<1.0 U	<1.0 U	3.4	2.8	<10 U	2.7 UB	5.1 UB	4.2	<1.0 U	5.4 UB	4.2	2.4	
Benzene	µg/L	5	<0.5 U	1.3	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5.0 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	
Bromobenzene	µg/L	2,000	<0.5 U	<																	

Table 6. LHAAP-18/24 Analytical Results - June 2019

Location Identification: Sample Date:		MCL/MS PCL	18CPTMW12DW _061719 6/17/19	18CPTMW14 _062519 6/25/19	18CPTMW15 _062119 6/21/19	18CPTMW16 _062719 6/27/19	18CPTMW18 _062619 6/26/19	18CPTMW19 _062019 6/20/19	18CPTMW19SW _062019 6/20/19	18CPTMW22R_ 061319 6/13/19	18CPTMW22SW_ 061319 6/13/19	18CPTMW22DW_ 061319 6/13/19	18CPTMW23 -061719 6/17/19	18CPTMW23SW -061719 6/17/19	18CPTMW24 _062519 6/25/19	18CPTMW26SW_ 061319 6/13/19	17WW08 _062519 6/25/19	18WW02 _062019 6/20/19	18WW03 _062419 6/24/19	18WW03 _062419_a 6/24/19	18WW06 _062019 6/20/19
Units																					
Metals (6020A)																					
Aluminum	mg/L	100	0.0201	0.427	NA	NA	0.0122 UB	NA	0.0745	1.54	0.284	0.133	NA	NA	NA	NA	0.0212 UB	1.56	0.0156 UB	0.0175 UB	NA
Antimony	mg/L	0.006	0.000406 J	0.000513 UB	NA	NA	< 0.000500 U	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	NA	NA	NA	< 0.005000 U	< 0.005000 U	< 0.005000 U	< 0.005000 U	NA
Arsenic	mg/L	0.01	0.00401 J	0.00240 J	NA	NA	0.00127 J	NA	0.00543	0.00317 J	0.00358 J	0.00316 J	NA	NA	NA	NA	0.00576	0.000675 J	0.000834 J	0.000750 J	NA
Barium	mg/L	2	0.133	6.03	NA	NA	0.608	NA	0.198	0.0493	0.0799	0.0930	NA	NA	NA	NA	0.539	0.0506	0.194	0.185	NA
Beryllium	mg/L	0.004	< 0.000500 U	< 0.000500 U	NA	NA	< 0.000500 U	NA	< 0.000500 U	0.000337 J	< 0.000500 U	< 0.000500 U	NA	NA	NA	NA	< 0.005000 U	< 0.000500 U	< 0.005000 U	< 0.005000 U	NA
Cadmium	mg/L	0.005	< 0.000500 U	0.000243 J	NA	NA	< 0.000500 U	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	NA	NA	NA	< 0.005000 U	< 0.000500 U	< 0.005000 U	< 0.005000 U	NA
Calcium	mg/L	NV	9.65	466	NA	NA	281	NA	11.2	0.683	24.5	12.4	NA	NA	NA	NA	129	7.84	8.98	8.70	NA
Chromium	mg/L	0.1	0.0136	0.00598	NA	NA	0.00200 J	NA	0.00171 J	0.00400 J	0.0486	0.000531 J	NA	NA	NA	NA	0.438	0.00851	0.0540 J	0.0356 J	NA
Cobalt	mg/L	6.1	0.000115 J	0.0142	NA	NA	0.0139	NA	0.0104	0.00659	< 0.000500 U	0.000402 J	NA	NA	NA	NA	0.0156	0.000341 J	0.000142 J	< 0.005000 U	NA
Copper	mg/L	1.3	< 0.00100 U	0.00130 J	NA	NA	< 0.00100 U	NA	< 0.00100 U	0.00172 UB	< 0.00100 U	< 0.00100 U	NA	NA	NA	NA	0.00484 J	0.00663 UB	< 0.00100 U	< 0.00100 U	NA
Iron	mg/L	NV	1.14	2.89	NA	NA	1.06	NA	16.1	2.90	0.0723 J	0.832	NA	NA	NA	NA	29.0	2.46	5.60	5.40	NA
Lead	mg/L	0.015	< 0.00100 U	< 0.00100 U	NA	NA	< 0.00100 U	NA	< 0.00100 U	0.000894 J	< 0.00100 U	< 0.00100 U	NA	NA	NA	NA	< 0.00100 U	0.00123 J	< 0.00100 U	< 0.00100 U	NA
Magnesium	mg/L	NV	4.67	157	NA	NA	194	NA	5.98	0.800	2.20	6.18	NA	NA	NA	NA	85.6	1.44	6.34	6.12	NA
Manganese	mg/L	1.1*	0.0329	0.793	NA	NA	2.21	NA	0.477	0.0807	0.0223	0.0603	NA	NA	NA	NA	1.62	0.0988	0.117	0.112	NA
Nickel	mg/L	0.49*	0.000995 J	0.00836	NA	NA	0.0131	NA	0.00246 J	0.00370 J	0.00100 J	0.000918 J	NA	NA	NA	NA	0.370	0.00574	0.00325 J	0.00335 J	NA
Potassium	mg/L	NV	108	17.5	NA	NA	2.98	NA	1.68	0.542	379	2.85	NA	NA	NA	NA	2.12	2.12	1.97	1.85	NA
Selenium	mg/L	0.05	< 0.00250 U	< 0.00250 U	NA	NA	< 0.00250 U	NA	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	NA	NA	NA	NA	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	NA
Silver	mg/L	0.51	< 0.000500 U	< 0.000500 U	NA	NA	< 0.000500 U	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	NA	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA
Sodium	mg/L	NV	184	605	NA	NA	746	NA	28.1	20.8	313	234	NA	NA	NA	NA	527	25.4	111	106	NA
Thallium	mg/L	0.002	< 0.000500 U	< 0.000500 U	NA	NA	< 0.000500 U	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	NA	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA
Vanadium	mg/L	0.72	0.00169 UB	0.00212 J	NA	NA	< 0.00100 U	NA	0.00184 UB	0.00954	0.00200 UB	0.00216 UB	NA	NA	NA	NA	0.00169 J	0.00394 UB	0.00237 UB	0.00240 UB	NA
Zinc	mg/L	31	0.0198	0.0184	NA	NA	0.0225	NA	0.0247	0.0183	0.0294	0.0220	NA	NA	NA	NA	0.0291	0.0147	0.0171	0.0163	NA
Mercury	mg/L	0.002	< 0.000100 U	< 0.000100 U	NA	NA	< 0.000100 U	NA	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	NA	NA	NA	NA	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	NA
1,4-Dioxane (8270D SIM)																					
1,4-Dioxane	µg/L	9.1	0.11	0.13	0.43	0.048	0.021	0.068	< 0.010 U	< 0.010 U	0.95	0.15	8.1	< 0.010 U	< 0.010 U	0.024	NA	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U

Notes:

Blue highlighting indicates concentrations above the MCL/MS/PCL

MCL/MS - Maximum Contaminant Limit/Medium-Specific Concentrations/Protective Concentration Level

NA - Not Analyzed

µg/L - micrograms per liter a - duplicate sample

mg/L - milligrams 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.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

U - Undetected: The analyte was analyzed for, but not detected. Value presented is the limit of detection.

NV - No Value

UB - considered a non-detect due to blank contamination

*Perchlorate, manganese, and nickel compared to the PCL

** Value is for total xylenes

PCL – Texas Risk Reduction Program (TRRP) Tier 1 Groundwater Residential Protective Concentration Level

November 2019

Table 6. LHAAP-18/24 Analytical Results - June 2019

Location Identification: Sample Date:		MCL/MS/ PCL	18WW08 _062719 6/27/19	18WW09 _062719 6/27/19	18WW10 _062519 6/25/19	18WW10 _062519-a 6/25/19	18WW14 _061719 6/17/19	18WW16 _062619 6/26/19	18WW17 _062419 6/24/19	18WW18 _062419 6/24/19	18WW19 _080819 8/8/19	18WW20 _080819 8/8/19	18WW22 _062019 6/20/19	18WW24 _062619 6/26/19	18WW25 _062719 6/27/19	C01_062119 6/21/19	C02_062519 6/25/19	C03_062619 6/26/19	C04_062019 6/20/19	C06_062619 6/26/19	C08_062119 6/21/19
Metals (6020A)																					
Aluminum	mg/L	100	NA	0.0863	NA	NA	0.138	0.649	0.0219 UB	0.0389 UB	0.327	0.0246	0.213	0.482	0.255	NA	NA	0.00694 UB	NA	0.0222	NA
Antimony	mg/L	0.006	NA	< 0.005000 U	NA	NA	< 0.005000 U	0.00244 J	< 0.005000 U	< 0.005000 U	< 0.005000 U	< 0.005000 U	< 0.000500 U	< 0.00500 U	< 0.00500 U	NA	NA	< 0.00500 U	NA	< 0.00500 U	NA
Arsenic	mg/L	0.01	NA	0.00754	NA	NA	0.000663 J	0.00640	0.00328 J	0.00567	0.000655 J	< 0.005000 U	0.00175 J	0.000998 J	0.00770	NA	NA	0.00318 J	NA	0.00101 J	NA
Barium	mg/L	2	NA	0.239	NA	NA	1.19	0.141	4.13	1.34	0.119	0.0929	0.145	0.0582	0.316	NA	NA	1.39	NA	1.03	NA
Beryllium	mg/L	0.004	NA	< 0.005000 U	NA	NA	< 0.005000 U	0.00310	< 0.005000 U	0.000322 J	< 0.005000 U	< 0.005000 U	< 0.000500 U	< 0.00500 U	< 0.00500 U	NA	NA	< 0.00500 U	NA	< 0.00500 U	NA
Cadmium	mg/L	0.005	NA	0.000214 J	NA	NA	0.000783 J	0.00858	0.000710 J	< 0.005000 U	< 0.005000 U	< 0.005000 U	< 0.000500 U	0.000207 J	< 0.00500 U	NA	NA	< 0.00500 U	NA	< 0.00500 U	NA
Calcium	mg/L	NV	NA	17.9	NA	NA	50.8	182	371	58.2	6.82	2.93	15.2	8.52	20.6	NA	NA	46.7	NA	19.7	NA
Chromium	mg/L	0.1	NA	0.0175	NA	NA	0.409	9.14	1.80	0.00520	0.0100	0.000595 J	0.0245	0.000791 J	0.000744 J	NA	NA	< 0.000500 U	NA	0.000674 J	NA
Cobalt	mg/L	6.1	NA	0.00123 J	NA	NA	0.0132	0.418	0.0122	0.000122 J	0.000430 J	0.00504	0.000243 J	0.00641	0.00410 J	NA	NA	0.000279 J	NA	0.00214 J	NA
Copper	mg/L	1.3	NA	< 0.00100 U	NA	NA	0.0119	0.755	0.109	< 0.00100 U	< 0.00100 U	< 0.00100 U	< 0.00100 U	0.00151 J	< 0.00100 U	NA	NA	< 0.00100 U	NA	< 0.00100 U	NA
Iron	mg/L	NV	NA	39.4	NA	NA	1.90	29.7	25.2	113	15.8	4.37	0.0577 J	0.483	27.0	NA	NA	87.5	NA	63.2	NA
Lead	mg/L	0.015	NA	< 0.00100 U	NA	NA	< 0.00100 U	0.00364 J	0.00130 J	0.000647 J	< 0.00100 U	< 0.00100 U	< 0.00100 U	< 0.00100 U	< 0.00100 U	NA	NA	< 0.00100 U	NA	< 0.00100 U	NA
Magnesium	mg/L	NV	NA	9.91	NA	NA	40.4	166	249	36.3	3.17	2.08	3.50	6.41	12.5	NA	NA	30.1	NA	12.4	NA
Manganese	mg/L	1.1*	NA	0.792	NA	NA	0.876	3.12	0.308	2.33	0.279	0.220	0.00169 J	2.89	2.92	NA	NA	1.52	NA	0.994	NA
Nickel	mg/L	0.49*	NA	0.0111	NA	NA	0.306	14.3	0.886	0.00103 J	0.00475 J	0.00749	< 0.00100 U	0.206	0.00273 J	NA	NA	< 0.00100 U	NA	0.00170 J	NA
Potassium	mg/L	NV	NA	2.58	NA	NA	4.38	4.36	1.55	3.49	2.04	1.33	4.81	1.08	1.51	NA	NA	3.38	NA	4.20	NA
Selenium	mg/L	0.05	NA	< 0.00250 U	NA	NA	< 0.00250 U	0.0130	0.00181 J	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	NA	NA	< 0.00250 U	NA	< 0.00250 U	NA
Silver	mg/L	0.51	NA	< 0.000500 U	NA	NA	< 0.000500 U	0.000338 J	0.000215 J	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	NA	< 0.000500 U	NA	< 0.000500 U	NA
Sodium	mg/L	NV	NA	42.5	NA	NA	137	532	1,270	148	22.5	26.2	39.1	208	35.7	NA	NA	168	NA	233	NA
Thallium	mg/L	0.002	NA	< 0.000500 U	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	NA	< 0.000500 U	NA	< 0.000500 U	NA
Vanadium	mg/L	0.72	NA	0.00236 UB	NA	NA	0.00422 UB	0.0771	0.0203	< 0.00100 U	0.00202 J	0.000822 J	0.0148	0.00210 J	0.000983 UB	NA	NA	< 0.00100 U	NA	< 0.00100 U	NA
Zinc	mg/L	31	NA	0.0131	NA	NA	0.0390	0.175	0.185	0.0145	0.0211	0.0191	0.0168	0.138	0.0183	NA	NA	0.0216	NA	0.0188	NA
Mercury	mg/L	0.002	NA	< 0.000100 U	NA	NA	< 0.000100 U	0.0000520 J	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	NA	NA	< 0.000100 U	NA	< 0.000100 U	NA
1,4-Dioxane (8270D SIM)																					
1,4-Dioxane	µg/L	9.1	< 0.010 U	< 0.010 U	< 0.010 U	< 0.010 U	NA	NA	NA	< 0.010 U	NA	0.25	0.017	NA	< 0.010 U	NA	NA	0.012	NA	NA	< 0.010 U

Notes:

Blue highlighting indicates concentrations above the MCL/MS/ PCL

MCL/MS/ - Maximum Contaminant Limit/Medium-Specific Concentrations/Protective Concentration Level

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µg/L - micrograms per liter a - duplicate sample

mg/L - milligrams per liter

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NV - No Value

UB - considered a non-detect due to blank contamination

*Perchlorate, manganese, and nickel compared to the PCL

** Value is for total xylenes

PCL – Texas Risk Reduction Program (TRRP) Tier 1 Groundwater Residential Protective Concentration Level

Table 6. LHAAP-18/24 Analytical Results - June 2019

Location Identification: Sample Date:			MCL/MS/CL	C09_062619 6/26/19	MW1_061919 6/19/19	MW2_061919 6/19/19	MW2_061919_a 6/19/19	MW3_062519 6/25/19	MW5_061819 6/18/19	MW6_061819 6/18/19	MW7_061719 6/17/19	MW8_062119 6/21/19	MW9_062519 6/25/19	MW10_062519 6/25/19	MW12_062019 6/20/19	MW13_062519 6/25/19	MW14_062019 6/20/19	MW14_062019-a 6/20/19	MW16_062619 6/26/19	MW17_062519 6/25/19	MW18_062619 6/26/19	
Units																						
Lab Package:				HS19061486	HS19061083	HS19061083	HS19061083	HS19061383	HS19060986	HS19060986	HS19060929	HS19061210	HS19061386	HS19061386	HS19061164	HS19061386	HS19061164	HS19061164	HS19061482	HS19061386	HS19061486	
Well Identification:				C-09	MW-1	MW-2	MW-2	MW-3	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-12	MW-13	MW-14	MW-14	MW-16	MW-17	MW-18	
Perchlorate (6850)																						
Perchlorate	µg/L	17*	< 2.0 U	590	<2.0 U	<2.0 U	<2.0 U	11,000	26,000	4,400	26,000	7,100	520	<2.0 U	<2.0 U	< 2.0 U	240,000	230,000	2,900	< 2.0 U	<2.0 U	
Volatile Organic Compounds (8260C)																						
1,1,1,2-Tetrachloroethane	µg/L	110	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,1,1-Trichloroethane	µg/L	200	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,1,2,2-Tetrachloroethane	µg/L	14	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,1,2-Trichloroethane	µg/L	5	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,1-Dichloroethane	µg/L	10,000	< 0.5 UJ	< 10 U	< 25 U	< 25 U	< 25 U	1.4	1.1	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	0.89 J	NA	< 0.5 U	
1,1-Dichloroethene	µg/L	7	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	1.0	< 0.5 U	130	140 J	15	NA	< 0.5 U
1,1-Dichloropropene	µg/L	2.9	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,2,3-Trichlorobenzene	µg/L	310	< 0.5 UJ	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 UJ	< 0.5 UJ	< 0.5 U	< 0.5 UJ	< 10 U	< 10 U	< 0.5 UJ	NA	< 0.5 U	
1,2,3-Trichloropropane	µg/L	0.041	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,2,4-Trichlorobenzene	µg/L	70	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,2,4-Trimethylbenzene	µg/L	5,100	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,2-Dibromo-3-chloropropane	µg/L	0.2	< 0.5 UJ	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 UJ	< 0.5 UJ	< 0.5 UJ	< 0.5 UJ	< 0.5 UJ	< 10 UJ	< 10 UJ	< 0.5 UJ	NA	< 0.5 U	
1,2-Dibromoethane	µg/L	0.05	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,2-Dichlorobenzene	µg/L	600	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,2-Dichloroethane	µg/L	5	< 0.5 U	300	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	26	0.75 J	< 0.5 U	< 0.5 U	0.57 J	< 0.5 U	100	110 J	84	NA	< 0.5 U	
1,2-Dichloropropane	µg/L	5	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,3,5-Trimethylbenzene	µg/L	5,100	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,3-Dichlorobenzene	µg/L	3,100	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	0.62 J	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,3-Dichloropropane	µg/L	29	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
1,4-Dichlorobenzene	µg/L	75	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
2,2-Dichloropropane	µg/L	42	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
2-Butanone	µg/L	61,000	< 1.0 U	< 20 U	< 50 U	< 50 U	< 50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 20 U	< 1.0 U	NA	< 1.0 U	
2-Chlorotoluene	µg/L	2,000	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
2-Hexanone	µg/L	6,100	< 1.0 U	< 20 U	< 50 U	< 50 U	< 50 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 20 U	< 1.0 U	NA	< 1.0 U	
4-Chlorotoluene	µg/L	2,000	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
4-Isopropyltoluene	µg/L	10,000	< 0.5 U	< 10 U	< 25 U	< 25 U	< 25 U	< 0.5 U	< 0.5 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 10 U	< 10 U	< 0.5 U	NA	< 0.5 U	
4-Methyl-2-pentanone	µg/L	8,200	< 1.0 U	< 20 U	< 25 U	< 25 U	< 25 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 20 U	< 20 U	&			

Table 6. LHAAP-18/24 Analytical Results - June 2019

Location Identification: Sample Date:		MCL/MS/ PCL	C09_062619 6/26/19	MW1_061919 6/19/19	MW2_061919 6/19/19	MW2_061919_a 6/19/19	MW3_062519 6/25/19	MW5_061819 6/18/19	MW6_061819 6/18/19	MW7_061719 6/17/19	MW8_062119 6/21/19	MW9_062519 6/25/19	MW10_062519 6/25/19	MW12_062019 6/20/19	MW13_062519 6/25/19	MW14_062019 6/20/19	MW14_062019-a 6/20/19	MW16_062619 6/26/19	MW17_062519 6/25/19	MW18_062619 6/26/19
	Units																			
Metals (6020A)																				
Aluminum	mg/L	100	0.370	0.0775	NA	NA	0.00644 J	NA	0.0152	NA	NA	0.0255	NA	NA	0.336	0.0408	0.0353	NA	NA	NA
Antimony	mg/L	0.006	0.000800 J	< 0.00500 U	NA	NA	< 0.000500 U	NA	< 0.000500 U	NA	NA	< 0.000500 U	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	NA	NA
Arsenic	mg/L	0.01	< 0.00500 U	< 0.00500 U	NA	NA	0.000625 J	NA	0.00204 J	NA	NA	< 0.000500 U	NA	NA	0.000513 J	0.00702	0.00636	NA	NA	NA
Barium	mg/L	2	0.238	0.406	NA	NA	0.370	NA	0.700	NA	NA	0.119	NA	NA	0.234	0.311	0.297	NA	NA	NA
Beryllium	mg/L	0.004	< 0.00500 U	< 0.00500 U	NA	NA	< 0.000500 U	NA	< 0.000500 U	NA	NA	< 0.000500 U	NA	NA	< 0.000500 U	0.000305 J	0.000276 J	NA	NA	NA
Cadmium	mg/L	0.005	< 0.00500 U	< 0.00500 U	NA	NA	< 0.000500 U	NA	0.000205 J	NA	NA	< 0.000500 U	NA	NA	0.000407 J	0.000877 J	0.000834 J	NA	NA	NA
Calcium	mg/L	NV	76.3	17.9	NA	NA	26.5	NA	26.9	NA	NA	15.0	NA	NA	14.8	122	116	NA	NA	NA
Chromium	mg/L	0.1	0.00659	0.358	NA	NA	0.00222 J	NA	0.228	NA	NA	0.156	NA	NA	0.738	0.0974	0.0866	NA	NA	NA
Cobalt	mg/L	6.1	0.000529 J	0.0170	NA	NA	0.00313 J	NA	0.00561	NA	NA	0.00255 J	NA	NA	0.00531	0.0252	0.0240	NA	NA	NA
Copper	mg/L	1.3	0.00119 J	0.00256 UB	NA	NA	0.00658	NA	0.00520 UB	NA	NA	< 0.00100 U	NA	NA	0.0274	0.00394 UB	0.00362 UB	NA	NA	NA
Iron	mg/L	NV	0.354	5.03	NA	NA	0.218	NA	2.15	NA	NA	0.830	NA	NA	37.1	128	120	NA	NA	NA
Lead	mg/L	0.015	< 0.00100 U	< 0.00100 U	NA	NA	< 0.00100 U	NA	< 0.00100 U	NA	NA	< 0.00100 U	NA	NA	< 0.00100 U	< 0.00100 U	< 0.00100 U	NA	NA	NA
Magnesium	mg/L	NV	3.79	14.4	NA	NA	16.4	NA	22.9	NA	NA	3.78	NA	NA	7.96	72.8	68.8	NA	NA	NA
Manganese	mg/L	1.1*	0.0798	0.703	NA	NA	0.295	NA	0.137 J	NA	NA	0.0495	NA	NA	0.844	4.58	4.81	NA	NA	NA
Nickel	mg/L	0.49*	0.00408 J	1.07	NA	NA	0.00306 J	NA	0.168	NA	NA	0.127	NA	NA	0.247	0.158	0.150	NA	NA	NA
Potassium	mg/L	NV	0.511	2.47	NA	NA	1.56	NA	2.16	NA	NA	0.438	NA	NA	3.58	14.0	13.5	NA	NA	NA
Selenium	mg/L	0.05	< 0.00250 U	< 0.00250 U	NA	NA	< 0.00250 U	NA	< 0.00250 U	NA	NA	< 0.00250 U	NA	NA	< 0.00250 U	< 0.00250 U	< 0.00250 U	NA	NA	NA
Silver	mg/L	0.51	< 0.000500 U	< 0.000500 U	NA	NA	< 0.000500 U	NA	< 0.000500 U	NA	NA	< 0.000500 U	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	NA	NA
Sodium	mg/L	NV	14.3	170	NA	NA	254	NA	203	NA	NA	17.2	NA	NA	56.0	449	482	NA	NA	NA
Thallium	mg/L	0.002	0.000881 J	< 0.000500 U	NA	NA	< 0.000500 U	NA	< 0.000500 U	NA	NA	< 0.000500 U	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	NA	NA
Vanadium	mg/L	0.72	0.00199 J	0.00117 UB	NA	NA	0.00152 J	NA	0.00378 UB	NA	NA	0.000919 J	NA	NA	0.00339 J	< 0.00100 U	< 0.00100 U	NA	NA	NA
Zinc	mg/L	31	0.0252	0.00816	NA	NA	0.0217	NA	0.0358	NA	NA	0.0279	NA	NA	0.0257	0.467	0.439	NA	NA	NA
Mercury	mg/L	0.002	< 0.000100 U	< 0.000100 U	NA	NA	< 0.000100 U	NA	< 0.000100 U	NA	NA	< 0.000100 U	NA	NA	< 0.000100 U	< 0.000100 U	< 0.000100 U	NA	NA	NA
1,4-Dioxane (8270D SIM)																				
1,4-Dioxane	µg/L	9.1	NA	NA	3.5 J	6.2 J	NA	< 0.010 U	NA	9.7	0.46	2.0	0.12	NA	NA	280 J	390 J	12	0.31	NA

Notes:

Blue highlighting indicates concentrations above the MCL/MS/ PCL

MCL/MS/ - Maximum Contaminant Limit/Medium-Specific Concentrations/Protective Concentration Level

NA - Not Analyzed

µg/L - micrograms per liter a - duplicate sample

mg/L - milligrams 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.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

U - Undetected: The analyte was analyzed for, but not detected. Value presented is the limit of detection.

NV - No Value

UB - considered a non-detect due to blank contamination

*Perchlorate, manganese, and nickel compared to the PCL

** Value is for total xylenes

PCL – Texas Risk Reduction Program (TRRP) Tier 1 Groundwater Residential Protective Concentration Level

Table 6. LHAAP-18/24 Analytical Results - June 2019

Location Identification: Sample Date:			MCL/MS/ PCL	MW19_062619 6/2619	MW20_061319 6/13/19	MW21-061819 6/18/19	MW22_062119 6/21/19	MW23_062419 6/24/19	102_062419 6/24/19	109_061819 6/18/19	120_062019 6/20/19	125_062419 6/24/19	126_062419 6/24/19	129_062419 6/24/19	130_062519 6/25/19	130_062519-a 6/25/19	ICT2_062819 6/28/19	ICT4_062819 6/28/19	ICT7_062819 6/28/19	ICT8_062819 6/28/19	ICT11_062819 6/28/19	ICT11_062819-a 6/28/19
Lab Package:		Units		HS19061482	HS19060835	HS19060986	HS19061210	HS19061279	HS19061279	HS19060986	HS19061164	HS19061279	HS19061279	HS19061279	HS19061386	HS19061386	HS19070016	HS19070016	HS19070016	HS19070016	HS19070016	HS19070016
Well Identification:				MW-19	MW-20	MW-21	MW-22	MW-23	MW-102	MW-109	MW-120	MW-125	MW-126	MW-129	MW-130	MW-130	ICT-2	ICT-4	ICT-7	ICT-8	ICT-11	ICT-11
Perchlorate (6850)																						
Perchlorate	µg/L	17*		<2.0 U	<2.0 U	24,000	95	67,000	33	10,000	13,000	260	5.9 J	4,200	<2.0 U	<2.0 U	6,900	7,700	260	140	2,500	2,600
Volatile Organic Compounds (8260C)																						
1,1,1,2-Tetrachloroethane	µg/L	110		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,1,1-Trichloroethane	µg/L	200		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,1,2,2-Tetrachloroethane	µg/L	14		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,1,2-Trichloroethane	µg/L	5		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,1-Dichloroethane	µg/L	10,000		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	0.55 J	< 0.5 U	9.3 J	< 0.5 U	< 0.5 U
1,1-Dichloroethene	µg/L	7		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	78	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	2.0	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,1-Dichloropropene	µg/L	2.9		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,2,3-Trichlorobenzene	µg/L	310		< 0.5 UJ	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,2,3-Trichloropropane	µg/L	0.041		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,2,4-Trichlorobenzene	µg/L	70		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,2,4-Trimethylbenzene	µg/L	5,100		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,2-Dibromo-3-chloropropane	µg/L	0.2		< 0.5 UJ	< 0.5 U	< 10 U	< 0.5 UJ	< 2.5 U	< 0.5 U	< 0.5 U	< 10 UJ	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 UJ	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,2-Dibromoethane	µg/L	0.05		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,2-Dichlorobenzene	µg/L	600		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,2-Dichloroethane	µg/L	5		< 0.5 U	< 0.5 U	38	3.3	66	< 0.5 U	< 0.5 U	17 J	< 5.0 U	< 0.5 U	15	< 0.5 U	< 0.5 U	40	110	< 0.5 U	47	0.99 J	0.87 J
1,2-Dichloropropane	µg/L	5		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,3,5-Trimethylbenzene	µg/L	5,100		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,3-Dichlorobenzene	µg/L	3,100		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,3-Dichloropropane	µg/L	29		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
1,4-Dichlorobenzene	µg/L	75		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
2,2-Dichloropropane	µg/L	42		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
2-Butanone	µg/L	61,000		< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 20 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 10 U	< 1.0 U	< 1.0 U
2-Chlorotoluene	µg/L	2,000		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
2-Hexanone	µg/L	6,100		< 1.0 U	< 1.0 U	< 20 U	< 1.0 U	< 5.0 U	< 1.0 U	< 1.0 U	< 20 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 10 U	< 1.0 U	< 1.0 U
4-Chlorotoluene	µg/L	2,000		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.5 U
4-Isopropyltoluene	µg/L	10,000		< 0.5 U	< 0.5 U	< 10 U	< 0.5 U	< 2.5 U	< 0.5 U	< 0.5 U	< 10 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 0.5 U	< 0.

Table 6. LHAAP-18/24 Analytical Results - June 2019

Location Identification: Sample Date:			Units	MCL/MSC/ PCL	MW19_062619 6/26/19	MW20_061319 6/13/19	MW21-061819 6/18/19	MW22_062119 6/21/19	MW23_062419 6/24/19	102_062419 6/24/19	109_061819 6/18/19	120_062019 6/20/19	125_062419 6/24/19	126_062419 6/24/19	129_062419 6/24/19	130_062519 6/25/19	130_062519-a 6/25/19	ICT2_062819 6/28/19	ICT4_062819 6/28/19	ICT7_062819 6/28/19	ICT8_062819 6/28/19	ICT11_062819 6/28/19	ICT11_062819-a 6/28/19
Metals (6020A)																							
Aluminum	mg/L	100	1.54	1.12	0.0299	0.0158	NA	10.3	NA	NA	0.324	0.0917	2.44	5.22	5.34	0.139	0.0112	0.211	0.0188	0.00846 J	0.0149 J		
Antimony	mg/L	0.006	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	< 0.000500 U	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	0.000493 UB	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U		
Arsenic	mg/L	0.01	0.0137	0.00104 J	0.00241 J	0.00145 J	NA	0.00262 J	NA	NA	0.000450 J	0.00462 J	0.00120 J	0.00360 J	0.00349 J	0.00229 J	0.000680 J	0.000594 J	0.00649	< 0.000500 U	0.000576 J		
Barium	mg/L	2	0.467	0.479	9.21	0.683	NA	0.276	NA	NA	0.0647	10.4	0.119	0.0930	0.0899	0.167	0.134	0.217	0.303	0.443	0.446		
Beryllium	mg/L	0.004	0.000294 J	< 0.000500 U	0.000301 J	< 0.000500 U	NA	0.00113 J	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	0.000454 J	0.000469 J	< 0.000500 U	< 0.000500 U	0.000549 J	< 0.000500 U	0.000285 J	0.000280 J		
Cadmium	mg/L	0.005	0.00227	0.000359 J	0.000837 J	< 0.000500 U	NA	0.000225 J	NA	NA	0.000218 J	0.000370 J	0.000738 J	0.000499 J	0.000533 J	< 0.000500 U	0.000394 J	< 0.000500 U	< 0.000500 U	0.000354 J	0.000314 J		
Calcium	mg/L	NV	44.1	44.7	223	76.1	NA	3.53	NA	NA	1.25	344	4.49	8.03	8.07	19.5	35.8	2.41	12.8	10.3	10.4		
Chromium	mg/L	0.1	0.791	0.0188	1.09	0.0930	NA	0.0141	NA	NA	0.00412 J	0.000825 J	0.00567	0.00929	0.00918	0.00284 J	0.0321	0.00142 J	0.00144 J	0.142 J	0.219 J		
Cobalt	mg/L	6.1	0.0171	0.0154	0.117	0.00142 J	NA	0.00925	NA	NA	0.000344 J	0.00777	0.00936	0.00947	0.00954	0.0116	0.00928	0.00298 J	0.00314 J	0.00481 J	0.00468 J		
Copper	mg/L	1.3	0.0244	0.00576 UB	0.219	0.00249 J	NA	0.0139	NA	NA	< 0.00100 U	< 0.00100 U	0.00326 J	0.00755	0.00743	0.0501	< 0.00100 U	0.00281 J	< 0.00100 U	0.00472 J	0.00424 J		
Iron	mg/L	NV	67.1	3.14	15.2	1.13	NA	15.7	NA	NA	0.466	4.05	3.29	7.93	7.87	4.17	0.404	0.836	16.0	1.00	1.58		
Lead	mg/L	0.015	0.00323 J	0.00155 J	0.000663 J	< 0.00100 U	NA	0.0113	NA	NA	0.00128 J	< 0.00100 U	0.00297 J	0.00546	0.00565	0.00446 J	< 0.00100 U	< 0.00100 U	< 0.00100 U	< 0.00100 U	< 0.00100 U		
Magnesium	mg/L	NV	26.1	12.5	178	34.5	NA	3.81	NA	NA	0.937	269	3.31	5.19	5.20	20.0	26.9	2.46	10.3	7.04	7.20		
Manganese	mg/L	1.1*	1.50	0.274	2.59	0.0164	NA	0.0964	NA	NA	0.00625	0.150	0.176	0.285	0.287	0.336	0.311	0.0961	0.228	0.205	0.200		
Nickel	mg/L	0.49*	0.214	0.540	1.49	0.179	NA	0.0255	NA	NA	0.0022 J	0.0137	0.00812	0.00933	0.00981	0.0139	0.265	0.0181	0.0213	0.564	0.547		
Potassium	mg/L	NV	4.36	0.862	3.20	1.93	NA	1.73	NA	NA	0.321	3.57	0.647	1.88	1.89	1.24	1.54	1.45	1.48	0.934	0.968		
Selenium	mg/L	0.05	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	NA	0.00243 J	NA	NA	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U		
Silver	mg/L	0.51	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	< 0.000500 U	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U		
Sodium	mg/L	NV	453	48.6	552	383	NA	17.0	NA	NA	28.8	949	69.6	123	126	155	259	13.3	69.6	64.8	67.2		
Thallium	mg/L	0.002	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	NA	0.000275 J	NA	NA	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	0.000618 J	< 0.000500 U		
Vanadium	mg/L	0.72	0.0102	0.00507 UB	0.00433 UB	0.00257 UB	NA	0.0237	NA	NA	0.00142 UB	0.00257 UB	0.00659	0.0165	0.0168	0.00189 UB	0.00174 UB	0.00136 UB	0.00195 UB	0.00109 UB	0.00243 UB		
Zinc	mg/L	31	0.0441	0.102	0.0462	0.0241	NA	0.0748	NA	NA	0.0207	0.0423	0.0356	0.0478	0.0456	0.196	0.0164	0.0553	0.0101	0.0902	0.0793		
Mercury	mg/L	0.002	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	NA	< 0.000100 U	NA	NA	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U		
1,4-Dioxane (8270D SIM)																							
1,4-Dioxane	µg/L	9.1	NA	NA	1.2 J	NA	NA	NA	NA	0.500	9.9	NA	< 0.010 U	1.2	NA	NA	NA	NA	NA	NA	NA		

Notes:

Blue highlighting indicates concentrations above the MCL/MSL/PCL

MCL/MSL - Maximum Contaminant Limit/Medium-Specific

Concentrations/Protective Concentration Level

NA - Not Analyzed

µg/L - micrograms per liter a - duplicate sample

mg/L - milligrams 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.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

U - Undetected: The analyte was analyzed for, but not detected. Value presented is the limit of detection.

NV - No Value

UB - considered a non-detect due to blank contamination

*Perchlorate, manganese, and nickel compared to the PCL

** Value is for total xylenes

PCL – Texas Risk Reduction Program (TRRP) Tier 1 Groundwater

Residential Protective Concentration Level

Table 6. LHAAP-18/24 Analytical Results - June 2019

Location Identification: Sample Date:		MCL/MS/CL	ICT12B_062819 6/28/19	ICT12B_062819-a 6/28/19	ICT12C_062819 6/28/19	ICT12D_062819 6/28/19	ICT12E_062819 6/28/19	ICT13A_071118 7/11/18	ICT13B_062819 6/28/19	ICT13D_062819 6/28/19	ICT13E_062819 6/28/19	ICT13F_062819 6/28/19	ICT14B_062819 6/28/19	ICT14C_062819 6/28/19	ICT14D_062819 6/28/19
Lab Package:	Units		HS19070016	HS19070016	HS19070016	HS19070016	HS19070016	HS19070622	HS19070016	HS19070016	HS19070016	HS19070016	HS19070016	HS19070016	HS19070016
Well Identification:			ICT-12B	ICT-12B	ICT-12C	ICT-12D	ICT-12E	ICT-13A	ICT-13B	ICT-13D	ICT-13E	ICT-13F	ICT-14B	ICT-14C	ICT-14D
Perchlorate (6850)															
Perchlorate	µg/L	17*	140,000	150,000	6,500	13,000	28,000	540	< 2.0 U	43	3.8 J	< 2.0 U	12,000	< 2.0 U	210
Volatile Organic Compounds (8260C)															
1,1,1,2-Tetrachloroethane	µg/L	110	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,1,1-Trichloroethane	µg/L	200	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,1,1,2,2-Tetrachloroethane	µg/L	14	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,1,1,2-Trichloroethane	µg/L	5	< 5.0 U	< 5.0 U	< 5.0 U	9.8 J	14	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	5.1 J	< 5.0 U
1,1-Dichloroethane	µg/L	10,000	11	12	< 5.0 U	75	100	1.3 J	1.0	< 0.5 U	< 0.5 U	< 0.5 U	1.4	10	25
1,1-Dichloroethene	µg/L	7	< 5.0 U	< 5.0 U	< 5.0 U	370	550	5.5 J	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	140	< 5.0 U
1,1-Dichloropropene	µg/L	2.9	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,2,3-Trichlorobenzene	µg/L	310	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,2,3-Trichloropropane	µg/L	0.041	< 5.0 U	< 5.0 U	< 5.0 U	350	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,2,4-Trichlorobenzene	µg/L	70	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,2,4-Trimethylbenzene	µg/L	5,100	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,2-Dibromoethane	µg/L	0.05	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,2-Dichlorobenzene	µg/L	600	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,2-Dichloroethane	µg/L	5	91	68	27	160	63	18 J	42	10	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	13
1,2-Dichloropropane	µg/L	5	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,3,5-Trimethylbenzene	µg/L	5,100	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,3-Dichlorobenzene	µg/L	3,100	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,3-Dichloropropane	µg/L	29	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
1,4-Dichlorobenzene	µg/L	75	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
2,2-Dichloropropane	µg/L	42	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
2-Butanone	µg/L	61,000	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 10 U	< 10 U
2-Chlorotoluene	µg/L	2,000	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
2-Hexanone	µg/L	6,100	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 10 U	< 10 U
4-Chlorotoluene	µg/L	2,000	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
4-Isopropyltoluene	µg/L	10,000	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
4-Methyl-2-pentanone	µg/L	8,200	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 10 U	< 10 U
Acetone	µg/L	92,000	< 10 U	< 10 U	< 10 U	< 10 U	180	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	6.2	< 10 U	< 10 U
Benzene	µg/L	5	16 J	11 J	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
Bromobenzene	µg/L	2,000	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
Bromochloromethane	µg/L	4,100	< 5.0 U	< 5.0 U	< 5.0 U	55	40	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	22
Bromodichloromethane	µg/L	4.6	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
Bromoform	µg/L	36	< 5.0 U	< 5.0 U	< 5.0 U	7.8 J	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
Bromomethane	µg/L	140	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
Carbon disulfide	µg/L	10,000	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 10 U	< 10 U
Carbon tetrachloride	µg/L	5	68 J	49 J	11	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
Chlorobenzene	µg/L	100	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
Chloroethane	µg/L	41,000	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
Chloroform	µg/L	1,000	74	60	16	61	84	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	39	29
Chloromethane	µg/L	220	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
cis-1,2-Dichloroethene	µg/L	70	930	1,100	140	10,000	17,000	86 J	140	37	< 0.5 U	< 0.5 U	31	11,000	21,000
cis-1,3-Dichloropropene	µg/L	5.3	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
Dibromochloromethane	µg/L	34	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U
Dibromomethane	µg/L	380	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 5.0 U	< 5.0 U

Table 6. LHAAP-18/24 Analytical Results - June 2019

Location Identification: Sample Date:		MCL/MS/ PCL	ICT12B_062819 6/28/19	ICT12B_062819-a 6/28/19	ICT12C_062819 6/28/19	ICT12D_062819 6/28/19	ICT12E_062819 6/28/19	ICT13A_071118 7/11/18	ICT13B_062819 6/28/19	ICT13D_062819 6/28/19	ICT13E_062819 6/28/19	ICT13F_062819 6/28/19	ICT14B_062819 6/28/19	ICT14C_062819 6/28/19	ICT14D_062819 6/28/19
	Units														
Metals (6020A)															
Aluminum	mg/L	100	0.0271	0.0285	0.0415	0.595	0.0433	0.677	0.0158	1.41	6.70	3.09	0.0254	0.00742 J	0.0223 J
Antimony	mg/L	0.006	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U
Arsenic	mg/L	0.01	< 0.000500 U	< 0.000500 U	< 0.000500 U	0.00524	0.00106 J	0.00149 J	0.00630	0.00193 J	0.00294 J	0.00162 J	0.00114 J	0.0108	0.00810
Barium	mg/L	2	0.286	0.285	0.123	0.444	0.197	0.0656 J	0.203	0.0962	0.136	0.115	0.447	1.07	1.18
Beryllium	mg/L	0.004	< 0.000500 U	< 0.000500 U	< 0.000500 U	0.000829 J	0.000205 J	0.000221 J	0.000547 J	< 0.000500 U	0.00102 J	0.000645 J	0.000259 J	< 0.000500 U	0.000518 J
Cadmium	mg/L	0.005	< 0.000500 U	< 0.000500 U	< 0.000500 U	0.000738 J	0.000355 J	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	0.000225 J	0.000219 J	0.000514 J
Calcium	mg/L	NV	26.6	27.2	6.85	20.5	37.7	3.93	13.3	3.50	1.16	1.05	12.4	78.9	80.0
Chromium	mg/L	0.1	0.0412	0.0449	0.0972	0.338	0.142	0.0155	0.0230	0.121	0.0248	0.0124	0.0489	0.0341	0.00422 J
Cobalt	mg/L	6.1	0.00545	0.00515	0.000998 J	0.0404	0.0315	0.00696	0.105	0.00316 J	0.00491 J	0.00302 J	0.00274 J	0.0331	0.0141
Copper	mg/L	1.3	0.0824	0.0802	< 0.00250 U	0.721	0.0229	0.00803	0.0276	0.00533	0.0168	0.0127	0.00307 J	0.00281 J	0.00411 J
Iron	mg/L	NV	1.68	1.58	0.969	20.4	3.22	5.49	20.3	9.93	12.1	6.24	0.842	274	19.5
Lead	mg/L	0.015	< 0.00100 U	< 0.00100 U	< 0.00100 U	0.0259	< 0.00100 U	0.000925 J	< 0.00100 U	0.00505	0.00889	0.00438 J	< 0.00100 U	< 0.00100 U	< 0.00100 U
Magnesium	mg/L	NV	18.6	18.6	5.56	17.2	29.8	3.51	17.7	4.38	1.63	1.14	11.6	80.4	57.2
Manganese	mg/L	1.1*	0.165	0.155	0.0176	1.13	1.28	0.132	4.05	0.0744	0.0546	0.0357	0.239	2.33	1.31
Nickel	mg/L	0.49*	0.345	0.328	0.0408	0.850	0.178	0.0145	0.0245	0.0578	0.0192	0.00929	0.0822	0.120	0.0474
Potassium	mg/L	NV	0.743	0.749	0.301	1.05	2.43	0.708	2.37	0.918	2.09	1.90	0.565	1.41	1.46
Selenium	mg/L	0.05	< 0.00250 U	< 0.00250 U	< 0.00250 U	0.00224 J	0.00349 J	0.00127 J	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	< 0.00250 U	0.0109	< 0.000500 U
Silver	mg/L	0.51	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U
Sodium	mg/L	NV	195	192	96.2	175	339	70.0	103	34.2	5.75	4.44	85.8	265	295
Thallium	mg/L	0.002	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	0.000243 J	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U	< 0.000500 U
Vanadium	mg/L	0.72	0.000667 J	0.000792 J	0.00125 J	0.00303 J	< 0.000500 U	0.00425 J	0.00112 J	0.00524	0.0267	0.0146	0.00184 UB	< 0.000500 U	0.000634 J
Zinc	mg/L	31	0.105	0.120	0.0188	0.0862	0.0387	0.288	0.0910	0.491	0.0557	0.0596	0.0305	0.0439	0.141
Mercury	mg/L	0.002	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U	< 0.000100 U
1,4-Dioxane (8270D SIM)															
1,4-Dioxane	µg/L	9.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Blue highlighting indicates concentrations above the MCL/MS/PCL

MCL/MS/ - Maximum Contaminant Limit/Medium-Specific Concentrations/Protective Concentration Level

NA - Not Analyzed

µg/L - micrograms per liter a - duplicate sample

mg/L - milligrams 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.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

U - Undetected: The analyte was analyzed for, but not detected. Value presented is the limit of detection.

NV - No Value

UB - considered a non-detect due to blank contamination

*Perchlorate, manganese, and nickel compared to the PCL

** Value is for total xylenes

PCL – Texas Risk Reduction Program (TRRP) Tier 1 Groundwater Residential Protective Concentration Level

GWTP QUARTERLY EVALUATION REPORT – 2ND QUARTER 2019

LONGHORN ARMY AMMUNITION PLANT

Table 7. Weekly Perchlorate Sample Results

Sample Identification	Lab Package	Date Sampled	Sample Location	Effluent Discharge Point	Harrison Bayou Maximum Allowable Daily Discharge Perchlorate Concentration (µg/L)	INF Pond Discharge Criteria for Perchlorate (µg/L)	Reporting Limit	Influent Perchlorate (6850)	Effluent Perchlorate (6850)		Does Concentration Meet Discharge Limit? (Yes/No)	No Daily Maximum Concentration		
								Result (µg/L)	Result (µg/L)	DVQ		Ammonia as N (350.3) (mg/L)	Ortho-Phosphate (365.3) (mg/L)	Organic Carbon (415.1) (mg/L)
LH18/24-SP650_040419/BIX	HS19040313	4/4/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	17	3.63	2.23
LH18/24-SP650_041019/BIX	HS19040653	4/10/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	15	3.92	2.37
LH18/24-SP650_041719/BIX	HS19041072	4/17/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	17	4.37	1.89
LH18/24-SP650_041019/BIX (monthly)	HS19040652	4/10/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	--	--	--
LH18/24-SP140_041019 (monthly)	HS19040654	4/10/2019	TK-140	--	--	--	NA	5,600	NA		NA	--	--	--
LH18/24-SP650_050119/BIX	HS19050126	5/1/2019	TK-650	INF Pond	589	17	4	NA	1.1	J	Yes	24	6.2	1.51
LH18/24-SP650_050719/BIX	HS19050397	5/7/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	21	4.95	1.46
LH18/24-SP650_050719 (monthly)	HS19050398	5/7/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	--	--	--
LH18/24-SP140_050719 (monthly)	HS19050401	5/7/2019	TK-140	--	--	--	NA	4,200	NA		NA	--	--	--
LH18/24-SP650_051419/BIX	HS19050886	5/14/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	NA	14	4.22	1.64
LH18/24-SP650_052119/BIX	HS19051289	5/21/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	11	2.47	1.65
LH18/24-SP650_052919/BIX	HS19051856	5/29/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	10	2.21	2.12
LH18/24-SP650_052919/BIX (quarterly)	HS19051859	5/29/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	--	--	--
LH18/24-SP140_052919 (quarterly)	HS19051863	5/29/2019	TK-140	--	--	--	NA	4,900	NA		NA	--	--	--
LH18/24-SP650_060419/BIX	HS19060172	6/4/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	7.5	2.11	2.21
LH18/24-SP650_060419/BIX (monthly)	HS19060168	6/4/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	--	--	--
LH18/24-SP140_060419 (monthly)	HS19060174	6/4/2019	TK-140	--	--	--	NA	6,800	NA		NA	--	--	--
LH18/24-SP650_061219/BIX	HS19060672	6/12/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	10	2.37	2.04

Notes:

Texas Risk Reduction Program (TRRP) Tier 1 Groundwater Residential Protective Concentration Level (PCL)

SP140 samples are influent samples.

µg/L - micrograms per liter

DVQ - data validation qualifier

J - Estimated concentration between the detection limit and limit of quantitation and/or due to quality control discrepancies

NA - not applicable

U - non detect and reported to the limit of detection

BIX - before ion exchange

mg/L - milligrams per liter

Table 8. Bi-Weekly GWTP Analytical Sampling Results for April 2019

Sample Location				EFFLUENT - Biweekly		EFFLUENT - Monthly		INFLUENT - Monthly*		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
Sample Identification				LH18/24-SP650_040419		LH18/24-SP650_041019		LH18/24-SP140_041019		LH18/24-SP650_041719		
Lab Package				HS19040319		HS19040652		HS19040654		HS19041158		
Sample Date				4/4/2019		4/10/2019		4/10/2019		4/17/2019		
Sample Type				GRAB		GRAB		GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD			Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	Reporting Limit									
VOLATILES	µg/L	µg/L	µg/L			µg/L		µg/L		µg/L		
1,1,1-Trichloroethane	3,417	7,230	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
1,1,2-Trichloroethane	102.5	216.9	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
1,1-Dichloroethane	6,633	14,032	1	< 0.5	U	< 0.5	U	NA		< 0.5	UJ	Yes
1,1-Dichloroethene	119	253	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
1,2-Dichloroethane	85	181	1	0.58	J	0.67	J	NA		< 0.5	U	Yes
1,2-Dichloropropane	NA	NA	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Acetone	1,132	2,395	2	< 1.0	U	< 1.0	U	NA		< 1.0	U	Yes
Benzene	85	181	1	< 0.5	U	< 0.5	U	NA		< 0.5	UJ	Yes
Carbon Tetrachloride	85	181	1	< 0.5	UJ	< 0.5	UJ	NA		< 0.5	U	Yes
Chlorobenzene	22,300	47,180	1	< 0.5	U	< 0.5	U	NA		< 0.5	UJ	Yes
Chloroform	1,708	3,615	1	< 0.5	U	< 0.5	U	NA		< 0.5	UJ	Yes
Ethylbenzene	26,954	57,025	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
m,p-Xylenes	39.5	83.6	2	< 1.0	U	< 1.0	U	NA		< 1.0	U	Yes
Methylene Chloride	803	1,699	2	< 1.0	U	< 1.0	U	NA		< 1.0	UJ	Yes
o-Xylene	39.5	83.6	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Styrene	2,829	5,987	1	< 0.5	U	< 0.5	U	NA		37	J	Yes
Tetrachloroethene	85.4	180.7	1	< 0.5	UJ	< 0.5	UJ	NA		< 0.5	UJ	Yes
Toluene	1,980	4,189	1	< 0.5	U	< 0.5	U	NA		1.8	J	Yes
Trichloroethene	85	181	1	0.78	J	0.82	J	NA		< 0.5	U	Yes
Vinyl Chloride	34	72	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
ANIONS	mg/L	mg/L	mg/L			mg/L		mg/L		mg/L		
Chloride	NA	NA	10	377	J	NA		NA		344		NA
Sulfate	NA	NA	10	29.6		NA		NA		25.6		NA
PERCHLORATE	µg/L	µg/L	µg/L			µg/L		µg/L		µg/L		
Perchlorate	278	589	4	NA		< 2.0	U	5,600		NA		Yes
METALS	mg/L	mg/L	mg/L			mg/L		mg/L		mg/L		
Hexavalent Chromium	0.058	0.124	0.010	NA		< 0.0100	U	< 0.0100	U	NA		Yes
Barium	1	2	0.004	NA		0.154		NA		NA		Yes
Lead	0.0022	0.0046	0.002	NA		< 0.00100	U	NA		NA		Yes
Selenium	0.0057	0.0120	0.002	NA		< 0.00250	U	< 0.00250	U	NA		Yes
Silver	0.0014	0.0030	0.002	A		< 0.000500	U	< 0.000500	U	NA		Yes
SEMI-VOLATILES	µg/L	µg/L	µg/L			µg/L		µg/L		µg/L		
1,4-Dioxane**	NA	134.2	1	NA		7.9		NA		NA		Yes

Notes:

µg/L - micrograms per liter

DVQ - data validation qualifier

GWTP - Groundwater Treatment Plant

Grab samples are compared to the daily maximum and composite samples to the daily average.

U - not detected and reported to the limit of detection

UJ - estimated non detected due to QC issue(s)

*Influent sample not compared to discharge limits

** Calculated Effluent Limit

mg/L - milligrams per liter

NA - not applicable or not analyzed

ROD - Record of Decision

J - estimated concentration and/or due to QC discrepancies

GWTP QUARTERLY EVALUATION REPORT – 2ND QUARTER 2019

LONGHORN ARMY AMMUNITION PLANT

Table 9. Bi-Weekly GWTP Analytical Sampling Results for May 2019

Sample Location Sample Identification Lab Package Sample Date Sample Type				EFFLUENT - Biweekly		EFFLUENT - Monthly		INFLUENT - Monthly*		EFFLUENT - Biweekly		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
				LH18/24-SP650_050119		LH18/24-SP650_050719		LH18/24-SP140_050719		LH 18/24-SP650_051419		LH18/24-SP650_052919		
				HS19050138		HS19050398		HS19050401		HS19050920		HS19051866		
				5/1/2019		5/7/2019		5/7/2019		5/14/2019		5/29/2019		
GRAB				GRAB		GRAB		GRAB		GRAB				
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD			Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	Detection Limit											
VOLATILES	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		µg/L		
1,1,1-Trichloroethane	3,417	7,230	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
1,1,2-Trichloroethane	102.5	216.9	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
1,1-Dichloroethane	6,633	14,032	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
1,1-Dichloroethene	119	253	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
1,2-Dichloroethane	85	181	1	0.51	J	0.51	J	NA		< 0.5	U	< 0.5	U	Yes
1,2-Dichloropropane	NA	NA	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Acetone	1,132	2,395	2	< 1.0	U	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
Benzene	85	181	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Carbon Tetrachloride	85	181	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Chlorobezene	22,300	47,180	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Chloroform	1,708	3,615	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Ethylbenzene	26,954	57,025	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
m,p-Xylenes	39.5	83.6	2	< 1.0	U	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
Methylene Chloride	803	1,699	2	< 1.0	U	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
o-Xylene	39.5	83.6	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Styrene	2,829	5,987	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Tetrachloroethene	85.4	180.7	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Toluene	1,980	4,189	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Trichloroethene	85	181	1	0.65	J	0.65	J	NA		0.56	J	0.85	J	Yes
Vinyl Chloride	34	72	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
ANIONS	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		mg/L		mg/L		
Chloride	NA	NA	10	302		NA		NA		231		252		NA
Sulfate	NA	NA	10	15		NA		NA		24.1		34		NA
PERCHLORATE	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		µg/L		
Perchlorate	278	589	4	NA		< 2.0	U	4,200		NA		NA		Yes
METALS	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		mg/L		mg/L		
Hexavalent Chromium	0.058	0.124	0.010	NA		< 0.0100	U	< 0.0100	U	NA		NA		Yes
Barium	1	2	0.004	NA		0.136		NA		NA		NA		Yes
Lead	0.0022	0.0046	0.002	NA		< 0.00100	U	NA		NA		NA		Yes
Selenium	0.0057	0.0120	0.002	NA		< 0.00250	U	< 0.00250	U	NA		NA		Yes
Silver	0.0014	0.0030	0.002	NA		< 0.000500	U	< 0.000500	U	NA		NA		Yes
SEMI-VOLATILES	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		µg/L		
1,4-Dioxane**	NA	134.2	1	NA		21		NA		NA		NA		Yes

Notes:

µg/L - micrograms per liter

mg/L - milligrams per liter

DVQ - data validation qualifier

ROD - Record of Decision

GWTP - Groundwater Treatment Plant

*Influent sample not compared to discharge limits

NA - not applicable or not analyzed

U - not detected and reported to the limit of detection

Grab samples are compared to the daily maximum and composite samples to the daily average.

** Calculated Effluent Limit

J - estimated concentration and/or due to QC discrepancies

GWTP QUARTERLY EVALUATION REPORT –2ND QUARTER 2019

LONGHORN ARMY AMMUNITION PLANT

Table 10. Bi-Weekly Analytical GWTP Sampling Results for June 2019

Sample Location Sample Identification Lab Package Sample Date Sample Type				EFFLUENT - Monthly		INFLUENT - Monthly*		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
				LH18/24-SP650_060419		LH18/24-SP140_060419		LH18/24-SP650_061219		
				HS19060168		HS19060174		HS19060699		
				6/4/2019		6/4/2019		6/12/2019		
				GRAB		GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD			Result	DVQ	Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	Detection Limit							
VOLATILES	µg/L	µg/L	µg/L	µg/L						
1,1,1-Trichloroethane	3,417	7,230	1	< 0.5	U	NA		< 0.5	U	Yes
1,1,2-Trichloroethane	102.5	216.9	1	< 0.5	U	NA		< 0.5	U	Yes
1,1-Dichloroethane	6,633	14,032	1	< 0.5	U	NA		< 0.5	U	Yes
1,1-Dichloroethene	119	253	1	< 0.5	U	NA		< 0.5	U	Yes
1,2-Dichloroethane	85	181	1	< 0.5	U	NA		0.46	J	Yes
1,2-Dichloropropane	NA	NA	1	< 0.5	U	NA		< 0.5	U	Yes
Acetone	1,132	2,395	2	< 1.0	U	NA		< 1.0	UJ	Yes
Benzene	85	181	1	< 0.5	U	NA		< 0.5	U	Yes
Carbon Tetrachloride	85	181	1	< 0.5	U	NA		< 0.5	U	Yes
Chlorobenzene	22,300	47,180	1	< 0.5	U	NA		< 0.5	U	Yes
Chloroform	1,708	3,615	1	< 0.5	U	NA		< 0.5	U	Yes
Ethylbenzene	26,954	57,025	1	< 0.5	U	NA		< 0.5	U	Yes
m,p-Xylenes	39.5	83.6	2	< 1.0	U	NA		< 1.0	U	Yes
Methylene Chloride	803	1,699	2	< 0.5	U	NA		< 0.5	U	Yes
o-Xylene	39.5	83.6	1	< 0.5	U	NA		< 0.5	U	Yes
Styrene	2,829	5,987	1	< 0.5	U	NA		< 0.5	U	Yes
Tetrachloroethene	85.4	180.7	1	< 0.5	U	NA		< 0.5	U	Yes
Toluene	1,980	4,189	1	< 0.5	U	NA		< 0.5	U	Yes
Trichloroethene	85	181	1	0.76	J	NA		0.64	J	Yes
Vinyl Chloride	34	72	1	< 0.5	U	NA		< 0.5	U	Yes
ANIONS	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		
Chloride	NA	NA	10	NA		NA		362		NA
Sulfate	NA	NA	10	NA		NA		33.4		NA
PERCHLORATE	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		
Perchlorate	278	589	4	< 2.0	U	6,800		NA		Yes
METALS	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		
Hexavalent Chromium	0.058	0.124	0.010	< 0.0100	U	< 0.0100	U	NA		Yes
Barium	1	2	0.004	0.175		NA		NA		Yes
Lead	0.0022	0.0046	0.002	< 0.00100	U	NA		NA		Yes
Selenium	0.0057	0.0120	0.002	< 0.00250	UJ	< 0.00250	U	NA		Yes
Silver	0.0014	0.0030	0.002	< 0.000500	U	< 0.000500	U	NA		Yes
SEMI-VOLATILES	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		
1,4-Dioxane**	NA	134.2	1	6.2		NA		NA		Yes

Notes:

µg/L - micrograms per liter

DVQ - data validation qualifier

GWTP - Groundwater Treatment Plant

U - Non detect reported to the limit of detection

mg/L - milligrams per liter

J - estimated concentration between the detection limit and limit of quantitation and/or due to quality control discrepancy

*Influent sample not compared to discharge limits

** Calculated Effluent Limit

Grab samples are compared to the daily maximum and composite samples to the daily average.

ROD - Record of Decision

NA - not applicable or not analyzed

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Table 11. Quarterly GWTP Analytical Sampling Results

Sample Location Sample Identification Lab Package Sample Date Sample Type				EFFLUENT		INFLUENT*		Does Concentration Meet Discharge Limits? (Yes/No)
				LH18/24-SP650_052919		LH18/24-SP140_052919		
				HS19051859		HS19051863		
				5/29/2019		5/29/2019		
				GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Protocol			Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	Reporting Limit					
VOLATILES	µg/L	µg/L	µg/L	µg/L		µg/L		
1,1,1-Trichloroethane	3,417	7,230	1	< 0.5	U	< 50	U	Yes
1,1,2-Trichloroethane	102.5	216.9	1	< 0.5	U	< 50	U	Yes
1,1-Dichloroethane	6,633	14,032	1	< 0.5	U	< 50	U	Yes
1,1-Dichloroethene	119	253	1	< 0.5	U	< 50	U	Yes
1,2-Dichloroethane	85	181	1	< 0.5	U	53	J	Yes
1,2-Dichloropropane	NA	NA	1	< 0.5	U	< 50	U	Yes
Acetone	1,132	2,395	2	< 2.0	U	< 100	U	Yes
Benzene	85	181	1	< 0.5	U	< 50	U	Yes
Carbon Tetrachloride	85	181	1	< 0.5	U	< 50	U	Yes
Chlorobenzene	22,300	47,180	1	< 0.5	U	< 50	U	Yes
Chloroform	1,708	3,615	1	< 0.5	U	< 50	U	Yes
Ethylbenzene	26,954	57,025	1	< 0.5	U	< 50	U	Yes
m,p-Xylenes	39.5	83.6	2	< 1.0	U	< 100	U	Yes
Methylene Chloride	803	1,699	2	< 0.5	U	3,900		Yes
o-Xylene	39.5	83.6	1	< 0.5	U	< 50	U	Yes
Styrene	2,829	5,987	1	< 0.5	U	< 50	U	Yes
Tetrachloroethene	85.4	180.7	1	< 0.5	U	62	J	Yes
Toluene	1,980	4,189	1	< 0.5	U	< 50	U	Yes
Trichloroethene	85	181	1	0.92	J	5,600		Yes
Vinyl Chloride	34	72	1	< 0.5	U	< 50	U	Yes
ANIONS	mg/L	mg/L	mg/L	mg/L		mg/L		
Chloride	NA	NA	10	253		240		NA
Sulfate	NA	NA	10	33		37.4		NA
PERCHLORATE	µg/L	µg/L	µg/L	µg/L		µg/L		
Perchlorate	278	589	4	< 2.0	U	4,900		Yes
METALS	mg/L	mg/L	mg/L	mg/L		mg/L		
Aluminum	0.777	1.644	0.0100	0.0422		0.165		Yes
Antimony	NA	NA	0.00200	< 0.000500	U	< 0.000500	U	NA
Arsenic	0.365	0.772	0.00200	0.000699	J	0.00138	J	Yes

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Table 11. Quarterly GWTP Analytical Sampling Results

Sample Location Sample Identification Lab Package Sample Date Sample Type				EFFLUENT		INFLUENT*		Does Concentration Meet Discharge Limits? (Yes/No)
				LH18/24-SP650_052919		LH18/24-SP140_052919		
				HS19051859		HS19051863		
				5/29/2019		5/29/2019		
				GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Protocol			Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	Reporting Limit					
Barium	1	2	0.00400	0.114		0.448		Yes
Beryllium	NA	NA	0.00200	< 0.000500	U	< 0.000500	U	NA
Cadmium	0.0016	0.0034	0.00200	< 0.000500	U	< 0.000500	U	Yes
Calcium	NA	NA	0.500	8.42		22.2		NA
Chromium	0.355	0.752	0.00400	0.00105	J	0.00112	J	Yes
Cobalt	5.433	11.495	0.00500	0.00105	J	0.00904		Yes
Iron	1.132	2.395	0.200	0.195	J	1.04		Yes
Lead	0.0022	0.0046	0.00200	< 0.00100	U	< 0.00100	U	Yes
Magnesium	NA	NA	0.200	10.7		20.1		NA
Manganese	7.323	15.494	0.00500	0.0833		0.428		Yes
Nickel	0.087	0.184	0.00200	0.00257		0.00947		Yes
Potassium	NA	NA	0.200	1.46		1.41		NA
Selenium	0.0057	0.012	0.00200	< 0.00250	U	< 0.00250	U	Yes
Silver	0.0014	0.003	0.00200	< 0.000500	U	< 0.000500	U	Yes
Sodium	NA	NA	1.00	280		140		NA
Thallium	NA	NA	0.00200	< 0.000500	U	< 0.000500	U	NA
Vanadium	1.698	3.592	0.00500	0.000969	J	0.00202	J	Yes
Zinc	0.146	0.31	0.00400	0.0228		0.0260		No
Mercury	NA	NA	0.000200	0.0000900	J	< 0.000100	U	NA
1,4-DIOXANE	µg/L	µg/L	µg/L	µg/L		µg/L		
1,4-Dioxane	NA	134.2	1	5.1		8.6		Yes
CHEMICAL OXYGEN DEMAND (COD)	mg/L	mg/L	mg/L	mg/L		mg/L		
COD	NA	200	75	16		15		Yes
OIL AND GREASE (O&G)	mg/L	mg/L	mg/L	mg/L		mg/L		
O&G	NA	15	2	1.46	J	6.56		Yes

Notes:

µg/L - micrograms per liter

DVQ - data validation qualifier

Grab samples are compared to the daily maximum and composite samples to the daily average

* only Effluent sample is compared to discharge limits

J - Estimated concentration between the detection limit and limit of quantitation and/or due to quality control discrepancy

U - non detect and reported to the limit of detection

mg/L - milligrams per liter

NA - not applicable

GWTP - Groundwater Treatment Plant

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3 EVALUATION OF LHAAP-16 EXTRACTION SYSTEM

No groundwater was extracted from LHAAP-16 in the 2nd quarter of 2019 due to the main transformer being down. However, monthly depth to water measurements were collected.

3.1 Groundwater Elevation

The groundwater elevations in the piezometers and monitoring wells at LHAAP-16 for April, May, and June 2019 are presented in **Table 12**. The potentiometric surface maps for the shallow and Upper Wilcox (intermediate) groundwater zones at LHAAP-16 for April, May, and June 2019 are presented on **Figures B-7 through B-12** in **Appendix B**. Based on the potentiometric surface maps, the general groundwater flow direction in the shallow and intermediate zone is east-southeast towards Harrison Bayou. However, the shallow and intermediates zone during the April 2019 well gauging showed a generally flat gradient with flow still generally to the east-southeast.

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Table 12. Groundwater Elevations at LHAAP-16 Piezometers and Monitoring Wells – 2nd Quarter 2019

Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 4/26/2019	Groundwater Elevation (feet amsl) 4/26/2019	Depth to Water (feet) 5/29/2019	Groundwater Elevation (feet amsl) 5/29/2019	Depth to Water (feet) 6/28/2019	Groundwater Elevation (feet amsl) 6/28/2019
16PZ-1	Piezometer	199.44	26.25	173.19	25.97	173.47	25.74	173.70
16PZ-2	Piezometer	199.75	26.17	173.58	25.80	173.95	25.70	174.05
16PZ-3	Piezometer	198.61	25.10	173.51	24.76	173.85	24.59	174.02
16PZ-4	Piezometer	198.81	25.40	173.41	25.02	173.79	24.89	173.92
16PZ-5	Piezometer	198.31	24.71	173.60	24.39	173.92	24.19	174.12
16PZ-6	Piezometer	198.61	25.24	173.37	25.95	172.66	25.72	172.89
16PZ-7	Piezometer	200.10	26.19	173.91	25.83	174.27	25.70	174.40
16PZ-8	Piezometer	199.93	26.50	173.43	26.15	173.78	25.97	173.96
16PZ-9	Piezometer	196.49	23.14	173.35	22.79	173.70	22.57	173.92
16PZ-10	Piezometer	196.65	23.27	173.38	22.93	173.72	22.80	173.85
16PZ-11	Piezometer	198.88	25.25	173.63	24.87	174.01	24.71	174.17
16PZ-12	Piezometer	199.00	25.49	173.51	25.07	173.93	24.96	174.04
16PZ-13	Piezometer	196.58	23.08	173.50	22.71	173.87	22.58	174.00
16PZ-14	Piezometer	196.09	22.69	173.40	22.38	173.71	22.20	173.89
16PZ-15	Piezometer	191.93	18.33	173.60	18.00	173.93	17.69	174.24
16PZ-16	Piezometer	190.79	17.41	173.38	17.07	173.72	16.83	173.96
16PZ-17	Piezometer	186.67	13.16	173.51	12.77	173.90	12.55	174.12
16PZ-18	Piezometer	185.99	12.80	173.19	12.45	173.54	12.23	173.76
16PZ-19	Piezometer	183.98	10.72	173.26	10.39	173.59	10.25	173.73
16PZ-20	Piezometer	183.12	9.88	173.24	9.55	173.57	9.42	173.70
16WW12	Monitoring Well	188.81	15.87	172.94	15.67	173.14	15.55	173.26
16WW14	Monitoring Well	198.87	24.66	174.21	24.29	174.58	24.10	174.77
16WW22	Monitoring Well	200.13	26.53	173.60	26.07	174.06	25.95	174.18
16WW25	Monitoring Well	188.77	15.01	173.76	15.11	173.66	14.89	173.88
16WW26	Monitoring Well	188.83	14.55	174.28	13.90	174.93	13.76	175.07
16WW29	Monitoring Well	178.24	3.94	174.30	4.81	173.43	4.62	173.62
16WW30	Monitoring Well	178.47	4.11	174.36	5.11	173.36	4.98	173.49
16WW31	Monitoring Well	202.78	29.00	173.78	28.39	174.39	28.20	174.58
16WW33	Monitoring Well	203.09	29.12	173.97	28.60	174.49	28.41	174.68
16WW35	Monitoring Well	191.23	17.20	174.03	16.82	174.41	16.60	174.63
16WW36	Monitoring Well	190.94	16.73	174.21	16.33	174.61	16.17	174.77

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4 QUALITY CONTROL

This report summarizes the data for samples collected during April, May, and June 2019. The samples were reviewed and validated in accordance with the guidelines in the *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA, January 2017); *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (USEPA, January 2017); and the quality control criteria specified in the *Basewide Uniform Federal Policy - Quality Assurance Project Plan Longhorn Army Ammunition Plant* which is in Appendix C of the *Final Installation-Wide Work Plan for Longhorn Army Ammunition Plant Karnack, Texas* (Bhate, May 2018).

The purpose of the sampling program is to evaluate the effectiveness of the groundwater pump and treat system, assess water quality within the capture zone, and assure compliance with the effluent discharge requirements of the Interim ROD. Quality control and quality assurance problems noted in the case narratives received from the laboratory are minor and do not affect the usability of the data for compliance at the GWTP. No sample results from the 2nd quarter of 2019 were rejected due to quality control problems.

ALS Environmental analyzed the compliance samples collected from the GWTP. Independent data verification and validation was performed by the Bhate project chemist as described in the Quality Control Summary Report in **Appendix G**. The laboratory reports for the 2nd quarter of 2019 sampling conducted at LHAAP-18/24 are included in **Appendix C** on a CD and the laboratory results for the GWTP are included in **Appendix F** on CD. Air monitoring data is presented in **Appendix H** on CD.

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5 TREATED GROUNDWATER DISCHARGED

Reinjection of groundwater in ICT 6 and ICT 9 was discontinued as of 15 July 2012. The last injection occurred on 24 May 2012, immediately prior to the scrubber system malfunction which caused GWTP operation to cease temporarily.

Treated groundwater that met the perchlorate discharge criteria was discharged to Harrison Bayou or the INF Pond in accordance with the Protocol for Discharging GWTP Effluent (**Appendix I**). **Table 4** summarizes flow rates from the INF Pond to the Harrison Bayou, the maximum flow rate allowed by chloride and sulfate concentrations, and the approximated flow rate discharged for the 2nd quarter of 2019. Approximately 271,989 gallons of treated groundwater was discharged from the GWTP to the Harrison Bayou in April, 504,435 gallons in May, and 285,912 gallons in June. No treated groundwater was discharged to the INF Pond in the 2nd quarter of 2019 due to the continuous flow of the Harrison Bayou.

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6 AIR MONITORING

6.1 Summary of Air Monitoring Approach

Operation of the GWTP without air abatement was approved by the TCEQ and USEPA conditioned on collection of air monitoring data to determine the effect of GWTP operation on ambient air quality with respect to potential human health exposure risk. An Interim Air Monitoring Plan was developed by AECOM in August 2012 and used to implement the air monitoring program. The air monitoring program included sampling emission concentrations from the air stripper, ambient air at the GWTP, and ambient air downwind of the GWTP. Collection of air data occurred on a weekly basis between September 2012 and September 2013, on a monthly basis between September 2013 and September 2014, and on a quarterly basis since that time. The sampling program includes use of Summa canisters and a photoionization detector (PID) to measure vapor phase concentrations. The air stripper emission sample is collected as a grab sample, while the ambient air samples are collected as composite samples. The GWTP sample is collected over 8 hours to represent a work day and the downwind sample is collected over 24 hours to represent potential exposure to an off-site receptor¹. The downwind sample is collected at the closest downwind property boundary, based on prevailing wind direction.

PID data (after system calibration) are collected each time the GWTP is operated and serve as a real-time indicator of ambient air conditions at and downwind of the GWTP. Correlations between definitive analytical air data and PID measurements were established and a means to calculate contaminant concentration from PID measurements was developed. A PID threshold of 0.4 parts per million by volume (ppmv) in ambient air was established, such that Summa canister measurements would occur when the PID threshold is exceeded.

The Summa canister samples are analyzed for VOCs using USEPA Method TO-15. The PID measurements are collected after instrument calibration. The air sampling results are summarized and reported to the USEPA and TCEQ in the GWTP quarterly reports; however, the air results are reviewed immediately upon receipt for the potential presence of any exceedances of ambient air concentrations. **Appendix J (Tables 1 through 3)** includes a comparison of ambient air concentrations with TCEQ Air Monitoring Comparison Values (AMCVs) or the short-term Effects Screening Levels (ESLs) for chemicals with no published AMCVs, calculations of emission rates from the emission point, and a compilation of PID results and calibration records. The air monitoring results to date indicate that all ambient air concentrations are lower than the AMCVs or ESLs. The stripper stack sample concentrations are used to calculate emission rates in pounds

¹ Off-site receptor - Any recreational area, residence, commercial/industrial facility, or other normally occupied structures not used solely by the owner or operator of the facilities or the owner of the site upon which the facilities are located. Measurements of distances to determine compliance with this distance restriction must be taken toward structures that are in use as of the date that a notification is filed with the commission.

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per hour (lbs/hr) and tons per year (tpy). The calculated emission rates in lbs/hr are then compared to the allowable emission rates per 30 Texas Administrative Code (TAC) §106.533(f)(1). The emission rates have been lower than the allowable emission rates to the conservatively-selected off-site receptor. The calculated emission rate in tpy is compared to the allowable limit of 5 tpy per chemical. All emission rates have been lower than the allowable emission rates.

The air monitoring results from the first few months of operation between September and November 2012 were compiled and submitted in a separate report (December 2012) (along with validated data) to TCEQ to demonstrate compliance with Texas Permit by Rule emission standards. Approval of the analytical results and concurrence that the site will continue to meet Title 30 TAC §106.533 without the use of air abatement using a catalytic oxidation system was obtained from the TCEQ via email on 22 February 2013.

On 18 February 2013, AECOM presented analysis of the approach applicable to obtaining a variance for operating the GWTP without air abatement equipment to the TCEQ and USEPA. The analysis indicated that the use of an Explanation of Significant Difference (ESD) was the appropriate approach for the site. Approval of use of an ESD was obtained from the USEPA via email on 21 March 2013. The ESD was developed, reviewed, and accepted by USEPA and TCEQ. The ESD was signed by the designated parties on 3 April 2014, and concurrence from the TCEQ was obtained in a letter dated 16 April 2014.

6.2 Air Monitoring Results for the 2nd Quarter of 2019

During the 2nd quarter of 2019, air sampling was completed on 29 May 2019. The laboratory data package is presented in **Appendix H**. A summary of the air sampling results is presented in **Appendix J (Tables 1 through 3)**. All results met the criteria described in Section 6.1.

6.2.1 Summa Canister Monitoring Results

One sampling event was conducted on 29 May 2019, for presentation during the 2nd Quarter 2019 reporting period using Summa canisters. The samples were collected and analyzed as described in Section 6.1 and per the approved air monitoring plan dated August 2012. The analytical results were then compiled in spreadsheets where calculations were completed and comparisons to applicable criteria were made as described in Section 6.1.

6.2.1.1 Ambient Air Results

Acetone; 1,2-dichloroethane; benzene; carbon disulfide; chloroform; Tetrachloroethene; n-hexane; styrene; toluene; ethylbenzene; m,p-xylenes; o-xylene; propene; dichlorodifluoromethane; ethanol; trichlorofluoromethane; trichlorotrifluoroethane; alpha-pinene; and d-limonene were detected in May 2019 in ambient air downwind of the GWTP.

Compounds originating at the GWTP would be expected to have lower concentrations in the downwind sampling location than at the GWTP sampling location. Likewise, compounds like acetone; n-hexane; toluene; m,p-xylenes; propene; dichlorodifluoromethane; ethanol; trichlorofluoromethane; and alpha-pinene with similar concentrations in both GWTP ambient air and downwind ambient air are suspected to be present in the ambient (background) air. The

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ambient air results during the quarter met the ambient air criteria, as presented in **Table 1** within **Appendix J**.

6.2.1.2 Air Stripper Effluent Results

The VOCs present in groundwater that are removed via the air stripper include vinyl chloride; Tetrachloroethene; 1,2-dichloroethane; 1,1-dichloroethene; and methylene chloride. The highest reported concentrations are for cis-1,2-DCE; trichlorotrifluoroethane; and trichloroethene. These compounds are frequently reported in groundwater at the site, with the exception of trichlorotrifluoroethane which is not typically a groundwater analyte at LHAAP. Trichlorotrifluoroethane, however, appears to be present in groundwater as indicated by limited analysis conducted in December 2013, where it was detected in several wells, and from historical accounts. Many of the chemicals that are reported in ambient air are not detected in the air stripper effluent. This is likely because the reporting limit for the air stripper effluent is higher than the reporting limit for the ambient air samples or the source for some of these chemicals are extraneous to groundwater.

The air stripper effluent concentrations were below the emission criteria, as presented in **Table 2** within **Appendix J**.

6.2.2 PID Results

Along with collection of Summa canister air samples, PID measurements from the same sources/areas are collected and recorded. These simultaneous measurements allowed establishing a correlation between PID readings and VOC concentrations in the Summa canister air samples. Conversion from PID to compound concentrations was established by TCEQ in 30 TAC §106.533(h). The TCEQ equation allows use of a PID to determine individual compound concentrations if the distribution of chemicals in the ambient air is known or assumed. This allows the use of a PID as a tool to measure VOC concentrations and convert the PID results to estimates of compound concentrations. All ambient air PID measurements during this quarter at the GWTP were reported at 0.0 parts per million. The stripper PID location detected between 19.7 and 24.3 parts per million at each sampling event. The other two locations had no detections. The results of the PID readings collected during GWTP operations are presented in **Table 3** within **Appendix J**.

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7 COMMENTS AND RESPONSES

The USEPA does not have comments on the 1st quarter 2019 GWTP Quarterly Evaluation Report per electronic mail (e-mail) dated 14 August 2019. The TCEQ issued the following comment on 14 August 2019.

Comment 1: 2.4, first sentence – please add that all requirements are documented in the Final Revised Sampling and Analysis Plan.

Response to Comment 1: Concur. The following sentence will be added to Section 2.5: *Sampling and analysis is completed in accordance with the requirements documented in the Final Revised Sampling and Analysis Plan (AECOM Technical Services, Inc., September 2017).*

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APPENDIX A
ICT LAYOUT AND GWTP PROCESS FLOW DIAGRAM

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Table A-1: ICTs Completion Depths

ICT	TOC Elevation	Total Depth	Sump Elevation	Comment
1	186.07	22.5	163.57	Taken out of service in 2007.
2	185.02	29.5	155.52	
3	192.27	37.75	154.52	Taken out of service in 2007.
4	193.51	37.5	156.01	
5	192.67	35	157.67	Taken out of service in 2007.
6	197.30	40.75	156.55	Converted to infiltration in 2007. Ceased reinjection in July 2012.
7	198.03	32.33	165.7	
8	198.97	44.5	154.47	
9	197.64	45.5	152.14	Converted to infiltration in 2007. Ceased reinjection in July 2012.
10	198.07	45.42	152.65	Taken out of service in 2007.
11	198.01	43.33	154.68	
12A	189.06	31.5	157.56	Taken out of service in 2007. Reinstituted in December 2012.
12B	191.97	36.25	155.72	
12C	193.90	34.33	159.57	
12D	185.64	33.75	151.89	
12E	183.38	32.25	151.13	
13A	182.59	28.17	154.42	
13B	184.72	29.58	155.14	
13C	186.13	28.17	157.96	
13D	186.72	26.17	160.55	
13E	191.79	27.08	164.71	
13F	197.81	32.33	165.48	
13G	197.03	27.25	169.78	Taken out of service in 2008.
14A	196.8	43.00	153.8	
14B	197.61	43.42	154.19	
14C	197.86	41.33	156.53	
14D	198.47	44.25	154.22	
14E	198.47	43.08	155.39	

Note(s):

ICT - interception-collection trench

TOC - top of casing, measuring point for groundwater elevations

Elevations are reported as feet above mean sea level.

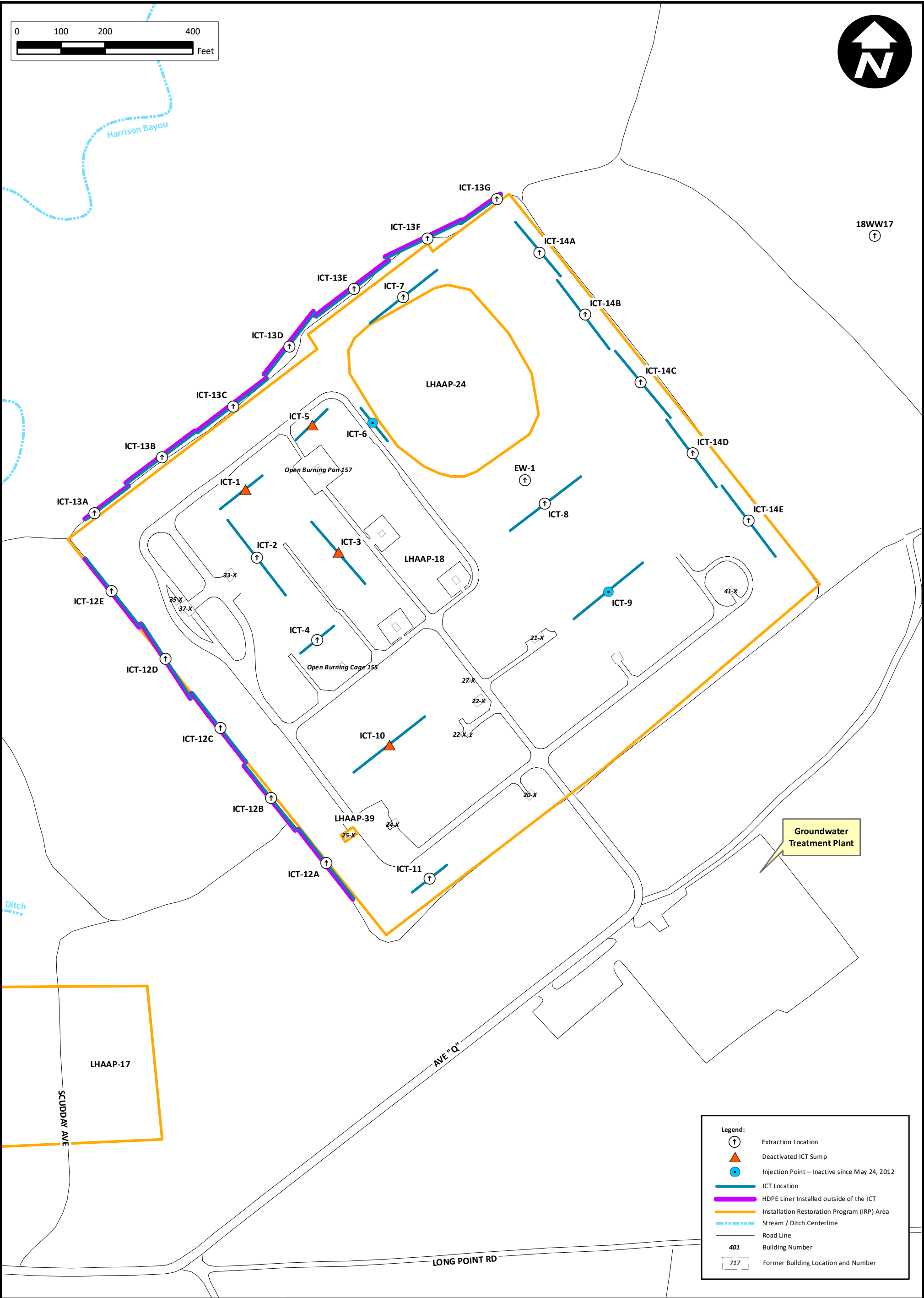
Total depths are reported as feet below TOC.

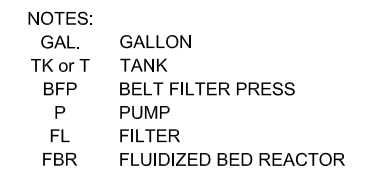
Sump elevation calculated by subtracting total depth from TOC elevation.

ICTs were installed in 1998.

ICT 12A was replaced on December 5, 2012, and extraction has resumed.

TOC Elevations and total depth measured in October 2003, 4th Quarter 2003, Groundwater Treatment Plant Report.





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APPENDIX B
GROUNDWATER ELEVATION CONTOUR MAPS

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Table B-1: Extraction Equipment Maintenance Since 2011**LHAAP-18/24**

Well I.D.	Replaced Parts	Date	Contractor
ICT 14E	Pump	3/15/2012	Shaw
ICT 14D	Pump, motor, level probes	3/16/2012	Shaw
ICT 14B	Pump, level probes, level probe wire	3/16/2012	Shaw
ICT 14A	Pump, motor, level probes, level probe wire	3/17/2012	Shaw
ICT 2	Pump, motor	3/17/2012	Shaw
ICT 13D	Pump	3/19/2012	Shaw
ICT 13B	Pump	3/20/2012	Shaw
ICT 14E	Pump, motor, broken piping	11/19/2012	AECOM
ICT 13C	Pump	11/20/2012	AECOM
ICT13E	Pump	11/20/2012	AECOM
ICT 12A	Pump, motor, wiring harness, level probes, level probe wire	12/5/2012	AECOM
ICT 7	Pump, motor, wiring harness, level probes	12/6/2012	AECOM
ICT2	Pump	6/10/2013	AECOM
ICT 13C	Pump	6/11/2013	AECOM
ICT 13D	Pump	6/12/2013	AECOM
ICT 14E	Pump rebuilt	6/15/2013	AECOM
ICT 14E	Replaced low level switch	6/19/2013	AECOM
ICT 13C	Pump, wiring harness, flow meter	4/15/2014	AECOM
ICT 14D	Repaired level probes	6/24/2014	AECOM
ICT 14E	Repaired level probes	6/24/2014	AECOM
ICT 14E	Pump and motor troubleshooting	6/26/2014	AECOM
ICT2, 13F, 14C, 14D, 14E	Repaired level probes	7/7/2014	AECOM
ICT 12E	Pump, motor	10/2/2014	AECOM
ICT 12E	Wiring harness, fixed leak	10/8/2014	AECOM
ICT 12E	Level probes	10/9/2014	AECOM
ICT13A	Pump, piping	10/15/2014	AECOM
ICT 12E	Repaired leaking fittings	10/16/2014	AECOM
ICT 11	1" tee and 1" elbow	1/13/2015	AECOM
ICT 12B	Flow meter	1/13/2015	AECOM
ICT 7	1" tee, repaired 1" pipe	1/13/2015	AECOM
ICT 13A	Flow meter	1/15/2015	AECOM
ICT 13B	Pump	1/15/2015	AECOM
ICT 13C	Pump	1/16/2015	AECOM
ICT 7	Low level probe	1/16/2015	AECOM
ICT 13D	Pump, level probes	1/17/2015	AECOM
ICT 14C	Low level probe	1/17/2015	AECOM
ICT 14C	Low level probe	1/29/2015	AECOM
ICT 14D	Low level probe	1/29/2015	AECOM
ICT 13D	Level probes	1/29/2015	AECOM
ICT 2	Pump	1/30/2015	AECOM
ICT 8	Fuse	3/2/2015	AECOM
ICT 8	Fuse	3/9/2015	AECOM
ICT 12E	Flow meter	3/13/2015	AECOM
ICT 13D	Union	3/13/2015	AECOM
ICT 14C	Cleaned level probes	4/1/2015	AECOM
ICT 14D	Cleaned level probes	4/1/2015	AECOM
ICT 13A	Cleaned level probes	4/21/2015	AECOM
ICT 14C	Cleaned level probes	4/21/2015	AECOM
ICT 8	Low level probe	7/24/2015	AECOM
ICT 13C	Installed New Pump	7/28/2015	AECOM

Table B-1: Extraction Equipment Maintenance Since 2011

Well I.D.	Replaced Parts	Date	Contractor
ICT 14C	Installed New Pump and Electric Motor	7/29/2015	AECOM
ICT 14E	Installed New Pump and Electric Motor	7/31/2015	AECOM
ICT 12E	Repaired wiring	8/12/2015	AECOM
ICT 13E	Replaced high and low level probes	8/12/2015	AECOM
ICT 2	Installed Rebuilt Pump	9/9/2015	AECOM
ICT 12 E, ICT 14E	Replaced high level probe and wiring	9/15/2015	AECOM
ICT 13A	Installed new pump	12/23/2015	AECOM
ICT 13B	Installed new pump	12/24/2015	AECOM
ICT 13D	Replaced high level probe	2/11/2016	Aerotek
ICT 14C	Replace low level probe on ICT 14C	2/15/2016	Aerotek
ICT 8	Installed new pump and electric motor	2/19/2016	Aerotek
ICT 14C	Repaired piping leak	3/10/2016	Aerotek
ICT 14E	Installed high and low level probes, level probe wire	3/22/2016	Aerotek
ICT 13D, ICT 14B	Installed high and low level probes, level probe wire	3/24/2016	Aerotek
ICT 14B	Installed new pump and electric motor	3/31/2016	Aerotek
ICT 14C	Installed new low level probe	4/20/2016	Aerotek
ICT 12B	Installed new mechanical flow meter	6/16/2016	Aerotek
ICT 13C	Installed rebuilt pump and new flow meter	8/10/2016	Aerotek
ICT 13A	Installed rebuilt pump, new flow meter, and new 1" unions	8/24/2016	Aerotek
ICT 14E	Installed new mechanical flow meter	8/26/2016	Aerotek
ICT 12C	Repair flow meter	8/30/2016	Aerotek
ICT 2	Install rebuilt pump and new flow meter	8/31/2016	Aerotek
ICT 14C	Clean and adjust level probes	9/7/2016	Aerotek
ICT 14C	Replaced level probes	9/12/2016	Aerotek
ICT 14C	Installed new level probe wire and level probes	9/21/2016	Aerotek
ICT 12C	Installed rebuilt pump, new electric motor, new wiring harness, new level probe wire, and new level probes	9/27/2016	Aerotek
ICT 14C	Cleaned and adjusted level probes	10/14/2016	Aerotek
ICT 13C	Cleaned and adjusted level probes	10/21/2016	Aerotek
ICT 13B	Installed rebuilt pump	10/25/2016	Aerotek
ICT 14D	Installed rebuilt pump	10/27/2016	Aerotek
ICT 13C	Replace low level probe	11/8/2016	Aerotek
ICT 13B	Replace relay base plate	11/8/2016	Aerotek
ICT 13E	Clean and adjust low level probe	11/15/2016	Aerotek
ICT 13B	Replace broken relay base plate and bad level probe wire	11/17/2016	Aerotek
ICT 13C	Clean & repair leaking flow meter	11/18/2016	Aerotek
ICT 13B	Clean & adjust low level probe	11/18/2016	Aerotek
ICT 13A, 13B, & 13E	Clean and adjust low level probes	12/2/2016	Aerotek
ICT 13C & 14C	Pulled piping and pumps	2/8/2017	Aerotek
ICT 14C	Installed new electric motor	2/8/2017	Aerotek
ICT 13C & 14C	Installed rebuilt grundfos pumps	2/8/2017	Aerotek
ICT 7, 13A, & 14D	Repaired sample ports	2/9/2017	Aerotek
ICT 13B & 14E	Cleaned and adjusted low level probes	3/30/2017	Aerotek
ICT 13B & 13F	Installed new flow meters	3/30/2017	Aerotek
ICT 12B	Repair flow meter	4/13/2017	Aerotek
ICT 12C	Replace broken 1" tee	5/1/2017	Aerotek
ICT 11	Installed new manual flow meter	5/5/2017	Aerotek
ICT 2	Installed new flow meter	5/9/2017	Aerotek
ICT 14C & 14D	Cleaned and adjusted low level probes	5/31/2017	Aerotek
ICT 14C	Cleaned and adjusted low level probe	6/27/2017	Aerotek
ICT 8	Clean low level probe	7/11/2017	Aerotek
ICT 2 & 14D	Cleaned and replaced level probes	7/17/2017	Aerotek
ICT 14C	Cleaned low level probe	7/24/2017	Aerotek

Table B-1: Extraction Equipment Maintenance Since 2011

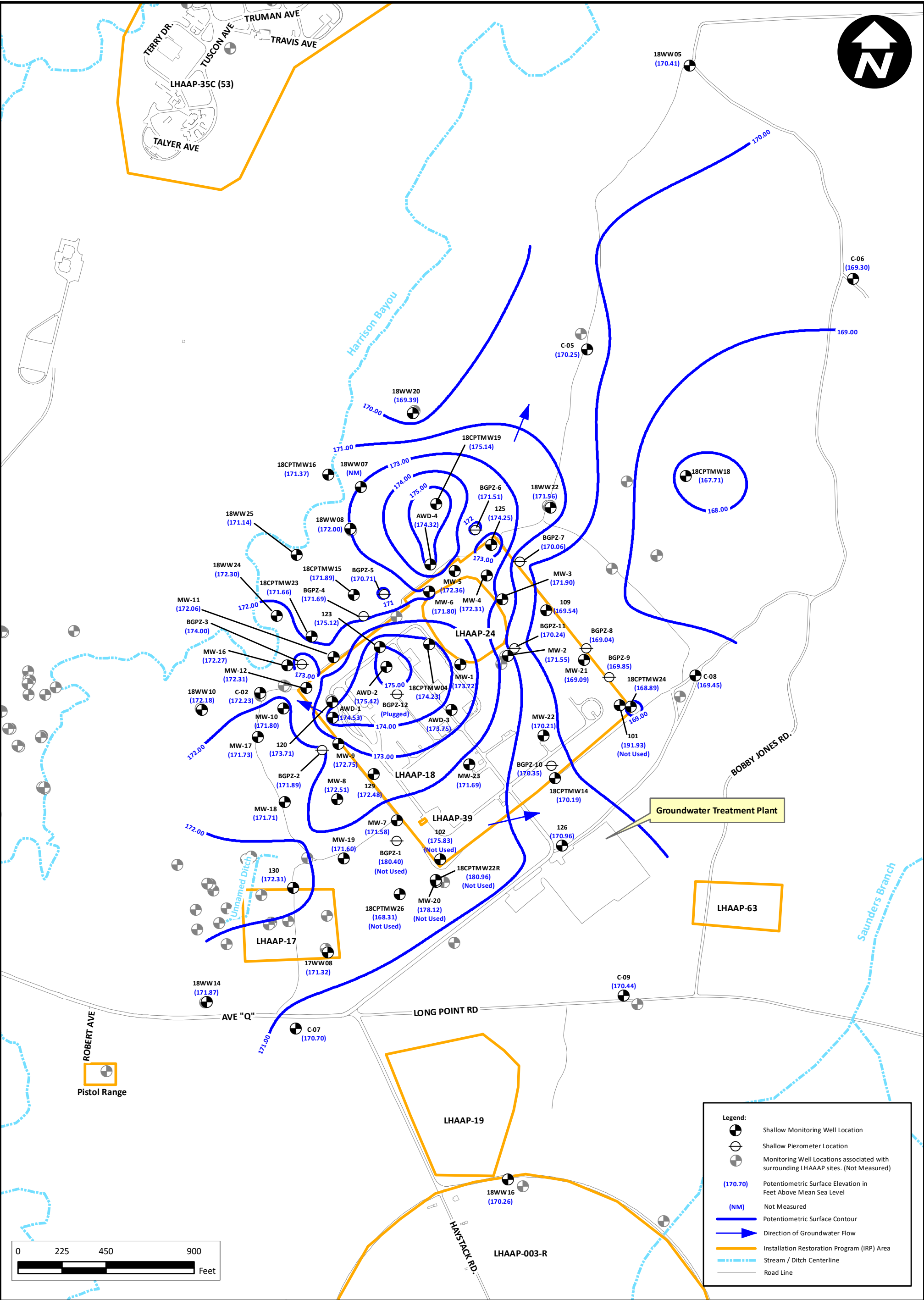
Well I.D.	Replaced Parts	Date	Contractor
ICT 13A	Installed new pump and flow meter	8/8/2017	Aerotek
ICT 13C & 13B	Installed new pump and flow meter	8/9/2017	Aerotek
ICT 13B	Installed new low level probe	8/10/2017	Aerotek
ICT 11	Installed new pump and flow meter	8/11/2017	Aerotek
ICT 4	Replaced low level probe	8/11/2017	Aerotek
ICT 2	Installed rebuilt pump	9/19/2017	Aerotek
ICT 13D	Adjusted level probes	9/22/2017	Aerotek
ICT 14C	Cleaned level probes	10/11/2017	Bhate
ICT 13E	Clean and adjust level probes	10/24/2017	Bhate
ICT 12B	Adjust level probes	11/15/2017	Bhate
ICT 14D	Cleaned level probes	11/15/2017	Bhate
ICT 8	Clean and adjust level probes	11/28/2017	Bhate
ICT 2	Cleaned level probes	12/20/2017	Bhate
ICT 13C	Install new flow meter	1/30/2018	Bhate
ICT 14C	Cleaned level probes	1/30/2018	Bhate
ICT 13C	Cleaned & adjusted level probes	2/1/2018	Bhate
ICT 13B	Repair broken 1" union	2/1/2018	Bhate
ICT 14A	Repair 2 broken 1" elbows & lower high level probe	2/1/2018	Bhate
ICT 14B	Repair broken 1" tee & lower high level probe	2/1/2018	Bhate
ICT 14D	Install new flow meter	2/8/2018	Bhate
ICT 8	Replace broken 1" tee & cleaned level probes	2/8/2018	Bhate
ICT 14D	Cleaned level probes	2/28/2018	Bhate
ICT 14C	Replace low level probe	2/28/2018	Bhate
ICT 13B	Cleaned level probes	2/28/2018	Bhate
ICT 13A	Install new motor & replace leaking 1" union	3/14/2018	Bhate
ICT 13C	Cleaned & adjusted level probes	3/21/2018	Bhate
ICT 12B	Replace broken 1" elbow & install new flow meter	3/21/2018	Bhate
ICT 2	Install new pump	3/22/2018	Bhate
ICT 13B	Replaced level probes	3/30/2018	Bhate
ICT 14E	Lower high level probe	3/30/2018	Bhate
ICT 14C	Cleaned level probes	4/27/2018	Bhate
ICT 11	Install new breaker	4/27/2018	Bhate
ICT 14E	Cleaned level probes	6/7/2018	Bhate
ICT 12C	Cleaned level probes	6/7/2018	Bhate
EW 01	Cleaned level probes	6/7/2018	Bhate
ICT 14E	Replaced level probes	6/8/2018	Bhate
ICT 11	Install new electrical wire from breaker to well	6/14/2018	Bhate
ICT 12B	Replaced pump	6/25/2018	Bhate
ICT 14E	Cleaned level probes	6/26/2018	Bhate
ICT 8	Cleaned level probes	6/26/2018	Bhate
ICT 14C	Replaced pump	6/27/2018	Bhate
EW01	Replaced level probes	9/12/2018	Bhate
ICT 7	Cleaned level probes	9/12/2018	Bhate
ICT 12C	Replaced low level probe wire and probe	9/12/2018	Bhate
ICT 14D	Replaced high level probe wire & probe	9/13/2018	Bhate
ICT 12B	Replaced high and low level probe wires & probes	9/13/2018	Bhate
ICT 12B	Replaced electrical relay and relay base plate	9/13/2018	Bhate
ICT 14C	Cleaned level probes	9/13/2018	Bhate
ICT 13E	Replaced flow meter	9/14/2018	Bhate
ICT 14D	Replace low level probe	10/31/2018	Bhate
ICT 8	Cleaned level probes	10/31/2018	Bhate
ICT 14C	Cleaned level probes	10/31/2018	Bhate
ICT 13A	Replace broken 1" Tee	12/12/2018	Bhate
ICT 14C	Cleaned level probes	12/12/2018	Bhate
ICT 13A	Install new flow meters	2/14/2019	Bhate

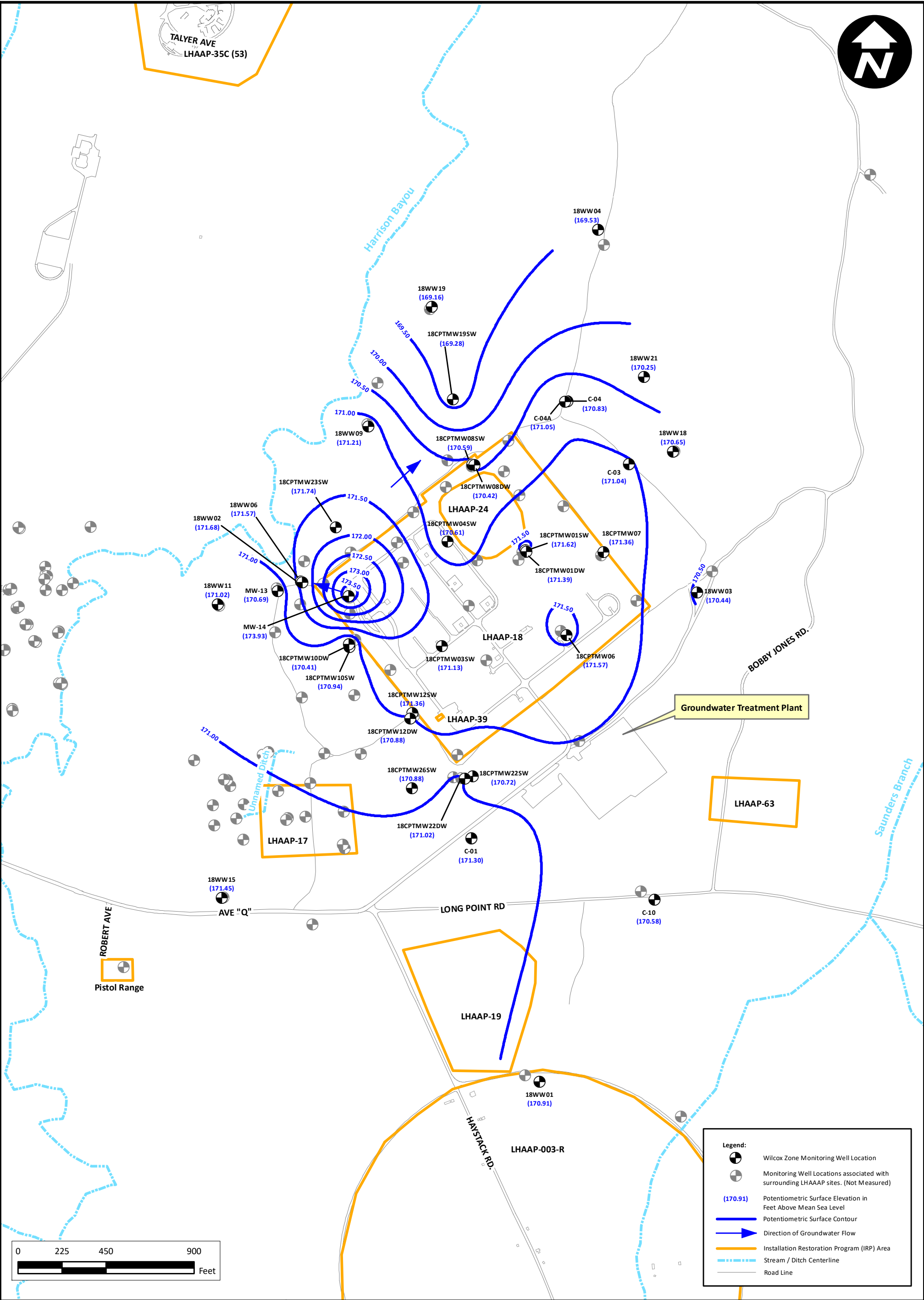
Table B-1: Extraction Equipment Maintenance Since 2011

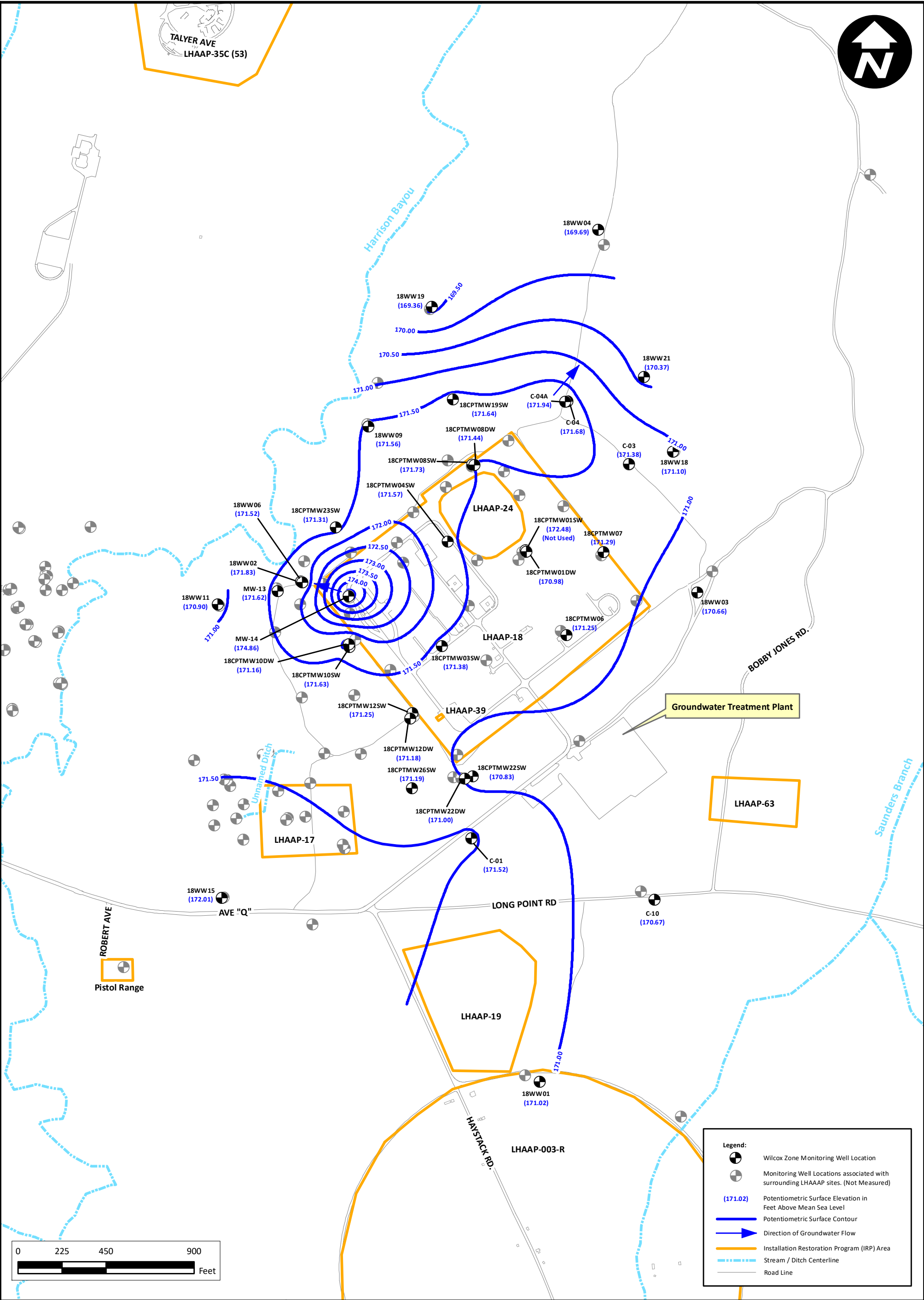
Well I.D.	Replaced Parts	Date	Contractor
ICT 12D	Replace pump & motor	3/6/2019	Bhate
ICT 13C	Replace pump	3/8/2019	Bhate
ICT 2	Replace pump & flow meter	3/11/2019	Bhate
ICT 14C	Replace pump & motor	3/12/2019	Bhate
ICT 14D	Replace pump	3/12/2019	Bhate
ICT 14E	Replace pump, seal plate & level probes	3/14/2019	Bhate
ICT 14A	Replace pump and repair leaking 1" pipe	3/15/2019	Bhate
ICT 13C	Lower high level probe	3/22/2019	Bhate
ICT 14A	Lower high level probe	3/22/2019	Bhate
EW-01	Replace pump	3/29/2019	Bhate
ICT 8	Clean level probes	4/1/2019	Bhate
ICT 12C	Clean level probes	4/1/2019	Bhate
ICT 13D	Clean level probes	4/1/2019	Bhate
ICT 14E	Replaced bad relay	4/2/2019	Bhate
ICT 12A	Replace flow meter	4/3/2019	Bhate
ICT 13F	Replace flow meter	4/3/2019	Bhate
ICT 13D	Replace low level probe	4/3/2019	Bhate
ICT 13C	Clean level probes	5/8/2019	Bhate
ICT 14C	Clean level probes	5/8/2019	Bhate
ICT 12D	Replace bad relay	5/8/2019	Bhate
LHAAP-16			
Well I.D.	Replaced Parts	Date	Contractor
EW08	New pump	2/28/2011	Shaw
EW01	Rebuild pump	8/25/2011	Shaw
EW06	Rebuild pump	8/25/2011	Shaw
EW02	Rebuild pump	2/12/2012	Shaw
EW03	Rebuild pump	2/12/2012	Shaw
EW08	Rebuild pump	11/8/2012	AECOM
EW01	Rebuild pump	11/8/2012	AECOM
EW04	Repair pump	11/13/2012	AECOM
EW07	Rebuild pump	11/13/2012	AECOM
EW04	Installed New Pump	11/28/2012	AECOM
EW06	Installed New Pump	11/28/2012	AECOM
EW02	Installed New Pump	12/4/2012	AECOM
EW03	Installed New Pump	12/4/2012	AECOM
EW01	Installed New Pump	12/17/2012	AECOM
EW01	Replaced Low level probe	1/17/2015	AECOM
EW01	Cleaned and adjusted level probes	10/21/2016	Aerotek

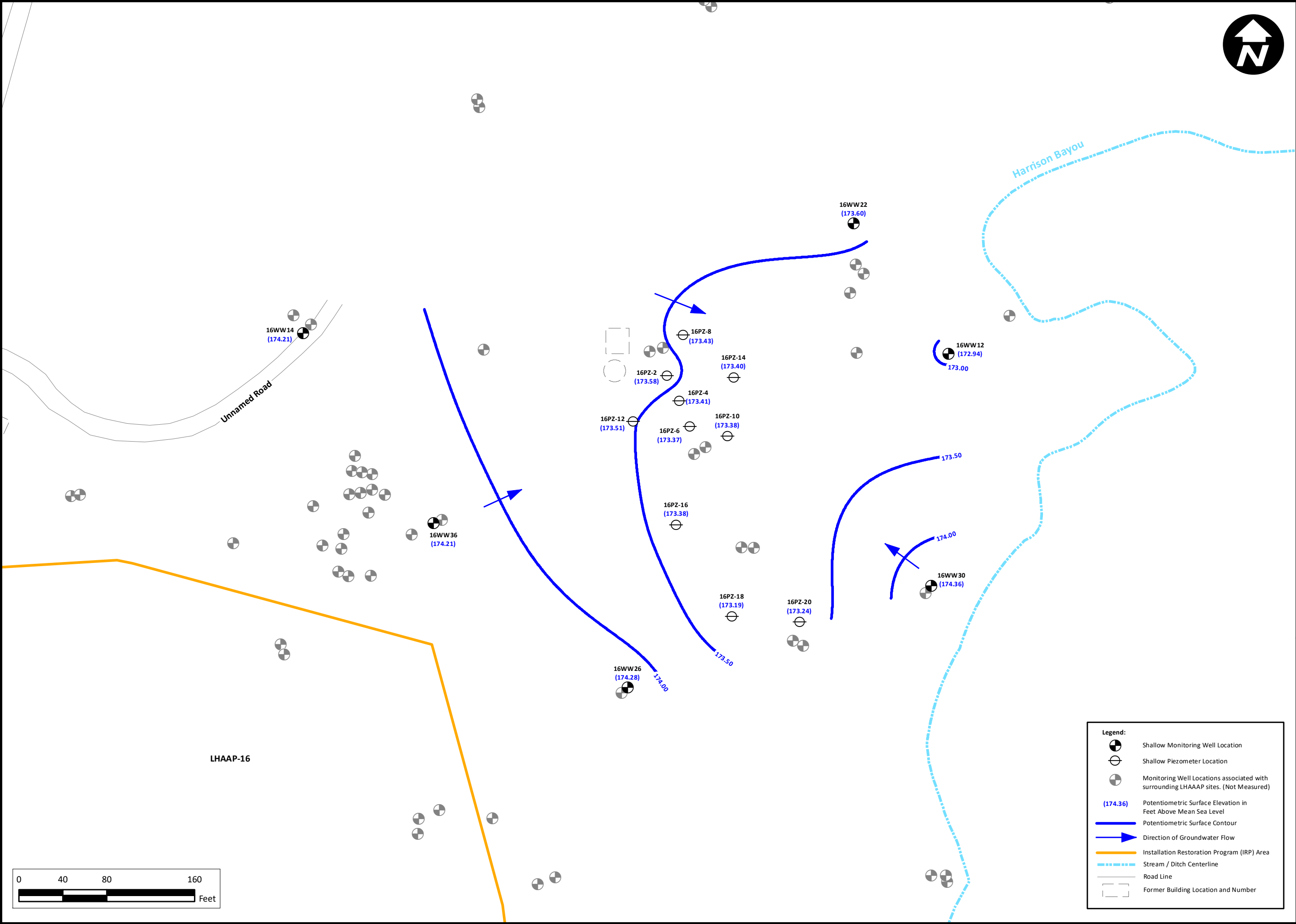












Groundwater Potentiometric Surface Map
Shallow Zone (April 26, 2019) LHAAP-16

Quarterly Evaluation Report 2nd Quarter (April – June) 2019
Groundwater Treatment Plant
Longhorn Army Ammunition Plant, Karnack, Texas

PROJECT NO:
NWO1312.0150

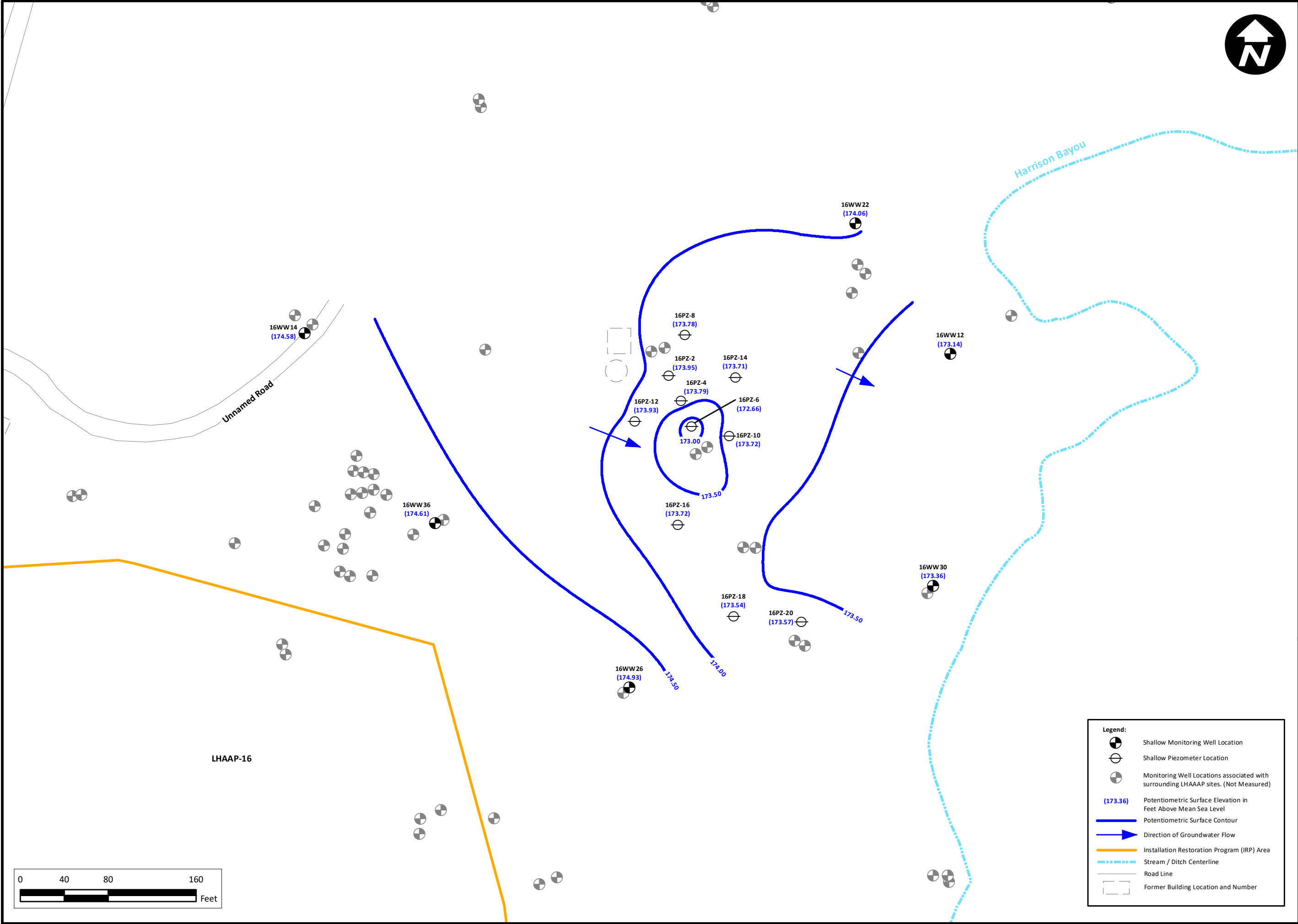
SCALE:
As Shown

DATE:
8/5/2019

DRAWN BY:
MRM

bhate
www.bhate.com

Figure B-7



Groundwater Potentiometric Surface Map
Shallow Zone (May 29, 2019) LHAAP-16

Quarterly Evaluation Report 2nd Quarter (April – June) 2019
Groundwater Treatment Plant
Longhorn Army Ammunition Plant, Karnack, Texas

PROJECT NO: NWO1312.0150

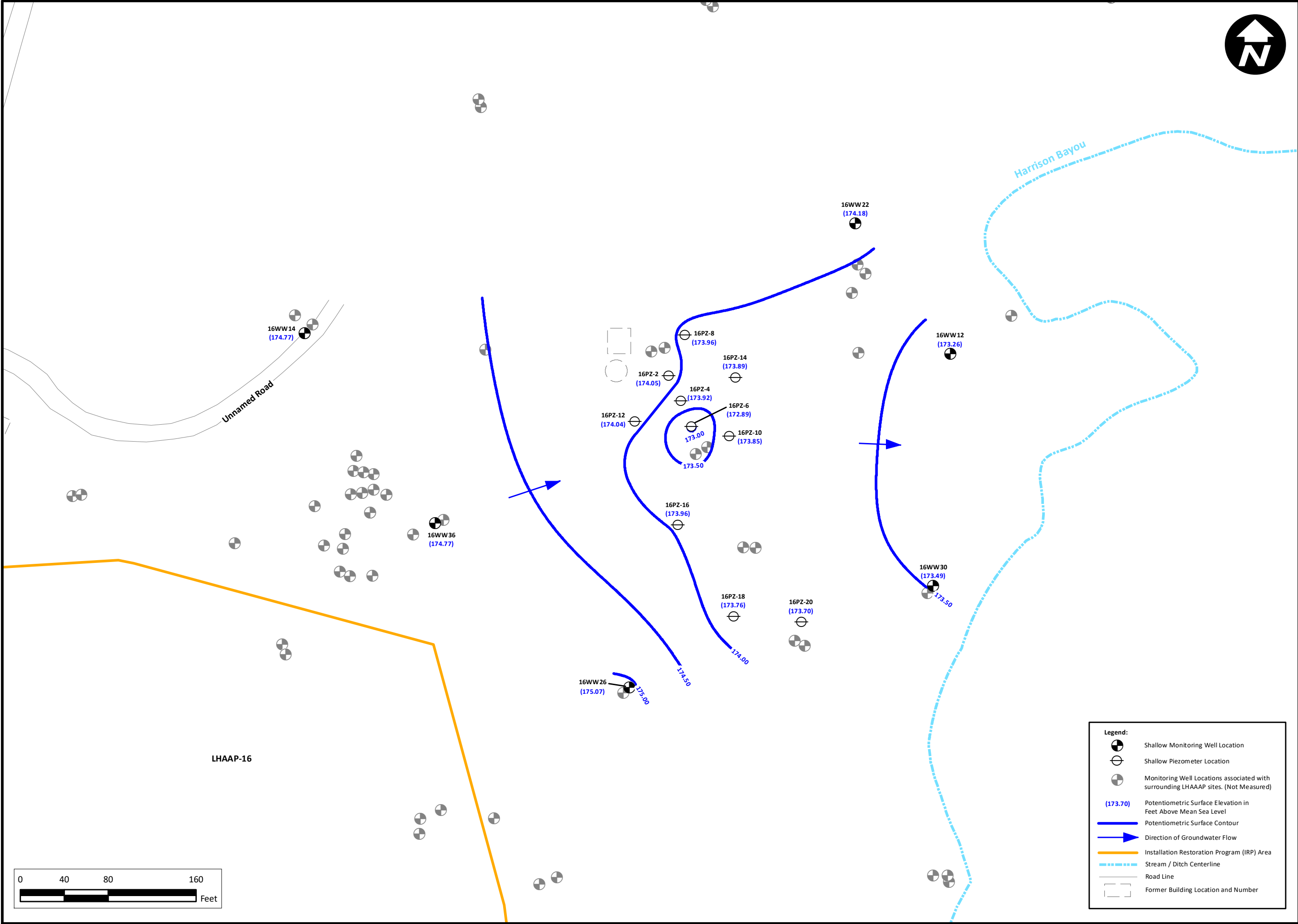
SCALE: As Shown

DATE: 8/5/2019

DRAWN BY: MRM

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Figure B-8



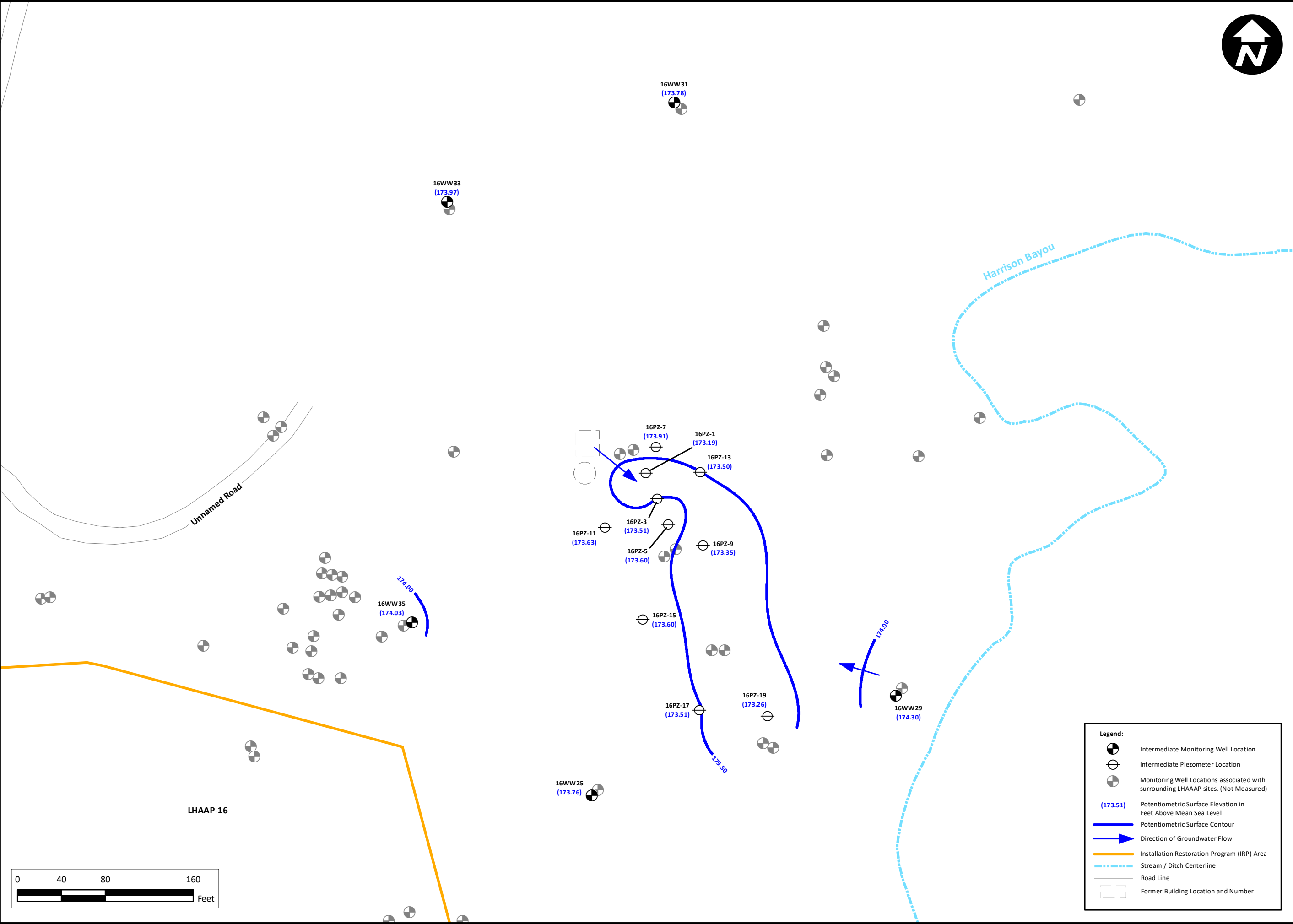
Quarterly Evaluation Report 2nd Quarter (April – June) 2019 Groundwater Treatment Plant Longhorn Army Ammunition Plant, Karnack, Texas			
PROJECT NO:	SCALE:	DATE:	DRAWN BY:
NW01312.0150	As Shown	12/5/2019	MRM



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Groundwater Potentiometric Surface Map
Shallow Zone (June 28, 2019) LHAAAP-16

Figure B-9



Groundwater Potentiometric Surface Map
Intermediate Zone (April 26, 2019) LHAAP-16

Figure B-10

Quarterly Evaluation Report 2nd Quarter (April – June) 2019
Groundwater Treatment Plant
Longhorn Army Ammunition Plant, Karnack, Texas

DRAWN BY:

MRM

DATE:

12/5/2019

SCALE:

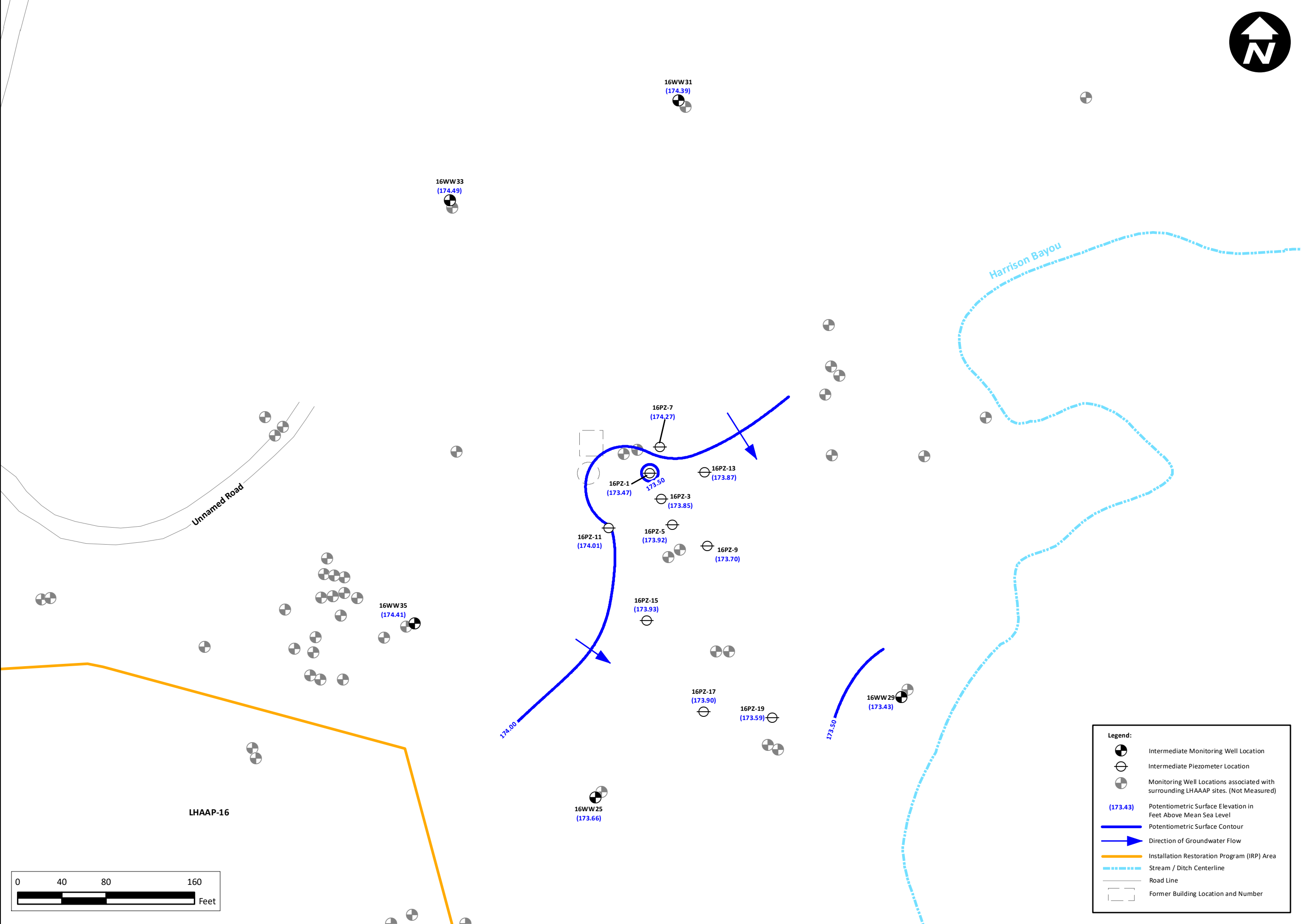
As Shown

PROJECT NO:

NW01312.0150



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Groundwater Potentiometric Surface Map
Intermediate Zone (May 29, 2019) LHAAP-16

Quarterly Evaluation Report 2nd Quarter (April – June) 2019
Groundwater Treatment Plant
Longhorn Army Ammunition Plant, Karnack, Texas

PROJECT NO:
NWO1312.0150

SCALE:
As Shown

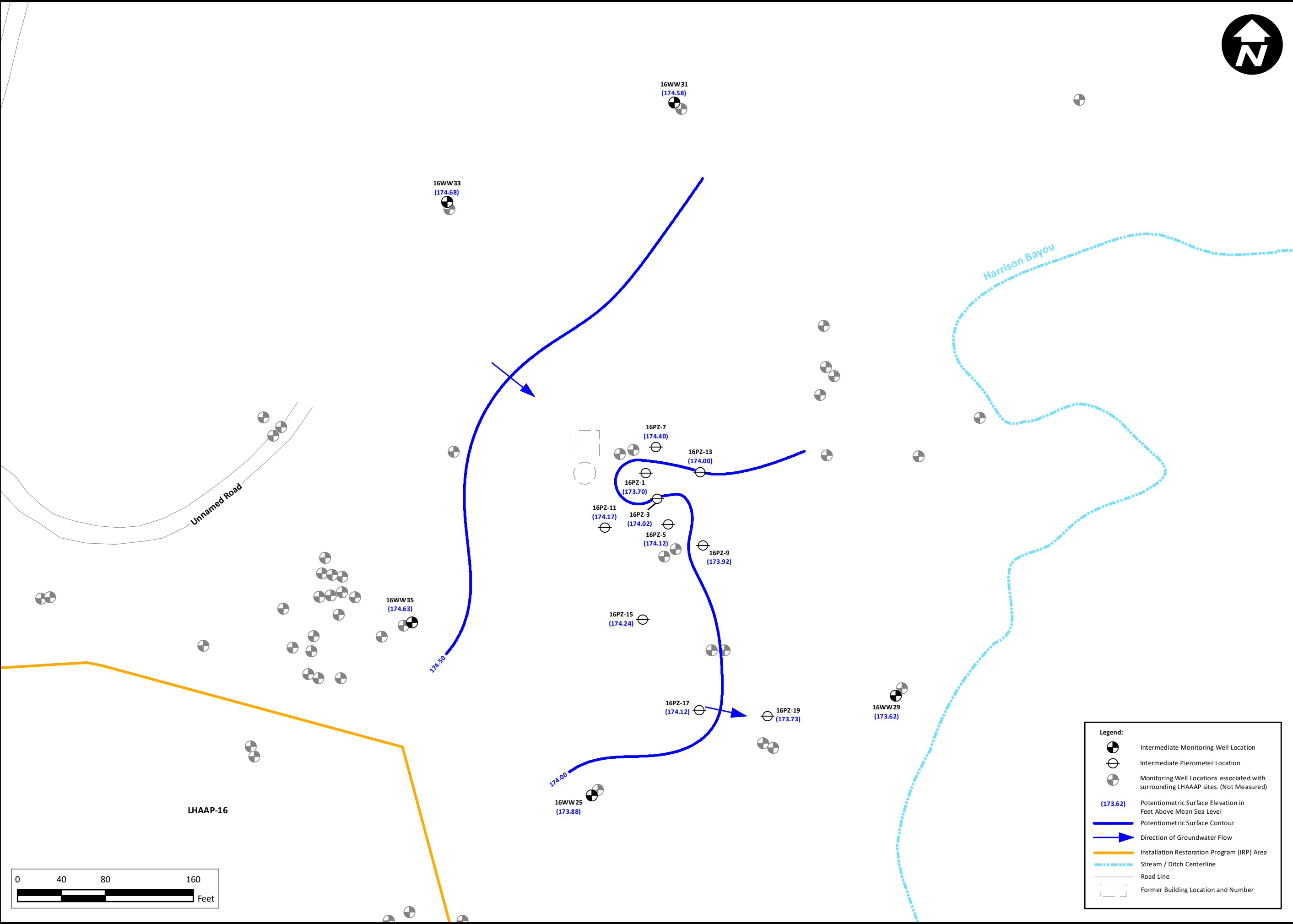
DATE:
12/4/2019

DRAWN BY:
MRM

bhate

www.bhate.com

Figure B-11



Groundwater Potentiometric Surface Map
Intermediate Zone (June 28, 2019) LHAAP-16

Quarterly Evaluation Report 2nd Quarter (April – June) 2019
Groundwater Treatment Plant
Longhorn Army Ammunition Plant, Karnack, Texas

PROJECT NO: NWO1312.0150

SCALE: As Shown

DATE: 12/5/2019

DRAWN BY: MRM

bhate

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GWTP QUARTERLY EVALUATION REPORT – 2ND QUARTER 2019
LONGHORN ARMY AMMUNITION PLANT

APPENDIX C
LABORATORY ANALYTICAL RESULTS FOR LHAAP-18/24
(PROVIDED ON CD ONLY)

GWTP QUARTERLY EVALUATION REPORT –2ND QUARTER 2019
LONGHORN ARMY AMMUNITION PLANT

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

April 16, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19040313**

Laboratory Results for: **LH18/24 Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on Apr 05, 2019 for the analysis presented in the following report.

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

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

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

Sincerely,

Generated By: JUMOKE.LAWAL

RJ Modashia
Project Manager

ALS Houston, US

Date: 16-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19040313

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19040313-01	LH18/24-SP650_040419	Water		04-Apr-2019 14:00	05-Apr-2019 08:40	<input type="checkbox"/>
HS19040313-02	LH18/24-SP650_040419_BIX	Water		04-Apr-2019 14:00	05-Apr-2019 08:40	<input type="checkbox"/>

ALS Houston, US

Date: 16-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order:

CASE NARRATIVE

Work Order Comments

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

Work Order Comments

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

WetChemistry by Method E350.3**Batch ID: R336353**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method E365.3**Batch ID: R336073**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

ALS Houston, US

Date: 16-Apr-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
 Sample ID: LH18/24-SP650_040419
 Collection Date: 04-Apr-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19040313
 Lab ID:HS19040313-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
AMMONIA AS N BY E350.3(ISE)		Method:E350.3						Analyst: KVL
Nitrogen, Ammonia (As N)	17		0.20	0.10	0.20	mg/L	1	09-Apr-2019 11:30
ORTHO PHOSPHATE (PO4) AS P BY E365.3		Method:E365.3						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	3.63		0.100	0.200	0.250	mg/L	10	05-Apr-2019 15:53
SUBCONTRACT ANALYSIS - TOC ANALYSIS		Method:NA						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	12-Apr-2019 11:32

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

ALS Houston, US

Date: 16-Apr-19

Client:	Bhate Environmental Associates, Inc.	ANALYTICAL REPORT
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS19040313
Sample ID:	LH18/24-SP650_040419_BIX	Lab ID:HS19040313-02
Collection Date:	04-Apr-2019 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	15-Apr-2019 09:48

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

ALS Houston, US

Date: 16-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19040313

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R336073	Test Name : ORTHO PHOSPHATE (PO4) AS P BY E365.3			Matrix: Water		
HS19040313-01	LH18/24-SP650_040419	04 Apr 2019 14:00			05 Apr 2019 15:53	10
Batch ID R336353	Test Name : AMMONIA AS N BY E350.3(ISE)			Matrix: Water		
HS19040313-01	LH18/24-SP650_040419	04 Apr 2019 14:00			09 Apr 2019 11:30	1
Batch ID R336479	Test Name : SUBCONTRACT ANALYSIS - TOC ANALYSIS			Matrix: Water		
HS19040313-01	LH18/24-SP650_040419	04 Apr 2019 14:00			12 Apr 2019 11:32	1
Batch ID R336563	Test Name : SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			Matrix: Water		
HS19040313-02	LH18/24-SP650_040419_BIX	04 Apr 2019 14:00			15 Apr 2019 09:48	1

ALS Houston, US

Date: 16-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19040313

QC BATCH REPORT NEW

Batch ID: R336073 (0)		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3					
MBLK	Sample ID: MBLK-336073	Units: mg/L		Analysis Date: 05-Apr-2019 15:53					
Client ID:	Run ID: UV-2450_336073	SeqNo: 5024403		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.0200	0.0250							U
LCS	Sample ID: LCS-336073	Units: mg/L		Analysis Date: 05-Apr-2019 15:53					
Client ID:	Run ID: UV-2450_336073	SeqNo: 5024404		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.251	0.0250	0.25	0	100	85 - 115			
MS	Sample ID: HS19040313-01MS	Units: mg/L		Analysis Date: 05-Apr-2019 15:53					
Client ID: LH18/24-SP650_040419	Run ID: UV-2450_336073	SeqNo: 5024406		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	6.15	0.250	2.5	3.63	101	80 - 120			
MSD	Sample ID: HS19040313-01MSD	Units: mg/L		Analysis Date: 05-Apr-2019 15:53					
Client ID: LH18/24-SP650_040419	Run ID: UV-2450_336073	SeqNo: 5024407		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	6.17	0.250	2.5	3.63	102	80 - 120	6.15	0.325	20
The following samples were analyzed in this batch: HS19040313-01									

ALS Houston, US

Date: 16-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19040313

QC BATCH REPORT NEW

Batch ID: R336353 (0)		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
MBLK	Sample ID: MBLK-R336353	Units: mg/L		Analysis Date: 09-Apr-2019 11:30						
Client ID:	Run ID: WetChem_HS_336353		SeqNo: 5030695		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.10	0.20								U
LCS	Sample ID: LCS-R336353	Units: mg/L		Analysis Date: 09-Apr-2019 11:30						
Client ID:	Run ID: WetChem_HS_336353		SeqNo: 5030694		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.81	0.20	10	0	108	80 - 120				
MS	Sample ID: HS19040342-01MS	Units: mg/L		Analysis Date: 09-Apr-2019 11:30						
Client ID:	Run ID: WetChem_HS_336353		SeqNo: 5030701		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.54	0.20	10	0.1863	104	80 - 120				
MSD	Sample ID: HS19040342-01MSD	Units: mg/L		Analysis Date: 09-Apr-2019 11:30						
Client ID:	Run ID: WetChem_HS_336353		SeqNo: 5030702		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.34	0.20	10	0.1863	102	80 - 120	10.54	1.92	20	
The following samples were analyzed in this batch: HS19040313-01										

ALS Houston, US

Date: 16-Apr-19

Client:	Bhate Environmental Associates, Inc.	QUALIFIERS, ACRONYMS, UNITS
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19040313	

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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Texas	T10470231-18-21	30-Apr-2019
North Dakota	R193 2018-2019	30-Apr-2019
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kentucky	123043 - 2018	30-Apr-2019
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
California	2919, 2018-2019	30-Apr-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020

ALS Houston, US

Date: 16-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19040313

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19040313-01	LH18/24-SP650_040419	Login	4/5/2019 10:59:51 AM	NDR	WET094
HS19040313-01	LH18/24-SP650_040419	Login	4/5/2019 10:59:51 AM	NDR	WET094
HS19040313-01	LH18/24-SP650_040419	Login	4/5/2019 10:59:51 AM	NDR	Sub
HS19040313-02	LH18/24-SP650_040419_BIX	Login	4/5/2019 10:59:51 AM	NDR	Sub

ALS Houston, US

Date: 16-Apr-19

Sample Receipt Checklist

Client Name: Bhate Environmental
 Work Order: HS19040313

Date/Time Received: **05-Apr-2019 08:40**
 Received by: **NDR**

Checklist completed by: Nilesh D. Ranchod 5-Apr-2019
 eSignature Date

Reviewed by: RJ Modashia 5-Apr-2019
 eSignature Date

Matrices: **Water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:N/A
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	3.5 UC/C IR11		
Cooler(s)/Kit(s):	44555		
Date/Time sample(s) sent to storage:	04/05/2019 12:00		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:

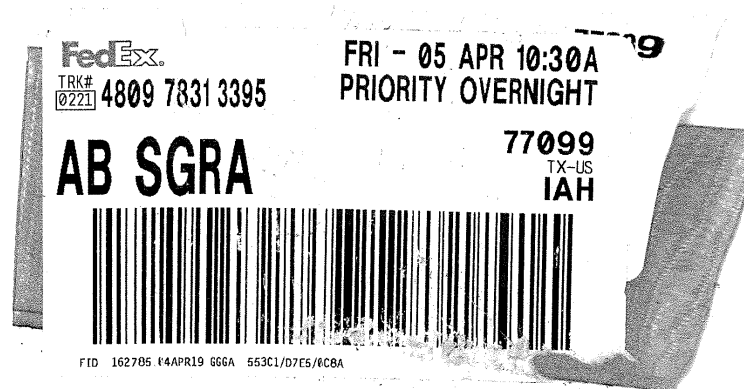
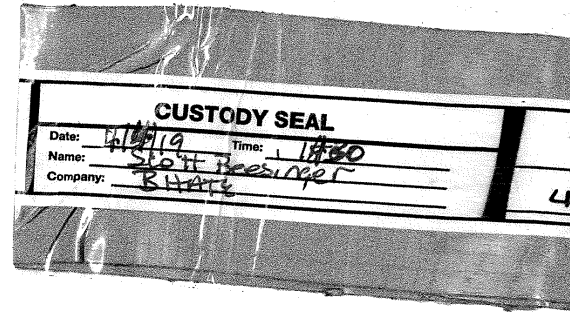
HS19040313

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: R.J Modshia

Bhate Environmental Associates, Inc.
118/24 Longhorn GW Treatment Plant Weekly Sample

Project: BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS						Project No. NWO1312.0150.0 16.0001																															
Job: GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES																																					
Prepared By:							P.O. Number																														
Scott Beesinger																																					
Field Sample I.D.										Sample Matrix		Date / Time		MS / MSD		No. OF CONTAINERS		AMMONIA-N		TOTAL ORGANIC CARBON		ORTHO-PHOSPHATE		PERCHLORATE										Remarks (Preservatives, etc.)		Lab I.D.#	
LH18/24-SP650_040419										Water		04/04/19 / 14:00		2		X		X														H2SO4					
LH18/24-SP650_040419										Water		04/04/19 / 14:00		1						X												NONE					
LH18/24-SP650_040419_BIX										Water		04/04/19 / 14:00		1								X										NONE					
Additional Remarks: Standard TAT on all parameters																																					
Relinquished By:					Date		Time		Received By:					Date		Time		Relinquished By:					Date		Time		Received By:					Date		Time			
[Signature]					04/04/19		14:30																				NIL					4/4		08:40			
For Lab Use Only																																					
Received At Lab By:					Date		Time		Airbill No.					Opened By:					Date		Time		Temp of Container					Seal No.		Condition							
Remarks:																																					





ALS Environmental
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April 12, 2019

Analytical Report for Service Request No: K1903068

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

RE: ALS Houston DOD TOC / HS19040313

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory April 06, 2019
For your reference, these analyses have been assigned our service request number **K1903068**.

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

For Kelley Lovejoy
Project Manager



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 General Chemistry

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjllabs.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/bsdwlabservice.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/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577- 7222 Fax (360)636- 1068
www.alsglobal.com



Client: ALS Environmental - US
Project: ALS Houston DOD TOC
Sample Matrix: Water

Service Request: K1903068
Date Received: 04/06/2019

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:

One water sample was received for analysis at ALS Environmental on 04/06/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The sample was stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by

A handwritten signature in black ink, appearing to read "Cheryl Davis", written over a horizontal line.

Date

04/12/2019



Chain of Custody

ALS Environmental—Kelso Laboratory
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K1903068



10450 Stancliff Rd, Ste 210
Houston, TX 77099
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Subcontract Chain of Custody

COC ID: 11075

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: HS19040313
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19040313-01	LH18/24-SP650_040419	Water	04 Apr 2019 14:00
TOC Analysis for DOD Level IV			15 Apr 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: J. M. Lawal
Received By: [Signature]
Cooler ID(s): _____

Date/Time: 4/5/19 18:00
Date/Time: 4/6/19 1010
Temperature(s): _____

RIGHT SOLUTIONS | RIGHT PARTNER

4/5 Apr 2019

4/6 Apr 2019



PC

KL

Cooler Receipt and Preservation Form

Client ALS Houston Service Request K19 03068
 Received: 4/6/19 Opened: 4/6/19 By: CG Unloaded: 4/6/19 By: CG

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
 2. Samples were received in: (circle) Cooler Box Envelope Other NA
 3. Were custody seals on coolers? NA Y N If yes, how many and where? 2 Front
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

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	-0.1	1.4	1.6	+0.2	379	11075	4809 7832 5995	

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:

RUSH



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
Project: ALS Houston DOD TOC/HS19040313
Sample Matrix: Water
Analysis Method: SM 5310 C
Prep Method: None

Service Request: K1903068
Date Collected: 04/4/19
Date Received: 04/6/19
Units: mg/L
Basis: NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_040419	K1903068-001	2.23	0.50	0.20	0.07	1	04/10/19 22:46	
Method Blank	K1903068-MB	ND U	0.50	0.20	0.07	1	04/11/19 12:23	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: ALS Houston DOD TOC/HS19040313
Sample Matrix: Water

Service Request: K1903068
Date Collected: 04/04/19
Date Received: 04/06/19

Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
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
Batch QC	K1902831-003DUP	50	20	7	655	654	654	<1	10	04/11/19
LH18/24-SP650_040419	K1903068-001DUP	0.50	0.20	0.07	2.23	2.22	2.22	<1	10	04/10/19
Batch QC	K1903133-001DUP	50	20	7	686	675	680	2	10	04/11/19
Batch QC	K1903135-001DUP	0.50	0.20	0.07	30.9	31.1	31.0	<1	10	04/10/19
Batch QC	K1903135-002DUP	0.50	0.20	0.07	30.7	31.0	30.9	1	10	04/11/19
Batch QC	K1903135-003DUP	0.50	0.20	0.07	12.3	12.0	12.2	2	10	04/11/19
Batch QC	K1903135-004DUP	0.50	0.20	0.07	13.9	13.8	13.9	<1	10	04/11/19
Batch QC	K1903167-001DUP	0.50	0.20	0.07	1.25	1.30	1.27	3	10	04/11/19
Batch QC	K1903167-002DUP	0.50	0.20	0.07	0.89	0.85	0.872	4	10	04/11/19
Batch QC	K1903167-003DUP	0.50	0.20	0.07	1.61	1.61	1.61	<1	10	04/11/19
Batch QC	K1903167-004DUP	0.50	0.20	0.07	1.21	1.20	1.21	1	10	04/11/19
Batch QC	K1903167-005DUP	0.50	0.20	0.07	6.65	6.70	6.67	<1	10	04/11/19

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.

QA/QC Report

Client: ALS Environmental - US
Project: ALS Houston DOD TOC/HS19040313
Sample Matrix: Water

Service Request: K1903068
Date Collected: 04/04/19
Date Received: 04/06/19
Date Analyzed: 04/10/19
Date Extracted: NA

Matrix Spike Summary
Carbon, Total Organic

Sample Name: LH18/24-SP650_040419
Lab Code: K1903068-001
Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
Basis: NA

Matrix Spike
K1903068-001MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic	2.23	28.7	25.0	106	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.

QA/QC Report

Client: ALS Environmental - US
Project: ALS Houston DOD TOC/HS19040313
Sample Matrix: Water

Service Request: K1903068
Date Analyzed: 04/11/19
Date Extracted: NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 631518

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1903068-LCS	26.4	25.0	106	83-117

Client: ALS Environmental - US
Project: ALS Houston DOD TOC/HS19040313

Service Request: K1903068

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	631518	KQ1904698-06	04/10/19 20:10	25.0	25.8	103	90-110
CCV2	631518	KQ1904698-07	04/11/19 01:07	25.0	25.7	103	90-110
CCV3	631518	KQ1904698-08	04/11/19 05:50	25.0	25.6	102	90-110
CCV4	631518	KQ1904698-09	04/11/19 11:53	25.0	25.3	101	90-110
CCV5	631518	KQ1904698-10	04/11/19 14:40	25.0	25.2	101	90-110

Client: ALS Environmental - US
Project: ALS Houston DOD TOC/HS19040313

Service Request: K1903068

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	631518	KQ1904698-01	04/10/19 20:24	0.50	0.20	0.07	0.14	J
CCB2	631518	KQ1904698-02	04/11/19 01:22	0.50	0.20	0.07	ND	U
CCB3	631518	KQ1904698-03	04/11/19 06:05	0.50	0.20	0.07	ND	U
CCB4	631518	KQ1904698-04	04/11/19 12:08	0.50	0.20	0.07	ND	U
CCB5	631518	KQ1904698-05	04/11/19 14:55	0.50	0.20	0.07	ND	U



Raw Data

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General Chemistry

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Work Request # Original K190305, 3149, 3076, 3068, 2807, 3149, 2831, 3133, 3135, 3167
 Tier: II II II IV I II II II II II
 Date Analyzed: 4/10/19 TOC: 631516, 631518
 Analyst: BED Run # DOC: 631517
 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: K1903076 - ^{REP 4/11/19} reports a high raw result and needs a dilution, will be sent for RA.
K1903076-1/2/3/4/5/6 are over diluted and will be sent for reanalysis.

Final Approved by: *James*

Date: 04/12/19

DQREPORT

Analytical Results Summary

00937449

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 631516 Method/Testcode: 9060/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
K1902807-014	Carbon, Total Organic	N/A		Water	0.58 mg/L	10 mL	0.58 mg/L	1	0.07	0.50			4/10/19 17:21:00	N	1
KQ1904696-03	Carbon, Total Organic	CCB		Water	0.09 mg/L	10 ml	0.09 mg/L J	1	0.07	0.50			4/10/19 14:04	N	1
KQ1904696-04	Carbon, Total Organic	CCB		Water	0.14 mg/L	10 ml	0.14 mg/L J	1	0.07	0.50			4/10/19 20:24	N	1
KQ1904696-05	Carbon, Total Organic	CCV		Water	25.62 mg/L	10 ml	25.6 mg/L	1					4/10/19 13:49	N	1
KQ1904696-06	Carbon, Total Organic	CCV		Water	25.83 mg/L	10 ml	25.8 mg/L	1					4/10/19 20:10	N	1
KQ1904696-07	Carbon, Total Organic	LCS		Water	26.45 mg/L	10 ml	26.5 mg/L	1	0.07	0.50	106		4/10/19 15:15	N	1
KQ1904696-08	Carbon, Total Organic	LCS		Water	26.55 mg/L	10 ml	26.5 mg/L	1	0.07	0.50	106		4/10/19 15:15	N	1
KQ1904696-09	Carbon, Total Organic	LCS		Water	26.23 mg/L	10 ml	26.2 mg/L	1	0.07	0.50	105		4/10/19 15:15	N	1
KQ1904696-10	Carbon, Total Organic	LCS		Water	26.22 mg/L	10 ml	26.2 mg/L	1	0.07	0.50	105		4/10/19 15:15	N	1
KQ1904696-11	Carbon, Total Organic	MB		Water	0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/10/19 14:19	N	1
KQ1904696-12	Carbon, Total Organic	MB		Water	0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/10/19 14:19	N	1
KQ1904696-13	Carbon, Total Organic	MB		Water	5.060000000000001E-05	10 ml	0.50 mg/L U	1	0.07	0.50			4/10/19 14:19	N	1
KQ1904696-14	Carbon, Total Organic	MB		Water	4.560000000000001E-05	10 ml	0.50 mg/L U	1	0.07	0.50			4/10/19 14:19	N	1

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indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

00937450

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 631517 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
K1903051-001	Carbon, Dissolved Organic (DOC)	N/A		Effluent	1.55 mg/L	10 ml	1.55 mg/L	1	0.07	0.50			4/10/19 18:16	N	II
K1903051-002	Carbon, Dissolved Organic (DOC)	N/A		Water	1.73 mg/L	10 ml	1.73 mg/L	1	0.07	0.50			4/10/19 19:14	N	II
K1903076-003	Carbon, Dissolved Organic	N/A		Water	0.08 mg/L	10 ml	1000 mg/L U 2000		200	1000			4/10/19 21:22	N	II
K1903149-001	Carbon, Dissolved Organic (DOC)	N/A		Water	6.13 mg/L	10 ml	6.13 mg/L	1	0.07	0.50			4/10/19 19:42	N	II
K1903149-002	Carbon, Dissolved Organic (DOC)	N/A		Water	5.77 mg/L	10 ml	5.77 mg/L	1	0.07	0.50			4/10/19 20:39	N	II
KQ1904697-01	Carbon, Dissolved Organic CCB			Effluent	0.09 mg/L	10 ml	0.09 mg/L J	1	0.07	0.50			4/10/19 14:04	N	II
KQ1904697-01	Carbon, Dissolved Organic CCB (DOC)			Effluent	0.09 mg/L	10 ml	0.09 mg/L J	1	0.07	0.50			4/10/19 14:04	N	II
KQ1904697-02	Carbon, Dissolved Organic CCB			Effluent	0.14 mg/L	10 ml	0.14 mg/L J	1	0.07	0.50			4/10/19 20:24	N	II
KQ1904697-02	Carbon, Dissolved Organic CCB (DOC)			Effluent	0.14 mg/L	10 ml	0.14 mg/L J	1	0.07	0.50			4/10/19 20:24	N	II
KQ1904697-03	Carbon, Dissolved Organic CCB			Effluent	0.02 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/11/19 01:22	N	II
KQ1904697-03	Carbon, Dissolved Organic CCB (DOC)			Effluent	0.02 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/11/19 01:22	N	II
KQ1904697-04	Carbon, Dissolved Organic CCV			Effluent	25.62 mg/L	10 ml	25.6 mg/L	1			102		4/10/19 13:49	N	II
KQ1904697-04	Carbon, Dissolved Organic CCV (DOC)			Effluent	25.62 mg/L	10 ml	25.6 mg/L	1			102		4/10/19 13:49	N	II
KQ1904697-05	Carbon, Dissolved Organic CCV			Effluent	25.83 mg/L	10 ml	25.8 mg/L	1			103		4/10/19 20:10	N	II
KQ1904697-05	Carbon, Dissolved Organic CCV (DOC)			Effluent	25.83 mg/L	10 ml	25.8 mg/L	1			103		4/10/19 20:10	N	II
KQ1904697-06	Carbon, Dissolved Organic CCV			Effluent	25.66 mg/L	10 ml	25.7 mg/L	1			103		4/11/19 01:07	N	II
KQ1904697-06	Carbon, Dissolved Organic CCV (DOC)			Effluent	25.66 mg/L	10 ml	25.7 mg/L	1			103		4/11/19 01:07	N	II
KQ1904697-07	Carbon, Dissolved Organic MB			Effluent	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/11/19 01:37	N	II
KQ1904697-07	Carbon, Dissolved Organic MB (DOC)			Effluent	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/11/19 01:37	N	II
KQ1904697-08	Carbon, Dissolved Organic LCS			Effluent	26.51 mg/L	10 ml	26.5 mg/L	1	0.07	0.50			4/11/19 01:51	N	II
KQ1904697-08	Carbon, Dissolved Organic LCS (DOC)			Effluent	26.51 mg/L	10 ml	26.5 mg/L	1	0.07	0.50			4/11/19 01:51	N	II
KQ1904697-09	Carbon, Dissolved Organic MS (DOC)		K1903051-001	Effluent	28.79 mg/L	10 ml	28.8 mg/L	1	0.07	0.50	109		4/10/19 18:44	N	II
KQ1904697-10	Carbon, Dissolved Organic DUP (DOC)		K1903051-001	Effluent	1.57 mg/L	10 ml	1.57 mg/L	1	0.07	0.50		1	4/10/19 18:16	N	II
KQ1904697-11	Carbon, Dissolved Organic DUP (DOC)		K1903051-002	Water	1.84 mg/L	10 ml	1.84 mg/L	1	0.07	0.50		6	4/10/19 19:14	N	II
KQ1904697-12	Carbon, Dissolved Organic DUP (DOC)		K1903149-001	Water	6.18 mg/L	10 ml	6.18 mg/L	1	0.07	0.50		<1	4/10/19 19:42	N	II
KQ1904697-13	Carbon, Dissolved Organic DUP (DOC)		K1903149-002	Water	5.81 mg/L	10 ml	5.81 mg/L	1	0.07	0.50		<1	4/10/19 20:39	N	II
KQ1904697-14	Carbon, Dissolved Organic DUP		K1903076-003	Water	0.05 mg/L	10 ml	1000 mg/L U 2000		200	1000		NC	4/10/19 21:22	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

00937451

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 631517 Method/Testcode: 415.1/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
KQ1904697-15	Carbon, Dissolved Organic	N/A		Water	1.55 mg/L	10 mL	1.55 mg/L	1	0.07	0.50			4/10/19 18:16:00	N	II
KQ1904697-16	Carbon, Dissolved Organic	MS	KQ1904697-15	Water	28.79 mg/L	10 mL	28.8 mg/L	1	0.07	0.50	109		4/10/19 18:44:00	N	II
KQ1904697-18	Carbon, Dissolved Organic	DUP	KQ1904697-15	Water	1.57 mg/L	10 mL	1.57 mg/L	1	0.07	0.50		1	4/10/19 18:16:00	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

00937452

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 631518 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
K1902831-003	Carbon, Total Organic	N/A		Water	6.55 mg/L	10 ml	655 mg/L	100	7	50			4/11/19 03:58	N	II
K1903068-001	Carbon, Total Organic	N/A		Water	2.23 mg/L	10 ml	2.23 mg/L	1	0.07	0.50			4/10/19 22:46	N	IV
K1903076-001	Carbon, Total Organic	N/A		Water	-0.07 mg/L	10 ml	1000 mg/L	U 2000	200	1000			4/11/19 07:44	N	II
K1903076-002	Carbon, Total Organic	N/A		Water	-0.12 mg/L	10 ml	1000 mg/L	U 2000	200	1000			4/11/19 08:12	N	II
K1903076-003	Carbon, Total Organic	N/A		Water	-0.11 mg/L	10 ml	1000 mg/L	U 2000	200	1000			4/11/19 08:41	N	II
K1903076-004	Carbon, Total Organic	N/A		Water	-0.18 mg/L	10 ml	1000 mg/L	U 2000	200	1000			4/11/19 09:09	N	II
K1903076-005	Carbon, Total Organic	N/A		Water	-0.18 mg/L	10 ml	1000 mg/L	U 2000	200	1000			4/11/19 09:37	N	II
K1903076-006	Carbon, Total Organic	N/A		Water	-0.15 mg/L	10 ml	1000 mg/L	U 2000	200	1000			4/11/19 10:05	N	II
K1903076-007	Carbon, Total Organic	N/A		Water	57.49 mg/L	10 ml	230000 mg/L	4000	300	2000			4/11/19 12:52	N	II
K1903133-001	Carbon, Total Organic	N/A		Water	6.86 mg/L	10 ml	686 mg/L	100	7	50			4/11/19 03:30	N	II
K1903135-001	Carbon, Total Organic	N/A		Water	30.95 mg/L	10 ml	30.9 mg/L	1	0.07	0.50			4/10/19 23:43	N	II
K1903135-002	Carbon, Total Organic	N/A		Water	30.69 mg/L	10 ml	30.7 mg/L	1	0.07	0.50			4/11/19 00:11	N	II
K1903135-003	Carbon, Total Organic	N/A		Water	12.27 mg/L	10 ml	12.3 mg/L	1	0.07	0.50			4/11/19 02:06	N	II
K1903135-004	Carbon, Total Organic	N/A		Water	13.92 mg/L	10 ml	13.9 mg/L	1	0.07	0.50			4/11/19 02:34	N	II
K1903167-001	Carbon, Total Organic	N/A		Ground Water	1.25 mg/L	10 ml	1.25 mg/L	1	0.07	0.50			4/11/19 04:54	N	II
K1903167-002	Carbon, Total Organic	N/A		Ground Water	0.89 mg/L	10 ml	0.89 mg/L	1	0.07	0.50			4/11/19 05:22	N	II
K1903167-003	Carbon, Total Organic	N/A		Ground Water	1.61 mg/L	10 ml	1.61 mg/L	1	0.07	0.50			4/11/19 06:20	N	II
K1903167-004	Carbon, Total Organic	N/A		Ground Water	1.22 mg/L	10 ml	1.21 mg/L	1	0.07	0.50			4/11/19 06:48	N	II
K1903167-005	Carbon, Total Organic	N/A		Ground Water	6.65 mg/L	10 ml	6.65 mg/L	1	0.07	0.50			4/11/19 07:16	N	II
KQ1904698-01	Carbon, Total Organic	CCB		Water	0.14 mg/L	10 ml	0.14 mg/L	J 1	0.07	0.50			4/10/19 20:24	N	IV
KQ1904698-01	Carbon, Total Organic	CCB		Water	0.14 mg/L	10 ml	0.14 mg/L	J 1	0.07	0.50			4/10/19 20:24	N	IV
KQ1904698-02	Carbon, Total Organic	CCB		Water	0.02 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			4/11/19 01:22	N	IV
KQ1904698-02	Carbon, Total Organic	CCB		Water	0.02 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			4/11/19 01:22	N	IV
KQ1904698-03	Carbon, Total Organic	CCB		Water	-0.05 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			4/11/19 06:05	N	IV
KQ1904698-03	Carbon, Total Organic	CCB		Water	-0.05 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			4/11/19 06:05	N	IV
KQ1904698-04	Carbon, Total Organic	CCB		Water	-0.10 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			4/11/19 12:08	N	IV
KQ1904698-04	Carbon, Total Organic	CCB		Water	-0.10 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			4/11/19 12:08	N	IV
KQ1904698-05	Carbon, Total Organic	CCB		Water	-0.17 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			4/11/19 14:55	N	IV
KQ1904698-05	Carbon, Total Organic	CCB		Water	-0.17 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			4/11/19 14:55	N	IV
KQ1904698-06	Carbon, Total Organic	CCV		Water	25.83 mg/L	10 ml	25.8 mg/L	1			103		4/10/19 20:10	N	IV
KQ1904698-06	Carbon, Total Organic	CCV		Water	25.83 mg/L	10 ml	25.8 mg/L	1			103		4/10/19 20:10	N	IV
KQ1904698-07	Carbon, Total Organic	CCV		Water	25.66 mg/L	10 ml	25.7 mg/L	1			103		4/11/19 01:07	N	IV
KQ1904698-07	Carbon, Total Organic	CCV		Water	25.66 mg/L	10 ml	25.7 mg/L	1			103		4/11/19 01:07	N	IV

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

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Resub Summary

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Analytical Results Summary

00937453

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 631518 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
KQ1904698-08	Carbon, Total Organic	CCV		Water	25.56 mg/L	10 ml	25.6 mg/L	1			102		4/11/19 05:50	N	IV
KQ1904698-08	Carbon, Total Organic	CCV		Water	25.56 mg/L	10 ml	25.6 mg/L	1			102		4/11/19 05:50	N	IV
KQ1904698-09	Carbon, Total Organic	CCV		Water	25.27 mg/L	10 ml	25.3 mg/L	1			101		4/11/19 11:53	N	IV
KQ1904698-09	Carbon, Total Organic	CCV		Water	25.27 mg/L	10 ml	25.3 mg/L	1			101		4/11/19 11:53	N	IV
KQ1904698-10	Carbon, Total Organic	CCV		Water	25.16 mg/L	10 ml	25.2 mg/L	1			101		4/11/19 14:40	N	IV
KQ1904698-10	Carbon, Total Organic	CCV		Water	25.16 mg/L	10 ml	25.2 mg/L	1			101		4/11/19 14:40	N	IV
KQ1904698-11	Carbon, Total Organic	MB		Water	-0.15 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/11/19 12:23	N	IV
KQ1904698-11	Carbon, Total Organic	MB		Water	-0.15 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/11/19 12:23	N	IV
KQ1904698-12	Carbon, Total Organic	LCS		Water	26.39 mg/L	10 ml	26.4 mg/L	1	0.07	0.50	106		4/11/19 12:37	N	IV
KQ1904698-12	Carbon, Total Organic	LCS		Water	26.39 mg/L	10 ml	26.4 mg/L	1	0.07	0.50	106		4/11/19 12:37	N	IV
KQ1904698-13	Carbon, Total Organic	MS	K1903068-001	Water	28.68 mg/L	10 ml	28.7 mg/L	1	0.07	0.50	106		4/10/19 23:14	N	IV
KQ1904698-14	Carbon, Total Organic	DUP	K1903068-001	Water	2.22 mg/L	10 ml	2.22 mg/L	1	0.07	0.50		<1	4/10/19 22:46	N	IV
KQ1904698-15	Carbon, Total Organic	DUP	K1903135-001	Water	31.06 mg/L	10 ml	31.1 mg/L	1	0.07	0.50		<1	4/10/19 23:43	N	II
KQ1904698-16	Carbon, Total Organic	DUP	K1903135-002	Water	31.03 mg/L	10 ml	31.0 mg/L	1	0.07	0.50		1	4/11/19 00:11	N	II
KQ1904698-17	Carbon, Total Organic	DUP	K1903135-003	Water	12.04 mg/L	10 ml	12.0 mg/L	1	0.07	0.50		2	4/11/19 02:06	N	II
KQ1904698-18	Carbon, Total Organic	DUP	K1903135-004	Water	13.83 mg/L	10 ml	13.8 mg/L	1	0.07	0.50		<1	4/11/19 02:34	N	II
KQ1904698-19	Carbon, Total Organic	DUP	K1902831-003	Water	6.54 mg/L	10 ml	654 mg/L	100	7	50		<1	4/11/19 03:58	N	II
KQ1904698-20	Carbon, Total Organic	DUP	K1903133-001	Water	6.75 mg/L	10 ml	675 mg/L	100	7	50		2	4/11/19 03:30	N	II
KQ1904698-21	Carbon, Total Organic	DUP	K1903167-001	Water	1.30 mg/L	10 ml	1.30 mg/L	1	0.07	0.50		3	4/11/19 04:54	N	II
KQ1904698-22	Carbon, Total Organic	DUP	K1903167-002	Water	0.85 mg/L	10 ml	0.85 mg/L	1	0.07	0.50		4	4/11/19 05:22	N	II
KQ1904698-23	Carbon, Total Organic	DUP	K1903167-003	Water	1.61 mg/L	10 ml	1.61 mg/L	1	0.07	0.50		<1	4/11/19 06:20	N	II
KQ1904698-24	Carbon, Total Organic	DUP	K1903167-004	Water	1.20 mg/L	10 ml	1.20 mg/L	1	0.07	0.50		1	4/11/19 06:48	N	II
KQ1904698-25	Carbon, Total Organic	DUP	K1903167-005	Water	6.70 mg/L	10 ml	6.70 mg/L	1	0.07	0.50		<1	4/11/19 07:16	N	II
KQ1904698-26	Carbon, Total Organic	DUP	K1903076-001	Water	-0.08 mg/L	10 ml	1000 mg/L U	2000	200	1000		NC	4/11/19 07:44	N	II
KQ1904698-27	Carbon, Total Organic	DUP	K1903076-002	Water	-0.10 mg/L	10 ml	1000 mg/L U	2000	200	1000		NC	4/11/19 08:12	N	II
KQ1904698-28	Carbon, Total Organic	DUP	K1903076-003	Water	-0.11 mg/L	10 ml	1000 mg/L U	2000	200	1000		NC	4/11/19 08:41	N	II
KQ1904698-29	Carbon, Total Organic	DUP	K1903076-004	Water	-0.13 mg/L	10 ml	1000 mg/L U	2000	200	1000		NC	4/11/19 09:09	N	II
KQ1904698-30	Carbon, Total Organic	DUP	K1903076-005	Water	-0.19 mg/L	10 ml	1000 mg/L U	2000	200	1000		NC	4/11/19 09:37	N	II
KQ1904698-31	Carbon, Total Organic	DUP	K1903076-006	Water	-0.12 mg/L	10 ml	1000 mg/L U	2000	200	1000		NC	4/11/19 10:05	N	II
KQ1904698-32	Carbon, Total Organic	DUP	K1903076-007	Water	57.05 mg/L	10 ml	228000 mg/L	4000	300	2000		<1	4/11/19 12:52	N	II
KQ1904698-33	Carbon, Total Organic	N/A		Water	2.23 mg/L	10 mL	2.23 mg/L	1	0.07	0.50			4/11/19 22:46:00	N	II
KQ1904698-34	Carbon, Total Organic	DUP	KQ1904698-33	Water	2.22 mg/L	10 mL	2.22 mg/L	1	0.07	0.50		<1	4/11/19 22:46:00	N	II
KQ1904698-35	Carbon, Total Organic	MS	KQ1904698-33	Water	28.68 mg/L	10 mL	28.7 mg/L	1	0.07	0.50	106		4/11/19 23:14:00	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

TOC: 631516,
631518
DOC: 631517

Schedule: 04102019**Version: 3****Instrument:** Fusion1**Last Saved by:** Fusion1 (Fusion1)**Last Saved on:** 2019/04/10 12:16 - Wednesday

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)	4	True	Ready
C	Check Standard	[TOC] LCS [24.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
2	Sample	ICS	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
3	Sample	LOD	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
4	Sample	LOQ	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
5	Sample	K1903051-001.03 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
6	Sample	K1903051-001.03 ms doc	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
7	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
8	Sample	K1903051-002.03 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
9	Sample	K1903149-001.02 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
10	Sample	K1903149-002.02 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	FB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
12	Sample	K1903076-003.01 doc 2000x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
14	Sample	K1903068-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1903068-001.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
16	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
17	Sample	K1903135-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1903135-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	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
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	K1903135-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K1903135-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K1903133-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K1902831-003.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
27	Sample	K1903167-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
28	Sample	K1903167-002.01	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	K1903167-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1903167-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
31	Sample	K1903167-005.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
32	Sample	K1903076-001.01 2000x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
33	Sample	K1903076-002.01 2000x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
34	Sample	K1903076-003.01 2000x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
35	Sample	K1903076-004.01 2000x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
36	Sample	K1903076-005.01 2000x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
37	Sample	K1903076-006.01 2000x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
38	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	6	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready

Printed on: April 11, 2019 16:27:51

04/12/19
Fusion1

Schedule: 04102019

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 [24.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
40	Sample	K1903076-007.01 4000x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
41	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	6	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 - 04102019
Wednesday, April 10, 2019 11:49 AM(View - Reps, Unused Reps, Meta-
Data, Signature, History)
Printed on 2019/04/11 16:27 -
Thursday**Report Summary Information**

Company Location: Gen Chem Lab
 Schedule Name: 04102019
 Instrument Name: Fusion1
 Report Version: 1 of 1
 Report Creation by Operators (schedule version): Fusion1 (Fusion1) (v2)
 Fusion1 (Fusion1) (v3)
 Comment:

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

Report Results04/12/19
*Forney***Sample Type:** Clean

From Schedule Version 2

Pos	Analysis Type	Sample ID	Start Time
♦ (clean)		Clean	2019/04/10 11:49

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	12.93	17.79	4.85	49.69	05:24
2	TC Clean	13.57	16.70	3.12	49.85	07:16
3	TC Clean	2.36	5.72	3.36	49.92	07:03
4	TC Clean	1.81	4.85	3.04	50.00	03:55

Sample Type: Clean

From Schedule Version 3

Pos	Analysis Type	Sample ID	Start Time
♦ (clean)		Clean	2019/04/10 12:17

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	1.08	4.06	2.98	49.74	05:27
2	TC Clean	3.88	6.92	3.04	50.00	04:03
3	TC Clean	2.06	4.99	2.93	50.01	03:48
4	TC Clean	1.71	4.80	3.09	50.05	03:52

Sample Type: Clean

From Schedule Version 3

Pos	Analysis Type	Sample ID			Start Time	
♦ (clean)		Clean			2019/04/10 12:39	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.93	3.93	3.00	49.71	05:26
2	TC Clean	4.63	7.70	3.07	50.03	04:01
3	TC Clean	2.57	5.66	3.09	50.02	03:47
4	TC Clean	2.03	5.15	3.12	50.01	03:46

Sample Type: Blank (Creating v1244)

From Schedule Version 3

Pos	Analysis Type	Sample ID			Start Time	
♦ (blank)		Reagent/Acid Blank			2019/04/10 13:01	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.96	3.97	3.00	49.71	05:15
2	TC Clean	5.02	8.12	3.11	49.97	04:01
3	TC Clean	2.84	5.95	3.11	49.97	03:47
4	TC Clean	2.56	5.73	3.17	50.04	03:55
5	Reagent Blank	7.30	10.49	3.20	50.00	05:03
6	Acid Blank	1.48	4.50	3.02	49.69	05:30

Sample Type: Sample

From Schedule Version 3

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
◆	D	TOC	RB	1.1222 ppm	0.0000 ppm	0.0000%	2019/04/10 13:35		
Rep #	Base Analysis Type		ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC		1.1222	11.2218	16.62	19.77	3.15	50.13	10:31
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>		<u>Calibration</u>			
1:10		(TC) 9.0027 (IC) (v1244)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)			

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 3

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.8322 ppm (PASS)	0.0000 ppm	0%	2019/04/10 13:49

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.8322	258.3221	184.81	187.95	3.14	50.14	10:28

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 3

	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)	0.3064 ppm (PASS)	0.0000 ppm	0%	2019/04/10 14:04

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.3064	3.0635	11.54	14.59	3.05	50.15	10:31

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 3

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	1	TOC	MB1	0.2298 ppm	0.0145 ppm	6.3100%	2019/04/10 14:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2403	2.4032	10.63	13.61	2.98	50.14	10:25
2	TOC	0.2442	2.4415	10.66	13.76	3.10	50.14	10:26
3	TOC	0.2175	2.1749	10.48	13.55	3.07	50.14	10:25
4	TOC	0.2170	2.1705	10.48	13.56	3.08	50.14	10:26

Dilution

1:10

Blank Contribution

(TC) 9.0027 (IC) (v1244)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS

From Schedule Version 3

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦	C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	26.5736 ppm	0.1655 ppm	0.62%	2019/04/10 15:15

(PASS)										
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	26.6629	266.6295	190.45	193.39	2.94	50.12	10:28
C	TOC	25.0 ppm	2	26.7622	267.6224	191.12	194.24	3.12	50.11	10:26
C	TOC	25.0 ppm	3	26.4389	264.3887	188.93	191.95	3.03	50.12	10:25
C	TOC	25.0 ppm	4	26.4305	264.3048	188.87	191.88	3.00	50.09	10:22
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos C</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		25 ppmC		

Sample Type: Sample

From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
2	TOC	ICS	0.5597 ppm	0.0000 ppm	0.0000%	2019/04/10 16:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5597	5.5971	12.80	15.99	3.19	50.11	10:32

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
3	TOC	LOD	0.4147 ppm	0.0247 ppm	5.9700%	2019/04/10 16:25

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4458	4.4583	12.03	15.05	3.02	50.12	10:26
2	TOC	0.3997	3.9972	11.72	14.88	3.16	50.12	10:29
3	TOC	0.4226	4.2256	11.87	14.87	3.00	50.11	10:28
4	TOC	0.3906	3.9059	11.65	14.79	3.14	50.12	10:27

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
4	TOC	LOQ	0.7432 ppm	0.0366 ppm	4.9200%	2019/04/10 17:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.7941	7.9410	14.39	17.37	2.97	50.13	10:26
2	TOC	0.7310	7.3105	13.96	17.05	3.09	50.12	10:22
3	TOC	0.7076	7.0762	13.81	16.99	3.18	50.13	10:29
4	TOC	0.7402	7.4018	14.03	17.20	3.18	50.12	10:30

Dilution

1:10

Blank Contribution

(TC) 9.0027 (IC)

Method

CAS_salt_010711

Calibration

CAS_salt_010711

(v1244)

(v4)

(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
5	TOC	K1903051-001.03 doc	1.7736 ppm	0.0147 ppm	0.8300%	2019/04/10 18:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.7632	17.6317	20.97	24.18	3.21	50.11	10:32
2	TOC	1.7839	17.8394	21.11	24.28	3.17	50.11	10:25

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
6	TOC	K1903051-001.03 ms doc	29.0015 ppm	0.0000 ppm	0.0000%	2019/04/10 18:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	29.0015	290.0148	205.86	208.88	3.02	50.12	10:33

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
7	TOC	RB	0.3910 ppm	0.0000 ppm	0.0000%	2019/04/10 18:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3910	3.9103	11.66	14.66	3.00	50.12	10:30

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
8	TOC	K1903051-002.03 doc	1.9987 ppm	0.0747 ppm	3.7400%	2019/04/10 19:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.9458	19.4585	22.21	25.43	3.22	50.12	10:29
2	TOC	2.0515	20.5148	22.93	26.10	3.17	50.16	10:30

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
9	TOC	K1903149-001.02 doc	6.3700 ppm	0.0329 ppm	0.5200%	2019/04/10 19:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.3467	63.4674	52.08	55.27	3.19	50.13	10:27

2	TOC	6.3933	63.9329	52.40	55.58	3.18	50.13	10:25
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 9.0027 (IC) (v1244)		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)			

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 3

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)	26.0401 ppm (PASS)	0.0000 ppm	0%	2019/04/10 20:10

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	26.0401	260.4008	186.22	189.41	3.19	50.15	10:34

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos B

50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 3

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)	0.3548 ppm (PASS)	0.0000 ppm	0%	2019/04/10 20:24

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.3548	3.5482	11.87	14.92	3.05	50.12	10:30

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 10	TOC	K1903149-002.02 doc	6.0037 ppm	0.0268 ppm	0.4500%	2019/04/10 20:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.9848	59.8477	49.63	52.56	2.94	50.12	10:30
2	TOC	6.0226	60.2264	49.88	52.89	3.01	50.15	10:29

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Analysis	Std. Dev.
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Pos	Type	Sample ID	Result (ppmC)	(ppmC)	RSD	Start Time
11	TOC	FB	0.4184 ppm	0.0000 ppm	0.0000%	2019/04/10 21:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4184	4.1843	11.84	14.81	2.96	50.14	10:31

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
12	TOC	K1903076-003.01 doc 2000x	0.2744 ppm	0.0226 ppm	8.2400%	2019/04/10 21:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2904	2.9041	10.97	13.94	2.97	50.15	10:29
2	TOC	0.2584	2.5844	10.76	13.77	3.01	50.13	10:26

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
13	TOC	RB	0.2574 ppm	0.0357 ppm	13.8700%	2019/04/10 21:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2713	2.7126	10.84	13.78	2.94	50.15	10:28
2	TOC	0.2994	2.9940	11.04	13.94	2.91	50.13	10:27
3	TOC	0.2419	2.4194	10.64	13.48	2.83	50.14	10:31
4	TOC	0.2170	2.1705	10.48	13.37	2.89	50.11	10:30

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
14	TOC	K1903068-001.01	2.4374 ppm	0.0132 ppm	0.5400%	2019/04/10 22:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.4467	24.4674	25.61	28.55	2.94	50.10	10:26
2	TOC	2.4280	24.2803	25.48	28.41	2.92	50.10	10:27

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
15	TOC	K1903068-001.01 ms	28.8889 ppm	0.0000 ppm	0.0000%	2019/04/10 23:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
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1	TOC	28.8889	288.8892	205.10	207.98	2.88	50.09	10:31
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Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	16	TOC	RB	0.4472 ppm	0.0000 ppm	0.0000%	2019/04/10 23:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4472	4.4716	12.04	15.01	2.98	50.12	10:29

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	17	TOC	K1903135-001.01	31.2161 ppm	0.0819 ppm	0.2600%	2019/04/10 23:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	31.1582	311.5824	220.50	223.50	3.00	50.11	10:29
2	TOC	31.2740	312.7403	221.29	224.37	3.08	50.14	10:28

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	18	TOC	K1903135-002.01	31.0730 ppm	0.2399 ppm	0.7700%	2019/04/11 00:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	30.9034	309.0338	218.77	221.92	3.14	50.11	10:27
2	TOC	31.2427	312.4266	221.08	224.33	3.25	50.12	10:27

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	19	TOC	RB	0.3721 ppm	0.1057 ppm	28.4200%	2019/04/11 00:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4469	4.4686	12.04	15.26	3.22	50.15	10:27
2	TOC	0.2973	2.9734	11.02	14.10	3.08	50.12	10:27

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.8710 ppm (PASS)	0.0000 ppm	0%	2019/04/11 01:07

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.8710	258.7096	185.07	188.15	3.07	50.12	10:32

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 3

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)	0.2356 ppm (PASS)	0.0000 ppm	0%	2019/04/11 01:22

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.2356	2.3564	11.06	14.25	3.19	50.11	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

Sample Type: Sample

From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 20	TOC	MB2	0.1695 ppm	0.0000 ppm	0.0000%	2019/04/11 01:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1695	1.6946	10.15	13.30	3.14	50.13	10:35

Dilution

1:10

Blank Contribution

(TC) 9.0027 (IC) (v1244)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	26.7201 ppm (PASS)	0.0000 ppm	0%	2019/04/11 01:51

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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	Type									
C	TOC	25.0 ppm	1	26.7201	267.2011	190.84	193.92	3.09	50.11	10:30

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)**STD Conc - Pos C**

25 ppmC

Sample Type: Sample

From Schedule Version 3

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	21	TOC	K1903135-003.01	12.3692 ppm	0.1652 ppm	1.3400%	2019/04/11 02:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	12.4860	124.8601	93.76	96.87	3.12	50.10	10:26
2	TOC	12.2524	122.5236	92.17	95.20	3.03	50.12	10:27

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	22	TOC	K1903135-004.01	14.0856 ppm	0.0610 ppm	0.4300%	2019/04/11 02:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	14.1288	141.2878	104.91	107.87	2.96	50.08	10:25
2	TOC	14.0424	140.4245	104.32	107.36	3.04	50.11	10:27

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	23	TOC	RB	0.2791 ppm	0.1005 ppm	36.0100%	2019/04/11 03:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3502	3.5022	11.38	14.61	3.23	50.10	10:25
2	TOC	0.2081	2.0806	10.42	13.45	3.04	50.03	10:28

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	24	TOC	K1903133-001.01 100x	7.0151 ppm	0.0753 ppm	1.0700%	2019/04/11 03:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.0683	70.6831	56.98	60.07	3.09	50.11	10:27
2	TOC	6.9618	69.6180	56.26	59.31	3.05	50.12	10:29

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
25	TOC	K1902831-003.01 100x	6.7564 ppm	0.0066 ppm	0.1000%	2019/04/11 03:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.7610	67.6100	54.90	58.09	3.19	50.15	10:24
2	TOC	6.7517	67.5172	54.83	57.86	3.02	50.11	10:27

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
26	TOC	RB	0.1620 ppm	0.0466 ppm	28.7400%	2019/04/11 04:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1949	1.9495	10.33	13.25	2.93	50.13	10:29
2	TOC	0.1291	1.2910	9.88	13.01	3.13	50.11	10:25

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
27	TOC	K1903167-001.01	1.4867 ppm	0.0311 ppm	2.1000%	2019/04/11 04:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4647	14.6470	18.94	22.07	3.13	50.12	10:25
2	TOC	1.5087	15.0875	19.24	22.09	2.85	50.12	10:30

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
28	TOC	K1903167-002.01	1.0845 ppm	0.0258 ppm	2.3800%	2019/04/11 05:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.1027	11.0273	16.49	19.49	3.00	50.11	10:28
2	TOC	1.0662	10.6620	16.24	19.38	3.14	50.14	10:29

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.7723 ppm (PASS)	0.0000 ppm	0%	2019/04/11 05:50

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.7723	257.7225	184.40	187.32	2.92	50.11	10:34

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 3

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)	0.1630 ppm (PASS)	0.0000 ppm	0%	2019/04/11 06:05

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.1630	1.6301	10.57	13.63	3.06	50.13	10:33

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 29	TOC	K1903167-003.01	1.8253 ppm	0.0016 ppm	0.0900%	2019/04/11 06:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.8264	18.2637	21.40	24.39	2.99	50.12	10:30
2	TOC	1.8242	18.2416	21.38	24.40	3.01	50.13	10:27

Dilution

1:10

Blank Contribution

(TC) 9.0027 (IC) (v1244)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 30	TOC	K1903167-004.01	1.4209 ppm	0.0093 ppm	0.6500%	2019/04/11 06:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4274	14.2743	18.69	21.71	3.01	50.14	10:28
2	TOC	1.4143	14.1432	18.60	21.69	3.09	50.12	10:26

Dilution**Blank Contribution****Method****Calibration**

1:10

(TC) 9.0027 (IC)
(v1244)CAS_salt_010711
(v4)CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
31	TOC	K1903167-005.01	6.8869 ppm	0.0341 ppm	0.4900%	2019/04/11 07:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.8628	68.6280	55.59	58.63	3.04	50.15	10:29
2	TOC	6.9110	69.1098	55.91	58.81	2.89	50.12	10:27

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
32	TOC	K1903076-001.01 2000x	0.1368 ppm	0.0091 ppm	6.6200%	2019/04/11 07:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1432	1.4324	9.98	13.13	3.15	50.14	10:30
2	TOC	0.1304	1.3042	9.89	12.94	3.05	50.13	10:30

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
33	TOC	K1903076-002.01 2000x	0.0999 ppm	0.0135 ppm	13.5500%	2019/04/11 08:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0904	0.9035	9.62	12.68	3.06	50.12	10:29
2	TOC	0.1095	1.0950	9.75	12.80	3.05	50.13	10:30

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
34	TOC	K1903076-003.01 2000x	0.1028 ppm	0.0057 ppm	5.5700%	2019/04/11 08:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1069	1.0685	9.73	12.70	2.97	50.12	10:27
2	TOC	0.0987	0.9875	9.67	12.61	2.94	50.13	10:28

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
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♦	35	TOC	K1903076-004.01 2000x	0.0587 ppm	0.0400 ppm	68.1700%	2019/04/11 09:09
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Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0304	0.3039	9.21	12.18	2.97	50.10	10:26
2	TOC	0.0870	0.8696	9.59	12.72	3.12	50.12	10:23

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	36	TOC	K1903076-005.01 2000x	0.0294 ppm	0.0031 ppm	10.6400%	2019/04/11 09:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0316	0.3157	9.22	12.30	3.09	50.11	10:29
2	TOC	0.0272	0.2715	9.19	12.31	3.13	50.11	10:26

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	37	TOC	K1903076-006.01 2000x	0.0755 ppm	0.0221 ppm	29.2600%	2019/04/11 10:05

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0599	0.5986	9.41	12.64	3.23	50.11	10:25
2	TOC	0.0911	0.9109	9.62	12.72	3.10	50.12	10:26

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	38	TOC	RB	0.0307 ppm	0.0230 ppm	74.9400%	2019/04/11 10:33

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0361	0.3614	9.25	12.30	3.05	50.05	10:29
2	TOC	0.0684	0.6840	9.47	12.54	3.08	50.11	10:29
3	TOC	0.0313	0.3128	9.22	12.34	3.13	50.11	10:32
4	TOC	0.0345	0.3452	9.24	12.29	3.05	50.11	10:24
5	TOC	0.0123	0.1227	9.09	12.08	2.99	50.10	10:25
6	TOC	0.0017	0.0166	9.01	12.08	3.06	50.08	10:25

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.4841 ppm (PASS)	0.0000 ppm	0%	2019/04/11 11:53

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.4841	254.8409	182.45	185.43	2.99	50.09	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 3

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)	0.1085 ppm (PASS)	0.0000 ppm	0%	2019/04/11 12:08

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.1085	1.0850	10.20	13.12	2.93	50.07	10:30

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 39	TOC	MB3	0.0613 ppm	0.0000 ppm	0.0000%	2019/04/11 12:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0613	0.6133	9.42	12.54	3.13	50.09	10:31

Dilution

1:10

Blank Contribution

(TC) 9.0027 (IC) (v1244)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	26.6071 ppm (PASS)	0.0000 ppm	0%	2019/04/11 12:37

Base

Pos	Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	26.6071	266.0711	190.07	193.12	3.05	50.09	10:30

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos C

25 ppmC

Sample Type: Sample

From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
40	TOC	K1903076-007.01 4000x	57.4834 ppm	0.3105 ppm	0.5400%	2019/04/11 12:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	57.7030	577.0296	400.69	403.86	3.17	50.10	10:31
2	TOC	57.2638	572.6380	397.71	401.01	3.31	50.10	10:24

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
41	TOC	RB	0.1819 ppm	0.1955 ppm	107.4500%	2019/04/11 13:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5584	5.5839	12.79	16.23	3.44	50.10	10:29
2	TOC	0.2085	2.0850	10.42	13.59	3.17	50.11	10:26
3	TOC	0.1054	1.0538	9.72	12.88	3.16	50.12	10:26
4	TOC	0.1396	1.3956	9.95	12.97	3.02	50.12	10:27
5	TOC	0.0579	0.5794	9.40	12.48	3.08	50.13	10:25
6	TOC	0.0218	0.2185	9.15	12.30	3.14	50.12	10:26

Dilution

1:10

Blank Contribution(TC) 9.0027 (IC)
(v1244)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.3767 ppm (PASS)	0.0000 ppm	0%	2019/04/11 14:40

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.3767	253.7670	181.72	184.91	3.19	50.12	10:31

Completion StateSuccess ActionMethodCalibrationSTD 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 3

	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)	0.0468 ppm (PASS)	0.0000 ppm	0%	2019/04/11 14:55

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0468	0.4678	9.78	12.86	3.08	50.12	10:32

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
v1243	1.8623	1.1330	0.0000	0.0000	0.0000	2019/04/05 14:46	Fusion1 (Fusion1)
v1244	2.4323	1.4770	0.0000	0.0000	0.0000	2019/04/10 13:35	Fusion1 (Fusion1)

Calibrations**Name:** CAS_salt_010711 (TOC)

Version: v30

Calibration curve formula: TOC: $y = 6.788x + 9.463$

Ver Creation: 2019/03/05 17:42

 r^2 value: TOC: $r^2 = 0.99963$

Comment:

Operator: Fusion1 (Fusion1)

Basic Analysis Type
TOC**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

Operator: Fusion1 (Fusion1)

Ver Creation: 2019/02/21 17:57

Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	ICSpurgeRinseVolume	12.0 ml
UVReactorPrerinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPrerinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPrerinses	1	SyringeSpeedWaste	10
ICSpurgeTime	1.00 mins	SyringeSpeedAcid	7
DetectorSweepFlow	500 ml/min	SyringeSpeedReagent	7
PreSpurgeTime	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
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Report History

Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/04/11 15:11

0.306				OBSERVATIONS	12	ABOVE
0.240	0.240	0.240	0.240	STD Deviation	0.09244	0.2403
0.244	0.244	0.244	0.244	AVERAGE	0.19708	0.2442
0.218	0.218	0.218	0.218	UCL	0.28952	0.2175
0.217	0.217	0.217	0.217	LCL	0.10463	0.217
0.355						ABOVE
0.236	0.236	0.236	0.236			0.2356
0.170	0.170	0.170	0.170	OBSERVATIONS	8	0.1695
0.163	0.163	0.163	0.163	STD Deviation	0.08049	0.163
0.109	0.109			AVERAGE	0.19945	0.1085
0.061				UCL	0.27994	BELOW
0.047				LCL	0.11896	BELOW
						BELOW
						BELOW
				OBSERVATIONS	7	BELOW
				STD Deviation	0.08059	BELOW
				AVERAGE	0.21244	BELOW
				UCL	0.29303	BELOW
				LCL	0.13185	BELOW
						BELOW
						BELOW
				OBSERVATIONS	7	BELOW
				STD Deviation	0.03597	BELOW
				AVERAGE	0.21244	BELOW
						BELOW
						BELOW
						BELOW
						BELOW
						BELOW
						BELOW

04/12/19
[Signature]

StarLIMS Run: 631516, 631517, 631518
Analysis: TOC/DOC
Method: 9060, 415.1, SM 5310 C, 9060A

CCV: 11-GEN-05-77C 50 ppm LCS: 11-GEN-05-77D 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-74A

ICS TV: 25.0 ppm ICS % R = 2

Spike ID: 11-GEN-05-700 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-77I

21 % H₃PO₄: 11-GEN-05-77H

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: NA

Analyzed By: BCD	Date Analyzed: 4/11/19
Reviewed By: <i>[Signature]</i>	Date Reviewed: 04/12/19

r.02/24/10		Limit of Quantitation - LOQ Verification									
		ALS Environmental - Kelso									
Analytical Method:		9060/9060A									
Extr./Dig. Method:						Instrument:		Fusion K-TOC-03			
Matrix:		Water				Analyst(s):		BCD			
Units:		mg/L									
		K1900530-26		K1902807-14							
Analyte	Date Analyzed:	3/12/2019		4/10/2019							
	Spike Level	Result		Result		Result		Result		Avg Percent Recovery	
	0.500	0.397		0.582						Percent RSD	
	total organic carbon	0.338		0.519						% Rec Limits	
	total organic carbon	0.402		0.495						% RSD Limits	
total organic carbon	0.500	0.381		0.528							
total organic carbon	0.500	R-628235		R-631516							
Supervisor Approval:		TH 3/15/2019		MH 04/12/19							
QA Approval:											

ALS - Kelso

[illegible]



Case Narrative

Method: 6850

Analysis: Perchlorate

Analysis SOP: LC-MS-CLO4

ALS WO ID(s): 1909152; 1909153; 1909154;
1909947; 1909949

Client: ALS Laboratories (Houston, TX)

Matrix: Water

ELMS Batch (HBN): 2233 (236356)

General Set Information: There were ten 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. 50 μL 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 0.45 μm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1909153001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

Method QC data: The method blank (LMB 647198) was less than 1/2 the CRDL. The recovery for the LCS (647199) was within acceptable parameters.



MS/MSD Analysis: MS/MSD was performed on sample 1909152001 (Client ID's: LH18/24-SP650_032719_BIX). 4.0µl of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4.µg/L. The MS/MSD – 647200/01 failed QC acceptance criteria for percent recoveries, biased high. This is due to the fact that the unspiked sample result of 2.574µg/L was not subtracted from the MS/MSD results. The Matrix Spike and Matrix Spike duplicate is reported for the clients' information only. The sample matrix may be inappropriate for the method selected. The MS/MSD relative percent difference (RPD) was 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 – 647196) is reported from the analysis of the Laboratory Control Sample (LCS – 647199) at a level of 4.0µg/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: 19MARI03).

Thomas Bosch	April 11, 2019
Analyst	Date



00937481

ANALYTICAL REPORT

Report Date: April 11, 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: **34-1909947**

Project ID: HS19040313

Purchase Order: HS19040313

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/25-SP650_040419_BIX	1909947001	04/04/19	04/06/19	

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Environmental www.alsglobal.com

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ANALYTICAL REPORT

Workorder: 34-1909947

Client: ALS Environmental
(Houston)

Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: LH18/25-SP650_040419_BIX		Sampling Site: NA		Collected: 04/04/2019		
Lab ID: 1909947001		Media: 125 mL Nalgene		Received: 04/06/2019		
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/2233 (HBN: 236356)		Percent Solid: NA	
			Analyzed: 04/10/2019 12:02		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

Comments

Quality Control: EPA 6850, DoD QSM - (HBN: 236356)

Field sample 1909153001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has 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 04/11/2019 09:27	/S/ Stephen Brose 04/11/2019 15:00

Laboratory Contact Information

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

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



ANALYTICAL REPORT

Workorder: 34-1909947

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.pjllabs.com
	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.com
	Utah (TNI)	UT00953	http://lams.nelac-institute.org/search
	Nevada (TNI)	UT00953201-1	https://ndep.nv.gov/water/lab-certification
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
	Oklahoma (TNI)	IJ# 9980	http://www.deq.state.ok.us/CSDnew/labcert.htm
	Texas (TNI)	T104704456-18-9	https://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_list.pdf
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	http://www.aihaaccreditedlabs.org
	DOECAP-AP	L18-606	http://www.pjllabs.com
	Washington	C596	https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.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

00937484

Analysis Information

Workorder: 1909947

Limits: Client SOW/Contract Specified

Preparation: NA

Analysis: EPA 6850, DoD QSM

Basis: DoD QSM

Batch: NA

Batch: ELMS/2233 (HBN: 236356)

Prepared By: NA

Analyzed By: Thomas Bosch

Blank

LMB: 647198

Analyzed: 04/10/2019 10:42

Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 647199

Analyzed: 04/10/2019 10:15

Dilution: 1

Units: ug/L

Analyte	Result	Target	% Rec	QC Limits
Perchlorate	3.68	4.00	91.9	78.8 123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1909152001

Analyzed: 04/10/2019 10:55

Dilution: 1

Units: ug/L

MS: 647200

Analyzed: 04/10/2019 11:08

Dilution: 1

Units: ug/L

MSD: 647201

Analyzed: 04/10/2019 11:22

Dilution: 1

Units: ug/L

Analyte	Result	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Perchlorate	2.60	6.18	4	# 154	78.8 123.8	6.36	# 159	2.92	0.0 20.0

Comments

Field sample 1909153001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

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

Analyst	Peer Review
/S/ Thomas Bosch 04/11/2019 13:48	/S/ Stephen Brose 04/11/2019 15:00

Symbols and Definitions

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

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



W



1909947

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

COC ID: 11076

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: HS19040313
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19040313-02	LH18/24-SP650_040419_BIX	Water	04 Apr 2019 14:00
SUB_Perch-6850			15 Apr 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: J. Modashia
Received By: Meredith Lawal
Cooler ID(s): 9242

Date/Time: 4/5/19 12:00
Date/Time: 4/16/19 9:05
Temperature(s): 2

RIGHTS RESERVED: ALL RIGHTS RESERVED

[illegible]

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: <u>ALS Houston</u>		Project/Task/Site: <u>190714</u>						
Date/Time of Receipt: <u>4/6/19 905</u>		Number of Coolers Received: <u>1</u>						
Condition of Coolers: <u>Acceptable/Unacceptable</u>		Temperature Control: <u>Present/Not Included</u>						
Cooler Custody Seals: <u>Present/Absent/NA</u>		Location Temp Taken: <u>Control/Between Samples</u>						
Container Custody Seals: <u>Present/Absent/NA</u>		Are all temperatures within project specific guidelines? <u>Yes/No/NA</u>						
Ice Present: <u>Yes/No/NA</u>		VOA Headspace Present? <u>Yes/No/NA</u>						
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	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 <u>9292</u>	<u>2</u> °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C
Taken By: <u>Meredith Hurst</u>		Signature		Printed Name		Date		

CLIENT-RELATED INFORMATION

- | | | | |
|--|---|--|---|
| <input type="checkbox"/> Missing Cooler | <input type="checkbox"/> Missing Samples/Bottles | <input type="checkbox"/> Incorrect Preservation | <input type="checkbox"/> Insufficient Sample Volume |
| <input type="checkbox"/> Cooler Conditions | <input type="checkbox"/> Broken/Leaking Samples | <input type="checkbox"/> pH Criteria Not Met | <input type="checkbox"/> Chain of Custody Problems |
| <input type="checkbox"/> Missing Paperwork | <input type="checkbox"/> Incorrect Bottle Type | <input type="checkbox"/> Residual Chlorine Present | <input type="checkbox"/> Other: |
| <input type="checkbox"/> Missing/Incorrect Bottle Labels | <input type="checkbox"/> Cooler Temperatures Out of Range | <input type="checkbox"/> 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: _____ Returned to Sample Receipt by: _____ Date: _____
Printed Name Signature



**Must Deliver Next Business Day
Time and Temperature Sensitive!**

Part # 150459-43, R112 EXP 01/20 *

ORIGIN ID: SGRN (281) 530-5656
CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON, TX 77066
UNITED STATES US

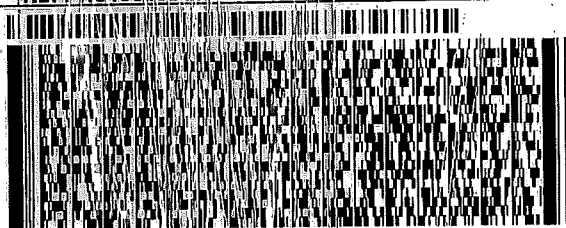
SHIP DATE: 05APR19
ACTWGT: 60.00 LB MAN
CAD: 300190/CAFE3211
DIMS: 26x14x14 IN
BILL THIRD PARTY

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

SALT LAKE CITY UT 84123

(801) 268-7700

REF: HS19040347/347/313/15 - SUBS



**FedEx
Express**



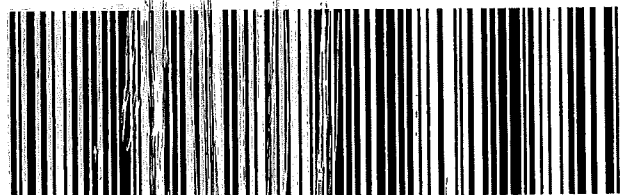
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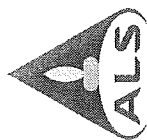
TRK# 4809 7832 6009
0201

**SATURDAY 12:00P
PRIORITY OVERNIGHT**

XO BTFA

**84123
UT-US SLC**





Batch Worklist

Batch: ELMS/ 2233

Rule: EPA 6850, DoD QSM Water

Created: 4/9/2019 08:42

Analyst: T. Bosch

Instrument: LCMS04

Status: WP

HBN: 236356



Workorder: 1909152 [ENV_LVL4]
 Workorder: 1909153 [ENV_LVL4]
 Workorder: 1909154 [ENV_LVL4]
 Workorder: 1909947 [ENV_LVL4]
 Workorder: 1909949 [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	647195	CCV for HBN 236356 [ELMS/2233]				CCV	3		E685041C3Q	S311		4/11/2019	4/10/2019
2	647199	LCS for HBN 236356 [ELMS/2233]				LCS	3		E6850Q413Q	S311		4/11/2019	4/10/2019
3	647197	ICS for HBN 236356 [ELMS/2233]				ICS	3		E6850..D3Q	S311		4/11/2019	4/10/2019
4	647198	LMB for HBN 236356 [ELMS/2233]				LMB	3		E6850Q413Q	S311		4/11/2019	4/10/2019
5	1909152001	LH18/24-SP650_032719_BIX				SAMPLE	3	1909152001-A	E6850Q41.3	S480	4/24/2019	4/11/2019	4/10/2019
6	647200	LH18/24-SP650...(1909152001MS)				MS	3		E6850Q413Q	S311		4/11/2019	4/10/2019
7	647201	LH18/24-SP65...(1909152001MSD)				MSD	3		E6850Q413Q	S311		4/11/2019	4/10/2019
8	1909153001	LH18-24-SP140_032719				SAMPLE	3	1909153001-A	E6850Q41.3	S480	4/24/2019	4/11/2019	4/10/2019
9	1909154001	LH18/24-SP650_032719_BIX				SAMPLE	3	1909154001-A	E6850Q41.3	S480	4/24/2019	4/11/2019	4/10/2019
10	1909947001	LH18/25-SP650_040419_BIX				SAMPLE	3	1909947001-A	E6850Q41.3	S480	5/2/2019	4/18/2019	4/10/2019
11	1909949001	HBW7_040119				SAMPLE	3	1909949001-A	E6850Q41.3	S480	5/1/2019	4/18/2019	4/10/2019
12	1909949002	HBW7_040119-a				SAMPLE	3	1909949002-A	E6850Q41.3	S480	5/1/2019	4/18/2019	4/10/2019
13	1909949003	HBW10_040119				SAMPLE	3	1909949003-A	E6850Q41.3	S480	5/1/2019	4/18/2019	4/10/2019
14	1909949004	HBW1_040119				SAMPLE	3	1909949004-A	E6850Q41.3	S480	5/1/2019	4/18/2019	4/10/2019
15	1909949005	GPW1_040119				SAMPLE	3	1909949005-A	E6850Q41.3	S480	5/1/2019	4/18/2019	4/10/2019
16	1909949006	GPW3_040119				SAMPLE	3	1909949006-A	E6850Q41.3	S480	5/1/2019	4/18/2019	4/10/2019
17	647196	RLVS for HBN 236356 [ELMS/2233]				RLVS	3		E685041C3Q	S311		4/11/2019	4/10/2019
18	647202	CCV for HBN 236356 [ELMS/2233]				CCV	3		E685041C3Q	S311		4/11/2019	4/10/2019



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #()'s: 1909152 (001); 1909153 (001); 1909154 (001); 1909947 (001); 1909949 (001-06) ELMS Batch/HBN ID: 2233 (236356)
 Prep Date: 04/09/2019 Analysis Date: 04/10/2019 Analyst: T. Bosch
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\MAR\28MAR19D.s
 Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by TNB. 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 AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

STANDARDS: Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

CALIBRATION CURVE: Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.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: 6 Injection Volume: 30µL
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

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: 4.0µL of QC Solution Horizon ID 41830 was used for LCS 647199; Target = 4.0µg/L. ASTM type II water was used for LMB 647198.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1909152001 (Client ID's: LH18/24-SP650_032719_BIX). 4.0µl of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. Spike target = 4.0µg/L.

COMMENTS:

- 1) Results reported in µg/L. Field sample 1909153001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.
- 2) All QC, Blank, CCV, and MS/MSD results were within method parameters, except for the following. The MS/MSD – 647200/01 failed QC acceptance criteria for percent recoveries, biased high. This is due to the fact that the unspiked sample result of 2.574µg/L was not subtracted from the MS/MSD results. The Matrix Spike and Matrix Spike duplicate is reported for the clients' information only. The sample matrix may be inappropriate for the method selected.
- 3) Sample data can be viewed at two directories within the ALS system: \\ALSLTWS013\LCMS\LCMS04\2019\APR\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alstws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\236356-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATA\REVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 647196) is reported from the analysis of the Laboratory Control Sample (LCS – 647199) at a level 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, many of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03).

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.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDG: E LMS: 2233 HBN: 236356 1209947 / 1209949		
Sample Set IDs if Applicable: 1909152/1209153/1909154		
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
Method Blanks 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 flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed	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 checked	TB	SB
Preparation and analysis calculations checked	TB	SB
NCRs are completed as necessary NC/CAR#	—	—
Report forms are complete and accurate	TB	SB
Manual integrations checked	TB	SB



STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850 WKG Std 100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	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
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	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

Working Standard - CLO4 INT

CLO4 INT			Description - 6850 Intermdt AccStd 10.ug/mL		
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
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
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: 41831		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/09/2018 10:05AM		Expires: 05/09/2019	
MFG Lot: TNB: 05/09/2018				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
41830	CLO4 QC INT	6850 QC Intmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	05/09/2019



STANDARD REPORT

Constituent

Working Standard - CLO4 QC INT

CLO4 QC INT			Description - 6850 QC Intmdt Std-QC 10ug/mL		
Standard: 41830		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/09/2018 10:05AM		Expires: 05/09/2019	
MFG Lot: TNB: 05/09/2018				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



STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

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

Working Standard - CLO4ISTDWRK

WORKING STANDARD

CLO4ISTDWRK			Description - Perchlorate ISTD Wrk 1,000ug/L		
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		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
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



STANDARD REPORT

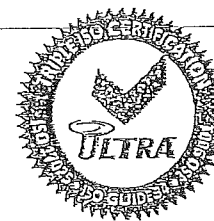
Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729			Amount: 1 mL
MFG: Cambridge Isotope			Expires: 04/28/2026
MFG Lot: SDFF-012A			Usable: Yes
Part ID: OLM-7310-S			Lab Lot: CLO4ISTDSTK
Created By: Thomas Bosch			
Create Date: 09/20/2018 09:09AM			
Verified By: Thomas Bosch			
Verify Date:			
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



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

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.

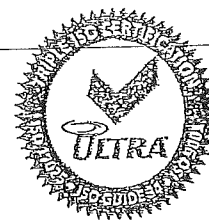
Hazards:
Refer to the Safety Data Sheet for information regarding this RM.

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.





Certificate of Analysis

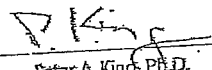


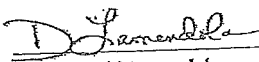
ISO Guide 34 Reference Material

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/QA

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 (ClO₄)

SRM: Ind. Std.

Lot: 218065075

Matrix: Water

Hazards: Refer to SDS for complete safety information

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



Signal Word: None

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.

Meigan O'Leary

Certified By:

Meigan O'Leary, Inorganic QC Manager



Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

Quality Standards:

ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification: $\geq 98\%$

Labeled CAS Number: NA

Unlabeled CAS Number: 7601-89-0

MW*: 130.4

Chemical Formula: NaCl^*O_4

Storage: Store at room temperature away from light and moisture.

Stability: See storage and expiration date.

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.

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/NCSL 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.

* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 $\mu\text{g/mL}$
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	109.4 \pm 2.8 $\mu\text{g/mL}$ (k=2)



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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
#*	647195	CCV@25	Vial 71	1	Control	1	1.06336e6	21.31933
#*	647199	QC@4.0	Vial 72	1	Control	2	1.97600e5	3.67714
#*	647197	ICS@4.0	Vial 73	1	Control	3	1.49399e5	3.21517
#*	647198	LMB	Vial 74	1	Control	4	0.00000	0.00000
#*	1909152001		Vial 75	1	Sample	5	9.15156e4	2.57433
#*	647200	91521MS	Vial 76	1	Sample	6	2.25049e5	6.17769
#*	647201	91521SD	Vial 77	1	Sample	7	2.49579e5	6.36091
#*	1909153001	1K	Vial 78	1	Sample	8	3.70174e5	6532.86203
#*	1909154001		Vial 79	1	Sample	9	7.79123e4	2.34023
#*	1909947001		Vial 80	1	Sample	10	0.00000	0.00000
#*	1909949001		Vial 81	1	Sample	11	0.00000	0.00000
#*	1909949002		Vial 82	1	Sample	12	0.00000	0.00000
#*	1909949003		Vial 83	1	Sample	13	0.00000	0.00000
#*	1909949004		Vial 84	1	Sample	14	0.00000	0.00000
#*	1909949005		Vial 85	1	Sample	15	0.00000	0.00000
#*	1909949006		Vial 86	1	Sample	16	0.00000	0.00000
*	647202	CCV@25	Vial 71	1	Control	17	1.08007e6	22.59518

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#*	647195	CCV@25	Vial 71	1	Control	1	3.43635e5	23.09461
#*	647199	QC@4.0	Vial 72	1	Control	2	7.01681e4	4.22460
#*	647197	ICS@4.0	Vial 73	1	Control	3	5.45965e4	3.77625
#*	647198	LMB	Vial 74	1	Control	4	0.00000	0.00000
#*	1909152001		Vial 75	1	Sample	5	3.18275e4	2.84107
#*	647200	91521MS	Vial 76	1	Sample	6	7.61114e4	6.88356
#*	647201	91521SD	Vial 77	1	Sample	7	8.42686e4	7.08137
#*	1909153001	1K	Vial 78	1	Sample	8	1.21054e5	7051.77497
#*	1909154001		Vial 79	1	Sample	9	2.76117e4	2.61418
#*	1909947001		Vial 80	1	Sample	10	0.00000	0.00000
#*	1909949001		Vial 81	1	Sample	11	0.00000	0.00000
#*	1909949002		Vial 82	1	Sample	12	0.00000	0.00000
#*	1909949003		Vial 83	1	Sample	13	0.00000	0.00000
#*	1909949004		Vial 84	1	Sample	14	0.00000	0.00000
#*	1909949005		Vial 85	1	Sample	15	0.00000	0.00000
#*	1909949006		Vial 86	1	Sample	16	0.00000	0.00000
*	647202	CCV@25	Vial 71	1	Control	17	3.36319e5	23.63294

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
#*	647195	CCV@25	Vial 71	1	Control	1	1.53120e5	5.00000
#*	647199	QC@4.0	Vial 72	1	Control	2	1.77838e5	5.00000
#*	647197	ICS@4.0	Vial 73	1	Control	3	1.54931e5	5.00000
#*	647198	LMB	Vial 74	1	Control	4	1.76915e5	5.00000
#*	1909152001		Vial 75	1	Sample	5	1.20240e5	5.00000
#*	647200	91521MS	Vial 76	1	Sample	6	1.17757e5	5.00000
#*	647201	91521SD	Vial 77	1	Sample	7	1.26683e5	5.00000
#*	1909153001	1K	Vial 78	1	Sample	8	1.82758e5	5000.00000
#*	1909154001		Vial 79	1	Sample	9	1.13404e5	5.00000
#*	1909947001		Vial 80	1	Sample	10	1.15130e5	5.00000
#*	1909949001		Vial 81	1	Sample	11	1.14791e5	5.00000
#*	1909949002		Vial 82	1	Sample	12	1.24046e5	5.00000
#*	1909949003		Vial 83	1	Sample	13	1.23373e5	5.00000
#*	1909949004		Vial 84	1	Sample	14	1.20241e5	5.00000
#*	1909949005		Vial 85	1	Sample	15	1.27767e5	5.00000
#*	1909949006		Vial 86	1	Sample	16	1.23965e5	5.00000
*	647202	CCV@25	Vial 71	1	Control	17	1.46281e5	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

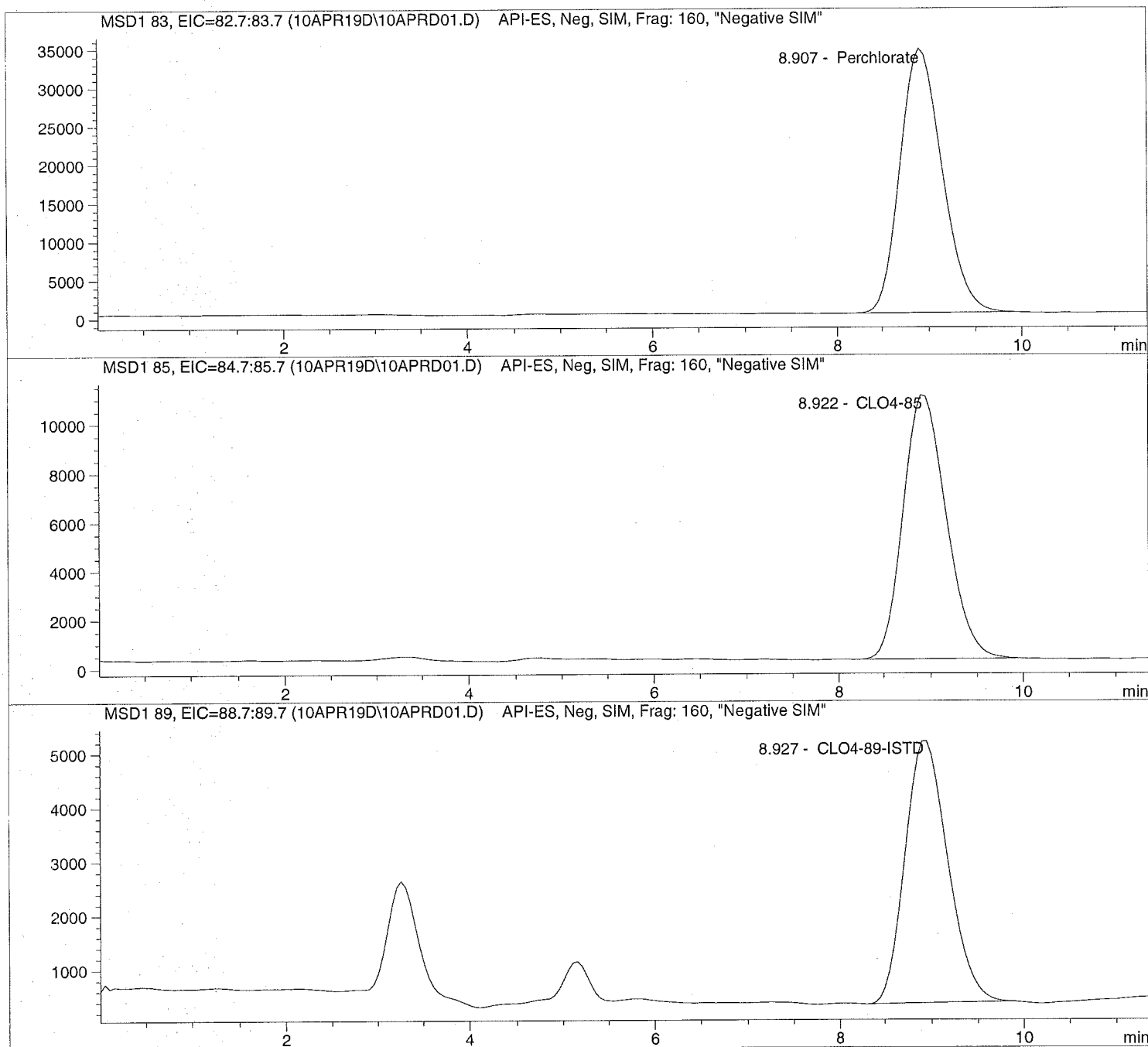
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	647195 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	647199 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	647197 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	647198 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1909152001	CLO4-AQN	1	Sample		
6	Vial 76	647200 91521MS	CLO4-AQN	1	Sample		
7	Vial 77	647201 91521SD	CLO4-AQN	1	Sample		
8	Vial 78	1909153001 1K	CLO4-AQN	1	Sample		
9	Vial 79	1909154001	CLO4-AQN	1	Sample		
10	Vial 80	1909947001	CLO4-AQN	1	Sample		
11	Vial 81	1909949001	CLO4-AQN	1	Sample		
12	Vial 82	1909949002	CLO4-AQN	1	Sample		
13	Vial 83	1909949003	CLO4-AQN	1	Sample		
14	Vial 84	1909949004	CLO4-AQN	1	Sample		
15	Vial 85	1909949005	CLO4-AQN	1	Sample		
16	Vial 86	1909949006	CLO4-AQN	1	Sample		
17	Vial 71	647202 CCV@25	CLO4-AQN	1	Ctrl Samp		

Injection Date: 4/10/2019 10:01:38
Sample Name: 647195 CCV@25
Acq Operator: TNB

Seq Line: 1
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



```
=====
Injection Date:  4/10/2019  10:01:38      Seq Line:      1
Sample Name:    647195    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-DP2.M
Last Changed:   3/19/2019  14:48:09
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.907	PBA	1063358.2	21.3193	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.922	PBA	343635.4	23.0946	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.927	PBA	153120.0	5.0000	CLO4-89-ISTD

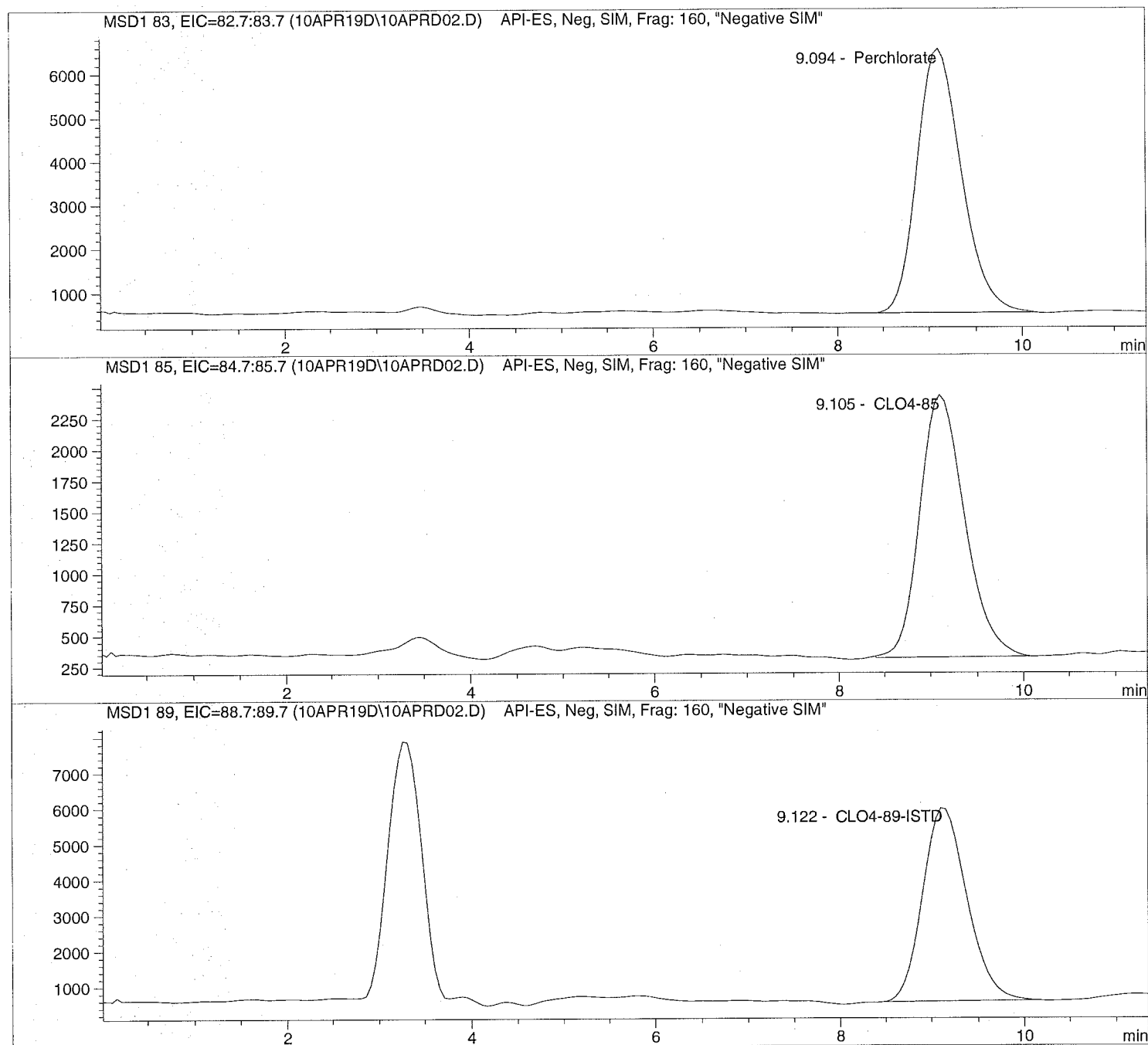
```
=====
*** End of Report ***
=====
```


Injection Date: 4/10/2019 10:15:40
Sample Name: 647199 QC@4.0
Acq Operator: TNB

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 30 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



```
=====
Injection Date:  4/10/2019  10:15:40      Seq Line:      2
Sample Name:    647199    QC@4.0          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-DP2.M
Last Changed:   3/19/2019  14:48:09
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  4.000
```

```
=====
                          LCMS Results
=====
```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.094	BBA	197600.1	3.6771	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.105	BBA	70168.1	4.2246	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.122	BBA	177837.9	5.0000	CLO4-89-ISTD

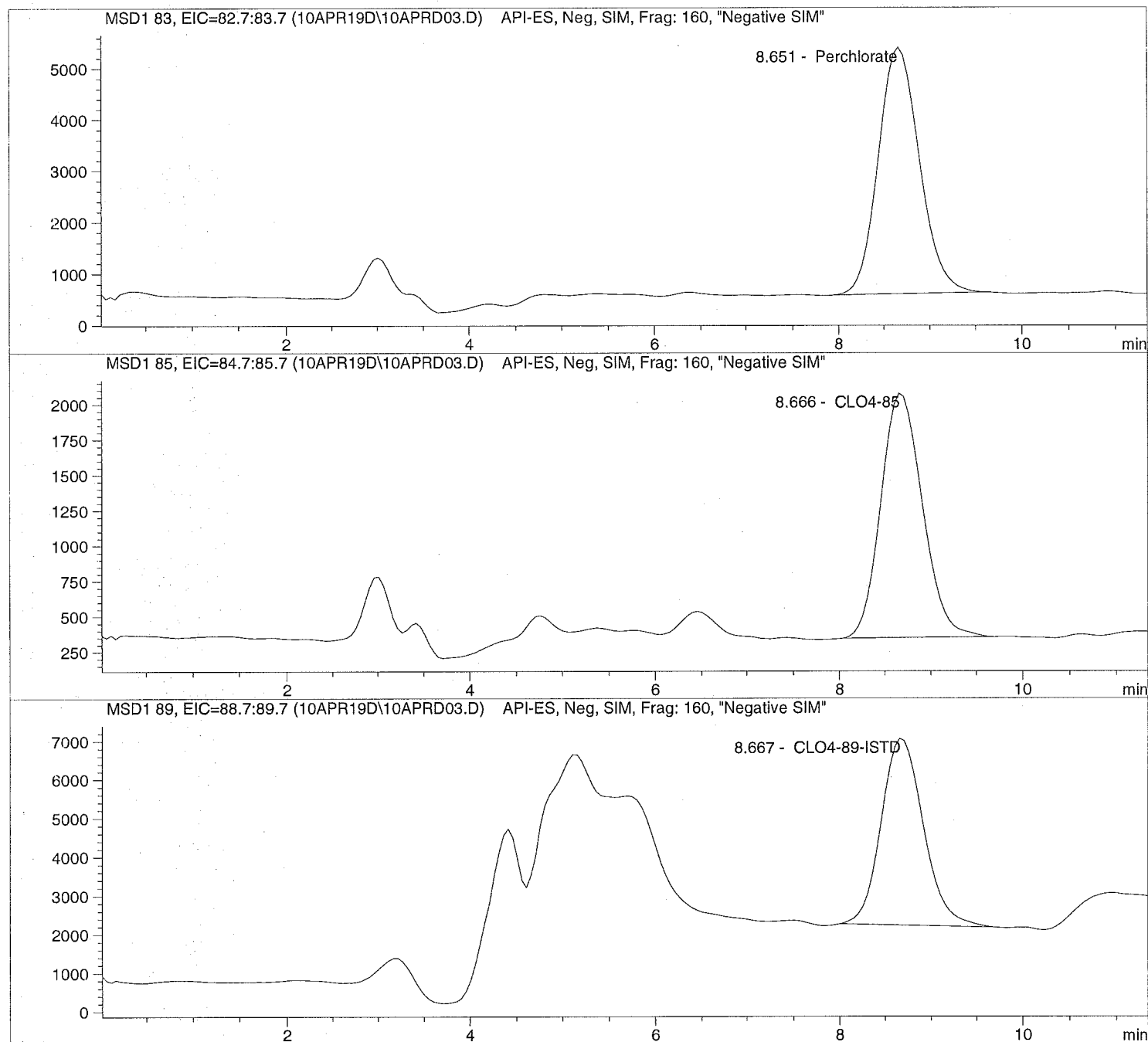
```
=====
*** End of Report ***
=====
```

Injection Date: 4/10/2019 10:28:57
Sample Name: 647197 ICS@4.0
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



Injection Date: 4/10/2019 10:28:57 Seq Line: 3
Sample Name: 647197 ICS@4.0 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-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.651	PBA	149398.5	3.2152	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.666	BBA	54596.5	3.7763	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.667	PBA	154930.6	5.0000	CLO4-89-ISTD

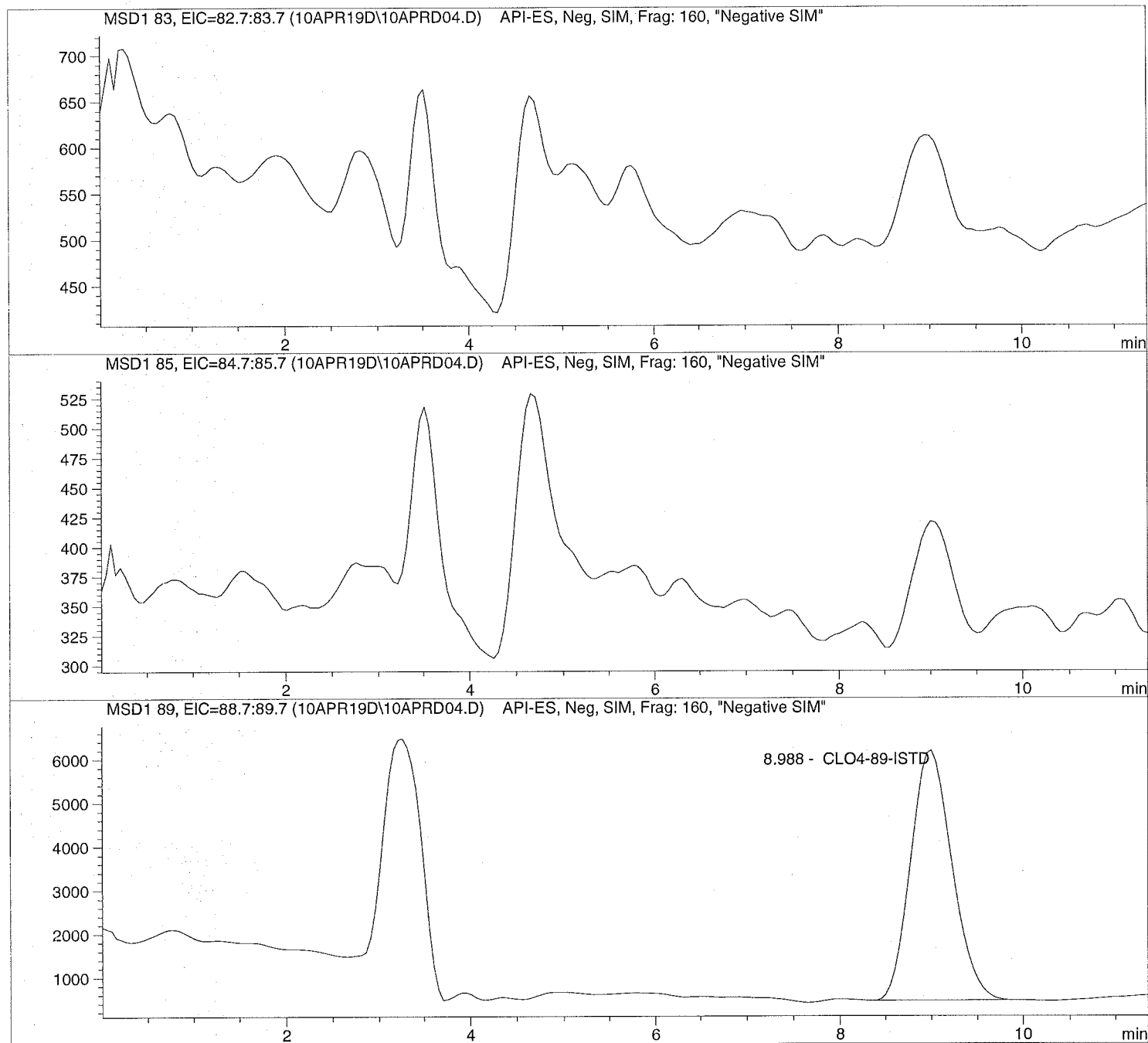
*** End of Report ***

Injection Date: 4/10/2019 10:42:16
Sample Name: 647198 LMB
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 30 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



```
=====
Injection Date:  4/10/2019  10:42:16      Seq Line:      4
Sample Name:    647198    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-DP2.M
Last Changed:   3/19/2019  14:48:09
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.988	PBA	176915.0	5.0000	CLO4-89-ISTD

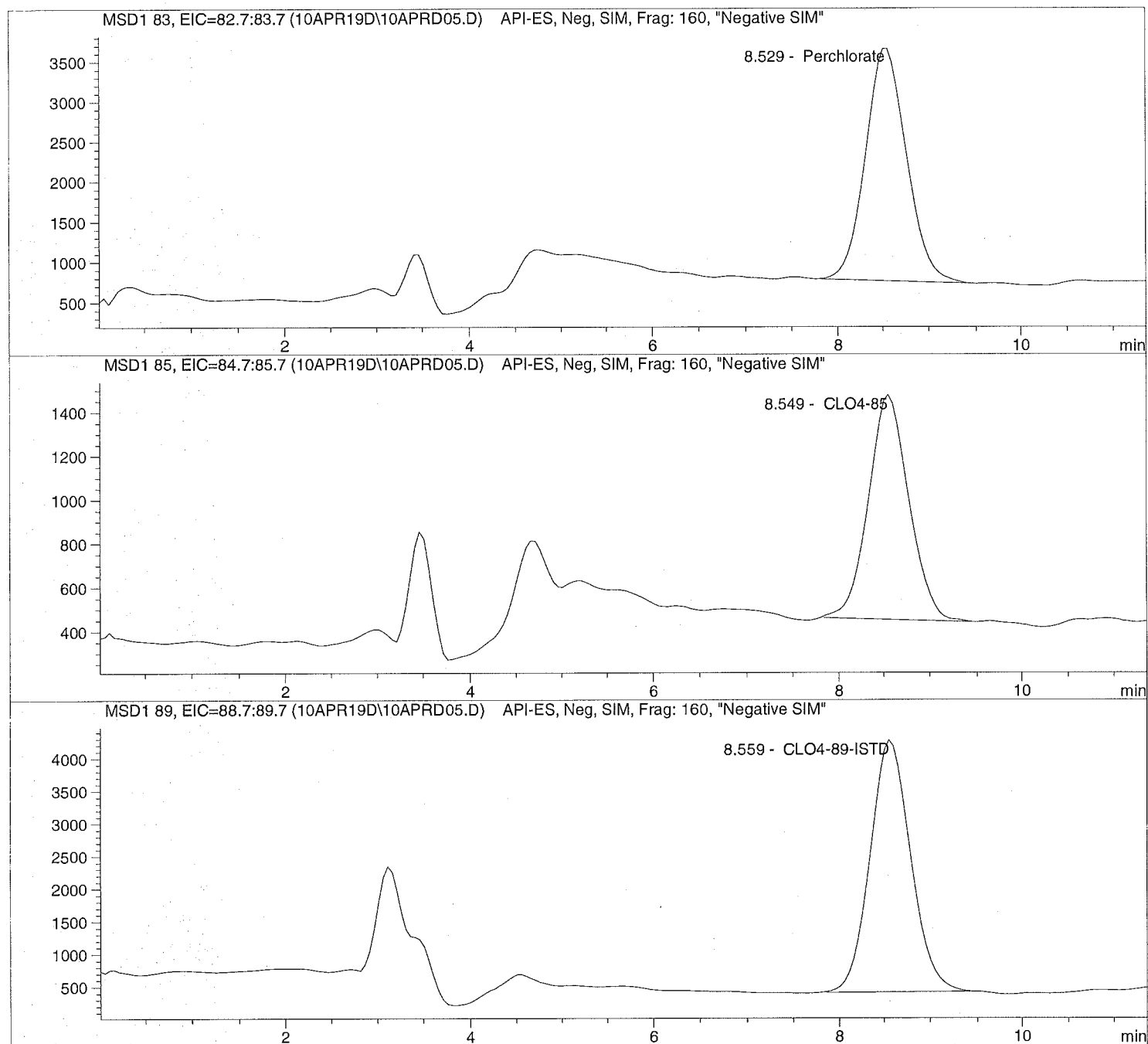
```
=====
*** End of Report ***
=====
```

Injection Date: 4/10/2019 10:55:33
Sample Name: 1909152001
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



```
=====
Injection Date:  4/10/2019  10:55:33      Seq Line:      5
Sample Name:    1909152001      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-DP2.M
Last Changed:   3/19/2019  14:48:09
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.529	BBA	91515.6	2.5743	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.549	BBA	31827.5	2.8411	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.559	BBA	120239.7	5.0000	CLO4-89-ISTD

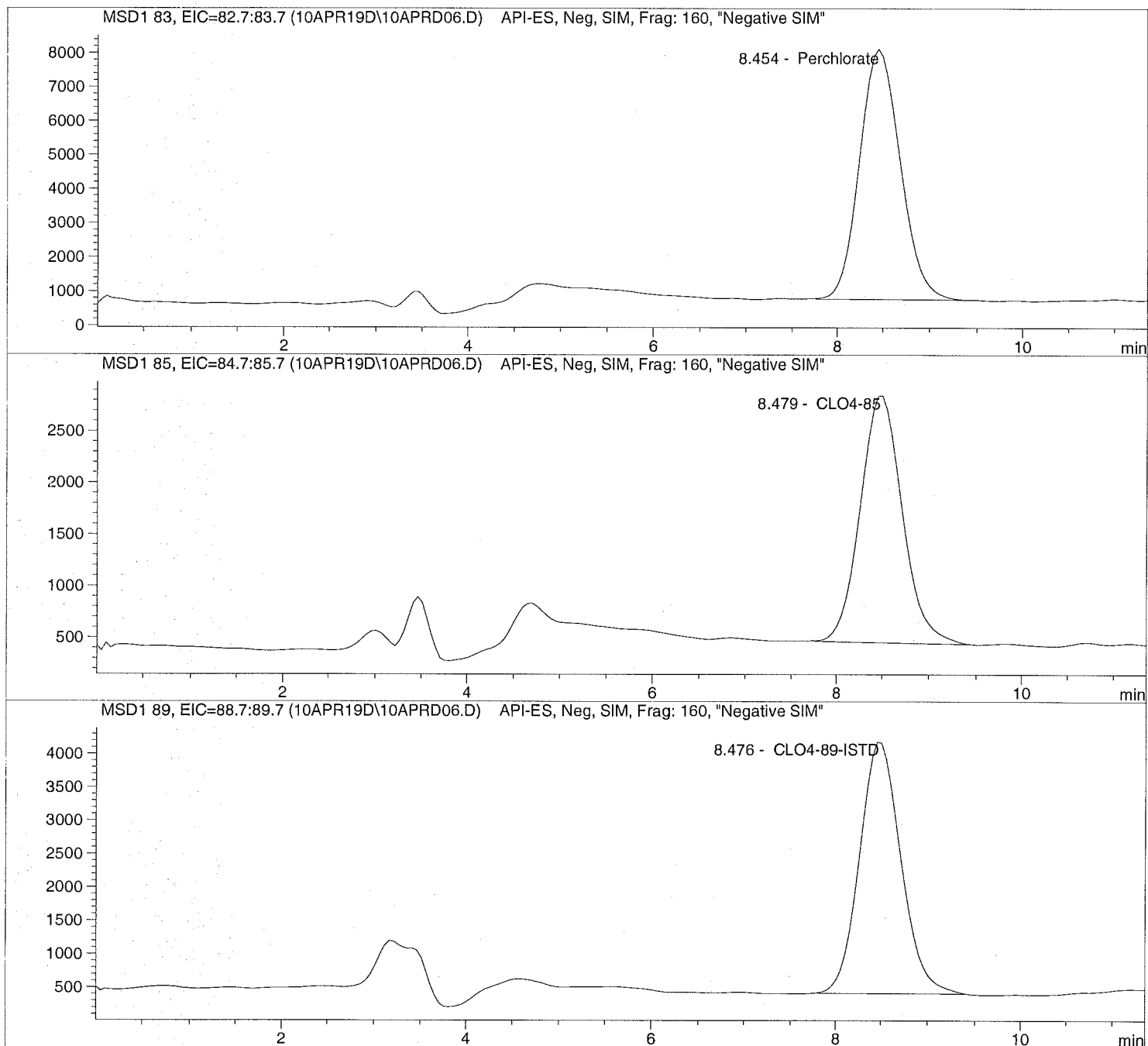
```
=====
*** End of Report ***
=====
```


Injection Date: 4/10/2019 11:08:49
Sample Name: 647200 91521MS
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



```
=====
Injection Date:  4/10/2019  11:08:49      Seq Line:        6
Sample Name:    647200   91521MS        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-DP2.M
Last Changed:   3/19/2019  14:48:09
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.454	BBA	225049.5	6.1777	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.479	BBA	76111.4	6.8836	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.476	BBA	117756.7	5.0000	CLO4-89-ISTD

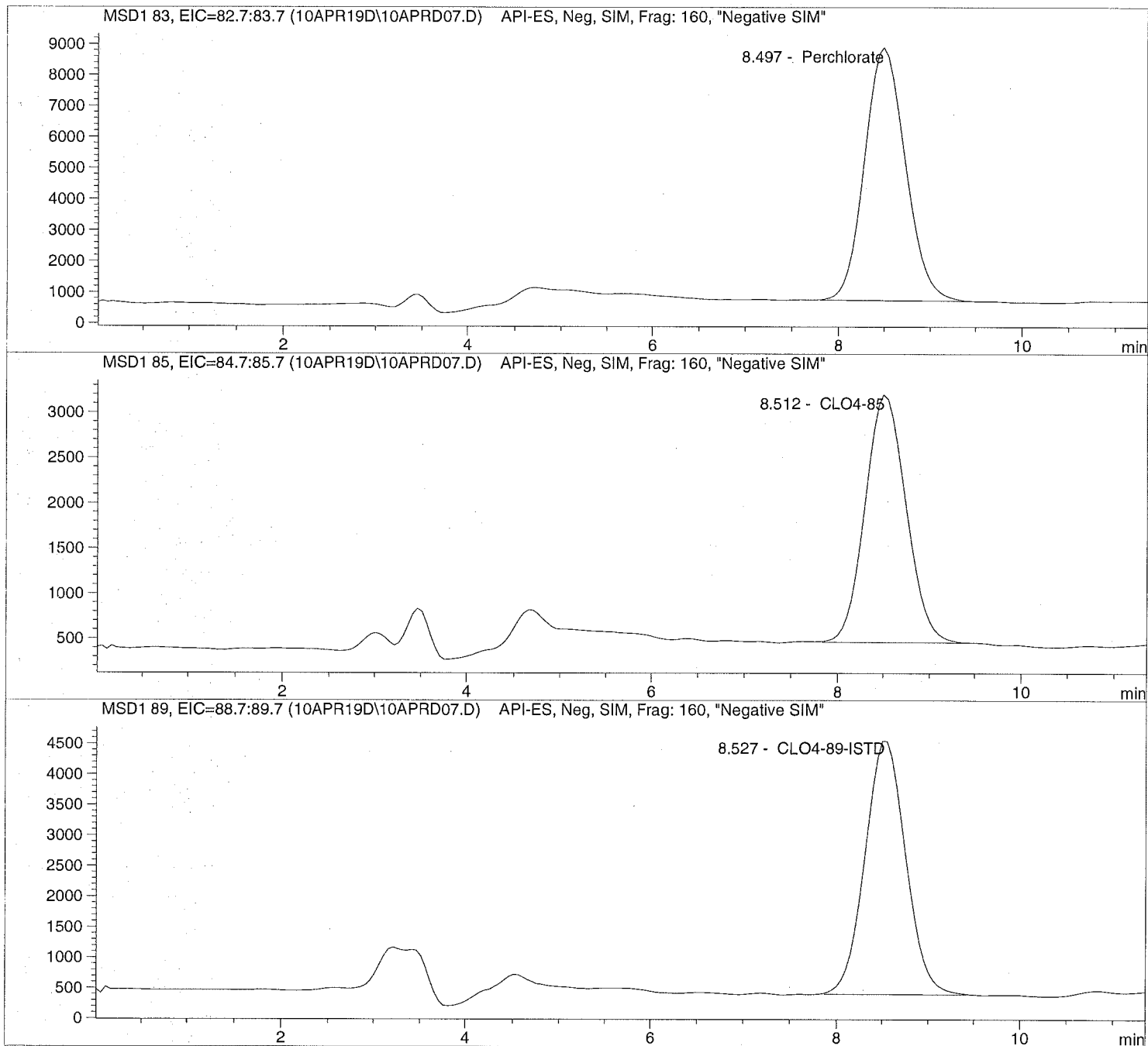
```
=====
*** End of Report ***
=====
```

Injection Date: 4/10/2019 11:22:09
Sample Name: 647201 91521SD
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



Injection Date: 4/10/2019 11:22:09 Seq Line: 7
Sample Name: 647201 91521SD 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-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.497	BBA	249579.0	6.3609	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.512	BBA	84268.6	7.0814	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.527	BBA	126683.1	5.0000	CLO4-89-ISTD

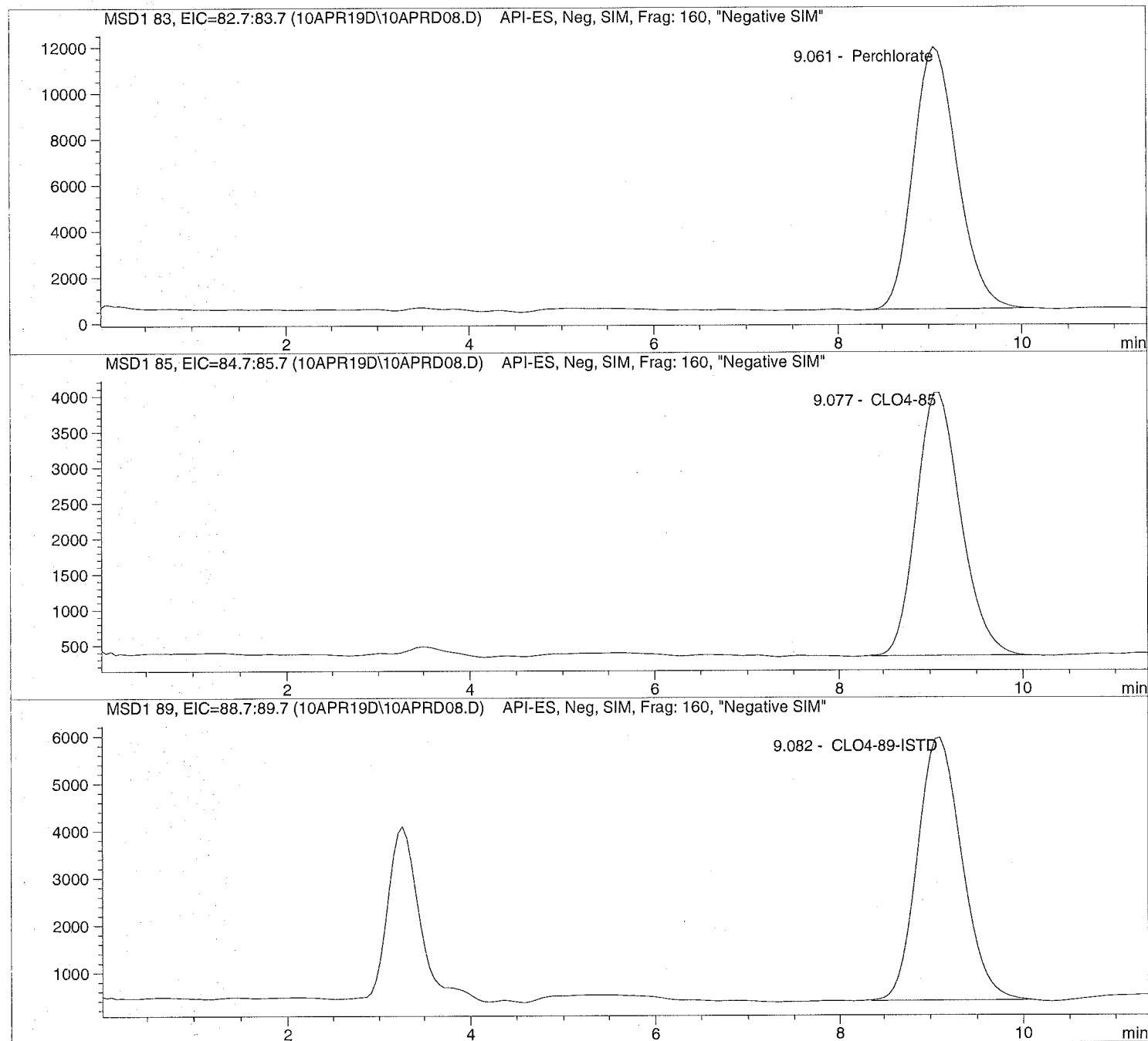
*** End of Report ***

Injection Date: 4/10/2019 11:35:27
Sample Name: 1909153001 1K
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 30 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



```
=====
Injection Date:  4/10/2019  11:35:27      Seq Line:      8
Sample Name:    1909153001  1K           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-DP2.M
Last Changed:   3/19/2019  14:48:09
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
9.061	PBA	370174.3	6532.8620	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.077	BBA	121053.5	7051.7750	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.082	BBA	182757.9	5000.0000	CLO4-89-ISTD

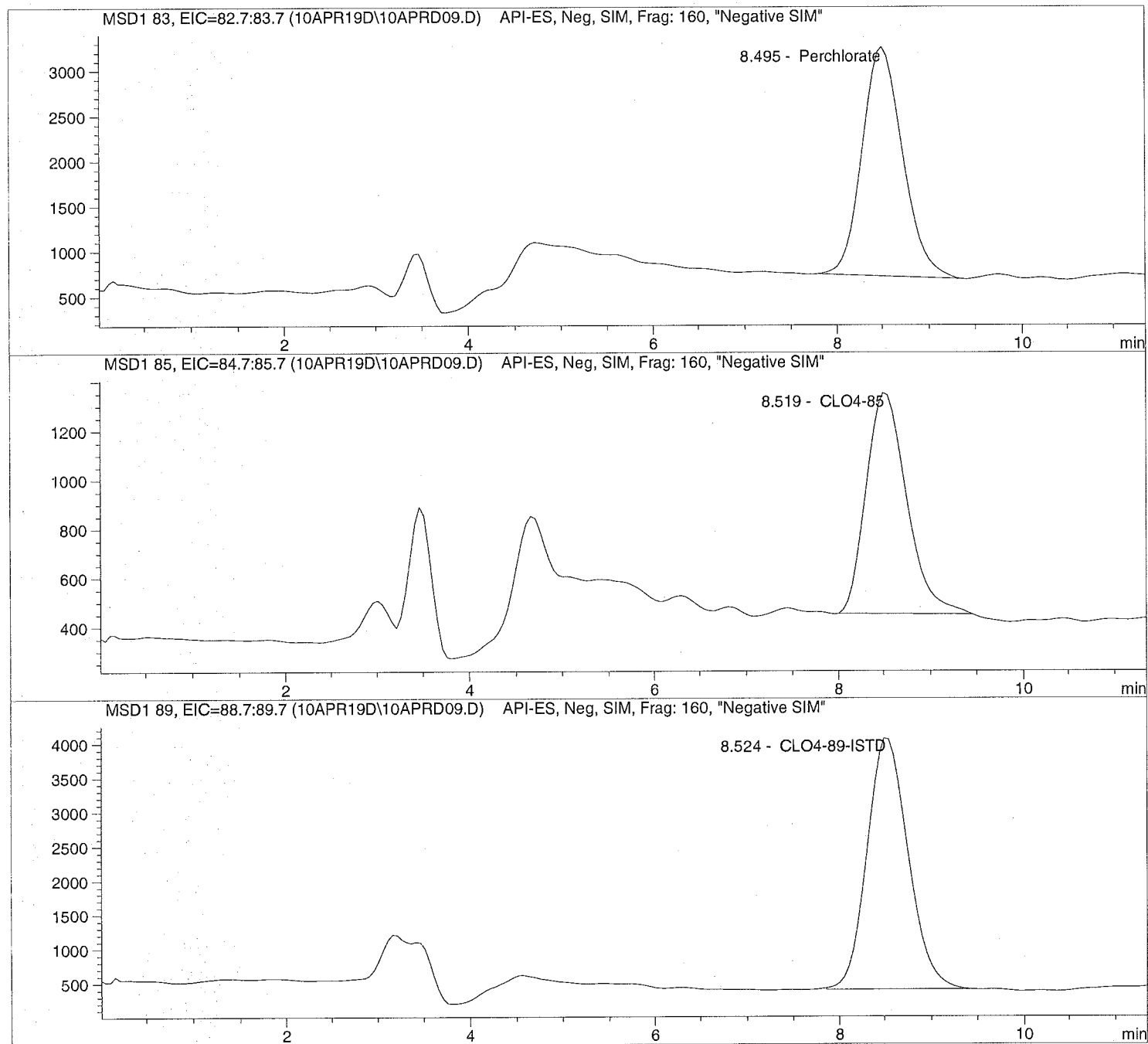
```
=====
*** End of Report ***
=====
```

Injection Date: 4/10/2019 11:48:52
Sample Name: 1909154001
Acq Operator: TNB

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



```
=====
Injection Date:  4/10/2019  11:48:52      Seq Line:      9
Sample Name:    1909154001      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-DP2.M
Last Changed:   3/19/2019  14:48:09
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.495	PBA	77912.3	2.3402	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.519	PBA	27611.7	2.6142	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.524	BBA	113404.4	5.0000	CLO4-89-ISTD

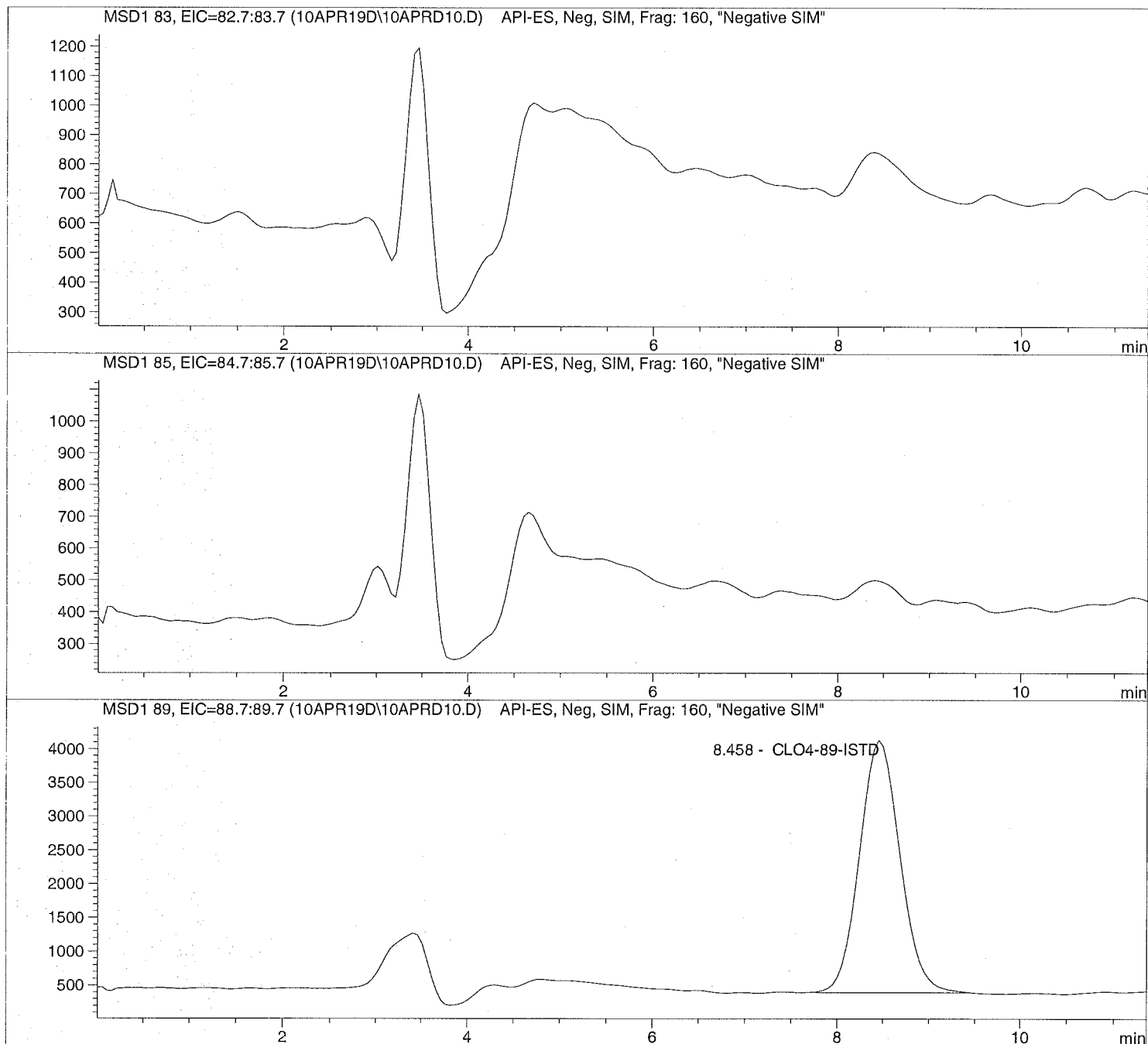
```
=====
*** End of Report ***
=====
```


Injection Date: 4/10/2019 12:02:10
Sample Name: 1909947001
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



```
=====
Injection Date: 4/10/2019 12:02:10      Seq Line: 10
Sample Name: 1909947001                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-DP2.M
Last Changed: 3/19/2019 14:48:09
```

Perchlorate analysis

```
=====
Sample Information
=====
```

```
Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.458	BBA	115129.6	5.0000	CLO4-89-ISTD

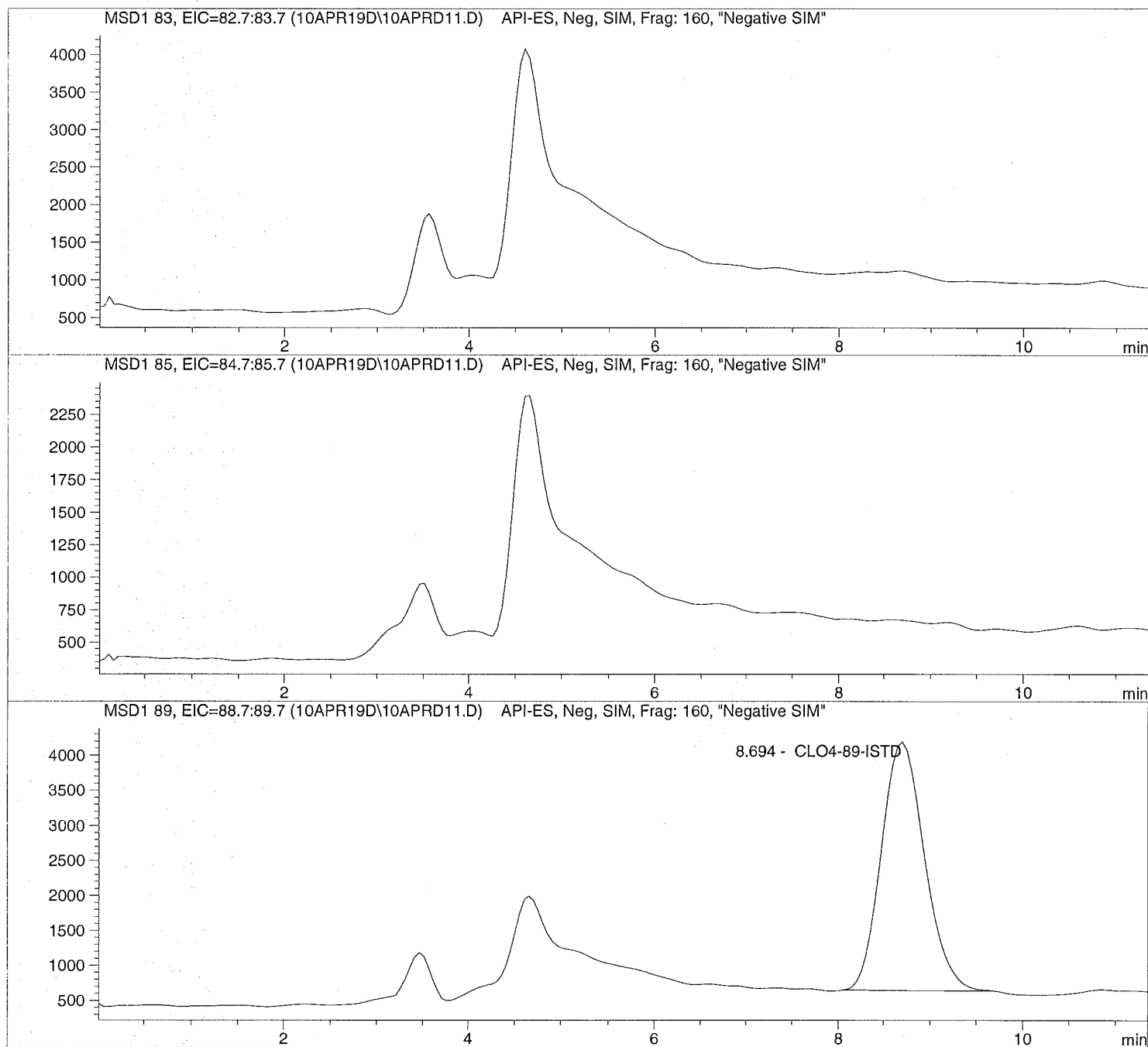
```
=====
*** End of Report ***
=====
```

Injection Date: 4/10/2019 12:15:27
Sample Name: 1909949001
Acq Operator: TNB

Seq Line: 11
Location: Vial 81
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



```
=====
Injection Date:  4/10/2019  12:15:27      Seq Line:      11
Sample Name:    1909949001      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-DP2.M
Last Changed:   3/19/2019  14:48:09
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.694	PBA	114791.4	5.0000	CLO4-89-ISTD

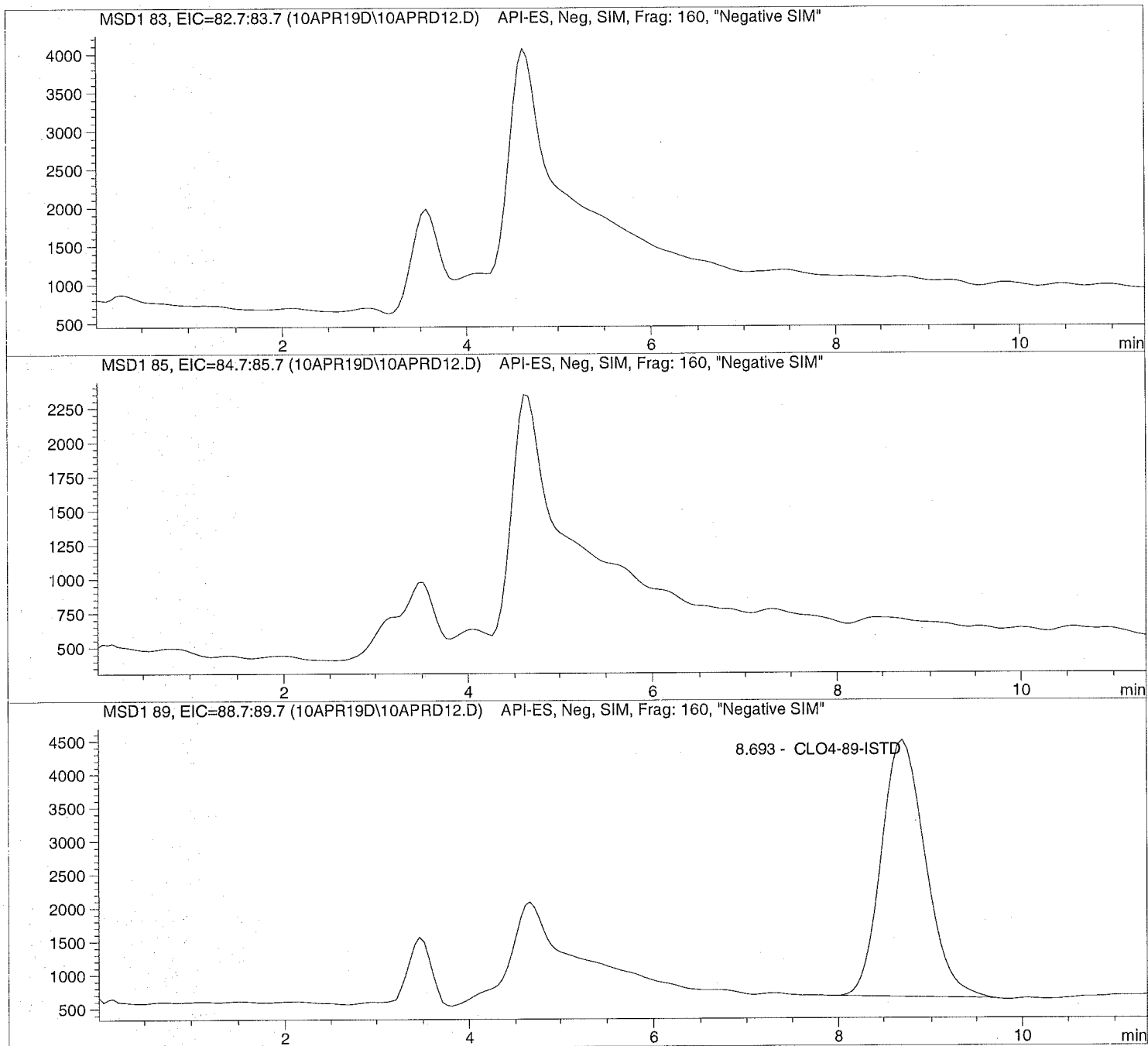
```
=====
*** End of Report ***
=====
```

Injection Date: 4/10/2019 12:28:41
Sample Name: 1909949002
Acq Operator: TNB

Seq Line: 12
Location: Vial 82
Inj. No.: 1
Inj. Vol.: 30 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



Injection Date: 4/10/2019 12:28:41 Seq Line: 12
Sample Name: 1909949002 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-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.693	PBA	124045.6	5.0000	CLO4-89-ISTD

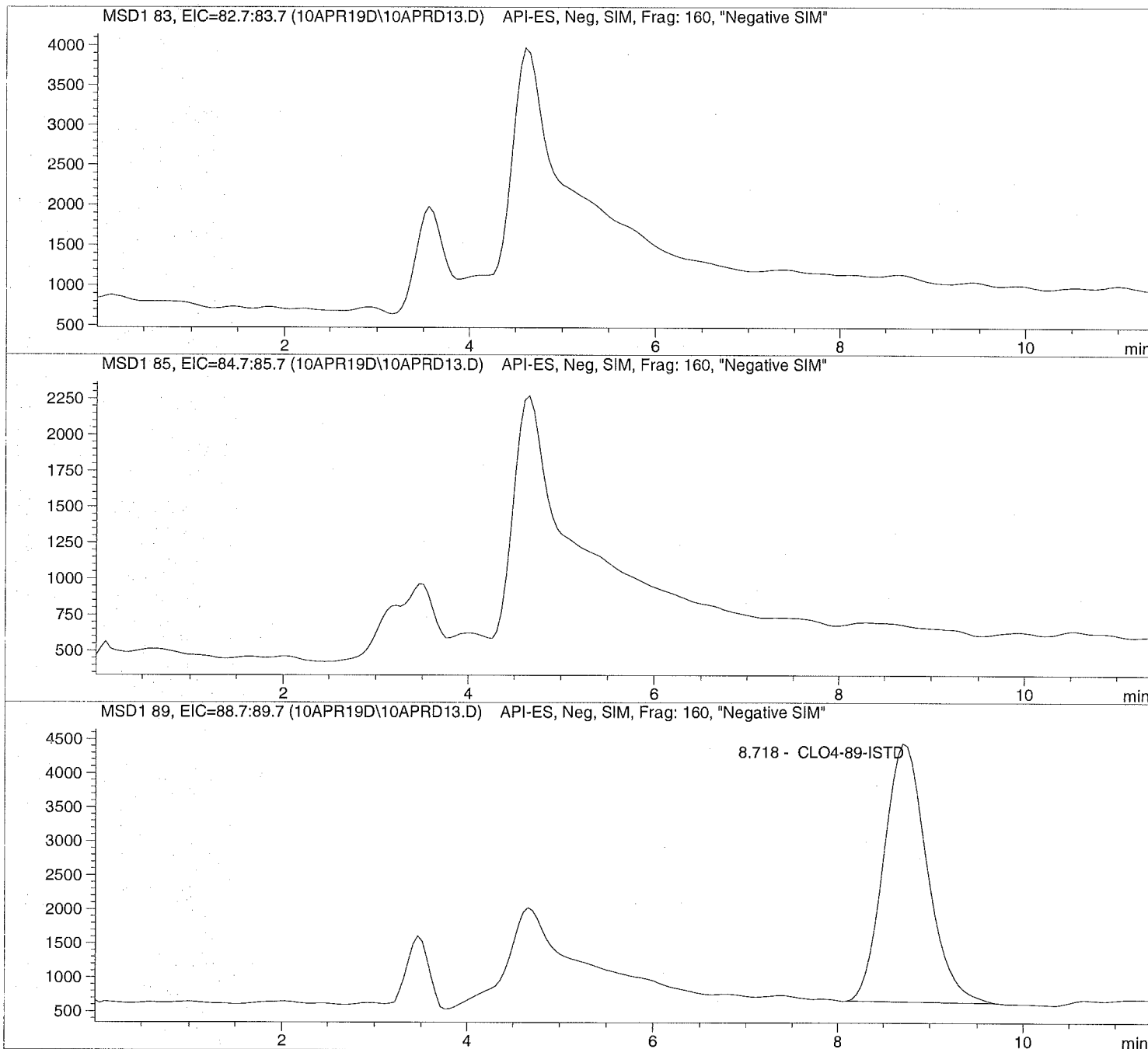
*** End of Report ***

Injection Date: 4/10/2019 12:41:59
Sample Name: 1909949003
Acq Operator: TNB

Seq Line: 13
Location: Vial 83
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



```
=====
Injection Date: 4/10/2019 12:41:59      Seq Line: 13
Sample Name: 1909949003                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-DP2.M
Last Changed: 3/19/2019 14:48:09
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.718	PBA	123373.0	5.0000	CLO4-89-ISTD

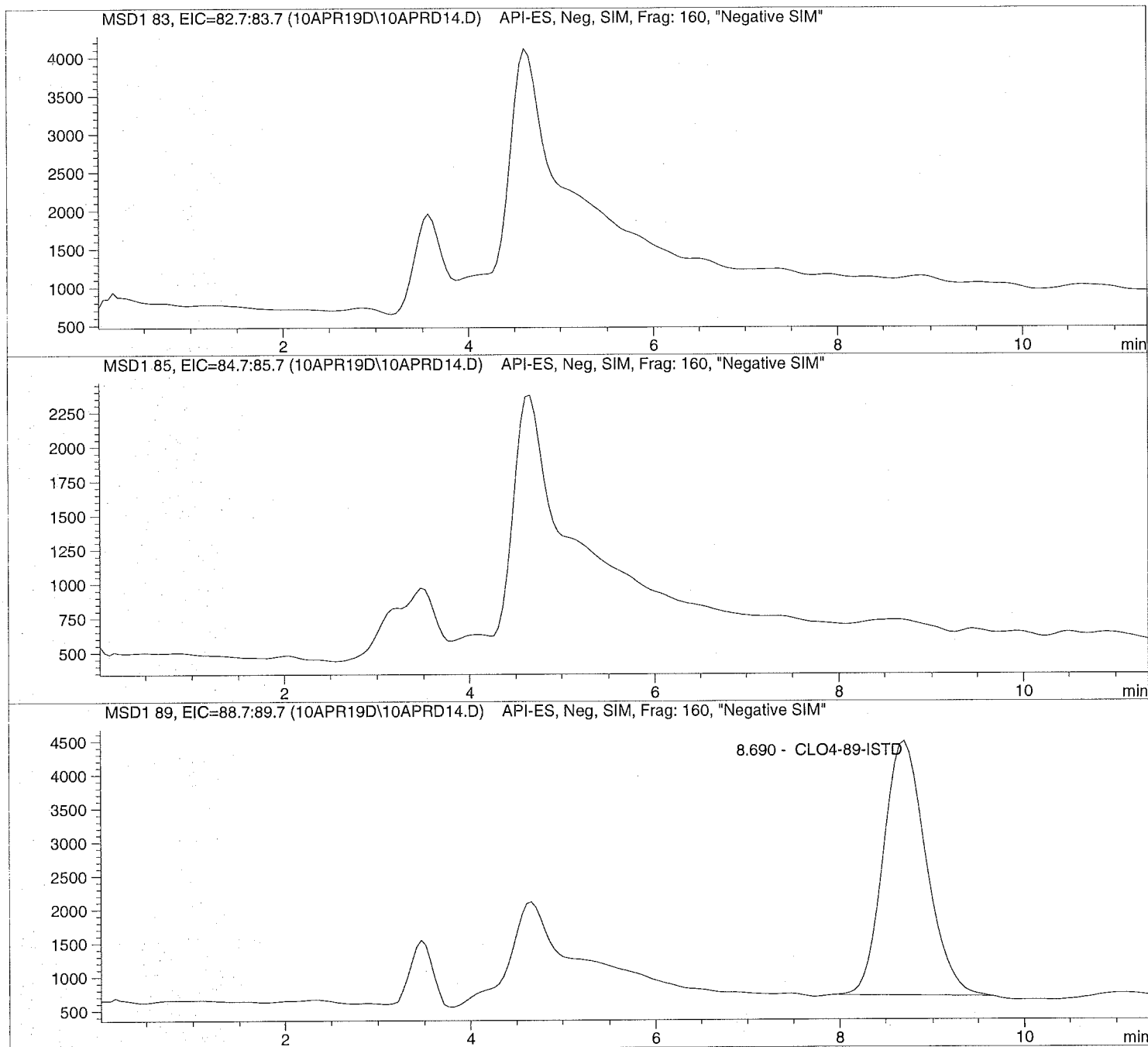
```
=====
*** End of Report ***
=====
```


Injection Date: 4/10/2019 12:55:15
Sample Name: 1909949004
Acq Operator: TNB

Seq Line: 14
Location: Vial 84
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



```
=====
Injection Date:  4/10/2019  12:55:15      Seq Line:      14
Sample Name:    1909949004      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-DP2.M
Last Changed:   3/19/2019  14:48:09
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.690	BBA	120241.5	5.0000	CLO4-89-ISTD

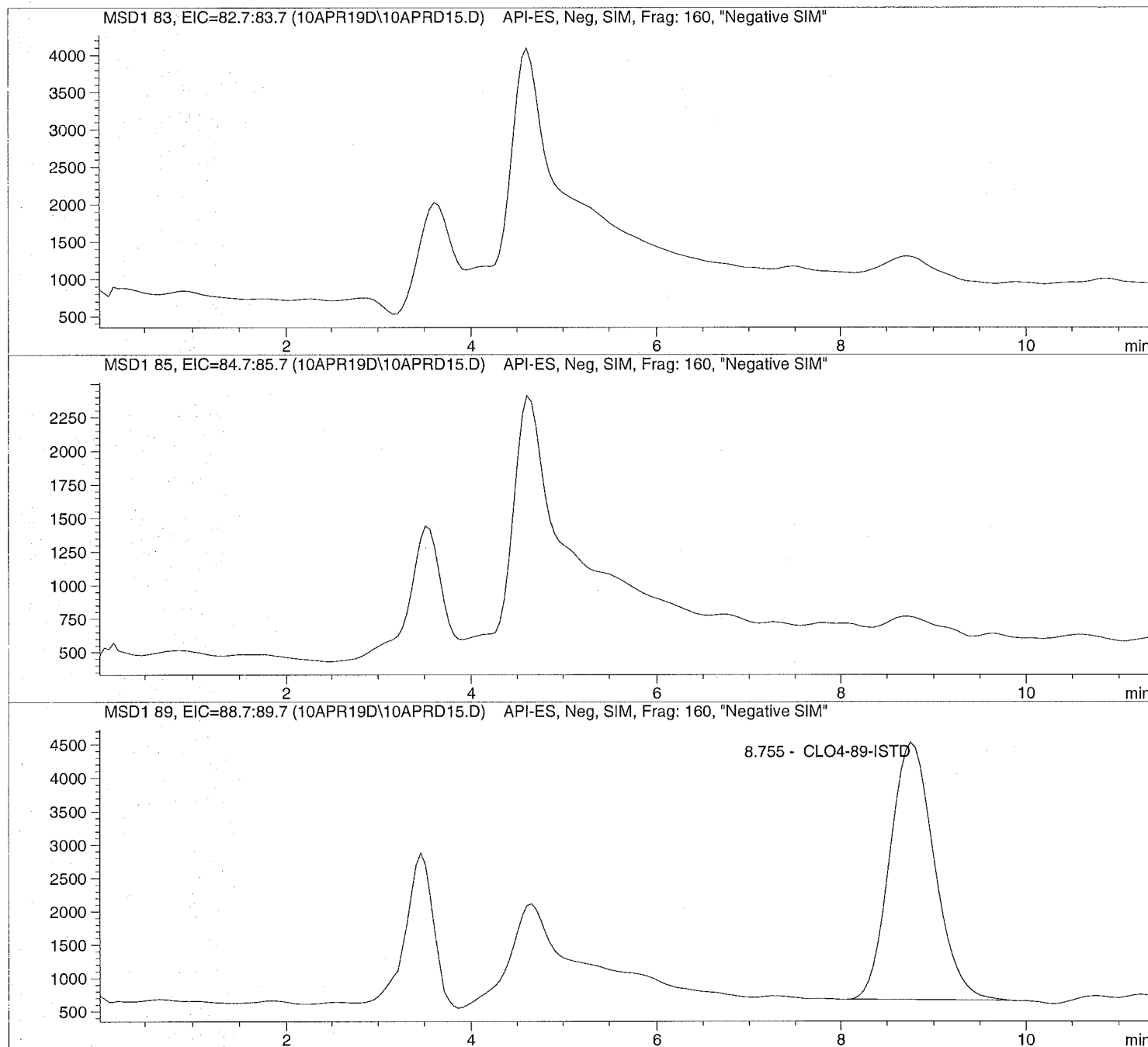
```
=====
*** End of Report ***
=====
```

Injection Date: 4/10/2019 13:08:30
Sample Name: 1909949005
Acq Operator: TNB

Seq Line: 15
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 30 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



Injection Date: 4/10/2019 13:08:30 Seq Line: 15
Sample Name: 1909949005 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-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.755	PBA	127767.0	5.0000	CLO4-89-ISTD

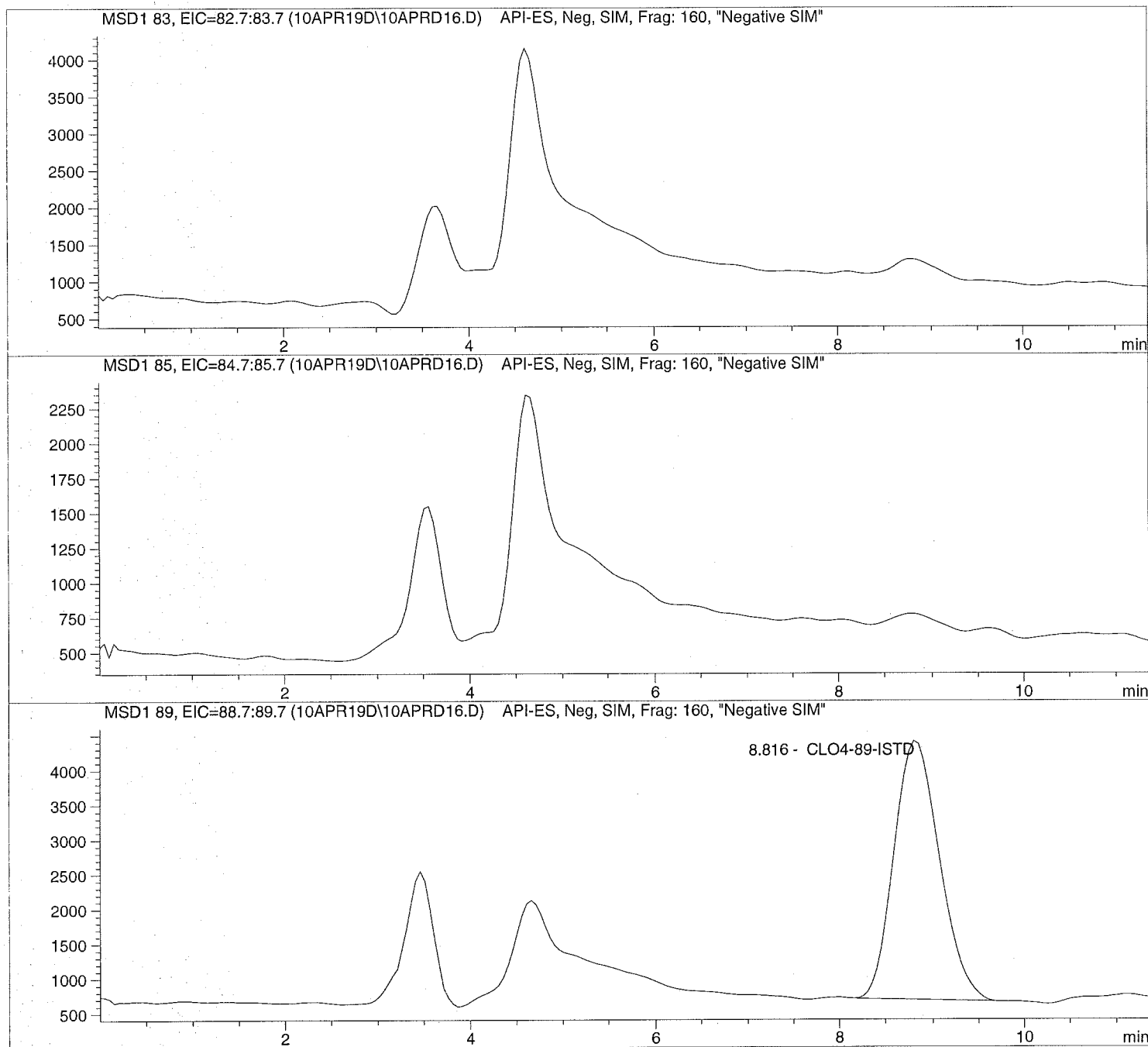
*** End of Report ***

Injection Date: 4/10/2019 13:21:46
Sample Name: 1909949006
Acq Operator: TNB

Seq Line: 16
Location: Vial 86
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



```
=====
Injection Date:  4/10/2019  13:21:46      Seq Line:      16
Sample Name:    1909949006      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-DP2.M
Last Changed:   3/19/2019  14:48:09
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.816	BBA	123964.7	5.0000	CLO4-89-ISTD

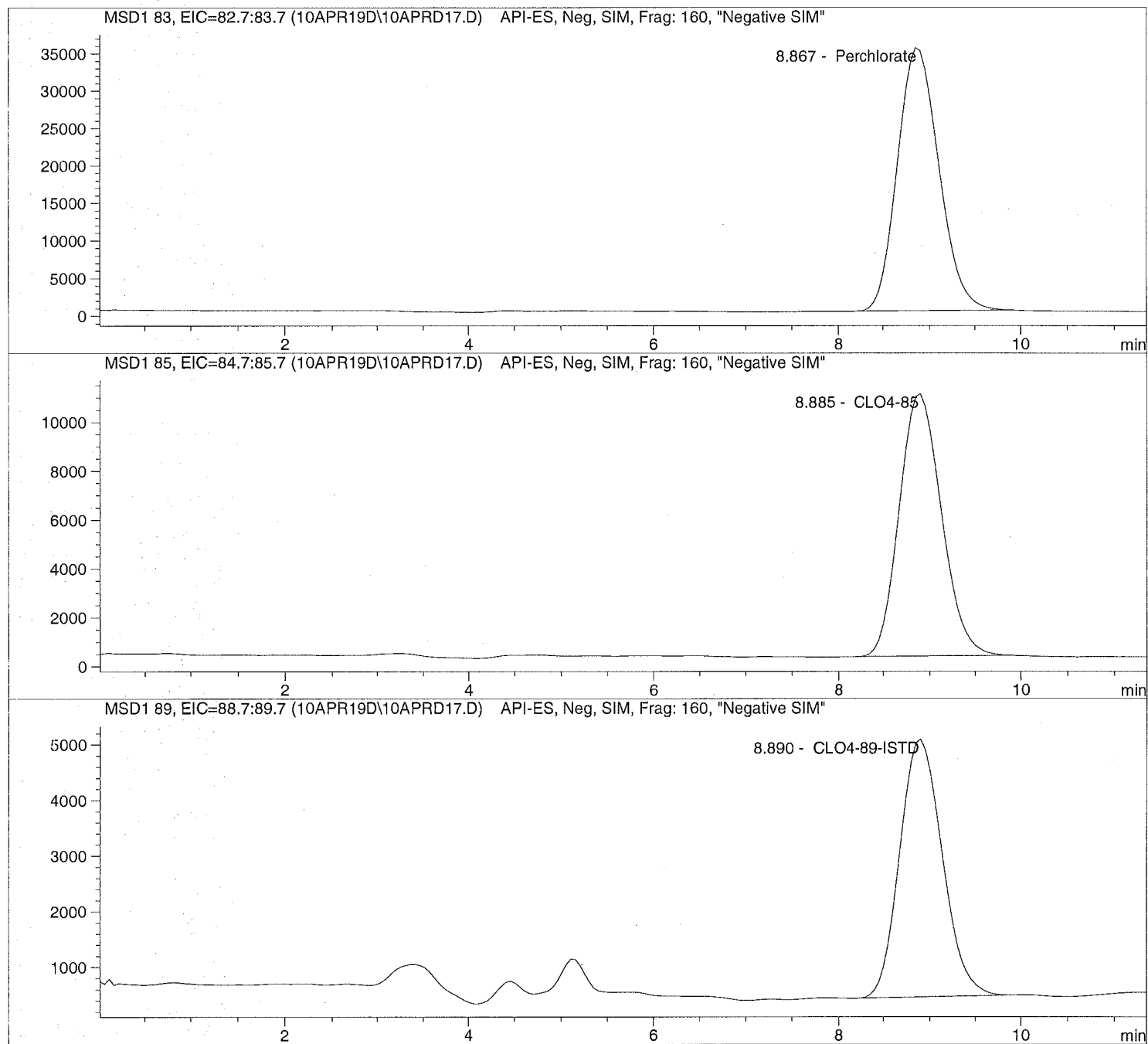
```
=====
*** End of Report ***
=====
```

Injection Date: 4/10/2019 13:35:04
Sample Name: 647202 CCV@25
Acq Operator: TNB

Seq Line: 17
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 30 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis



Injection Date: 4/10/2019 13:35:04 Seq Line: 17
Sample Name: 647202 CCV025 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-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.867	PBA	1080071.3	22.5952	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.885	PBA	336319.0	23.6329	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.890	PBA	146280.5	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 : 3/19/2019 2:35:19 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	Lvl	Amount	Area	Amt/Area	Ref Grp	Name
[min]	Sig					
8.744	1	1	1.00000	7.76074e4	1.28854e-5	1 Perchlorate
		2	2.00000	1.35273e5	1.47849e-5	
		3	5.00000	3.37764e5	1.48033e-5	
		4	10.00000	6.83454e5	1.46316e-5	
		5	25.00000	2.08433e6	1.19943e-5	
		6	50.00000	4.13334e6	1.20968e-5	
		7	75.00000	5.99313e6	1.25143e-5	
8.755	2	1	1.00000	2.36780e4	4.22333e-5	1 CLO4-85
		2	2.00000	4.69486e4	4.25998e-5	
		3	5.00000	1.06124e5	4.71147e-5	
		4	10.00000	2.13523e5	4.68335e-5	
		5	25.00000	6.14295e5	4.06971e-5	
		6	50.00000	1.19814e6	4.17315e-5	
		7	75.00000	1.78355e6	4.20509e-5	
8.766	3	1	5.00000	2.73208e5	1.83011e-5	+I1 CLO4-89-ISTD
		2	5.00000	2.24886e5	2.22335e-5	
		3	5.00000	2.33196e5	2.14412e-5	
		4	5.00000	2.34454e5	2.13262e-5	
		5	5.00000	2.50568e5	1.99547e-5	
		6	5.00000	2.30977e5	2.16472e-5	

RetTime	Lvl	Amount	Area	Amt/Area	Ref Grp Name
---------	-----	--------	------	----------	--------------

[min]	Sig				
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min

Curve Type : Quadratic

Origin : Ignored

Calibration Level Weights:/

Level 1	: 1
Level 2	: 0.5
Level 3	: 0.2
Level 4	: 0.1
Level 5	: 0.04
Level 6	: 0.02
Level 7	: 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min

Curve Type : Quadratic

Origin : Ignored

Calibration Level Weights:/

Level 1	: 1
Level 2	: 0.5
Level 3	: 0.2
Level 4	: 0.1
Level 5	: 0.04
Level 6	: 0.02
Level 7	: 0.013333

Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min

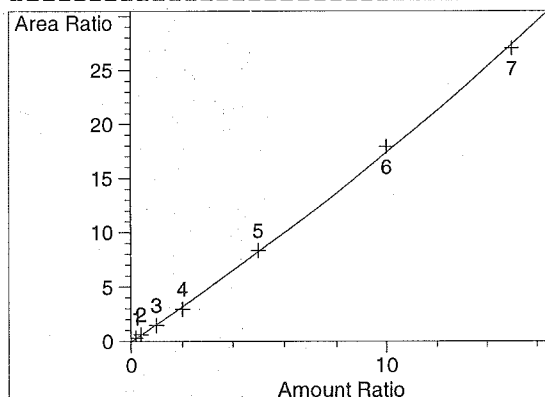
Curve Type : Linear

Origin : Included

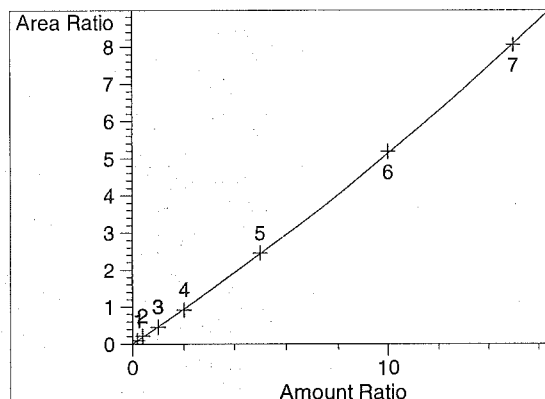
Calibration Level Weights:/

Level 1	: 1
Level 2	: 1
Level 3	: 1
Level 4	: 1
Level 5	: 1
Level 6	: 1
Level 7	: 1

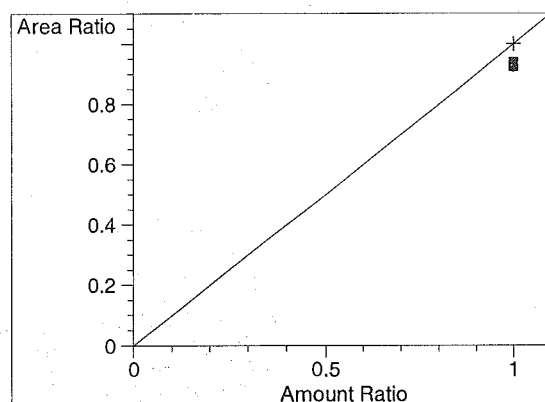
=====
Peak Sum Table
=====***No Entries in table***
=====

=====
Calibration Curves
=====

Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation: 0.99957
Residual Std. Dev.: 0.30744
Formula: $y = ax^2 + bx + c$
a: 1.76988e-2
b: 1.56480
c: -4.92430e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755
MSD1 85, EIC=84.7:85.7
Correlation: 0.99983
Residual Std. Dev.: 0.03473
Formula: $y = ax^2 + bx + c$
a: 5.13396e-3
b: 4.62055e-1
c: 4.97209e-4
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766
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 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	7.76074e4	8.744	1.06245
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	8.992	2.06969
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	8.586	4.73474
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	8.698	9.27727
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	8.451	25.29036
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	8.810	51.36844
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	8.586	74.16754
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	8.702	9.25940

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	8.755	9.30535e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	9.012	2.24255
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	8.602	4.86656
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	8.713	9.64312
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	8.468	25.12159
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	8.825	50.46721
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	8.603	74.72019
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	8.721	9.54024

#*	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	2.73208e5	8.766	5.00000
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	9.012	5.00000
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	8.609	5.00000
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	8.716	5.00000
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	8.472	5.00000
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	8.825	5.00000
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	8.610	5.00000
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	8.725	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

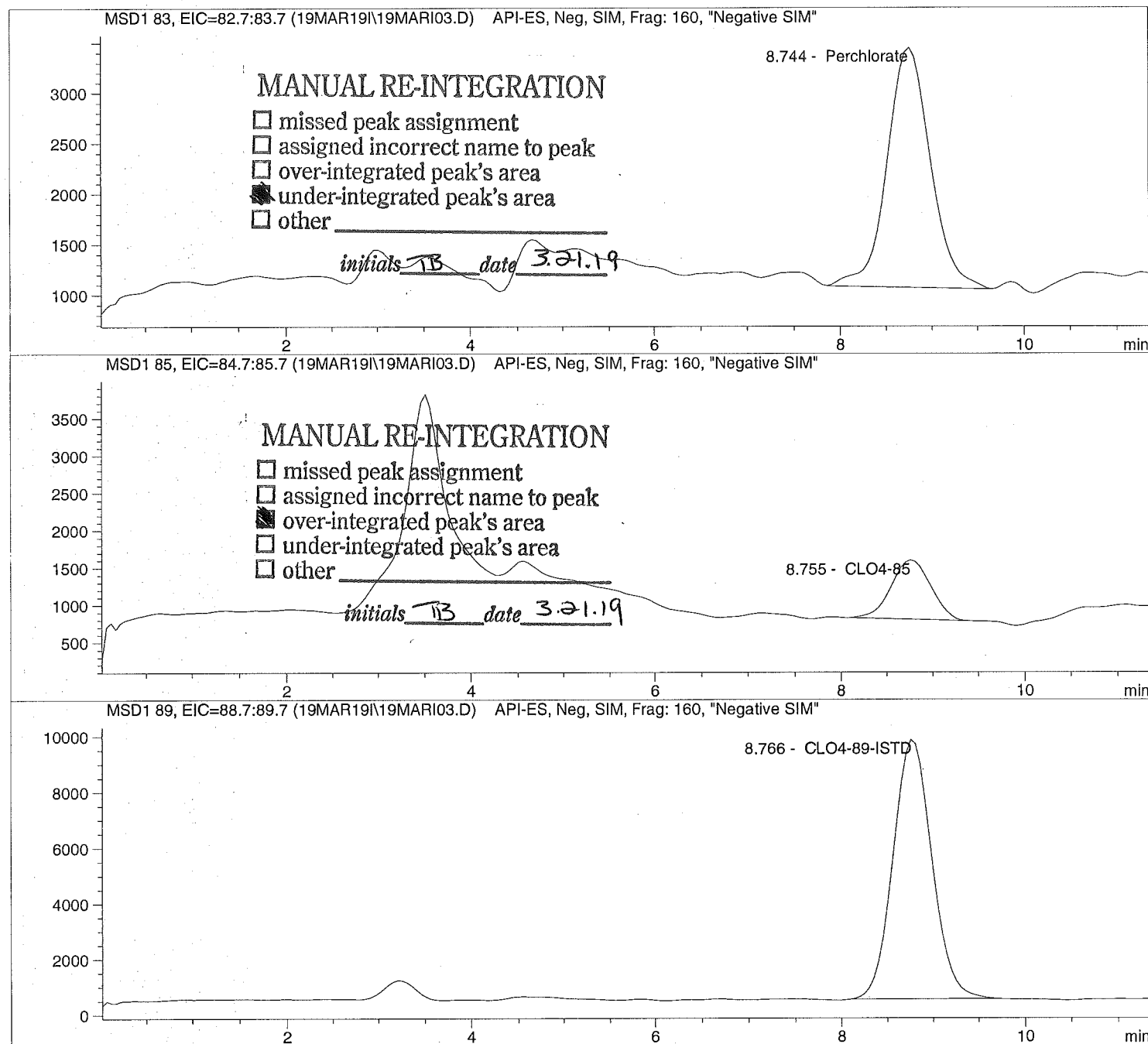
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	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 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:39:40 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.744	MM	77607.4	1.0625	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	MM	23678.0	0.9305	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 09:53:00

Seq Line: 4

Sample Name: CLO4@ 2.0ug/L

Location: Vial 74

Acq Operator: TNB

Inj. No.: 1

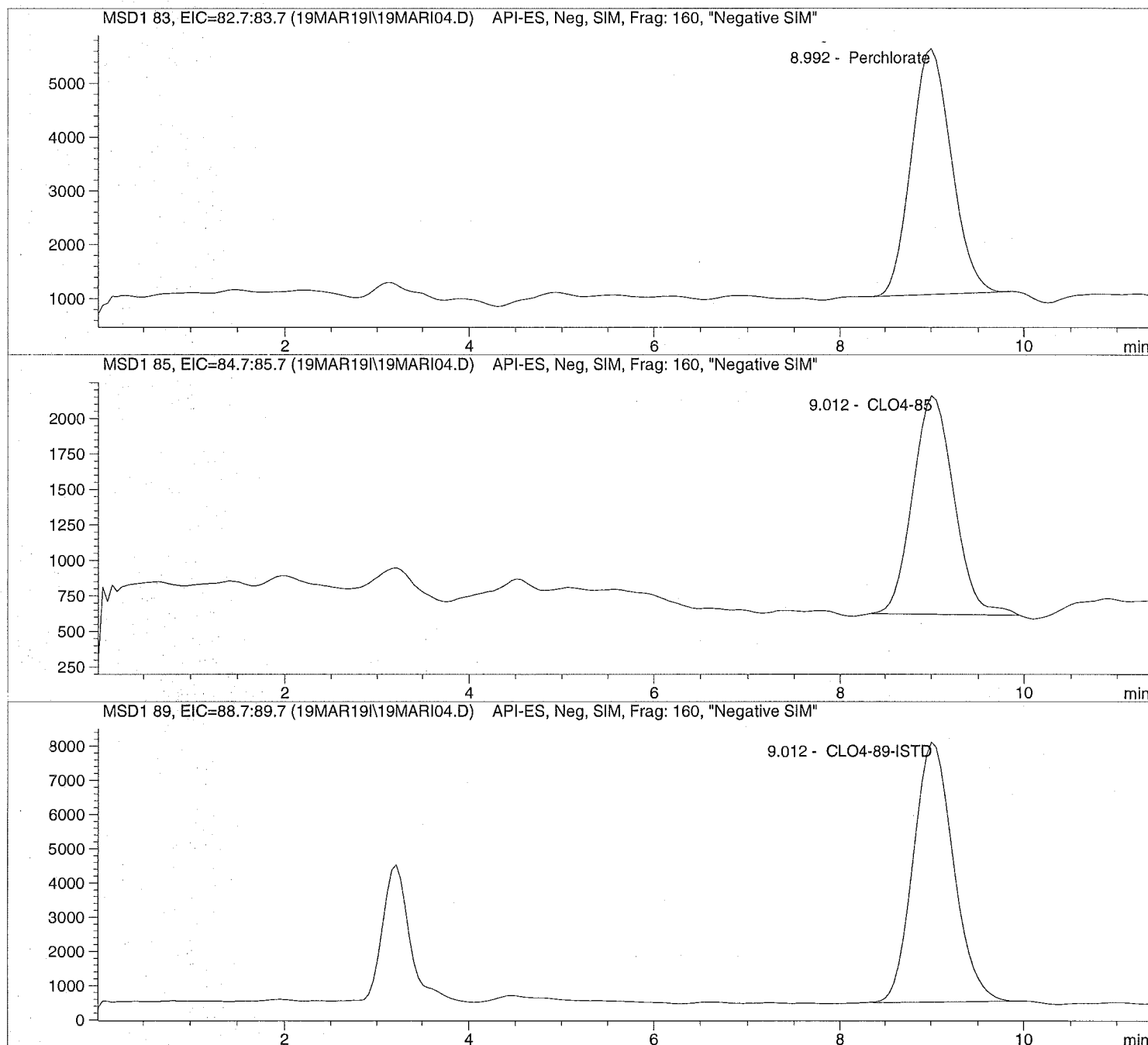
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:53:00 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.992	BBA	135272.8	2.0697	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

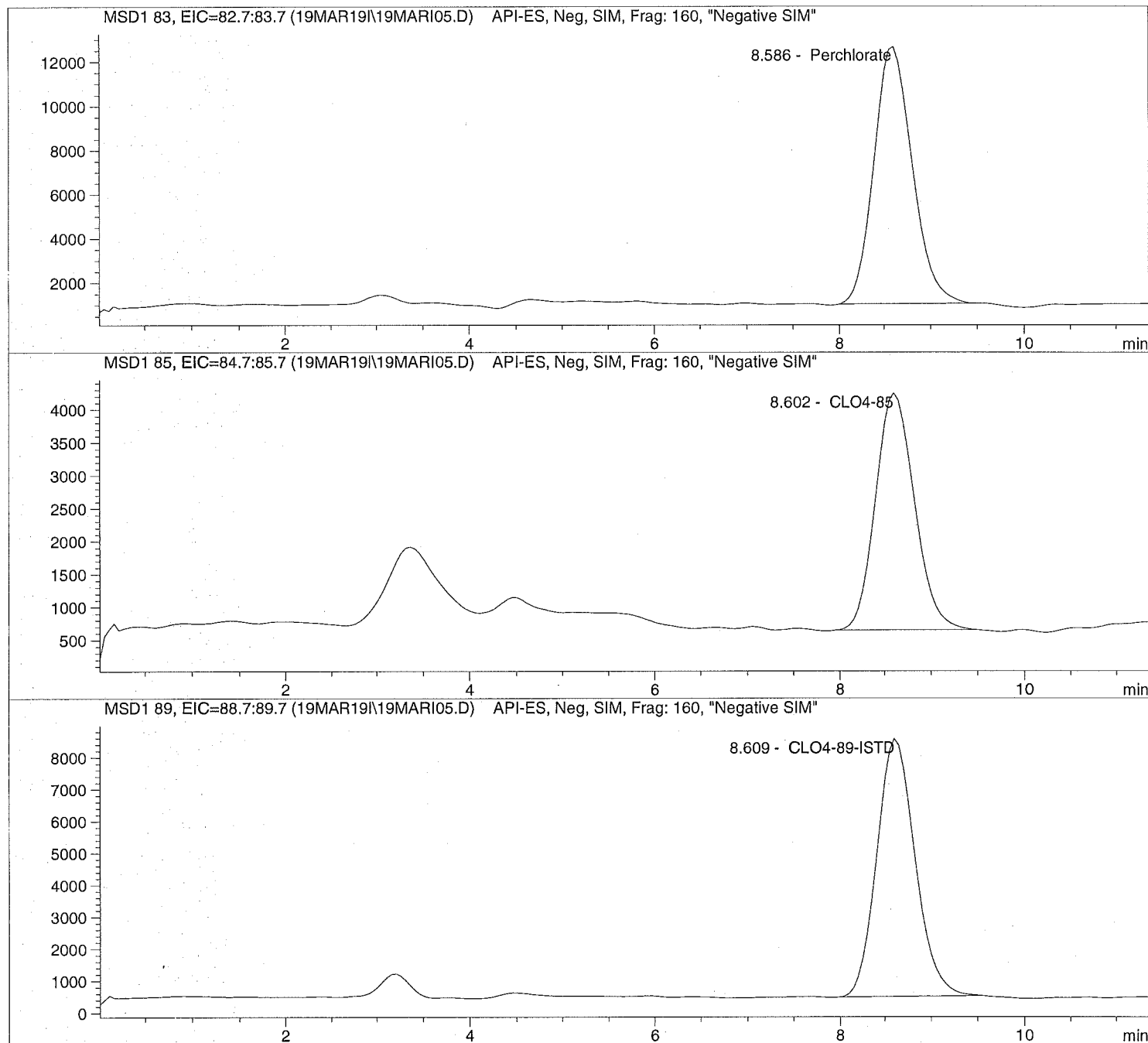
*** End of Report ***

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date:  3/19/2019  10:06:16      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-DP2.M
Last Changed:    3/19/2019  14:35:22
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Tue, 19. Mar. 2019,02:35:19 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
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

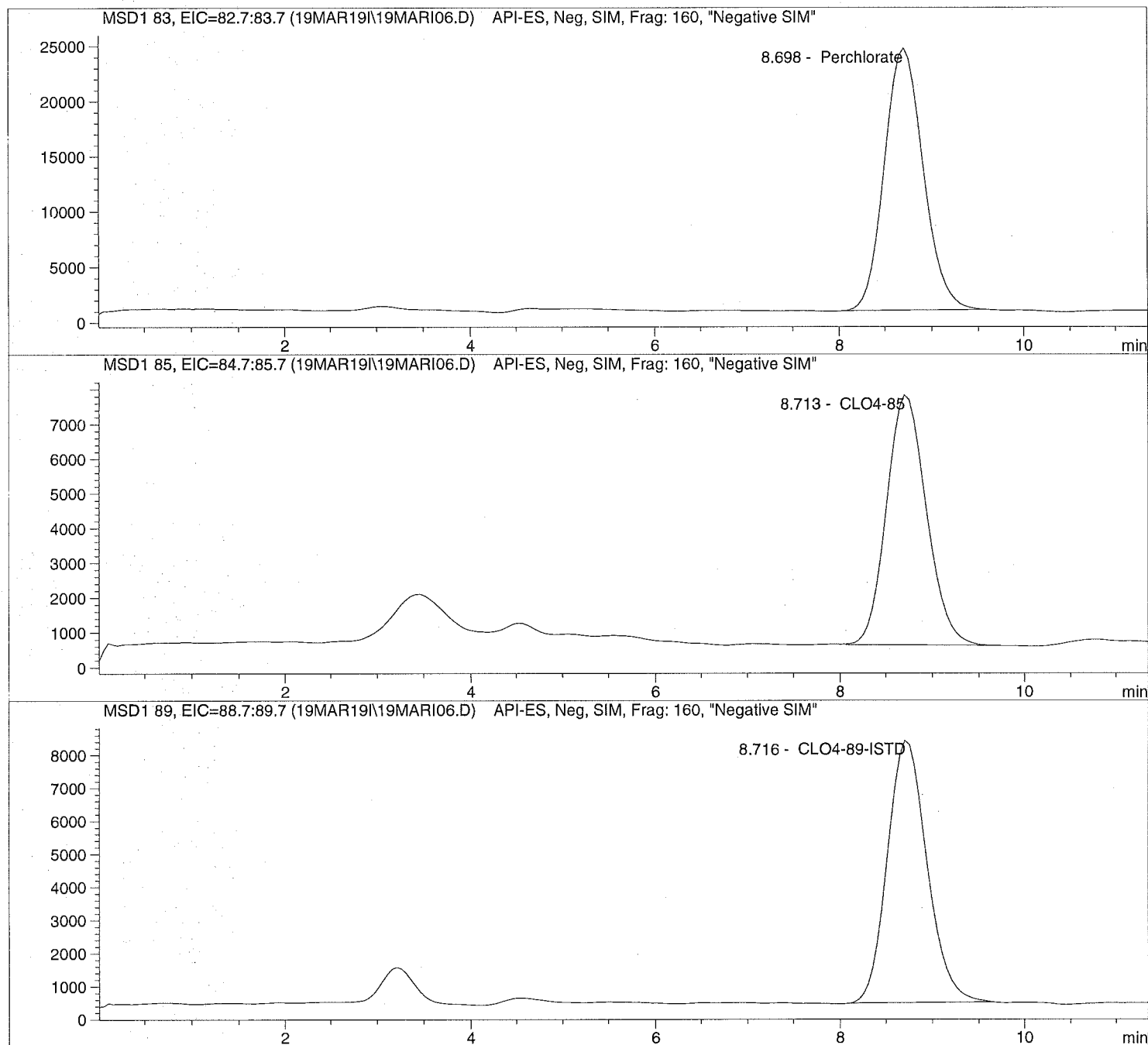
```
=====
*** End of Report ***
=====
```

Injection Date: 3/19/2019 10:19:32
Sample Name: CLO4@ 10.ug/L
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date:  3/19/2019  10:19:32      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-DP2.M
Last Changed:   3/19/2019  14:35:22
=====
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Tue, 19. Mar. 2019,02:35:19 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
8.698	PBA	683454.4	9.2773	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

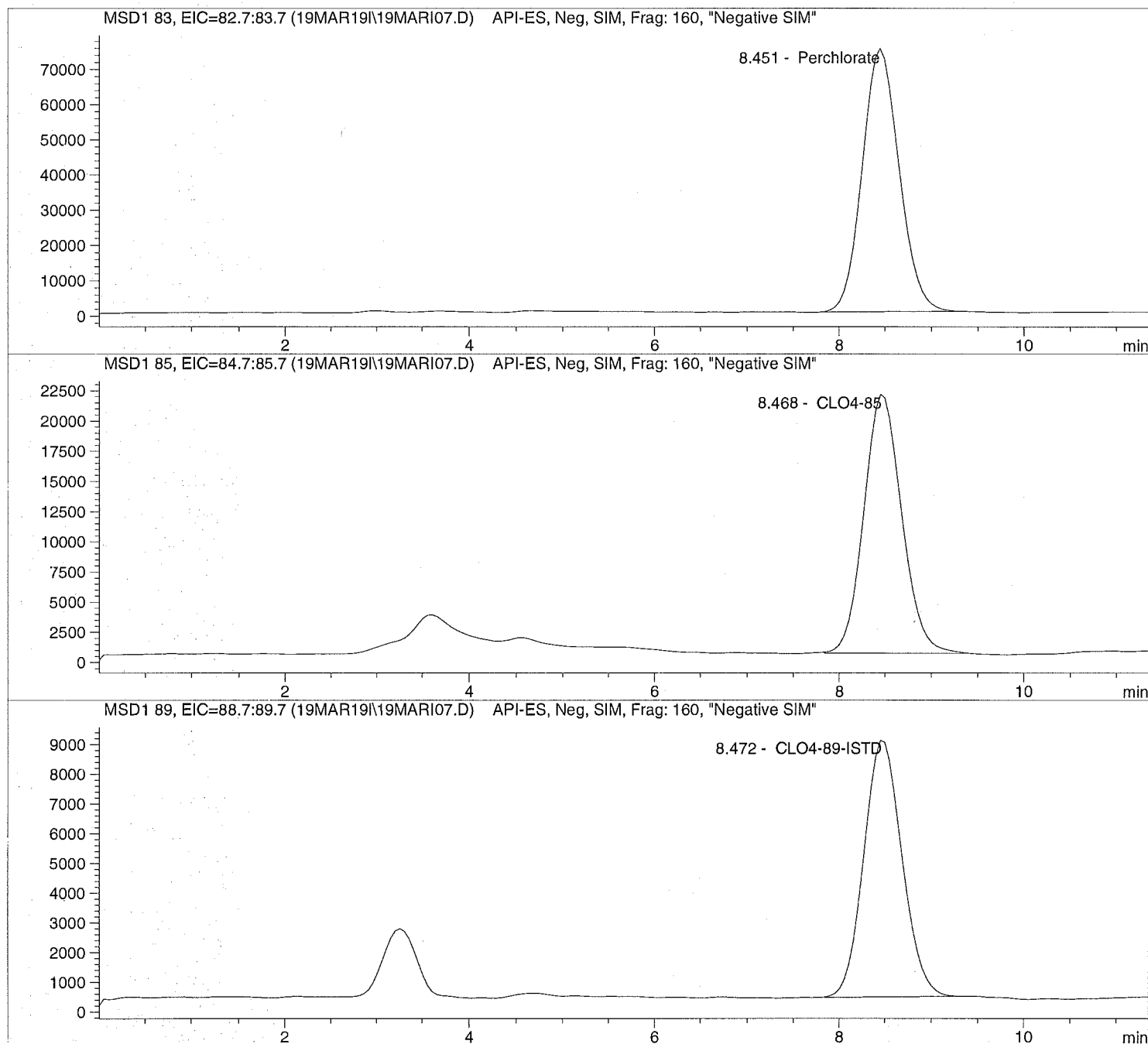
```
=====
*** End of Report ***
=====
```

Injection Date: 3/19/2019 10:32:49
Sample Name: CLO4@ 25.ug/L
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date:  3/19/2019  10:32:49      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-DP2.M
Last Changed:    3/19/2019  14:35:22
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Tue, 19. Mar. 2019,02:35:19 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
8.451	PBA	2084327.4	25.2904	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.468	BBA	614294.8	25.1216	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

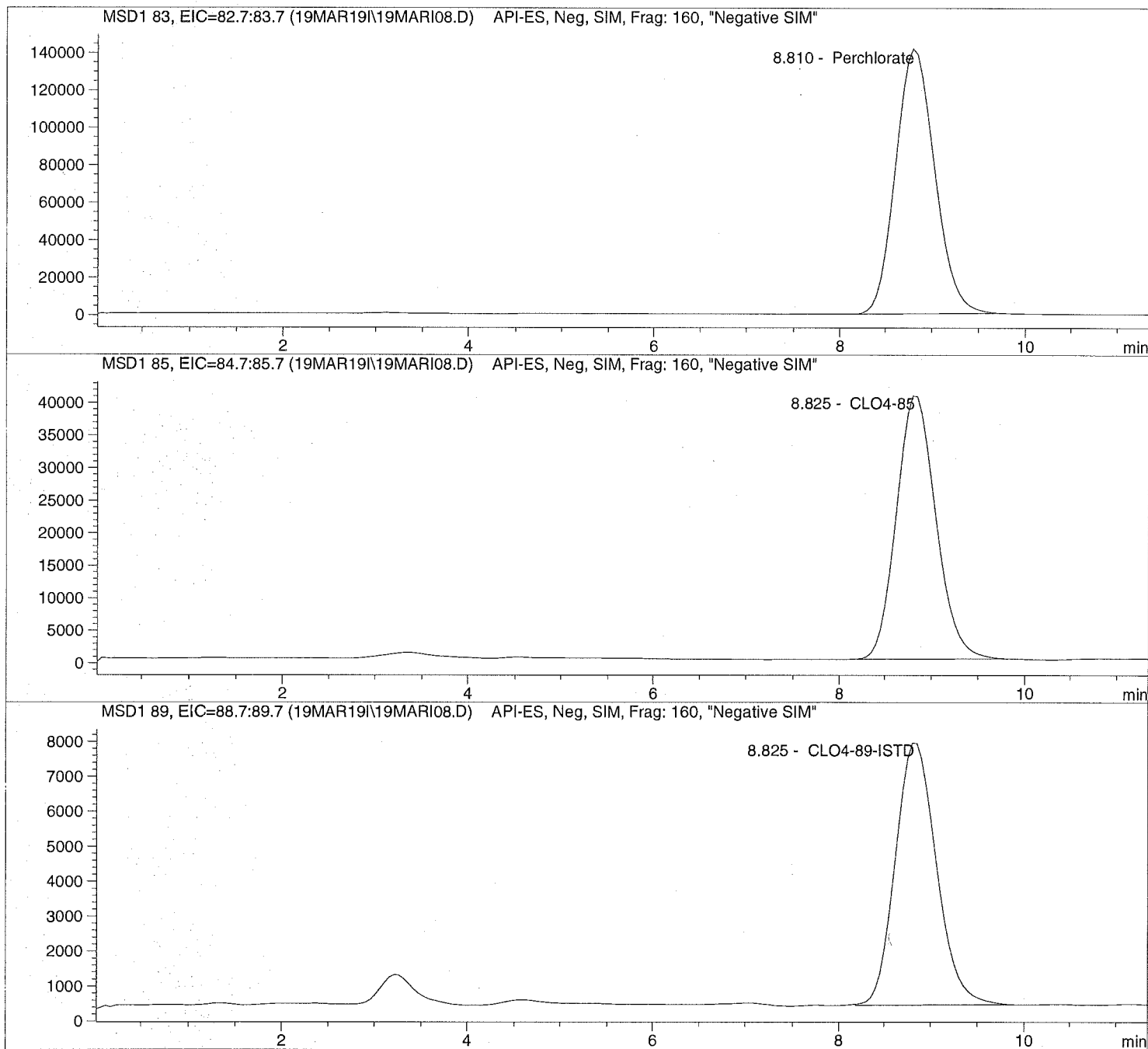
```
=====
*** End of Report ***
=====
```


Injection Date: 3/19/2019 10:46:05
Sample Name: CLO4@ 50.ug/L
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date:  3/19/2019  10:46:05      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-DP2.M
Last Changed:   3/19/2019  14:35:22
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Tue, 19. Mar. 2019,02:35:19 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
8.810	PBA	4133340.5	51.3684	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.4672	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

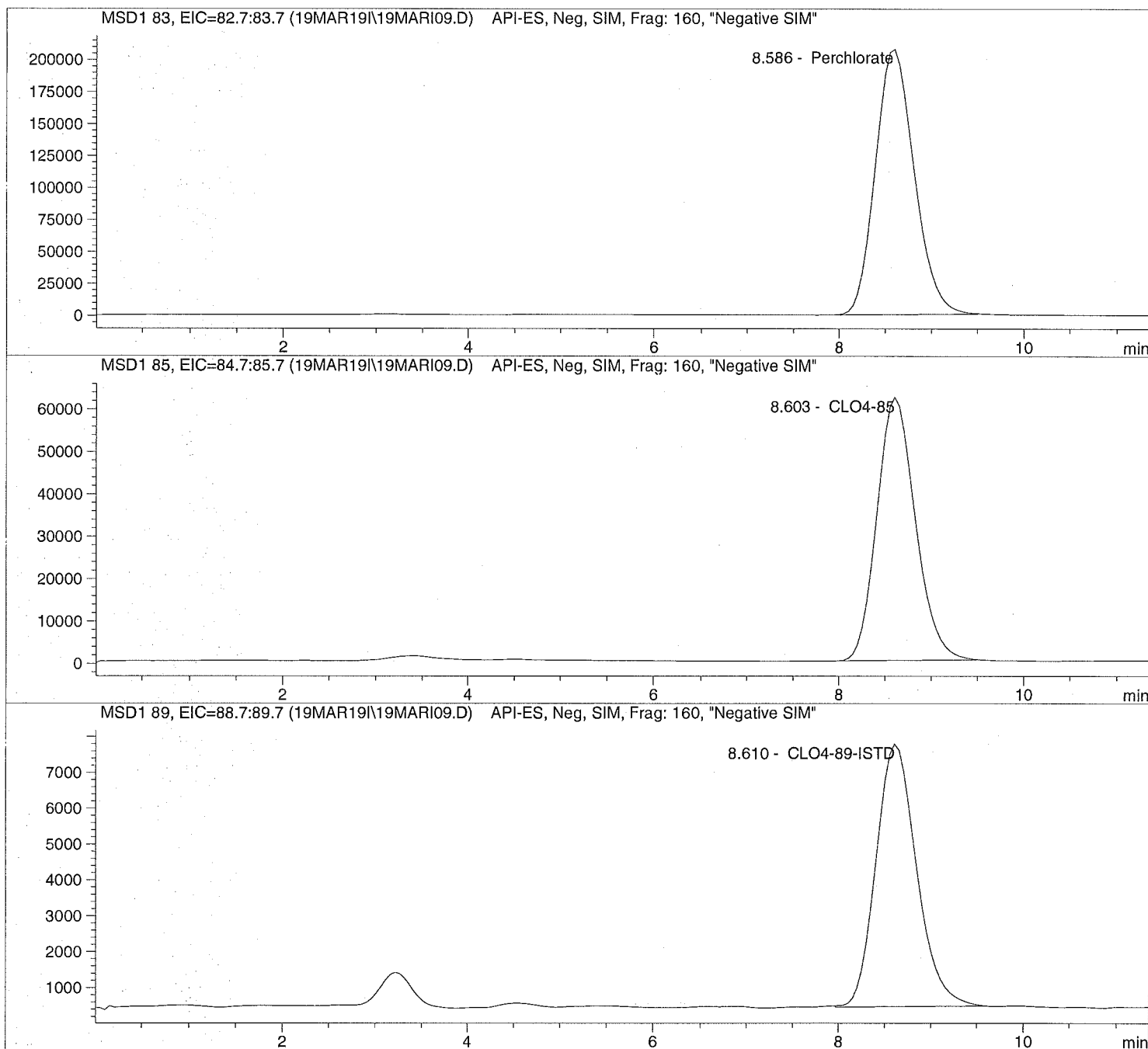
```
=====
*** End of Report ***
=====
```

Injection Date: 3/19/2019 10:59:22
Sample Name: CLO4@ 75.ug/L
Acq Operator: TNB

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



=====
Injection Date: 3/19/2019 10:59:22 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

=====
Sample Information
=====

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

=====
*** End of Report ***
=====

Injection Date: 3/19/2019 11:12:42

Seq Line: 10

Sample Name: ICAL Verf@10ug/L

Location: Vial 80

Acq Operator: TNB

Inj. No.: 1

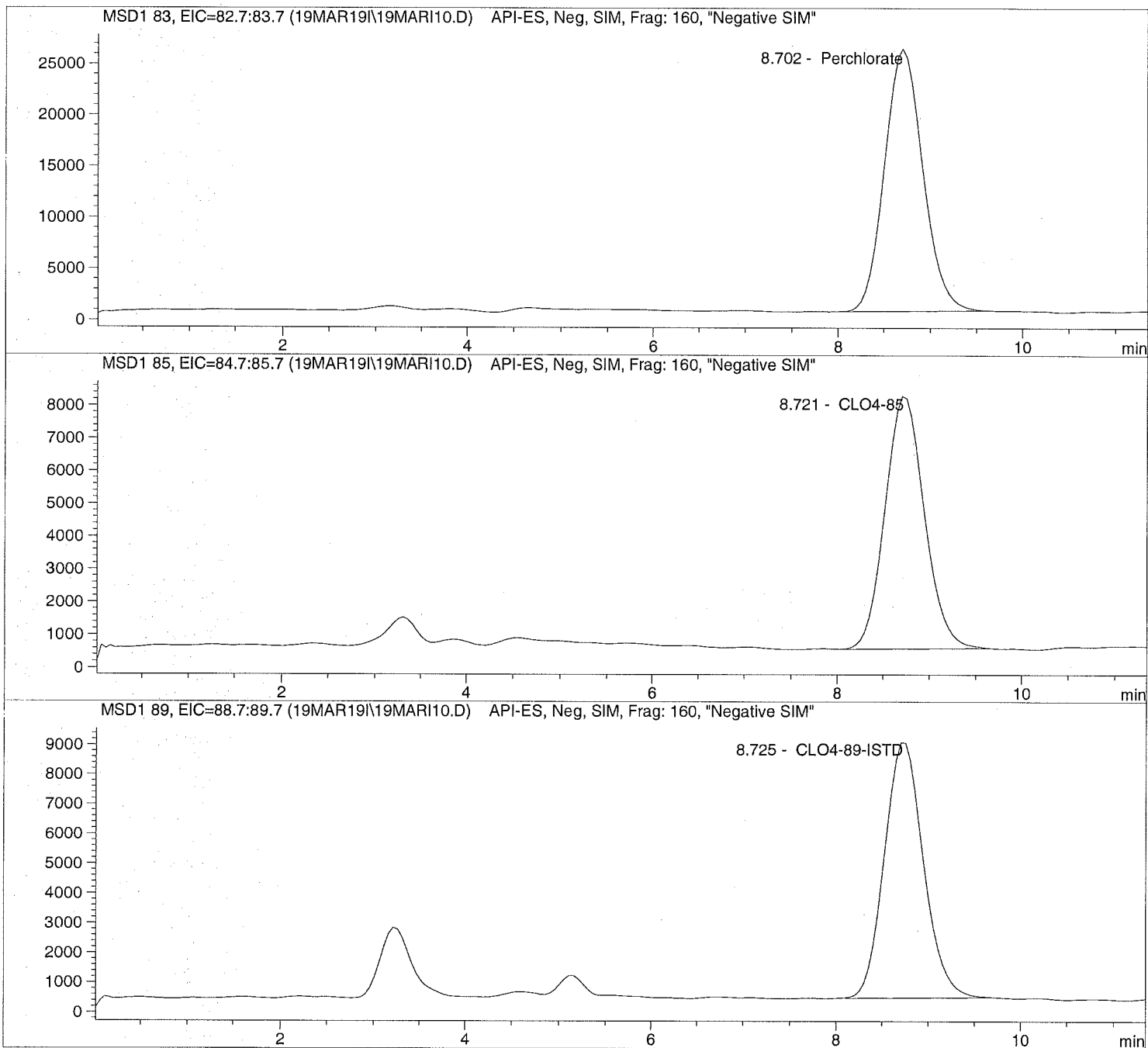
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 11:12:42 Seq Line: 10
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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

*** End of Report ***



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

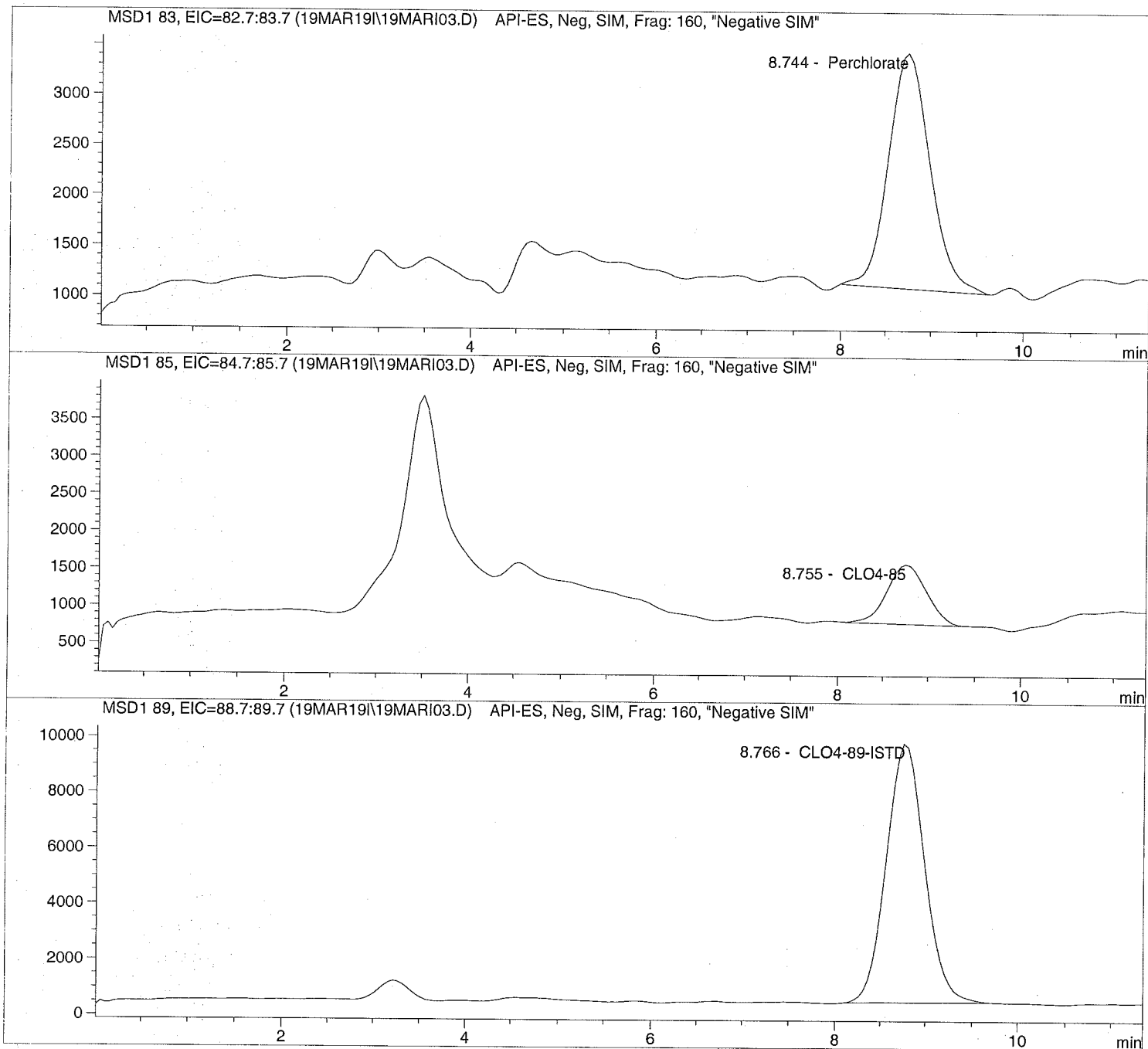
Unmodified

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:38:25

Perchlorate analysis



Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:38:25

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.744	BBA	74166.3	1.0224	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	BBA	24138.1	0.9487	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

*** End of Report ***



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

April 18, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19040319**

Laboratory Results for: **Longhorn GW Treatment Plant Bi-Weekly Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on Apr 05, 2019 for the analysis presented in the following report.

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

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

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

Sincerely,

Generated By: JUMOKE.LAWAL

RJ Modashia
Project Manager

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
Work Order: HS19040319

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19040319-01	LH18/24-SP650_040419	Water		04-Apr-2019 14:00	05-Apr-2019 08:40	<input type="checkbox"/>
HS19040319-02	Trip Blank	Water		04-Apr-2019 00:00	05-Apr-2019 08:40	<input type="checkbox"/>

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
Work Order: HS19040319

CASE NARRATIVE

GCMS Volatiles by Method SW8260**Batch ID: R336625****Sample ID: CCV**

- Carbontetrachloride, Hexachlorobutadiene, n-Butylbenzene and Tetrachloroethene exceeded %D limits on CCV. Samples ND.

Sample ID: HS19040783-05MSD

- MSD was performed on unrelated sample

WetChemistry by Method SW9056**Batch ID: R336786****Sample ID: LH18/24-SP650_040419 (HS19040319-01MS)**

- The matrix spike recovery was outside of the control limits. However, the matrix spike duplicate recovery and the RPD between the MS and MSD were in control. (Chloride)
-

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples
 Sample ID: LH18/24-SP650_040419
 Collection Date: 04-Apr-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19040319
 Lab ID:HS19040319-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		Method:SW8260						Analyst: AKP
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,2-Dichloroethane	0.58	J	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:25
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Apr-2019 14:25
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Apr-2019 14:25
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:25
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Apr-2019 14:25
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	15-Apr-2019 14:25
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Apr-2019 14:25
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25

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

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples
 Sample ID: LH18/24-SP650_040419
 Collection Date: 04-Apr-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19040319
 Lab ID:HS19040319-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		Method:SW8260						Analyst: AKP
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
cis-1,2-Dichloroethene	2.0		0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Apr-2019 14:25
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Apr-2019 14:25
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Apr-2019 14:25
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:25
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Trichloroethene	0.78	J	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:25
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:25
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>86.6</i>			0	<i>81-118</i>	%REC	<i>1</i>	<i>15-Apr-2019 14:25</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>96.2</i>			0	<i>85-114</i>	%REC	<i>1</i>	<i>15-Apr-2019 14:25</i>
<i>Surr: Dibromofluoromethane</i>	<i>91.0</i>			0	<i>80-119</i>	%REC	<i>1</i>	<i>15-Apr-2019 14:25</i>
<i>Surr: Toluene-d8</i>	<i>103</i>			0	<i>89-112</i>	%REC	<i>1</i>	<i>15-Apr-2019 14:25</i>
ANIONS BY SW9056A		Method:SW9056						Analyst: KMU
Chloride	377		2.00	5.00	5.00	mg/L	10	16-Apr-2019 15:03
Sulfate	29.6		2.00	5.00	5.00	mg/L	10	16-Apr-2019 15:03

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

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples
 Sample ID: Trip Blank
 Collection Date: 04-Apr-2019 00:00

ANALYTICAL REPORT

WorkOrder:HS19040319
 Lab ID:HS19040319-02
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD		Method:SW8260						Analyst: AKP
8260C								
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 13:37
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Apr-2019 13:37
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Apr-2019 13:37
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 13:37
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Apr-2019 13:37
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	15-Apr-2019 13:37
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Apr-2019 13:37
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37

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

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples
 Sample ID: Trip Blank
 Collection Date: 04-Apr-2019 00:00

ANALYTICAL REPORT

WorkOrder:HS19040319
 Lab ID:HS19040319-02
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD		Method:SW8260						Analyst: AKP
8260C								
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Apr-2019 13:37
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Apr-2019 13:37
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Apr-2019 13:37
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 13:37
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 13:37
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 13:37
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>86.2</i>			0	<i>81-118</i>	%REC	<i>1</i>	<i>15-Apr-2019 13:37</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>95.5</i>			0	<i>85-114</i>	%REC	<i>1</i>	<i>15-Apr-2019 13:37</i>
<i>Surr: Dibromofluoromethane</i>	<i>90.2</i>			0	<i>80-119</i>	%REC	<i>1</i>	<i>15-Apr-2019 13:37</i>
<i>Surr: Toluene-d8</i>	<i>103</i>			0	<i>89-112</i>	%REC	<i>1</i>	<i>15-Apr-2019 13:37</i>

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

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R336625	Test Name : VOLATILES ORGANICS BY METHOD 8260C			Matrix: Water		
HS19040319-01	LH18/24-SP650_040419	04 Apr 2019 14:00			15 Apr 2019 14:25	1
HS19040319-02	Trip Blank	04 Apr 2019 00:00			15 Apr 2019 13:37	1
Batch ID R336786	Test Name : ANIONS BY SW9056A			Matrix: Water		
HS19040319-01	LH18/24-SP650_040419	04 Apr 2019 14:00			16 Apr 2019 15:03	10

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

QC BATCH REPORT NEW

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MBLK	Sample ID: VBLKW-190415	Units: UG/L		Analysis Date: 15-Apr-2019 13:13					
Client ID:	Run ID: VOA6_336625	SeqNo: 5036128		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	0.50	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	0.50	1.0							U
1,1,2-Trichloroethane	0.50	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	0.50	1.0							U
1,2,3-Trichlorobenzene	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
Bromomethane	0.50	1.0							U

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

QC BATCH REPORT NEW

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MBLK	Sample ID: VBLKW-190415	Units: UG/L		Analysis Date: 15-Apr-2019 13:13					
Client ID:	Run ID: VOA6_336625	SeqNo: 5036128		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	1.0	2.0							U
Carbon tetrachloride	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	43.81	1.0	50	0	87.6	81 - 118			
Surr: 4-Bromofluorobenzene	48.27	1.0	50	0	96.5	85 - 114			
Surr: Dibromofluoromethane	45.78	1.0	50	0	91.6	80 - 119			
Surr: Toluene-d8	50.76	1.0	50	0	102	89 - 112			

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

QC BATCH REPORT NEW

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-190415		Units: UG/L		Analysis Date: 15-Apr-2019 12:01			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036126		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	22.62	1.0	20	0	113	78 - 124			
1,1,1-Trichloroethane	20.75	1.0	20	0	104	74 - 131			
1,1,2,2-Tetrachloroethane	20.57	1.0	20	0	103	71 - 121			
1,1,2-Trichloroethane	20.88	1.0	20	0	104	80 - 119			
1,1-Dichloroethane	18.5	1.0	20	0	92.5	77 - 125			
1,1-Dichloroethene	19.56	1.0	20	0	97.8	71 - 131			
1,1-Dichloropropene	20.53	1.0	20	0	103	78 - 125			
1,2,3-Trichlorobenzene	22.3	1.0	20	0	111	69 - 129			
1,2,3-Trichloropropane	20.92	1.0	20	0	105	73 - 122			
1,2,4-Trichlorobenzene	22.16	1.0	20	0	111	69 - 130			
1,2,4-Trimethylbenzene	23.96	1.0	20	0	120	76 - 124			
1,2-Dibromo-3-chloropropane	21.56	1.0	20	0	108	62 - 128			
1,2-Dibromoethane	22.06	1.0	20	0	110	77 - 121			
1,2-Dichlorobenzene	21.83	1.0	20	0	109	80 - 119			
1,2-Dichloroethane	20.97	1.0	20	0	105	73 - 128			
1,2-Dichloropropane	19.44	1.0	20	0	97.2	78 - 122			
1,3,5-Trimethylbenzene	23.36	1.0	20	0	117	75 - 124			
1,3-Dichlorobenzene	22.14	1.0	20	0	111	80 - 119			
1,3-Dichloropropane	20.55	1.0	20	0	103	80 - 119			
1,4-Dichlorobenzene	21.91	1.0	20	0	110	79 - 118			
2,2-Dichloropropane	20.44	1.0	20	0	102	60 - 139			
2-Butanone	34.91	2.0	40	0	87.3	56 - 143			
2-Chlorotoluene	21.42	1.0	20	0	107	79 - 122			
2-Hexanone	40.09	2.0	40	0	100	57 - 139			
4-Chlorotoluene	21.72	1.0	20	0	109	78 - 122			
4-Isopropyltoluene	23.88	1.0	20	0	119	77 - 127			
4-Methyl-2-pentanone	38.74	2.0	40	0	96.9	67 - 130			
Acetone	33.63	2.0	40	0	84.1	39 - 160			
Benzene	21.09	1.0	20	0	105	79 - 120			
Bromobenzene	23.22	1.0	20	0	116	80 - 120			
Bromochloromethane	20.29	1.0	20	0	101	78 - 123			
Bromodichloromethane	21.35	1.0	20	0	107	79 - 125			
Bromoform	22.42	1.0	20	0	112	66 - 130			
Bromomethane	23.55	1.0	20	0	118	53 - 141			

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

QC BATCH REPORT NEW

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-190415		Units: UG/L		Analysis Date: 15-Apr-2019 12:01			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036126		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	36.08	2.0	40	0	90.2	64 - 133			
Carbon tetrachloride	24.06	1.0	20	0	120	72 - 136			
Chlorobenzene	21.18	1.0	20	0	106	82 - 118			
Chloroethane	17.9	1.0	20	0	89.5	60 - 138			
Chloroform	19.78	1.0	20	0	98.9	79 - 124			
Chloromethane	13.81	1.0	20	0	69.0	50 - 139			
cis-1,2-Dichloroethene	19.48	1.0	20	0	97.4	78 - 123			
cis-1,3-Dichloropropene	19.48	1.0	20	0	97.4	75 - 124			
Dibromochloromethane	22.32	1.0	20	0	112	74 - 126			
Dibromomethane	21.3	1.0	20	0	106	79 - 123			
Dichlorodifluoromethane	20.04	1.0	20	0	100	32 - 152			
Ethylbenzene	23.17	1.0	20	0	116	79 - 121			
Hexachlorobutadiene	26.18	1.0	20	0	131	66 - 134			
Isopropylbenzene	23.3	1.0	20	0	117	72 - 131			
m,p-Xylene	45.06	2.0	40	0	113	80 - 121			
Methylene chloride	19.58	2.0	20	0	97.9	74 - 124			
Naphthalene	21.44	1.0	20	0	107	61 - 128			
n-Butylbenzene	24.06	1.0	20	0	120	75 - 128			
n-Propylbenzene	22.63	1.0	20	0	113	76 - 126			
o-Xylene	21.99	1.0	20	0	110	78 - 122			
sec-Butylbenzene	23.1	1.0	20	0	116	77 - 126			
Styrene	22.87	1.0	20	0	114	78 - 123			
tert-Butylbenzene	22.98	1.0	20	0	115	78 - 124			
Tetrachloroethene	24.12	1.0	20	0	121	74 - 129			
Toluene	22.17	1.0	20	0	111	80 - 121			
trans-1,2-Dichloroethene	19.59	1.0	20	0	98.0	75 - 124			
trans-1,3-Dichloropropene	21.32	1.0	20	0	107	73 - 127			
Trichloroethene	21.61	1.0	20	0	108	79 - 123			
Trichlorofluoromethane	21.57	1.0	20	0	108	65 - 141			
Vinyl chloride	16.87	1.0	20	0	84.4	58 - 137			
Surr: 1,2-Dichloroethane-d4	43.53	1.0	50	0	87.1	81 - 118			
Surr: 4-Bromofluorobenzene	49.05	1.0	50	0	98.1	85 - 114			
Surr: Dibromofluoromethane	45.63	1.0	50	0	91.3	80 - 119			
Surr: Toluene-d8	51.4	1.0	50	0	103	89 - 112			

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

QC BATCH REPORT NEW

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCSD		Sample ID: VLCSDW-190415		Units: UG/L		Analysis Date: 15-Apr-2019 12:25				
Client ID:		Run ID: VOA6_336625		SeqNo: 5036127		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	21.97	1.0	20	0	110	78 - 124	22.62	2.9	20	
1,1,1-Trichloroethane	20.06	1.0	20	0	100	74 - 131	20.75	3.35	20	
1,1,2,2-Tetrachloroethane	20.83	1.0	20	0	104	71 - 121	20.57	1.29	20	
1,1,2-Trichloroethane	20.92	1.0	20	0	105	80 - 119	20.88	0.171	20	
1,1-Dichloroethane	18.16	1.0	20	0	90.8	77 - 125	18.5	1.84	20	
1,1-Dichloroethene	18.88	1.0	20	0	94.4	71 - 131	19.56	3.54	20	
1,1-Dichloropropene	20.24	1.0	20	0	101	78 - 125	20.53	1.46	20	
1,2,3-Trichlorobenzene	23	1.0	20	0	115	69 - 129	22.3	3.1	20	
1,2,3-Trichloropropane	21.34	1.0	20	0	107	73 - 122	20.92	1.98	20	
1,2,4-Trichlorobenzene	22.54	1.0	20	0	113	69 - 130	22.16	1.72	20	
1,2,4-Trimethylbenzene	23.74	1.0	20	0	119	76 - 124	23.96	0.958	20	
1,2-Dibromo-3-chloropropane	21.98	1.0	20	0	110	62 - 128	21.56	1.93	20	
1,2-Dibromoethane	22.29	1.0	20	0	111	77 - 121	22.06	1.05	20	
1,2-Dichlorobenzene	21.95	1.0	20	0	110	80 - 119	21.83	0.537	20	
1,2-Dichloroethane	21.51	1.0	20	0	108	73 - 128	20.97	2.51	20	
1,2-Dichloropropane	19.29	1.0	20	0	96.4	78 - 122	19.44	0.804	20	
1,3,5-Trimethylbenzene	23.21	1.0	20	0	116	75 - 124	23.36	0.612	20	
1,3-Dichlorobenzene	21.98	1.0	20	0	110	80 - 119	22.14	0.73	20	
1,3-Dichloropropane	20.58	1.0	20	0	103	80 - 119	20.55	0.163	20	
1,4-Dichlorobenzene	21.54	1.0	20	0	108	79 - 118	21.91	1.66	20	
2,2-Dichloropropane	19.64	1.0	20	0	98.2	60 - 139	20.44	4.01	20	
2-Butanone	36.5	2.0	40	0	91.2	56 - 143	34.91	4.44	20	
2-Chlorotoluene	21.24	1.0	20	0	106	79 - 122	21.42	0.83	20	
2-Hexanone	40.49	2.0	40	0	101	57 - 139	40.09	0.977	20	
4-Chlorotoluene	21.68	1.0	20	0	108	78 - 122	21.72	0.156	20	
4-Isopropyltoluene	23.3	1.0	20	0	116	77 - 127	23.88	2.44	20	
4-Methyl-2-pentanone	39.85	2.0	40	0	99.6	67 - 130	38.74	2.81	20	
Acetone	34.57	2.0	40	0	86.4	39 - 160	33.63	2.77	20	
Benzene	20.5	1.0	20	0	102	79 - 120	21.09	2.83	20	
Bromobenzene	22.92	1.0	20	0	115	80 - 120	23.22	1.33	20	
Bromochloromethane	20.14	1.0	20	0	101	78 - 123	20.29	0.728	20	
Bromodichloromethane	21.33	1.0	20	0	107	79 - 125	21.35	0.112	20	
Bromoform	22.36	1.0	20	0	112	66 - 130	22.42	0.259	20	
Bromomethane	21.73	1.0	20	0	109	53 - 141	23.55	8.04	20	

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

QC BATCH REPORT NEW

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCSD		Sample ID: VLCSDW-190415		Units: UG/L		Analysis Date: 15-Apr-2019 12:25			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036127		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	34.78	2.0	40	0	86.9	64 - 133	36.08	3.68	20
Carbon tetrachloride	23.64	1.0	20	0	118	72 - 136	24.06	1.75	20
Chlorobenzene	21.23	1.0	20	0	106	82 - 118	21.18	0.223	20
Chloroethane	17.77	1.0	20	0	88.9	60 - 138	17.9	0.709	20
Chloroform	19.21	1.0	20	0	96.1	79 - 124	19.78	2.9	20
Chloromethane	13.34	1.0	20	0	66.7	50 - 139	13.81	3.42	20
cis-1,2-Dichloroethene	18.99	1.0	20	0	94.9	78 - 123	19.48	2.55	20
cis-1,3-Dichloropropene	19.64	1.0	20	0	98.2	75 - 124	19.48	0.777	20
Dibromochloromethane	21.98	1.0	20	0	110	74 - 126	22.32	1.55	20
Dibromomethane	21.37	1.0	20	0	107	79 - 123	21.3	0.368	20
Dichlorodifluoromethane	19.28	1.0	20	0	96.4	32 - 152	20.04	3.87	20
Ethylbenzene	22.22	1.0	20	0	111	79 - 121	23.17	4.15	20
Hexachlorobutadiene	25.09	1.0	20	0	125	66 - 134	26.18	4.27	20
Isopropylbenzene	22.72	1.0	20	0	114	72 - 131	23.3	2.54	20
m,p-Xylene	43.7	2.0	40	0	109	80 - 121	45.06	3.05	20
Methylene chloride	19.08	2.0	20	0	95.4	74 - 124	19.58	2.6	20
Naphthalene	22.19	1.0	20	0	111	61 - 128	21.44	3.44	20
n-Butylbenzene	24.01	1.0	20	0	120	75 - 128	24.06	0.198	20
n-Propylbenzene	22.35	1.0	20	0	112	76 - 126	22.63	1.24	20
o-Xylene	21.28	1.0	20	0	106	78 - 122	21.99	3.3	20
sec-Butylbenzene	22.9	1.0	20	0	114	77 - 126	23.1	0.895	20
Styrene	22.39	1.0	20	0	112	78 - 123	22.87	2.13	20
tert-Butylbenzene	22.55	1.0	20	0	113	78 - 124	22.98	1.89	20
Tetrachloroethene	23.45	1.0	20	0	117	74 - 129	24.12	2.8	20
Toluene	21.39	1.0	20	0	107	80 - 121	22.17	3.6	20
trans-1,2-Dichloroethene	18.77	1.0	20	0	93.9	75 - 124	19.59	4.27	20
trans-1,3-Dichloropropene	20.84	1.0	20	0	104	73 - 127	21.32	2.27	20
Trichloroethene	20.94	1.0	20	0	105	79 - 123	21.61	3.17	20
Trichlorofluoromethane	20.92	1.0	20	0	105	65 - 141	21.57	3.03	20
Vinyl chloride	16.4	1.0	20	0	82.0	58 - 137	16.87	2.85	20
Surr: 1,2-Dichloroethane-d4	44.62	1.0	50	0	89.2	81 - 118	43.53	2.47	20
Surr: 4-Bromofluorobenzene	48.9	1.0	50	0	97.8	85 - 114	49.05	0.319	20
Surr: Dibromofluoromethane	45.81	1.0	50	0	91.6	80 - 119	45.63	0.395	20
Surr: Toluene-d8	50.74	1.0	50	0	101	89 - 112	51.4	1.28	20

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

QC BATCH REPORT NEW

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS19040783-05MS		Units: UG/L		Analysis Date: 15-Apr-2019 15:37			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036134		PrepDate:		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	219.1	10	200	0	110	78 - 124			
1,1,1-Trichloroethane	208.4	10	200	0	104	74 - 131			
1,1,2,2-Tetrachloroethane	205.5	10	200	0	103	71 - 121			
1,1,2-Trichloroethane	205.1	10	200	2.7	101	80 - 119			
1,1-Dichloroethane	183.3	10	200	0	91.7	77 - 125			
1,1-Dichloroethene	195.9	10	200	0	97.9	71 - 131			
1,1-Dichloropropene	211.2	10	200	50.1	80.5	78 - 125			
1,2,3-Trichlorobenzene	224.5	10	200	0	112	69 - 129			
1,2,3-Trichloropropane	201.6	10	200	3.051	99.3	73 - 122			
1,2,4-Trichlorobenzene	224.3	10	200	0	112	69 - 130			
1,2,4-Trimethylbenzene	226.6	10	200	3.34	112	76 - 124			
1,2-Dibromo-3-chloropropane	227.9	10	200	0	114	62 - 128			
1,2-Dibromoethane	216.1	10	200	0	108	77 - 121			
1,2-Dichlorobenzene	217.4	10	200	0	109	80 - 119			
1,2-Dichloroethane	212.8	10	200	13.12	99.8	73 - 128			
1,2-Dichloropropane	187.2	10	200	0	93.6	78 - 122			
1,3,5-Trimethylbenzene	227	10	200	2.269	112	75 - 124			
1,3-Dichlorobenzene	215.7	10	200	0	108	80 - 119			
1,3-Dichloropropane	203.4	10	200	0	102	80 - 119			
1,4-Dichlorobenzene	215.1	10	200	0	108	79 - 118			
2,2-Dichloropropane	200.1	10	200	0	100	60 - 139			
2-Butanone	362	20	400	0	90.5	56 - 143			
2-Chlorotoluene	212.5	10	200	0	106	79 - 122			
2-Hexanone	403.2	20	400	0	101	57 - 139			
4-Chlorotoluene	212.4	10	200	0	106	78 - 122			
4-Isopropyltoluene	232.2	10	200	1.803	115	77 - 127			
4-Methyl-2-pentanone	396.8	20	400	2.045	98.7	67 - 130			
Acetone	398	20	400	6.558	97.9	39 - 160			
Benzene	678.1	10	200	485.3	96.4	79 - 120			
Bromobenzene	219.1	10	200	0	110	80 - 120			
Bromochloromethane	188.3	10	200	0	94.1	78 - 123			
Bromodichloromethane	205.8	10	200	0	103	79 - 125			
Bromoform	214.5	10	200	15.19	99.7	66 - 130			
Bromomethane	214.3	10	200	5.754	104	53 - 141			

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

QC BATCH REPORT NEW

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS19040783-05MS		Units: UG/L		Analysis Date: 15-Apr-2019 15:37			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036134		PrepDate:		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Carbon disulfide	380.9	20	400	0	95.2	64 - 133			
Carbon tetrachloride	238.1	10	200	92.29	72.9	72 - 136			
Chlorobenzene	212.7	10	200	0	106	82 - 118			
Chloroethane	185.8	10	200	0	92.9	60 - 138			
Chloroform	192.8	10	200	1.452	95.7	79 - 124			
Chloromethane	158.9	10	200	0	79.4	50 - 139			
cis-1,2-Dichloroethene	185.9	10	200	0	93.0	78 - 123			
cis-1,3-Dichloropropene	197.3	10	200	0	98.6	75 - 124			
Dibromochloromethane	215.1	10	200	0	108	74 - 126			
Dibromomethane	205.9	10	200	0	103	79 - 123			
Dichlorodifluoromethane	218.8	10	200	0	109	32 - 152			
Ethylbenzene	222.1	10	200	14.36	104	79 - 121			
Hexachlorobutadiene	257	10	200	0	128	66 - 134			
Isopropylbenzene	227.3	10	200	0	114	72 - 131			
m,p-Xylene	458.8	20	400	11.39	112	80 - 121			
Methylene chloride	201.1	20	200	13.8	93.6	74 - 124			
Naphthalene	219.8	10	200	1.985	109	61 - 128			
n-Butylbenzene	234.8	10	200	1.33	117	75 - 128			
n-Propylbenzene	225.7	10	200	0	113	76 - 126			
o-Xylene	223	10	200	4.111	109	78 - 122			
sec-Butylbenzene	232.8	10	200	2.756	115	77 - 126			
Styrene	218.6	10	200	0	109	78 - 123			
tert-Butylbenzene	230.2	10	200	0	115	78 - 124			
Tetrachloroethene	237.2	10	200	0	119	74 - 129			
Toluene	238.4	10	200	22.15	108	80 - 121			
trans-1,2-Dichloroethene	194.8	10	200	0	97.4	75 - 124			
trans-1,3-Dichloropropene	200.7	10	200	0	100	73 - 127			
Trichloroethene	217.9	10	200	0	109	79 - 123			
Trichlorofluoromethane	227.9	10	200	0	114	65 - 141			
Vinyl chloride	174.3	10	200	0	87.2	58 - 137			
Surr: 1,2-Dichloroethane-d4	438.9	10	500	0	87.8	81 - 118			
Surr: 4-Bromofluorobenzene	490.6	10	500	0	98.1	85 - 114			
Surr: Dibromofluoromethane	458.5	10	500	0	91.7	80 - 119			
Surr: Toluene-d8	513	10	500	0	103	89 - 112			

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

QC BATCH REPORT NEW

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS19040783-05MSD		Units: UG/L		Analysis Date: 15-Apr-2019 16:01			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036135		PrepDate:		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	215.6	10	200	0	108	78 - 124	219.1	1.61	20
1,1,1-Trichloroethane	198.6	10	200	0	99.3	74 - 131	208.4	4.82	20
1,1,2,2-Tetrachloroethane	203.8	10	200	0	102	71 - 121	205.5	0.84	20
1,1,2-Trichloroethane	205.1	10	200	2.7	101	80 - 119	205.1	0.0221	20
1,1-Dichloroethane	174.7	10	200	0	87.3	77 - 125	183.3	4.82	20
1,1-Dichloroethene	184.7	10	200	0	92.3	71 - 131	195.9	5.87	20
1,1-Dichloropropene	199.6	10	200	50.1	74.8	78 - 125	211.2	5.64	20 S
1,2,3-Trichlorobenzene	235.3	10	200	0	118	69 - 129	224.5	4.68	20
1,2,3-Trichloropropane	199	10	200	3.051	98.0	73 - 122	201.6	1.3	20
1,2,4-Trichlorobenzene	224.3	10	200	0	112	69 - 130	224.3	0.0243	20
1,2,4-Trimethylbenzene	218.7	10	200	3.34	108	76 - 124	226.6	3.56	20
1,2-Dibromo-3-chloropropane	222.9	10	200	0	111	62 - 128	227.9	2.23	20
1,2-Dibromoethane	216.6	10	200	0	108	77 - 121	216.1	0.217	20
1,2-Dichlorobenzene	213.3	10	200	0	107	80 - 119	217.4	1.92	20
1,2-Dichloroethane	205.1	10	200	13.12	96.0	73 - 128	212.8	3.69	20
1,2-Dichloropropane	181.8	10	200	0	90.9	78 - 122	187.2	2.93	20
1,3,5-Trimethylbenzene	220	10	200	2.269	109	75 - 124	227	3.1	20
1,3-Dichlorobenzene	211.5	10	200	0	106	80 - 119	215.7	1.95	20
1,3-Dichloropropane	201.3	10	200	0	101	80 - 119	203.4	1.01	20
1,4-Dichlorobenzene	210.6	10	200	0	105	79 - 118	215.1	2.11	20
2,2-Dichloropropane	189.5	10	200	0	94.8	60 - 139	200.1	5.45	20
2-Butanone	360.4	20	400	0	90.1	56 - 143	362	0.44	20
2-Chlorotoluene	205.1	10	200	0	103	79 - 122	212.5	3.53	20
2-Hexanone	401.2	20	400	0	100	57 - 139	403.2	0.482	20
4-Chlorotoluene	207.7	10	200	0	104	78 - 122	212.4	2.2	20
4-Isopropyltoluene	226.3	10	200	1.803	112	77 - 127	232.2	2.56	20
4-Methyl-2-pentanone	392.9	20	400	2.045	97.7	67 - 130	396.8	0.971	20
Acetone	405.6	20	400	6.558	99.8	39 - 160	398	1.91	20
Benzene	652.6	10	200	485.3	83.7	79 - 120	678.1	3.82	20
Bromobenzene	216.6	10	200	0	108	80 - 120	219.1	1.14	20
Bromochloromethane	183.1	10	200	0	91.5	78 - 123	188.3	2.81	20
Bromodichloromethane	198.4	10	200	0	99.2	79 - 125	205.8	3.66	20
Bromoform	214.2	10	200	15.19	99.5	66 - 130	214.5	0.158	20
Bromomethane	214	10	200	5.754	104	53 - 141	214.3	0.12	20

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

QC BATCH REPORT NEW

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS19040783-05MSD		Units: UG/L		Analysis Date: 15-Apr-2019 16:01			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036135		PrepDate:		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	358.8	20	400	0	89.7	64 - 133	380.9	5.96	20
Carbon tetrachloride	226.7	10	200	92.29	67.2	72 - 136	238.1	4.89	20 S
Chlorobenzene	208.3	10	200	0	104	82 - 118	212.7	2.09	20
Chloroethane	159.6	10	200	0	79.8	60 - 138	185.8	15.2	20
Chloroform	184.5	10	200	1.452	91.5	79 - 124	192.8	4.37	20
Chloromethane	153.7	10	200	0	76.8	50 - 139	158.9	3.34	20
cis-1,2-Dichloroethene	183.5	10	200	0	91.7	78 - 123	185.9	1.34	20
cis-1,3-Dichloropropene	192.4	10	200	0	96.2	75 - 124	197.3	2.51	20
Dibromochloromethane	212.1	10	200	0	106	74 - 126	215.1	1.41	20
Dibromomethane	199.3	10	200	0	99.7	79 - 123	205.9	3.25	20
Dichlorodifluoromethane	206.6	10	200	0	103	32 - 152	218.8	5.7	20
Ethylbenzene	216.4	10	200	14.36	101	79 - 121	222.1	2.59	20
Hexachlorobutadiene	258.8	10	200	0	129	66 - 134	257	0.713	20
Isopropylbenzene	221.9	10	200	0	111	72 - 131	227.3	2.39	20
m,p-Xylene	441	20	400	11.39	107	80 - 121	458.8	3.96	20
Methylene chloride	194.1	20	200	13.8	90.2	74 - 124	201.1	3.52	20
Naphthalene	224.1	10	200	1.985	111	61 - 128	219.8	1.93	20
n-Butylbenzene	228.5	10	200	1.33	114	75 - 128	234.8	2.72	20
n-Propylbenzene	218.6	10	200	0	109	76 - 126	225.7	3.21	20
o-Xylene	219.2	10	200	4.111	108	78 - 122	223	1.71	20
sec-Butylbenzene	225	10	200	2.756	111	77 - 126	232.8	3.43	20
Styrene	212.6	10	200	0	106	78 - 123	218.6	2.78	20
tert-Butylbenzene	223.5	10	200	0	112	78 - 124	230.2	2.97	20
Tetrachloroethene	227.2	10	200	0	114	74 - 129	237.2	4.3	20
Toluene	231	10	200	22.15	104	80 - 121	238.4	3.17	20
trans-1,2-Dichloroethene	187.5	10	200	0	93.7	75 - 124	194.8	3.85	20
trans-1,3-Dichloropropene	198	10	200	0	99.0	73 - 127	200.7	1.35	20
Trichloroethene	207.4	10	200	0	104	79 - 123	217.9	4.91	20
Trichlorofluoromethane	213.7	10	200	0	107	65 - 141	227.9	6.43	20
Vinyl chloride	163.4	10	200	0	81.7	58 - 137	174.3	6.44	20
Surr: 1,2-Dichloroethane-d4	432.1	10	500	0	86.4	81 - 118	438.9	1.56	20
Surr: 4-Bromofluorobenzene	490.4	10	500	0	98.1	85 - 114	490.6	0.0491	20
Surr: Dibromofluoromethane	460.5	10	500	0	92.1	80 - 119	458.5	0.425	20
Surr: Toluene-d8	516	10	500	0	103	89 - 112	513	0.582	20

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

QC BATCH REPORT NEW**Batch ID:** R336625 (0)**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD
8260C

The following samples were analyzed in this batch:

HS19040319-01	HS19040319-02
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ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

QC BATCH REPORT NEW

Batch ID: R336786 (0)		Instrument: ICS2100		Method: ANIONS BY SW9056A					
MBLK	Sample ID: WBLKW1-041619	Units: mg/L		Analysis Date: 16-Apr-2019 11:54					
Client ID:	Run ID: ICS2100_336786	SeqNo: 5039313		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	0.500	0.500							U
Sulfate	0.500	0.500							U
LCS	Sample ID: WLC SW1-041619	Units: mg/L		Analysis Date: 16-Apr-2019 12:09					
Client ID:	Run ID: ICS2100_336786	SeqNo: 5039314		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	20.02	0.500	20	0	100	80 - 120			
Sulfate	19.78	0.500	20	0	98.9	80 - 120			
LCSD	Sample ID: WLCSDW1-041619	Units: mg/L		Analysis Date: 16-Apr-2019 12:23					
Client ID:	Run ID: ICS2100_336786	SeqNo: 5039315		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	20.7	0.500	20	0	104	80 - 120	20.02	3.33	20
Sulfate	20.55	0.500	20	0	103	80 - 120	19.78	3.81	20
MS	Sample ID: HS19040319-01MS	Units: mg/L		Analysis Date: 16-Apr-2019 15:18					
Client ID: LH18/24-SP650_040419	Run ID: ICS2100_336786	SeqNo: 5039317		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	452	5.00	100	376.6	75.4	80 - 120			S
Sulfate	121.7	5.00	100	29.61	92.1	80 - 120			
MSD	Sample ID: HS19040319-01MSD	Units: mg/L		Analysis Date: 16-Apr-2019 15:33					
Client ID: LH18/24-SP650_040419	Run ID: ICS2100_336786	SeqNo: 5039318		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	457.9	5.00	100	376.6	81.3	80 - 120	452	1.3	20
Sulfate	124.1	5.00	100	29.61	94.5	80 - 120	121.7	2.01	20
The following samples were analyzed in this batch: HS19040319-01									

ALS Houston, US

Date: 18-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19040319

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/L	Milligrams per Liter

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Texas	T10470231-18-21	30-Apr-2019
North Dakota	R193 2018-2019	30-Apr-2019
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kentucky	123043 - 2018	30-Apr-2019
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
California	2919, 2018-2019	30-Apr-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020

Client:	Bhate Environmental Associates, Inc.	SAMPLE TRACKING
Project:	Longhorn GW Treatment Plant Bi-Weekly Samples	
Work Order:	HS19040319	

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19040319-01	LH18/24-SP650_040419	Login	4/5/2019 11:49:50 AM	NDR	WET341
HS19040319-01	LH18/24-SP650_040419	Login	4/5/2019 11:49:50 AM	NDR	VOA067
HS19040319-02	Trip Blank	Login	4/5/2019 11:49:50 AM	NDR	VOA067

ALS Houston, US

Date: 18-Apr-19

Sample Receipt Checklist

Client Name: Bhate Environmental
Work Order: HS19040319

Date/Time Received: **05-Apr-2019 08:40**
Received by: **NDR**

Checklist completed by: Nilesh D. Ranchod 5-Apr-2019
eSignature Date

Reviewed by: RJ Modashia 5-Apr-2019
eSignature Date

Matrices: **Water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:None
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	3.5c U/c IR11		
Cooler(s)/Kit(s):	44555		
Date/Time sample(s) sent to storage:	04/05/2019 12:00		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:


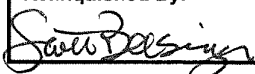
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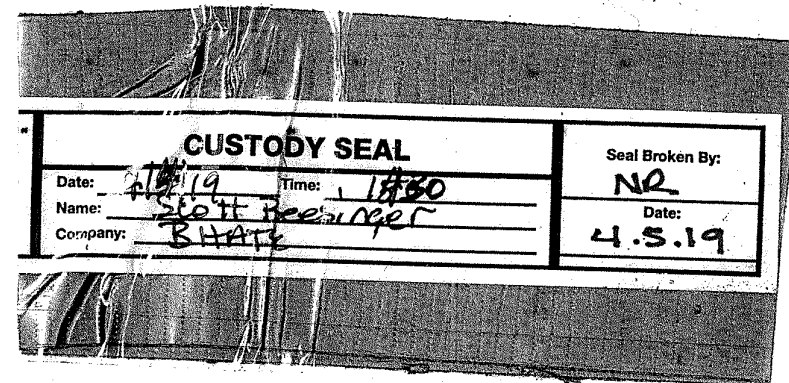
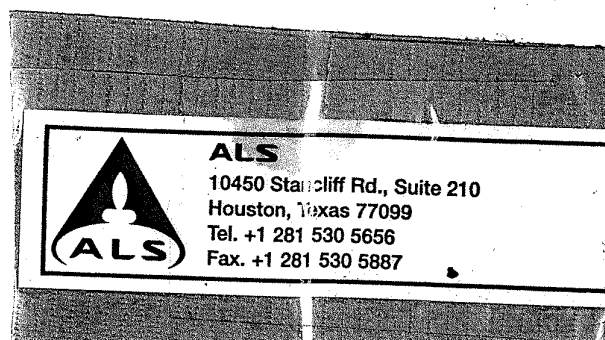
Comments:

Corrective Action:

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210, Houston, Tx. 77099 ATTN: R.J. ModashiaPage 1 of 1

Project: BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			Project No. NWO1312.0150.0 16.0001		Analyses										Remarks (Preservatives, etc.)	 Bate Environmental Associates, Inc. Longhorn GW Treatment Plant Bi-Weekly Samples			
Job: GROUNDWATER TREATMENT PLANT BI-WEEKLY SAMPLES					MS / MSD No. OF CONTAINERS	VOC	CHLORIDE, SULFATE												
Prepared By: Scott Beesinger			P.O Number																
Field Sample I.D.	Sample Matrix	Date / Time																	
LH18/24-SP650_040419	Water	04/04/19 / 14:00	3	3															HCL
LH18/24-SP650_040419	Water	04/04/19 / 14:00	1	1															NONE
Trip Blank	Water	04/04/19	2	2															HCL
Additional Remarks: STANDARD TAT ON ALL PARAMETERS.																			
Relinquished By: 		Date 04/04/19	Time 14:30	Received By:		Date	Time	Relinquished By:		Date	Time	Received By: NR		Date 4/5/19	Time 08:40				
9 For Lab Use Only																			
Received At Lab By:		Date	Time	Airbill No.	Opened By:		Date	Time	Temp of Container	Seal No.	Condition								
Remarks																			





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

April 29, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19040652**

Laboratory Results for: **LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples**

Dear Marcia,

ALS Environmental received 3 sample(s) on Apr 11, 2019 for the analysis presented in the following report.

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

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

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

Sincerely,

Generated By: JUMOKE.LAWAL

RJ Modashia
Project Manager

ALS Houston, US

Date: 29-Apr-19

Client:

Project:

Work Order:

Bhate Environmental Associates, Inc.
LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
HS19040652

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19040652-01	LH18/24-SP650_041019	Water		10-Apr-2019 14:00	11-Apr-2019 09:00	<input type="checkbox"/>
HS19040652-02	LH18/24-SP650_041019_BIX	Water		10-Apr-2019 14:00	11-Apr-2019 09:00	<input type="checkbox"/>
HS19040652-03	Trip Blank	Water		10-Apr-2019 14:00	11-Apr-2019 09:00	<input type="checkbox"/>

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
Work Order:

CASE NARRATIVE

Work Order Comments

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

GCMS Semivolatiles by Method SW8270SIM**Batch ID: 139780****Sample ID: LH18/24-SP650_041019 (HS19040652-01)**

- The surrogate recoveries could not be determined due to dilution below the calibration range.

GCMS Volatiles by Method SW8260**Batch ID: R336625****Sample ID: CCV**

- Carbontetrachloride, Hexachlorobutadiene, n-Butylbenzene and Tetrachloroethene exceeded %D limits on CCV. Samples ND.

Sample ID: HS19040783-05MS

- MS and MSD are for an unrelated sample

Metals by Method SW6020**Batch ID: 139800**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method SW7196**Batch ID: R336862**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
 Sample ID: LH18/24-SP650_041019
 Collection Date: 10-Apr-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19040652

Lab ID:HS19040652-01

Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		Method:SW8260						Analyst: AKP
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,2-Dichloroethane	0.67	J	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:49
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Apr-2019 14:49
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Apr-2019 14:49
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:49
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Apr-2019 14:49
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	15-Apr-2019 14:49
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Apr-2019 14:49
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49

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

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
 Sample ID: LH18/24-SP650_041019
 Collection Date: 10-Apr-2019 14:00

ANALYTICAL REPORT
 WorkOrder:HS19040652
 Lab ID:HS19040652-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C			Method:SW8260				Analyst: AKP	
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
cis-1,2-Dichloroethene	2.3		0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Apr-2019 14:49
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Apr-2019 14:49
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Apr-2019 14:49
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:49
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Trichloroethene	0.82	J	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:49
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:49
<i>Surr: 1,2-Dichloroethane-d4</i>	86.7			0	81-118	%REC	1	15-Apr-2019 14:49
<i>Surr: 4-Bromofluorobenzene</i>	96.5			0	85-114	%REC	1	15-Apr-2019 14:49
<i>Surr: Dibromofluoromethane</i>	90.6			0	80-119	%REC	1	15-Apr-2019 14:49
<i>Surr: Toluene-d8</i>	105			0	89-112	%REC	1	15-Apr-2019 14:49
SEMIVOLATILES SIM			Method:SW8270SIM				Prep:SW3510 / 12-Apr-2019	Analyst: QX
1,4-Dioxane	7.9		1.0	1.0	1.0	ug/L	100	15-Apr-2019 15:15
<i>Surr: 2-Fluorobiphenyl</i>	0	S		0	40-140	%REC	100	15-Apr-2019 15:15
<i>Surr: 4-Terphenyl-d14</i>	0	S		0	40-140	%REC	100	15-Apr-2019 15:15
<i>Surr: Nitrobenzene-d5</i>	0	S		0	40-140	%REC	100	15-Apr-2019 15:15
METALS BY ICPMS BY SW6020A			Method:SW6020				Prep:SW3010A / 15-Apr-2019	Analyst: JHD
Barium	0.154		0.00190	0.00250	0.00500	mg/L	1	16-Apr-2019 23:33
Lead	0.00100	U	0.000600	0.00100	0.00500	mg/L	1	16-Apr-2019 23:33
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	16-Apr-2019 23:33
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	16-Apr-2019 23:33

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

ALS Houston, US

Date: 29-Apr-19

Client:	Bhate Environmental Associates, Inc.	ANALYTICAL REPORT
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples	WorkOrder:HS19040652
Sample ID:	LH18/24-SP650_041019	Lab ID:HS19040652-01
Collection Date:	10-Apr-2019 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
HEXAVALENT CHROMIUM BY SW7196A		Method:SW7196		Analyst: MZD				
Chromium, Hexavalent	0.0100	U	0.00600	0.0100	0.0100	mg/L	1	11-Apr-2019 12:10

ALS Houston, US

Date: 29-Apr-19

Client:	Bhate Environmental Associates, Inc.	ANALYTICAL REPORT
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples	WorkOrder:HS19040652
Sample ID:	LH18/24-SP650_041019_BIX	Lab ID:HS19040652-02
Collection Date:	10-Apr-2019 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	25-Apr-2019 17:26

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
 Sample ID: Trip Blank
 Collection Date: 10-Apr-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19040652

Lab ID:HS19040652-03

Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		Method:SW8260						Analyst: AKP
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:01
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Apr-2019 14:01
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Apr-2019 14:01
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:01
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Apr-2019 14:01
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	15-Apr-2019 14:01
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Apr-2019 14:01
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01

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

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
 Sample ID: Trip Blank
 Collection Date: 10-Apr-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19040652

Lab ID:HS19040652-03

Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD		Method:SW8260						Analyst: AKP
8260C								
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Apr-2019 14:01
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Apr-2019 14:01
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	15-Apr-2019 14:01
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Apr-2019 14:01
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Apr-2019 14:01
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Apr-2019 14:01
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>86.4</i>			0	<i>81-118</i>	%REC	<i>1</i>	<i>15-Apr-2019 14:01</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>95.7</i>			0	<i>85-114</i>	%REC	<i>1</i>	<i>15-Apr-2019 14:01</i>
<i>Surr: Dibromofluoromethane</i>	<i>90.8</i>			0	<i>80-119</i>	%REC	<i>1</i>	<i>15-Apr-2019 14:01</i>
<i>Surr: Toluene-d8</i>	<i>104</i>			0	<i>89-112</i>	%REC	<i>1</i>	<i>15-Apr-2019 14:01</i>

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

WEIGHT LOG

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

Batch ID: 139780 **Method:** SEMIVOLATILES SIM **Prep:** 3510_B_SIM

SamplID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19040652-01	1	1000	1 (mL)	0.001

Batch ID: 139800 **Method:** METALS BY ICPMS BY SW6020A **Prep:** 3010A

SamplID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19040652-01	1	10	10 (mL)	1

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID 139780	Test Name : SEMIVOLATILES SIM			Matrix: Water		
HS19040652-01	LH18/24-SP650_041019	10 Apr 2019 14:00		12 Apr 2019 14:36	15 Apr 2019 15:15	100
Batch ID 139800	Test Name : METALS BY ICPMS BY SW6020A			Matrix: Water		
HS19040652-01	LH18/24-SP650_041019	10 Apr 2019 14:00		15 Apr 2019 08:30	16 Apr 2019 23:33	1
Batch ID R336625	Test Name : VOLATILES ORGANICS BY METHOD 8260C			Matrix: Water		
HS19040652-01	LH18/24-SP650_041019	10 Apr 2019 14:00			15 Apr 2019 14:49	1
HS19040652-03	Trip Blank	10 Apr 2019 14:00			15 Apr 2019 14:01	1
Batch ID R336862	Test Name : HEXAVALENT CHROMIUM BY SW7196A			Matrix: Water		
HS19040652-01	LH18/24-SP650_041019	10 Apr 2019 14:00			11 Apr 2019 12:10	1
Batch ID R337297	Test Name : SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			Matrix: Water		
HS19040652-02	LH18/24-SP650_041019_BIX	10 Apr 2019 14:00			25 Apr 2019 17:26	1

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: 139800 (0)		Instrument: ICPMS05		Method: ICP-MS METALS BY SW6020A					
MBLK	Sample ID: MBLK-139800	Units: mg/L		Analysis Date: 16-Apr-2019 22:45					
Client ID:	Run ID: ICPMS05_336650		SeqNo: 5038034		PrepDate: 15-Apr-2019		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.00250	0.00400							U
Lead	0.00100	0.00200							U
Selenium	0.00250	0.00200							U
Silver	0.000500	0.00200							U

LCS	Sample ID: LCS-139800	Units: mg/L		Analysis Date: 16-Apr-2019 22:48					
Client ID:	Run ID: ICPMS05_336650		SeqNo: 5038035		PrepDate: 15-Apr-2019		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.04817	0.00400	0.05	0	96.3	80 - 120			
Lead	0.04697	0.00200	0.05	0	93.9	80 - 120			
Selenium	0.05057	0.00200	0.05	0	101	80 - 120			
Silver	0.05065	0.00200	0.05	0	101	80 - 120			

MS	Sample ID: HS19040658-01MS	Units: mg/L		Analysis Date: 16-Apr-2019 22:58					
Client ID:	Run ID: ICPMS05_336650		SeqNo: 5038040		PrepDate: 15-Apr-2019		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.09918	0.00400	0.05	0.05263	93.1	80 - 120			
Lead	0.05081	0.00200	0.05	0.001376	98.9	80 - 120			
Selenium	0.05136	0.00200	0.05	0.000747	101	80 - 120			
Silver	0.04992	0.00200	0.05	0.000017	99.8	80 - 120			

MSD	Sample ID: HS19040658-01MSD	Units: mg/L		Analysis Date: 16-Apr-2019 23:01					
Client ID:	Run ID: ICPMS05_336650		SeqNo: 5038041		PrepDate: 15-Apr-2019		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.101	0.00400	0.05	0.05263	96.7	80 - 120	0.09918	1.82	20
Lead	0.05184	0.00200	0.05	0.001376	101	80 - 120	0.05081	2	20
Selenium	0.05176	0.00200	0.05	0.000747	102	80 - 120	0.05136	0.78	20
Silver	0.04999	0.00200	0.05	0.000017	99.9	80 - 120	0.04992	0.14	20

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: 139800 (0)		Instrument: ICPMS05		Method: ICP-MS METALS BY SW6020A					
PDS		Sample ID: HS19040658-01PDS		Units: mg/L		Analysis Date: 16-Apr-2019 23:03			
Client ID:		Run ID: ICPMS05_336650		SeqNo: 5038042		PrepDate: 15-Apr-2019		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.1474	0.00400	0.1	0.05263	94.8	75 - 125			
Lead	0.09706	0.00200	0.1	0.001376	95.7	75 - 125			
Selenium	0.101	0.00200	0.1	0.000747	100	75 - 125			
Silver	0.0996	0.00200	0.1	0.000017	99.6	75 - 125			

SD		Sample ID: HS19040658-01SD		Units: mg/L		Analysis Date: 16-Apr-2019 22:56			
Client ID:		Run ID: ICPMS05_336650		SeqNo: 5038039		PrepDate: 15-Apr-2019		DF: 5	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit Qual
Lead	0.00500	0.0100					0.001376	0 10	U
Selenium	0.0125	0.0100					0.000747	0 10	U
Silver	0.00250	0.0100					0.000017	0 10	U

The following samples were analyzed in this batch: HS19040652-01

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: 139780 (0)		Instrument: SV-5		Method: SEMIVOLATILES SIM					
MBLK	Sample ID: MBLK-139780	Units: ug/L		Analysis Date: 15-Apr-2019 12:25					
Client ID:	Run ID: SV-5_336636	SeqNo: 5036512		PrepDate: 12-Apr-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0.010	0.010							U
Surr: 2-Fluorobiphenyl	0.08629	0	0.08	0	108	40 - 140			
Surr: 4-Terphenyl-d14	0.07264	0	0.08	0	90.8	40 - 140			
Surr: Nitrobenzene-d5	0.07613	0	0.08	0	95.2	40 - 140			

LCS	Sample ID: LCS-139780	Units: ug/L		Analysis Date: 15-Apr-2019 12:46					
Client ID:	Run ID: SV-5_336636	SeqNo: 5036513		PrepDate: 12-Apr-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0.08801	0.010	0.08	0	110	40 - 140			
Surr: 2-Fluorobiphenyl	0.09164	0	0.08	0	115	40 - 140			
Surr: 4-Terphenyl-d14	0.08667	0	0.08	0	108	40 - 140			
Surr: Nitrobenzene-d5	0.07931	0	0.08	0	99.1	40 - 140			

LCSD	Sample ID: LCSD-139780	Units: ug/L		Analysis Date: 15-Apr-2019 13:07					
Client ID:	Run ID: SV-5_336636	SeqNo: 5036514		PrepDate: 12-Apr-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0.09214	0.010	0.08	0	115	40 - 140	0.08801	4.59	20
Surr: 2-Fluorobiphenyl	0.09791	0	0.08	0	122	40 - 140	0.09164	6.61	20
Surr: 4-Terphenyl-d14	0.07892	0	0.08	0	98.6	40 - 140	0.08667	9.37	20
Surr: Nitrobenzene-d5	0.09288	0	0.08	0	116	40 - 140	0.07931	15.8	20

The following samples were analyzed in this batch: HS19040652-01

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MBLK	Sample ID: VBLKW-190415	Units: UG/L		Analysis Date: 15-Apr-2019 13:13					
Client ID:	Run ID: VOA6_336625	SeqNo: 5036128		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	0.50	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	0.50	1.0							U
1,1,2-Trichloroethane	0.50	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	0.50	1.0							U
1,2,3-Trichlorobenzene	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
Bromomethane	0.50	1.0							U

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MBLK	Sample ID: VBLKW-190415	Units: UG/L		Analysis Date: 15-Apr-2019 13:13					
Client ID:	Run ID: VOA6_336625	SeqNo: 5036128		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	1.0	2.0							U
Carbon tetrachloride	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	43.81	1.0	50	0	87.6	81 - 118			
Surr: 4-Bromofluorobenzene	48.27	1.0	50	0	96.5	85 - 114			
Surr: Dibromofluoromethane	45.78	1.0	50	0	91.6	80 - 119			
Surr: Toluene-d8	50.76	1.0	50	0	102	89 - 112			

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-190415		Units: UG/L		Analysis Date: 15-Apr-2019 12:01			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036126		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	22.62	1.0	20	0	113	78 - 124			
1,1,1-Trichloroethane	20.75	1.0	20	0	104	74 - 131			
1,1,2,2-Tetrachloroethane	20.57	1.0	20	0	103	71 - 121			
1,1,2-Trichloroethane	20.88	1.0	20	0	104	80 - 119			
1,1-Dichloroethane	18.5	1.0	20	0	92.5	77 - 125			
1,1-Dichloroethene	19.56	1.0	20	0	97.8	71 - 131			
1,1-Dichloropropene	20.53	1.0	20	0	103	78 - 125			
1,2,3-Trichlorobenzene	22.3	1.0	20	0	111	69 - 129			
1,2,3-Trichloropropane	20.92	1.0	20	0	105	73 - 122			
1,2,4-Trichlorobenzene	22.16	1.0	20	0	111	69 - 130			
1,2,4-Trimethylbenzene	23.96	1.0	20	0	120	76 - 124			
1,2-Dibromo-3-chloropropane	21.56	1.0	20	0	108	62 - 128			
1,2-Dibromoethane	22.06	1.0	20	0	110	77 - 121			
1,2-Dichlorobenzene	21.83	1.0	20	0	109	80 - 119			
1,2-Dichloroethane	20.97	1.0	20	0	105	73 - 128			
1,2-Dichloropropane	19.44	1.0	20	0	97.2	78 - 122			
1,3,5-Trimethylbenzene	23.36	1.0	20	0	117	75 - 124			
1,3-Dichlorobenzene	22.14	1.0	20	0	111	80 - 119			
1,3-Dichloropropane	20.55	1.0	20	0	103	80 - 119			
1,4-Dichlorobenzene	21.91	1.0	20	0	110	79 - 118			
2,2-Dichloropropane	20.44	1.0	20	0	102	60 - 139			
2-Butanone	34.91	2.0	40	0	87.3	56 - 143			
2-Chlorotoluene	21.42	1.0	20	0	107	79 - 122			
2-Hexanone	40.09	2.0	40	0	100	57 - 139			
4-Chlorotoluene	21.72	1.0	20	0	109	78 - 122			
4-Isopropyltoluene	23.88	1.0	20	0	119	77 - 127			
4-Methyl-2-pentanone	38.74	2.0	40	0	96.9	67 - 130			
Acetone	33.63	2.0	40	0	84.1	39 - 160			
Benzene	21.09	1.0	20	0	105	79 - 120			
Bromobenzene	23.22	1.0	20	0	116	80 - 120			
Bromochloromethane	20.29	1.0	20	0	101	78 - 123			
Bromodichloromethane	21.35	1.0	20	0	107	79 - 125			
Bromoform	22.42	1.0	20	0	112	66 - 130			
Bromomethane	23.55	1.0	20	0	118	53 - 141			

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-190415		Units: UG/L		Analysis Date: 15-Apr-2019 12:01			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036126		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	36.08	2.0	40	0	90.2	64 - 133			
Carbon tetrachloride	24.06	1.0	20	0	120	72 - 136			
Chlorobenzene	21.18	1.0	20	0	106	82 - 118			
Chloroethane	17.9	1.0	20	0	89.5	60 - 138			
Chloroform	19.78	1.0	20	0	98.9	79 - 124			
Chloromethane	13.81	1.0	20	0	69.0	50 - 139			
cis-1,2-Dichloroethene	19.48	1.0	20	0	97.4	78 - 123			
cis-1,3-Dichloropropene	19.48	1.0	20	0	97.4	75 - 124			
Dibromochloromethane	22.32	1.0	20	0	112	74 - 126			
Dibromomethane	21.3	1.0	20	0	106	79 - 123			
Dichlorodifluoromethane	20.04	1.0	20	0	100	32 - 152			
Ethylbenzene	23.17	1.0	20	0	116	79 - 121			
Hexachlorobutadiene	26.18	1.0	20	0	131	66 - 134			
Isopropylbenzene	23.3	1.0	20	0	117	72 - 131			
m,p-Xylene	45.06	2.0	40	0	113	80 - 121			
Methylene chloride	19.58	2.0	20	0	97.9	74 - 124			
Naphthalene	21.44	1.0	20	0	107	61 - 128			
n-Butylbenzene	24.06	1.0	20	0	120	75 - 128			
n-Propylbenzene	22.63	1.0	20	0	113	76 - 126			
o-Xylene	21.99	1.0	20	0	110	78 - 122			
sec-Butylbenzene	23.1	1.0	20	0	116	77 - 126			
Styrene	22.87	1.0	20	0	114	78 - 123			
tert-Butylbenzene	22.98	1.0	20	0	115	78 - 124			
Tetrachloroethene	24.12	1.0	20	0	121	74 - 129			
Toluene	22.17	1.0	20	0	111	80 - 121			
trans-1,2-Dichloroethene	19.59	1.0	20	0	98.0	75 - 124			
trans-1,3-Dichloropropene	21.32	1.0	20	0	107	73 - 127			
Trichloroethene	21.61	1.0	20	0	108	79 - 123			
Trichlorofluoromethane	21.57	1.0	20	0	108	65 - 141			
Vinyl chloride	16.87	1.0	20	0	84.4	58 - 137			
Surr: 1,2-Dichloroethane-d4	43.53	1.0	50	0	87.1	81 - 118			
Surr: 4-Bromofluorobenzene	49.05	1.0	50	0	98.1	85 - 114			
Surr: Dibromofluoromethane	45.63	1.0	50	0	91.3	80 - 119			
Surr: Toluene-d8	51.4	1.0	50	0	103	89 - 112			

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCSD		Sample ID: VLCSDW-190415		Units: UG/L		Analysis Date: 15-Apr-2019 12:25				
Client ID:		Run ID: VOA6_336625		SeqNo: 5036127		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	21.97	1.0	20	0	110	78 - 124	22.62	2.9	20	
1,1,1-Trichloroethane	20.06	1.0	20	0	100	74 - 131	20.75	3.35	20	
1,1,2,2-Tetrachloroethane	20.83	1.0	20	0	104	71 - 121	20.57	1.29	20	
1,1,2-Trichloroethane	20.92	1.0	20	0	105	80 - 119	20.88	0.171	20	
1,1-Dichloroethane	18.16	1.0	20	0	90.8	77 - 125	18.5	1.84	20	
1,1-Dichloroethene	18.88	1.0	20	0	94.4	71 - 131	19.56	3.54	20	
1,1-Dichloropropene	20.24	1.0	20	0	101	78 - 125	20.53	1.46	20	
1,2,3-Trichlorobenzene	23	1.0	20	0	115	69 - 129	22.3	3.1	20	
1,2,3-Trichloropropane	21.34	1.0	20	0	107	73 - 122	20.92	1.98	20	
1,2,4-Trichlorobenzene	22.54	1.0	20	0	113	69 - 130	22.16	1.72	20	
1,2,4-Trimethylbenzene	23.74	1.0	20	0	119	76 - 124	23.96	0.958	20	
1,2-Dibromo-3-chloropropane	21.98	1.0	20	0	110	62 - 128	21.56	1.93	20	
1,2-Dibromoethane	22.29	1.0	20	0	111	77 - 121	22.06	1.05	20	
1,2-Dichlorobenzene	21.95	1.0	20	0	110	80 - 119	21.83	0.537	20	
1,2-Dichloroethane	21.51	1.0	20	0	108	73 - 128	20.97	2.51	20	
1,2-Dichloropropane	19.29	1.0	20	0	96.4	78 - 122	19.44	0.804	20	
1,3,5-Trimethylbenzene	23.21	1.0	20	0	116	75 - 124	23.36	0.612	20	
1,3-Dichlorobenzene	21.98	1.0	20	0	110	80 - 119	22.14	0.73	20	
1,3-Dichloropropane	20.58	1.0	20	0	103	80 - 119	20.55	0.163	20	
1,4-Dichlorobenzene	21.54	1.0	20	0	108	79 - 118	21.91	1.66	20	
2,2-Dichloropropane	19.64	1.0	20	0	98.2	60 - 139	20.44	4.01	20	
2-Butanone	36.5	2.0	40	0	91.2	56 - 143	34.91	4.44	20	
2-Chlorotoluene	21.24	1.0	20	0	106	79 - 122	21.42	0.83	20	
2-Hexanone	40.49	2.0	40	0	101	57 - 139	40.09	0.977	20	
4-Chlorotoluene	21.68	1.0	20	0	108	78 - 122	21.72	0.156	20	
4-Isopropyltoluene	23.3	1.0	20	0	116	77 - 127	23.88	2.44	20	
4-Methyl-2-pentanone	39.85	2.0	40	0	99.6	67 - 130	38.74	2.81	20	
Acetone	34.57	2.0	40	0	86.4	39 - 160	33.63	2.77	20	
Benzene	20.5	1.0	20	0	102	79 - 120	21.09	2.83	20	
Bromobenzene	22.92	1.0	20	0	115	80 - 120	23.22	1.33	20	
Bromochloromethane	20.14	1.0	20	0	101	78 - 123	20.29	0.728	20	
Bromodichloromethane	21.33	1.0	20	0	107	79 - 125	21.35	0.112	20	
Bromoform	22.36	1.0	20	0	112	66 - 130	22.42	0.259	20	
Bromomethane	21.73	1.0	20	0	109	53 - 141	23.55	8.04	20	

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCSD		Sample ID: VLCSDW-190415		Units: UG/L		Analysis Date: 15-Apr-2019 12:25			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036127		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Carbon disulfide	34.78	2.0	40	0	86.9	64 - 133	36.08	3.68	20
Carbon tetrachloride	23.64	1.0	20	0	118	72 - 136	24.06	1.75	20
Chlorobenzene	21.23	1.0	20	0	106	82 - 118	21.18	0.223	20
Chloroethane	17.77	1.0	20	0	88.9	60 - 138	17.9	0.709	20
Chloroform	19.21	1.0	20	0	96.1	79 - 124	19.78	2.9	20
Chloromethane	13.34	1.0	20	0	66.7	50 - 139	13.81	3.42	20
cis-1,2-Dichloroethene	18.99	1.0	20	0	94.9	78 - 123	19.48	2.55	20
cis-1,3-Dichloropropene	19.64	1.0	20	0	98.2	75 - 124	19.48	0.777	20
Dibromochloromethane	21.98	1.0	20	0	110	74 - 126	22.32	1.55	20
Dibromomethane	21.37	1.0	20	0	107	79 - 123	21.3	0.368	20
Dichlorodifluoromethane	19.28	1.0	20	0	96.4	32 - 152	20.04	3.87	20
Ethylbenzene	22.22	1.0	20	0	111	79 - 121	23.17	4.15	20
Hexachlorobutadiene	25.09	1.0	20	0	125	66 - 134	26.18	4.27	20
Isopropylbenzene	22.72	1.0	20	0	114	72 - 131	23.3	2.54	20
m,p-Xylene	43.7	2.0	40	0	109	80 - 121	45.06	3.05	20
Methylene chloride	19.08	2.0	20	0	95.4	74 - 124	19.58	2.6	20
Naphthalene	22.19	1.0	20	0	111	61 - 128	21.44	3.44	20
n-Butylbenzene	24.01	1.0	20	0	120	75 - 128	24.06	0.198	20
n-Propylbenzene	22.35	1.0	20	0	112	76 - 126	22.63	1.24	20
o-Xylene	21.28	1.0	20	0	106	78 - 122	21.99	3.3	20
sec-Butylbenzene	22.9	1.0	20	0	114	77 - 126	23.1	0.895	20
Styrene	22.39	1.0	20	0	112	78 - 123	22.87	2.13	20
tert-Butylbenzene	22.55	1.0	20	0	113	78 - 124	22.98	1.89	20
Tetrachloroethene	23.45	1.0	20	0	117	74 - 129	24.12	2.8	20
Toluene	21.39	1.0	20	0	107	80 - 121	22.17	3.6	20
trans-1,2-Dichloroethene	18.77	1.0	20	0	93.9	75 - 124	19.59	4.27	20
trans-1,3-Dichloropropene	20.84	1.0	20	0	104	73 - 127	21.32	2.27	20
Trichloroethene	20.94	1.0	20	0	105	79 - 123	21.61	3.17	20
Trichlorofluoromethane	20.92	1.0	20	0	105	65 - 141	21.57	3.03	20
Vinyl chloride	16.4	1.0	20	0	82.0	58 - 137	16.87	2.85	20
Surr: 1,2-Dichloroethane-d4	44.62	1.0	50	0	89.2	81 - 118	43.53	2.47	20
Surr: 4-Bromofluorobenzene	48.9	1.0	50	0	97.8	85 - 114	49.05	0.319	20
Surr: Dibromofluoromethane	45.81	1.0	50	0	91.6	80 - 119	45.63	0.395	20
Surr: Toluene-d8	50.74	1.0	50	0	101	89 - 112	51.4	1.28	20

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS19040783-05MS		Units: UG/L		Analysis Date: 15-Apr-2019 15:37			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036134		PrepDate:		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	219.1	10	200	0	110	78 - 124			
1,1,1-Trichloroethane	208.4	10	200	0	104	74 - 131			
1,1,2,2-Tetrachloroethane	205.5	10	200	0	103	71 - 121			
1,1,2-Trichloroethane	205.1	10	200	2.7	101	80 - 119			
1,1-Dichloroethane	183.3	10	200	0	91.7	77 - 125			
1,1-Dichloroethene	195.9	10	200	0	97.9	71 - 131			
1,1-Dichloropropene	211.2	10	200	50.1	80.5	78 - 125			
1,2,3-Trichlorobenzene	224.5	10	200	0	112	69 - 129			
1,2,3-Trichloropropane	201.6	10	200	3.051	99.3	73 - 122			
1,2,4-Trichlorobenzene	224.3	10	200	0	112	69 - 130			
1,2,4-Trimethylbenzene	226.6	10	200	3.34	112	76 - 124			
1,2-Dibromo-3-chloropropane	227.9	10	200	0	114	62 - 128			
1,2-Dibromoethane	216.1	10	200	0	108	77 - 121			
1,2-Dichlorobenzene	217.4	10	200	0	109	80 - 119			
1,2-Dichloroethane	212.8	10	200	13.12	99.8	73 - 128			
1,2-Dichloropropane	187.2	10	200	0	93.6	78 - 122			
1,3,5-Trimethylbenzene	227	10	200	2.269	112	75 - 124			
1,3-Dichlorobenzene	215.7	10	200	0	108	80 - 119			
1,3-Dichloropropane	203.4	10	200	0	102	80 - 119			
1,4-Dichlorobenzene	215.1	10	200	0	108	79 - 118			
2,2-Dichloropropane	200.1	10	200	0	100	60 - 139			
2-Butanone	362	20	400	0	90.5	56 - 143			
2-Chlorotoluene	212.5	10	200	0	106	79 - 122			
2-Hexanone	403.2	20	400	0	101	57 - 139			
4-Chlorotoluene	212.4	10	200	0	106	78 - 122			
4-Isopropyltoluene	232.2	10	200	1.803	115	77 - 127			
4-Methyl-2-pentanone	396.8	20	400	2.045	98.7	67 - 130			
Acetone	398	20	400	6.558	97.9	39 - 160			
Benzene	678.1	10	200	485.3	96.4	79 - 120			
Bromobenzene	219.1	10	200	0	110	80 - 120			
Bromochloromethane	188.3	10	200	0	94.1	78 - 123			
Bromodichloromethane	205.8	10	200	0	103	79 - 125			
Bromoform	214.5	10	200	15.19	99.7	66 - 130			
Bromomethane	214.3	10	200	5.754	104	53 - 141			

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS19040783-05MS		Units: UG/L		Analysis Date: 15-Apr-2019 15:37			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036134		PrepDate:		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	380.9	20	400	0	95.2	64 - 133			
Carbon tetrachloride	238.1	10	200	92.29	72.9	72 - 136			
Chlorobenzene	212.7	10	200	0	106	82 - 118			
Chloroethane	185.8	10	200	0	92.9	60 - 138			
Chloroform	192.8	10	200	1.452	95.7	79 - 124			
Chloromethane	158.9	10	200	0	79.4	50 - 139			
cis-1,2-Dichloroethene	185.9	10	200	0	93.0	78 - 123			
cis-1,3-Dichloropropene	197.3	10	200	0	98.6	75 - 124			
Dibromochloromethane	215.1	10	200	0	108	74 - 126			
Dibromomethane	205.9	10	200	0	103	79 - 123			
Dichlorodifluoromethane	218.8	10	200	0	109	32 - 152			
Ethylbenzene	222.1	10	200	14.36	104	79 - 121			
Hexachlorobutadiene	257	10	200	0	128	66 - 134			
Isopropylbenzene	227.3	10	200	0	114	72 - 131			
m,p-Xylene	458.8	20	400	11.39	112	80 - 121			
Methylene chloride	201.1	20	200	13.8	93.6	74 - 124			
Naphthalene	219.8	10	200	1.985	109	61 - 128			
n-Butylbenzene	234.8	10	200	1.33	117	75 - 128			
n-Propylbenzene	225.7	10	200	0	113	76 - 126			
o-Xylene	223	10	200	4.111	109	78 - 122			
sec-Butylbenzene	232.8	10	200	2.756	115	77 - 126			
Styrene	218.6	10	200	0	109	78 - 123			
tert-Butylbenzene	230.2	10	200	0	115	78 - 124			
Tetrachloroethene	237.2	10	200	0	119	74 - 129			
Toluene	238.4	10	200	22.15	108	80 - 121			
trans-1,2-Dichloroethene	194.8	10	200	0	97.4	75 - 124			
trans-1,3-Dichloropropene	200.7	10	200	0	100	73 - 127			
Trichloroethene	217.9	10	200	0	109	79 - 123			
Trichlorofluoromethane	227.9	10	200	0	114	65 - 141			
Vinyl chloride	174.3	10	200	0	87.2	58 - 137			
Surr: 1,2-Dichloroethane-d4	438.9	10	500	0	87.8	81 - 118			
Surr: 4-Bromofluorobenzene	490.6	10	500	0	98.1	85 - 114			
Surr: Dibromofluoromethane	458.5	10	500	0	91.7	80 - 119			
Surr: Toluene-d8	513	10	500	0	103	89 - 112			

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS19040783-05MSD		Units: UG/L		Analysis Date: 15-Apr-2019 16:01			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036135		PrepDate:		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	215.6	10	200	0	108	78 - 124	219.1	1.61	20
1,1,1-Trichloroethane	198.6	10	200	0	99.3	74 - 131	208.4	4.82	20
1,1,2,2-Tetrachloroethane	203.8	10	200	0	102	71 - 121	205.5	0.84	20
1,1,2-Trichloroethane	205.1	10	200	2.7	101	80 - 119	205.1	0.0221	20
1,1-Dichloroethane	174.7	10	200	0	87.3	77 - 125	183.3	4.82	20
1,1-Dichloroethene	184.7	10	200	0	92.3	71 - 131	195.9	5.87	20
1,1-Dichloropropene	199.6	10	200	50.1	74.8	78 - 125	211.2	5.64	20 S
1,2,3-Trichlorobenzene	235.3	10	200	0	118	69 - 129	224.5	4.68	20
1,2,3-Trichloropropane	199	10	200	3.051	98.0	73 - 122	201.6	1.3	20
1,2,4-Trichlorobenzene	224.3	10	200	0	112	69 - 130	224.3	0.0243	20
1,2,4-Trimethylbenzene	218.7	10	200	3.34	108	76 - 124	226.6	3.56	20
1,2-Dibromo-3-chloropropane	222.9	10	200	0	111	62 - 128	227.9	2.23	20
1,2-Dibromoethane	216.6	10	200	0	108	77 - 121	216.1	0.217	20
1,2-Dichlorobenzene	213.3	10	200	0	107	80 - 119	217.4	1.92	20
1,2-Dichloroethane	205.1	10	200	13.12	96.0	73 - 128	212.8	3.69	20
1,2-Dichloropropane	181.8	10	200	0	90.9	78 - 122	187.2	2.93	20
1,3,5-Trimethylbenzene	220	10	200	2.269	109	75 - 124	227	3.1	20
1,3-Dichlorobenzene	211.5	10	200	0	106	80 - 119	215.7	1.95	20
1,3-Dichloropropane	201.3	10	200	0	101	80 - 119	203.4	1.01	20
1,4-Dichlorobenzene	210.6	10	200	0	105	79 - 118	215.1	2.11	20
2,2-Dichloropropane	189.5	10	200	0	94.8	60 - 139	200.1	5.45	20
2-Butanone	360.4	20	400	0	90.1	56 - 143	362	0.44	20
2-Chlorotoluene	205.1	10	200	0	103	79 - 122	212.5	3.53	20
2-Hexanone	401.2	20	400	0	100	57 - 139	403.2	0.482	20
4-Chlorotoluene	207.7	10	200	0	104	78 - 122	212.4	2.2	20
4-Isopropyltoluene	226.3	10	200	1.803	112	77 - 127	232.2	2.56	20
4-Methyl-2-pentanone	392.9	20	400	2.045	97.7	67 - 130	396.8	0.971	20
Acetone	405.6	20	400	6.558	99.8	39 - 160	398	1.91	20
Benzene	652.6	10	200	485.3	83.7	79 - 120	678.1	3.82	20
Bromobenzene	216.6	10	200	0	108	80 - 120	219.1	1.14	20
Bromochloromethane	183.1	10	200	0	91.5	78 - 123	188.3	2.81	20
Bromodichloromethane	198.4	10	200	0	99.2	79 - 125	205.8	3.66	20
Bromoform	214.2	10	200	15.19	99.5	66 - 130	214.5	0.158	20
Bromomethane	214	10	200	5.754	104	53 - 141	214.3	0.12	20

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: R336625 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS19040783-05MSD		Units: UG/L		Analysis Date: 15-Apr-2019 16:01			
Client ID:		Run ID: VOA6_336625		SeqNo: 5036135		PrepDate:		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Carbon disulfide	358.8	20	400	0	89.7	64 - 133	380.9	5.96	20
Carbon tetrachloride	226.7	10	200	92.29	67.2	72 - 136	238.1	4.89	20 S
Chlorobenzene	208.3	10	200	0	104	82 - 118	212.7	2.09	20
Chloroethane	159.6	10	200	0	79.8	60 - 138	185.8	15.2	20
Chloroform	184.5	10	200	1.452	91.5	79 - 124	192.8	4.37	20
Chloromethane	153.7	10	200	0	76.8	50 - 139	158.9	3.34	20
cis-1,2-Dichloroethene	183.5	10	200	0	91.7	78 - 123	185.9	1.34	20
cis-1,3-Dichloropropene	192.4	10	200	0	96.2	75 - 124	197.3	2.51	20
Dibromochloromethane	212.1	10	200	0	106	74 - 126	215.1	1.41	20
Dibromomethane	199.3	10	200	0	99.7	79 - 123	205.9	3.25	20
Dichlorodifluoromethane	206.6	10	200	0	103	32 - 152	218.8	5.7	20
Ethylbenzene	216.4	10	200	14.36	101	79 - 121	222.1	2.59	20
Hexachlorobutadiene	258.8	10	200	0	129	66 - 134	257	0.713	20
Isopropylbenzene	221.9	10	200	0	111	72 - 131	227.3	2.39	20
m,p-Xylene	441	20	400	11.39	107	80 - 121	458.8	3.96	20
Methylene chloride	194.1	20	200	13.8	90.2	74 - 124	201.1	3.52	20
Naphthalene	224.1	10	200	1.985	111	61 - 128	219.8	1.93	20
n-Butylbenzene	228.5	10	200	1.33	114	75 - 128	234.8	2.72	20
n-Propylbenzene	218.6	10	200	0	109	76 - 126	225.7	3.21	20
o-Xylene	219.2	10	200	4.111	108	78 - 122	223	1.71	20
sec-Butylbenzene	225	10	200	2.756	111	77 - 126	232.8	3.43	20
Styrene	212.6	10	200	0	106	78 - 123	218.6	2.78	20
tert-Butylbenzene	223.5	10	200	0	112	78 - 124	230.2	2.97	20
Tetrachloroethene	227.2	10	200	0	114	74 - 129	237.2	4.3	20
Toluene	231	10	200	22.15	104	80 - 121	238.4	3.17	20
trans-1,2-Dichloroethene	187.5	10	200	0	93.7	75 - 124	194.8	3.85	20
trans-1,3-Dichloropropene	198	10	200	0	99.0	73 - 127	200.7	1.35	20
Trichloroethene	207.4	10	200	0	104	79 - 123	217.9	4.91	20
Trichlorofluoromethane	213.7	10	200	0	107	65 - 141	227.9	6.43	20
Vinyl chloride	163.4	10	200	0	81.7	58 - 137	174.3	6.44	20
Surr: 1,2-Dichloroethane-d4	432.1	10	500	0	86.4	81 - 118	438.9	1.56	20
Surr: 4-Bromofluorobenzene	490.4	10	500	0	98.1	85 - 114	490.6	0.0491	20
Surr: Dibromofluoromethane	460.5	10	500	0	92.1	80 - 119	458.5	0.425	20
Surr: Toluene-d8	516	10	500	0	103	89 - 112	513	0.582	20

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent
Samples
WorkOrder: HS19040652

QC BATCH REPORT**Batch ID:** R336625 (0)**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD
8260C

The following samples were analyzed in this batch:

HS19040652-01	HS19040652-03
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ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19040652

QC BATCH REPORT

Batch ID: R336862 (0)		Instrument: UV-2450		Method: HEXAVALENT CHROMIUM BY SW7196A						
MBLK	Sample ID: MBLK-336862	Units: mg/L		Analysis Date: 11-Apr-2019 12:10						
Client ID:	Run ID: UV-2450_336862		SeqNo: 5041171		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.0100	0.0100								U
LCS	Sample ID: LCS-336862	Units: mg/L		Analysis Date: 11-Apr-2019 12:10						
Client ID:	Run ID: UV-2450_336862		SeqNo: 5041172		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.243	0.0100	0.25	0	97.2	80 - 120				
MS	Sample ID: HS19040652-01MS	Units: mg/L		Analysis Date: 11-Apr-2019 12:10						
Client ID: LH18/24-SP650_041019	Run ID: UV-2450_336862		SeqNo: 5041174		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.242	0.0100	0.25	-0.003	98.0	75 - 125				
MSD	Sample ID: HS19040652-01MSD	Units: mg/L		Analysis Date: 11-Apr-2019 12:10						
Client ID: LH18/24-SP650_041019	Run ID: UV-2450_336862		SeqNo: 5041175		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.251	0.0100	0.25	-0.003	102	75 - 125	0.242	3.65	20	

The following samples were analyzed in this batch: HS19040652-01

ALS Houston, US

Date: 29-Apr-19

Client:	Bhate Environmental Associates, Inc.	QUALIFIERS, ACRONYMS, UNITS
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples	
WorkOrder:	HS19040652	

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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Texas	T10470231-18-21	30-Apr-2019
North Dakota	R193 2018-2019	30-Apr-2019
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kentucky	123043 - 2018	30-Apr-2019
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
California	2919, 2018-2019	30-Apr-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020

Client:	Bhate Environmental Associates, Inc.	SAMPLE TRACKING
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples	
Work Order:	HS19040652	

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19040652-01	LH18/24-SP650_041019	Login	4/11/2019 10:29:12 AM	RPG	EXT049
HS19040652-01	LH18/24-SP650_041019	Login	4/11/2019 10:29:12 AM	RPG	WET070
HS19040652-01	LH18/24-SP650_041019	Login	4/11/2019 10:29:12 AM	RPG	MET033
HS19040652-01	LH18/24-SP650_041019	Login	4/11/2019 10:29:12 AM	RPG	VOA193
HS19040652-02	LH18/24-SP650_041019_BIX	Login	4/11/2019 10:29:12 AM	RPG	Sub
HS19040652-03	Trip Blank	Login	4/11/2019 10:29:12 AM	RPG	VOA193

ALS Houston, US

Date: 29-Apr-19

Sample Receipt Checklist

Client Name: Bhate Environmental
Work Order: HS19040652

Date/Time Received: **11-Apr-2019 09:00**
Received by: **PMG**

Checklist completed by: Raegen Giga 11-Apr-2019
eSignature Date

Reviewed by: RJ Modashia 11-Apr-2019
eSignature Date

Matrices: **water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samplers name present on COC?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	4.7c uc/c IR 25		
Cooler(s)/Kit(s):	25587		
Date/Time sample(s) sent to storage:	04/11/2019 10:34		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:

HS19040652

Bhate Environmental Associates, Inc.
 -H18/24 Longhorn GW Treatment Plant Monthly Effluent


CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd., Suite 210 Houston, TX 77099 (281) 530 - 5656 ATTN: RJ Modashia

Project: BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS						Project No. NWO1312.0150.0 16.0001					
Job: GROUNDWATER TREATMENT PLANT MONTHLY EFFLUENT SAMPLES											
Prepared By: Scott Beesinger								P.O. Number			
Field Sample I.D.											
Sample Matrix				Date / Time				MS / MSD		No. OF CONTAINERS	
LH18/24-SP650_041019	Water				04/10/19 / 14:00				3		
LH18/24-SP650_041019	Water				04/10/19 / 14:00				2		
LH18/24-SP650_041019_BIX	Water				04/10/19 / 14:00				1		
LH18/24-SP650_041019	Water				04/10/19 / 14:00				1		
Trip Blank	Water				04/10/19				2		
Additional Remarks:											
STANDARD TURN AROUND TIME											
Relinquished By:		Date	Time	Received By:		Date	Time	Relinquished By:		Date	Time
[Signature]		04/10/19	14:30	[Signature]		04/10/19	07:00				
For Lab Use Only											
Received At Lab By:		Date	Time	Airbill No.	Opened By:		Date	Temp of Container	Seal No.	Condition	
Remarks:											

ALS 10450 Stancil Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5856 Fax. +1 281 530 5887	CU Date: <u>4/10</u> Name: <u>SGA</u> Company: <u>B</u>
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STUDY SEAL Time: <u>1430</u> <u>Boozing</u>	Seal Broken By: <u>RG</u> Date: <u>4/11/19</u>
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TRK# 4380 9535 2846 FedEx 0221 AB SGRA	RETURNS MON-SAT THU - 11 APR 10:30A PRIORITY OVERNIGHT 77099 TX-US IAH
	
FTD 283665 18APR19 G6GA 553C1/D7E5/0CBA	



Case Narrative

Method: 6850

Analysis: Perchlorate

Analysis SOP: LC-MS-CLO4

ALS WO ID(s): 1910478; 1910480; 1910483;
1911288

Client: ALS Laboratories (Houston, TX)

Matrix: Water

ELMS Batch (HBN): 2241 (237388)

General Set Information: There were four 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. 50 μL 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 0.45 μm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1910480001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

Method QC data: The method blank (LMB 649380) was less than 1/2 the CRDL. The recovery for the LCS (649381) was within acceptable parameters.



MS/MSD Analysis: MS/MSD was performed on samples 1910837002/03 of Work Order 1910837. 4.0µl of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4.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 – 649378) is reported from the analysis of the Laboratory Control Sample (LCS – 649381) at a level of 4.0µg/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: 19MARI03).

Thomas Bosch	April 24, 2019
Analyst	Date



00937629

ANALYTICAL REPORTReport Date: April 25, 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: **34-1910478**

Project ID: HS19040652

Purchase Order: HS19040652

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_041019_BIX	1910478001	04/10/19	04/12/19	

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992

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Environmental www.alsglobal.com

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ANALYTICAL REPORT

Workorder: **34-1910478**Client: ALS Environmental
(Houston)

Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: LH18/24-SP650_041019_BIX		Sampling Site: NA		Collected: 04/10/2019	
Lab ID: 1910478001		Media: 125 mL Nalgene		Received: 04/12/2019	
Matrix: Water		Sampling Parameter: NA			
Analysis Method - EPA 6850, DoD QSM					
Preparation: Not Applicable			Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2241 (HBN: 237388) Analyzed: 04/23/2019 09:36		Instrument ID: LCMS04 Percent Solid: NA 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 04/24/2019 07:51	/S/ Stephen Brose 04/25/2019 07:42

Laboratory Contact Information

ALS Environmental
960 W Levoy Drive
Salt Lake City, Utah 84123Phone: (801) 266-7700
Email: als@altlab.com
Web: www.alsslc.com



ANALYTICAL REPORT

Workorder: 34-1910478

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.pjllabs.com
	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.com
	Utah (TNI)	UT00953	http://lams.nelac-institute.org/search
	Nevada (TNI)	UT00953201-1	https://ndep.nv.gov/water/lab-certification
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
	Oklahoma (TNI)	IJ# 9980	http://www.deq.state.ok.us/CSDnew/labcert.htm
	Texas (TNI)	T104704456-18-9	https://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_list.pdf
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	http://www.aihaaccreditedlabs.org
	DOECAP-AP	L18-606	http://www.pjllabs.com
	Washington	C596	https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.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

00937632

Analysis Information

Workorder: 1910478**Limits:** Client SOW/Contract Specified**Preparation:** NA**Analysis:** EPA 6850, DoD QSM**Basis:** DoD QSM**Batch:** NA**Batch:** ELMS/2241 (HBN: 237388)**Prepared By:** NA**Analyzed By:** Thomas Bosch

Blank

LMB: 649380**Analyzed:** 04/23/2019 09:20**Units:** ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 649381**Analyzed:** 04/23/2019 08:53**Dilution:** 1**Units:** ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.01	4.00	100	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1910837001**Analyzed:** 04/23/2019 10:30**Dilution:** 1**Units:** ug/L**MS:** 1910837002**Analyzed:** 04/23/2019 10:43**Dilution:** 1**Units:** ug/L**MSD:** 1910837003**Analyzed:** 04/23/2019 10:57**Dilution:** 1**Units:** ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	3.81	4	95.1	78.8	123.8	3.95	98.8	3.74	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 04/24/2019 07:52	/S/ Stephen Brose 04/25/2019 07:42

Symbols and Definitions

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

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



W

1910478

10450 Standcliff Rd, Ste 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887
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18698/#2

Subcontract Chain of Custody

COC ID: 11110

SUBCONTRACT TO:

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

Phone: +1 801 266 7700

1910478

CUSTOMER
INFORMATION:

Company: ALS Houston
Contact: RJ Modashia
Address: 10450 Standcliff 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 Standcliff Rd, Ste 210
Phone: +1 281 530 5656
Reference: HS19040652
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19040652-02	LH18/24-SP650_041019_BIX	Water	10 Apr 2019 14:00
SUB_Perch-6850			25 Apr 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:

R. Cuyar

Date/Time:

4/11/19 18:00

Received By:

Jumoke Lawal

Date/Time:

04-12-19 9:55

Cooler ID(s):

Temperature(s):

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[illegible]

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: <u>ALS Houston</u>		Project/Task/Site: <u>1916478</u>				
Date/Time of Receipt: <u>04-17-19 9:55</u>		Number of Coolers Received: <u>1</u>				
Condition of Coolers: <u>Acceptable</u> /Unacceptable		Temperature Control: <u>Present</u> /Not Included				
Cooler Custody Seals: <u>Present</u> /Absent/NA		Location Temp Taken: <u>Control</u> /Between Samples				
Intact/Broken/NA						
Container Custody Seals: <u>Present</u> /Absent/NA		Are all temperatures within project specific guidelines? <u>Yes</u> /No/NA				
Intact/Broken/NA						
Ice Present: <u>Yes</u> /No/NA		VOA Headspace Present? <u>Yes</u> /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	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 <u>9309</u>	<u>3</u> °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By: Jamir Vartasleep Tam Vartasleep 04-17-19
Signature Printed Name Date

CLIENT-RELATED INFORMATION

- | | | | |
|---|--|---|--|
| <input type="checkbox"/> Missing Cooler
<input type="checkbox"/> Cooler Conditions
<input type="checkbox"/> Missing Paperwork
<input type="checkbox"/> Missing/Incorrect Bottle Labels | <input type="checkbox"/> Missing Samples/Bottles
<input type="checkbox"/> Broken/Leaking Samples
<input type="checkbox"/> Incorrect Bottle Type
<input type="checkbox"/> Cooler Temperatures Out of Range | <input type="checkbox"/> Incorrect Preservation
<input type="checkbox"/> pH Criteria Not Met
<input type="checkbox"/> Residual Chlorine Present
<input type="checkbox"/> Head Space in Bottles | <input type="checkbox"/> Insufficient Sample Volume
<input type="checkbox"/> Chain of Custody Problems
<input type="checkbox"/> Other: |
|---|--|---|--|

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: _____ Returned to Sample Receipt by: _____ Date: _____
Printed Name Signature



**Must Deliver Next Business Day
Time and Tempature Sensitive!**

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

SHIP DATE: 11APR19
ACTWGT: 8.65 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

TO **PAUL POPE**
ALS LABORATORY GROUP
960 WEST LEVOY DRIVE

SALT LAKE CITY UT 84123

(800) 366-9135

REF: HS19040654/653/652 RJ



FedEx
Express



TRK# 4809 7832 8001
0201

FRI - 12 APR 3:00P
STANDARD OVERNIGHT

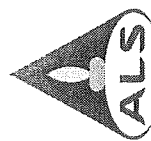
AX BTFA

84123

UT-US SLC



ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887



Batch Worklist

Batch: ELMS/2241

Created: 4/23/2019 07:43

Instrument:

HBN: 237388

Rule: EPA 6850, DoD QSM Water

Analyst: T. Bosch

Status: WP



Workorder: 1910478 [ENV_LVL4]

Workorder: 1910480 [ENV_LVL4]

Workorder: 1910483 [ENV_LVL4]

Workorder: 1910837 [ENV_LVL4]

Workorder: 1911288 [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	649377	CCV for HBN 237388 [ELMS/2241]				CCV	3		E685041C3Q	5311		4/25/2019	
2	649378	RLVS for HBN 237388 [ELMS/2241]				RLVS	3		E685041C3Q	5311		4/25/2019	
3	649379	ICS for HBN 237388 [ELMS/2241]				ICS	3		E6850.D3Q	5311		4/25/2019	
4	649380	LMB for HBN 237388 [ELMS/2241]				LMB	3		E6850Q413Q	5311		4/25/2019	
5	649381	LCS for HBN 237388 [ELMS/2241]				LCS	3		E6850Q413Q	5311		4/25/2019	
6	1910478001	LH18/24-SP650_041019_BIX				SAMPLE	3	1910478001-A	E6850Q41.3	5480	5/8/2019	4/25/2019	
7	1910480001	LH18/24-SP140_041019				SAMPLE	3	1910480001-A	E6850Q41.3	5480	5/8/2019	4/25/2019	
8	1910483001	LH18/24-SP650_041019_BIX				SAMPLE	3	1910483001-A	E6850Q41.3	5480	5/8/2019	4/25/2019	
9	1910837001	43MW01				SAMPLE	3	1910837001-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
10	1910837002	43MW01MS				MS	3	1910837002-A	E6850Q413Q	5480		4/25/2019	
11	1910837003	43MW01MSD				MSD	3	1910837003-A	E6850Q413Q	5480		4/25/2019	
12	1910837004	43MW03				SAMPLE	3	1910837004-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
13	1910837005	43MW04				SAMPLE	3	1910837005-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
14	1910837006	43MW05				SAMPLE	3	1910837006-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
15	1910837007	43MW06				SAMPLE	3	1910837007-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
16	649382	CCV for HBN 237388 [ELMS/2241]				CCV	3		E685041C3Q	5311		4/25/2019	
17	1910837008	DUP040919				FLDDUP	3	1910837008-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
18	1910837009	EB041019				EQBK	3	1910837009-A	E6850Q41.3	5480	5/8/2019	4/29/2019	
19	1911288001	LH18/24-SP650_041719_BIX				SAMPLE	3	1911288001-A	E6850Q41.3	5480	5/15/2019	5/2/2019	
20	649383	CCV for HBN 237388 [ELMS/2241]				CCV	3		E685041C3Q	5311		4/25/2019	



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #()'s: 1910478 (001); 1910480 (001); 1910483 (001); 1911288 (001);
 1910837 (001-09) ELMS Batch/HBN ID: 2241 (237388)
 Prep Date: 04/22/2019 Analysis Date: 04/23/2019 Analyst: T. Bosch
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\APR\23APR19D.s
 Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by TNB. 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 AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

STANDARDS: Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

CALIBRATION CURVE: Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.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:** 35µL
Column: KP-RPPX C8 separator, 250mm **Mobile Phase:** 70% Eluent A1; 30% Eluent B1

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: 4.0µL of QC Solution Horizon ID 41830 was used for LCS 649381; Target = 4.0µg/L. ASTM type II water was used for LMB 649380.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1910837002/03 (Client ID: 43MW01). 4.0µL of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. Spike target = 4.0µg/L.

COMMENTS:

- 1) Results reported in µg/L. Field sample 1910480001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has 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: \\ALS\TWS013\LCMS\LCMS04\2019\APR\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\237388-DoD-ALS-Hstn LCMS4 or through \\ALS\TWS013\DATA\REVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 649378) is reported from the analysis of the Laboratory Control Sample (LCS – 649381) at a level 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, many of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03).

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.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDG: ELMS: 2241 HBN: 237388 1910837 / 1911288		
Sample Set IDs if Applicable: 1910478 / 1910480 / 1910483		
Calibration standards analyzed and meets criteria	TB	SN
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
Method Blanks analyzed and meet acceptance criteria	TB	SB
Retention Time Windows checked	TB	SN
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	SN
MSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed	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 checked	TB	SB
Preparation and analysis calculations checked	TB	SB
NCRs are completed as necessary NC/CAR#		
Report forms are complete and accurate	TB	SB
Manual integrations checked	TB	SB



STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850 WKG Std 100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	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
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK		Description - 6850 Stock AccStd 1,000ug/mL	
Standard: 43659		Created By: Thomas Bosch	
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	
MFG Lot: 218065075		Amount: 100 mL	
Part ID: IC-PER-10X-1		Expires: 07/25/2020	
		Usable: No	
		Lab Lot: CLO4 STOCK	
Pos	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

ASTM H2O		Description - ASTM Type II Water	
Standard: 109		Created By: ALS Support (Lims)	
MFG: DCL In House		Create Date: 10/06/2005 09:10AM	
MFG Lot: Not Provided		Amount: 1000 L	
Part ID: Not Provided		Expires: 11/07/2025	
		Usable: Yes	
		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: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
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
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: 41831		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/09/2018 10:05AM		Expires: 05/09/2019	
MFG Lot: TNB: 05/09/2018				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
41830	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	05/09/2019



STANDARD REPORT

Constituent

Working Standard - CLO4 QC INT

CLO4 QC INT			Description - 6850 QC Intrmdt Std-QC 10ug/mL		
Standard: 41830		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/09/2018 10:05AM		Expires: 05/09/2019	
MFG Lot: TNB: 05/09/2018				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



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

Working Standard - CLO4ISTDWRK

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK			Description - Perchlorate ISTD Wrk 1,000ug/L		
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		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
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



STANDARD REPORT

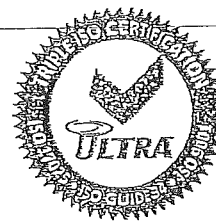
Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729			Amount: 1 mL
MFG: Cambridge Isotope			Expires: 04/28/2026
MFG Lot: SDFF-012A			Usable: Yes
Part ID: OLM-7310-S			Lab Lot: CLO4ISTDSTK
Created By: Thomas Bosch			
Create Date: 09/20/2018 09:09AM			
Verified By: Thomas Bosch			
Verify Date:			
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



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

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/NCCL 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.

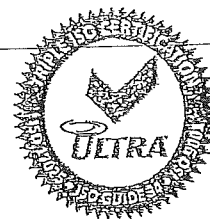
Hazards:
Refer to the Safety Data Sheet for information regarding this RM.

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.





Certificate of Analysis



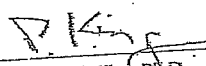
ISO Guide 34 Reference Material

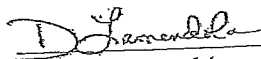
Product Number: ICC-013
Lot Number: CP-0860

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

125 Market Street
New Haven, CT 06513
USA



AccuStandard®

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

CERTIFICATE OF ANALYSIS



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

Date Certified: Jun 25, 2018

Expiration: Jul 25, 2020

Sample Size: 100 mL

Components: 1

Storage Condition: Ambient ($>5^\circ\text{C}$)

Included on ISO/IEC 17025 Scope of Accreditation: Yes

Included on ISO 17034 Scope of Accreditation: Yes



Signal Word: None

Component	SRM #	Prepared Concentration ($\mu\text{g/mL}$)
ClO_4 Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is $\pm 0.24\%$.

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 $0.2 \mu\text{m}$ 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 $\pm 0.5\%$ of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Meigan O'Leary

Certified By: Meigan O'Leary, Inorganic QC Manager

Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

Quality Standards:

ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification: $\geq 98\%$
 Labeled CAS Number: NA
 Unlabeled CAS Number: 7601-89-0
 MW*: 130.4
 Chemical Formula: NaCl*O4
 Storage: Store at room temperature away from light and moisture.
 Stability: See storage and expiration date.

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.

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/NCSL 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.

* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 µg/mL
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	109.4 ± 2.8 µg/mL (k=2)



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	
*	649377	CCV@25	Vial 71	1	Control	1	1.36054e6	8.855	24.00623
*	649381	QC@4.0	Vial 72	1	Control	2	2.53898e5	9.046	4.01121
*	649379	ICS@4.0	Vial 73	1	Control	3	1.82631e5	8.636	3.34158
*	649380	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1910478001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1910480001	1K	Vial 76	1	Sample	6	3.37161e5	9.026	5552.18188
*	1910483001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1911288001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1910837001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1910837002	MS	Vial 80	1	Sample	10	2.21785e5	9.050	3.80586
*	1910837003	MSD	Vial 81	1	Sample	11	2.20802e5	9.038	3.95111
*	1910837004		Vial 82	1	Sample	12	0.00000	0.000	0.00000
*	1910837005		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1910837006		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	649382	CCV@25	Vial 71	1	Control	15	1.31128e6	8.938	24.26925
*	1910837007		Vial 85	1	Sample	16	6.42400e4	9.045	1.26400
*	1910837008		Vial 86	1	Sample	17	0.00000	0.000	0.00000
*	1910837009		Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1909952003	10K	Vial 88	1	Sample	19	5.40192e5	9.131	9.36492e4
*	649383	CCV@25	Vial 71	1	Control	20	1.31963e6	8.922	24.70624

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	649377	CCV@25	Vial 71	1	Control	1	4.18181e5	8.869	24.80861
*	649381	QC@4.0	Vial 72	1	Control	2	8.36399e4	9.058	4.29372
*	649379	ICS@4.0	Vial 73	1	Control	3	6.48502e4	8.654	3.82172
*	649380	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1910478001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1910480001	1K	Vial 76	1	Sample	6	1.09251e5	9.041	5913.57786
*	1910483001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1911288001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1910837001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1910837002	MS	Vial 80	1	Sample	10	7.41215e4	9.057	4.12337
*	1910837003	MSD	Vial 81	1	Sample	11	7.23834e4	9.061	4.20632
*	1910837004		Vial 82	1	Sample	12	0.00000	0.000	0.00000
*	1910837005		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1910837006		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	649382	CCV@25	Vial 71	1	Control	15	4.00971e5	8.953	24.95975
*	1910837007		Vial 85	1	Sample	16	2.34854e4	9.061	1.36511
*	1910837008		Vial 86	1	Sample	17	0.00000	0.000	0.00000
*	1910837009		Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1909952003	10K	Vial 88	1	Sample	19	1.70464e5	9.151	9.83177e4
*	649383	CCV@25	Vial 71	1	Control	20	4.01823e5	8.937	25.30992

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
--	-----	-----	----	-----	----	-----	-----	-----	
*	649377	CCV@25	Vial 71	1	Control	1	1.72840e5	8.867	5.00000
*	649381	QC@4.0	Vial 72	1	Control	2	2.08542e5	9.066	5.00000
*	649379	ICS@4.0	Vial 73	1	Control	3	1.81824e5	8.654	5.00000
*	649380	LMB	Vial 74	1	Control	4	2.16871e5	9.008	5.00000
*	1910478001		Vial 75	1	Sample	5	1.72857e5	8.404	5.00000
*	1910480001	1K	Vial 76	1	Sample	6	1.97149e5	9.050	5000.00000
*	1910483001		Vial 77	1	Sample	7	1.65412e5	8.420	5.00000
*	1911288001		Vial 78	1	Sample	8	1.81749e5	8.489	5.00000

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount		
*	1910837001	Vial	79	1	Sample	9	1.87599e5	9.028	5.00000	
*	1910837002	MS	Vial	80	1	Sample	10	1.92507e5	9.073	5.00000
*	1910837003	MSD	Vial	81	1	Sample	11	1.84256e5	9.062	5.00000
*	1910837004	Vial	82	1	Sample	12	1.80138e5	8.810	5.00000	
*	1910837005	Vial	83	1	Sample	13	1.97954e5	9.090	5.00000	
*	1910837006	Vial	84	1	Sample	14	1.83017e5	9.051	5.00000	
*	649382	CCV@25	Vial	71	1	Control	15	1.64671e5	8.965	5.00000
*	1910837007	Vial	85	1	Sample	16	1.84879e5	9.067	5.00000	
*	1910837008	Vial	86	1	Sample	17	1.96777e5	8.752	5.00000	
*	1910837009	Vial	87	1	Sample	18	1.91613e5	9.161	5.00000	
*	1909952003	10K	Vial	88	1	Sample	19	1.83509e5	9.157	5.00000e4
*	649383	CCV@25	Vial	71	1	Control	20	1.62618e5	8.942	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

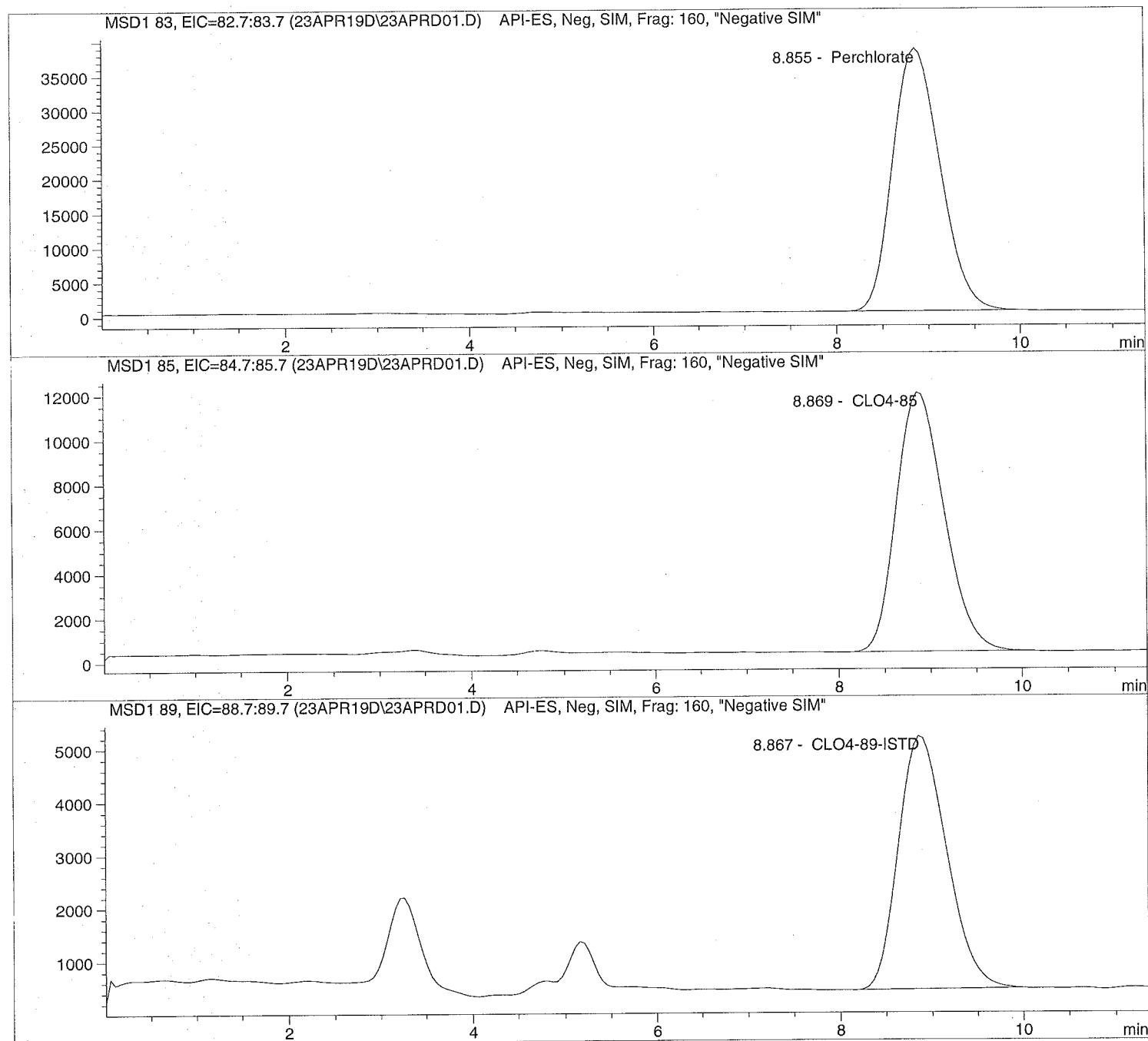
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	==	=====	=====	=====
1	Vial 71	649377 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	649381 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	649379 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	649380 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1910478001	CLO4-AQN	1	Sample		
6	Vial 76	1910480001 1K	CLO4-AQN	1	Sample		
7	Vial 77	1910483001	CLO4-AQN	1	Sample		
8	Vial 78	1911288001	CLO4-AQN	1	Sample		
9	Vial 79	1910837001	CLO4-AQN	1	Sample		
10	Vial 80	1910837002 MS	CLO4-AQN	1	Sample		
11	Vial 81	1910837003 MSD	CLO4-AQN	1	Sample		
12	Vial 82	1910837004	CLO4-AQN	1	Sample		
13	Vial 83	1910837005	CLO4-AQN	1	Sample		
14	Vial 84	1910837006	CLO4-AQN	1	Sample		
15	Vial 71	649382 CCV@25	CLO4-AQN	1	Ctrl Samp		
16	Vial 85	1910837007	CLO4-AQN	1	Sample		
17	Vial 86	1910837008	CLO4-AQN	1	Sample		
18	Vial 87	1910837009	CLO4-AQN	1	Sample		
19	Vial 71	649383 CCV@25	CLO4-AQN	1	Ctrl Samp		

Injection Date: 4/23/2019 08:37:56
Sample Name: 649377 CCV@25
Acq Operator: TNB

Seq Line: 1
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  08:37:56      Seq Line:          1
Sample Name:    649377   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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.855	PBA	1360543.6	24.0062	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.869	PBA	418181.2	24.8086	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.867	PBA	172839.5	5.0000	CLO4-89-ISTD

=====

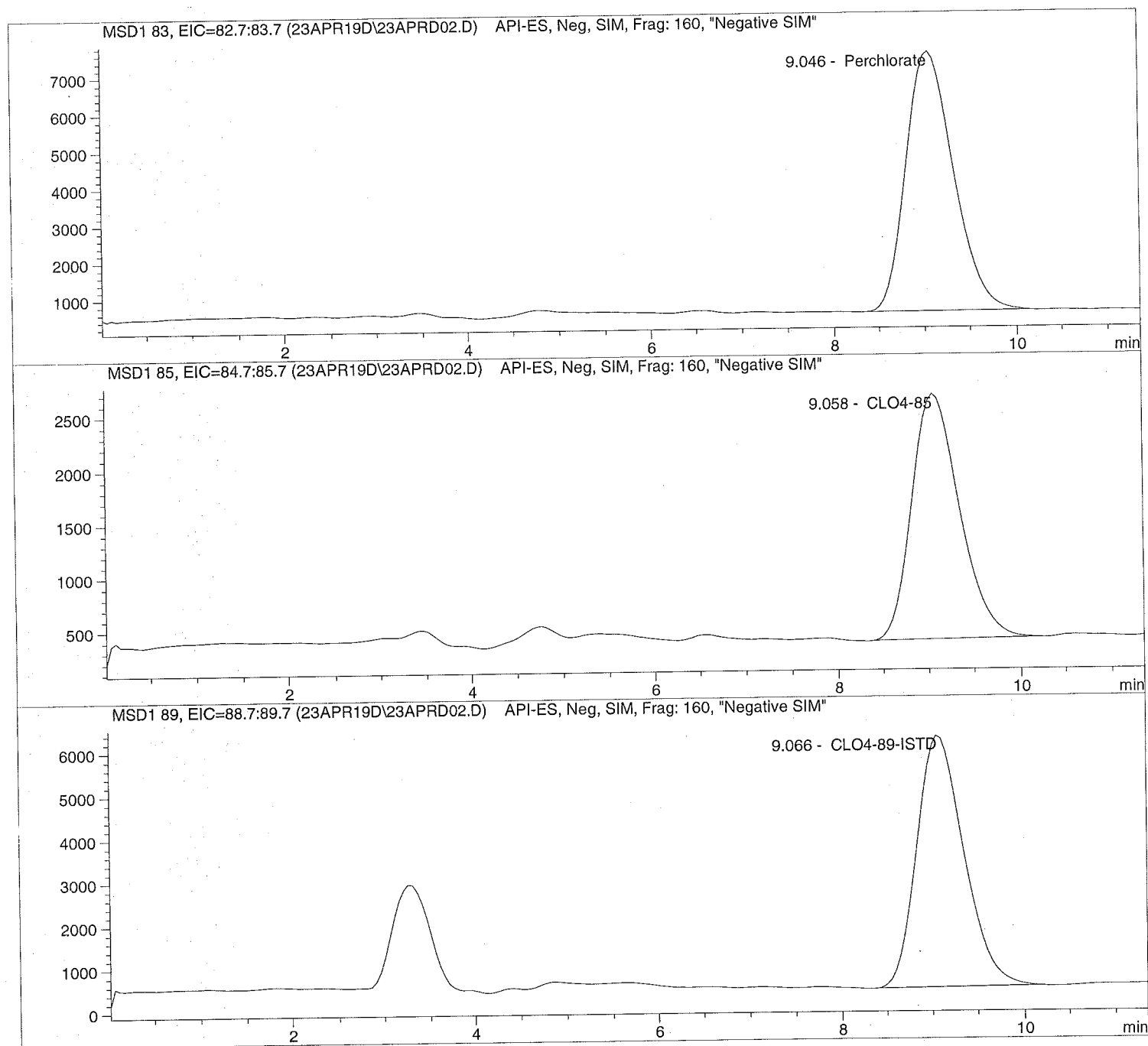
*** End of Report ***

Injection Date: 4/23/2019 08:53:38
Sample Name: 649381 QC@4.0
Acq Operator: TNB

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 08:53:38 Seq Line: 2
Sample Name: 649381 QC@4.0 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.046	PBA	253897.8	4.0112	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.058	PBA	83639.9	4.2937	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.066	PBA	208541.6	5.0000	CLO4-89-ISTD

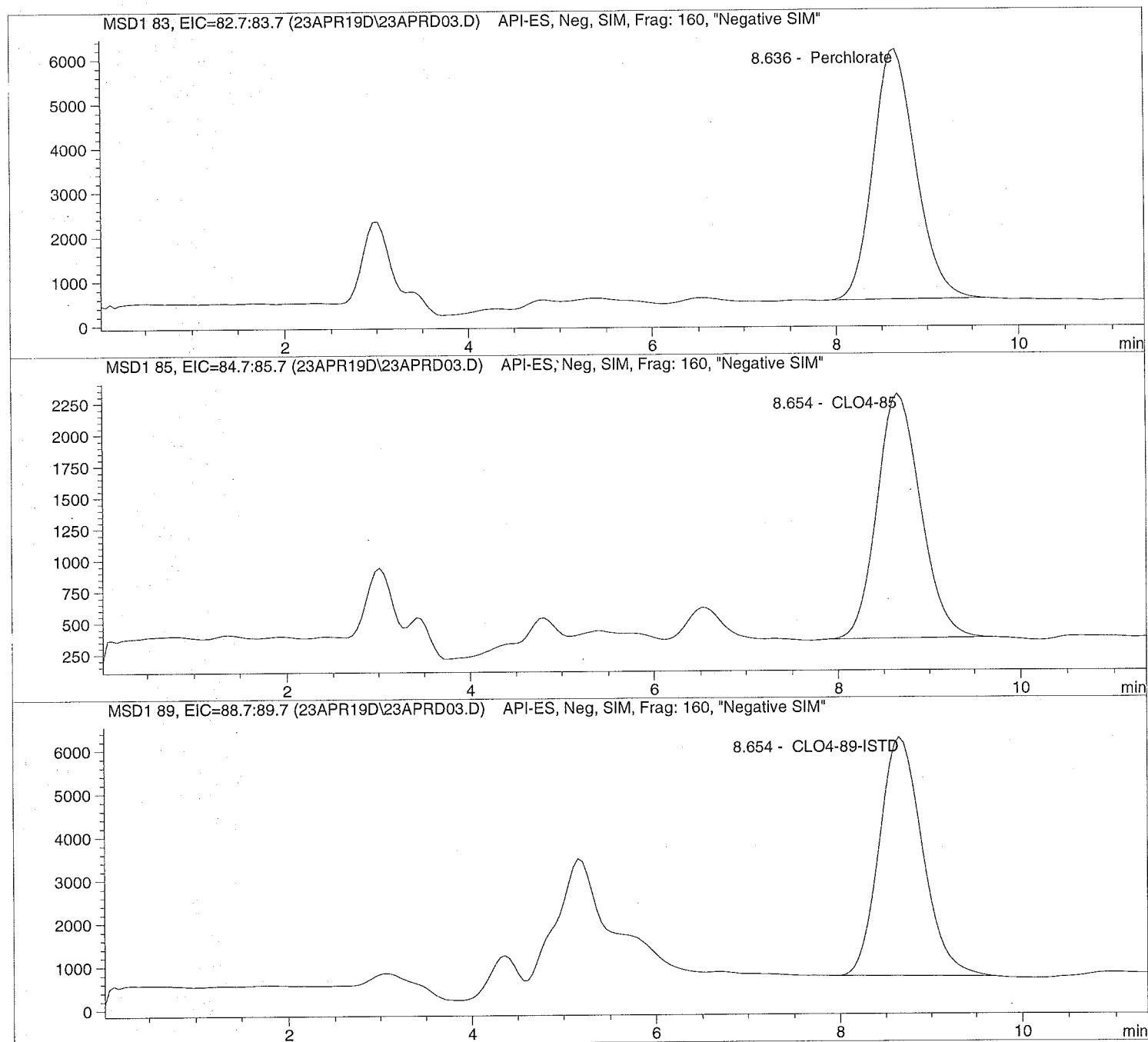
*** End of Report ***

Injection Date: 4/23/2019 09:07:01
Sample Name: 649379 ICS@4.0
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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 09:07:01
Sample Name: 649379 ICS@4.0
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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.636	PBA	182630.9	3.3416	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.654	PBA	64850.2	3.8217	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.654	PBA	181823.6	5.0000	CLO4-89-ISTD

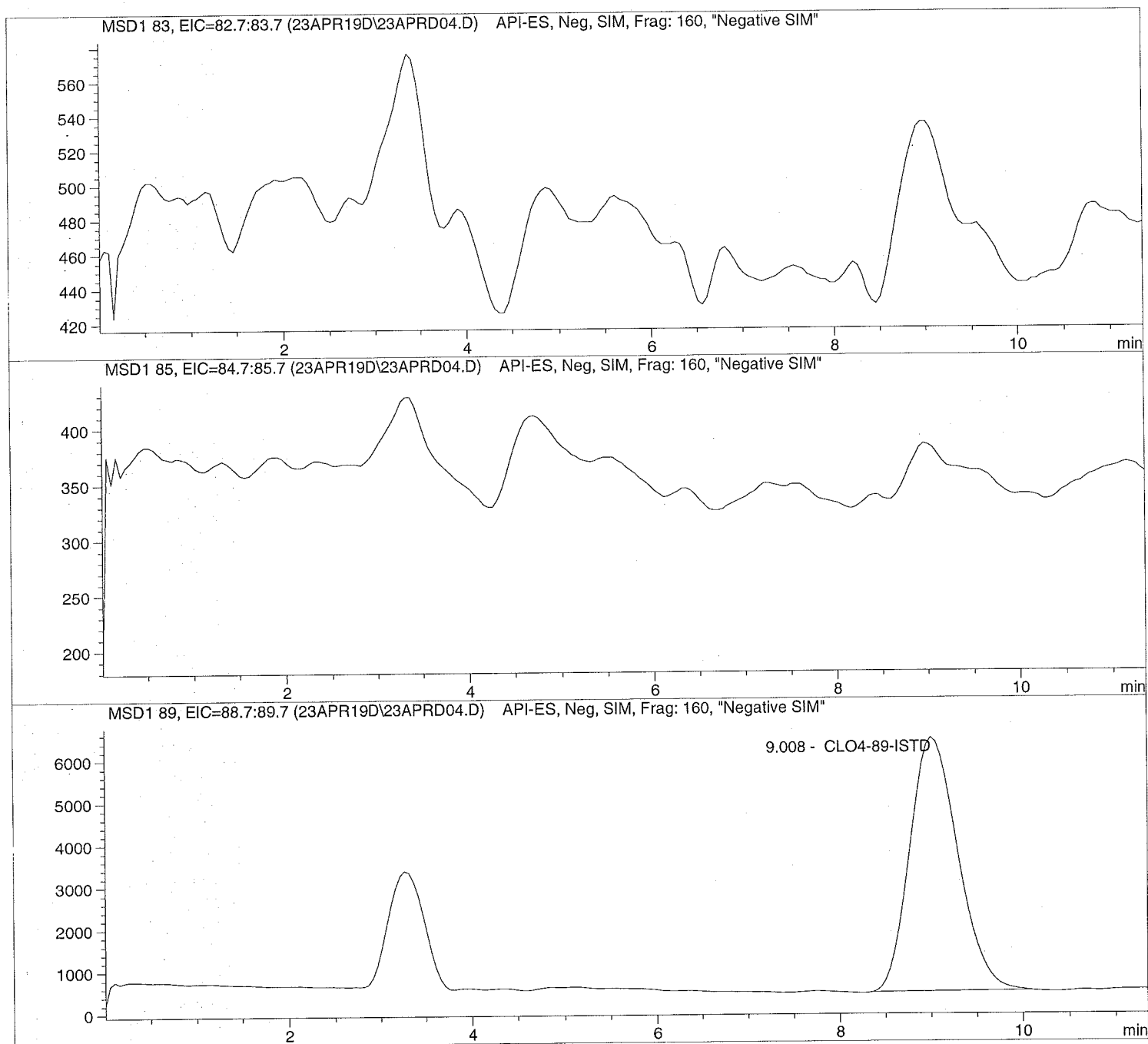
*** End of Report ***

Injection Date: 4/23/2019 09:20:26
Sample Name: 649380 LMB
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  09:20:26      Seq Line:      4
Sample Name:    649380    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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
9.008	PBA	216871.1	5.0000	CLO4-89-ISTD

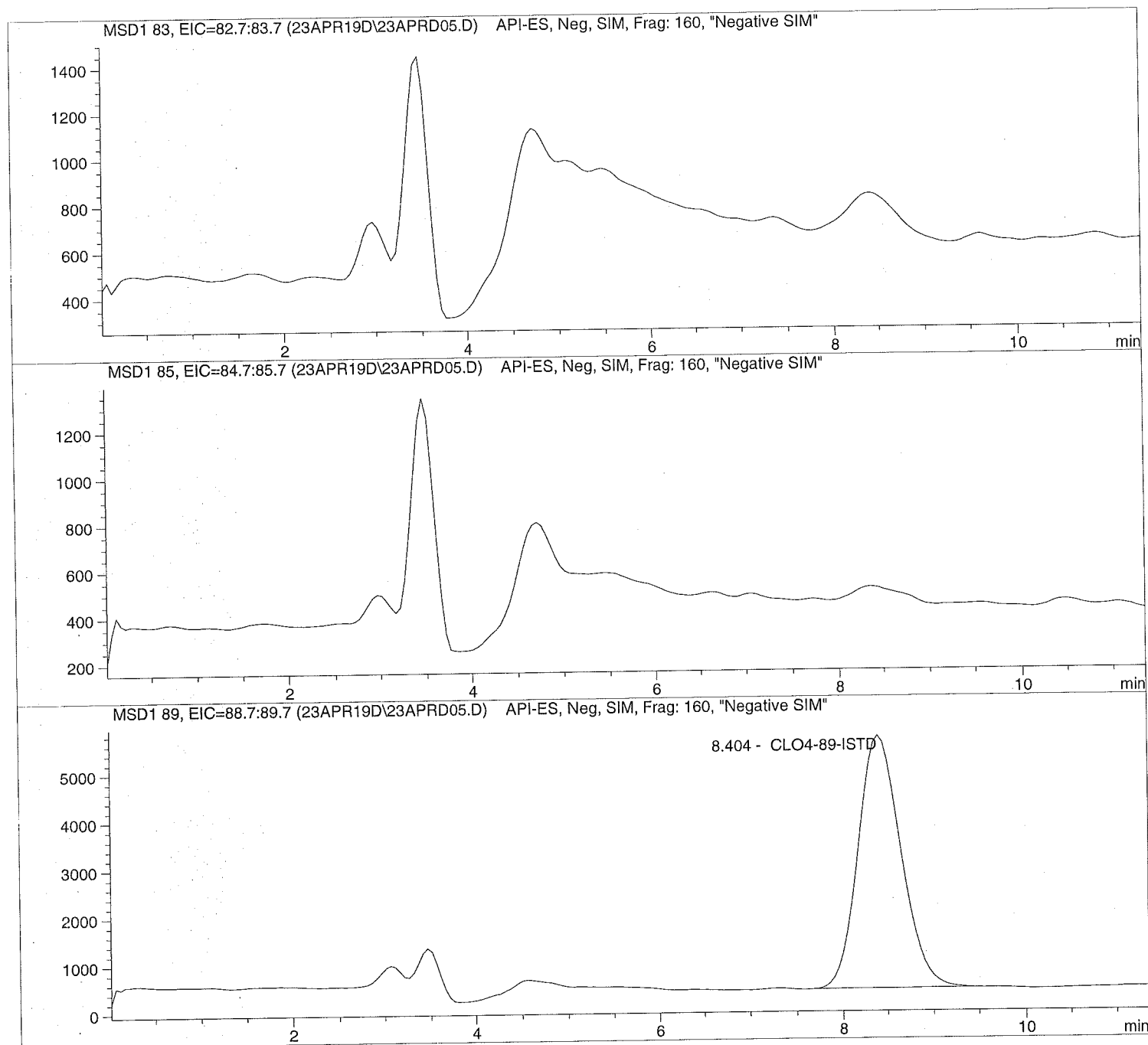
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 09:36:37
Sample Name: 1910478001
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 09:36:37 Seq Line: 5
Sample Name: 1910478001 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.404	PBA	172857.1	5.0000	CLO4-89-ISTD

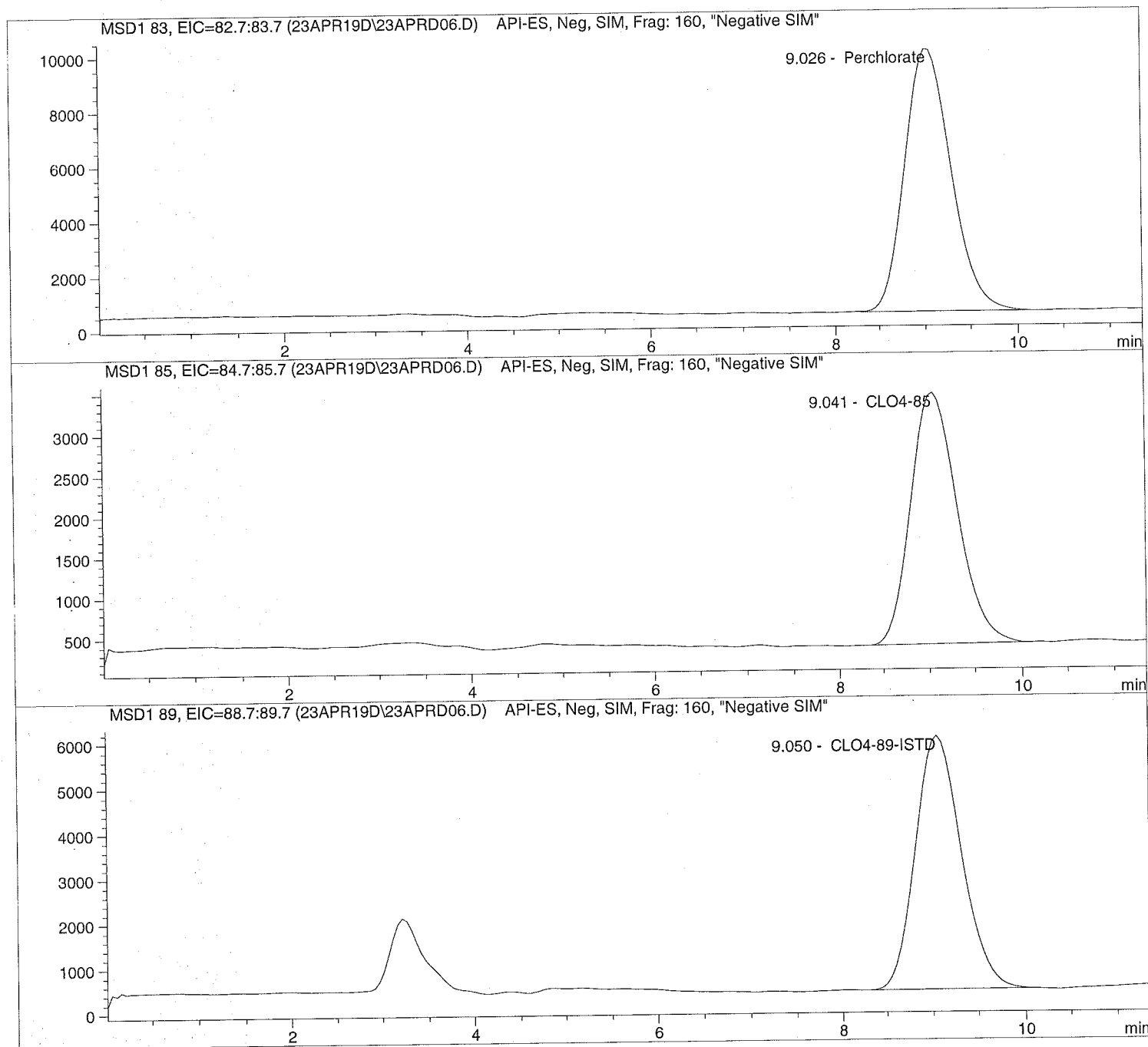
*** End of Report ***

Injection Date: 4/23/2019 09:49:59
Sample Name: 1910480001 1K
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  09:49:59      Seq Line:        6
Sample Name:    1910480001  1K           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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.026	BBA	337160.7	5552.1819	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.041	PBA	109251.5	5913.5779	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.050	PBA	197148.5	5000.0000	CLO4-89-ISTD

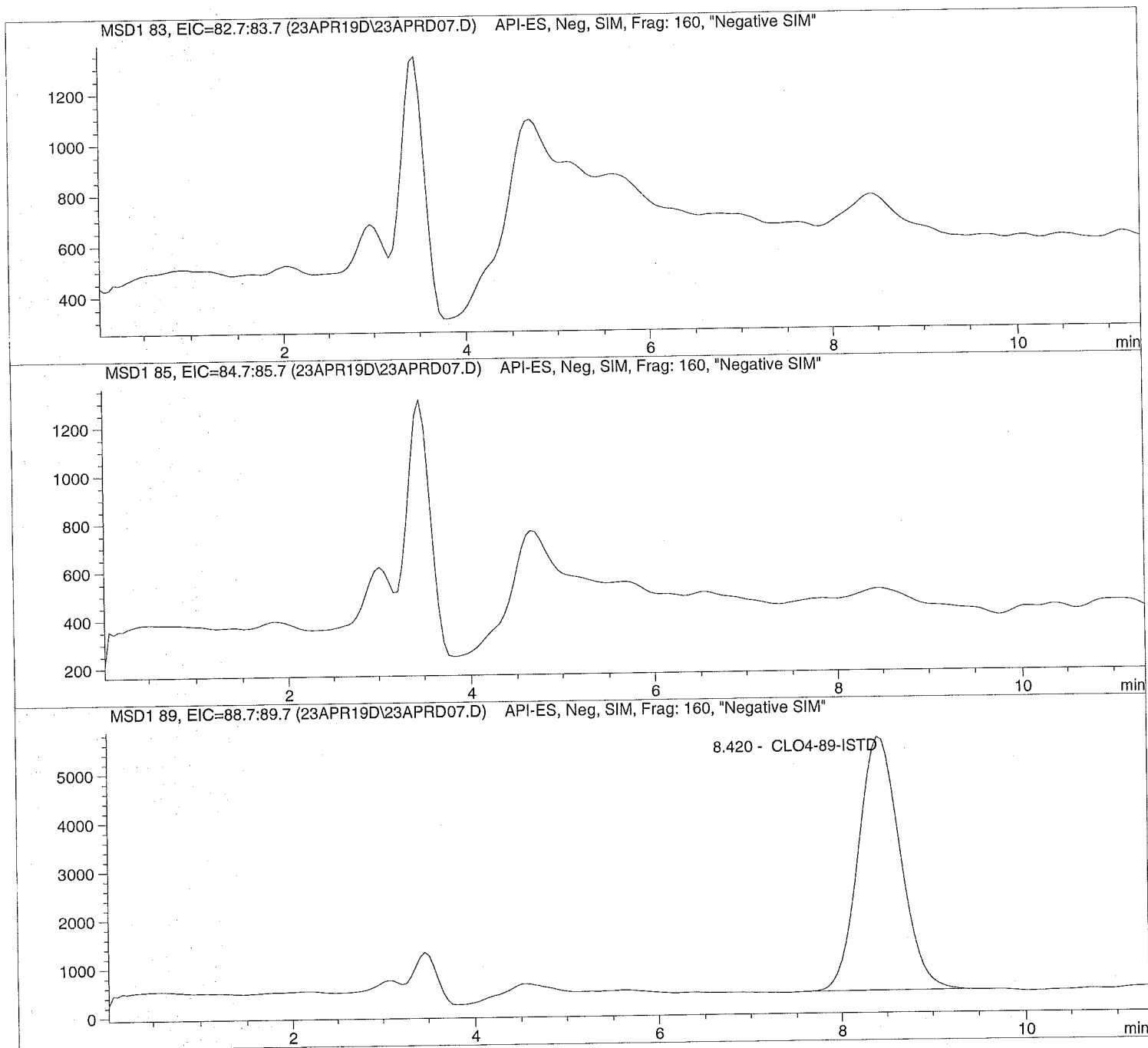
*** End of Report ***

Injection Date: 4/23/2019 10:03:26
Sample Name: 1910483001
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 10:03:26
Sample Name: 1910483001
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.420	PBA	165412.1	5.0000	CLO4-89-ISTD

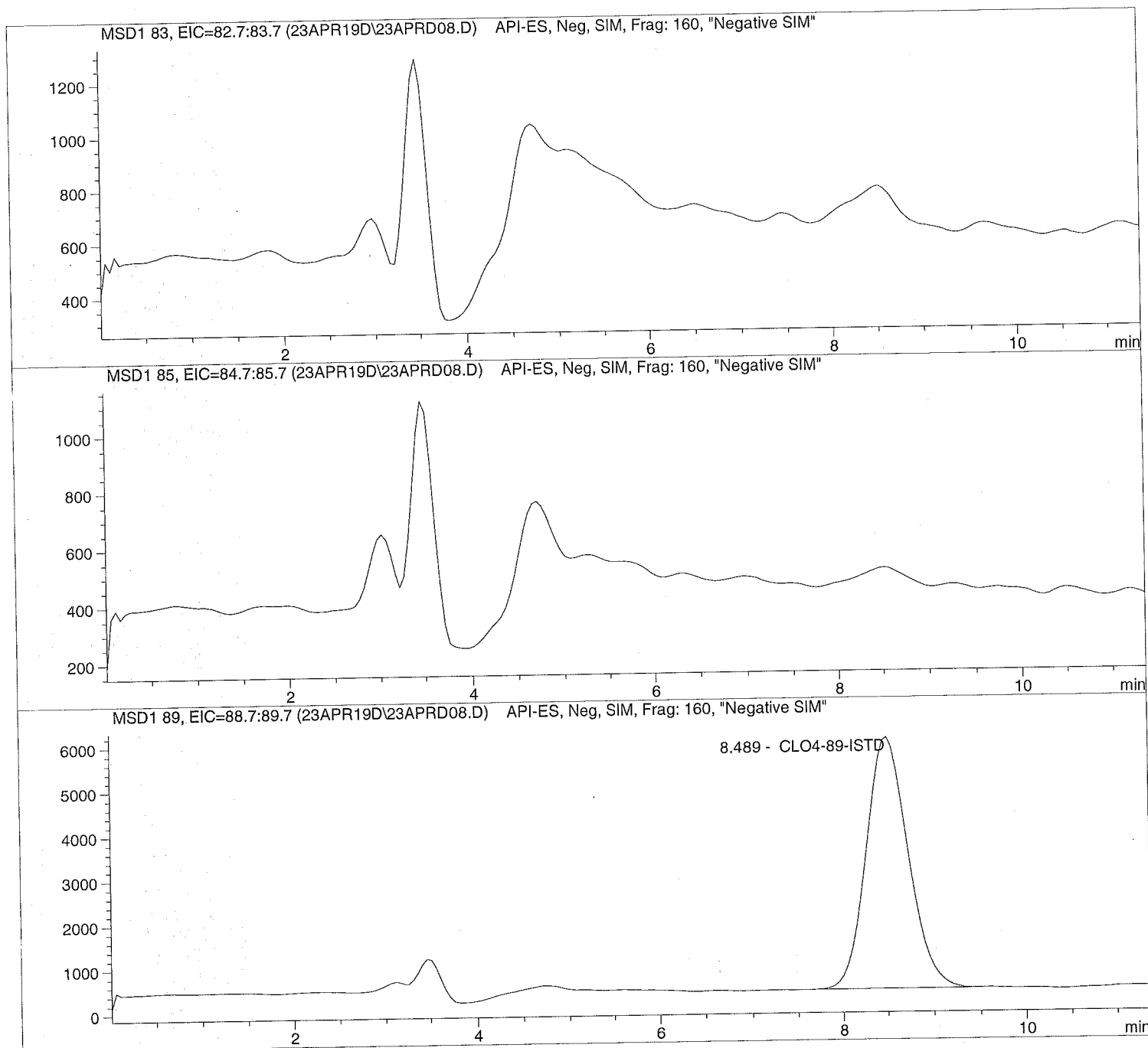
*** End of Report ***

Injection Date: 4/23/2019 10:16:48
Sample Name: 1911288001
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:16:48      Seq Line:      8
Sample Name:    1911288001      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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.489	BBA	181749.4	5.0000	CLO4-89-ISTD

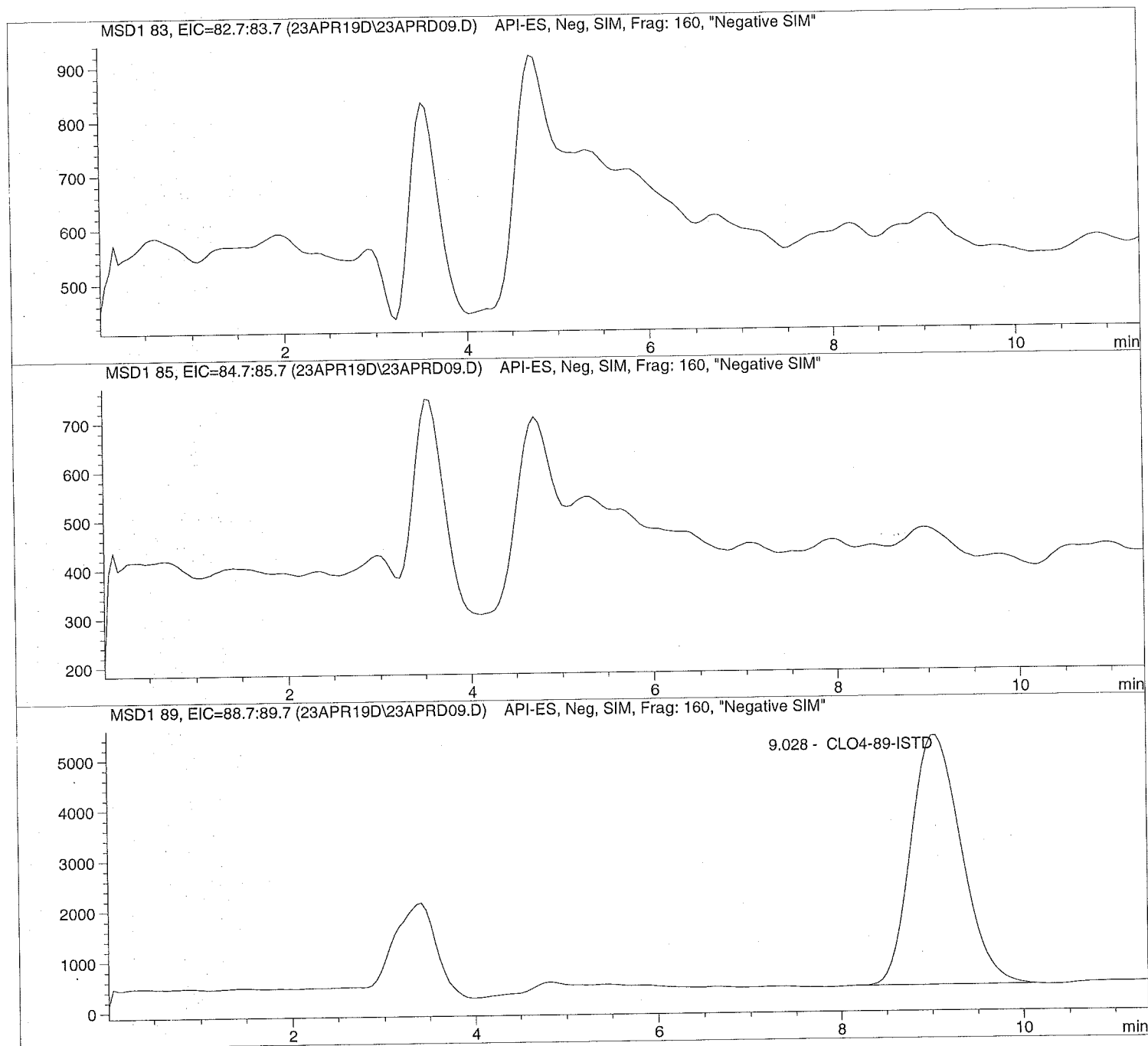
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 10:30:16
Sample Name: 1910837001
Acq Operator: TNB

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:30:16      Seq Line:          9
Sample Name:    1910837001      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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
9.028	BBA	187599.0	5.0000	CLO4-89-ISTD

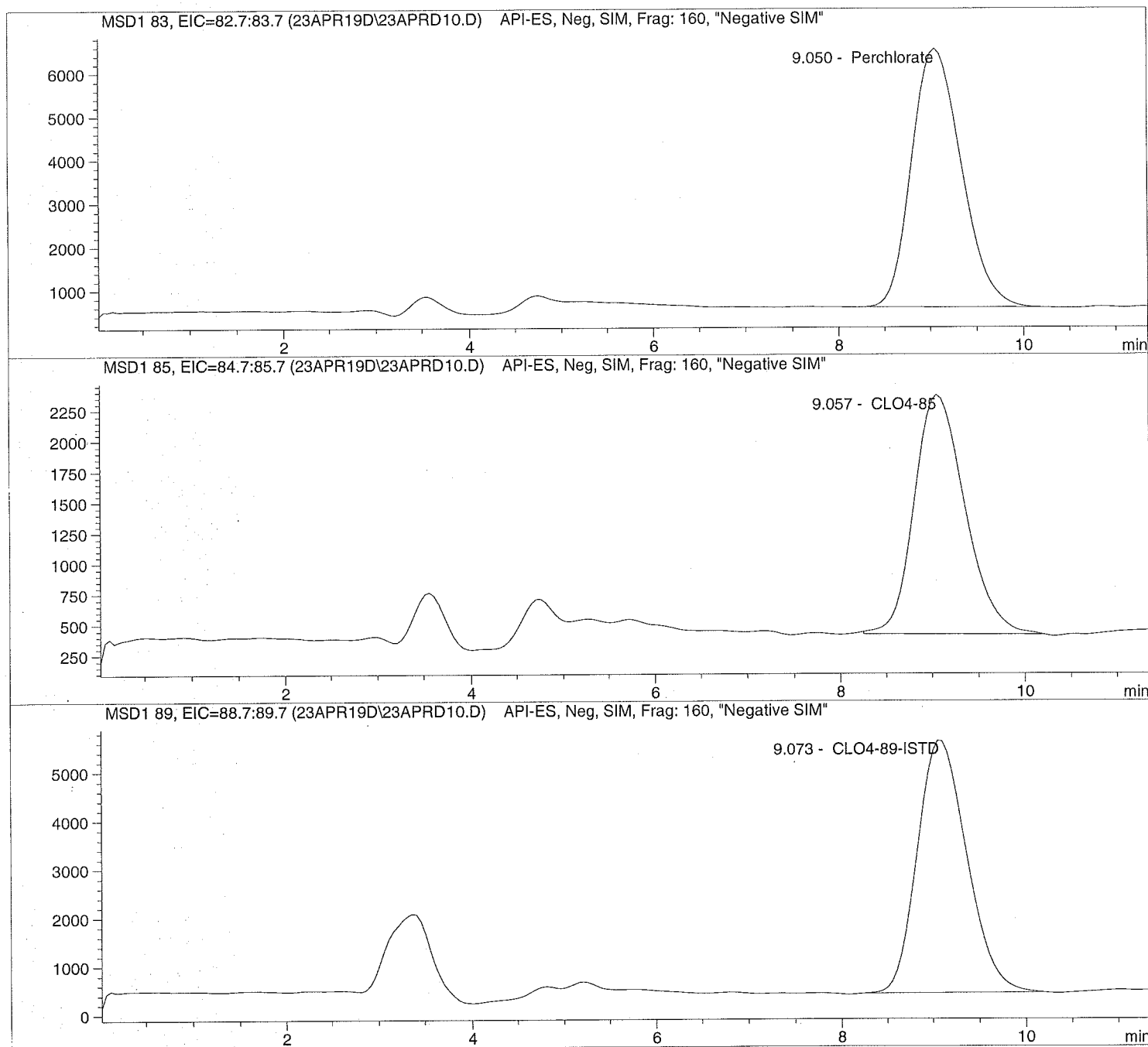
=====
*** End of Report ***
=====

Injection Date: 4/23/2019 10:43:43
Sample Name: 1910837002 MS
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:43:43      Seq Line:          10
Sample Name:    1910837002  MS           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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.050	PBA	221785.2	3.8059	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.057	BBA	74121.5	4.1234	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.073	PBA	192506.7	5.0000	CLO4-89-ISTD

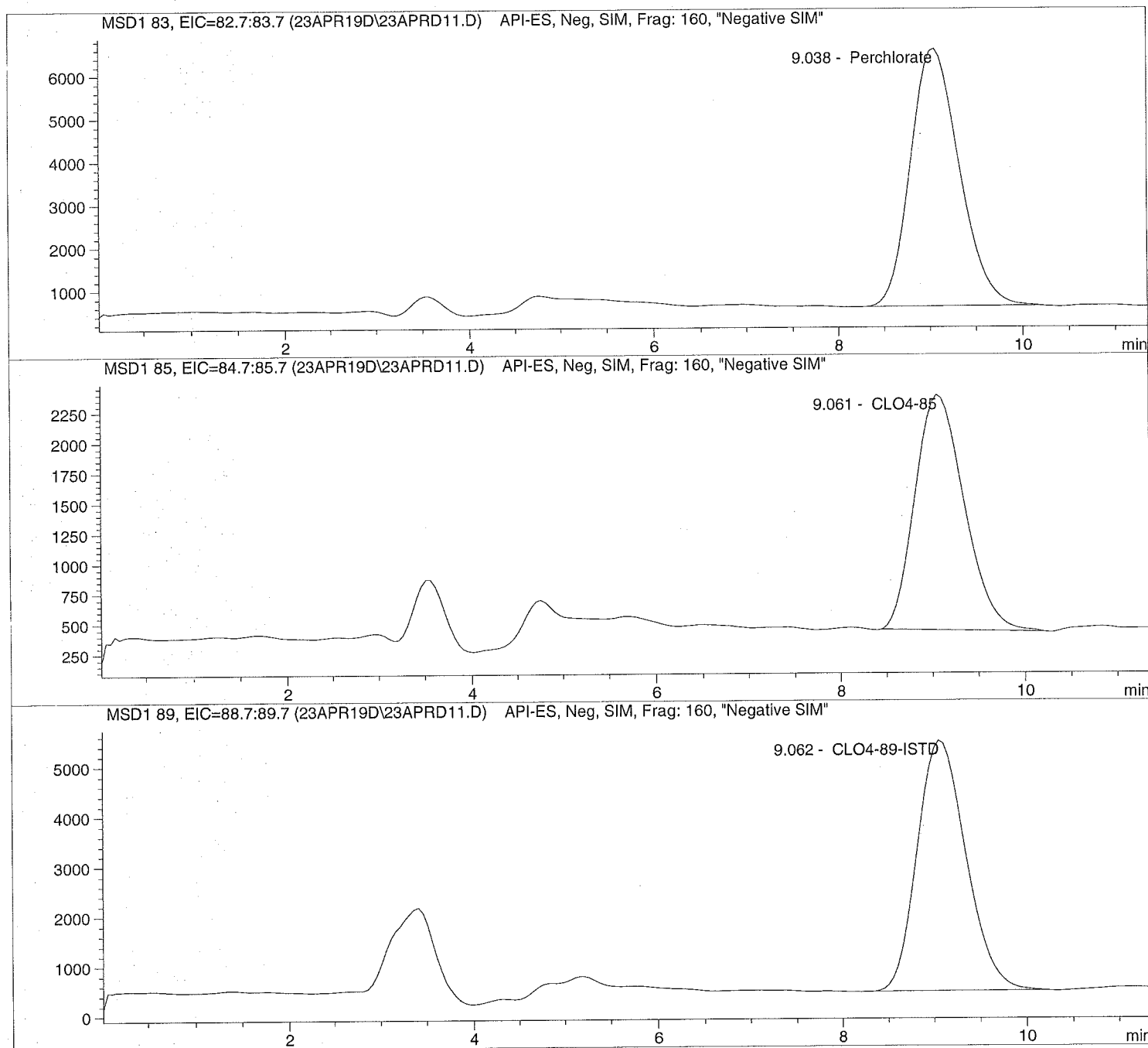
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 10:57:05
Sample Name: 1910837003 MSD
Acq Operator: TNB

Seq Line: 11
Location: Vial 81
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis




```
=====
Injection Date:  4/23/2019  10:57:05      Seq Line:           11
Sample Name:     1910837003  MSD          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-DP2.M
Last Changed:      4/12/2019  07:54:13
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:          Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
9.038	PBA	220802.4	3.9511	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.061	BBA	72383.4	4.2063	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.062	PBA	184256.2	5.0000	CLO4-89-ISTD

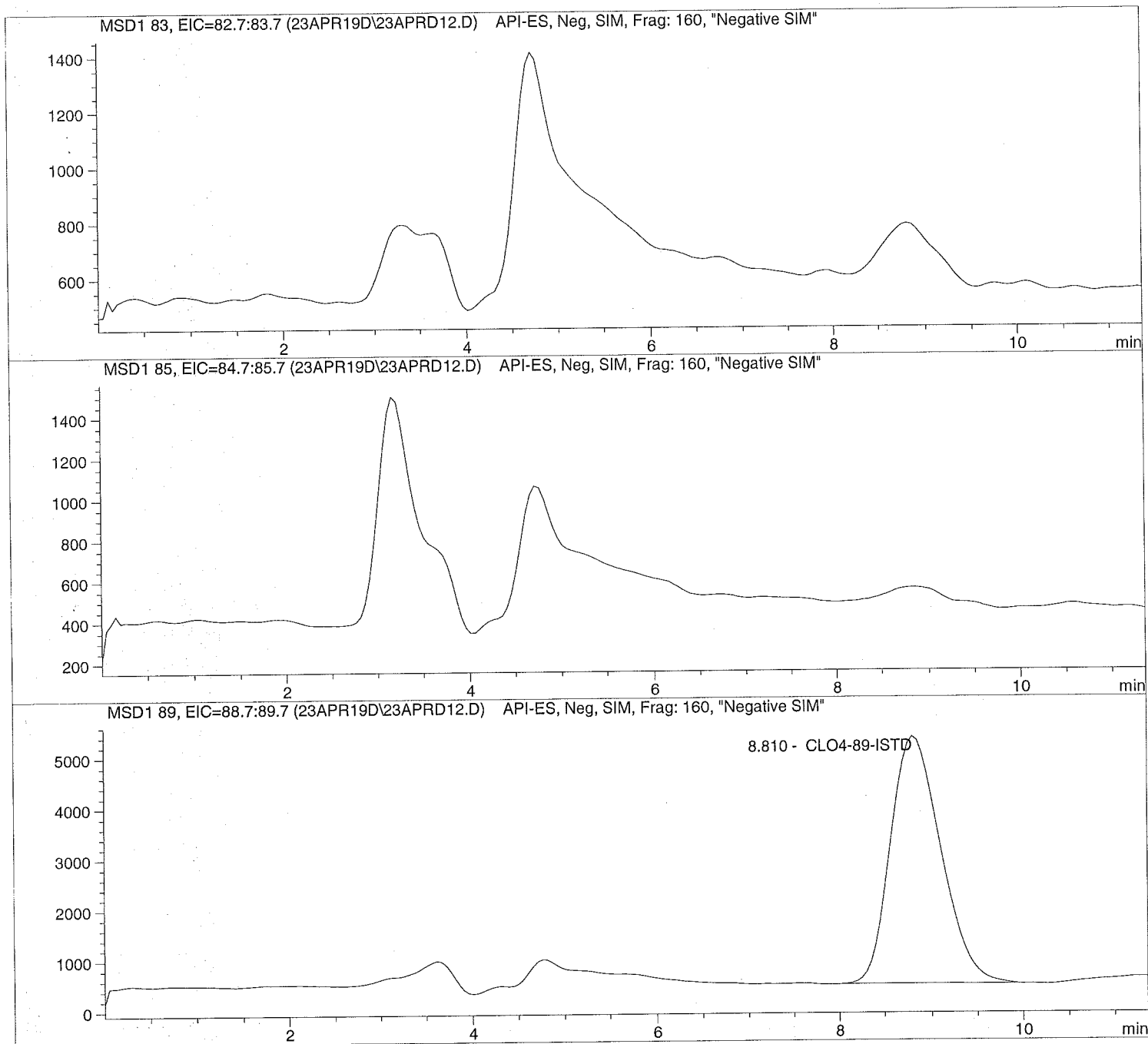
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 11:10:26
Sample Name: 1910837004
Acq Operator: TNB

Seq Line: 12
Location: Vial 82
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 11:10:26 Seq Line: 12
Sample Name: 1910837004 Location: Vial 82
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.810	PBA	180138.5	5.0000	CLO4-89-ISTD

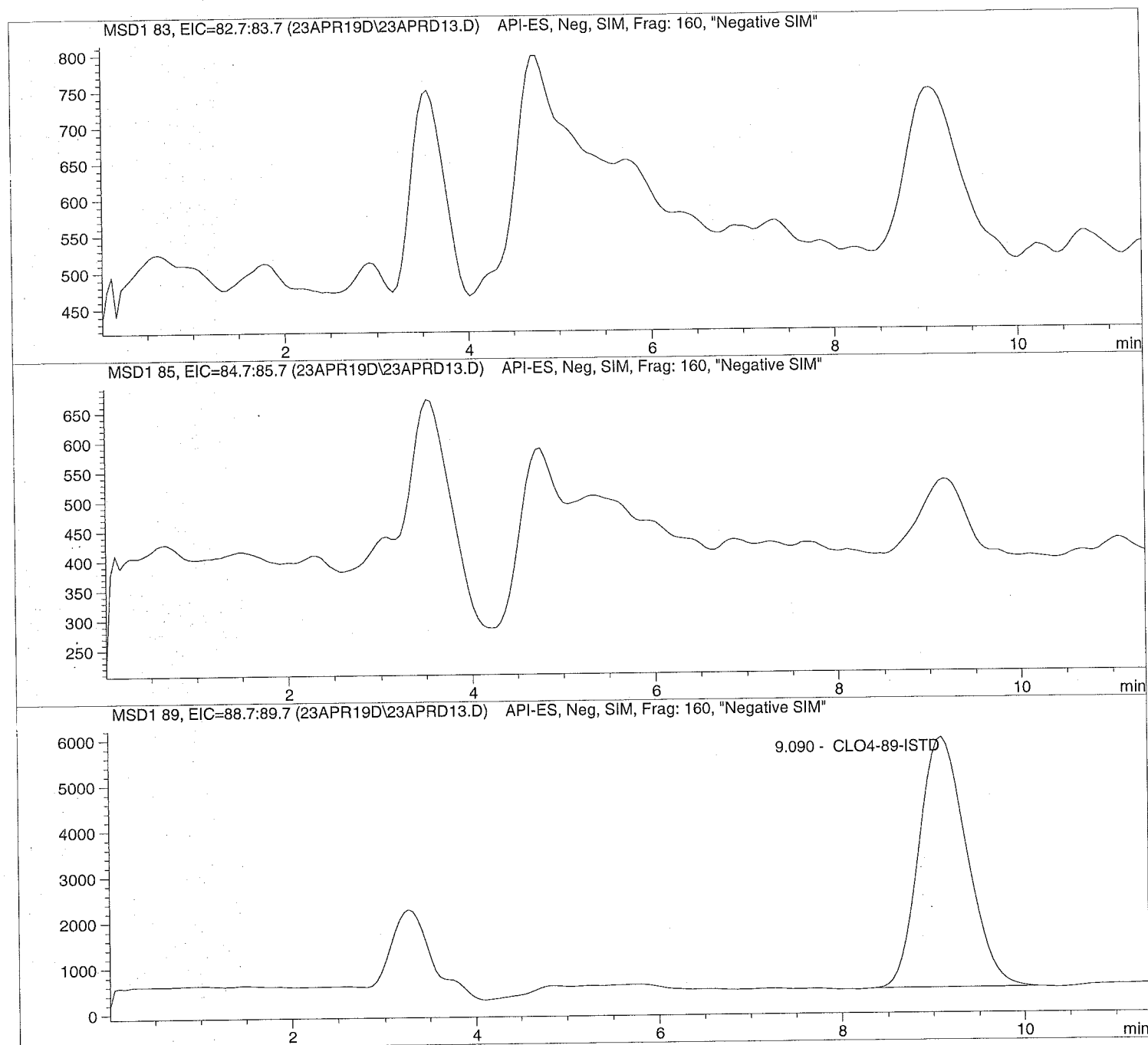
*** End of Report ***

Injection Date: 4/23/2019 11:23:52
Sample Name: 1910837005
Acq Operator: TNB

Seq Line: 13
Location: Vial 83
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  11:23:52      Seq Line:           13
Sample Name:    1910837005              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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
9.090	BBA	197954.5	5.0000	CLO4-89-ISTD

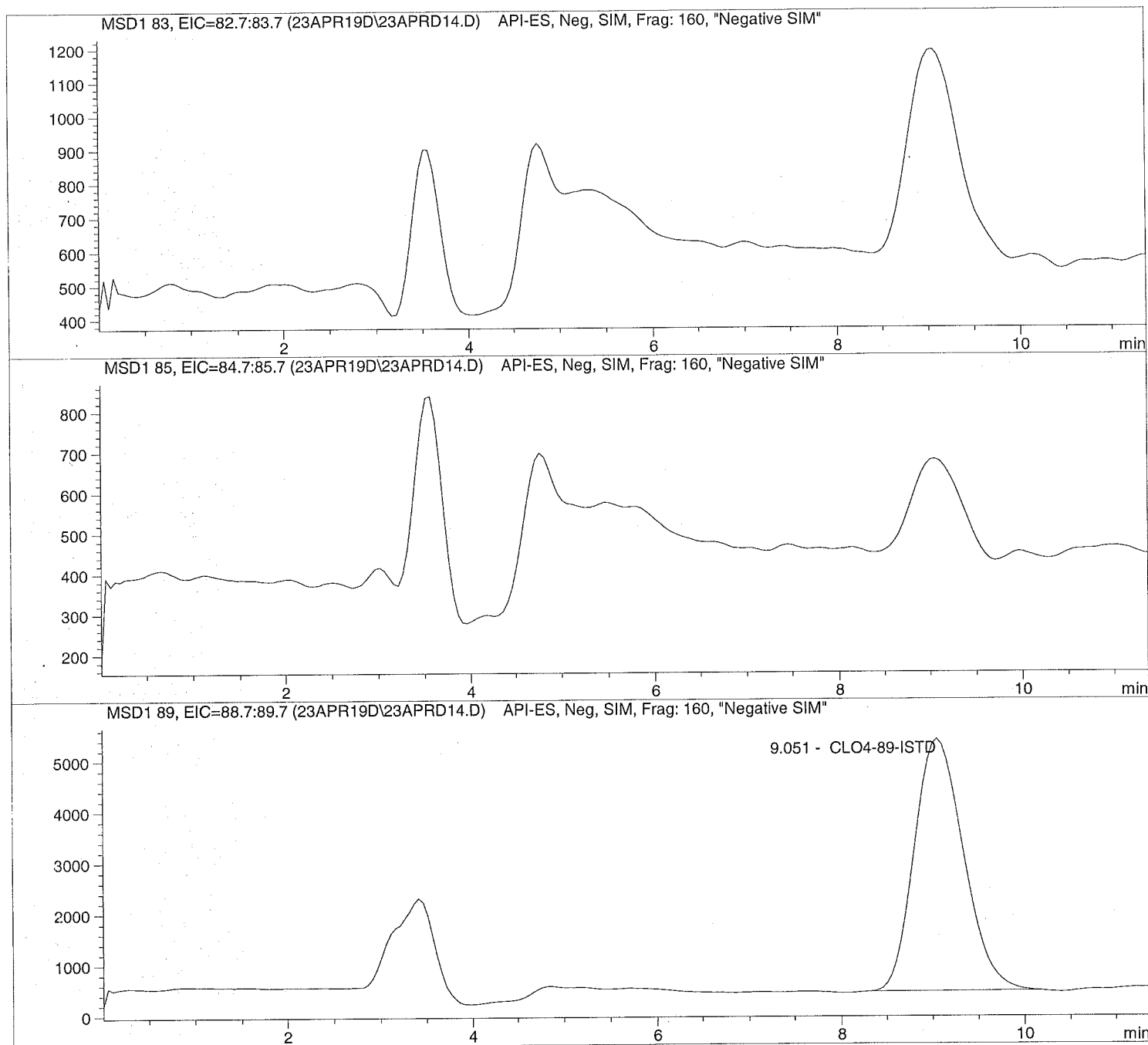
=====
*** End of Report ***
=====

Injection Date: 4/23/2019 11:37:15
Sample Name: 1910837006
Acq Operator: TNB

Seq Line: 14
Location: Vial 84
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  11:37:15      Seq Line:           14
Sample Name:    1910837006                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-DP2.M
Last Changed:   4/12/2019  07:54:13
=====
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
9.051	BBA	183017.4	5.0000	CLO4-89-ISTD

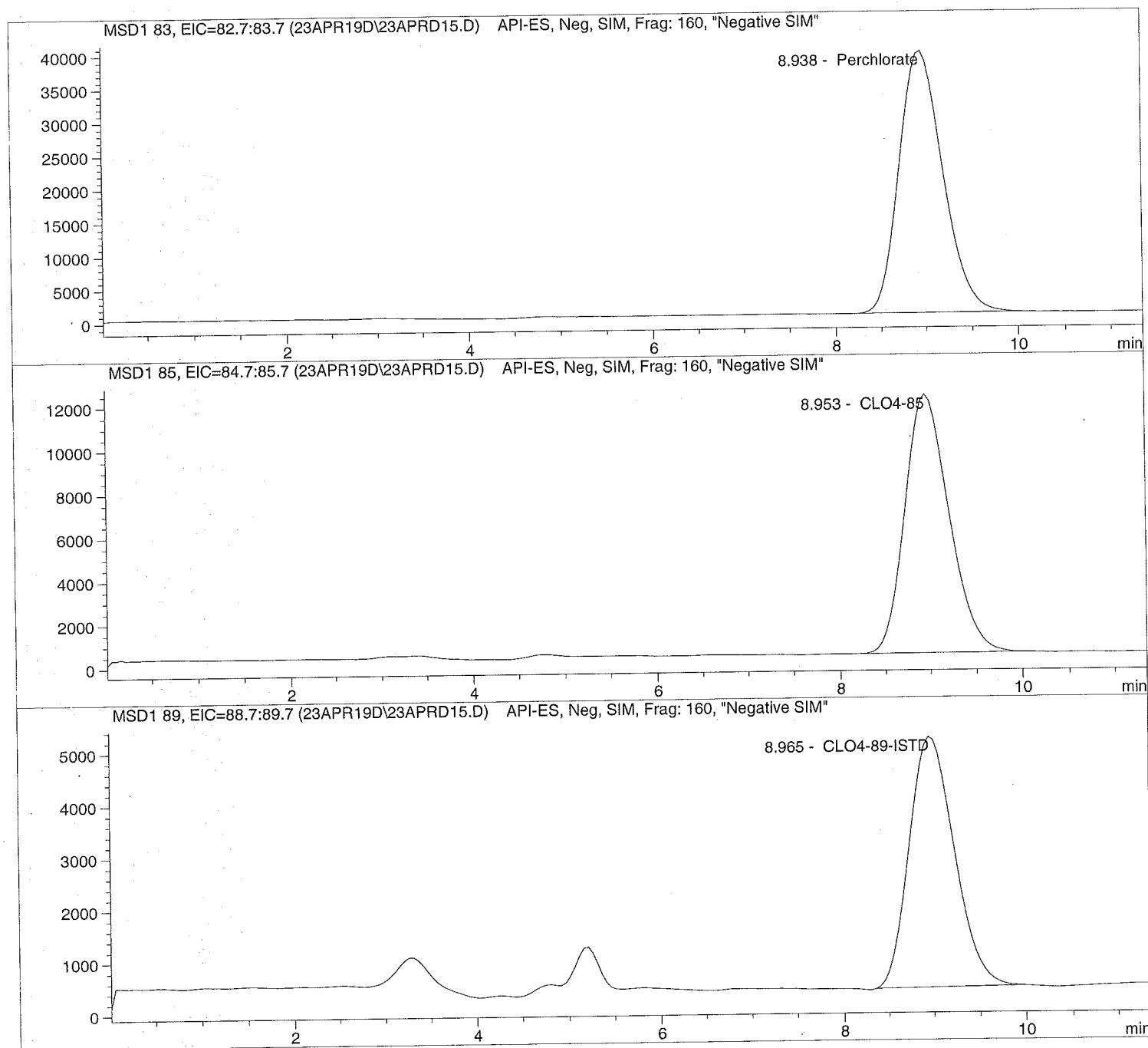
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 11:50:37
Sample Name: 649382 CCV@25
Acq Operator: TNB

Seq Line: 15
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 11:50:37
Sample Name: 649382 CCV@25
Acq Operator: TNB

Seq Line: 15
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.938	PBA	1311276.0	24.2693	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.953	BBA	400971.3	24.9597	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.965	PBA	164670.7	5.0000	CLO4-89-ISTD

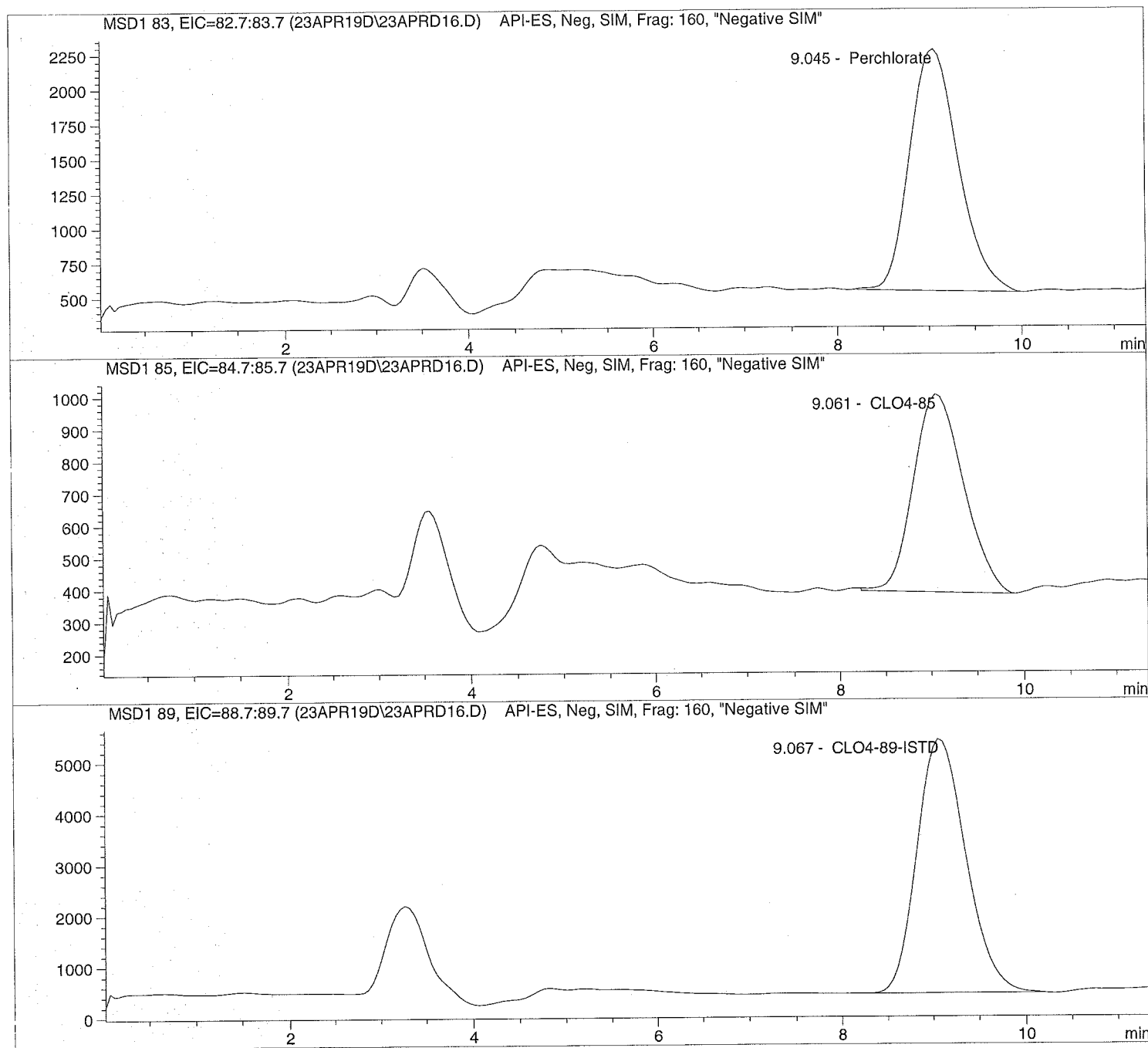
*** End of Report ***

Injection Date: 4/23/2019 12:03:59
Sample Name: 1910837007
Acq Operator: TNB

Seq Line: 16
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 12:03:59
Sample Name: 1910837007
Acq Operator: TNB

Seq Line: 16
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.045	BBA	64240.0	1.2640	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.061	BBA	23485.4	1.3651	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.067	PBA	184879.5	5.0000	CLO4-89-ISTD

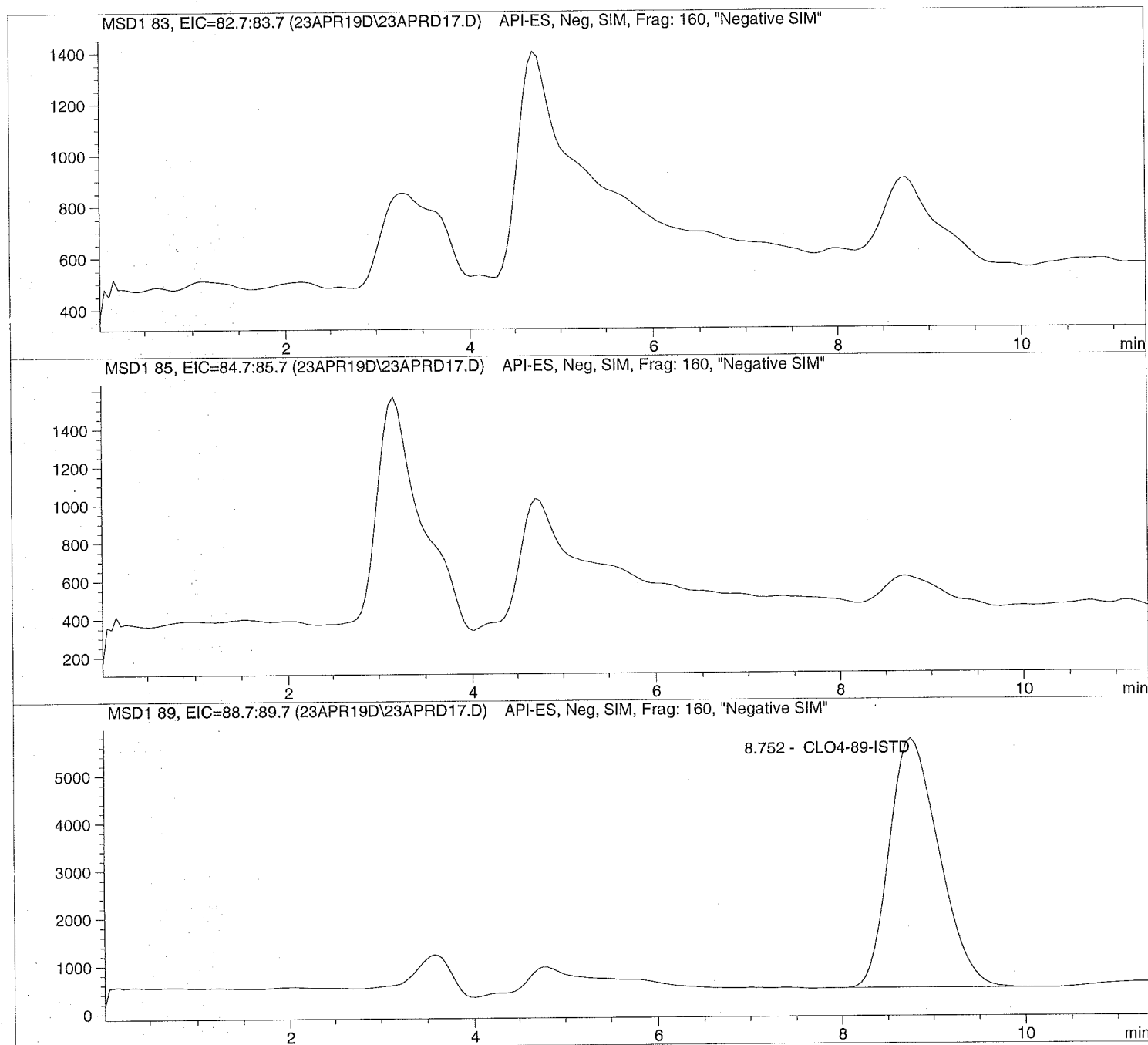
*** End of Report ***

Injection Date: 4/23/2019 12:17:22
Sample Name: 1910837008
Acq Operator: TNB

Seq Line: 17
Location: Vial 86
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  12:17:22      Seq Line:           17
Sample Name:    1910837008                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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.752	PBA	196776.6	5.0000	CLO4-89-ISTD

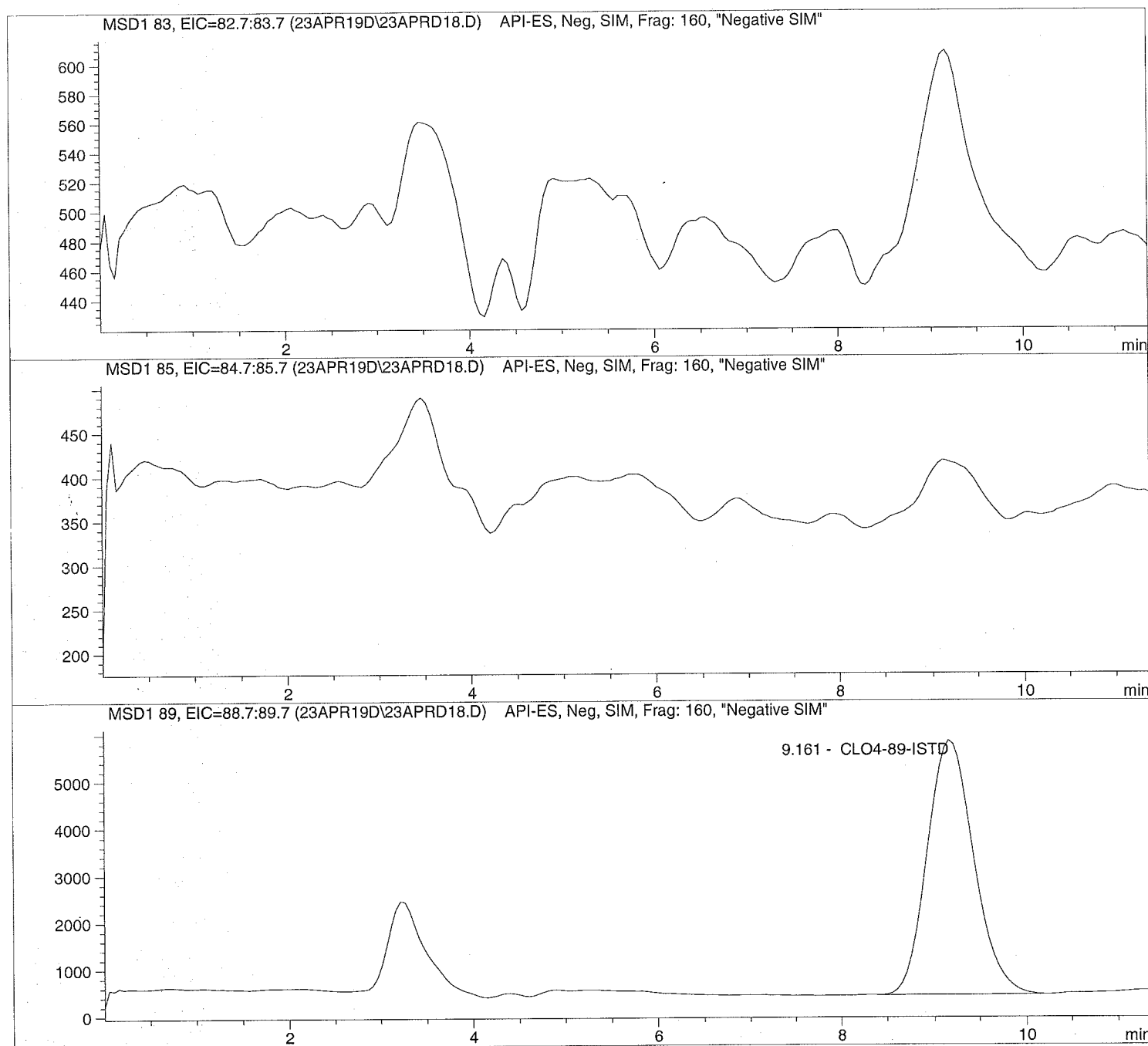
=====
*** End of Report ***
=====

Injection Date: 4/23/2019 12:30:43
Sample Name: 1910837009
Acq Operator: TNB

Seq Line: 18
Location: Vial 87
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 12:30:43
Sample Name: 1910837009
Acq Operator: TNB

Seq Line: 18
Location: Vial 87
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.161	BBA	191613.1	5.0000	CLO4-89-ISTD

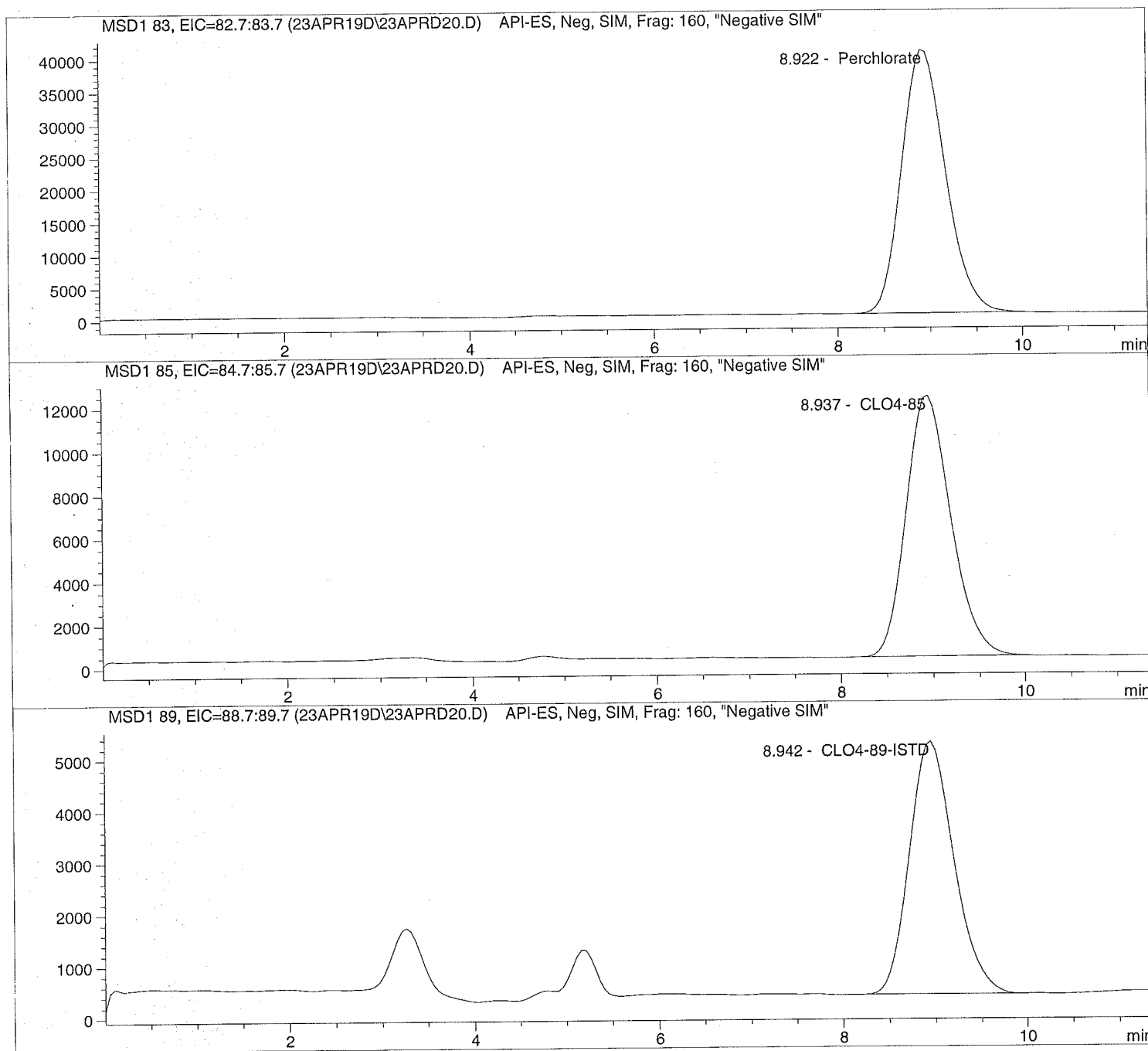
*** End of Report ***

Injection Date: 4/23/2019 13:01:17
Sample Name: 649383 CCV@25
Acq Operator: TNB

Seq Line: 20
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 13:01:17 Seq Line: 20
Sample Name: 649383 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.922	PBA	1319634.0	24.7062	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.937	PBA	401823.2	25.3099	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.942	PBA	162618.0	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 : 3/19/2019 2:35:19 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
8.744	1 1	1.00000	7.76074e4	1.28854e-5	1	Perchlorate
	2	2.00000	1.35273e5	1.47849e-5		
	3	5.00000	3.37764e5	1.48033e-5		
	4	10.00000	6.83454e5	1.46316e-5		
	5	25.00000	2.08433e6	1.19943e-5		
	6	50.00000	4.13334e6	1.20968e-5		
	7	75.00000	5.99313e6	1.25143e-5		
8.755	2 1	1.00000	2.36780e4	4.22333e-5	1	CLO4-85
	2	2.00000	4.69486e4	4.25998e-5		
	3	5.00000	1.06124e5	4.71147e-5		
	4	10.00000	2.13523e5	4.68335e-5		
	5	25.00000	6.14295e5	4.06971e-5		
	6	50.00000	1.19814e6	4.17315e-5		
	7	75.00000	1.78355e6	4.20509e-5		
8.766	3 1	5.00000	2.73208e5	1.83011e-5	+I1	CLO4-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5		
	3	5.00000	2.33196e5	2.14412e-5		
	4	5.00000	2.34454e5	2.13262e-5		
	5	5.00000	2.50568e5	1.99547e-5		
	6	5.00000	2.30977e5	2.16472e-5		

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min

Curve Type : Quadratic

Origin : Ignored

Calibration Level Weights:/

Level 1	: 1
Level 2	: 0.5
Level 3	: 0.2
Level 4	: 0.1
Level 5	: 0.04
Level 6	: 0.02
Level 7	: 0.013333

Compound: CL04-85

Time Window : From 6.650 min To 12.505 min

Curve Type : Quadratic

Origin : Ignored

Calibration Level Weights:/

Level 1	: 1
Level 2	: 0.5
Level 3	: 0.2
Level 4	: 0.1
Level 5	: 0.04
Level 6	: 0.02
Level 7	: 0.013333

Compound: CL04-89-ISTD

Time Window : From 6.659 min To 12.466 min

Curve Type : Linear

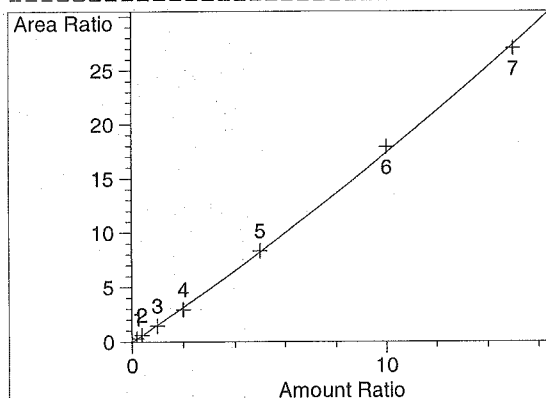
Origin : Included

Calibration Level Weights:/

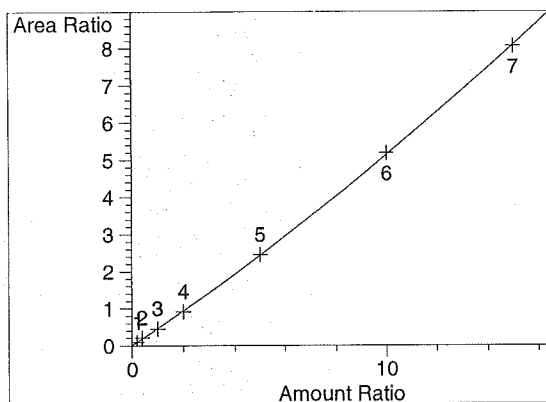
Level 1	: 1
Level 2	: 1
Level 3	: 1
Level 4	: 1
Level 5	: 1
Level 6	: 1
Level 7	: 1

=====
Peak Sum Table
=====

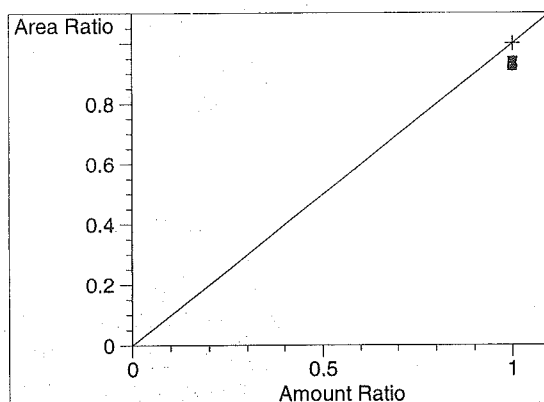
No Entries in table
=====

=====
Calibration Curves
=====

Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation: 0.99957
Residual Std. Dev.: 0.30744
Formula: $y = ax^2 + bx + c$
a: 1.76988e-2
b: 1.56480
c: -4.92430e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755
MSD1 85, EIC=84.7:85.7
Correlation: 0.99983
Residual Std. Dev.: 0.03473
Formula: $y = ax^2 + bx + c$
a: 5.13396e-3
b: 4.62055e-1
c: 4.97209e-4
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766
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 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	7.76074e4	8.744	1.06245
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	8.992	2.06969
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	8.586	4.73474
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	8.698	9.27727
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	8.451	25.29036
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	8.810	51.36844
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	8.586	74.16754
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	8.702	9.25940

##	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
##	-----	-----	---	-----	---	-----	-----	-----
##	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	8.755	9.30535e-1
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	9.012	2.24255
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	8.602	4.86656
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	8.713	9.64312
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	8.468	25.12159
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	8.825	50.46721
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	8.603	74.72019
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	8.721	9.54024

##	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	2.73208e5	8.766	5.00000
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	9.012	5.00000
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	8.609	5.00000
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	8.716	5.00000
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	8.472	5.00000
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	8.825	5.00000
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	8.610	5.00000
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	8.725	5.00000

*** End of Report ***

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\MAR\19MAR19I.S

Sequence Table:

Method and Injection Info Part:

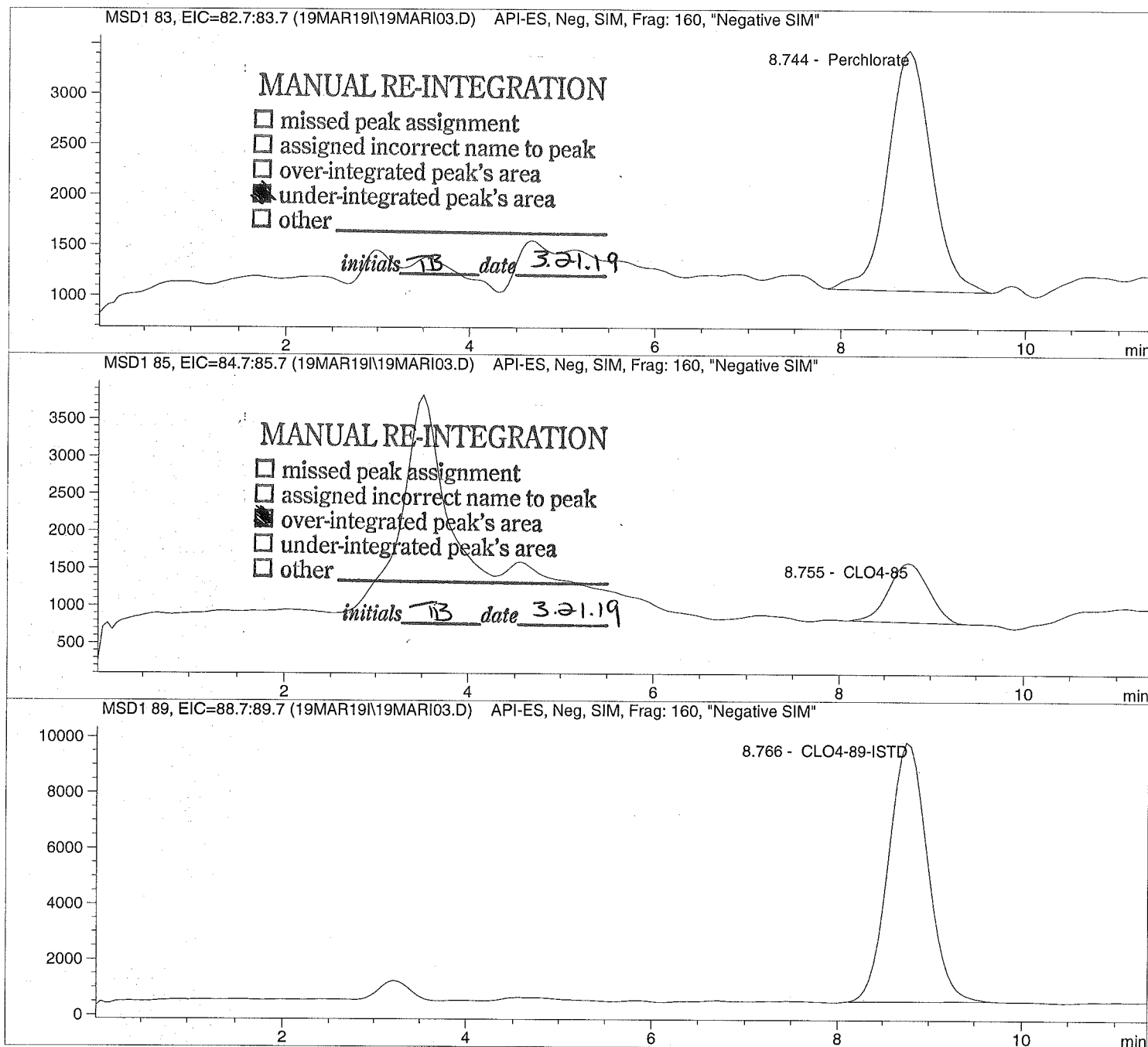
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	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 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.744	MM	77607.4	1.0625	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	MM	23678.0	0.9305	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

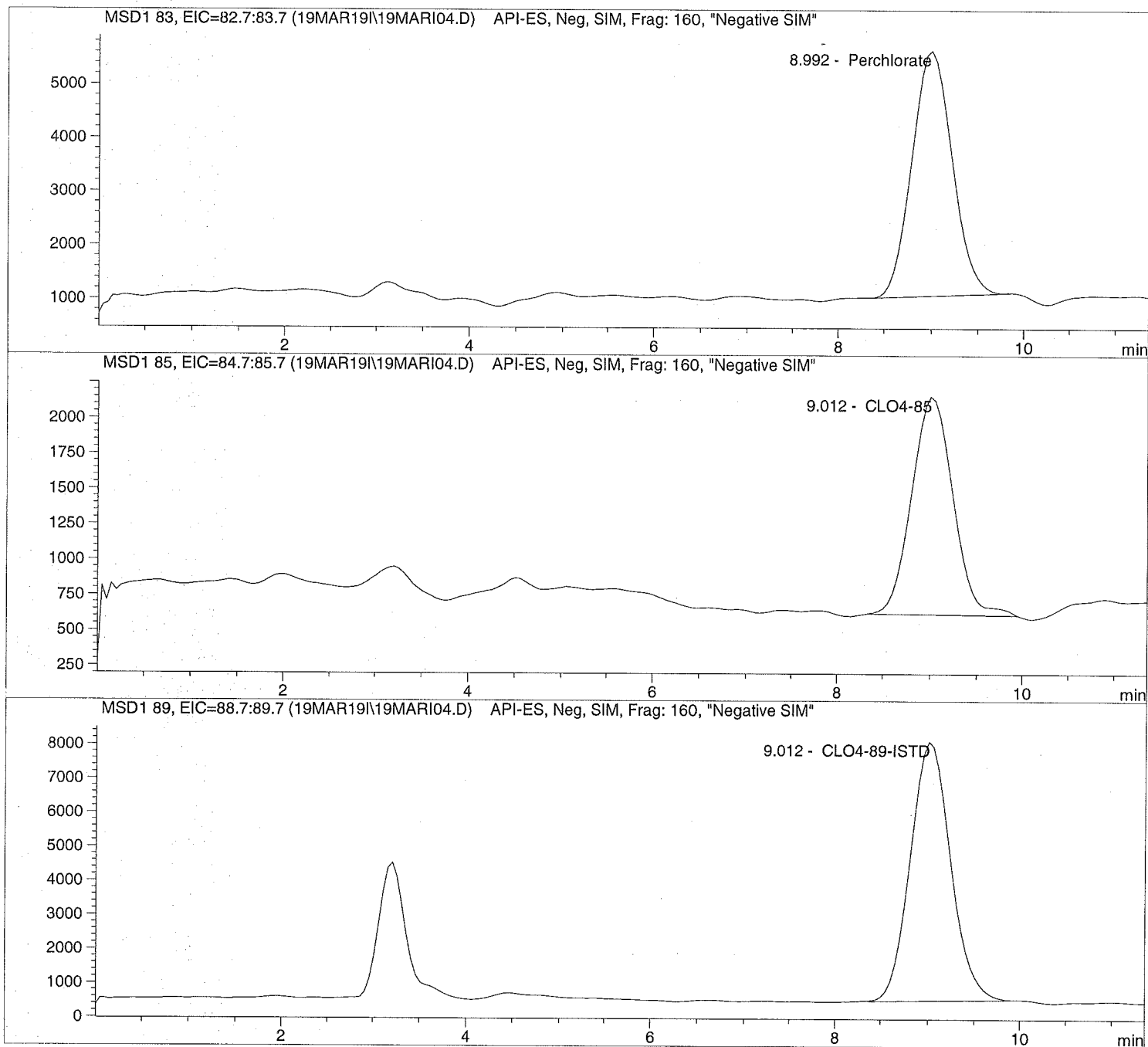
*** End of Report ***

Injection Date: 3/19/2019 09:53:00
Sample Name: CLO4@ 2.0ug/L
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date:   3/19/2019   09:53:00      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-DP2.M
Last Changed:      3/19/2019   14:35:22
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:          Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.992	BBA	135272.8	2.0697	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

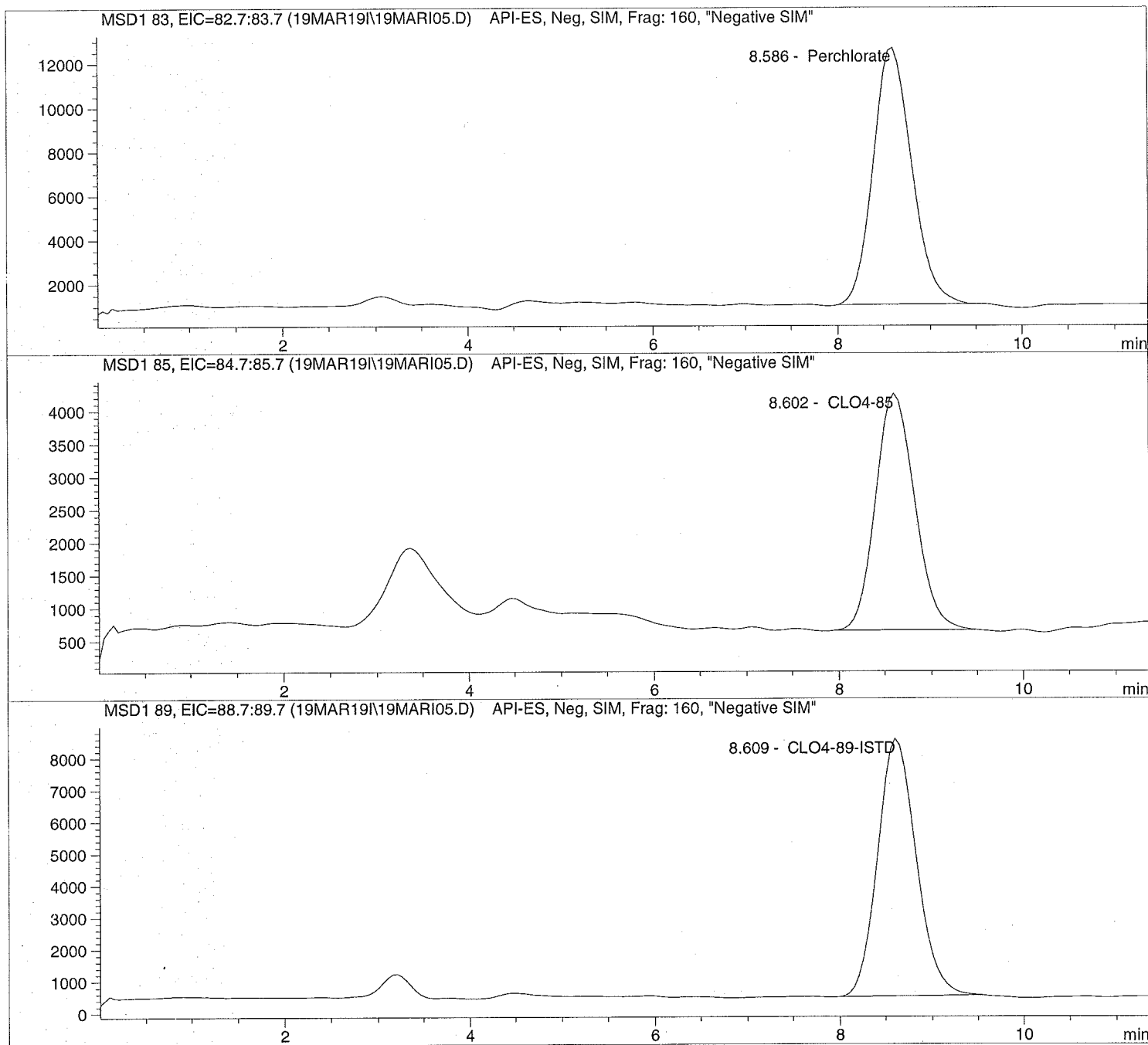
```
=====
*** End of Report ***
=====
```

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI05.D

Sample Name: CLO4@ 5.0ug/L

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 10:19:32

Seq Line: 6

Sample Name: CLO4@ 10.ug/L

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

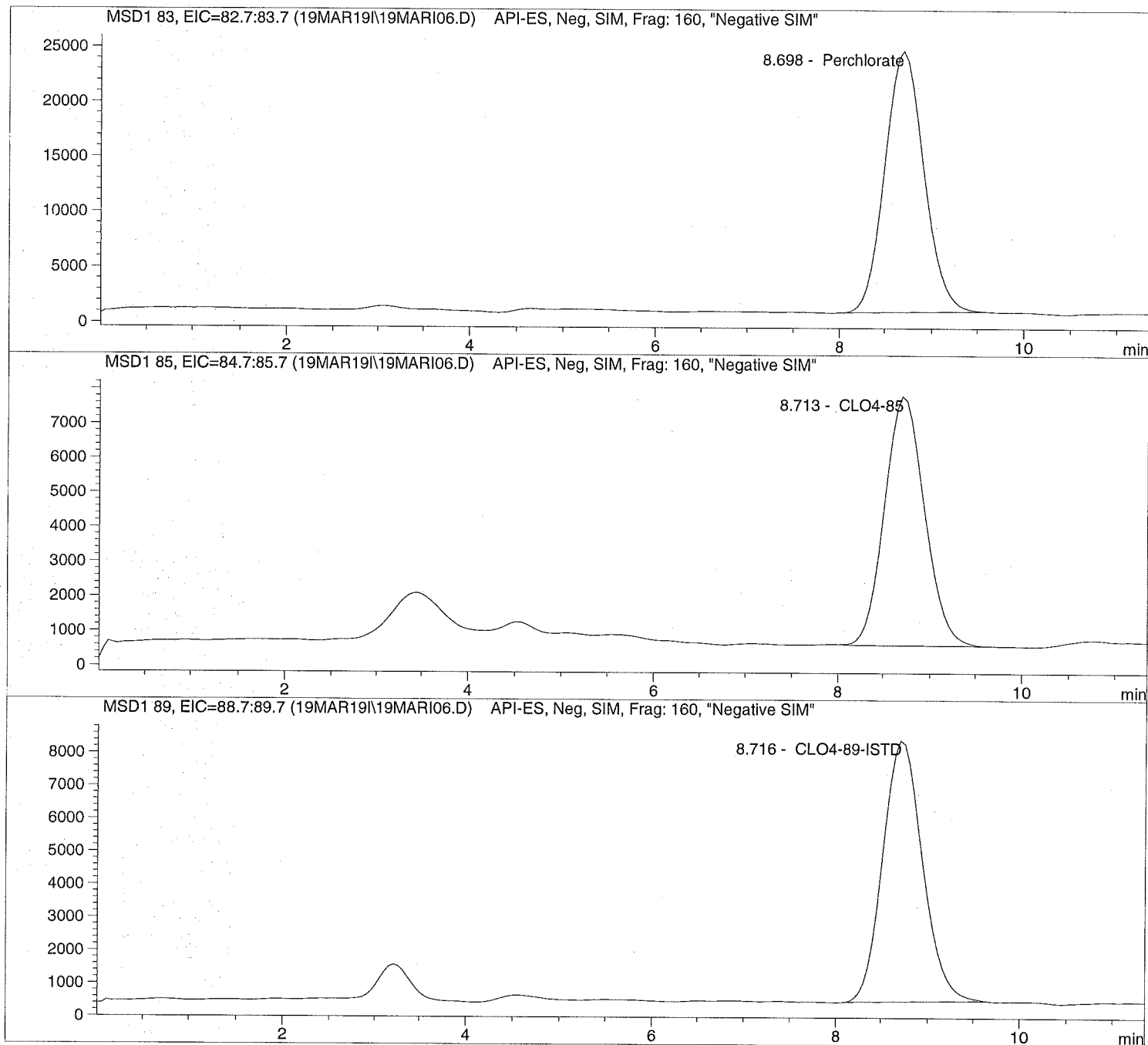
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI06.D

Sample Name: CLO4@ 10.ug/L

Injection Date: 3/19/2019 10:19:32
Sample Name: CLO4@ 10.ug/L
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.698	PBA	683454.4	9.2773	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

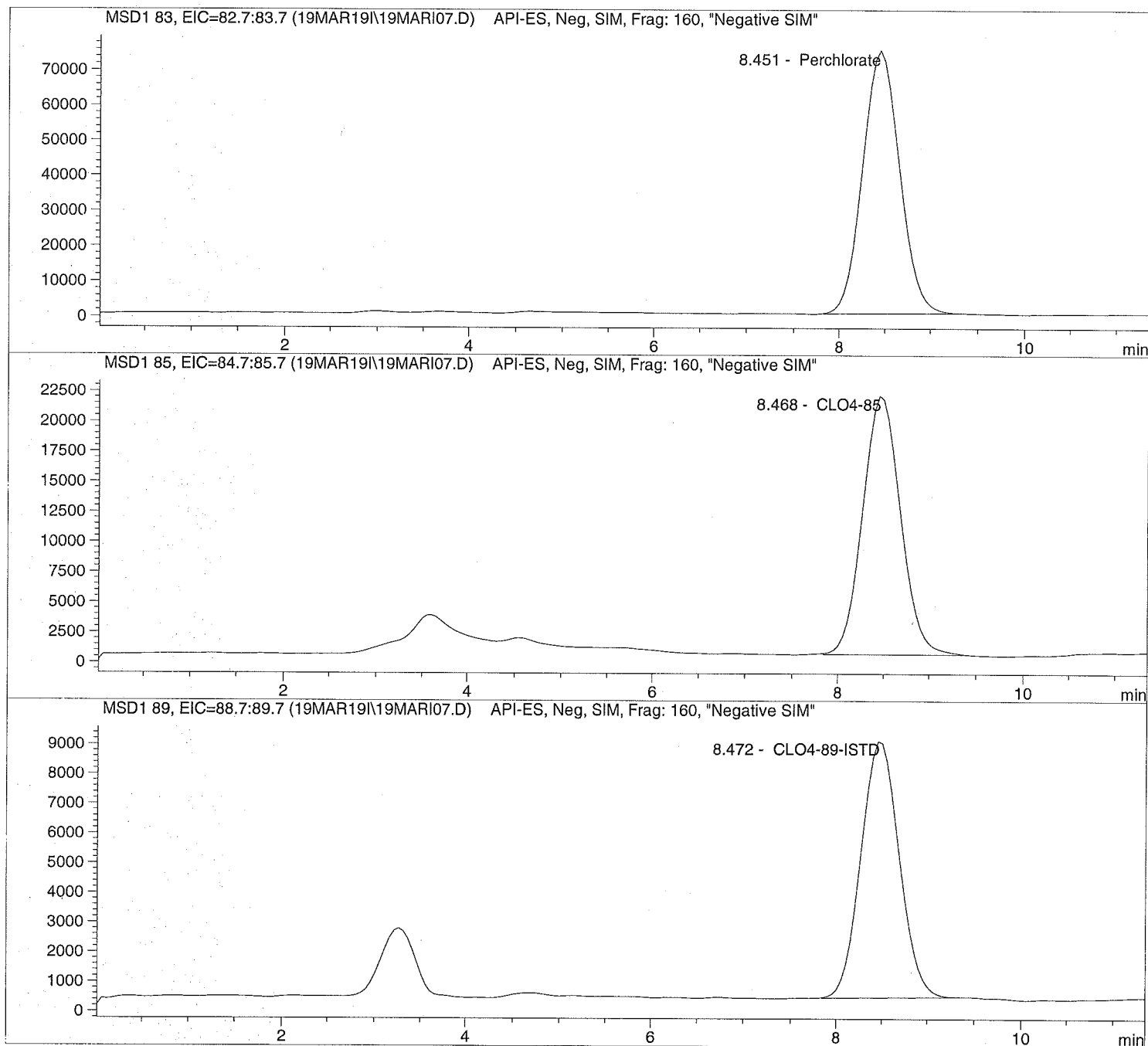
*** End of Report ***

Injection Date: 3/19/2019 10:32:49
Sample Name: CLO4@ 25.ug/L
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 10:32:49 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.451	PBA	2084327.4	25.2904	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.468	BBA	614294.8	25.1216	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D

Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05

Seq Line: 8

Sample Name: CLO4@ 50.ug/L

Location: Vial 78

Acq Operator: TNB

Inj. No.: 1

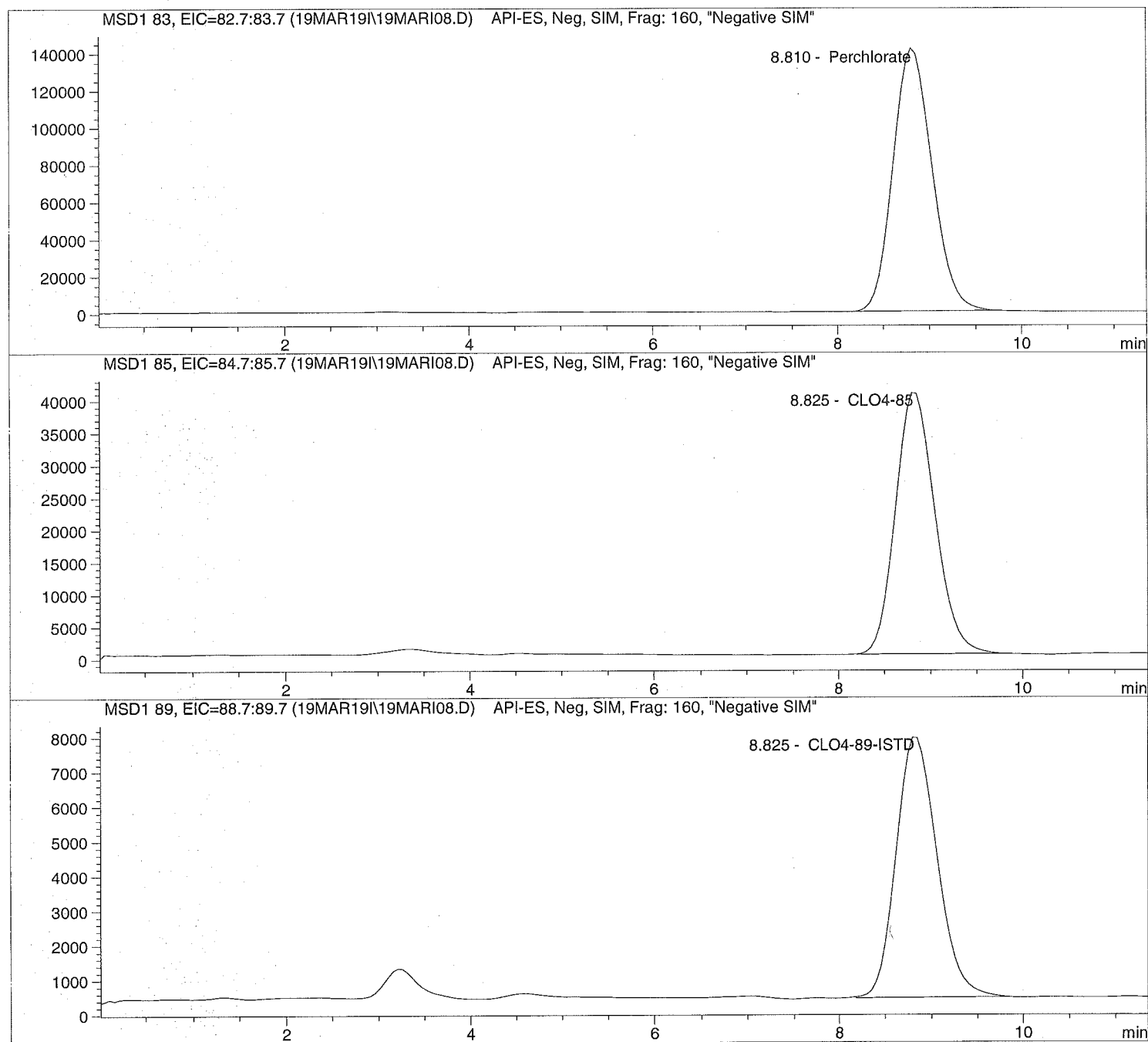
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D

Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.810	PBA	4133340.5	51.3684	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.4672	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 10:59:22

Seq Line: 9

Sample Name: CLO4@ 75.ug/L

Location: Vial 79

Acq Operator: TNB

Inj. No.: 1

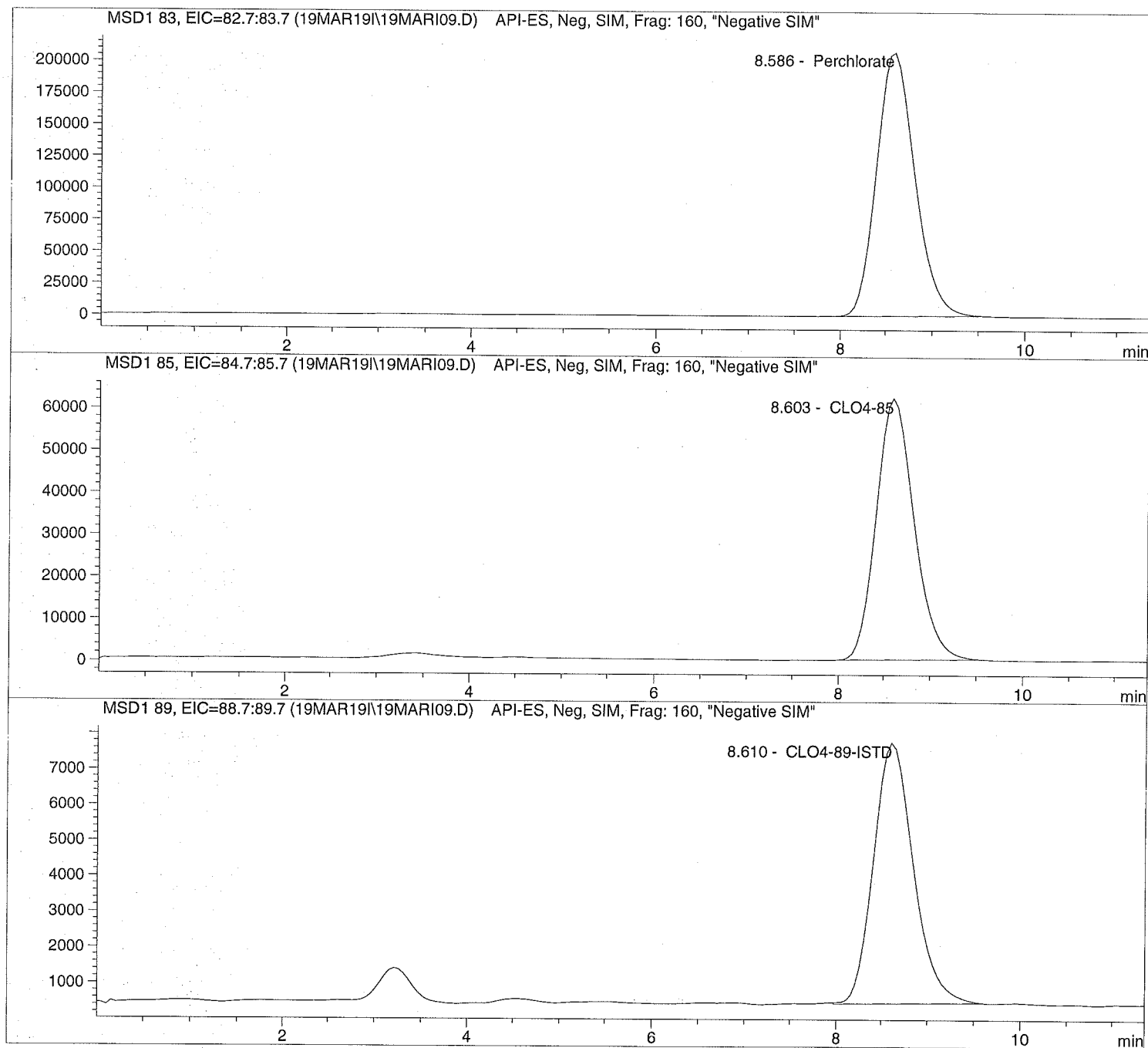
Inj. Vol.: 30 μ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI09.D Sample Name: CLO4@ 75.ug/L

Injection Date: 3/19/2019 10:59:22 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

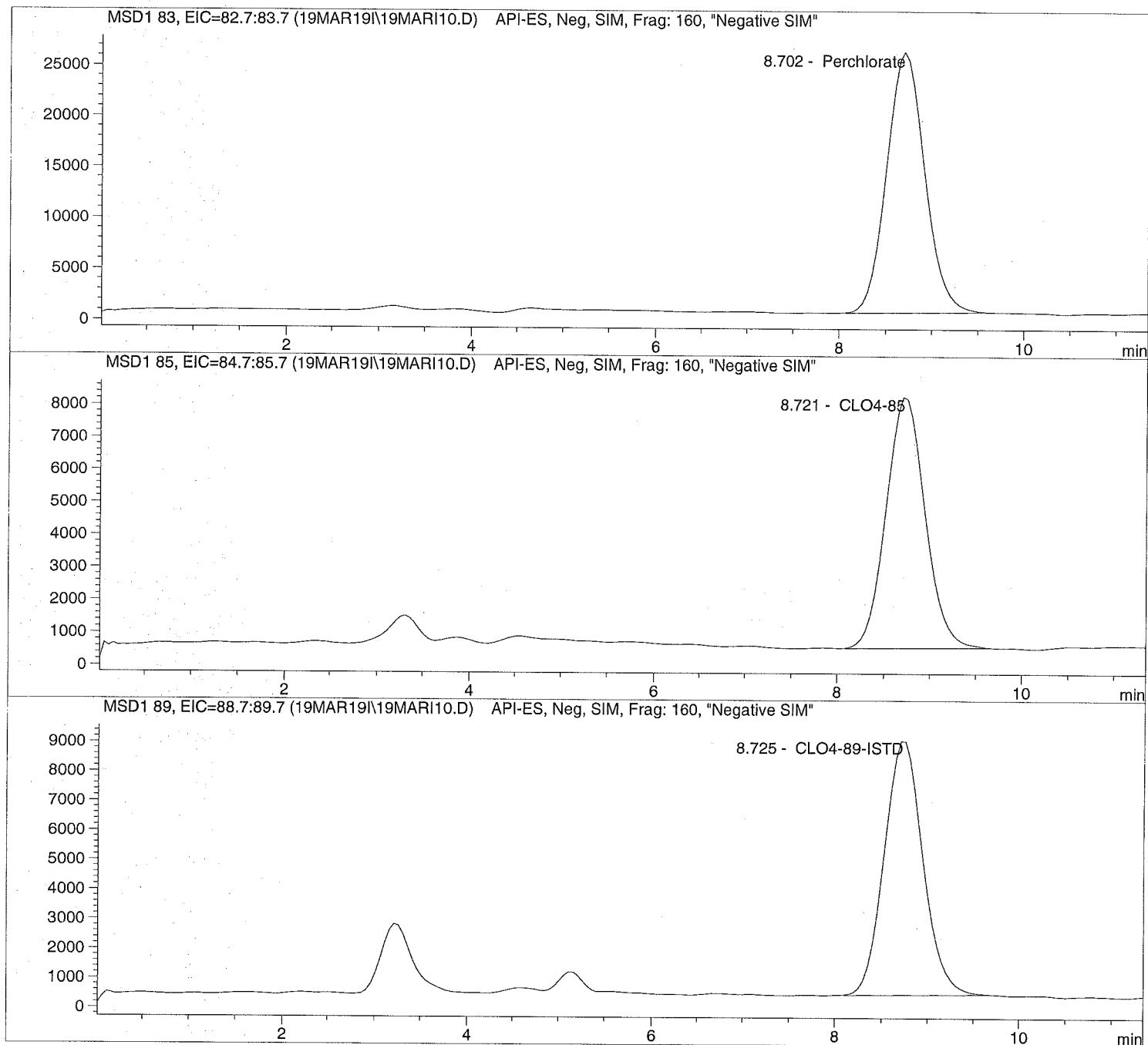
*** End of Report ***

Injection Date: 3/19/2019 11:12:42
Sample Name: ICAL Verf@10ug/L
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D

Sample Name: ICAL Verf@10ug/L

Injection Date: 3/19/2019 11:12:42

Seq Line: 10

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal

Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

*** End of Report ***



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

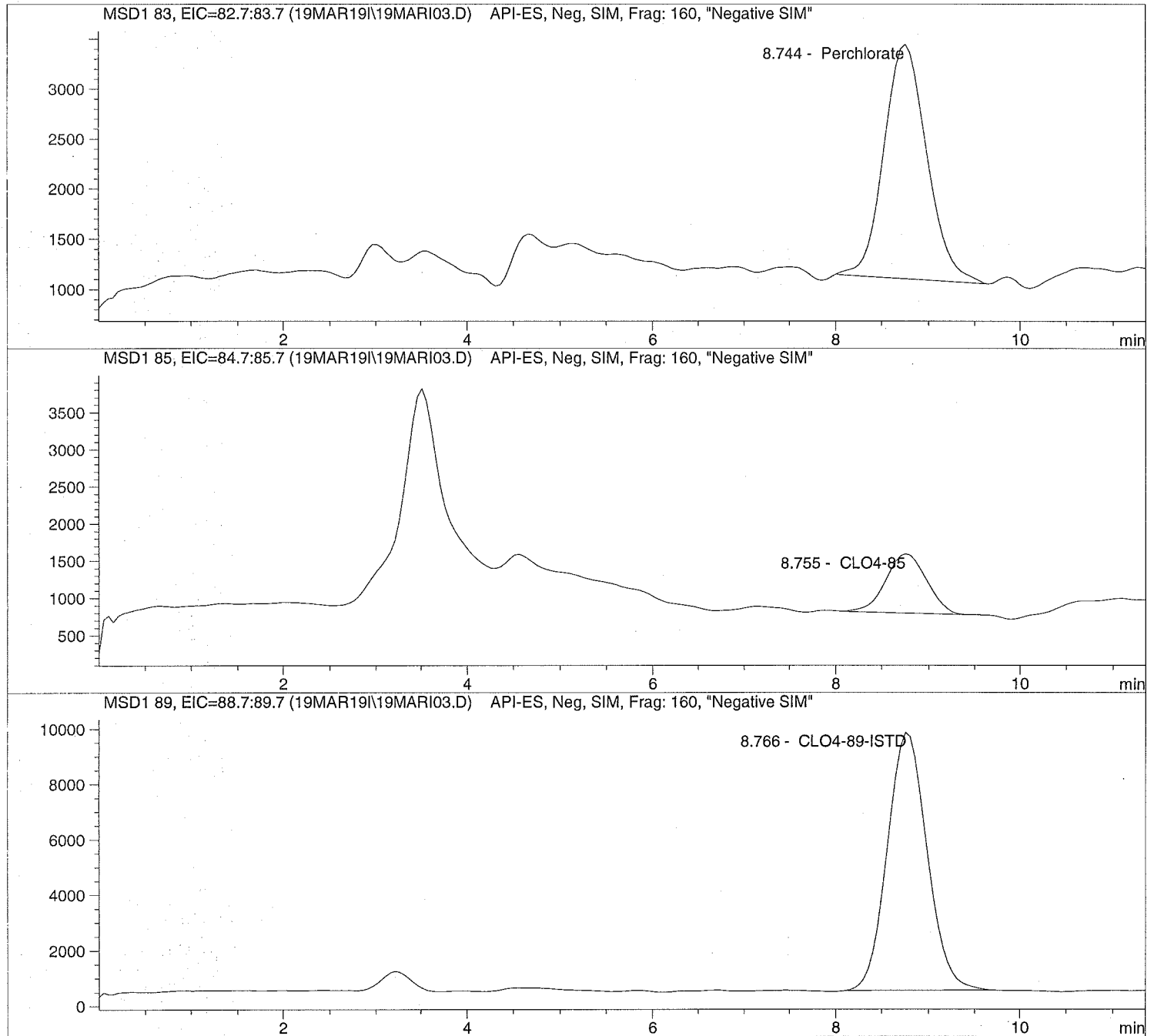
Unmodified

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:38:25

Perchlorate analysis



```
=====
Injection Date:  3/19/2019  09:39:40      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-DP2.M
Last Changed:   3/19/2019  14:38:25
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.744	BBA	74166.3	1.0224	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	BBA	24138.1	0.9487	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```



10450 Stancliff Rd. Suite 210
Houston, TX 77099
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April 25, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19040653**

Laboratory Results for: **LH18/24 Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on Apr 11, 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



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Houston, TX 77099
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F: +1 281 530 5887

April 29, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19040654**

Laboratory Results for: **LH18/24 GW Treatment Plant Monthly Influent Samples**

Dear Marcia,

ALS Environmental received 1 sample(s) on Apr 11, 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



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April 29, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19041072**

Laboratory Results for: **LH18/24 Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on Apr 18, 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: DAYNA.FISHER

RJ Modashia
Project Manager



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May 03, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19041158**

Laboratory Results for: **Longhorn GW Treatment Plant Bi-Weekly Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on Apr 18, 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



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May 17, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19050126**

Laboratory Results for: **LH18/24 Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on May 02, 2019 for the analysis presented in the following report.

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

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

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

Sincerely,

Generated By: JUMOKE.LAWAL

RJ Modashia
Project Manager

ALS Houston, US

Date: 17-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19050126

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19050126-01	LH18/24-SP650_050119	Water		01-May-2019 14:00	02-May-2019 12:50	<input type="checkbox"/>
HS19050126-02	LH18/24-SP650_050119_BIX	Water		01-May-2019 14:00	02-May-2019 12:50	<input type="checkbox"/>

ALS Houston, US

Date: 17-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order:

CASE NARRATIVE

Work Order Comments

- 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 Kelso, WA. Final report attached.
-

WetChemistry by Method E350.3**Batch ID: R338033**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

WetChemistry by Method E365.3**Batch ID: R337966**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

ALS Houston, US

Date: 17-May-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
 Sample ID: LH18/24-SP650_050119
 Collection Date: 01-May-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19050126
 Lab ID:HS19050126-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
AMMONIA AS N BY E350.3(ISE)		Method:E350.3					Analyst: RG	
Nitrogen, Ammonia (As N)	24		0.20	0.10	0.20	mg/L	1	08-May-2019 12:17
ORTHO PHOSPHATE (PO4) AS P BY E365.3		Method:E365.3					Analyst: MZD	
Phosphorus, Total Orthophosphate (As P)	6.20		0.100	0.200	0.250	mg/L	10	02-May-2019 16:00
SUBCONTRACT ANALYSIS - TOC ANALYSIS		Method:NA					Analyst: SUBK	
Subcontract Analysis	See Attached		0	0		NA	1	10-May-2019 18:40

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

ALS Houston, US

Date: 17-May-19

Client:	Bhate Environmental Associates, Inc.	ANALYTICAL REPORT
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS19050126
Sample ID:	LH18/24-SP650_050119_BIX	Lab ID:HS19050126-02
Collection Date:	01-May-2019 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	17-May-2019 09:27

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

ALS Houston, US

Date: 17-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19050126

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R337966	Test Name : ORTHO PHOSPHATE (PO4) AS P BY E365.3			Matrix: Water		
HS19050126-01	LH18/24-SP650_050119	01 May 2019 14:00			02 May 2019 16:00	10
Batch ID R338033	Test Name : AMMONIA AS N BY E350.3(ISE)			Matrix: Water		
HS19050126-01	LH18/24-SP650_050119	01 May 2019 14:00			08 May 2019 12:17	1
Batch ID R338229	Test Name : SUBCONTRACT ANALYSIS - TOC ANALYSIS			Matrix: Water		
HS19050126-01	LH18/24-SP650_050119	01 May 2019 14:00			10 May 2019 18:40	1
Batch ID R338598	Test Name : SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			Matrix: Water		
HS19050126-02	LH18/24-SP650_050119_BIX	01 May 2019 14:00			17 May 2019 09:27	1

ALS Houston, US

Date: 17-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19050126

QC BATCH REPORT

Batch ID: R337966 (0)		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3					
MBLK	Sample ID: MBLK-337966	Units: mg/L		Analysis Date: 02-May-2019 16:00					
Client ID:	Run ID: UV-2450_337966	SeqNo: 5064814		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.0200	0.0250							U
LCS	Sample ID: LCS-337966	Units: mg/L		Analysis Date: 02-May-2019 16:00					
Client ID:	Run ID: UV-2450_337966	SeqNo: 5064815		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.262	0.0250	0.25	0	105	85 - 115			
MS	Sample ID: HS19050089-01MS	Units: mg/L		Analysis Date: 02-May-2019 16:00					
Client ID:	Run ID: UV-2450_337966	SeqNo: 5064817		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.243	0.0250	0.25	-0.002	98.0	80 - 120			
MSD	Sample ID: HS19050089-01MSD	Units: mg/L		Analysis Date: 02-May-2019 16:00					
Client ID:	Run ID: UV-2450_337966	SeqNo: 5064818		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.237	0.0250	0.25	-0.002	95.6	80 - 120	0.243	2.5	20
The following samples were analyzed in this batch: HS19050126-01									

ALS Houston, US

Date: 17-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19050126

QC BATCH REPORT

Batch ID: R338033 (0)		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
MBLK	Sample ID: MBLK-R338033	Units: mg/L		Analysis Date: 08-May-2019 12:17						
Client ID:	Run ID: WetChem_HS_338033		SeqNo: 5066353		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.10	0.20								U
LCS	Sample ID: LCS-R338033	Units: mg/L		Analysis Date: 08-May-2019 12:17						
Client ID:	Run ID: WetChem_HS_338033		SeqNo: 5066352		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	9.945	0.20	10	0	99.4	80 - 120				
MS	Sample ID: HS19050180-01MS	Units: mg/L		Analysis Date: 08-May-2019 12:17						
Client ID:	Run ID: WetChem_HS_338033		SeqNo: 5066470		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.51	0.20	10	0.02978	105	80 - 120				
MSD	Sample ID: HS19050180-01MSD	Units: mg/L		Analysis Date: 08-May-2019 12:17						
Client ID:	Run ID: WetChem_HS_338033		SeqNo: 5066472		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.35	0.20	10	0.02978	103	80 - 120	10.51	1.53	20	
The following samples were analyzed in this batch: HS19050126-01										

ALS Houston, US

Date: 17-May-19

Client:	Bhate Environmental Associates, Inc.	QUALIFIERS, ACRONYMS, UNITS
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19050126	

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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020
Texas	TX104704231-19-23	30-Apr-2020

ALS Houston, US

Date: 17-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19050126

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19050126-01	LH18/24-SP650_050119	Login	5/2/2019 3:34:28 PM	JRM	WET352
HS19050126-01	LH18/24-SP650_050119	Login	5/2/2019 3:34:28 PM	JRM	WET352
HS19050126-01	LH18/24-SP650_050119	Login	5/2/2019 3:34:28 PM	JRM	Sub
HS19050126-02	LH18/24-SP650_050119_BIX	Login	5/2/2019 3:34:28 PM	JRM	Sub

ALS Houston, US

Date: 17-May-19

Sample Receipt Checklist

Client Name: Bhate Environmental
 Work Order: HS19050126

Date/Time Received: **02-May-2019 12:50**
 Received by: **JRM**

Checklist completed by: Jared R. Mekan 2-May-2019
 eSignature Date

Reviewed by: RJ Modashia 2-May-2019
 eSignature Date

Matrices: **Water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:N/A
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	1.8c/1.8c UC/C IR11		
Cooler(s)/Kit(s):	43551		
Date/Time sample(s) sent to storage:	05/02/2019 15:44		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:


Person Contacted:

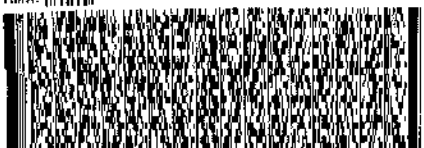

Contacted By:

Regarding:

Comments:

Corrective Action:

 ALS 10450 Stancil Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5658 Fax. +1 281 530 5887	CUSTODY SE Date: <u>5/1/19</u> Type: <u>1</u> Name: <u>Supervisor</u> Company: <u>ALS</u>		Seal Broken By: <u>JM</u> Date: <u>5/2/19</u>
	AL <u>480</u>		

RMA: 	FedEx Express 
TRK# 4380 9535 4231 FedEx TRK# 0221 4380 9535 4231 AB SGRA	RETURNS MON-SAT PRIORITY OVERNIGHT THU - 02 MAY 10:30/ PRIORITY OVERNIGHT 77099 TX-US IAH



ALS Environmental
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Kelso, WA 98626
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www.alsglobal.com

May 10, 2019

Analytical Report for Service Request No: K1903965

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

RE: HS19050126

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory May 03, 2019
For your reference, these analyses have been assigned our service request number **K1903965**.

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

for Kelley Lovejoy
Project Manager



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Acronyms

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 General Chemistry

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjllabs.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/bsdwlabservice.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/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577- 7222 Fax (360)636- 1068
www.alsglobal.com

Client: ALS Environmental - US
Project: HS19050126
Sample Matrix: Water

Service Request: K1903965
Date Received: 05/03/2019

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.

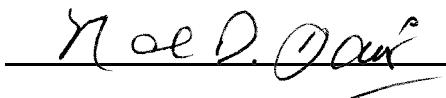
Sample Receipt:

One water sample was received for analysis at ALS Environmental on 05/03/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The sample was stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by



Date

05/10/2019



Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577- 7222 Fax (360)636- 1068
www.alsglobal.com



K1903965

00937748

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

Subcontract Chain of Custody

SAMPLING STATE: Dept of Defense

COC ID: 11243

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: HS19050126
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19050126-01	LH18/24-SP650_050119	Water	01 May 2019 14:00
TOC Analysis for DOD Level IV			10 May 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:

Received By:

Date/Time:

Cooler ID(s):

Temperature(s):

RIGHT SOLUTIONS | RIGHT PARTNER



00937749

PC KL

Cooler Receipt and Preservation Form

Client ALS-Houston Service Request K19 03965
Received: 5/3/19 Opened: 5/3/19 By: km Unloaded: 5/3/19 By: km

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	Tracking Number	NA	Filed
<u>-0.3</u>	<u>-0.1</u>	<u>2.0</u>	<u>2.2</u>	<u>+0.2</u>	<u>379</u>	<u>11243</u>	<u>480978334533</u>		

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:

RUSH



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
Project: HS19050126
Sample Matrix: Water
Analysis Method: SM 5310 C
Prep Method: None

Service Request: K1903965
Date Collected: 05/1/19
Date Received: 05/3/19
Units: mg/L
Basis: NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_050119	K1903965-001	1.51	0.50	0.20	0.07	1	05/07/19 17:30	
Method Blank	K1903965-MB	ND U	0.50	0.20	0.07	1	05/07/19 15:50	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project HS19050126
Sample Matrix: Water

Service Request: K1903965
Date Collected: 05/01/19
Date Received: 05/03/19
Date Analyzed: 05/07/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name: LH18/24-SP650_050119
Lab Code: K1903965-001

Units: mg/L
Basis: NA

Analyte Name	Analysis Method	LOQ	LOD	MDL	Sample Result	Duplicate Sample K1903965-001DUP	Average	RPD	RPD Limit
						Result			
Carbon, Total Organic	SM 5310 C	0.50	0.20	0.07	1.51	1.53	1.52	<1	10

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.

QA/QC Report

Client: ALS Environmental - US
Project: HS19050126
Sample Matrix: Water

Service Request: K1903965
Date Collected: 05/01/19
Date Received: 05/03/19
Date Analyzed: 05/7/19
Date Extracted: NA

Matrix Spike Summary
Carbon, Total Organic

Sample Name: LH18/24-SP650_050119
Lab Code: K1903965-001
Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
Basis: NA

Matrix Spike
K1903965-001MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic	1.51	27.5	25.0	104	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.

QA/QC Report

Client: ALS Environmental - US
Project: HS19050126
Sample Matrix: Water

Service Request: K1903965
Date Analyzed: 05/07/19
Date Extracted: NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 634658

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1903965-LCS	25.3	25.0	101	83-117

QA/QC Report

Client: ALS Environmental - US
Project: HS19050126

Service Request: K1903965

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	634658	KQ1906023-04	05/07/19 15:21	25.0	25.1	100	90-110
CCV2	634658	KQ1906023-05	05/07/19 19:24	25.0	25.6	102	90-110
CCV3	634658	KQ1906023-06	05/08/19 00:34	25.0	24.8	99	90-110

Client: ALS Environmental - US
Project: HS19050126

Service Request: K1903965

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	634658	KQ1906023-01	05/07/19 15:36	0.50	0.20	0.07	ND	U
CCB2	634658	KQ1906023-02	05/07/19 19:38	0.50	0.20	0.07	ND	U
CCB3	634658	KQ1906023-03	05/08/19 00:49	0.50	0.20	0.07	ND	U



Raw Data

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General Chemistry

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www.alsglobal.com

Work Request # ^{Original} (K103899, 3947, 3763, 3889, 3965, 3966, 3997, 4006,)
 Tier: I II II II IV IV I I
 Date Analyzed: 5/7/19 DOC: 634658
 Analyst: BCD Run # DOC: 634659
 Analysis: DOC/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:

Final Approved by: Harvey Date: 05/09/19
 DQREPORT

Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 634658 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
K1903763-004	Carbon, Total Organic	N/A		Water	7.05 mg/L	10 mL	705 mg/L	100	7	50			5/7/19 23:10:00	N	II
K1903763-005	Carbon, Total Organic	N/A		Water	7.11 mg/L	10 mL	711 mg/L	100	7	50			5/7/19 23:38:00	N	II
K1903889-001	Carbon, Total Organic	N/A		Water	7.75 mg/L	10 mL	7.75 mg/L	1	0.07	0.50			5/7/19 21:46:00	N	II
K1903889-002	Carbon, Total Organic	N/A		Water	18.69 mg/L	10 mL	18.7 mg/L	1	0.07	0.50			5/7/19 22:14:00	N	II
K1903889-003	Carbon, Total Organic	N/A		Water	14.58 mg/L	10 mL	14.6 mg/L	1	0.07	0.50			5/7/19 22:42:00	N	II
K1903965-001	Carbon, Total Organic	N/A		Water	1.51 mg/L	10 mL	1.51 mg/L	1	0.07	0.50			5/7/19 17:30:00	N	IV
K1903966-001	Carbon, Total Organic	N/A		Ground Water	2.91 mg/L	10 mL	2.91 mg/L	1	0.07	0.50			5/7/19 18:56:00	N	IV
K1903966-002	Carbon, Total Organic	N/A		Ground Water	3.24 mg/L	10 mL	3.24 mg/L	1	0.07	0.50			5/7/19 19:53:00	N	IV
K1903966-003	Carbon, Total Organic	N/A		Ground Water	2.09 mg/L	10 mL	2.09 mg/L	1	0.07	0.50			5/7/19 20:21:00	N	IV
K1903997-002	Carbon, Total Organic	N/A		Drinking Water	0.23 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/7/19 18:28:00	N	I
K1904006-001	Carbon, Total Organic	N/A		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/7/19 16:34:00	N	I
K1904006-002	Carbon, Total Organic	N/A		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/7/19 17:02:00	N	I
KQ1906023-01	Carbon, Total Organic	CCB		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/7/19 15:36:00	N	I
KQ1906023-02	Carbon, Total Organic	CCB		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/7/19 19:38:00	N	I
KQ1906023-03	Carbon, Total Organic	CCB		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/8/19 00:49:00	N	I
KQ1906023-04	Carbon, Total Organic	CCV		Reagent Water	25.09 mg/L	10 mL	25.1 mg/L	1					5/7/19 15:21:00	N	I
KQ1906023-05	Carbon, Total Organic	CCV		Reagent Water	25.59 mg/L	10 mL	25.6 mg/L	1					5/7/19 19:24:00	N	I
KQ1906023-06	Carbon, Total Organic	CCV		Reagent Water	24.77 mg/L	10 mL	24.8 mg/L	1					5/8/19 00:34:00	N	I
KQ1906023-07	Carbon, Total Organic	MB		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/7/19 15:50:00	N	I
KQ1906023-08	Carbon, Total Organic	LCS		Reagent Water	25.33 mg/L	10 mL	25.3 mg/L	1	0.07	0.50	101		5/7/19 16:05:00	N	I
KQ1906023-09	Carbon, Total Organic	MS	K1903965-001	Water	27.53 mg/L	10 mL	27.5 mg/L	1	0.07	0.50	104		5/7/19 17:59:00	N	IV
KQ1906023-10	Carbon, Total Organic	DUP	K1904006-001	Reagent Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50		NC	5/7/19 16:34:00	N	I
KQ1906023-11	Carbon, Total Organic	DUP	K1904006-002	Reagent Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50		NC	5/7/19 17:02:00	N	I
KQ1906023-12	Carbon, Total Organic	DUP	K1903965-001	Water	1.53 mg/L	10 mL	1.53 mg/L	1	0.07	0.50		<1	5/7/19 17:30:00	N	IV
KQ1906023-13	Carbon, Total Organic	DUP	K1903997-002	Drinking Water	0.19 mg/L	10 mL	0.19 mg/L	J 1	0.07	0.50		NC	5/7/19 18:28:00	N	I
KQ1906023-14	Carbon, Total Organic	DUP	K1903966-001	Ground Water	2.94 mg/L	10 mL	2.94 mg/L	1	0.07	0.50		<1	5/7/19 18:56:00	N	IV

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

05/09/19

Analytical Results Summary

00937761

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 634658 Method/Testcode: SM 5310 C/TOC T

<u>Lab Code</u>	<u>Target Analytes</u>	<u>QC</u>	<u>Parent Sample</u>	<u>Matrix</u>	<u>Raw Result</u>	<u>Sample Amt.</u>	<u>Final Result</u>	<u>Dil</u>	<u>MDL</u>	<u>PQL</u>	<u>% Rec</u>	<u>% RSD</u>	<u>Date Analyzed</u>	<u>QC?</u>	<u>Tier</u>
KQ1906023-15	Carbon, Total Organic	DUP	K1903966-002	Ground Water	3.06 mg/L	10 mL	3.06 mg/L	1	0.07	0.50		6	5/7/19 19:53:00	N	IV
KQ1906023-16	Carbon, Total Organic	DUP	K1903966-003	Ground Water	1.97 mg/L	10 mL	1.97 mg/L	1	0.07	0.50		6	5/7/19 20:21:00	N	IV
KQ1906023-17	Carbon, Total Organic	DUP	K1903889-001	Water	7.70 mg/L	10 mL	7.70 mg/L	1	0.07	0.50		<1	5/7/19 21:46:00	N	II
KQ1906023-18	Carbon, Total Organic	DUP	K1903889-002	Water	18.53 mg/L	10 mL	18.5 mg/L	1	0.07	0.50		<1	5/7/19 22:14:00	N	II
KQ1906023-19	Carbon, Total Organic	DUP	K1903889-003	Water	14.36 mg/L	10 mL	14.4 mg/L	1	0.07	0.50		2	5/7/19 22:42:00	N	II
KQ1906023-20	Carbon, Total Organic	DUP	K1903763-004	Water	7.05 mg/L	10 mL	705 mg/L	100	7	50		<1	5/7/19 23:10:00	N	II
KQ1906023-21	Carbon, Total Organic	DUP	K1903763-005	Water	6.92 mg/L	10 mL	692 mg/L	100	7	50		3	5/7/19 23:38:00	N	II

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indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

00937762

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 634659 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
K1903899-001	Carbon, Dissolved Organic (DOC)	N/A		Water	0.57 mg/L	10 mL	0.57 mg/L	1	0.07	0.50			5/8/19 01:47:00	N	I
K1903899-002	Carbon, Dissolved Organic (DOC)	N/A		Water	19.98 mg/L	10 mL	40.0 mg/L	2	0.2	1.0			5/8/19 02:44:00	N	I
K1903947-001	Carbon, Dissolved Organic (DOC)	N/A		Effluent	1.72 mg/L	10 mL	1.72 mg/L	1	0.07	0.50			5/7/19 20:49:00	N	II
K1903947-002	Carbon, Dissolved Organic (DOC)	N/A		Effluent	1.41 mg/L	10 mL	1.41 mg/L	1	0.07	0.50			5/7/19 21:17:00	N	II
KQ1906022-01	Carbon, Dissolved Organic (DOC)	CCB		Effluent	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/7/19 19:38:00	N	II
KQ1906022-02	Carbon, Dissolved Organic (DOC)	CCB		Effluent	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/8/19 00:49:00	N	II
KQ1906022-03	Carbon, Dissolved Organic (DOC)	CCB		Effluent	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/8/19 03:55:00	N	II
KQ1906022-04	Carbon, Dissolved Organic (DOC)	CCV		Effluent	25.09 mg/L	10 mL	25.1 mg/L	1					5/7/19 19:24:00	N	II
KQ1906022-05	Carbon, Dissolved Organic (DOC)	CCV		Effluent	25.59 mg/L	10 mL	25.6 mg/L	1					5/8/19 00:34:00	N	II
KQ1906022-06	Carbon, Dissolved Organic (DOC)	CCV		Effluent	24.60 mg/L	10 mL	24.6 mg/L	1					5/8/19 03:41:00	N	II
KQ1906022-07	Carbon, Dissolved Organic (DOC)	MS	K1903899-001	Water	26.19 mg/L	10 mL	26.2 mg/L	1	0.07	0.50	102		5/8/19 02:15:00	N	I
KQ1906022-08	Carbon, Dissolved Organic (DOC)	DUP	K1903899-001	Water	0.60 mg/L	10 mL	0.60 mg/L	1	0.07	0.50		4	5/8/19 01:47:00	N	I
KQ1906022-09	Carbon, Dissolved Organic (DOC)	DUP	K1903899-002	Water	19.75 mg/L	10 mL	39.5 mg/L	2	0.2	1.0		1	5/8/19 02:44:00	N	I
KQ1906022-10	Carbon, Dissolved Organic (DOC)	DUP	K1903947-001	Effluent	1.72 mg/L	10 mL	1.72 mg/L	1	0.07	0.50		<1	5/7/19 20:49:00	N	II
KQ1906022-11	Carbon, Dissolved Organic (DOC)	DUP	K1903947-002	Effluent	1.39 mg/L	10 mL	1.39 mg/L	1	0.07	0.50		1	5/7/19 21:17:00	N	II
KQ1906022-12	Carbon, Dissolved Organic (DOC)	MB		Effluent	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/8/19 01:03:00	N	II
KQ1906022-13	Carbon, Dissolved Organic (DOC)	LCS		Effluent	25.33 mg/L	10 mL	25.3 mg/L	1	0.07	0.50	101		5/8/19 01:18:00	N	II

05/09/19
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indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

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	C] CCV 25 ppm [25 p	1	25.087	0.0000	25.0871	25.0871	25.1	5/7/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/7/2019
4	MB1	1	0.000	0.0000	0.0000	0	<0.5	5/7/2019
5	[TOC] LCS [24ppm]	1	25.331	0.0000	25.3309	25.3309	25.3	5/7/2019
6	K1904006-001	1	0.000	0.0000	0.0000	0	<0.5	5/7/2019
7	K1904006-001d	1	0.000	0.0000	0.0000	0	<0.5	5/7/2019
8	K1904006-002	1	0.000	0.0000	0.0000	0	<0.5	5/7/2019
9	K1904006-002d	1	0.000	0.0000	0.0000	0	<0.5	5/7/2019
10	K1903965-001	1	1.514	0.0000	1.5136	1.5136	1.51	5/7/2019
11	K1903965-001d	1	1.525	0.0000	1.5251	1.5251	1.5	5/7/2019
12	K1903965-001ms	1	27.527	0.0000	27.5274	27.5274	27.53	5/7/2019
13	K1903997-002	1	0.234	0.0000	0.2341	0.2341	<0.5	5/7/2019
14	K1903997-002d	1	0.188	0.0000	0.1882	0.1882	<0.5	5/7/2019
15	K1903966-001	1	2.909	0.0000	2.9090	2.909	2.9	5/7/2019
16	K1903966-001d	1	2.938	0.0000	2.9382	2.9382	2.9	5/7/2019
17	C] CCV 25 ppm [25 p	1	25.595	0.0000	25.5949	25.5949	25.59	5/7/2019
18	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/7/2019
19	K1903966-002	1	3.244	0.0000	3.2436	3.2436	3.2	5/7/2019
20	K1903966-002d	1	3.056	0.0000	3.0563	3.0563	3.06	5/7/2019
21	K1903966-003	1	2.094	0.0000	2.0936	2.0936	2.09	5/7/2019
22	K1903966-003d	1	1.973	0.0000	1.9725	1.9725	2.0	5/7/2019
23	K1903889-001	1	7.745	0.0000	7.7454	7.7454	7.7	5/7/2019
24	K1903889-001d	1	7.704	0.0000	7.7043	7.7043	7.70	5/7/2019
25	K1903889-002	1	18.694	0.0000	18.6941	18.6941	18.69	5/7/2019

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)

Analyzed By: <i>[Signature]</i>	Date Analyzed: <i>5/7/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>05/09/19</i>

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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	K1903889-002d	1	18.527	0.0000	18.5272	18.5272	18.53	5/7/2019
27	K1903889-003	1	14.578	0.0000	14.5782	14.5782	14.58	5/7/2019
28	K1903889-003d	1	14.359	0.0000	14.3593	14.3593	14.4	5/7/2019
29	K1903763-004	100	7.047	0.0000	7.0467	704.67	704.7	5/7/2019
30	K1903763-004d	100	7.049	0.0000	7.0489	704.89	704.9	5/7/2019
31	K1903763-005	100	7.110	0.0000	7.1097	710.97	711.0	5/7/2019
32	K1903763-005d	100	6.923	0.0000	6.9234	692.34	692.3	5/7/2019
33	C] CCV 25 ppm [25 g	1	24.769	0.0000	24.7687	24.7687	24.8	5/8/2019
34	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/8/2019
35		1		0.0000	0.0000	0	<0.5	
36		1		0.0000	0.0000	0	<0.5	
37		1		0.0000	0.0000	0	<0.5	
38		1		0.0000	0.0000	0	<0.5	
39		1		0.0000	0.0000	0	<0.5	
40		1		0.0000	0.0000	0	<0.5	
41		1		0.0000	0.0000	0	<0.5	
42		1		0.0000	0.0000	0	<0.5	
43		1		0.0000	0.0000	0	<0.5	
44		1		0.0000	0.0000	0	<0.5	
45		1		0.0000	0.0000	0	<0.5	
46		1		0.0000	0.0000	0	<0.5	
47		1		0.0000	0.0000	0	<0.5	
48		1		0.0000	0.0000	0	<0.5	
49		1		0.0000	0.0000	0	<0.5	
50		1		0.0000	0.0000	0	<0.5	

Analyzed By: <i>BCD</i>	Date Analyzed: <i>5/7/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>05/09/19</i>

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	C] CCV 25 ppm [25 p	1	25.595	0.0000	25.5949	25.5949	25.6	5/7/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/7/2019
4	K1903947-001	1	1.718	0.0000	1.7176	1.7176	1.7	5/7/2019
5	K1903947-001d	1	1.717	0.0000	1.7166	1.7166	1.7	5/7/2019
6	K1903947-002	1	1.410	0.0000	1.4096	1.4096	1.41	5/7/2019
7	K1903947-002d	1	1.391	0.0000	1.3912	1.3912	1.4	5/7/2019
8	C] CCV 25 ppm [25 p	1	24.769	0.0000	24.7687	24.7687	25	5/8/2019
9	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/8/2019
10	MB2	1	0.000	0.0000	0.0000	0	<0.5	5/8/2019
11	[TOC] LCS [24ppm]	1	25.084	0.0000	25.0838	25.0838	25.1	5/8/2019
12	K1903899-001	1	0.575	0.0000	0.5749	0.5749	0.57	5/8/2019
13	K1903899-001d	1	0.597	0.0000	0.5970	0.597	0.60	5/8/2019
14	K1903899-001ms	1	26.188	0.0000	26.1881	26.1881	26.19	5/8/2019
15	K1903899-002	2	19.983	0.0000	19.9825	39.965	40.0	5/8/2019
16	K1903899-002d	2	19.747	0.0000	19.7471	39.4942	39.5	5/8/2019
17	C] CCV 25 ppm [25 p	1	24.602	0.0000	24.6022	24.6022	24.60	5/8/2019
18	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/8/2019
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)

Analyzed By: <i>BKD</i>	Date Analyzed: <i>5/7/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>05/09/19</i>

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TOC: 634658
DOC: 634659

Schedule: Daily Run Method 010711

Version: 73

Instrument: Fusion1

Last Saved by: Fusion1 (Fusion1)

Last Saved on: 2019/05/07 17:17 - Tuesday

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	K1904006-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
4	Sample	K1904006-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
5	Sample	K1903965-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
6	Sample	K1903965-001.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
7	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
8	Sample	K1903997-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
9	Sample	K1903966-001.01	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
10	Sample	K1903966-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K1903966-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	K1903947-001.03 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	K1903947-002.03 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K1903889-001.18	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1903889-002.18	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K1903889-003.18	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1903763-004.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1903763-005.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	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
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	FB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
22	Sample	K1903899-001.01 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	K1903899-001.01 ms doc	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
24	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
25	Sample	K1903899-002.01 doc 2x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	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	

05/09/19
Fusion1

Fusion Report - Daily Run Method 010711
Tuesday, May 07, 2019 01:17 PM(View - Reps, Unused Reps, Meta-
Data, Signature, History)
Printed on 2019/05/08 13:29 -
Wednesday**Report Summary Information**

Company Location: Gen Chem Lab
 Schedule Name: Daily Run Method 010711
 Instrument Name: Fusion1
 Report Version: 1 of 1
 Report Creation by Operators (schedule version): Fusion1 (Fusion1) (v72)
 Fusion1 (Fusion1) (v73)
 Comment:

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

Report Results05/09/19
*Huey***Sample Type:** Clean

From Schedule Version 72

Pos	Analysis Type	Sample ID	Start Time
♦ (clean)		Clean	2019/05/07 13:17

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	15.02	18.20	3.18	49.67	05:27
2	TC Clean	18.18	21.33	3.15	49.78	07:17
3	TC Clean	2.88	5.93	3.05	49.86	07:03
4	TC Clean	1.89	5.02	3.13	50.02	03:50

Sample Type: Clean

From Schedule Version 72

Pos	Analysis Type	Sample ID	Start Time
♦ (clean)		Clean	2019/05/07 13:45

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	1.15	4.12	2.97	49.61	05:15
2	TC Clean	4.52	7.64	3.12	49.87	07:14
3	TC Clean	1.56	4.66	3.10	50.01	03:47
4	TC Clean	1.10	4.11	3.01	50.03	03:50

Sample Type: Clean

From Schedule Version 72

Pos	Analysis Type	Sample ID		Start Time		
♦ (clean)		Clean		2019/05/07 14:10		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.72	3.62	2.90	49.71	05:13
2	TC Clean	3.80	6.60	2.80	50.01	04:04
3	TC Clean	1.46	4.45	2.99	50.00	03:48
4	TC Clean	1.30	4.20	2.90	50.01	03:49

Sample Type: Blank (Creating v1253)

From Schedule Version 72

Pos	Analysis Type	Sample ID		Start Time		
♦ (blank)		Reagent/Acid Blank		2019/05/07 14:32		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.83	3.79	2.96	49.69	05:25
2	TC Clean	3.69	6.70	3.01	50.02	04:05
3	TC Clean	1.84	4.72	2.88	50.04	03:50
4	TC Clean	1.34	4.28	2.94	50.03	03:56
5	Reagent Blank	4.03	7.02	3.00	50.02	05:07
6	Acid Blank	1.19	4.24	3.05	49.65	05:29

Sample Type: Sample

From Schedule Version 72

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
◆	D	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/07 15:06		
Rep #	Base Analysis Type		ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC		0.0000	0.0000	8.34	11.47	3.13	50.15	10:31
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>		<u>Calibration</u>			
1:10		(TC) 8.7847 (IC) (v1253)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)			

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 72

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.0871 ppm (PASS)	0.0000 ppm	0%	2019/05/07 15:21

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.0871	250.8707	179.75	182.77	3.02	50.10	10:32

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 72

	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%	2019/05/07 15:36

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.82	9.78	2.96	50.14	10:32

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 72

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/07 15:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.98	10.03	3.04	50.16	10:30

Dilution

1:10

Blank Contribution

(TC) 8.7847 (IC) (v1253)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS

From Schedule Version 72

	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)	25.3309 ppm (PASS)	0.0000 ppm	0%	2019/05/07 16:05

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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	Type									
C	TOC	25.0 ppm	1	25.3309	253.3088	181.41	184.42	3.01	50.11	10:30
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos C</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		25 ppmC		

Sample Type: Sample

From Schedule Version 72

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
◆	2	TOC	ICS	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/07 16:20		
Rep #	Base Analysis Type		ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC		0.0000	0.0000	8.36	11.40	3.04	50.15	10:29

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
◆	3	TOC	K1904006-001.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/07 16:34		

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.80	8.61	2.81	50.17	10:29
2	TOC	0.0000	0.0000	6.00	8.81	2.81	50.19	10:26

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
◆	4	TOC	K1904006-002.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/07 17:02		
Rep #	Base Analysis Type		ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC		0.0000	0.0000	5.72	8.65	2.93	50.20	10:31
2	TOC		0.0000	0.0000	5.83	8.72	2.88	50.26	10:29

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Sample

From Schedule Version 73

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
*	5	TOC	K1903965-001.01	1.5194 ppm	0.0081 ppm	0.5300%	2019/05/07 17:30		
Rep #	Base Analysis Type		ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC		1.5136	15.1361	19.06	22.10	3.04	50.20	10:29

2	TOC	1.5251	15.2510	19.14	21.98	2.84	50.22	10:27
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Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
* 6	TOC	K1903965-001.01 ms	27.5274 ppm	0.0000 ppm	0.0000%	2019/05/07 17:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	27.5274	275.2739	195.64	198.75	3.11	50.23	10:34

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
* 7	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/07 18:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.87	9.75	2.88	50.22	10:30

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
* 8	TOC	K1903997-002.01	0.2112 ppm	0.0325 ppm	15.3900%	2019/05/07 18:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2341	2.3413	10.37	13.22	2.85	50.22	10:29
2	TOC	0.1882	1.8817	10.06	13.08	3.02	50.18	10:25

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
* 9	TOC	K1903966-001.01	2.9236 ppm	0.0206 ppm	0.7100%	2019/05/07 18:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.9090	29.0903	28.53	31.45	2.92	50.07	10:28
2	TOC	2.9382	29.3819	28.73	31.64	2.91	50.03	10:28

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 73

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.5949 ppm (PASS)	0.0000 ppm	0%	2019/05/07 19:24

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.5949	255.9488	183.20	186.12	2.92	49.99	10:32

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos B</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 73

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%	2019/05/07 19:38

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.81	9.62	2.81	49.94	10:31

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos D</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample From Schedule Version 73

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 10	TOC	K1903966-002.01	3.1500 ppm	0.1324 ppm	4.2000%	2019/05/07 19:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.2436	32.4359	30.80	33.67	2.87	49.91	10:29
2	TOC	3.0563	30.5635	29.53	32.51	2.97	49.92	10:27

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.7847 (IC) (v1253)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 11	TOC	K1903966-003.01	2.0331 ppm	0.0856 ppm	4.2100%	2019/05/07 20:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.0936	20.9361	23.00	25.79	2.79	49.90	10:26
2	TOC	1.9725	19.7251	22.17	25.11	2.94	49.88	10:29

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
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1:10 (TC) 8.7847 (IC) CAS_salt_010711 CAS_salt_010711
(v1253) (v4) (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
12	TOC	K1903947-001.03 doc	1.7171 ppm	0.0007 ppm	0.0400%	2019/05/07 20:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.7176	17.1765	20.44	23.25	2.81	49.88	10:29
2	TOC	1.7166	17.1662	20.44	23.33	2.89	49.88	10:24

Dilution 1:10 Blank Contribution (TC) 8.7847 (IC) (v1253) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
13	TOC	K1903947-002.03 doc	1.4004 ppm	0.0130 ppm	0.9300%	2019/05/07 21:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4096	14.0960	18.35	21.27	2.92	49.88	10:28
2	TOC	1.3912	13.9119	18.23	21.18	2.95	49.90	10:29

Dilution 1:10 Blank Contribution (TC) 8.7847 (IC) (v1253) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
14	TOC	K1903889-001.18	7.7248 ppm	0.0291 ppm	0.3800%	2019/05/07 21:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.7454	77.4540	61.36	64.31	2.95	49.95	10:26
2	TOC	7.7043	77.0429	61.08	64.04	2.95	49.92	10:27

Dilution 1:10 Blank Contribution (TC) 8.7847 (IC) (v1253) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
15	TOC	K1903889-002.18	18.6106 ppm	0.1180 ppm	0.6300%	2019/05/07 22:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	18.6941	186.9408	135.68	138.58	2.90	49.93	10:26
2	TOC	18.5272	185.2716	134.55	137.69	3.14	49.92	10:30

Dilution 1:10 Blank Contribution (TC) 8.7847 (IC) (v1253) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
16	TOC	K1903889-003.18	14.4688 ppm	0.1548 ppm	1.0700%	2019/05/07 22:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	14.5782	145.7825	107.74	110.49	2.75	49.95	10:29
2	TOC	14.3593	143.5933	106.26	109.26	3.01	49.96	10:23

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	K1903763-004.01 100x	7.0478 ppm	0.0016 ppm	0.0200%	2019/05/07 23:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.0467	70.4666	56.62	59.72	3.10	49.99	10:26
2	TOC	7.0489	70.4887	56.63	59.56	2.93	50.00	10:28

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	K1903763-005.01 100x	7.0165 ppm	0.1318 ppm	1.8800%	2019/05/07 23:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.1097	71.0971	57.04	59.88	2.84	50.01	10:28
2	TOC	6.9234	69.2335	55.78	58.54	2.76	50.01	10:28

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
19	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/08 00:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.84	8.76	2.92	50.02	10:31
2	TOC	0.0000	0.0000	5.71	8.51	2.80	50.04	10:24

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 73

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)	24.7687 ppm (PASS)	0.0000 ppm	0%	2019/05/08 00:34

Pos	Base Analysis	ID	Rep	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run
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Sample Type: Sample

From Schedule Version 73

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
21	TOC	FB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/08 01:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.46	10.42	2.96	50.07	10:32

Dilution
1:10

Blank Contribution
(TC) 8.7847 (IC)
(v1253)

Method
CAS_salt_010711
(v4)

Calibration
CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
22	TOC	K1903899-001.01 doc	0.5859 ppm	0.0156 ppm	2.6700%	2019/05/08 01:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5749	5.7489	12.69	15.55	2.86	50.07	10:28
2	TOC	0.5970	5.9698	12.84	15.85	3.02	50.08	10:28

Dilution
1:10

Blank Contribution
(TC) 8.7847 (IC)
(v1253)

Method
CAS_salt_010711
(v4)

Calibration
CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
23	TOC	K1903899-001.01 ms doc	26.1881 ppm	0.0000 ppm	0.0000%	2019/05/08 02:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.1881	261.8810	186.55	189.41	2.86	50.10	10:30

Dilution
1:10

Blank Contribution
(TC) 8.7847 (IC)
(v1253)

Method
CAS_salt_010711
(v4)

Calibration
CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
24	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/08 02:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.09	9.08	3.00	50.10	10:30

Dilution
1:10

Blank Contribution
(TC) 8.7847 (IC)
(v1253)

Method
CAS_salt_010711
(v4)

Calibration
CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
25	TOC	K1903899-002.01 doc 2x	19.8648 ppm	0.1665 ppm	0.8400%	2019/05/08 02:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	19.9825	199.8254	144.42	147.36	2.94	50.10	10:28
2	TOC	19.7471	197.4712	142.83	145.99	3.16	50.12	10:24

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	26	TOC	RB	0.0802 ppm	0.1134 ppm	141.4200%	2019/05/08 03:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1603	1.6033	9.87	12.85	2.98	50.14	10:28
2	TOC	0.0000	0.0000	6.86	9.94	3.08	50.10	10:27

Dilution

1:10

Blank Contribution(TC) 8.7847 (IC)
(v1253)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)**Sample Type:** Check Standard --> CCV 25 ppm

From Schedule Version 73

	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)	24.6022 ppm (PASS)	0.0000 ppm	0%	2019/05/08 03:41

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.6022	246.0223	176.46	179.42	2.96	50.11	10:30

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos B

50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 73

	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%	2019/05/08 03:55

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.27	9.28	3.01	50.14	10:32

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_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
v1252	1.0447	0.7470	0.0000	0.0000	0.0000	2019/05/01 17:45	Fusion1 (Fusion1)
v1253	1.3423	1.1900	0.0000	0.0000	0.0000	2019/05/07 15:06	Fusion1 (Fusion1)

Calibrations**Name: CAS_salt_010711 (TOC)**

Version: v30 Calibration curve formula: TOC: $y = 6.788x + 9.463$

Ver Creation: 2019/03/05 17:42 r^2 value: TOC: $r^2 = 0.99963$

Comment:

Operator: Fusion1 (Fusion1)

Basic Analysis Type: TOC

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 Operator: Fusion1 (Fusion1)

Ver Creation: 2019/02/21 17:57

Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	ICSpurgeRinseVolume	12.0 ml
UVReactorPrerinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPrerinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPrerinses	1	SyringeSpeedWaste	10
ICSpurgeTime	1.00 mins	SyringeSpeedAcid	7
DetectorSweepFlow	500 ml/min	SyringeSpeedReagent	7
PreSpurgeTime	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
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Report History

Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/05/08 04:11

ALS Environmental

StarLIMS Run: 634658, 634659

Analysis: TOC

Method: 415.1, SM 5310 C, 9060, 9060A

CCV: 11-GEN-05-77K 50 ppm LCS: 11-GEN-05-77D 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-74A

ICS TV: 25.0 ppm ICS % R = 2

Spike ID: 11-GEN-05-77J 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-77M

21 % H₃PO₄: 11-GEN-05-77L

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: NA

Analyzed By: <i>Ed</i>	Date Analyzed: 5/7/19
Reviewed By: <i>Theresa</i>	Date Reviewed: 05/09/19



Case Narrative

Method: 6850
Analysis: Perchlorate
Analysis SOP: LC-MS-CLO4
ALS WO ID(s): 1912778, 1913240

Client: ALS Laboratories (Houston, TX)
Matrix: Water
ELMS Batch (HBN): 2246 (238759)

General Set Information: There were 7 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. 50 μL 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 0.45 μm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field samples 1913240002/004 were analyzed and reported from 1:10 dilutions. The reporting limits have been adjusted accordingly.

Method QC data: The method blank (LMB 652190) was less than 1/2 the CRDL. The recovery for the LCS (652191) was within acceptable parameters.



MS/MSD Analysis: MS/MSD (652192/93) was performed on samples 1912778001. 4.0µl of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4.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 $(A) \times (B)$,

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 – 652188) is reported from the analysis of the Laboratory Control Sample (LCS – 652191) at a level of 4.0µg/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: 19MARI03).

Stephen Brose
Analyst

May 16, 2019
Date



00937783

ANALYTICAL REPORT

Report Date: May 16, 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: **34-1912778**

Project ID: 11242

Purchase Order: NA

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_050119_BIX Water	1912778001	05/01/19	05/03/19	11242

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992

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ANALYTICAL REPORT

Workorder: 34-1912778

Client: ALS Environmental
(Houston)

Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: LH18/24-SP650_050119_BIX Water		Sampling Site: 11242		Collected: 05/01/2019		
Lab ID: 1912778001		Media: 125 mL Nalgene		Received: 05/03/2019		
Matrix: Water		Sampling Parameter: NA				
Analysis Method - EPA 6850, DoD QSM						
Preparation: Not Applicable			Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2246 (HBN: 238759) Analyzed: 05/11/2019 15:37		Instrument ID: LCMS04 Percent Solid: NA Report Basis: Wet	
Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	1.1	1.0	2.0	4.0	1	J

Comments

Quality Control: EPA 6850, DoD QSM - (HBN: 238759)

Field samples 1913240002/004 were analyzed and reported from 1:10 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/ Stephen Brose 05/16/2019 10:41	/S/ Thomas T. McKay 05/16/2019 14:26

Laboratory Contact Information

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

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



ANALYTICAL REPORT

Workorder: 34-1912778

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.pjllabs.com
	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.com
	Utah (TNI)	UT00953	http://lams.nelac-institute.org/search
	Nevada (TNI)	UT00953201-1	https://ndep.nv.gov/water/lab-certification
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
	Oklahoma (TNI)	IJ# 9980	http://www.deq.state.ok.us/CSDnew/labcert.htm
	Texas (TNI)	T104704456-18-9	https://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_list.pdf
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	http://www.aihaaccreditedlabs.org
	DOECAP-AP	L18-606	http://www.pjllabs.com
	Washington	C596	https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.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

00937786

Analysis Information

Workorder: 1912778**Limits:** Client SOW/Contract Specified**Preparation:** NA**Analysis:** EPA 6850, DoD QSM**Basis:** DoD QSM**Batch:** NA**Batch:** ELMS/2246 (HBN: 238759)**Prepared By:** NA**Analyzed By:** Stephen Brose

Blank

LMB: 652190**Analyzed:** 05/11/2019 15:24**Units:** ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 652191**Analyzed:** 05/11/2019 14:57**Dilution:** 1**Units:** ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	3.79	4.00	94.6	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1912778001**Analyzed:** 05/11/2019 15:37**Dilution:** 1**Units:** ug/L**MS:** 652192**Analyzed:** 05/11/2019 15:51**Dilution:** 1**Units:** ug/L**MSD:** 652193**Analyzed:** 05/11/2019 16:04**Dilution:** 1**Units:** ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	1.10	3.47	4	86.8	78.8	123.8	3.38	84.4	2.84	0.0	20.0

Comments

Field samples 1913240002/004 were analyzed and reported from 1:10 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/ Stephen Brose 05/16/2019 10:45	/S/ Thomas T. McKay 05/16/2019 14:26

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



1912778

my to

1912778
10450 Standliff 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: Dept of Defense

COC ID: 11242

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 Standliff 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 Standliff Rd, Ste 210
Phone: +1 281 530 5656
Reference: HS19050126
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19050126-02	LH18/24-SP650_050119_BIX	Water	01 May 2019 14:00
SUB_Perch-6850			10 May 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:

Received By:

Cooler ID(s):

Date/Time:

Date/Time:

Temperature(s):

5/2/19 1800

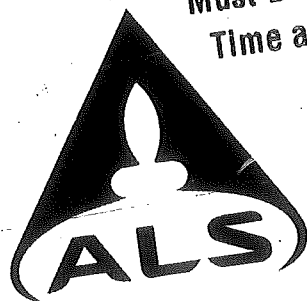
05-03-19 9:45

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02 May 2019

Page 1 of 1

[illegible][illegible]



Must Deliver
Time and Temperature Sensitive

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

SHIP DATE: 02MAY19
ACTWGT: 5.20 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) 288-7700
REF: HS19050126 - RJ



FedEx
Express

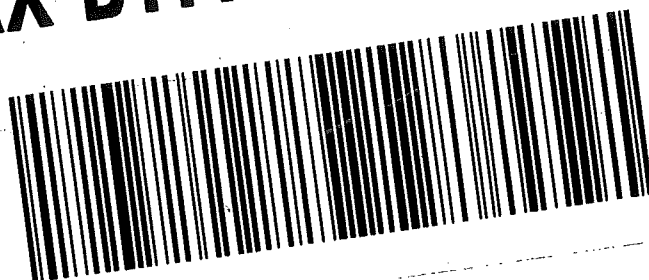


FRI - 03 MAY 3:00P
STANDARD OVERNIGHT

TRK# 4809 7833 4544
0201

AX BTFA

84123
UT-US SLC



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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: <u>ALS Houston</u>		Project/Task/Site: _____	
Date/Time of Receipt: <u>05-03-19 9:45</u>		Number of Coolers Received: <u>1</u>	
Condition of Coolers: <u>Acceptable</u> /Unacceptable Cooler Custody Seals: <u>Present</u> /Absent/NA Container Custody Seals: <u>Intact</u> /Broken/NA Ice Present: <u>Yes</u> /No/NA <u>Frozen</u> /Melted/NA		Temperature Control: <u>Present</u> /Not Included Location Temp Taken: <u>Control</u> /Between Samples Are all temperatures within project specific guidelines? Yes/No/ <u>NA</u> VOA Headspace Present? Yes/No/ <u>NA</u>	
pH Check Performed:	Metals Yes/No/NA Cyanide Yes/No/NA Sulfide Yes/No/NA Ammonia Yes/No/NA	Total Phenolics Yes/No/NA TPH - 418.1 Yes/No/NA COD Yes/No/NA TKN Yes/No/NA	NO3/NO2 Yes/No/NA Oil & Grease Yes/No/NA Total Phosphorous Yes/No/NA Gross A.B, Gamma Spec Yes/No/NA
Cooler Received	DCL Cooler No.	Temp.	Cooler Received
1	C19 <u>9369</u>	<u>2</u> °C	4
2	C19	°C	5
3	C19	°C	6
Taken By: <u>Tamara J. Fisk</u>		<u>Tamara Tassler</u> <small>Signature Printed Name</small>	
		<u>05-03-19</u> <small>Date</small>	

CLIENT-RELATED INFORMATION

<input type="checkbox"/> Missing Cooler	<input type="checkbox"/> Missing Samples/Bottles	<input type="checkbox"/> Incorrect Preservation	<input type="checkbox"/> Insufficient Sample Volume
<input type="checkbox"/> Cooler Conditions	<input type="checkbox"/> Broken/Leaking Samples	<input type="checkbox"/> pH Criteria Not Met	<input type="checkbox"/> Chain of Custody Problems
<input type="checkbox"/> Missing Paperwork	<input type="checkbox"/> Incorrect Bottle Type	<input type="checkbox"/> Residual Chlorine Present	<input type="checkbox"/> Other:
<input type="checkbox"/> Missing/Incorrect Bottle Labels	<input type="checkbox"/> Cooler Temperatures Out of Range	<input type="checkbox"/> 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: _____ Returned to Sample Receipt by: _____ Date: _____
Printed Name Signature

Batch Worklist

Batch: ELMIS/2246

Rule: EPA 6850, DoD QSM Water

Created: 5/9/2019 11:22

Analyst: S. Brose

Instrument:

Status: WP

HBN: 238759


 Workorder: 1912778 [ENV_LVL4]
 Workorder: 1913240 [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	652187	CCV for HBN 238759 [ELMS/2246]				CCV	3		E6850Q41C3Q	6214		5/16/2019	
2	652188	RLVS for HBN 238759 [ELMS/2246]				RLVS	3		E6850Q41C3Q	6214		5/16/2019	
3	652189	ICS for HBN 238759 [ELMS/2246]				ICS	3		E6850.D3Q	6214		5/16/2019	
4	652190	LMB for HBN 238759 [ELMS/2246]				LMB	3		E6850Q413Q	6214		5/16/2019	
5	652191	LCS for HBN 238759 [ELMS/2246]				LCS	3		E6850Q413Q	6214		5/16/2019	
6	1912778001	LH18/24-SP650_050119_BIX Water				SAMPLE	3	1912778001-A	E6850Q41.3	5480	5/29/2019	5/16/2019	
7	652192	LH18/24-SP650...(1912778001MS)				MS	3		E6850Q413Q	6214		5/16/2019	
8	652193	LH18/24-SP65...(1912778001MSD)				MSD	3		E6850Q413Q	6214		5/16/2019	
9	1913240001	50WW/06-190506				SAMPLE	3	1913240001-A	E6850Q41.3	5480	6/3/2019	5/21/2019	
10	1913240002	50WW/11-190506				SAMPLE	3	1913240002-A	E6850Q41.3	5480	6/3/2019	5/21/2019	
11	1913240003	50WW/14-190506				SAMPLE	3	1913240003-A	E6850Q41.3	5480	6/3/2019	5/21/2019	
12	1913240004	50WW/13-190506				SAMPLE	3	1913240004-A	E6850Q41.3	5480	6/3/2019	5/21/2019	
13	1913240005	50WW/22-190506				SAMPLE	3	1913240005-A	E6850Q41.3	5480	6/3/2019	5/21/2019	
14	1913240006	50WW/16-190506				SAMPLE	3	1913240006-A	E6850Q41.3	5480	6/3/2019	5/21/2019	
15	652194	CCV for HBN 238759 [ELMS/2246]				CCV	3		E6850Q41C3Q	6214		5/16/2019	



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #()'s: 1912778(001), 1913240(001-006)
 ELMS Batch/HBN ID: 2246 (238759)
 Prep Date: 05/11/2019 Analysis Date: 05/11/2019 Analyst: S. Brose
 Analyte: Perchlorate Matrix: Water Method: 6850
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\MAY\11MAY19D.s
 Reported DL: 1.0µg/L Reported LOD: 2.0µg/L Reported LOQ: 4.0µg/L

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by SAB. 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 AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).
 Eluent B1: 95% ACN (B&J Lot AH015-4) 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

STANDARDS: Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

CALIBRATION CURVE: Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.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: 35µL
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

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: 4.0µL of QC Solution Horizon ID 47516 was used for LCS 652191; Target = 4.0µg/L. ASTM type II water was used for LMB 652190.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1912778001 (Client ID: LH18/24-SP650_050119_BIX Water). 4.0µL of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. Spike target = 4.0µg/L.

COMMENTS:

- 1) Results reported in µg/L. Field samples 1913240002/004 were analyzed and reported from 1:10 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\MAY\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\238759-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATA\REVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 652188) is reported from the analysis of the Laboratory Control Sample (LCS – 652191) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, many of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03).

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.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
<u>Batch(es)/SDG: ELMS: 2246 HBN 238759</u>		
<u>Sample Set IDs if Applicable: 1912778, 1913240</u>		
<u>Calibration standards analyzed and meets criteria</u>	SB	
<u>Standards traceability checked and meets criteria</u>	SB	
<u>Standard curve coefficients evaluated and meet criteria</u>	SB	
<u>ICVs analyzed and meet acceptance criteria</u>	SB	
<u>CCVs analyzed and meet acceptance criteria</u>	SD	
<u>Retention Time Windows checked</u>	SB	
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	
<u>Surrogate recoveries checked and appropriately addressed</u>	SB	
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	SD	
<u>MSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed</u>	SB	
<u>RLVS analyzed</u>	SB	
<u>Preparation and analysis hold times met</u>	SB	
<u>Preparation deviations and re-preparations noted when performed</u>	SB	
<u>Analysis deviations and re-analyses noted when performed</u>	SB	
<u>Sample dilution factors noted on reports</u>	SB	
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	SB	
<u>Preparation and analysis calculations checked</u>	SB	
<u>NCRs are completed as necessary NC/CAR#</u>	—	
<u>Report forms are complete and accurate</u>	SB	
<u>Manual integrations checked</u>	SB	



STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK		Description - 6850 WKG Std 100.ug/L			
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name			Concentration
1	14797-73-0	Perchlorate			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
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK		Description - 6850 Stock AccStd 1,000ug/mL	
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075		Usable: No	
Part ID: IC-PER-10X-1		Lab Lot: CLO4 STOCK	
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	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: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
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
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



STANDARD REPORT

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



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

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



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

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

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730		Created By: Thomas Bosch	Amount: 25 mL		
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM	Expires: 09/20/2019		
MFG Lot: TNB: 05/09/2018		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
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



STANDARD REPORT

Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK		Description - Perchlorate ISTD Stock	
Standard: 43729		Created By: Thomas Bosch	Amount: 1 mL
MFG: Cambridge Isotope		Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026
MFG Lot: SDFF-012A		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



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

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.





Certificate of Analysis



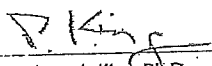
ISO Guide 34 Reference Material

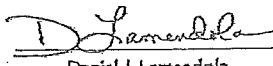
Product Number: ICC-013
Lot Number: CP-0860

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



125 Market Street
New Haven, CT 06513
USA



AccuStandard®

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

CERTIFICATE OF ANALYSIS



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

Date Certified: Jun 25, 2018

Expiration: Jul 25, 2020

Sample Size: 100 mL

Components: 1

Storage Condition: Ambient ($>5^\circ\text{C}$)

Included on ISO/IEC 17025 Scope of Accreditation: Yes

Included on ISO 17034 Scope of Accreditation: Yes



Signal Word: None

Component	SRM #	Prepared Concentration ($\mu\text{g/mL}$)
ClO_4 Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is $\pm 0.24\%$.

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 $0.2\ \mu\text{m}$ 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 $\pm 0.5\%$ of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By:

Melgan O'Leary

Melgan O'Leary, Inorganic QC Manager

Page 1 of 1

For use in routine laboratory analysis.

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

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



Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

Quality Standards:

ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number:

SDDG-013

Catalog Number:

OLM-7310-S

Product Information

Chemical Purity Specification:

≥ 98%

Labeled CAS Number:

NA

Unlabeled CAS Number:

7601-89-0

MW*:

130.4

Chemical Formula:

NaCl*O4

Storage:

Store at room temperature away from light and moisture.

Stability:

See storage and expiration date.

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.

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.

* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 µg/mL
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	109.4 ± 2.8 µg/mL (k=2)



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-PR2.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	
*	652187	CCV@25	Vial 71	1	Control	1	1.94996e6	8.885	24.87225
*	652191	QC@4.0	Vial 72	1	Control	2	3.64428e5	9.007	3.78501
*	652189	ICS@4.0	Vial 73	1	Control	3	2.68113e5	8.748	3.44195
*	652190	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1912778001		Vial 75	1	Sample	5	7.53303e4	8.536	1.10946
*	652192	MS	Vial 76	1	Sample	6	2.69491e5	8.479	3.47235
*	652193	SD	Vial 77	1	Sample	7	2.70470e5	8.544	3.37509
*	1913240001		Vial 78	1	Sample	8	4.01114e5	8.877	4.25158
*	1913240002	10X	Vial 79	1	Sample	9	3.90096e6	8.822	453.25091
*	1913240003		Vial 80	1	Sample	10	3.55168e4	8.432	5.69921e-1
*	1913240004	10X	Vial 81	1	Sample	11	1.24291e6	8.724	157.85203
*	1913240005		Vial 82	1	Sample	12	4.25340e4	8.340	8.04157e-1
*	1913240006		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	652194	CCV@25	Vial 71	1	Control	14	1.88465e6	8.932	24.16769

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	652187	CCV@25	Vial 71	1	Control	1	5.91244e5	8.900	25.24495
*	652191	QC@4.0	Vial 72	1	Control	2	1.17923e5	9.031	4.01248
*	652189	ICS@4.0	Vial 73	1	Control	3	9.96403e4	8.769	4.18546
*	652190	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1912778001		Vial 75	1	Sample	5	2.69706e4	8.555	1.24500
*	652192	MS	Vial 76	1	Sample	6	8.93023e4	8.504	3.76346
*	652193	SD	Vial 77	1	Sample	7	9.34108e4	8.562	3.81120
*	1913240001		Vial 78	1	Sample	8	1.31381e5	8.892	4.57235
*	1913240002	10X	Vial 79	1	Sample	9	1.17056e6	8.839	458.01109
*	1913240003		Vial 80	1	Sample	10	1.43885e4	8.420	6.86391e-1
*	1913240004	10X	Vial 81	1	Sample	11	3.77433e5	8.743	159.87183
*	1913240005		Vial 82	1	Sample	12	1.70179e4	8.352	9.89957e-1
*	1913240006		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	652194	CCV@25	Vial 71	1	Control	14	5.69187e5	8.947	24.43230

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	652187	CCV@25	Vial 71	1	Control	1	2.40557e5	8.905	5.00000
*	652191	QC@4.0	Vial 72	1	Control	2	3.12971e5	9.026	5.00000
*	652189	ICS@4.0	Vial 73	1	Control	3	2.53565e5	8.771	5.00000
*	652190	LMB	Vial 74	1	Control	4	2.93417e5	9.141	5.00000
*	1912778001		Vial 75	1	Sample	5	2.25140e5	8.555	5.00000
*	652192	MS	Vial 76	1	Sample	6	2.52604e5	8.502	5.00000
*	652193	SD	Vial 77	1	Sample	7	2.60936e5	8.566	5.00000
*	1913240001		Vial 78	1	Sample	8	3.06124e5	8.903	5.00000
*	1913240002	10X	Vial 79	1	Sample	9	2.51361e5	8.840	50.00000
*	1913240003		Vial 80	1	Sample	10	2.10601e5	8.453	5.00000
*	1913240004	10X	Vial 81	1	Sample	11	2.47229e5	8.744	50.00000
*	1913240005		Vial 82	1	Sample	12	1.76759e5	8.364	5.00000
*	1913240006		Vial 83	1	Sample	13	2.28541e5	8.741	5.00000
*	652194	CCV@25	Vial 71	1	Control	14	2.39698e5	8.955	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	==	=====	=====	=====
1	Vial 71	652187	CCV@25	CLO4-AQN 1	Ctrl Samp		
2	Vial 72	652191	QC@4.0	CLO4-AQN 1	Ctrl Samp		
3	Vial 73	652189	ICS@4.0	CLO4-AQN 1	Ctrl Samp		
4	Vial 74	652190	LMB	CLO4-AQN 1	Ctrl Samp		
5	Vial 75	1912778001		CLO4-AQN 1	Sample		
6	Vial 76	652192	MS	CLO4-AQN 1	Sample		
7	Vial 77	652193	SD	CLO4-AQN 1	Sample		
8	Vial 78	1913240001		CLO4-AQN 1	Sample		
9	Vial 79	1913240002	10X	CLO4-AQN 1	Sample		
10	Vial 80	1913240003		CLO4-AQN 1	Sample		
11	Vial 81	1913240004	10X	CLO4-AQN 1	Sample		
12	Vial 82	1913240005		CLO4-AQN 1	Sample		
13	Vial 83	1913240006		CLO4-AQN 1	Sample		
14	Vial 71	652194	CCV@25	CLO4-AQN 1	Ctrl Samp		

Sequence Table:

Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	652187	CCV@25	CLO4-AQN	1	Ctrl Samp	
2	Vial 72	652191	QC@4.0	CLO4-AQN	1	Ctrl Samp	
3	Vial 73	652189	ICS@4.0	CLO4-AQN	1	Ctrl Samp	
4	Vial 74	652190	LMB	CLO4-AQN	1	Ctrl Samp	
5	Vial 75	1912778001		CLO4-AQN	1	Sample	
6	Vial 76	652192	MS	CLO4-AQN	1	Sample	
7	Vial 77	652193	SD	CLO4-AQN	1	Sample	
8	Vial 78	1913240001		CLO4-AQN	1	Sample	
9	Vial 79	1913240002	10X	CLO4-AQN	1	Sample	
10	Vial 80	1913240003		CLO4-AQN	1	Sample	
11	Vial 81	1913240004	10X	CLO4-AQN	1	Sample	
12	Vial 82	1913240005		CLO4-AQN	1	Sample	
13	Vial 83	1913240006		CLO4-AQN	1	Sample	
14	Vial 71	652194	CCV@25	CLO4-AQN	1	Ctrl Samp	

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-PR2.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
	CCV@25	Vial 71	1	Control	1	1.91635e6	8.882	24.97443
1912778001	100	Vial 72	1	Sample	2	0.00000	0.000	0.00000 lx
1913240001	100	Vial 73	1	Sample	3	2.10623e4	9.044	2.62221e-1 lx
1913240002	100	Vial 74	1	Sample	4	3.40575e5	9.004	3.82326 wx
1913240003	100	Vial 75	1	Sample	5	2.45169e4	9.019	2.94033e-1 lx
1913240004	100	Vial 76	1	Sample	6	1.26007e5	9.014	1.47512 wx
1913240005	100	Vial 77	1	Sample	7	0.00000	0.000	0.00000 lx
1913240006	100	Vial 78	1	Sample	8	0.00000	0.000	0.00000 lx

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
	CCV@25	Vial 71	1	Control	1	5.80696e5	8.899	25.33477
1912778001	100	Vial 72	1	Sample	2	0.00000	0.000	0.00000
1913240001	100	Vial 73	1	Sample	3	0.00000	0.000	0.00000
1913240002	100	Vial 74	1	Sample	4	1.08556e5	9.016	3.99291
1913240003	100	Vial 75	1	Sample	5	0.00000	0.000	0.00000
1913240004	100	Vial 76	1	Sample	6	4.48596e4	9.034	1.67221
1913240005	100	Vial 77	1	Sample	7	0.00000	0.000	0.00000
1913240006	100	Vial 78	1	Sample	8	0.00000	0.000	0.00000

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
	CCV@25	Vial 71	1	Control	1	2.35383e5	8.903	5.00000
1912778001	100	Vial 72	1	Sample	2	3.22725e5	9.015	5.00000
1913240001	100	Vial 73	1	Sample	3	2.83809e5	9.044	5.00000
1913240002	100	Vial 74	1	Sample	4	2.89515e5	9.027	5.00000
1913240003	100	Vial 75	1	Sample	5	2.91977e5	8.997	5.00000
1913240004	100	Vial 76	1	Sample	6	2.81689e5	9.037	5.00000
1913240005	100	Vial 77	1	Sample	7	2.91318e5	8.988	5.00000
1913240006	100	Vial 78	1	Sample	8	2.72875e5	9.099	5.00000

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD01.D

Sample Name: 652187 CCV@25

Injection Date: 5/11/2019 14:44:14

Seq Line: 1

Sample Name: 652187 CCV@25

Location: Vial 71

Acq Operator: 6214

Inj. No.: 1

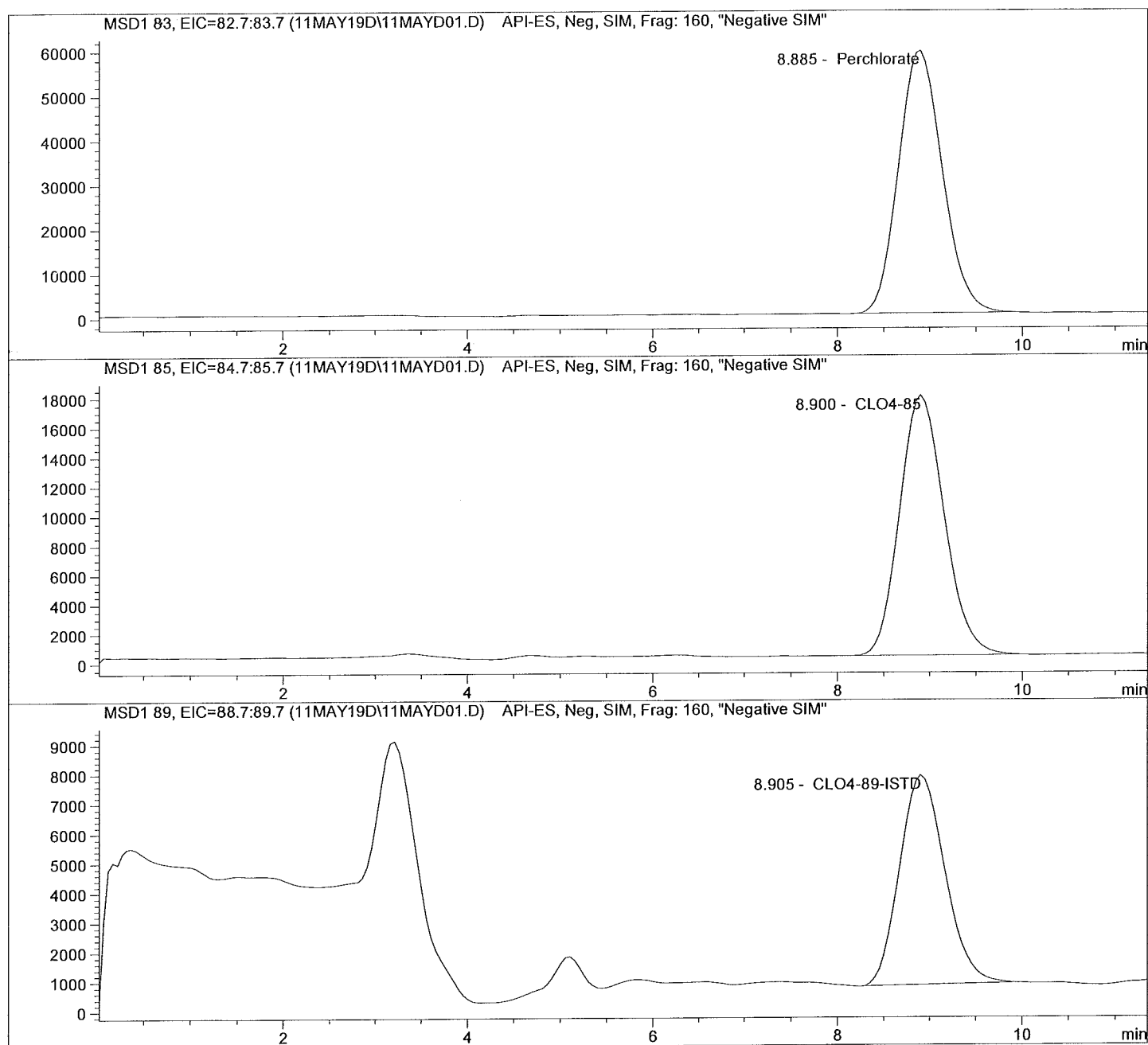
Inj. Vol.: 35 µl

Acq. Method: CLQ4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M

Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD01.D

Sample Name: 652187 CCV@25

```
=====
Injection Date: 5/11/2019 14:44:14      Seq Line: 1
Sample Name: 652187 CCV@25             Location: Vial 71
Acq Operator: 6214                     Inj. No.: 1
                                           Inj. Vol.: 35 µl
=====
```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.885	PBA	1949964.1	24.8722	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.900	PBA	591243.8	25.2450	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.905	PBA	240557.2	5.0000	CLO4-89-ISTD

=====

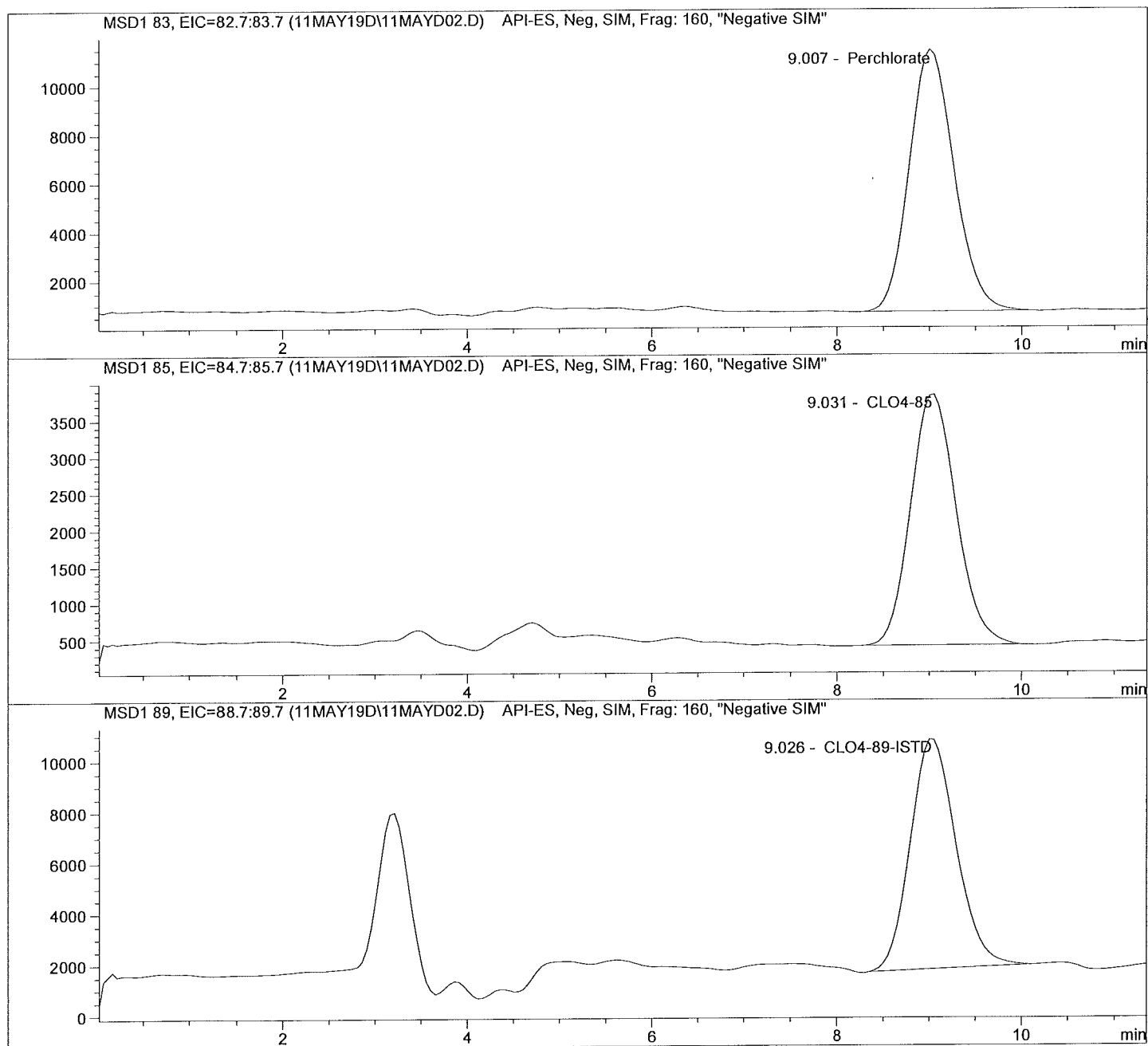
*** End of Report ***

Injection Date: 5/11/2019 14:57:36
Sample Name: 652191 QC@4.0
Acq Operator: 6214

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD02.D

Sample Name: 652191 QC@4.0

Injection Date: 5/11/2019 14:57:36
Sample Name: 652191 QC@4.0
Acq Operator: 6214

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 03:02:18 pm
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.007	PBA	364428.2	3.7850	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.031	PBA	117922.8	4.0125	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.026	PBA	312970.7	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD03.D

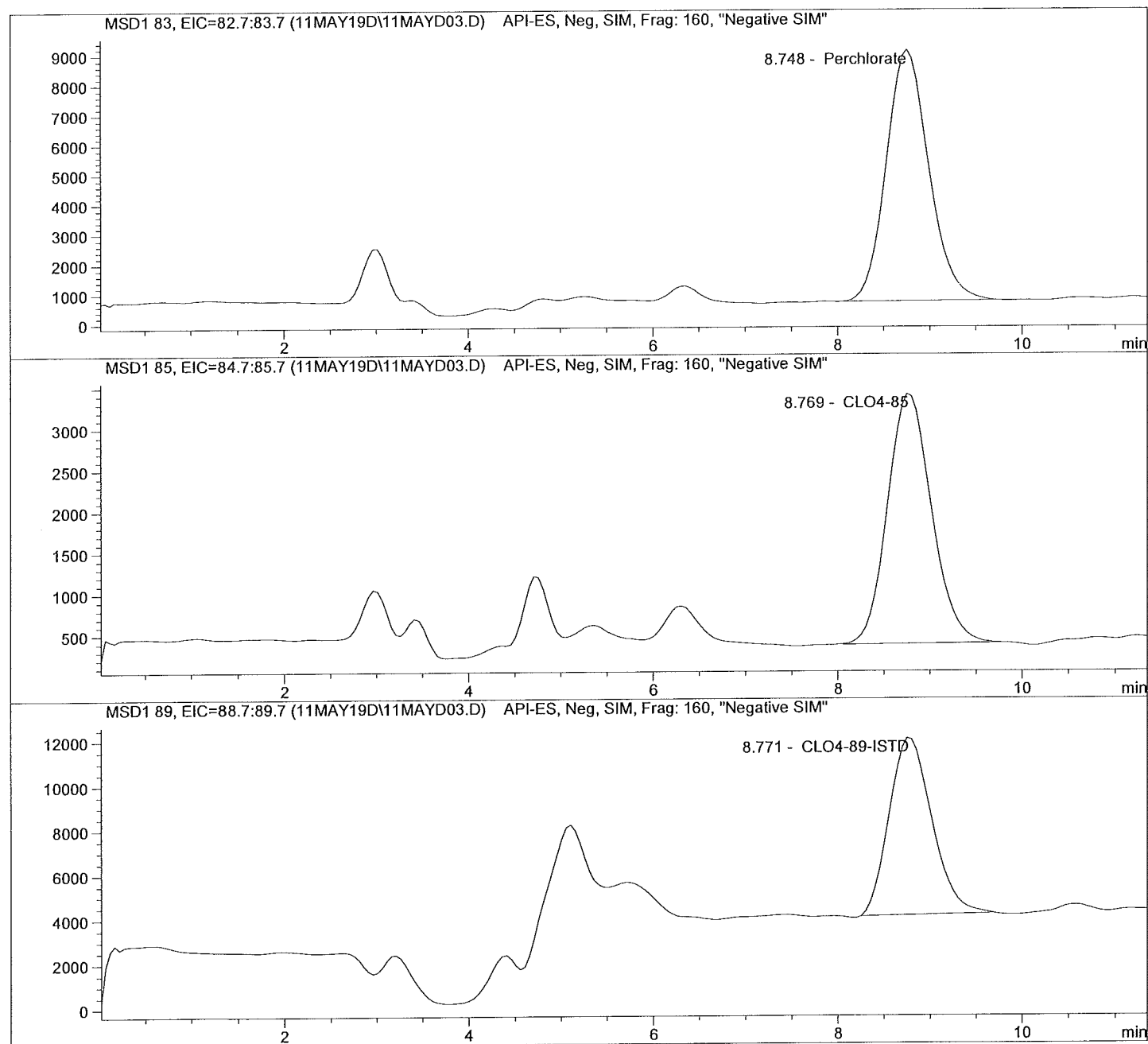
Sample Name: 652189 ICS@4.0

Injection Date: 5/11/2019 15:10:58
Sample Name: 652189 ICS@4.0
Acq Operator: 6214

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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD03.D

Sample Name: 652189 ICS@4.0

```
=====
Injection Date:  5/11/2019  15:10:58      Seq Line:           3
Sample Name:    652189    ICS@4.0        Location:          Vial 73
Acq Operator:   6214                      Inj. No.:           1
                                           Inj. Vol.:          35 µl
=====
```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:          Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 pm
Multiplier:         1.000000
Dilution:           1.000000
Sample Amount:      4.000
=====
```

=====

LCMS Results

Signal1: MSD1 33, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.748	BBA	268113.1	3.4419	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.769	BBA	99640.3	4.1855	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.771	PBA	253564.8	5.0000	CLO4-89-ISTD

=====

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD04.D

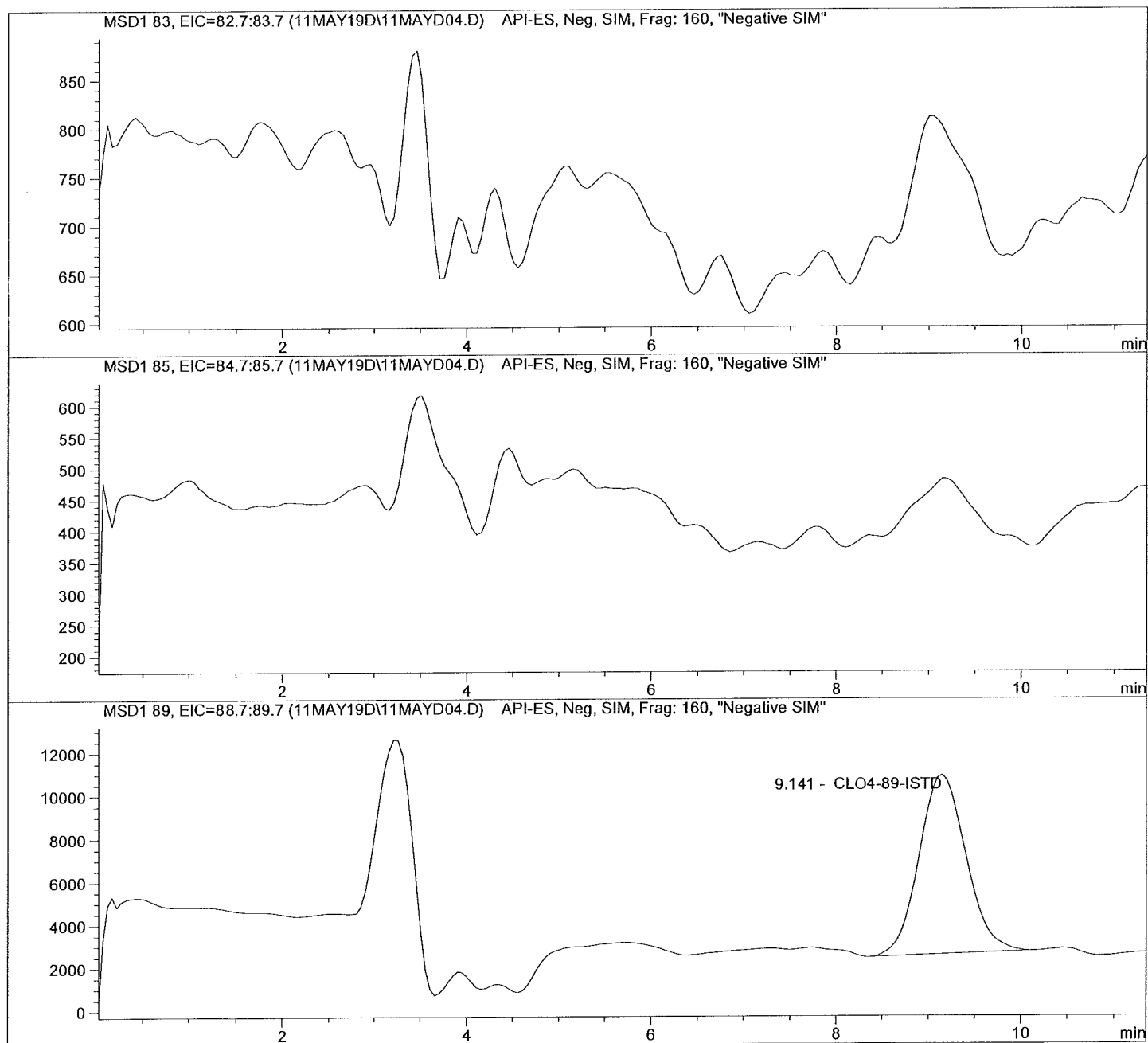
Sample Name: 652190 LMB

Injection Date: 5/11/2019 15:24:33
Sample Name: 652190 LMB
Acq Operator: 6214

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD04.D

Sample Name: 652190 LMB

```
=====
Injection Date:  5/11/2019  15:24:33      Seq Line:           4
Sample Name:    652190    LMB             Location:          Vial 74
Acq Operator:   6214              Inj. No.:           1
                                      Inj. Vol.:          35 µl
=====
```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:          Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
9.141	PBA	293417.4	5.0000	CLO4-89-ISTD

=====

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD05.D

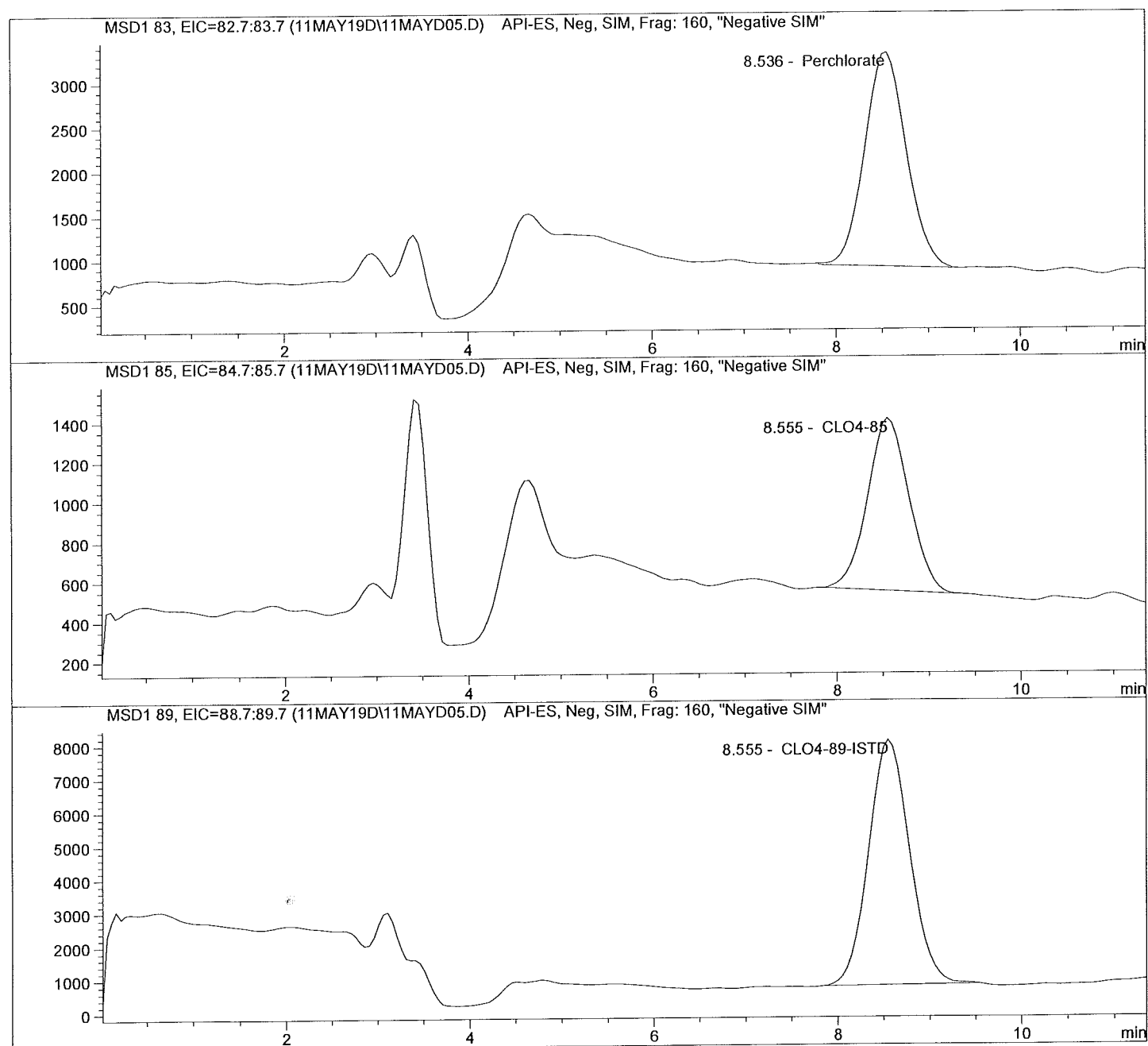
Sample Name: 1912778001

Injection Date: 5/11/2019 15:37:55
Sample Name: 1912778001
Acq Operator: 6214

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD05.D

Sample Name: 1912778001

```
=====
Injection Date:  5/11/2019  15:37:55      Seq Line:      5
Sample Name:    1912778001      Location:      Vial 75
Acq Operator:   6214           Inj. No.:      1
                                   Inj. Vol.:      35 µl
=====
```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.536	BBA	75330.3	1.1095	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.555	PBA	26970.6	1.2450	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.555	PBA	225139.6	5.0000	CLO4-89-ISTD

=====

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD06.D

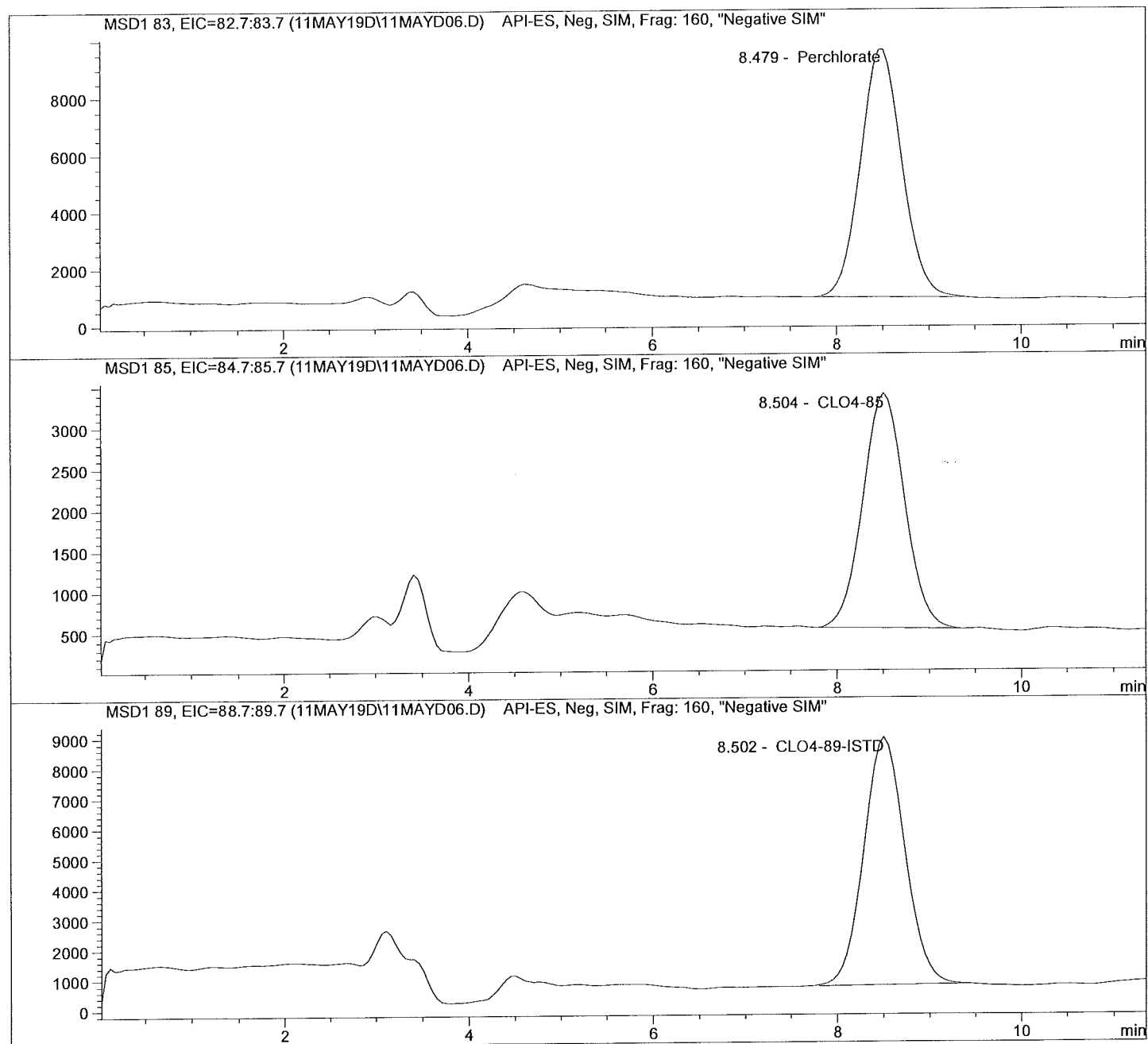
Sample Name: 652192 MS

Injection Date: 5/11/2019 15:51:17
Sample Name: 652192 MS
Acq Operator: 6214

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD06.D

Sample Name: 652192 MS

```
=====
Injection Date:  5/11/2019  15:51:17      Seq Line:           6
Sample Name:    652192    MS              Location:          Vial 76
Acq Operator:   6214                      Inj. No.:           1
                                           Inj. Vol.:          35 µl
=====
```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.479	PBA	269491.3	3.4723	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.504	PBA	89302.3	3.7635	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.502	BBA	252603.7	5.0000	CLO4-89-ISTD

=====

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD07.D

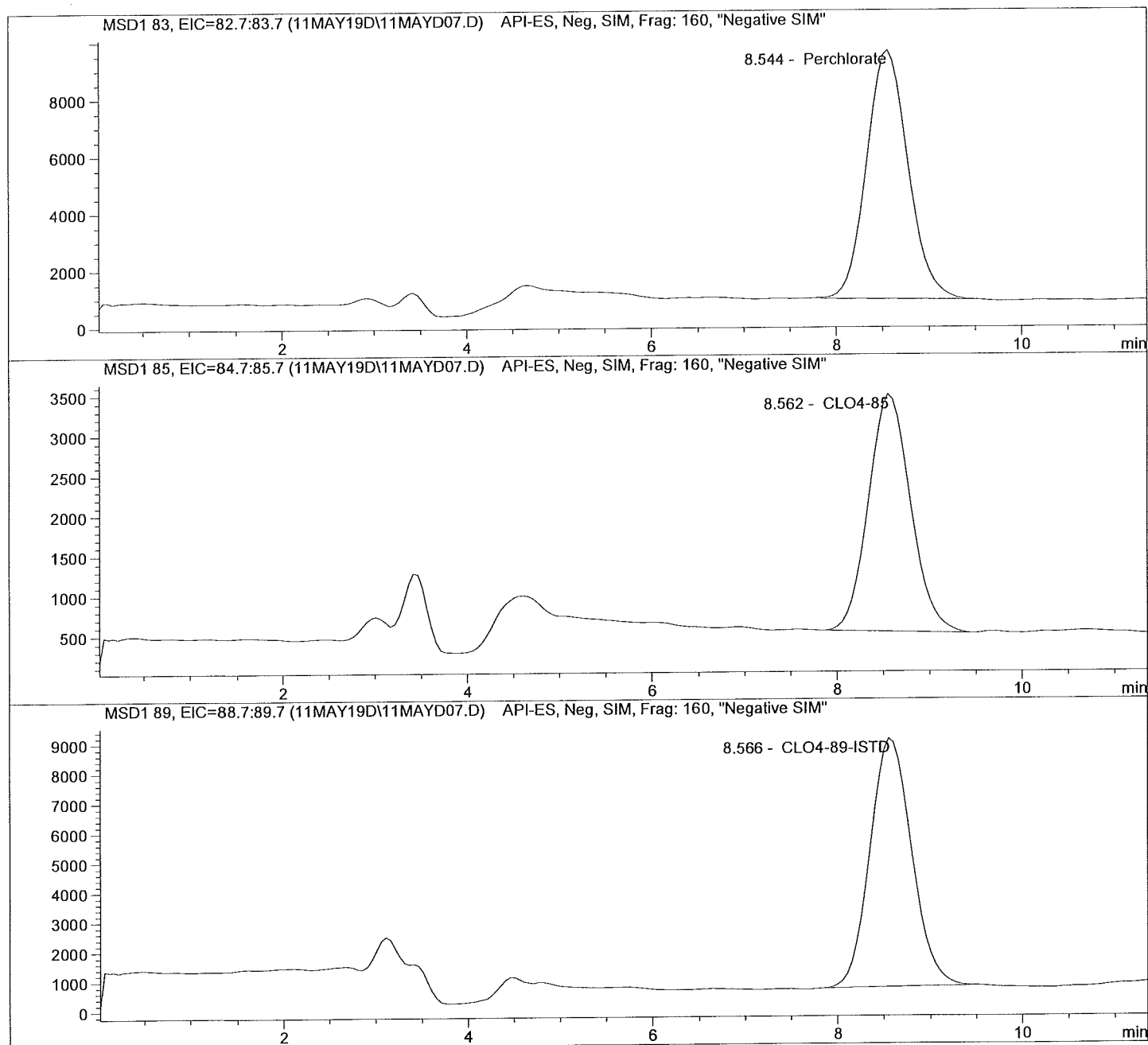
Sample Name: 652193 SD

Injection Date: 5/11/2019 16:04:48
Sample Name: 652193 SD
Acq Operator: 6214

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD07.D

Sample Name: 652193 SD

```

=====
Injection Date:  5/11/2019  16:04:48      Seq Line:          7
Sample Name:    652193    SD              Location:         Vial 77
Acq Operator:   6214                      Inj. No.:         1
                                           Inj. Vol.:        35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed:   3/19/2019  15:02:22

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Tue, 19. Mar. 2019,03:02:18 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
8.544	BBA	270469.7	3.3751	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.562	PBA	93410.8	3.8112	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.566	PBA	260935.7	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```


Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD08.D

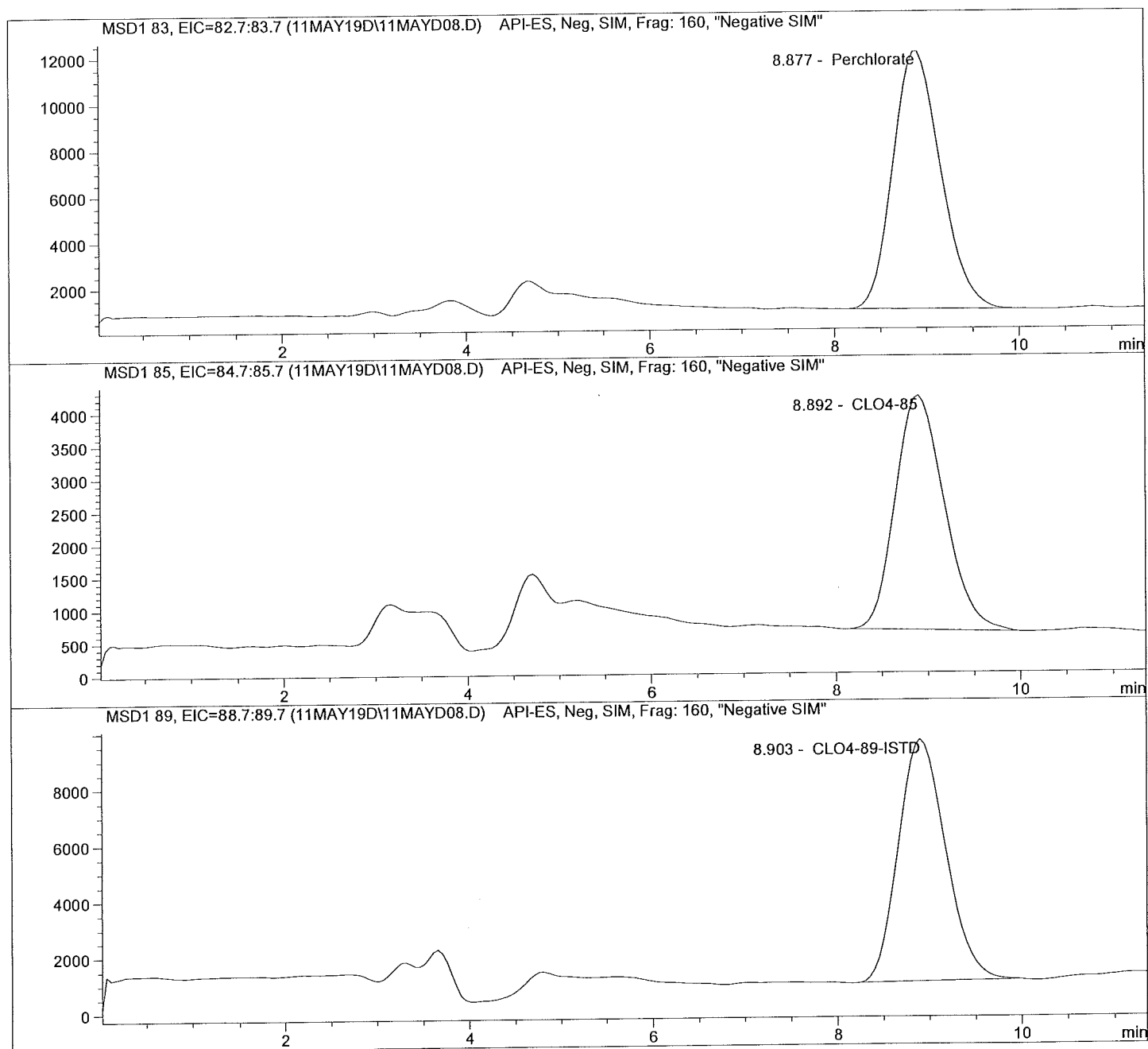
Sample Name: 1913240001

Injection Date: 5/11/2019 16:18:10
Sample Name: 1913240001
Acq Operator: 6214

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD08.D

Sample Name: 1913240001

```
=====
Injection Date:  5/11/2019  16:18:10      Seq Line:           8
Sample Name:    1913240001                Location:          Vial 78
Acq Operator:   6214                      Inj. No.:         1
                                           Inj. Vol.:       35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed:   3/19/2019  15:02:22
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.877	PBA	401113.9	4.2516	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.892	PBA	131380.7	4.5723	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.903	PBA	306123.7	5.0000	CLO4-89-ISTD

=====
*** End of Report ***
=====

Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD09.D

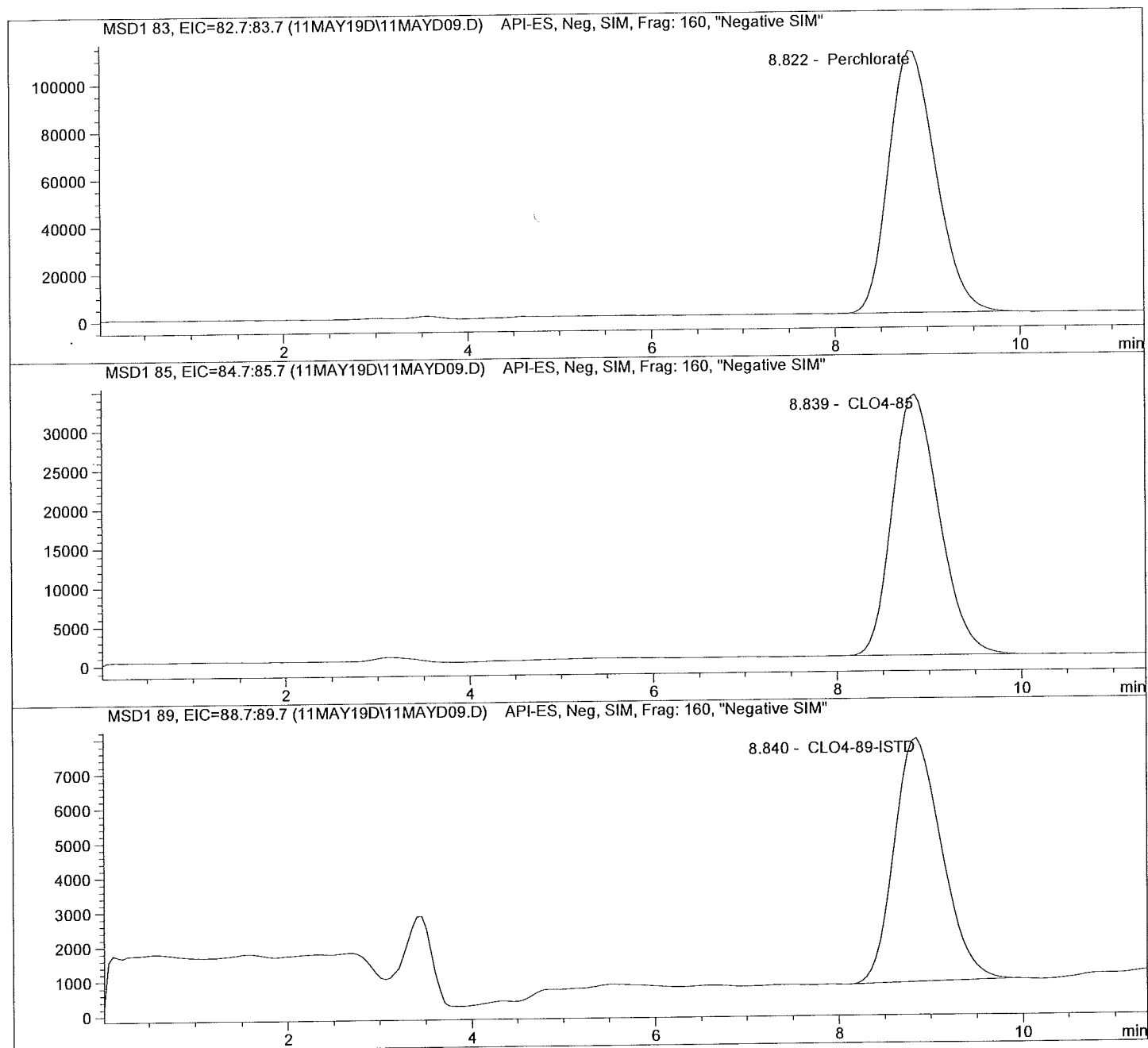
Sample Name: 1913240002 10X

Injection Date: 5/11/2019 16:31:33
Sample Name: 1913240002 10X
Acq Operator: 6214

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD09.D Sample Name: 1913240002 10X

```
=====
Injection Date:  5/11/2019  16:31:33      Seq Line:          9
Sample Name:    1913240002   10X          Location:        Vial 79
Acq Operator:   6214          Inj. No.:           1
                                   Inj. Vol.:          35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed:   3/19/2019  15:02:22
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.822	PBA	3900960.2	453.2509	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.839	PBA	1170561.0	458.0111	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.840	PBA	251360.6	50.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD10.D

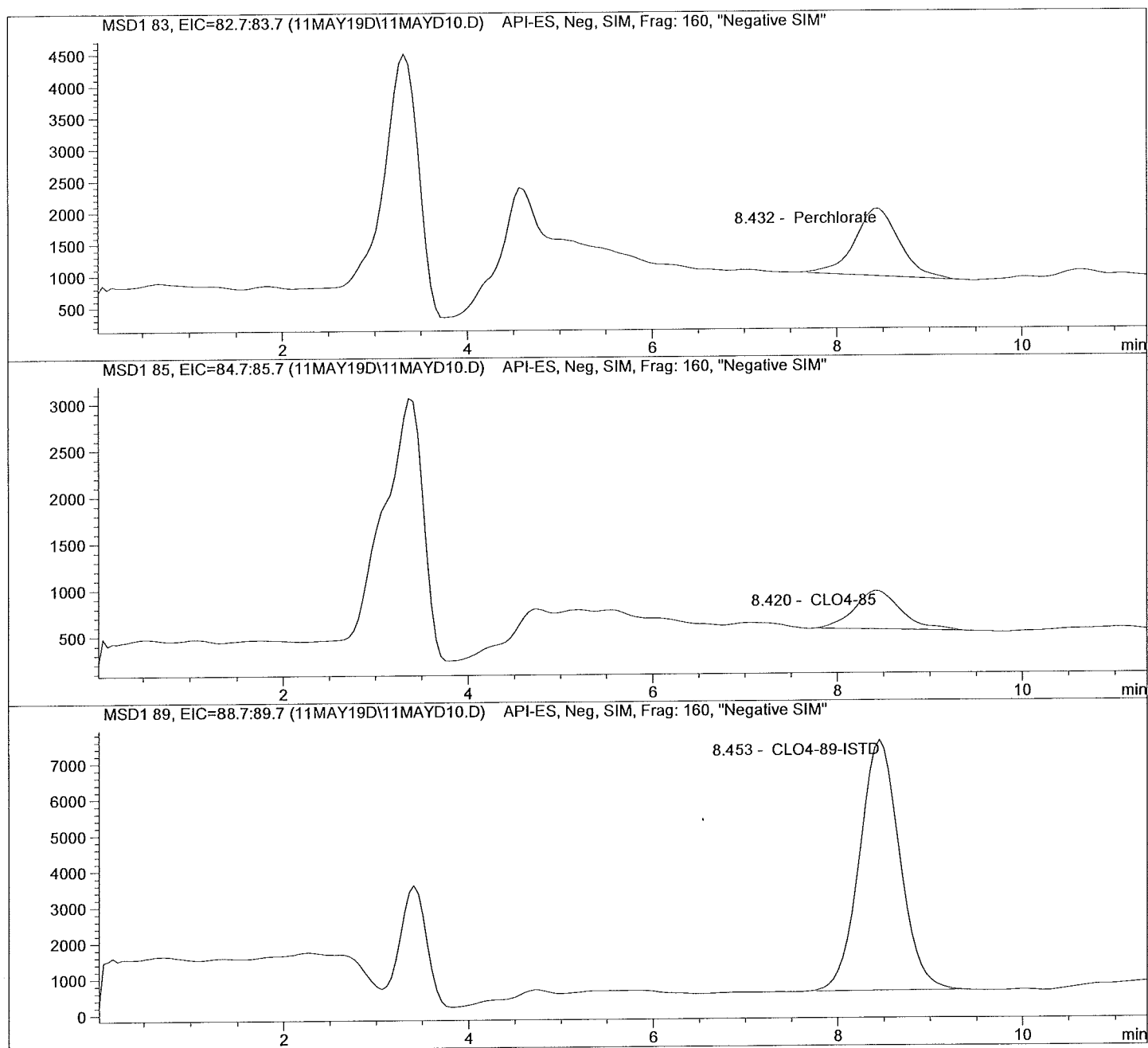
Sample Name: 1913240003

Injection Date: 5/11/2019 16:44:58
Sample Name: 1913240003
Acq Operator: 6214

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD10.D

Sample Name: 1913240003

```
=====
Injection Date:  5/11/2019  16:44:58      Seq Line:          10
Sample Name:    1913240003                Location:         Vial 80
Acq Operator:   6214                      Inj. No.:         1
                                           Inj. Vol.:       35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed:   3/19/2019  15:02:22
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.432	BBA	35516.8	0.5699	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.420	PBA	14388.5	0.6864	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.453	BBA	210600.8	5.0000	CLO4-89-ISTD

=====
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD11.D

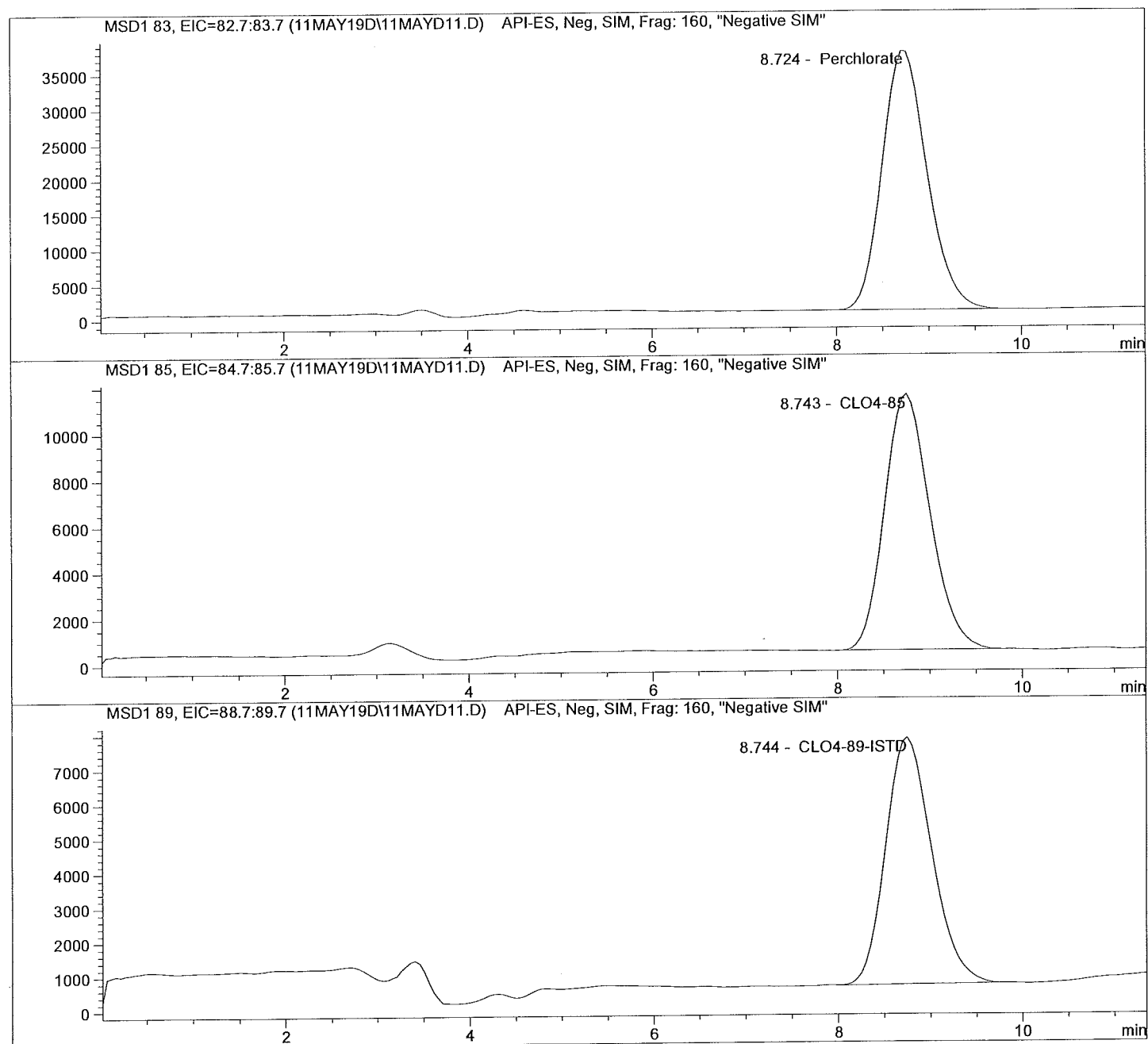
Sample Name: 1913240004 10X

Injection Date: 5/11/2019 16:58:21
Sample Name: 1913240004 10X
Acq Operator: 6214

Seq Line: 11
Location: Vial 81
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD11.D Sample Name: 1913240004 10X

```
=====
Injection Date:  5/11/2019  16:58:21      Seq Line:          11
Sample Name:    1913240004   10X          Location:         Vial 81
Acq Operator:   6214          Inj. No.:            1
                                      Inj. Vol.:         35 µl
=====
```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.724	PBA	1242909.1	157.8520	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.743	PBA	377432.6	159.8718	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.744	BBA	247229.1	50.0000	CLO4-89-ISTD

=====

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD12.D

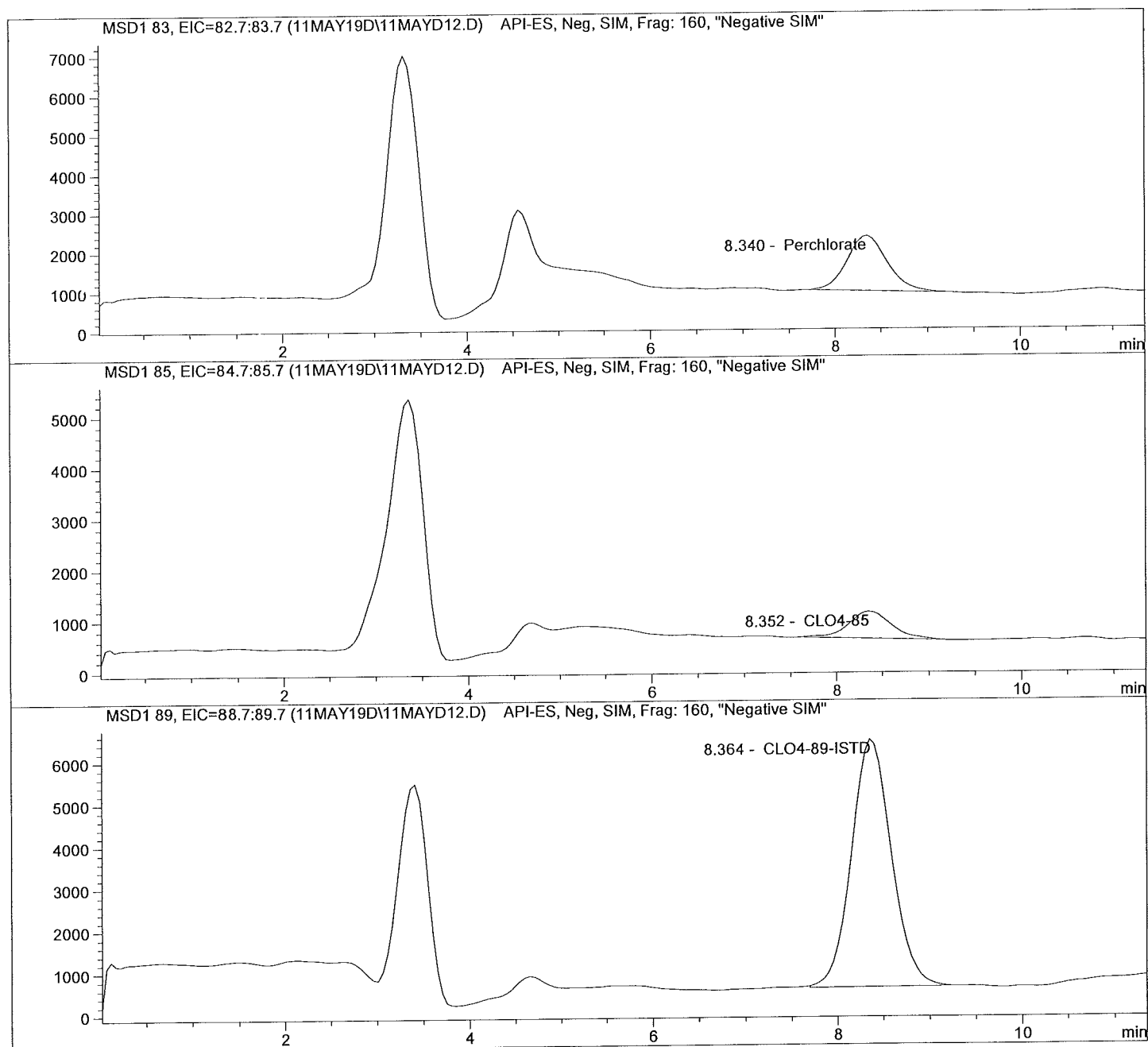
Sample Name: 1913240005

Injection Date: 5/11/2019 17:11:40
Sample Name: 1913240005
Acq Operator: 6214

Seq Line: 12
Location: Vial 82
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD12.D

Sample Name: 1913240005

```
=====
Injection Date:  5/11/2019  17:11:40      Seq Line:          12
Sample Name:    1913240005                Location:         Vial 82
Acq Operator:   6214                      Inj. No.:         1
                                           Inj. Vol.:        35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed:   3/19/2019  15:02:22
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.340	BBA	42534.0	0.8042	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.352	BBA	17017.9	0.9900	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.364	BBA	176758.8	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD13.D

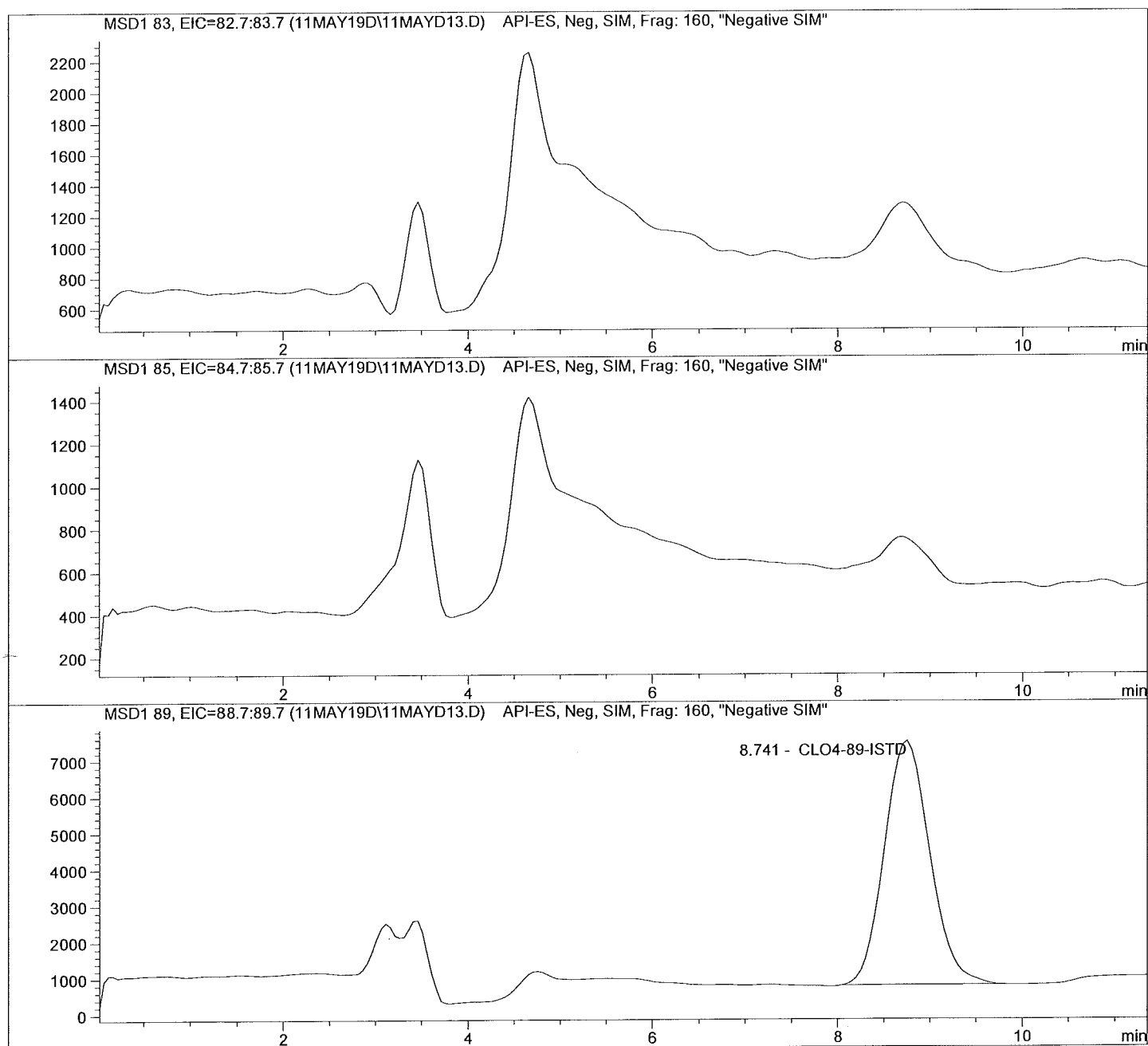
Sample Name: 1913240006

Injection Date: 5/11/2019 17:25:01
Sample Name: 1913240006
Acq Operator: 6214

Seq Line: 13
Location: Vial 83
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD13.D

Sample Name: 1913240006

```
=====
Injection Date:  5/11/2019  17:25:01      Seq Line:           13
Sample Name:    1913240006                Location:           Vial 83
Acq Operator:   6214                      Inj. No.:           1
                                           Inj. Vol.:          35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed:   3/19/2019  15:02:22
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Tue, 19. Mar. 2019,03:02:18 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
8.741	BBA	228540.6	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD14.D

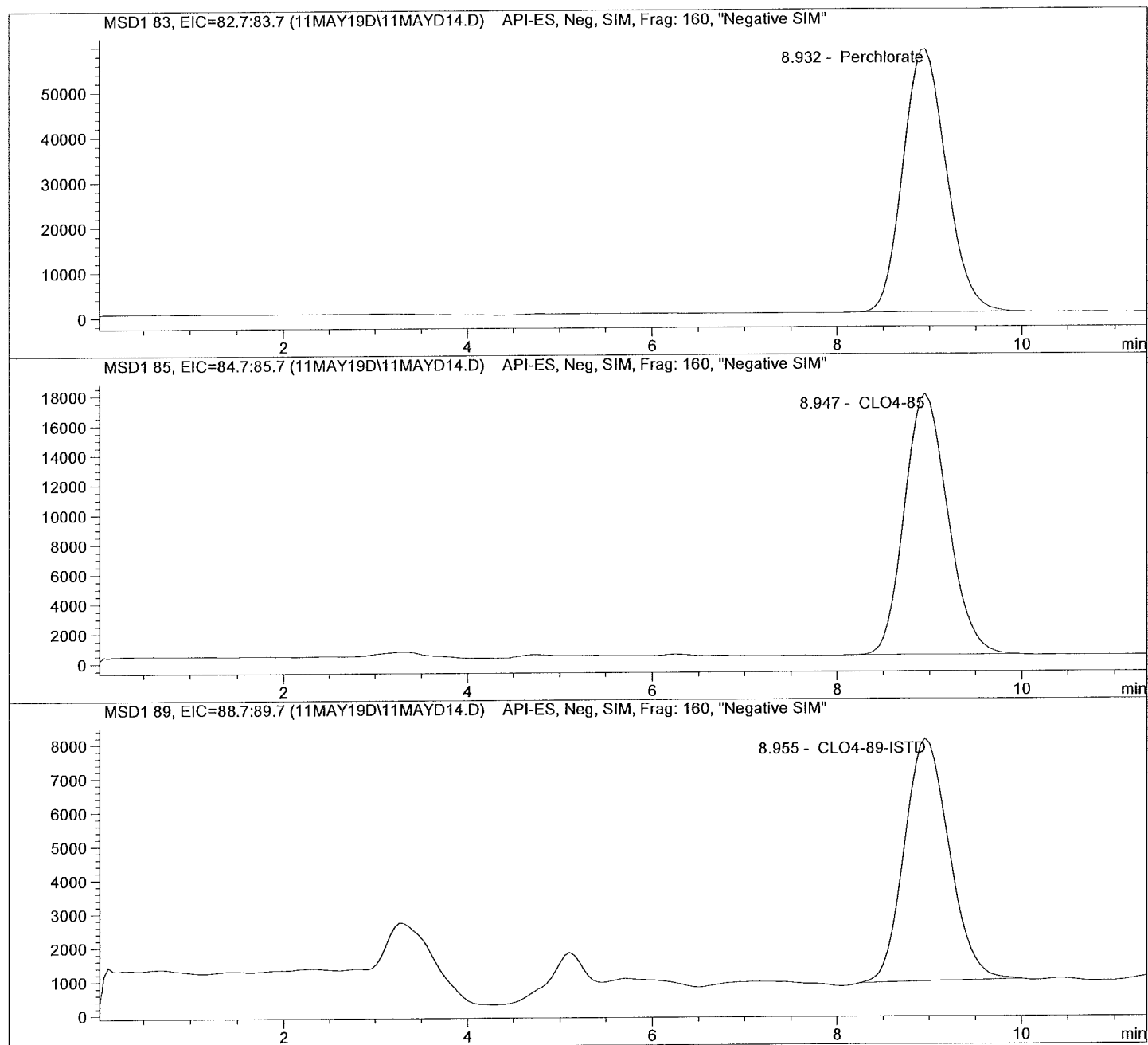
Sample Name: 652194 CCV@25

Injection Date: 5/11/2019 17:38:23
Sample Name: 652194 CCV@25
Acq Operator: 6214

Seq Line: 14
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\11MAY19D\11MAYD14.D Sample Name: 652194 CCV@25

```
=====
Injection Date:  5/11/2019  17:38:23      Seq Line:      14
Sample Name:    652194   CCV@25          Location:      Vial 71
Acq Operator:   6214                      Inj. No.:      1
                                           Inj. Vol.:    35 µl
=====
```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.932	BBA	1884651.9	24.1677	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.947	BBA	569187.4	24.4323	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.955	PBA	239698.4	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 : 3/19/2019 3:02:18 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	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
[min]	Sig						
8.851	1	1 2.00000e-1	1.81450e4	1.10223e-5	1		Perchlorate
		2 5.00000e-1	3.21972e4	1.55293e-5			
		3 1.00000	7.76263e4	1.28822e-5			
		4 2.00000	1.35273e5	1.47849e-5			
		5 5.00000	3.37764e5	1.48033e-5			
		6 10.00000	6.83454e5	1.46316e-5			
		7 25.00000	2.08433e6	1.19943e-5			
		8 50.00000	4.13334e6	1.20968e-5			
		9 75.00000	5.99313e6	1.25143e-5			
8.865	2	1 2.00000e-1	6104.14795	3.27646e-5	1		CLO4-85
		2 5.00000e-1	1.30663e4	3.82665e-5			
		3 1.00000	2.36911e4	4.22099e-5			
		4 2.00000	4.69486e4	4.25998e-5			
		5 5.00000	1.06124e5	4.71147e-5			
		6 10.00000	2.13523e5	4.68335e-5			
		7 25.00000	6.14295e5	4.06971e-5			
		8 50.00000	1.19814e6	4.17315e-5			
		9 75.00000	1.78355e6	4.20509e-5			
8.871	3	1 5.00000	2.49686e5	2.00252e-5	+I1		CLO4-89-ISTD
		2 5.00000	2.51653e5	1.98686e-5			

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
	3	5.00000	2.73208e5	1.83011e-5	
	4	5.00000	2.24886e5	2.22335e-5	
	5	5.00000	2.33196e5	2.14412e-5	
	6	5.00000	2.34454e5	2.13262e-5	
	7	5.00000	2.50568e5	1.99547e-5	
	8	5.00000	2.30977e5	2.16472e-5	
	9	5.00000	2.21509e5	2.25725e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 4.682 min To 11.682 min

Curve Type : Quadratic

Origin : Ignored

Calibration Level Weights:/

Level 1 : 1

Level 2 : 0.4

Level 3 : 0.2

Level 4 : 0.1

Level 5 : 0.04

Level 6 : 0.02

Level 7 : 0.008

Level 8 : 0.004

Level 9 : 0.002667

Compound: CLO4-85

Time Window : From 4.688 min To 11.688 min

Curve Type : Quadratic

Origin : Ignored

Calibration Level Weights:/

Level 1 : 1

Level 2 : 0.4

Level 3 : 0.2

Level 4 : 0.1

Level 5 : 0.04

Level 6 : 0.02

Level 7 : 0.008

Level 8 : 0.004

Level 9 : 0.002667

Compound: CLO4-89-ISTD

Time Window : From 4.685 min To 11.685 min

Curve Type : Linear

Origin : Included

Calibration Level Weights:/

Level 1 : 1

Level 2 : 1

Level 3 : 1

Level 4 : 1

Level 5 : 1

Level 6 : 1

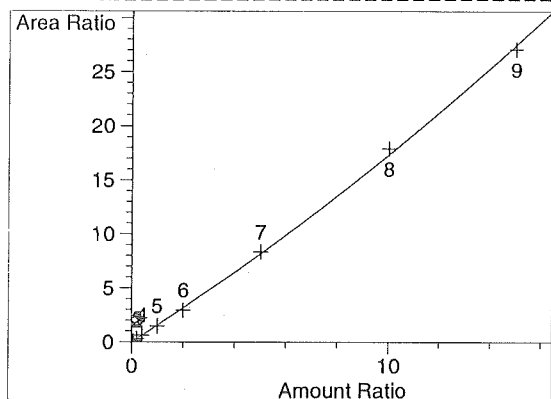
Level 7 : 1

Level 8 : 1

Level 9 : 1

=====
Peak Sum Table
=====

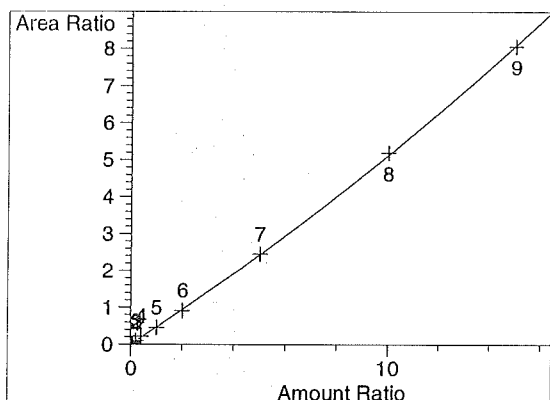
No Entries in table
=====

=====
Calibration Curves
=====

Perchlorate at exp. RT: 8.851
MSD1 83, EIC=82.7:83.7
Correlation: 0.99950
Residual Std. Dev.: 0.29306
Formula: $y = ax^2 + bx + c$
a: 2.00258e-2
b: 1.53115
c: -6.14208e-3
x: Amount Ratio
y: Area Ratio

Calibration Level Weights:

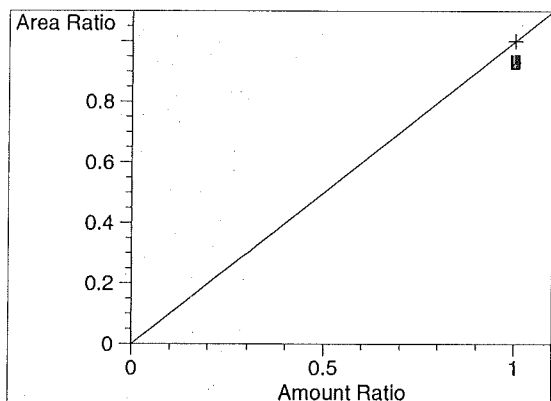
Level 1 : 1
Level 2 : 0.4
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.008
Level 8 : 0.004
Level 9 : 0.002667



CLO4-85 at exp. RT: 8.865
MSD1 85, EIC=84.7:85.7
Correlation: 0.99984
Residual Std. Dev.: 0.03219
Formula: $y = ax^2 + bx + c$
a: 5.36525e-3
b: 4.58662e-1
c: 5.25596e-3
x: Amount Ratio
y: Area Ratio

Calibration Level Weights:

Level 1 : 1
Level 2 : 0.4
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.008
Level 8 : 0.004
Level 9 : 0.002667



CLO4-89-ISTD at exp. RT: 8.871
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 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1
Level 8 : 1
Level 9 : 1

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-PR2.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@ 0.2ug/L	Vial 71	1	Control	1	1.81450e4	8.851	2.57194e-1
#*	CLO4@ 0.5ug/L	Vial 72	1	Control	2	3.21972e4	8.907	4.37356e-1
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	7.76263e4	8.744	9.45547e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	8.992	1.97413
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	8.586	4.69227
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	8.698	9.31250
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	8.451	25.48505
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	8.810	51.51493
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	8.586	74.03431
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	8.702	9.29435

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
#*	CLO4@ 0.2ug/L	Vial 71	1	Control	1	2.49686e5	8.871	5.00000
#*	CLO4@ 0.5ug/L	Vial 72	1	Control	2	2.51653e5	8.924	5.00000
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.73208e5	8.766	5.00000
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	9.012	5.00000
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	8.609	5.00000
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	8.716	5.00000
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	8.472	5.00000
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	8.825	5.00000
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21509e5	8.610	5.00000
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	8.725	5.00000

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#*	CLO4@ 0.2ug/L	Vial 71	1	Control	1	6104.14795	8.865	2.09108e-1
#*	CLO4@ 0.5ug/L	Vial 72	1	Control	2	1.30663e4	8.952	5.08112e-1
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36911e4	8.755	8.86167e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	9.012	2.20712
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	8.602	4.84870
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	8.713	9.65276
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	8.468	25.18450
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	8.825	50.51944
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	8.603	74.67276
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	8.721	9.54934

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

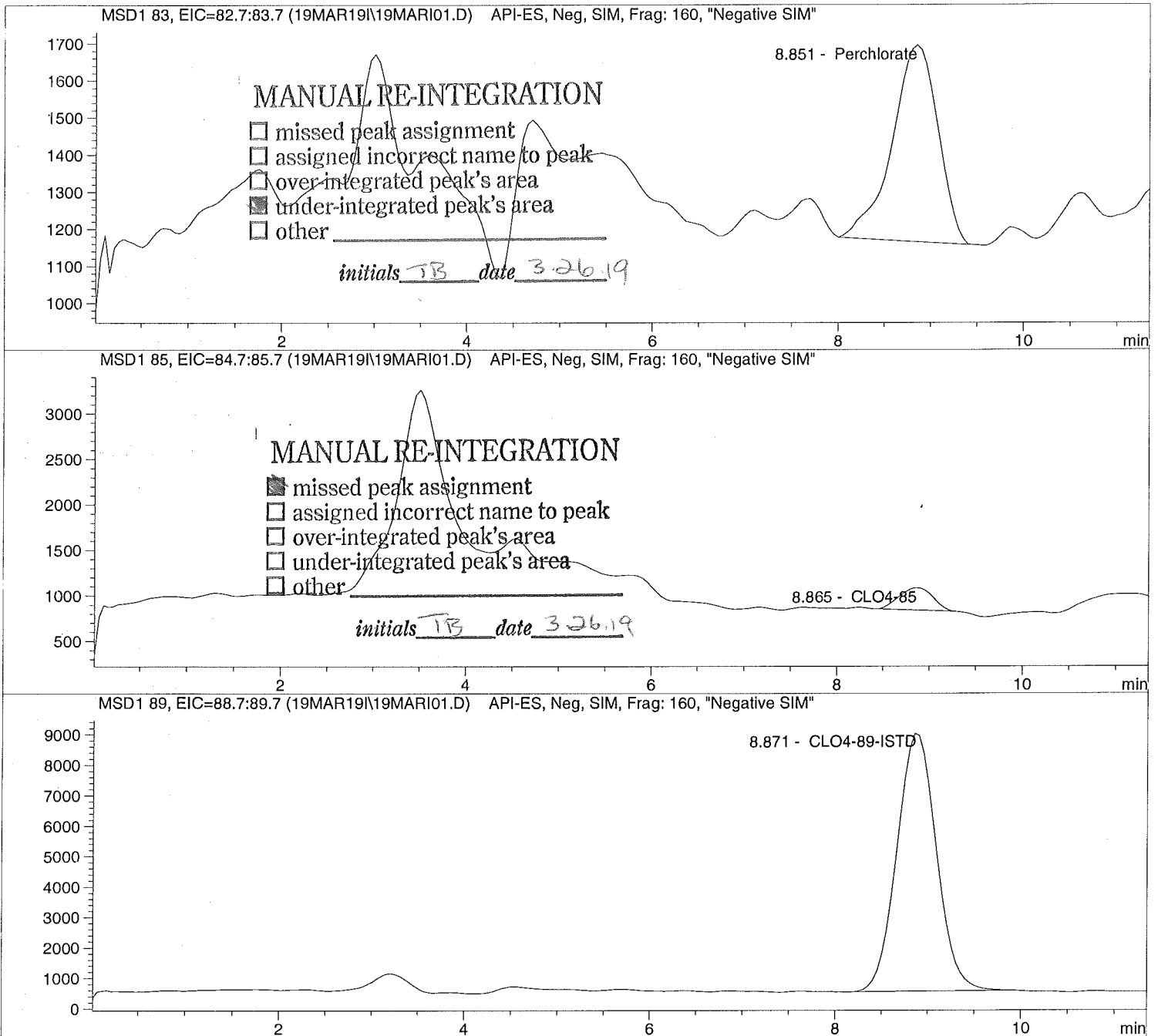
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	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 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Injection Date: 3/19/2019 09:13:09
Sample Name: CLO4@ 0.2ug/L
Acq Operator: TNB

Seq Line: 1
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 09:13:09 Seq Line: 1
Sample Name: CLO4@ 0.2ug/L 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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 03:02:18 pm
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.200

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.851	MM	18145.0	0.2572	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.865	MM	6104.1	0.2091	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.871	PBA	249685.7	5.0000	CLO4-89-ISTD

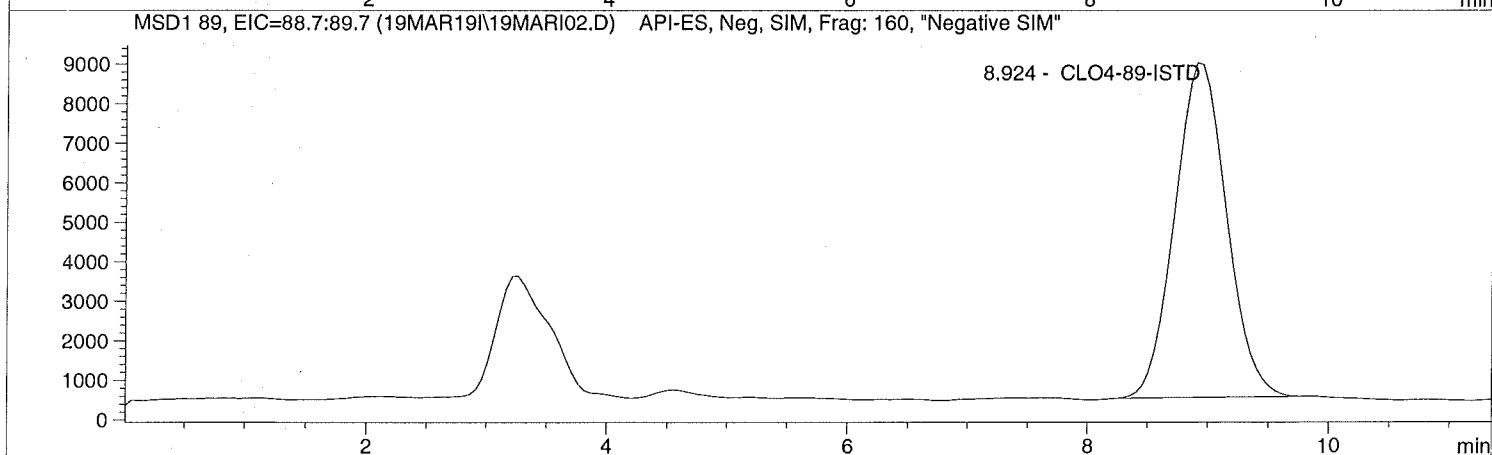
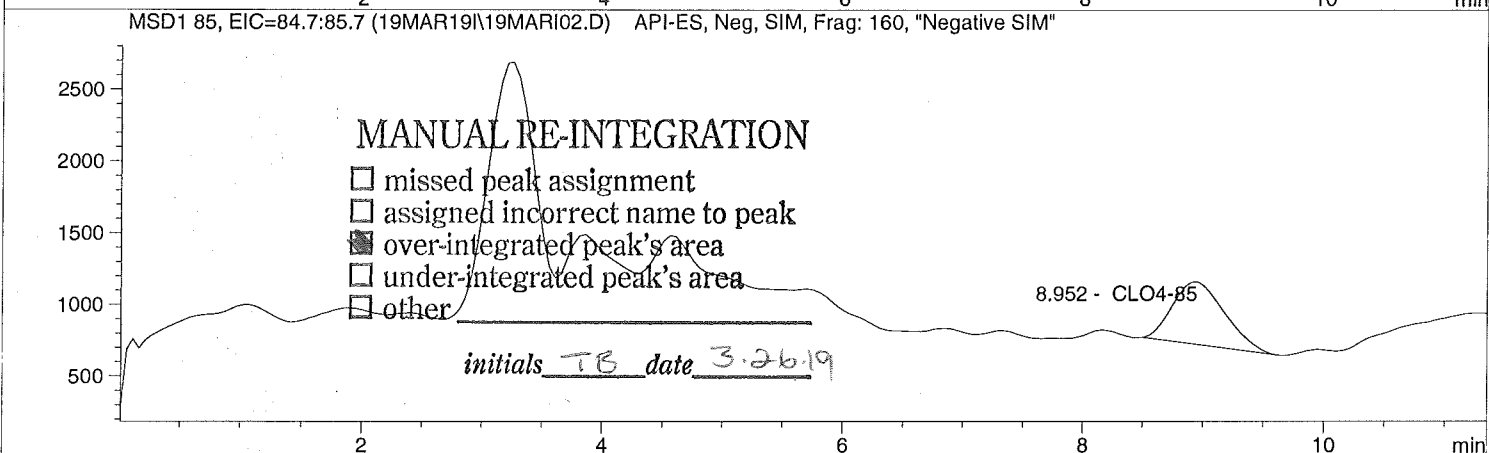
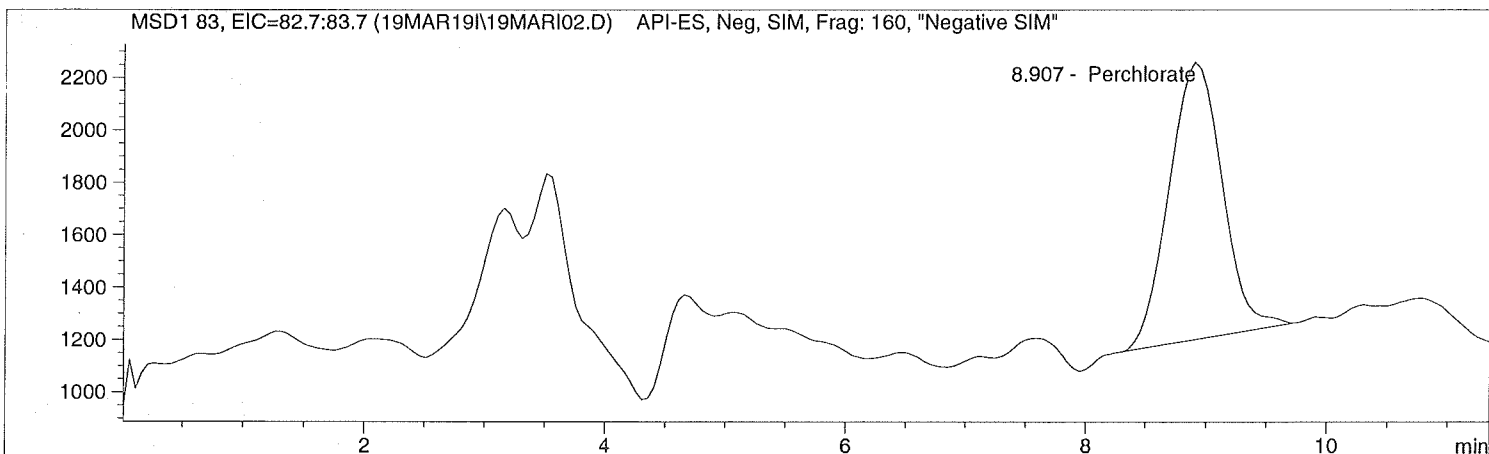
*** End of Report ***

Injection Date: 3/19/2019 09:26:25
Sample Name: CLO4@ 0.5ug/L
Acq Operator: TNB

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 09:26:25 Seq Line: 2
Sample Name: CLO4@ 0.5ug/L 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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 pm
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.500

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.907	PBA	32197.2	0.4374	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.952	MM	13066.3	0.5081	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.924	PBA	251653.1	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 09:39:40

Seq Line: 3

Sample Name: CLO4@ 1.0ug/L

Location: Vial 73

Acq Operator: TNB

Inj. No.: 1

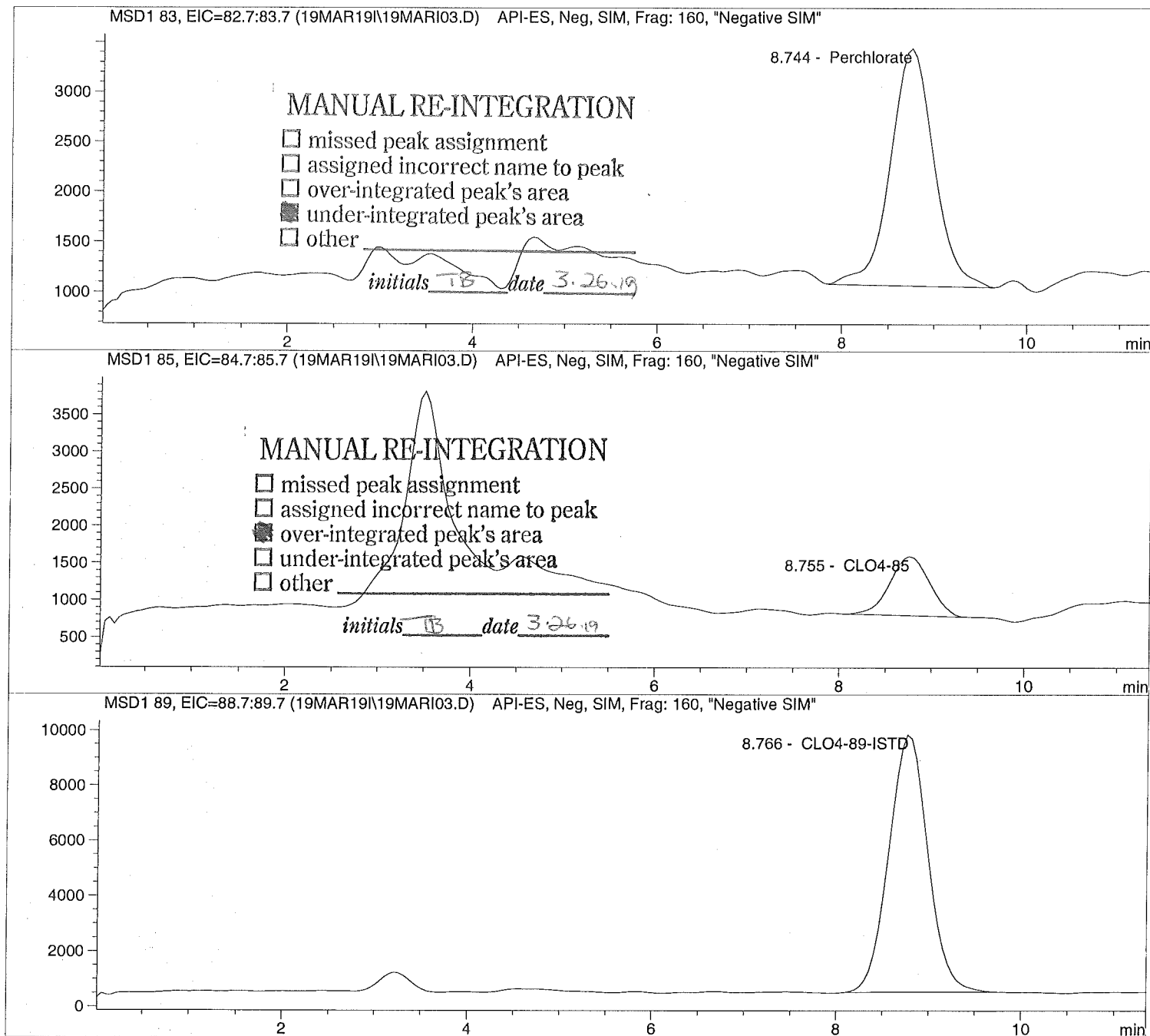
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M

Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 09:39:40 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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 03:02:18 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
8.744	MM	77626.3	0.9455	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	MM	23691.1	0.8862	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

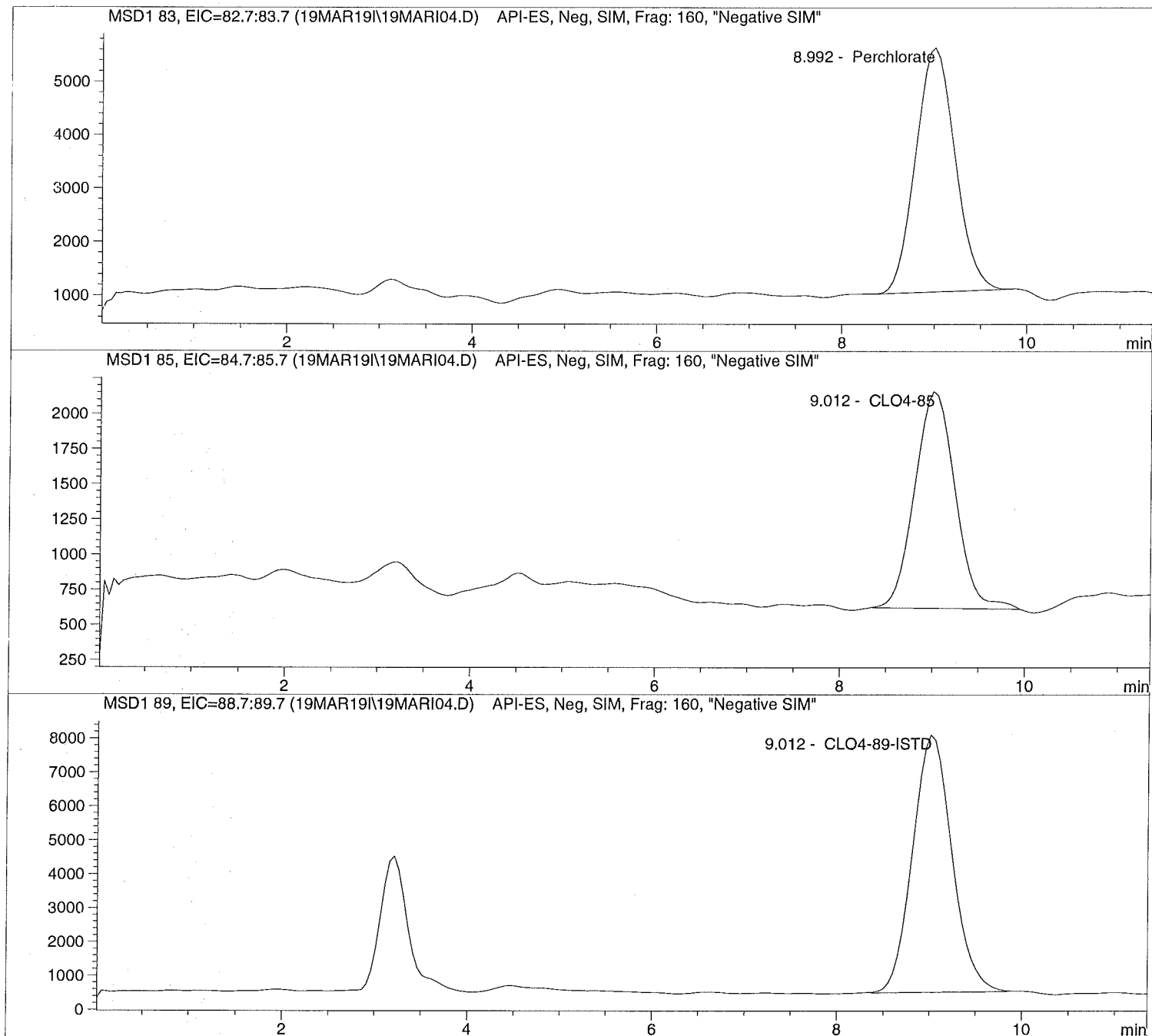
*** End of Report ***

Injection Date: 3/19/2019 09:53:00
Sample Name: CLO4@ 2.0ug/L
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 09:53:00 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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.992	BBA	135272.8	1.9741	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2071	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

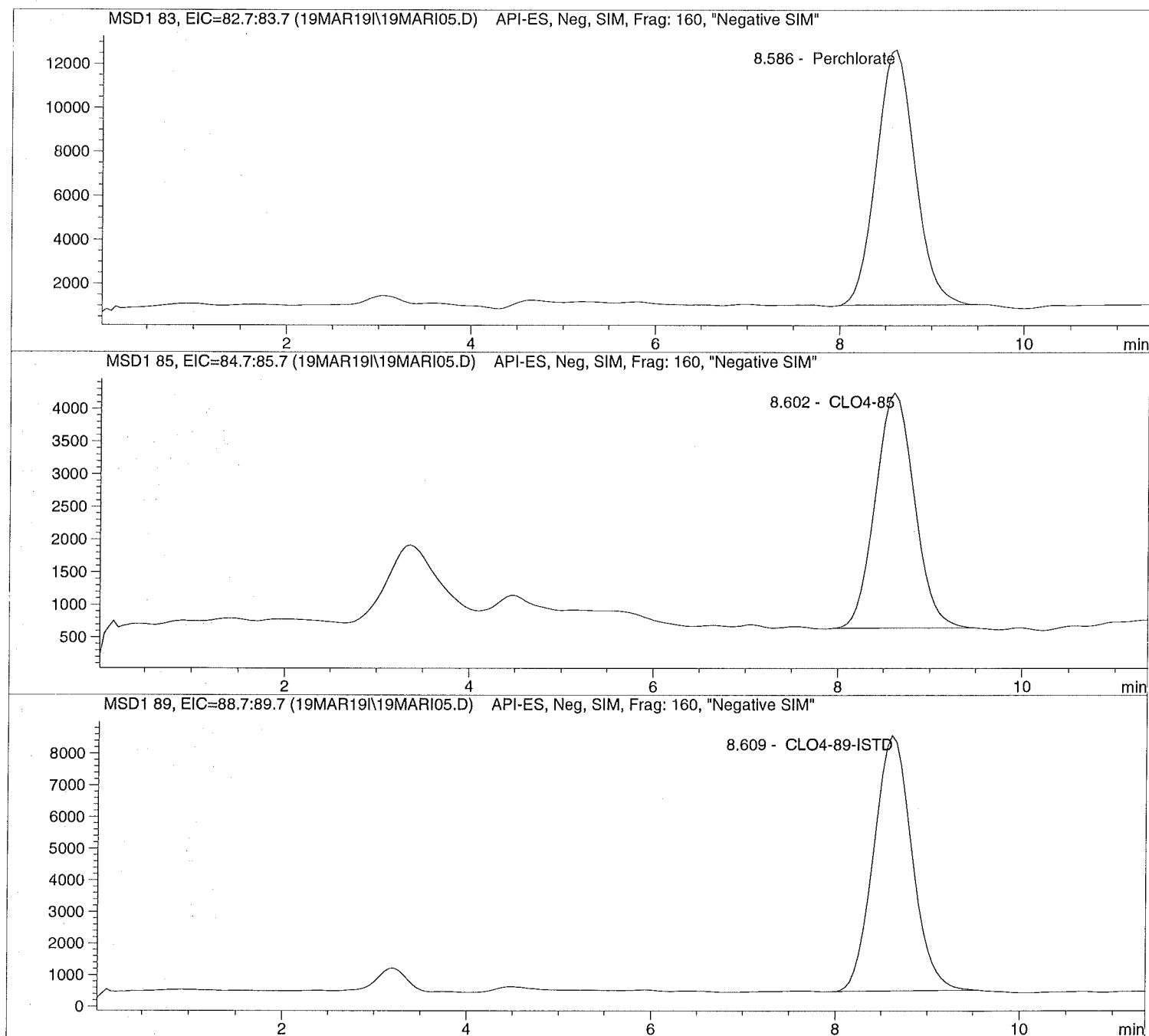
*** End of Report ***

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 10:06:16 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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.586	PBA	337763.6	4.6923	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8487	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

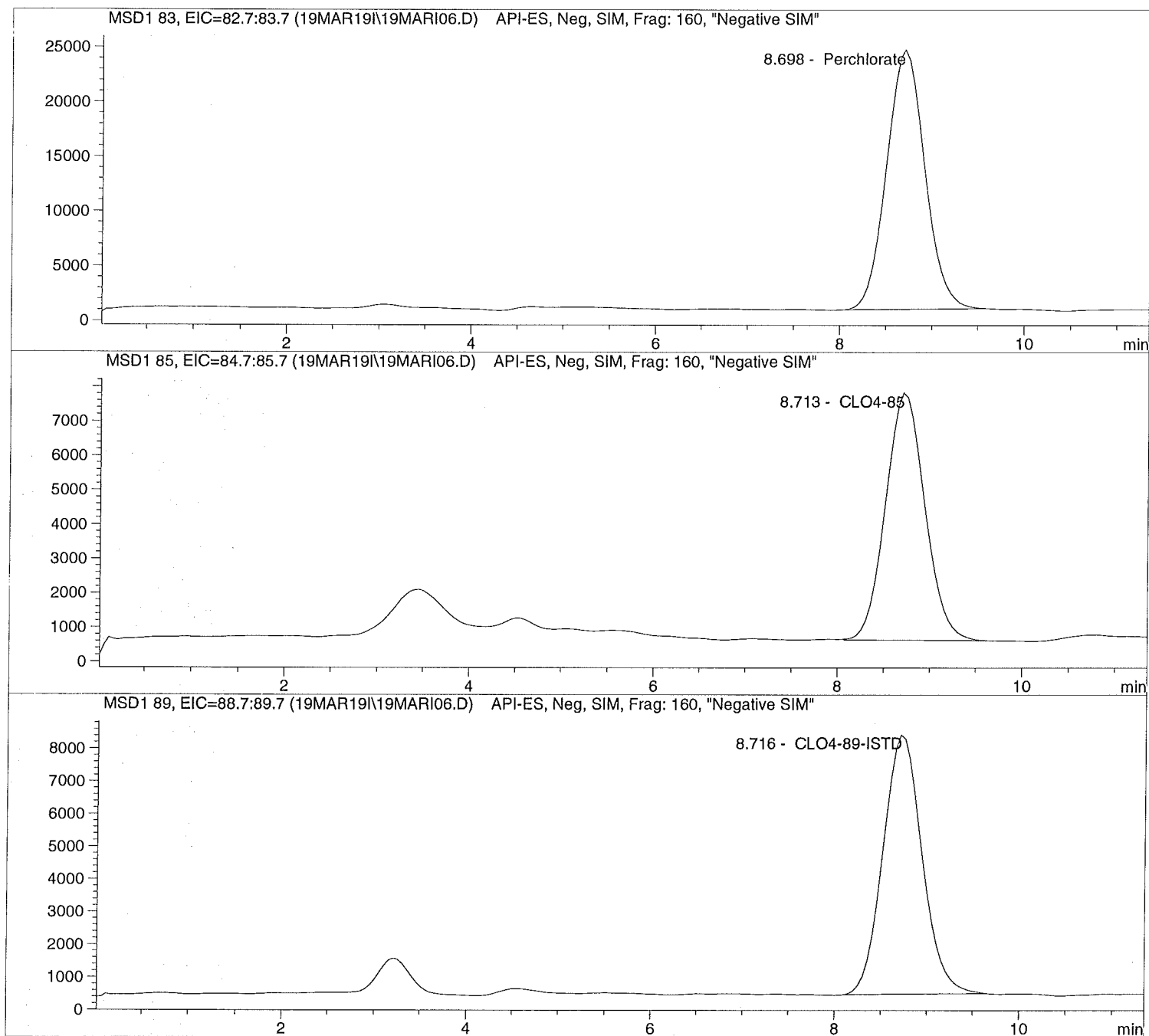
*** End of Report ***

Injection Date: 3/19/2019 10:19:32
Sample Name: CLO4@ 10.ug/L
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 10:19:32 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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.698	PBA	683454.4	9.3125	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6528	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

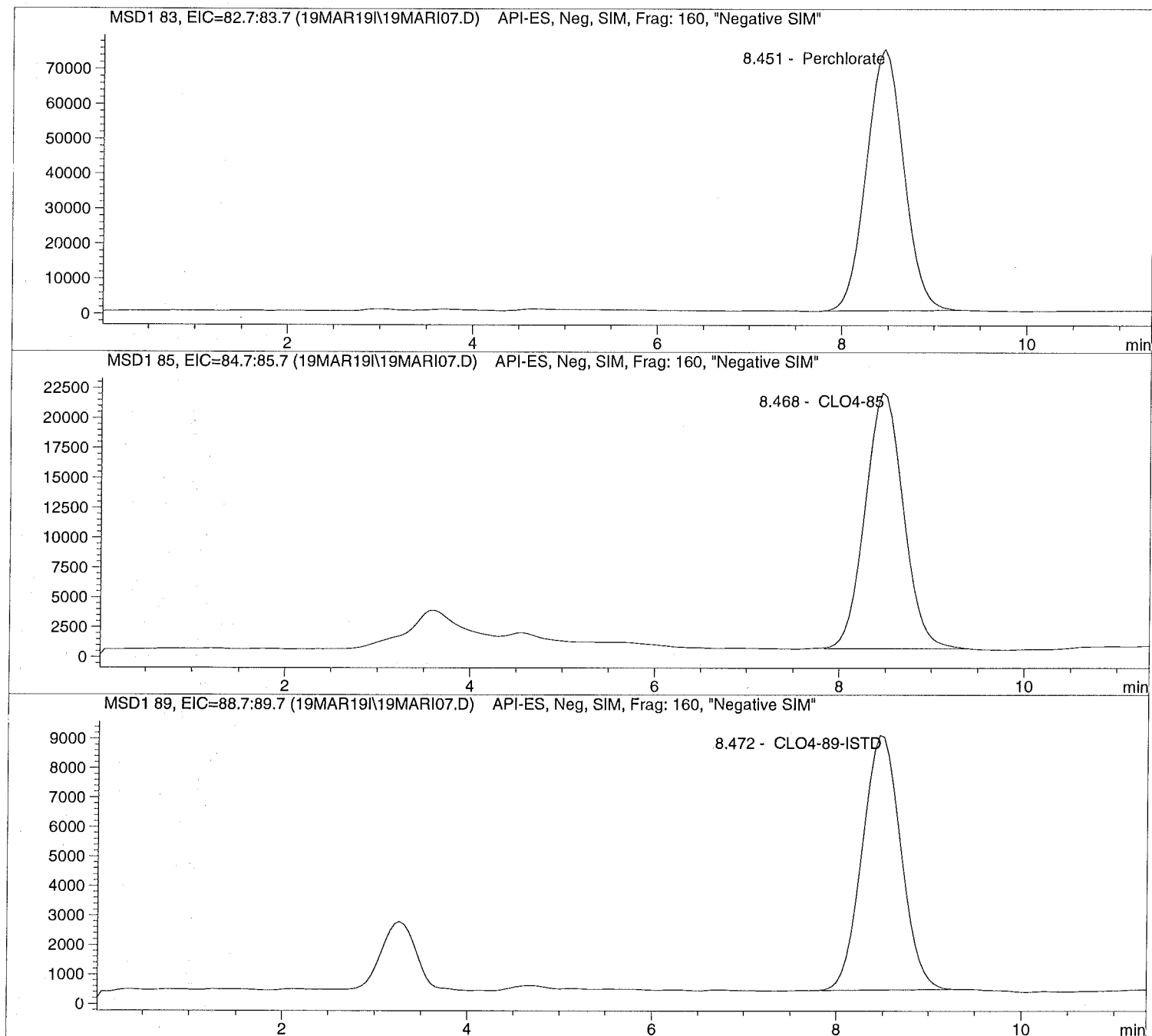
*** End of Report ***

Injection Date: 3/19/2019 10:32:49
Sample Name: CLO4@ 25.ug/L
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 10:32:49 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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.451	PBA	2084327.4	25.4851	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.468	BBA	614294.8	25.1845	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

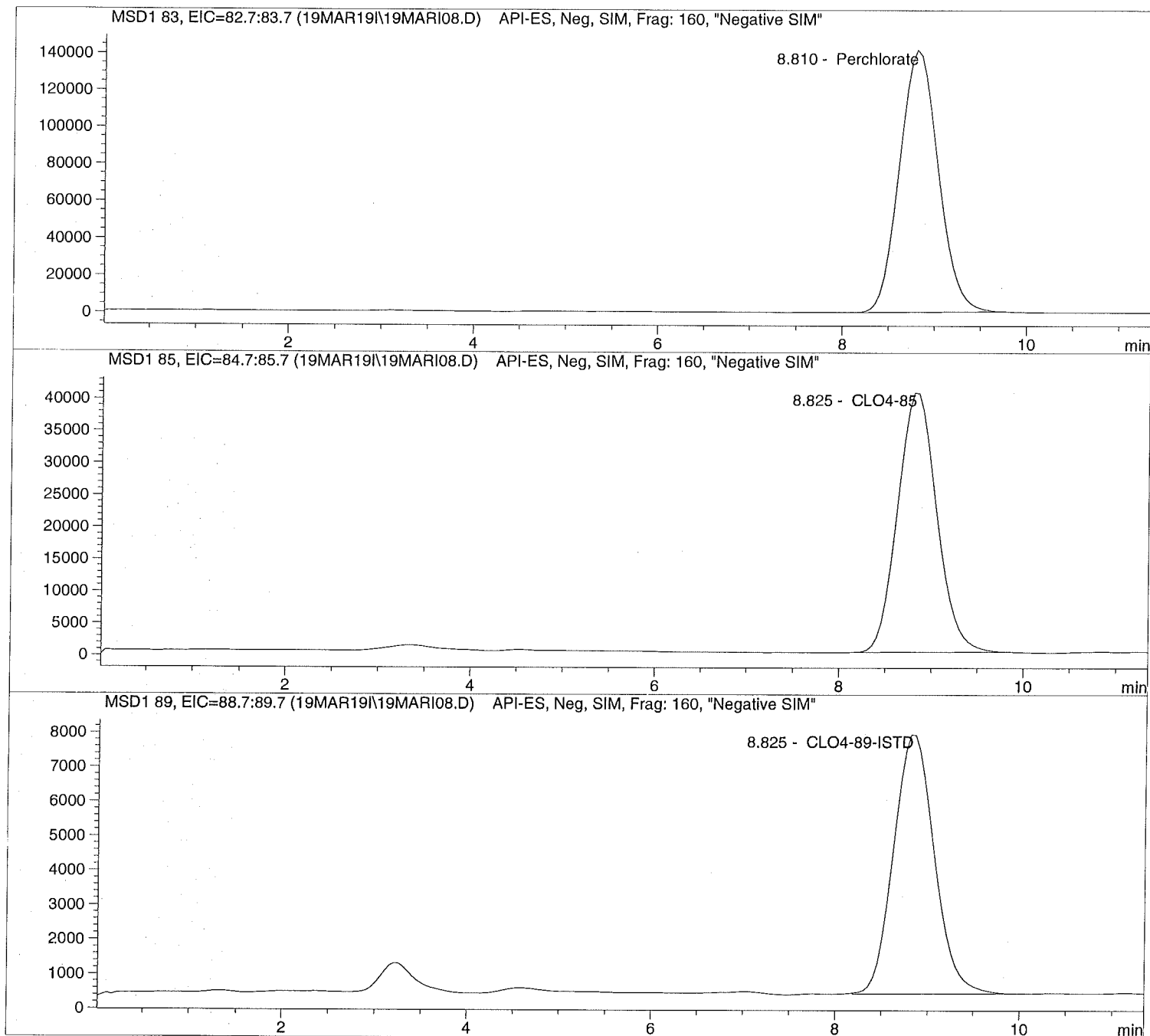
*** End of Report ***

Injection Date: 3/19/2019 10:46:05
Sample Name: CLO4@ 50.ug/L
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 10:46:05 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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.810	PBA	4133340.3	51.5149	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.5194	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

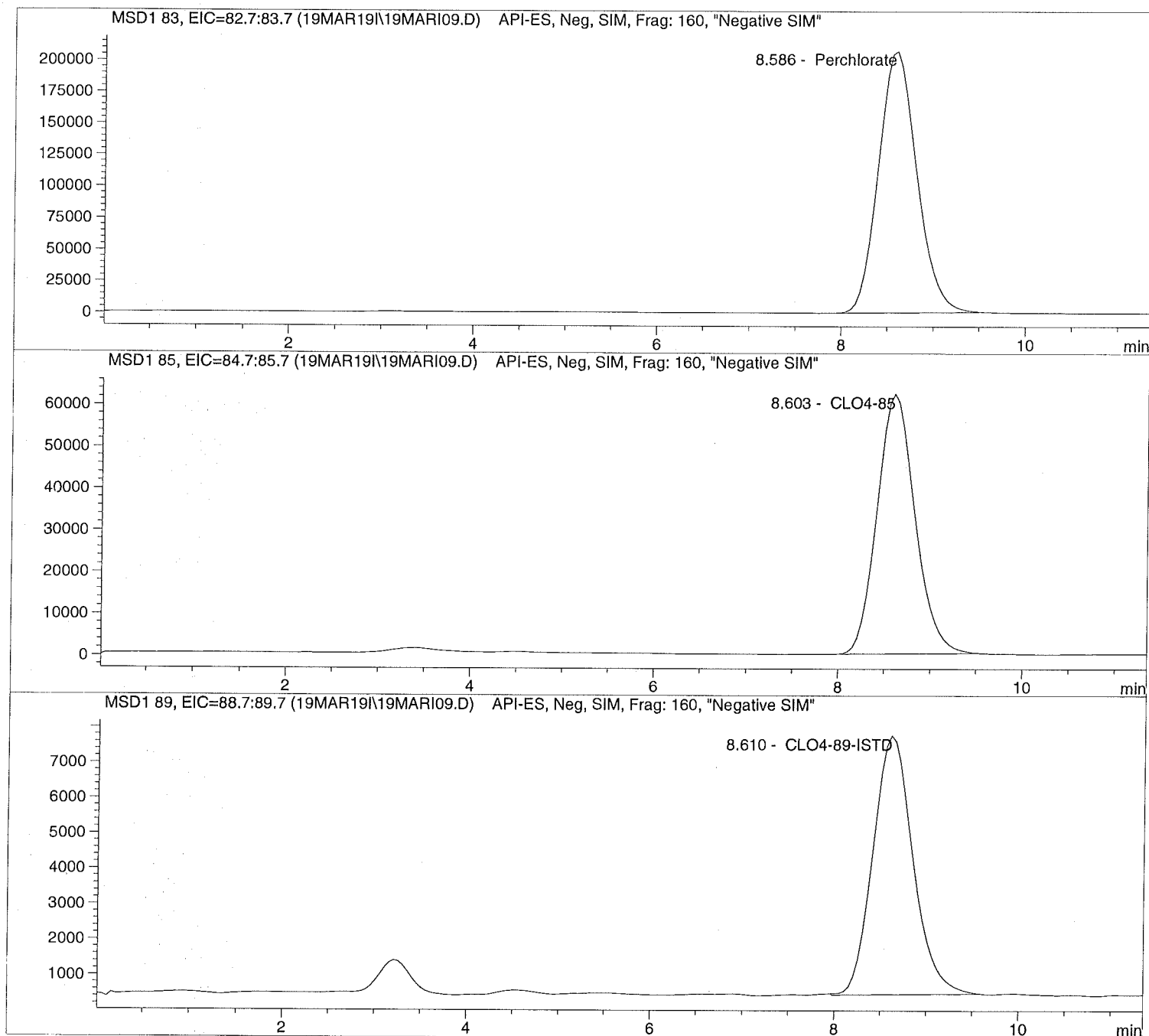
*** End of Report ***

Injection Date: 3/19/2019 10:59:22
Sample Name: CLO4@ 75.ug/L
Acq Operator: TNB

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 10:59:22 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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 03:02:18 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
8.586	PBA	5993128.0	74.0343	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.6728	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221508.9	5.0000	CLO4-89-ISTD

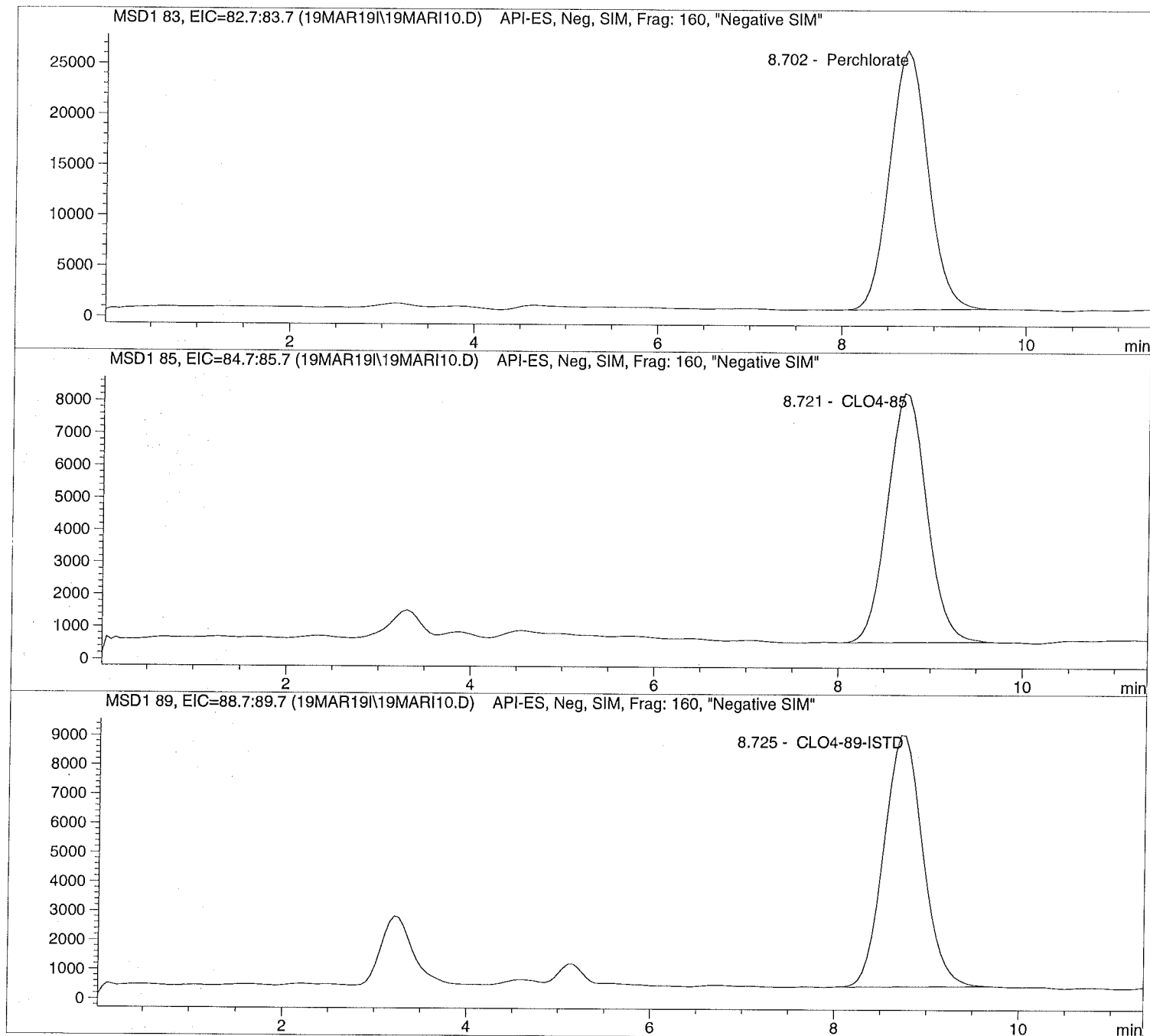
*** End of Report ***

Injection Date: 3/19/2019 11:12:42
Sample Name: ICAL Verf@10ug/L
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 11:12:42 Seq Line: 10
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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.702	PBA	734718.7	9.2944	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5493	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

*** End of Report ***



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

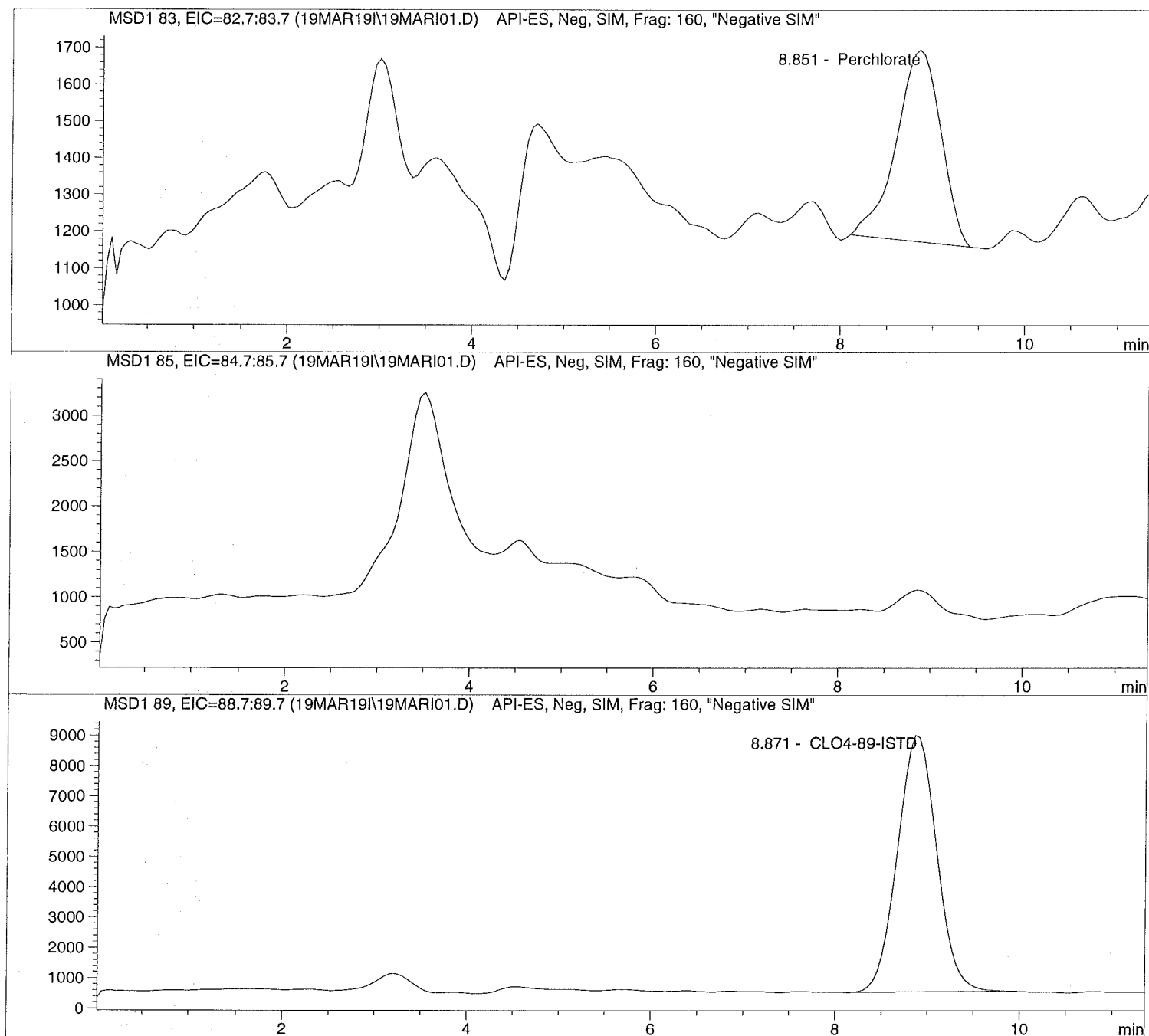
Unmodified

Injection Date: 3/19/2019 09:13:09
Sample Name: CLO4@ 0.2ug/L
Acq Operator: TNB

Seq Line: 1
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 09:13:09 Seq Line: 1
Sample Name: CLO4@ 0.2ug/L 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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 pm
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.200

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.851	PBA	17375.8	0.2471	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
8.871	PBA	249685.7	5.0000	CLO4-89-ISTD

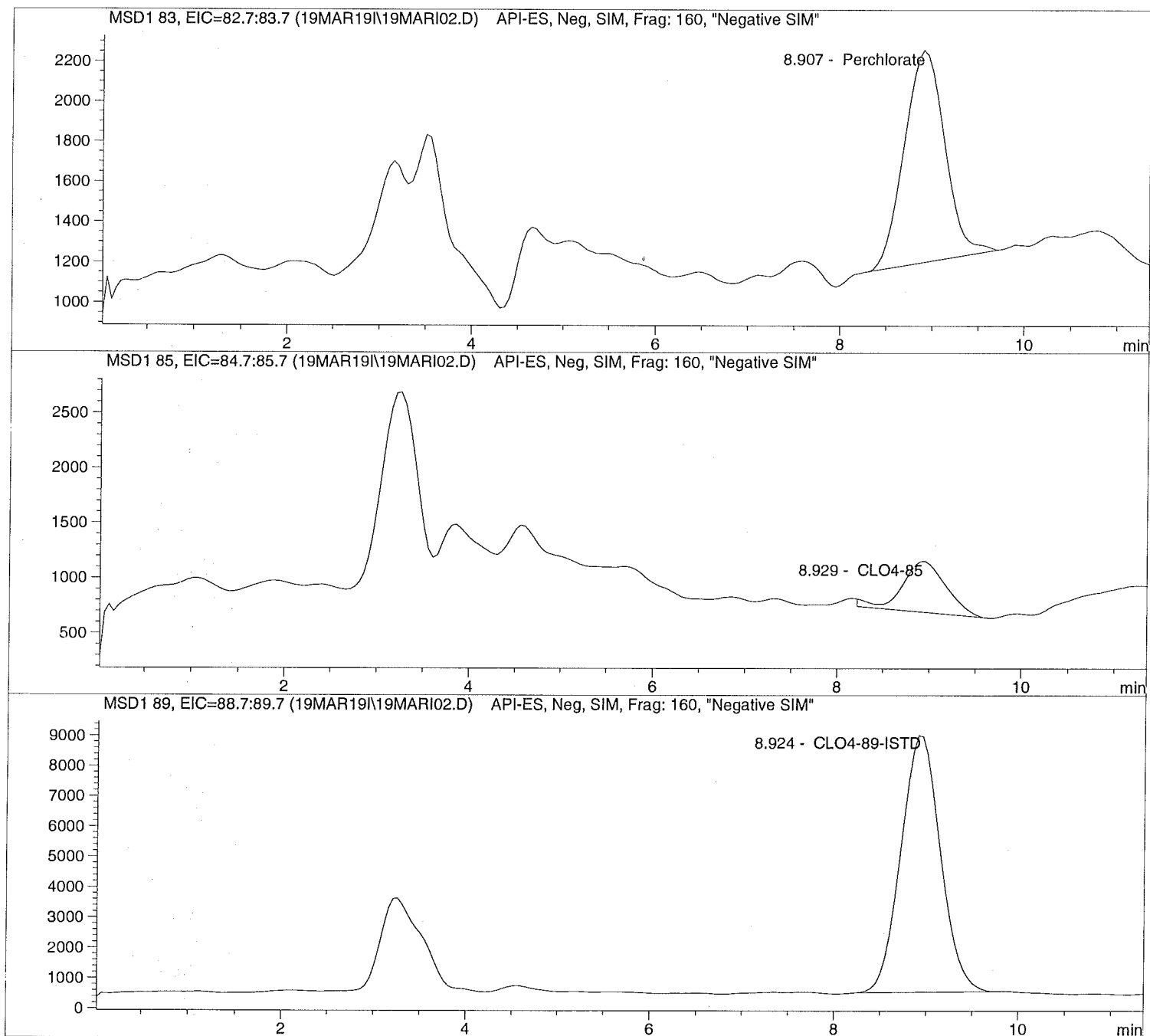
*** End of Report ***

Injection Date: 3/19/2019 09:26:25
Sample Name: CLO4@ 0.5ug/L
Acq Operator: TNB

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 09:26:25 Seq Line: 2
Sample Name: CLO4@ 0.5ug/L 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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 pm
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.500

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.907	PBA	32197.2	0.4374	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.929	BBA	15150.0	0.5981	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.924	PBA	251653.1	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 09:39:40

Seq Line: 3

Sample Name: CLO4@ 1.0ug/L

Location: Vial 73

Acq Operator: TNB

Inj. No.: 1

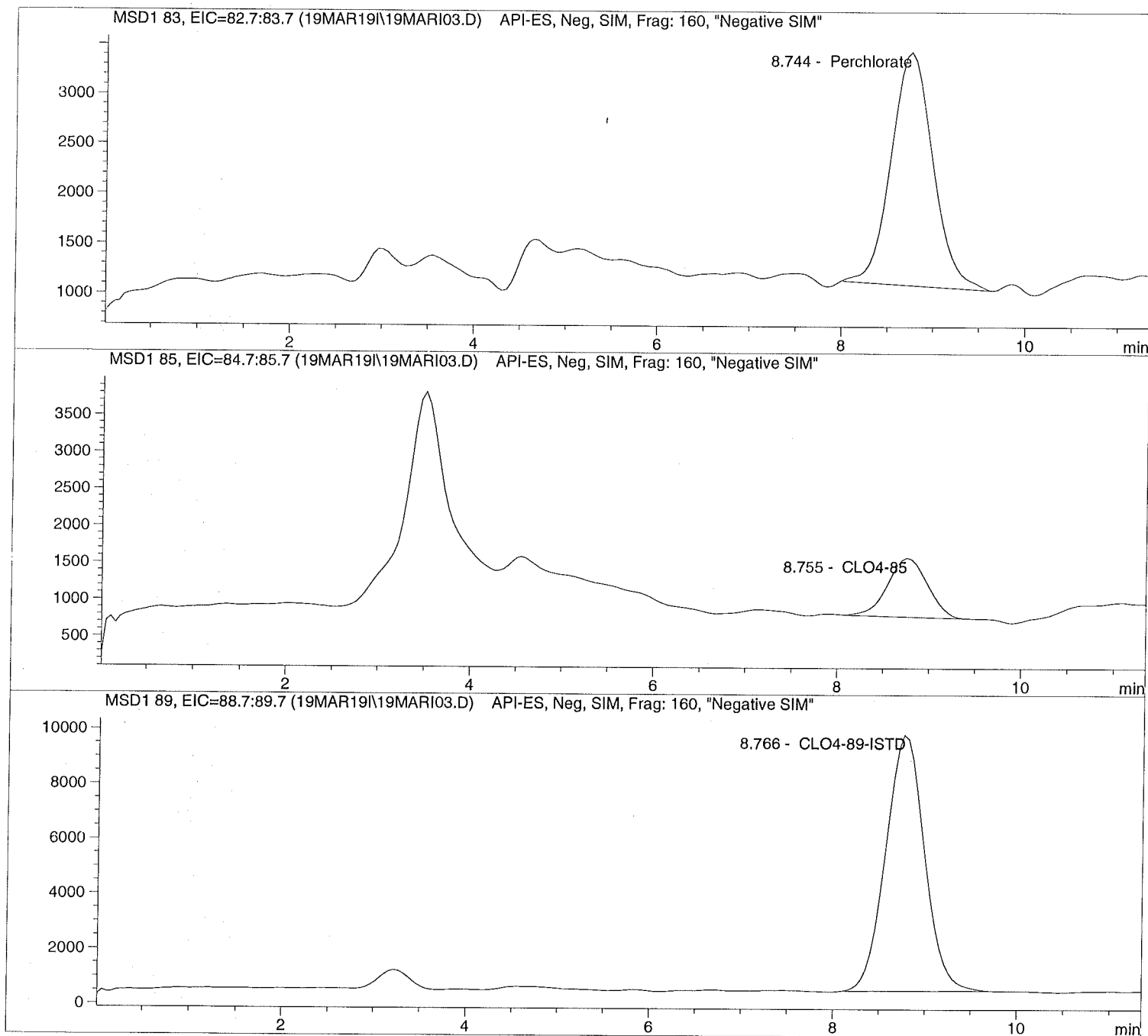
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-PR2.M

Last Changed: 3/19/2019 15:02:22

Perchlorate analysis



Injection Date: 3/19/2019 09:39:40 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-PR2.M
Last Changed: 3/19/2019 15:02:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,03:02:18 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
8.744	BBA	74166.4	0.9044	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	BBA	24138.1	0.9039	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

*** End of Report ***

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
Work Order: HS19041158

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19041158-01	LH18/24-SP650_041719	Water		17-Apr-2019 14:00	18-Apr-2019 09:33	<input type="checkbox"/>
HS19041158-02	Trip Blank	Water	ALS 022719-23	17-Apr-2019 00:00	18-Apr-2019 09:33	<input type="checkbox"/>

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
Work Order: HS19041158

CASE NARRATIVE

GCMS Volatiles by Method SW8260**Batch ID: R337183****Sample ID: LH18/24-SP650_041719(HS19041158-01MS)**

- MS/MSD failed QC limits for some compounds

WetChemistry by Method SW9056**Batch ID: R337759****Sample ID: HS19041343-10MS**

- MS and MSD are for an unrelated sample (Chloride)
-

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples
 Sample ID: LH18/24-SP650_041719
 Collection Date: 17-Apr-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19041158
 Lab ID:HS19041158-01
 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	23-Apr-2019 17:28
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:28
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	23-Apr-2019 17:28
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	23-Apr-2019 17:28
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:28
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	23-Apr-2019 17:28
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	23-Apr-2019 17:28
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	23-Apr-2019 17:28
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28

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

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples
 Sample ID: LH18/24-SP650_041719
 Collection Date: 17-Apr-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19041158
 Lab ID:HS19041158-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		Method:SW8260						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	23-Apr-2019 17:28
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	23-Apr-2019 17:28
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	23-Apr-2019 17:28
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:28
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Styrene	37		0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Toluene	1.8		0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:28
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:28
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>89.3</i>			0	<i>81-118</i>	%REC	1	23-Apr-2019 17:28
<i>Surr: 4-Bromofluorobenzene</i>	<i>101</i>			0	<i>85-114</i>	%REC	1	23-Apr-2019 17:28
<i>Surr: Dibromofluoromethane</i>	<i>89.8</i>			0	<i>80-119</i>	%REC	1	23-Apr-2019 17:28
<i>Surr: Toluene-d8</i>	<i>98.7</i>			0	<i>89-112</i>	%REC	1	23-Apr-2019 17:28
ANIONS BY SW9056A		Method:SW9056						Analyst: AJH
Chloride	344		2.00	5.00	5.00	mg/L	10	01-May-2019 22:31
Sulfate	25.6		2.00	5.00	5.00	mg/L	10	01-May-2019 22:31

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

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples
 Sample ID: Trip Blank
 Collection Date: 17-Apr-2019 00:00

ANALYTICAL REPORT

WorkOrder:HS19041158
 Lab ID:HS19041158-02
 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	23-Apr-2019 17:04
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:04
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	23-Apr-2019 17:04
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	23-Apr-2019 17:04
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:04
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	23-Apr-2019 17:04
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	23-Apr-2019 17:04
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	23-Apr-2019 17:04
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04

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

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
 Project: Longhorn GW Treatment Plant Bi-Weekly Samples
 Sample ID: Trip Blank
 Collection Date: 17-Apr-2019 00:00

ANALYTICAL REPORT

WorkOrder:HS19041158
 Lab ID:HS19041158-02
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD		Method:SW8260						Analyst: PC
8260C								
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	23-Apr-2019 17:04
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	23-Apr-2019 17:04
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	23-Apr-2019 17:04
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-Apr-2019 17:04
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-Apr-2019 17:04
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	23-Apr-2019 17:04
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>91.0</i>			0	<i>81-118</i>	%REC	<i>1</i>	<i>23-Apr-2019 17:04</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>102</i>			0	<i>85-114</i>	%REC	<i>1</i>	<i>23-Apr-2019 17:04</i>
<i>Surr: Dibromofluoromethane</i>	<i>90.8</i>			0	<i>80-119</i>	%REC	<i>1</i>	<i>23-Apr-2019 17:04</i>
<i>Surr: Toluene-d8</i>	<i>100</i>			0	<i>89-112</i>	%REC	<i>1</i>	<i>23-Apr-2019 17:04</i>

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

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19041158

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R337183	Test Name : VOLATILES ORGANICS BY METHOD 8260C			Matrix: Water		
HS19041158-01	LH18/24-SP650_041719	17 Apr 2019 14:00			23 Apr 2019 17:28	1
HS19041158-02	Trip Blank	17 Apr 2019 00:00			23 Apr 2019 17:04	1
Batch ID R337759	Test Name : ANIONS BY SW9056A			Matrix: Water		
HS19041158-01	LH18/24-SP650_041719	17 Apr 2019 14:00			01 May 2019 22:31	10

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19041158

QC BATCH REPORT

Batch ID: R337183 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MBLK	Sample ID: VBLKW-190423	Units: UG/L		Analysis Date: 23-Apr-2019 16:40					
Client ID:	Run ID: VOA6_337183		SeqNo: 5047952		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	0.50	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	0.50	1.0							U
1,1,2-Trichloroethane	0.50	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	0.50	1.0							U
1,2,3-Trichlorobenzene	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
Bromomethane	0.50	1.0							U

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19041158

QC BATCH REPORT

Batch ID: R337183 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MBLK	Sample ID: VBLKW-190423	Units: UG/L		Analysis Date: 23-Apr-2019 16:40					
Client ID:	Run ID: VOA6_337183	SeqNo: 5047952		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	1.0	2.0							U
Carbon tetrachloride	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	44.67	1.0	50	0	89.3	81 - 118			
Surr: 4-Bromofluorobenzene	50.24	1.0	50	0	100	85 - 114			
Surr: Dibromofluoromethane	45.25	1.0	50	0	90.5	80 - 119			
Surr: Toluene-d8	49.72	1.0	50	0	99.4	89 - 112			

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19041158

QC BATCH REPORT

Batch ID: R337183 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-190423		Units: UG/L		Analysis Date: 23-Apr-2019 15:28			
Client ID:		Run ID: VOA6_337183		SeqNo: 5047951		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	19.6	1.0	20	0	98.0	78 - 124			
1,1,1-Trichloroethane	19.32	1.0	20	0	96.6	74 - 131			
1,1,2,2-Tetrachloroethane	19.79	1.0	20	0	99.0	71 - 121			
1,1,2-Trichloroethane	19.46	1.0	20	0	97.3	80 - 119			
1,1-Dichloroethane	18.81	1.0	20	0	94.1	77 - 125			
1,1-Dichloroethene	18.52	1.0	20	0	92.6	71 - 131			
1,1-Dichloropropene	17.94	1.0	20	0	89.7	78 - 125			
1,2,3-Trichlorobenzene	25.05	1.0	20	0	125	69 - 129			
1,2,3-Trichloropropane	19.74	1.0	20	0	98.7	73 - 122			
1,2,4-Trichlorobenzene	21.01	1.0	20	0	105	69 - 130			
1,2,4-Trimethylbenzene	19.48	1.0	20	0	97.4	76 - 124			
1,2-Dibromo-3-chloropropane	20.8	1.0	20	0	104	62 - 128			
1,2-Dibromoethane	19.73	1.0	20	0	98.6	77 - 121			
1,2-Dichlorobenzene	19.84	1.0	20	0	99.2	80 - 119			
1,2-Dichloroethane	18.8	1.0	20	0	94.0	73 - 128			
1,2-Dichloropropane	19.84	1.0	20	0	99.2	78 - 122			
1,3,5-Trimethylbenzene	19.11	1.0	20	0	95.5	75 - 124			
1,3-Dichlorobenzene	19.41	1.0	20	0	97.0	80 - 119			
1,3-Dichloropropane	18.99	1.0	20	0	94.9	80 - 119			
1,4-Dichlorobenzene	19.08	1.0	20	0	95.4	79 - 118			
2,2-Dichloropropane	19.1	1.0	20	0	95.5	60 - 139			
2-Butanone	40.32	2.0	40	0	101	56 - 143			
2-Chlorotoluene	18.71	1.0	20	0	93.6	79 - 122			
2-Hexanone	39.02	2.0	40	0	97.6	57 - 139			
4-Chlorotoluene	19.05	1.0	20	0	95.3	78 - 122			
4-Isopropyltoluene	18.85	1.0	20	0	94.3	77 - 127			
4-Methyl-2-pentanone	38.62	2.0	40	0	96.5	67 - 130			
Acetone	43.91	2.0	40	0	110	39 - 160			
Benzene	18.93	1.0	20	0	94.6	79 - 120			
Bromobenzene	19.7	1.0	20	0	98.5	80 - 120			
Bromochloromethane	18.9	1.0	20	0	94.5	78 - 123			
Bromodichloromethane	18.92	1.0	20	0	94.6	79 - 125			
Bromoform	20.47	1.0	20	0	102	66 - 130			
Bromomethane	23.1	1.0	20	0	115	53 - 141			

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19041158

QC BATCH REPORT

Batch ID: R337183 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-190423		Units: UG/L		Analysis Date: 23-Apr-2019 15:28			
Client ID:		Run ID: VOA6_337183		SeqNo: 5047951		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	37.54	2.0	40	0	93.8	64 - 133			
Carbon tetrachloride	19.36	1.0	20	0	96.8	72 - 136			
Chlorobenzene	19.21	1.0	20	0	96.0	82 - 118			
Chloroethane	18.81	1.0	20	0	94.1	60 - 138			
Chloroform	19.26	1.0	20	0	96.3	79 - 124			
Chloromethane	18.04	1.0	20	0	90.2	50 - 139			
cis-1,2-Dichloroethene	19.49	1.0	20	0	97.4	78 - 123			
cis-1,3-Dichloropropene	19.21	1.0	20	0	96.0	75 - 124			
Dibromochloromethane	18.77	1.0	20	0	93.9	74 - 126			
Dibromomethane	19.04	1.0	20	0	95.2	79 - 123			
Dichlorodifluoromethane	18.76	1.0	20	0	93.8	32 - 152			
Ethylbenzene	18.7	1.0	20	0	93.5	79 - 121			
Hexachlorobutadiene	24.29	1.0	20	0	121	66 - 134			
Isopropylbenzene	18.7	1.0	20	0	93.5	72 - 131			
m,p-Xylene	37.96	2.0	40	0	94.9	80 - 121			
Methylene chloride	19.62	2.0	20	0	98.1	74 - 124			
Naphthalene	23.81	1.0	20	0	119	61 - 128			
n-Butylbenzene	18.7	1.0	20	0	93.5	75 - 128			
n-Propylbenzene	18.61	1.0	20	0	93.1	76 - 126			
o-Xylene	19.14	1.0	20	0	95.7	78 - 122			
sec-Butylbenzene	18.76	1.0	20	0	93.8	77 - 126			
Styrene	19.17	1.0	20	0	95.9	78 - 123			
tert-Butylbenzene	18.98	1.0	20	0	94.9	78 - 124			
Tetrachloroethene	19.22	1.0	20	0	96.1	74 - 129			
Toluene	18.92	1.0	20	0	94.6	80 - 121			
trans-1,2-Dichloroethene	19.15	1.0	20	0	95.8	75 - 124			
trans-1,3-Dichloropropene	19.27	1.0	20	0	96.3	73 - 127			
Trichloroethene	19.21	1.0	20	0	96.0	79 - 123			
Trichlorofluoromethane	18.64	1.0	20	0	93.2	65 - 141			
Vinyl chloride	17.68	1.0	20	0	88.4	58 - 137			
Surr: 1,2-Dichloroethane-d4	52.54	1.0	50	0	105	81 - 118			
Surr: 4-Bromofluorobenzene	51.58	1.0	50	0	103	85 - 114			
Surr: Dibromofluoromethane	52.26	1.0	50	0	105	80 - 119			
Surr: Toluene-d8	47.14	1.0	50	0	94.3	89 - 112			

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19041158

QC BATCH REPORT

Batch ID: R337183 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS19041158-01MS		Units: UG/L		Analysis Date: 23-Apr-2019 20:19			
Client ID: LH18/24-SP650_041719		Run ID: VOA6_337183		SeqNo: 5047959		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	16.8	1.0	20	0	84.0	78 - 124			
1,1,1-Trichloroethane	15.9	1.0	20	0	79.5	74 - 131			
1,1,2,2-Tetrachloroethane	15.87	1.0	20	0	79.4	71 - 121			
1,1,2-Trichloroethane	16.15	1.0	20	0	80.7	80 - 119			
1,1-Dichloroethane	14.78	1.0	20	0	73.9	77 - 125			S
1,1-Dichloroethene	16.04	1.0	20	0	80.2	71 - 131			
1,1-Dichloropropene	16.55	1.0	20	0	82.7	78 - 125			
1,2,3-Trichlorobenzene	16.53	1.0	20	0	82.6	69 - 129			
1,2,3-Trichloropropane	15.77	1.0	20	0	78.8	73 - 122			
1,2,4-Trichlorobenzene	15.15	1.0	20	0	75.8	69 - 130			
1,2,4-Trimethylbenzene	17.23	1.0	20	0	86.2	76 - 124			
1,2-Dibromo-3-chloropropane	15.18	1.0	20	0	75.9	62 - 128			
1,2-Dibromoethane	16.33	1.0	20	0	81.7	77 - 121			
1,2-Dichlorobenzene	16.47	1.0	20	0	82.4	80 - 119			
1,2-Dichloroethane	15.47	1.0	20	0	77.3	73 - 128			
1,2-Dichloropropane	16.49	1.0	20	0	82.4	78 - 122			
1,3,5-Trimethylbenzene	17.56	1.0	20	0	87.8	75 - 124			
1,3-Dichlorobenzene	16.62	1.0	20	0	83.1	80 - 119			
1,3-Dichloropropane	15.94	1.0	20	0	79.7	80 - 119			S
1,4-Dichlorobenzene	16.34	1.0	20	0	81.7	79 - 118			
2,2-Dichloropropane	15.62	1.0	20	0	78.1	60 - 139			
2-Butanone	32.01	2.0	40	0	80.0	56 - 143			
2-Chlorotoluene	16.62	1.0	20	0	83.1	79 - 122			
2-Hexanone	31.32	2.0	40	0	78.3	57 - 139			
4-Chlorotoluene	16.8	1.0	20	0	84.0	78 - 122			
4-Isopropyltoluene	17.97	1.0	20	0	89.8	77 - 127			
4-Methyl-2-pentanone	32	2.0	40	0	80.0	67 - 130			
Acetone	30.43	2.0	40	0	76.1	39 - 160			
Benzene	16	1.0	20	0	80.0	79 - 120			
Bromobenzene	16.58	1.0	20	0	82.9	80 - 120			
Bromochloromethane	14.63	1.0	20	0	73.1	78 - 123			S
Bromodichloromethane	15.48	1.0	20	0	77.4	79 - 125			S
Bromoform	16.22	1.0	20	0	81.1	66 - 130			
Bromomethane	14.45	1.0	20	0	72.2	53 - 141			

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19041158

QC BATCH REPORT

Batch ID: R337183 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS19041158-01MS		Units: UG/L		Analysis Date: 23-Apr-2019 20:19			
Client ID: LH18/24-SP650_041719		Run ID: VOA6_337183		SeqNo: 5047959		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	39.07	2.0	40	0	97.7	64 - 133			
Carbon tetrachloride	18	1.0	20	0	90.0	72 - 136			
Chlorobenzene	16.59	1.0	20	0	82.9	82 - 118			
Chloroethane	14.76	1.0	20	0	73.8	60 - 138			
Chloroform	14.95	1.0	20	0	74.8	79 - 124			S
Chloromethane	16.8	1.0	20	0	84.0	50 - 139			
cis-1,2-Dichloroethene	16.81	1.0	20	0	84.0	78 - 123			
cis-1,3-Dichloropropene	15.54	1.0	20	0	77.7	75 - 124			
Dibromochloromethane	15.74	1.0	20	0	78.7	74 - 126			
Dibromomethane	15.58	1.0	20	0	77.9	79 - 123			S
Dichlorodifluoromethane	17.46	1.0	20	0	87.3	32 - 152			
Ethylbenzene	16.87	1.0	20	0	84.3	79 - 121			
Hexachlorobutadiene	18.99	1.0	20	0	95.0	66 - 134			
Isopropylbenzene	17.59	1.0	20	0	87.9	72 - 131			
m,p-Xylene	33.71	2.0	40	0	84.3	80 - 121			
Methylene chloride	14.81	2.0	20	0	74.0	74 - 124			
Naphthalene	15.71	1.0	20	0	78.6	61 - 128			
n-Butylbenzene	17.62	1.0	20	0	88.1	75 - 128			
n-Propylbenzene	17.46	1.0	20	0	87.3	76 - 126			
o-Xylene	16.98	1.0	20	0	84.9	78 - 122			
sec-Butylbenzene	17.82	1.0	20	0	89.1	77 - 126			
Styrene	16.55	1.0	20	37.33	-104	78 - 123			S
tert-Butylbenzene	17.94	1.0	20	0	89.7	78 - 124			
Tetrachloroethene	18.23	1.0	20	0	91.2	74 - 129			
Toluene	16.88	1.0	20	1.754	75.6	80 - 121			S
trans-1,2-Dichloroethene	15.9	1.0	20	0	79.5	75 - 124			
trans-1,3-Dichloropropene	15.43	1.0	20	0	77.1	73 - 127			
Trichloroethene	17.13	1.0	20	0	85.7	79 - 123			
Trichlorofluoromethane	16.58	1.0	20	0	82.9	65 - 141			
Vinyl chloride	16.04	1.0	20	0	80.2	58 - 137			
Surr: 1,2-Dichloroethane-d4	45.1	1.0	50	0	90.2	81 - 118			
Surr: 4-Bromofluorobenzene	50.66	1.0	50	0	101	85 - 114			
Surr: Dibromofluoromethane	46.19	1.0	50	0	92.4	80 - 119			
Surr: Toluene-d8	48.87	1.0	50	0	97.7	89 - 112			

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19041158

QC BATCH REPORT

Batch ID: R337183 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS19041158-01MSD		Units: UG/L		Analysis Date: 23-Apr-2019 20:43			
Client ID: LH18/24-SP650_041719		Run ID: VOA6_337183		SeqNo: 5047960		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	16.54	1.0	20	0	82.7	78 - 124	16.8	1.6	20
1,1,1-Trichloroethane	15.14	1.0	20	0	75.7	74 - 131	15.9	4.95	20
1,1,2,2-Tetrachloroethane	17.27	1.0	20	0	86.4	71 - 121	15.87	8.44	20
1,1,2-Trichloroethane	16.32	1.0	20	0	81.6	80 - 119	16.15	1.05	20
1,1-Dichloroethane	14.12	1.0	20	0	70.6	77 - 125	14.78	4.57	20 S
1,1-Dichloroethene	14.93	1.0	20	0	74.7	71 - 131	16.04	7.14	20
1,1-Dichloropropene	15.57	1.0	20	0	77.9	78 - 125	16.55	6.06	20 S
1,2,3-Trichlorobenzene	18.28	1.0	20	0	91.4	69 - 129	16.53	10.1	20
1,2,3-Trichloropropane	16.68	1.0	20	0	83.4	73 - 122	15.77	5.59	20
1,2,4-Trichlorobenzene	16.81	1.0	20	0	84.1	69 - 130	15.15	10.4	20
1,2,4-Trimethylbenzene	18.19	1.0	20	0	90.9	76 - 124	17.23	5.4	20
1,2-Dibromo-3-chloropropane	16.62	1.0	20	0	83.1	62 - 128	15.18	9.12	20
1,2-Dibromoethane	16.49	1.0	20	0	82.4	77 - 121	16.33	0.931	20
1,2-Dichlorobenzene	17.63	1.0	20	0	88.1	80 - 119	16.47	6.76	20
1,2-Dichloroethane	15.11	1.0	20	0	75.5	73 - 128	15.47	2.34	20
1,2-Dichloropropane	15.59	1.0	20	0	78.0	78 - 122	16.49	5.58	20 S
1,3,5-Trimethylbenzene	18.4	1.0	20	0	92.0	75 - 124	17.56	4.67	20
1,3-Dichlorobenzene	17.9	1.0	20	0	89.5	80 - 119	16.62	7.45	20
1,3-Dichloropropane	15.98	1.0	20	0	79.9	80 - 119	15.94	0.252	20 S
1,4-Dichlorobenzene	17.43	1.0	20	0	87.1	79 - 118	16.34	6.43	20
2,2-Dichloropropane	14.7	1.0	20	0	73.5	60 - 139	15.62	6.09	20
2-Butanone	31.46	2.0	40	0	78.6	56 - 143	32.01	1.74	20
2-Chlorotoluene	17.61	1.0	20	0	88.1	79 - 122	16.62	5.8	20
2-Hexanone	32.63	2.0	40	0	81.6	57 - 139	31.32	4.1	20
4-Chlorotoluene	17.63	1.0	20	0	88.2	78 - 122	16.8	4.84	20
4-Isopropyltoluene	18.85	1.0	20	0	94.3	77 - 127	17.97	4.82	20
4-Methyl-2-pentanone	32.07	2.0	40	0	80.2	67 - 130	32	0.214	20
Acetone	29.99	2.0	40	0	75.0	39 - 160	30.43	1.46	20
Benzene	15.33	1.0	20	0	76.7	79 - 120	16	4.29	20 S
Bromobenzene	17.96	1.0	20	0	89.8	80 - 120	16.58	7.99	20
Bromochloromethane	13.84	1.0	20	0	69.2	78 - 123	14.63	5.53	20 S
Bromodichloromethane	15.11	1.0	20	0	75.5	79 - 125	15.48	2.44	20 S
Bromoform	16.7	1.0	20	0	83.5	66 - 130	16.22	2.92	20
Bromomethane	12.37	1.0	20	0	61.9	53 - 141	14.45	15.5	20

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19041158

QC BATCH REPORT

Batch ID: R337183 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS19041158-01MSD		Units: UG/L		Analysis Date: 23-Apr-2019 20:43			
Client ID: LH18/24-SP650_041719		Run ID: VOA6_337183		SeqNo: 5047960		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	32.63	2.0	40	0	81.6	64 - 133	39.07	18	20
Carbon tetrachloride	17.3	1.0	20	0	86.5	72 - 136	18	4	20
Chlorobenzene	16.24	1.0	20	0	81.2	82 - 118	16.59	2.13	20 S
Chloroethane	14.51	1.0	20	0	72.5	60 - 138	14.76	1.71	20
Chloroform	14.47	1.0	20	0	72.3	79 - 124	14.95	3.29	20 S
Chloromethane	18.33	1.0	20	0	91.6	50 - 139	16.8	8.69	20
cis-1,2-Dichloroethene	16.4	1.0	20	0	82.0	78 - 123	16.81	2.44	20
cis-1,3-Dichloropropene	15.19	1.0	20	0	76.0	75 - 124	15.54	2.22	20
Dibromochloromethane	16.04	1.0	20	0	80.2	74 - 126	15.74	1.88	20
Dibromomethane	15.36	1.0	20	0	76.8	79 - 123	15.58	1.43	20 S
Dichlorodifluoromethane	16.09	1.0	20	0	80.5	32 - 152	17.46	8.13	20
Ethylbenzene	16.44	1.0	20	0	82.2	79 - 121	16.87	2.58	20
Hexachlorobutadiene	21.25	1.0	20	0	106	66 - 134	18.99	11.2	20
Isopropylbenzene	17.07	1.0	20	0	85.4	72 - 131	17.59	2.97	20
m,p-Xylene	33.08	2.0	40	0	82.7	80 - 121	33.71	1.88	20
Methylene chloride	14.24	2.0	20	0	71.2	74 - 124	14.81	3.89	20 S
Naphthalene	17.46	1.0	20	0	87.3	61 - 128	15.71	10.5	20
n-Butylbenzene	18.86	1.0	20	0	94.3	75 - 128	17.62	6.77	20
n-Propylbenzene	18.27	1.0	20	0	91.3	76 - 126	17.46	4.5	20
o-Xylene	16.76	1.0	20	0	83.8	78 - 122	16.98	1.25	20
sec-Butylbenzene	18.86	1.0	20	0	94.3	77 - 126	17.82	5.71	20
Styrene	16.32	1.0	20	37.33	-105	78 - 123	16.55	1.39	20 S
tert-Butylbenzene	18.79	1.0	20	0	94.0	78 - 124	17.94	4.64	20
Tetrachloroethene	18.09	1.0	20	0	90.5	74 - 129	18.23	0.753	20
Toluene	16.76	1.0	20	1.754	75.0	80 - 121	16.88	0.681	20 S
trans-1,2-Dichloroethene	14.81	1.0	20	0	74.1	75 - 124	15.9	7.07	20 S
trans-1,3-Dichloropropene	15.1	1.0	20	0	75.5	73 - 127	15.43	2.16	20
Trichloroethene	16.34	1.0	20	0	81.7	79 - 123	17.13	4.75	20
Trichlorofluoromethane	15.18	1.0	20	0	75.9	65 - 141	16.58	8.81	20
Vinyl chloride	14.64	1.0	20	0	73.2	58 - 137	16.04	9.13	20
Surr: 1,2-Dichloroethane-d4	45.29	1.0	50	0	90.6	81 - 118	45.1	0.429	20
Surr: 4-Bromofluorobenzene	49.33	1.0	50	0	98.7	85 - 114	50.66	2.67	20
Surr: Dibromofluoromethane	45.6	1.0	50	0	91.2	80 - 119	46.19	1.29	20
Surr: Toluene-d8	49.55	1.0	50	0	99.1	89 - 112	48.87	1.38	20

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19041158

QC BATCH REPORT**Batch ID:** R337183 (0)**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD
8260C

The following samples were analyzed in this batch:

HS19041158-01	HS19041158-02
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ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19041158

QC BATCH REPORT

Batch ID: R337759 (0)		Instrument: ICS2100		Method: ANIONS BY SW9056A					
MBLK	Sample ID: WBLKW-043019	Units: mg/L		Analysis Date: 01-May-2019 21:32					
Client ID:	Run ID: ICS2100_337759	SeqNo: 5060505		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chloride	0.500	0.500							U
Sulfate	0.500	0.500							U

LCS	Sample ID: WLCSW2-043019	Units: mg/L		Analysis Date: 01-May-2019 21:47					
Client ID:	Run ID: ICS2100_337759	SeqNo: 5060506		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chloride	19.86	0.500	20	0	99.3	80 - 120			
Sulfate	19.62	0.500	20	0	98.1	80 - 120			

LCSD	Sample ID: WLCSDW2-043019	Units: mg/L		Analysis Date: 01-May-2019 22:02					
Client ID:	Run ID: ICS2100_337759	SeqNo: 5060507		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chloride	20.1	0.500	20	0	101	80 - 120	19.86	1.21	20
Sulfate	19.99	0.500	20	0	100.0	80 - 120	19.62	1.87	20

MS	Sample ID: HS19041343-10MS	Units: mg/L		Analysis Date: 02-May-2019 01:12					
Client ID:	Run ID: ICS2100_337759	SeqNo: 5060520		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chloride	3619	5.00	100	3606	12.8	80 - 120			SEO
Sulfate	344.8	5.00	100	248.2	96.6	80 - 120			

MSD	Sample ID: HS19041343-10MSD	Units: mg/L		Analysis Date: 02-May-2019 01:27					
Client ID:	Run ID: ICS2100_337759	SeqNo: 5060521		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Chloride	3567	5.00	100	3606	-38.8	80 - 120	3619	1.44	20 SEO
Sulfate	344.7	5.00	100	248.2	96.4	80 - 120	344.8	0.0528	20

The following samples were analyzed in this batch: HS19041158-01

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
WorkOrder: HS19041158

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/L	Milligrams per Liter

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020
Texas	TX104704231-19-23	30-Apr-2020

ALS Houston, US

Date: 03-May-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant Bi-Weekly Samples
Work Order: HS19041158

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19041158-01	LH18/24-SP650_041719	Login	4/19/2019 3:03:49 PM	JRM	WET309
HS19041158-01	LH18/24-SP650_041719	Login	4/19/2019 3:03:49 PM	JRM	VOA166
HS19041158-02	Trip Blank	Login	4/19/2019 3:03:49 PM	JRM	VOA166

ALS Houston, US

Date: 03-May-19

Sample Receipt Checklist

Client Name: Bhate Environmental
 Work Order: HS19041158

Date/Time Received: **18-Apr-2019 09:33**
 Received by: **NDR**

Checklist completed by: Jared R. Mekan 19-Apr-2019
 eSignature Date

Reviewed by: RJ Modashia 19-Apr-2019
 eSignature Date

Matrices: **Water**Carrier name: **ALS Courier**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:N/A
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	0.5c/0.5c UC/C IR11		
Cooler(s)/Kit(s):	42885		
Date/Time sample(s) sent to storage:	04/19/2019 15:34		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

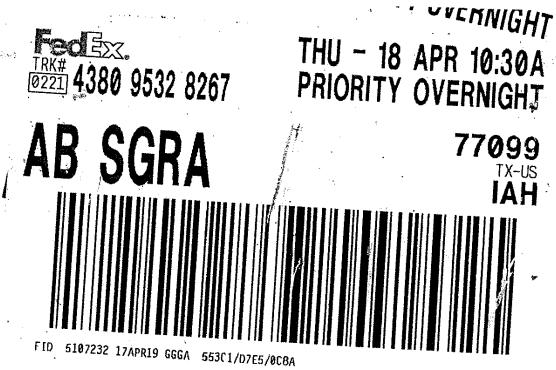
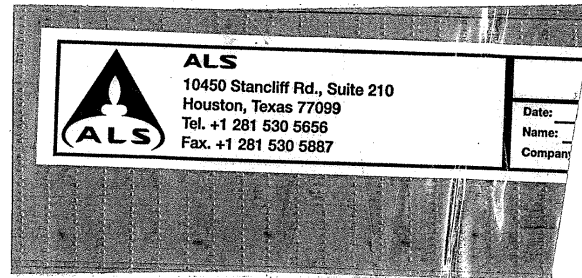
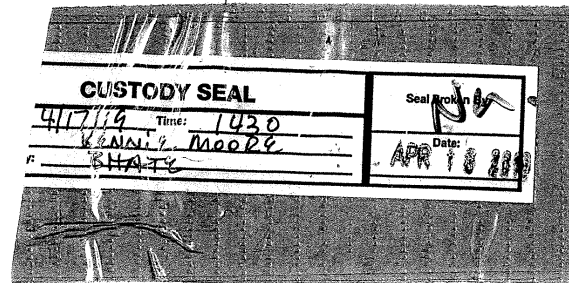
Corrective Action:

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210, Houston, Tx. 77099 ATTN: R.J. ModashiaPage 1 of 1

Project: BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			Project No. NWO1312.0150.0 16.0001			Analyses										Remarks (Preservatives, etc.)	Lab I.D.#
Job: GROUNDWATER TREATMENT PLANT BI-WEEKLY SAMPLES																	
Prepared By: Scott Beesinger			P.O Number														
Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	VOC	CHLORIDE, SULFATE											
LH18/24-SP650_041719	Water	04/17/19 / 14:00		3	3												HCL
LH18/24-SP650_041719	Water	04/17/19 / 14:00		1	1												NONE
Trip Blank	Water	04/17/19		2	2												HCL
Additional Remarks: STANDARD TAT ON ALL PARAMETERS.																	
Relinquished By: <i>Scott Beesinger</i>		Date 04/17/19	Time 14:30	Received By: NR		Date 04/18/19	Time 09:33	Relinquished By:		Date	Time	Received By:		Date	Time		
9 For Lab Use Only																	
Received At Lab By: NR		Date 4/18/19	Time 09:33	Airbill No. 4380 9332 3267		Opened By: NR		Date 4/18/19	Time 09:33	Temp of Container 0-5	Seal No.	Condition 12 x 11					
Remarks C1102																	

COWAN 42835



ALS Houston, US

Date: 29-Apr-19

Client:

Project:

Work Order:

Bhate Environmental Associates, Inc.

LH18/24 Longhorn GW Treatment Plant Weekly Samples

HS19041072

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19041072-01	LH18/24-SP650_041719	Water		17-Apr-2019 14:00	18-Apr-2019 09:33	<input type="checkbox"/>
HS19041072-02	LH18/24-SP650_041719_BIX	Water		17-Apr-2019 14:00	18-Apr-2019 09:33	<input type="checkbox"/>

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order:

CASE NARRATIVE

Work Order Comments

- 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.

WetChemistry by Method E350.3**Batch ID: R337210**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method E365.3**Batch ID: R337124**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
 Sample ID: LH18/24-SP650_041719
 Collection Date: 17-Apr-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19041072
 Lab ID:HS19041072-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
AMMONIA AS N BY E350.3(ISE)		Method:E350.3						Analyst: KVL
Nitrogen, Ammonia (As N)	17		0.20	0.10	0.20	mg/L	1	24-Apr-2019 12:20
ORTHO PHOSPHATE (PO4) AS P BY E365.3		Method:E365.3						Analyst: KVL
Phosphorus, Total Orthophosphate (As P)	4.37		0.100	0.200	0.250	mg/L	10	18-Apr-2019 17:40
SUBCONTRACT ANALYSIS - TOC ANALYSIS		Method:NA						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	26-Apr-2019 17:59

ALS Houston, US

Date: 29-Apr-19

Client:	Bhate Environmental Associates, Inc.	ANALYTICAL REPORT
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS19041072
Sample ID:	LH18/24-SP650_041719_BIX	Lab ID:HS19041072-02
Collection Date:	17-Apr-2019 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	25-Apr-2019 17:26

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

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19041072

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R337124	Test Name : ORTHO PHOSPHATE (PO4) AS P BY E365.3			Matrix: Water		
HS19041072-01	LH18/24-SP650_041719	17 Apr 2019 14:00			18 Apr 2019 17:40	10
Batch ID R337210	Test Name : AMMONIA AS N BY E350.3(ISE)			Matrix: Water		
HS19041072-01	LH18/24-SP650_041719	17 Apr 2019 14:00			24 Apr 2019 12:20	1
Batch ID R337297	Test Name : SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			Matrix: Water		
HS19041072-02	LH18/24-SP650_041719_BIX	17 Apr 2019 14:00			25 Apr 2019 17:26	1
Batch ID R337373	Test Name : SUBCONTRACT ANALYSIS - TOC ANALYSIS			Matrix: Water		
HS19041072-01	LH18/24-SP650_041719	17 Apr 2019 14:00			26 Apr 2019 17:59	1

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19041072

QC BATCH REPORT

Batch ID: R337124 (0)		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3					
MBLK	Sample ID: MBLK-R337124	Units: mg/L		Analysis Date: 18-Apr-2019 17:40					
Client ID:	Run ID: UV-2450_337124	SeqNo: 5046437		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.0200	0.0250							U
LCS	Sample ID: LCS-R337124	Units: mg/L		Analysis Date: 18-Apr-2019 17:40					
Client ID:	Run ID: UV-2450_337124	SeqNo: 5046436		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.249	0.0250	0.25	0	99.6	85 - 115			
LCSD	Sample ID: LCSD-R337124	Units: mg/L		Analysis Date: 18-Apr-2019 17:40					
Client ID:	Run ID: UV-2450_337124	SeqNo: 5046435		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.251	0.0250	0.25	0	100	85 - 115	0.249	0.8	20
MS	Sample ID: HS19041082-01MS	Units: mg/L		Analysis Date: 18-Apr-2019 17:40					
Client ID:	Run ID: UV-2450_337124	SeqNo: 5046439		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.311	0.0250	0.25	0.065	98.4	80 - 120			
MSD	Sample ID: HS19041082-01MSD	Units: mg/L		Analysis Date: 18-Apr-2019 17:40					
Client ID:	Run ID: UV-2450_337124	SeqNo: 5046438		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.316	0.0250	0.25	0.065	100	80 - 120	0.311	1.59	20

The following samples were analyzed in this batch: HS19041072-01

QC BATCH REPORT

Batch ID: R337210 (0)		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)					
MBLK	Sample ID: MBLK-R337210	Units: mg/L		Analysis Date: 24-Apr-2019 12:20					
Client ID:	Run ID: WetChem_HS_337210	SeqNo: 5048433		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Ammonia (As N)	0.10	0.20							U
LCS	Sample ID: LCS-R337210	Units: mg/L		Analysis Date: 24-Apr-2019 12:20					
Client ID:	Run ID: WetChem_HS_337210	SeqNo: 5048429		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Ammonia (As N)	9.971	0.20	10	0	99.7	80 - 120			
MS	Sample ID: HS19041148-01MS	Units: mg/L		Analysis Date: 24-Apr-2019 12:20					
Client ID:	Run ID: WetChem_HS_337210	SeqNo: 5048424		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Ammonia (As N)	9.456	0.20	10	0.157	93.0	80 - 120			
MSD	Sample ID: HS19041148-01MSD	Units: mg/L		Analysis Date: 24-Apr-2019 12:20					
Client ID:	Run ID: WetChem_HS_337210	SeqNo: 5048423		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Ammonia (As N)	9.899	0.20	10	0.157	97.4	80 - 120	9.456	4.58	20

The following samples were analyzed in this batch:

HS19041072-01

ALS Houston, US

Date: 29-Apr-19

Client:	Bhate Environmental Associates, Inc.	QUALIFIERS, ACRONYMS, UNITS
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19041072	

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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Texas	T10470231-18-21	30-Apr-2019
North Dakota	R193 2018-2019	30-Apr-2019
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kentucky	123043 - 2018	30-Apr-2019
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
California	2919, 2018-2019	30-Apr-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19041072

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19041072-01	LH18/24-SP650_041719	Login	4/18/2019 1:54:23 PM	NDR	WET270
HS19041072-01	LH18/24-SP650_041719	Login	4/18/2019 1:54:23 PM	NDR	WET270
HS19041072-01	LH18/24-SP650_041719	Login	4/18/2019 1:54:23 PM	NDR	Sub
HS19041072-02	LH18/24-SP650_041719_BIX	Login	4/18/2019 1:54:23 PM	NDR	Sub

ALS Houston, US

Date: 29-Apr-19

Sample Receipt Checklist

Client Name: Bhate Environmental
Work Order: HS19041072

Date/Time Received: **18-Apr-2019 09:33**
Received by: **NDR**

Checklist completed by: Nilesh D. Ranchod 18-Apr-2019
eSignature Date

Reviewed by: RJ Modashia 18-Apr-2019
eSignature Date

Matrices: **Water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	2 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	0.5C uc/c IR 11		
Cooler(s)/Kit(s):	42885		
Date/Time sample(s) sent to storage:	04/18/2019 2:30PM		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:			

Login Notes: Sample Bottle count does not match COC= 4 Rec'd = 5

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:

CHAIN OF CUSTODY


Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: R.J Modshia

Page 1 of 1[illegible]

Received At Lab By:				For Lab Use Only													
Date		Time		Airbill No.		Opened By:		Date		Time		Temp of Container		Seal No.		Condition	
4/18/14		09:33		43279532 9262		N.		4/18/14		09:33		0-5				14 # 11	
Remarks:																	
CLF 9																	

Control 42885

CUSTODY SEAL		Seal Broken By: <i>[Signature]</i>
41714	Time: 1430	Date: APR 18 1999
KELLY MADDY		
THAT		

	ALS	Date: _____
	10450 Stancliff Rd., Suite 210	Name: _____
	Houston, Texas 77099	Company: _____
	Tel. +1 281 530 5656	
	Fax. +1 281 530 5867	

FedEx
 TRK#
 0221 4380 9532 8267

OVERNIGHT
 THU - 18 APR 10:30A
 PRIORITY OVERNIGHT

AB SGRA

77099
 TX-US
 IAH



FTD 6107232 17APR19 GCGA 553C1/07K5/0C8A



ALS Environmental
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Kelso, WA 98626
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April 26, 2019

Analytical Report for Service Request No: K1903542

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

RE: HS19041072

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory April 19, 2019
For your reference, these analyses have been assigned our service request number **K1903542**.

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
Project Manager



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Acronyms

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 General Chemistry

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjllabs.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/bsdwlabservice.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/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577- 7222 Fax (360)636- 1068
www.alsglobal.com

Client: ALS Environmental - US
Project: HS19041072
Sample Matrix: Water

Service Request: K1903542
Date Received: 04/19/2019

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.

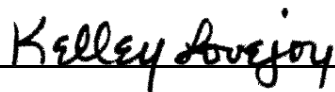
Sample Receipt:

One water sample was received for analysis at ALS Environmental on 04/19/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The sample was stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by



Date

04/26/2019



Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577- 7222 Fax (360)636- 1068
www.alsglobal.com



K1903542

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

Subcontract Chain of Custody

SAMPLING STATE: Dept of Defense

COC ID: 11163

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: HS19041072
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19041072-01	LH18/24-SP650_041719	Water	17 Apr 2019 14:00
TOC Analysis for DOD Level IV			26 Apr 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:

Received By:

Date/Time:

Cooler ID(s):

Temperature(s):

RIGHT SOLUTIONS | RIGHT PARTNER

8 Apr 2019

Page 1 of 1



Cooler Receipt and Preservation Form

Client ALS-Houston Service Request K19 03542
 Received: 4/19/19 Opened: 4/19/19 By: Km Unloaded: 4/19/19 By: JK

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	Tracking Number	NA	Filed
-0.3	-0.3	0.2	0.2	0	395	11163	480978329372	NA	

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	Out of	Head-	Broke	pH	Reagent	Volume	Reagent Lot	Initials	Time
	Bottle Type	Temp	space				added	Number		

Notes, Discrepancies, & Resolutions: _____

RUSH



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
Project: HS19041072
Sample Matrix: Water
Analysis Method: SM 5310 C
Prep Method: None

Service Request: K1903542
Date Collected: 04/17/19
Date Received: 04/19/19
Units: mg/L
Basis: NA

Carbon, Total Organic

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_041719	K1903542-001	1.89	0.50	0.07	1	04/25/19 15:43	
Method Blank	K1903542-MB	ND U	0.50	0.07	1	04/25/19 14:59	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project HS19041072
Sample Matrix: Water

Analysis Method: SM 5310 C
Prep Method: None

Service Request:K1903542
Date Collected:04/17/19
Date Received:04/19/19

Units:mg/L
Basis:NA

Replicate Sample Summary
Carbon, Total Organic

Sample Name:	Lab Code:	MRL	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
LH18/24-SP650_041719	K1903542-001DUP	0.50	0.07	1.89	1.87	1.88	1	10	04/25/19

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.

QA/QC Report

Client: ALS Environmental - US
Project: HS19041072
Sample Matrix: Water

Service Request: K1903542
Date Collected: N/A
Date Received: N/A
Date Analyzed: 04/26/19
Date Extracted: NA

Duplicate Matrix Spike Summary
Carbon, Total Organic

Sample Name: Batch QC
Lab Code: K1903601-008
Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
Basis: NA

Analyte Name	Sample Result	Matrix Spike K1903601-008MS			Duplicate Matrix Spike K1903601-008DMS			% Rec Limits	RPD	RPD Limit
		Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
Carbon, Total Organic	43.2	246	200	101	248	200	102	83-117	<1	10

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.

QA/QC Report

Client: ALS Environmental - US
Project: HS19041072
Sample Matrix: Water

Service Request: K1903542
Date Analyzed: 04/25/19
Date Extracted: NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 632947

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1903542-LCS	26.3	25.0	105	83-117

Client: ALS Environmental - US
Project: HS19041072

Service Request: K1903542

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	632947	KQ1905282-36	04/25/19 14:30	25.0	25.8	103	90-110
CCV2	632947	KQ1905282-37	04/25/19 19:00	25.0	25.5	102	90-110
CCV3	632947	KQ1905282-38	04/25/19 23:56	25.0	25.6	102	90-110
CCV4	632947	KQ1905282-39	04/26/19 04:13	25.0	24.7	99	90-110

Client: ALS Environmental - US
Project: HS19041072

Service Request: K1903542

Continuing Calibration Blank (CCB) Summary
Carbon, Total Organic

Analysis Method: SM 5310 C

Units: mg/L

	Analysis Lot	Lab Code	Date Analyzed	MRL	MDL	Result	Q
CCB1	632947	KQ1905282-30	04/25/19 14:45	0.50	0.07	ND	U
CCB2	632947	KQ1905282-31	04/25/19 19:00	0.50	0.07	ND	U
CCB3	632947	KQ1905282-32	04/26/19 00:11	0.50	0.07	ND	U
CCB4	632947	KQ1905282-33	04/26/19 04:28	0.50	0.07	ND	U



Raw Data

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General Chemistry

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Phone (360)577- 7222 Fax (360)636- 1068
www.alsglobal.com

Work Request # (Original) K1903542, 3517, 3498, 3409, 3601, 3613, 3624, 3648
 Tier: IV I II II IV II II
 Date Analyzed: 4/25/19
 Analyst: BCD/CES Run # 632947,
 Analysis: TOC 633273

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:

3517-3 RPD not within acceptance limits. The sample result is less than 5x the MRL.

Final Approved by: Fourey

Date: 04/26/19

DQREPORT

Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 632947 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
K1903409-002	Carbon, Total Organic	N/A		Water	4.24 mg/L	10 mL	424 mg/L	100	7	50			4/25/19 18:32:05	N	II
K1903409-003	Carbon, Total Organic	N/A		Water	3.46 mg/L	10 mL	346 mg/L	100	7	50			4/25/19 19:29:36	N	II
K1903409-004	Carbon, Total Organic	N/A		Water	3.57 mg/L	10 mL	357 mg/L	100	7	50			4/25/19 19:57:49	N	II
K1903498-001	Carbon, Total Organic	N/A		Water	7.35 mg/L	10 mL	14.7 mg/L	2	0.2	1.0			4/25/19 17:08:02	N	II
K1903498-002	Carbon, Total Organic	N/A		Water	0.95 mg/L	10 mL	0.95 mg/L	1	0.07	0.50			4/25/19 18:04:00	N	II
K1903517-003	Carbon, Total Organic	N/A		Drinking Water	0.54 mg/L	10 mL	0.54 mg/L	1	0.07	0.50			4/25/19 16:11:52	N	I
K1903517-004	Carbon, Total Organic	N/A		Drinking Water	0.21 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/25/19 16:39:53	N	I
K1903542-001	Carbon, Total Organic	N/A		Water	1.89 mg/L	10 mL	1.89 mg/L	1	0.07	0.50			4/25/19 15:43:47	N	IV
K1903601-002	Carbon, Total Organic	N/A		Water	3.92 mg/L	10 mL	3.92 mg/L	1	0.07	0.50			4/25/19 20:40:23	N	IV
K1903601-003	Carbon, Total Organic	N/A		Water	9.51 mg/L	10 mL	9.51 mg/L	1	0.07	0.50			4/25/19 21:08:24	N	IV
K1903601-004	Carbon, Total Organic	N/A		Water	12.62 mg/L	10 mL	12.6 mg/L	1	0.07	0.50			4/25/19 21:36:25	N	IV
K1903601-005	Carbon, Total Organic	N/A		Water	8.05 mg/L	10 mL	8.05 mg/L	1	0.07	0.50			4/25/19 22:04:29	N	IV
K1903601-006	Carbon, Total Organic	N/A		Water	8.62 mg/L	10 mL	8.62 mg/L	1	0.07	0.50			4/25/19 22:32:30	N	IV
K1903601-007	Carbon, Total Organic	N/A		Water	9.41 mg/L	10 mL	9.41 mg/L	1	0.07	0.50			4/25/19 23:00:26	N	IV
K1903601-008	Carbon, Total Organic	N/A		Water	10.80 mg/L	10 mL	43.2 mg/L	4	0.3	2.0			4/25/19 23:28:32	Y	IV
K1903613-001	Carbon, Total Organic	N/A		Water	8.39 mg/L	10 mL	8.39 mg/L	1	0.07	0.50			4/26/19 01:51:31	N	II
K1903624-001	Carbon, Total Organic	N/A		Water	6.89 mg/L	10 mL	689 mg/L	100	7	50			4/26/19 02:19:54	N	II
KQ1905282-10	Carbon, Total Organic	DUP	K1903542-001	Water	1.87 mg/L	10 mL	1.87 mg/L	1	0.07	0.50			4/25/19 15:43:47	N	IV
KQ1905282-11	Carbon, Total Organic	DUP	K1903517-003	Drinking Water	0.48 mg/L	10 mL	0.48 mg/L J	1	0.07	0.50		12*	4/25/19 16:11:52	N	I
KQ1905282-12	Carbon, Total Organic	DUP	K1903517-004	Drinking Water	0.22 mg/L	10 mL	0.22 mg/L J	1	0.07	0.50		NC	4/25/19 16:39:53	N	I
KQ1905282-13	Carbon, Total Organic	DUP	K1903498-001	Water	7.34 mg/L	10 mL	14.7 mg/L	2	0.2	1.0		<1	4/25/19 17:08:02	N	II
KQ1905282-14	Carbon, Total Organic	DUP	K1903498-002	Water	0.91 mg/L	10 mL	0.91 mg/L	1	0.07	0.50		4	4/25/19 18:04:00	N	II
KQ1905282-15	Carbon, Total Organic	DUP	K1903409-002	Water	4.31 mg/L	10 mL	431 mg/L	100	7	50		2	4/25/19 18:32:05	N	II
KQ1905282-16	Carbon, Total Organic	DUP	K1903409-003	Water	3.45 mg/L	10 mL	345 mg/L	100	7	50		<1	4/25/19 19:29:36	N	II
KQ1905282-17	Carbon, Total Organic	DUP	K1903409-004	Water	3.60 mg/L	10 mL	360 mg/L	100	7	50		<1	4/25/19 19:57:49	N	II
KQ1905282-19	Carbon, Total Organic	DUP	K1903601-002	Water	3.89 mg/L	10 mL	3.89 mg/L	1	0.07	0.50		<1	4/25/19 20:40:23	N	IV
KQ1905282-20	Carbon, Total Organic	DUP	K1903601-003	Water	9.55 mg/L	10 mL	9.55 mg/L	1	0.07	0.50		<1	4/25/19 21:08:24	N	IV
KQ1905282-21	Carbon, Total Organic	DUP	K1903601-004	Water	12.78 mg/L	10 mL	12.8 mg/L	1	0.07	0.50		1	4/25/19 21:36:25	N	IV
KQ1905282-22	Carbon, Total Organic	DUP	K1903601-005	Water	7.84 mg/L	10 mL	7.84 mg/L	1	0.07	0.50		3	4/25/19 22:04:29	N	IV
KQ1905282-23	Carbon, Total Organic	DUP	K1903601-006	Water	8.59 mg/L	10 mL	8.59 mg/L	1	0.07	0.50		<1	4/25/19 22:32:30	N	IV
KQ1905282-24	Carbon, Total Organic	DUP	K1903601-007	Water	9.31 mg/L	10 mL	9.31 mg/L	1	0.07	0.50		1	4/25/19 23:00:26	N	IV
KQ1905282-25	Carbon, Total Organic	DUP	K1903601-008	Water	10.92 mg/L	10 mL	43.7 mg/L	4	0.3	2.0		1	4/25/19 23:28:32	N	IV
KQ1905282-26	Carbon, Total Organic	DUP	K1903613-001	Water	8.45 mg/L	10 mL	8.45 mg/L	1	0.07	0.50		<1	4/26/19 01:51:31	N	II
KQ1905282-27	Carbon, Total Organic	DUP	K1903624-001	Water	6.95 mg/L	10 mL	695 mg/L	100	7	50		<1	4/26/19 02:19:54	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

00937936

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 632947 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
KQ1905282-30	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/25/19 14:45:03	N	IV
KQ1905282-30	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/25/19 14:45:03	N	IV
KQ1905282-31	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/25/19 19:00:10	N	IV
KQ1905282-31	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/25/19 19:00:10	N	IV
KQ1905282-32	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/26/19 00:11:20	N	IV
KQ1905282-32	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/26/19 00:11:20	N	IV
KQ1905282-33	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/26/19 04:28:00	N	IV
KQ1905282-33	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/26/19 04:28:00	N	IV
KQ1905282-36	Carbon, Total Organic	CCV		Water	25.83 mg/L	10 mL	25.8 mg/L	1					4/25/19 14:30:17	N	IV
KQ1905282-36	Carbon, Total Organic	CCV		Water	25.83 mg/L	10 mL	25.8 mg/L	1					4/25/19 14:30:17	N	IV
KQ1905282-37	Carbon, Total Organic	CCV		Water	25.52 mg/L	10 mL	25.5 mg/L	1					4/25/19 19:00:10	N	IV
KQ1905282-37	Carbon, Total Organic	CCV		Water	25.52 mg/L	10 mL	25.5 mg/L	1					4/25/19 19:00:10	N	IV
KQ1905282-38	Carbon, Total Organic	CCV		Water	25.58 mg/L	10 mL	25.6 mg/L	1					4/25/19 23:56:37	N	IV
KQ1905282-38	Carbon, Total Organic	CCV		Water	25.58 mg/L	10 mL	25.6 mg/L	1					4/25/19 23:56:37	N	IV
KQ1905282-39	Carbon, Total Organic	CCV		Water	24.73 mg/L	10 mL	24.7 mg/L	1					4/26/19 04:13:24	N	IV
KQ1905282-39	Carbon, Total Organic	CCV		Water	24.73 mg/L	10 mL	24.7 mg/L	1					4/26/19 04:13:24	N	IV
KQ1905282-40	Carbon, Total Organic	LCS		Water	26.25 mg/L	10 mL	26.3 mg/L	1	0.07	0.50	105		4/25/19 15:14:26	N	IV
KQ1905282-40	Carbon, Total Organic	LCS		Water	26.25 mg/L	10 mL	26.3 mg/L	1	0.07	0.50	105		4/25/19 15:14:26	N	IV
KQ1905282-41	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/25/19 14:59:49	N	IV
KQ1905282-41	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/25/19 14:59:49	N	IV
KQ1905282-45	Carbon, Total Organic	MS	K1903601-008	Water	30.72 mg/L	10 mL	246 mg/L	8	0.6	4.0	101		4/26/19 00:55:18	N	IV
KQ1905282-46	Carbon, Total Organic	DMS	K1903601-008	Water	30.99 mg/L	10 mL	248 mg/L	8	0.6	4.0	102	<1	4/26/19 00:55:18	N	IV

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

00937937

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 633273 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
K1903648-001	Carbon, Total Organic	N/A		Water	0.49 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/26/19 02:48:07	N	II
K1903648-002	Carbon, Total Organic	N/A		Water	0.63 mg/L	10 mL	0.63 mg/L	1	0.07	0.50			4/26/19 03:45:15	N	II
K1903648-003	Carbon, Total Organic	N/A		Water	0.54 mg/L	10 mL	0.54 mg/L	1	0.07	0.50			4/26/19 04:42:46	N	II
K1903648-004	Carbon, Total Organic	N/A		Water	0.55 mg/L	10 mL	0.55 mg/L	1	0.07	0.50			4/26/19 05:10:52	N	II
KQ1905407-01	Carbon, Total Organic	MS	K1903648-001	Water	26.12 mg/L	10 mL	26.1 mg/L	1	0.07	0.50	104		4/26/19 03:16:08	N	II
KQ1905407-02	Carbon, Total Organic	DUP	K1903648-001	Water	0.41 mg/L	10 mL	0.41 mg/L J	1	0.07	0.50		NC	4/26/19 02:48:07	N	II
KQ1905407-03	Carbon, Total Organic	DUP	K1903648-002	Water	0.67 mg/L	10 mL	0.67 mg/L	1	0.07	0.50		5	4/26/19 03:45:15	N	II
KQ1905407-04	Carbon, Total Organic	DUP	K1903648-003	Water	0.59 mg/L	10 mL	0.59 mg/L	1	0.07	0.50		8	4/26/19 04:42:46	N	II
KQ1905407-05	Carbon, Total Organic	DUP	K1903648-004	Water	0.54 mg/L	10 mL	0.54 mg/L	1	0.07	0.50		2	4/26/19 05:10:52	N	II
KQ1905407-06	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/26/19 00:11:20	N	II
KQ1905407-07	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/26/19 04:28:00	N	II
KQ1905407-08	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/26/19 05:53:37	N	II
KQ1905407-09	Carbon, Total Organic	CCV		Water	25.58 mg/L	10 mL	25.6 mg/L	1					4/25/19 23:56:37	N	II
KQ1905407-10	Carbon, Total Organic	CCV		Water	24.73 mg/L	10 mL	24.7 mg/L	1					4/26/19 04:13:24	N	II
KQ1905407-11	Carbon, Total Organic	CCV		Water	24.53 mg/L	10 mL	24.5 mg/L	1					4/26/19 05:38:56	N	II
KQ1905407-12	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			4/26/19 00:26:11	N	II
KQ1905407-13	Carbon, Total Organic	LCS		Water	25.32 mg/L	10 mL	25.3 mg/L	1	0.07	0.50	101		4/26/19 00:40:41	N	II

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Results Summary

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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	C] CCV 25 ppm [25	1	25.827	0.0000	25.8272	25.8272	25.8	2:30:17 4/25/2019 PM
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	2:45:03 4/25/2019
4	MB1	1	0.000	0.0000	0.0000	0	<0.5	2:59:49 4/25/2019
5	[TOC] LCS [24ppm]	1	26.253	0.0000	26.2530	26.253	26.3	3:14:26 4/25/2019
6	K1903542-001	1	1.893	0.0000	1.8931	1.8931	1.89	3:43:47 4/25/2019
7	K1903542-001d	1	1.873	0.0000	1.8730	1.873	1.9	3:43:47 4/25/2019
8	K1903517-003	1	0.544	0.0000	0.5436	0.5436	1	4:11:52 4/25/2019
9	K1903517-003d	1	0.481	0.0000	0.4809	0.4809	<0.5	4:11:52 4/25/2019
10	K1903517-004	1	0.212	0.0000	0.2116	0.2116	<0.5	4:39:53 4/25/2019
11	K1903517-004d	1	0.218	0.0000	0.2183	0.2183	<0.5	4:39:53 4/25/2019
12	K1903498-001	2	7.349	0.0000	7.3485	14.697	14.70	5:08:02 4/25/2019
13	K1903498-001d	2	7.342	0.0000	7.3420	14.684	14.68	5:08:02 4/25/2019
14	K1903498-002	1	0.946	0.0000	0.9458	0.9458	0.95	6:04:00 4/25/2019
15	K1903498-002d	1	0.908	0.0000	0.9084	0.9084	0.9	6:04:00 4/25/2019
16	K1903409-002	100	4.236	0.0000	4.2355	423.55	423.6	6:52:05 4/25/2019
17	K1903409-002d	100	4.306	0.0000	4.3062	430.62	430.62	↓ 4/25/2019
18	C] CCV 25 ppm [25	1	25.524	0.0000	25.5243	25.5243	25.5	7:00:10 4/25/2019
19	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	7:14:50 4/25/2019
20	K1903409-003	100	3.456	0.0000	3.4556	345.56	345.56	7:29:36 4/25/2019
21	K1903409-003d	100	3.454	0.0000	3.4544	345.44	345.44	↓ 4/25/2019
22	K1903409-004	100	3.569	0.0000	3.5687	356.87	356.9	7:57:49 4/25/2019
23	K1903409-004d	100	3.597	0.0000	3.5965	359.65	359.7	↓ 4/25/2019
24	K1903601-002	1	3.919	0.0000	3.9187	3.9187	3.92	8:40:23 4/25/2019
25	K1903601-002d	1	3.890	0.0000	3.8900	3.89	3.89	↓ 4/25/2019

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)

Analyzed By: CES	Date Analyzed: 4/25/19 19:30
Reviewed By: [Signature]	Date Reviewed: 04/26/19

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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	K1903601-003	1	9.506	0.0000	9.5057	9.5057	9.51	9:08:24 4/25/2019 PM
27	K1903601-003d	1	9.546	0.0000	9.5455	9.5455	9.55	↓ 4/25/2019
28	K1903601-004	1	12.618	0.0000	12.6180	12.618	12.6	9:36:25 4/25/2019
29	K1903601-004d	1	12.780	0.0000	12.7796	12.7796	12.8	↓ 4/25/2019
30	K1903601-005	1	8.050	0.0000	8.0497	8.0497	8.0	10:04:29 4/25/2019
31	K1903601-005d	1	7.838	0.0000	7.8383	7.8383	7.8	↓ 4/25/2019
32	K1903601-006	1	8.620	0.0000	8.6200	8.62	8.6	10:32:30 4/25/2019
33	K1903601-006d	1	8.594	0.0000	8.5939	8.5939	8.6	↓ 4/25/2019
34	K1903601-007	1	9.411	0.0000	9.4105	9.4105	9.4	11:00:26 4/25/2019
35	K1903601-007d	1	9.306	0.0000	9.3055	9.3055	9.3	↓ 4/25/2019
36	K1903601-008	4	10.798	0.0000	10.7975	43.19	43.2	11:28:32 4/25/2019
37	K1903601-008d	4	10.921	0.0000	10.9210	43.684	43.7	11:28:32 4/25/2019
38	C] CCV 25 ppm [25 p	1	25.580	0.0000	25.5796	25.5796	25.6	11:56:37 4/25/2019
39	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	12:11:20 4/26/2019 AM
40	K1903601-008ms	8	30.719	0.0000	30.7186	245.7488	245.7	12:55:18 4/26/2019
41	K1903601-008msd	8	30.995	0.0000	30.9947	247.9576	248.0	↓ 4/26/2019
42	K1903613-001	1	8.395	0.0000	8.3945	8.3945	8.4	1:51:31 4/26/2019
43	K1903613-001d	1	8.447	0.0000	8.4469	8.4469	8.4	↓ 4/26/2019
44	K1903624-001	100	6.892	0.0000	6.8924	689.24	689.2	2:19:54 4/26/2019
45	K1903624-001d	100	6.949	0.0000	6.9485	694.85	694.9	↓ 4/26/2019
46	C] CCV 25 ppm [25 p	1	24.728	0.0000	24.7283	24.7283	24.7	4:13:24 4/26/2019
47	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	4:28:00 4/26/2019
48		1		0.0000	0.0000	0	<0.5	
49		1		0.0000	0.0000	0	<0.5	
50		1		0.0000	0.0000	0	<0.5	

Analyzed By: CES	Date Analyzed: 4/25/19
Reviewed By: Huerfano	Date Reviewed: 04/26/19

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	C] CCV 25 ppm [25 p	1	25.580	0.0000	25.5796	25.5796	25.6	11:56:37 4/25/2019 PM
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	12:11:26 4/26/2019 AM
4	MB2	1	0.000	0.0000	0.0000	0	<0.5	12:26:11 4/26/2019
5	[TOC] LCS [24ppm]	1	25.319	0.0000	25.3185	25.3185	25.3	12:40:41 4/26/2019
6	K1903648-001	1	0.487	0.0000	0.4865	0.4865	<0.5	2:48:07 4/26/2019
7	K1903648-001d	1	0.408	0.0000	0.4081	0.4081	<0.5	↓ 4/26/2019
8	K1903648-001ms	1	26.120	0.0000	26.1203	26.1203	26	3:16:08 4/26/2019
9	K1903648-002	1	0.631	0.0000	0.6314	0.6314	0.63	3:45:15 4/26/2019
10	K1903648-002d	1	0.667	0.0000	0.6668	0.6668	0.67	↓ 4/26/2019
11	C] CCV 25 ppm [25 p	1	24.728	0.0000	24.7283	24.7283	24.7	4:13:24 4/26/2019
12	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	4:28:00 4/26/2019
13	K1903648-003	1	0.544	0.0000	0.5436	0.5436	0.54	4:42:46 4/26/2019
14	K1903648-003d	1	0.589	0.0000	0.5886	0.5886	0.59	↓ 4/26/2019
15	K1903648-004	1	0.550	0.0000	0.5501	0.5501	0.6	5:10:52 4/26/2019
16	K1903648-004d	1	0.537	0.0000	0.5371	0.5371	0.5	↓ 4/26/2019
17	C] CCV 25 ppm [25 p	1	24.530	0.0000	24.5302	24.5302	24.53	5:38:56 4/26/2019
18	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5:53:37 4/26/2019
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)

Analyzed By: CES	Date Analyzed: 4/25/19 11:56
Reviewed By: [Signature]	Date Reviewed: 04/26/19

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

TOC: 632947,
633273

Schedule: 04252019

Version: 3

Instrument: Fusion1

Last Saved by: Fusion1 (Fusion1)

Last Saved on: 2019/04/25 11:51 - Thursday

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	K1903542-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
4	Sample	K1903517-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
5	Sample	K1903517-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
6	Sample	K1903498-001.01 2x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
7	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
8	Sample	K1903498-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
9	Sample	K1903409-002.01 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
10	Sample	K1903409-003.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K1903409-004.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
13	Sample	K1903601-002.09	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K1903601-003.09	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1903601-004.09	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K1903601-005.09	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1903601-006.09	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1903601-007.09	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	Sample	K1903601-008.10 4x	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	K1903601-008.10 ms 8x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	K1903613-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K1903624-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K1903648-001.10	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K1903648-001.10 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
27	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
28	Sample	K1903648-002.10	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	K1903648-003.10	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1903648-004.10	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	

04/26/19
Fusion1

Fusion Report - 04252019
Thursday, April 25, 2019 11:41 AM(View - Reps, Unused Reps, Meta-
Data, Signature, History)
Printed on 2019/04/26 09:38 -
Friday**Report Summary Information**

Company Location: Gen Chem Lab

Schedule Name: 04252019

Engine 1.1.5.1

Version:

Instrument Name: Fusion1

Firmware 1.2.0696

Version:

Report Version: 1 of 1

Connection: RS232 COM1

Report Creation by Fusion1 (Fusion1) (v2)

Operators (schedule
version): Fusion1 (Fusion1) (v3)

Comment:

Report Results*04/26/19*
*Heupel***Sample Type:** Clean

From Schedule Version 2

Pos	Analysis Type	Sample ID			Start Time	
♦ (clean)		Clean			2019/04/25 11:41	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	14.08	17.05	2.97	49.91	08:00
2	TC Clean	6.32	9.27	2.95	49.71	07:16
3	TC Clean	3.12	5.99	2.87	49.71	07:01
4	TC Clean	2.05	4.73	2.68	49.72	07:01

Sample Type: Clean

From Schedule Version 3

Pos	Analysis Type	Sample ID			Start Time	
♦ (clean)		Clean			2019/04/25 12:15	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.70	3.72	3.02	49.87	08:00
2	TC Clean	5.21	8.07	2.85	49.66	07:18
3	TC Clean	1.99	4.86	2.87	49.65	07:02
4	TC Clean	1.51	4.36	2.85	49.63	07:01

Sample Type: Clean

From Schedule Version 3

	Pos	Analysis Type	Sample ID		Start Time	
◊	(clean)		Clean		2019/04/25 12:49	

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	1.04	3.73	2.68	49.78	08:00
2	TC Clean	4.60	7.41	2.81	49.61	07:16
3	TC Clean	2.00	4.89	2.89	49.60	07:02
4	TC Clean	1.68	4.53	2.85	49.58	07:01

Sample Type: Blank (Creating v1250)

From Schedule Version 3

	Pos	Analysis Type	Sample ID		Start Time	
◆	(blank)		Reagent/Acid Blank		2019/04/25 13:24	

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.84	3.63	2.79	49.74	07:58
2	TC Clean	5.11	7.75	2.65	49.58	07:16
3	TC Clean	2.08	4.82	2.74	49.56	07:00
4	TC Clean	1.72	4.59	2.87	49.54	07:04
5	Reagent Blank	6.96	9.69	2.73	49.56	08:11
6	Acid Blank	1.41	4.26	2.85	49.72	08:01

Sample Type: Sample

From Schedule Version 3

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
*	D	TOC	RB	0.1962 ppm	0.0000 ppm	0.0000%	2019/04/25 14:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1962	1.9624	10.31	13.20	2.89	49.72	10:32

Dilution
1:10

Blank Contribution
(TC) 8.9799 (IC)
(v1250)

Method
CAS_salt_010711
(v4)

Calibration
CAS_salt_010711
(v30)

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.8272 ppm (PASS)	0.0000 ppm	0%	2019/04/25 14:30

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.8272	258.2720	184.78	187.52	2.74	49.68	10:31

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 3

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%	2019/04/25 14:45

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.85	10.69	2.84	49.81	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

Sample Type: Sample

From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/25 14:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.17	9.89	2.72	49.73	10:31

Dilution

1:10

Blank Contribution

(TC) 8.9799 (IC) (v1250)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	26.2530 ppm (PASS)	0.0000 ppm	0%	2019/04/25 15:14

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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	Type									
C	TOC	25.0 ppm	1	26.2530	262.5296	187.67	190.55	2.89	49.74	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 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
2	TOC	ICS	0.1319 ppm	0.0000 ppm	0.0000%	2019/04/25 15:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1319	1.3187	9.88	12.72	2.84	49.75	10:32

Dilution **Blank Contribution** **Method** **Calibration**
 1:10 (TC) 8.9799 (IC) (v1250) CAS_salt_010711 (v4) CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
3	TOC	K1903542-001.01	1.8831 ppm	0.0142 ppm	0.7500%	2019/04/25 15:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.8931	18.9308	21.83	24.66	2.83	49.86	10:29
2	TOC	1.8730	18.7304	21.69	24.54	2.84	49.75	10:30

Dilution **Blank Contribution** **Method** **Calibration**
 1:10 (TC) 8.9799 (IC) (v1250) CAS_salt_010711 (v4) CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
4	TOC	K1903517-003.01	0.5122 ppm	0.0444 ppm	8.6600%	2019/04/25 16:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5436	5.4362	12.67	15.37	2.70	49.84	10:28
2	TOC	0.4809	4.8087	12.24	14.97	2.72	49.77	10:27

Dilution **Blank Contribution** **Method** **Calibration**
 1:10 (TC) 8.9799 (IC) (v1250) CAS_salt_010711 (v4) CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
5	TOC	K1903517-004.01	0.2150 ppm	0.0048 ppm	2.2300%	2019/04/25 16:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2116	2.1157	10.42	13.16	2.74	49.83	10:28
2	TOC	0.2183	2.1834	10.46	13.37	2.91	49.76	10:25

Dilution **Blank Contribution** **Method** **Calibration**
 1:10 (TC) 8.9799 (IC) CAS_salt_010711 CAS_salt_010711

(v1250)

(v4)

(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
6	TOC	K1903498-001.01 2x	7.3452 ppm	0.0046 ppm	0.0600%	2019/04/25 17:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.3485	73.4849	58.86	61.69	2.83	49.84	10:28
2	TOC	7.3420	73.4200	58.82	61.68	2.87	49.78	10:27

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
7	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/25 17:35

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.03	9.88	2.85	49.80	10:29
2	TOC	0.0000	0.0000	7.12	9.99	2.88	49.77	10:24

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
8	TOC	K1903498-002.01	0.9271 ppm	0.0265 ppm	2.8500%	2019/04/25 18:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9458	9.4581	15.40	18.24	2.84	49.76	10:33
2	TOC	0.9084	9.0839	15.15	17.98	2.83	49.73	10:25

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
9	TOC	K1903409-002.01 100x	4.2708 ppm	0.0500 ppm	1.1700%	2019/04/25 18:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.2355	42.3547	37.73	40.52	2.79	49.71	10:28
2	TOC	4.3062	43.0618	38.21	41.01	2.80	49.71	10:29

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
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♦	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.5243 ppm (PASS)	0.0000 ppm	0%	2019/04/25 19:00
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.5243	255.2431	182.72	185.57	2.85	49.70	10:33
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos B</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		50 ppmC		

<u>Sample Type:</u> Check Standard --> CCB							From Schedule Version 3			
♦	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/04/25 19:14
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.07	9.93	2.86	49.69	10:30
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos D</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		0 ppmC		

Sample Type: Sample

From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 10	TOC	K1903409-003.01 100x	3.4550 ppm	0.0008 ppm	0.0200%	2019/04/25 19:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.4556	34.5555	32.44	35.35	2.91	49.69	10:28
2	TOC	3.4544	34.5438	32.43	35.32	2.89	49.69	10:26

Dilution

1:10

Blank Contribution

(TC) 8.9799 (IC)
(v1250)

Method

CAS_salt_010711
(v4)

Calibration

CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 11	TOC	K1903409-004.01 100x	3.5826 ppm	0.0197 ppm	0.5500%	2019/04/25 19:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.5687	35.6870	33.20	36.09	2.89	49.71	10:30
2	TOC	3.5965	35.9654	33.39	36.32	2.93	49.73	10:25

Dilution

1:10

Blank Contribution

(TC) 8.9799 (IC)
(v1250)

Method

CAS_salt_010711
(v4)

Calibration

CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
12	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/25 20:25

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.58	9.41	2.83	49.73	10:32

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
13	TOC	K1903601-002.09	3.9044 ppm	0.0203 ppm	0.5200%	2019/04/25 20:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.9187	39.1873	35.58	38.50	2.92	49.73	10:29
2	TOC	3.8900	38.9000	35.38	38.25	2.87	49.74	10:25

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
14	TOC	K1903601-003.09	9.5256 ppm	0.0281 ppm	0.3000%	2019/04/25 21:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.5057	95.0569	73.50	76.49	2.98	49.74	10:27
2	TOC	9.5455	95.4547	73.77	76.68	2.90	49.75	10:27

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
15	TOC	K1903601-004.09	12.6988 ppm	0.1143 ppm	0.9000%	2019/04/25 21:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	12.6180	126.1798	94.63	97.61	2.98	49.78	10:27
2	TOC	12.7796	127.7959	95.73	98.51	2.79	49.79	10:26

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
16	TOC	K1903601-005.09	7.9440 ppm	0.1495 ppm	1.8800%	2019/04/25 22:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.0497	80.4973	63.62	66.42	2.80	49.81	10:26
2	TOC	7.8383	78.3833	62.19	64.88	2.69	49.81	10:25

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	K1903601-006.09	8.6070 ppm	0.0184 ppm	0.2100%	2019/04/25 22:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.6200	86.2001	67.49	70.31	2.82	49.85	10:24
2	TOC	8.5939	85.9393	67.32	69.96	2.64	49.85	10:26

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	K1903601-007.09	9.3580 ppm	0.0743 ppm	0.7900%	2019/04/25 23:00

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.4105	94.1053	72.86	75.84	2.99	49.86	10:31
2	TOC	9.3055	93.0549	72.15	75.13	2.98	49.88	10:26

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
19	TOC	K1903601-008.10 4x	10.8593 ppm	0.0873 ppm	0.8000%	2019/04/25 23:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	10.7975	107.9754	82.27	85.11	2.84	49.89	10:29
2	TOC	10.9210	109.2100	83.11	86.05	2.94	49.90	10:26

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.5796 ppm (PASS)	0.0000 ppm	0%	2019/04/25 23:56

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.5796	255.7956	183.10	185.89	2.79	49.94	10:32

Completion State

Success - Criteria

Success Action

Do Nothing

Method

CAS_salt_010711

Calibration

CAS_salt_010711

STD Conc - Pos B

50 ppmC

met.

(v4)

(v30)

Sample Type: Check Standard --> CCB

From Schedule Version 3

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%	2019/04/26 00:11

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.15	10.04	2.89	49.92	10:34

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/26 00:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.91	8.91	3.00	49.93	10:32

Dilution

1:10

Blank Contribution

(TC) 8.9799 (IC) (v1250)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS

From Schedule Version 3

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)	25.3185 ppm (PASS)	0.0000 ppm	0%	2019/04/26 00:40

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	25.3185	253.1850	181.32	184.00	2.68	49.98	10:31

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos C

25 ppmC

Sample Type: Sample

From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

♦	21	TOC	K1903601-008.10 ms 8x	30.8566 ppm	0.1952 ppm	0.6300%	2019/04/26 00:55
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Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	30.7186	307.1861	217.50	220.37	2.87	50.00	10:27
2	TOC	30.9947	309.9469	219.37	222.19	2.82	50.00	10:26

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	22	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/26 01:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.45	10.33	2.88	50.02	10:27
2	TOC	0.0000	0.0000	6.18	9.12	2.94	50.03	10:28

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	23	TOC	K1903613-001.01	8.4207 ppm	0.0371 ppm	0.4400%	2019/04/26 01:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.3945	83.9446	65.96	69.02	3.06	50.03	10:28
2	TOC	8.4469	84.4691	66.32	69.27	2.95	50.03	10:31

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	24	TOC	K1903624-001.01 100x	6.9204 ppm	0.0397 ppm	0.5700%	2019/04/26 02:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.8924	68.9238	55.76	58.68	2.92	50.07	10:31
2	TOC	6.9485	69.4851	56.15	59.21	3.07	50.05	10:29

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	25	TOC	K1903648-001.10	0.4473 ppm	0.0554 ppm	12.3900%	2019/04/26 02:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4865	4.8646	12.28	14.99	2.71	50.06	10:29
2	TOC	0.4081	4.0809	11.75	14.74	2.99	50.07	10:27

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
26	TOC	K1903648-001.10 ms	26.1203 ppm	0.0000 ppm	0.0000%	2019/04/26 03:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.1203	261.2031	186.28	189.06	2.78	50.08	10:34

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
27	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/26 03:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.17	9.07	2.90	50.09	10:30

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
28	TOC	K1903648-002.10	0.6491 ppm	0.0250 ppm	3.8500%	2019/04/26 03:45

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6314	6.3143	13.27	16.15	2.89	50.08	10:29
2	TOC	0.6668	6.6678	13.51	16.28	2.77	50.11	10:28

Dilution

1:10

Blank Contribution(TC) 8.9799 (IC)
(v1250)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 3

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)	24.7283 ppm (PASS)	0.0000 ppm	0%	2019/04/26 04:13

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.7283	247.2834	177.32	180.14	2.82	50.17	10:31

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos B

50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 3

	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%	2019/04/26 04:28

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.85	8.73	2.88	50.11	10:31

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 3

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	29	TOC	K1903648-003.10	0.5661 ppm	0.0318 ppm	5.6100%	2019/04/26 04:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5436	5.4362	12.67	15.57	2.90	50.14	10:26
2	TOC	0.5886	5.8856	12.98	15.83	2.86	50.09	10:25

Dilution

1:10

Blank Contribution

(TC) 8.9799 (IC) (v1250)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	30	TOC	K1903648-004.10	0.5436 ppm	0.0092 ppm	1.6900%	2019/04/26 05:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5501	5.5011	12.71	15.66	2.95	50.10	10:28
2	TOC	0.5371	5.3714	12.63	15.45	2.82	50.13	10:24

Dilution

1:10

Blank Contribution

(TC) 8.9799 (IC) (v1250)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 3

	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)	24.5302 ppm (PASS)	0.0000 ppm	0%	2019/04/26 05:38

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.5302	245.3020	175.97	179.03	3.06	50.09	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 3

	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%	2019/04/26 05:53

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.89	8.75	2.86	50.15	10:28

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Meta Data Used in this Report

Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1249	2.9333	1.7730	0.0000	0.0000	0.0000	2019/04/24 12:54	Fusion1 (Fusion1)
v1250	2.3183	1.4080	0.0000	0.0000	0.0000	2019/04/25 14:15	Fusion1 (Fusion1)

Calibrations

Name: CAS_salt_010711 (TOC)

Version: v30

Calibration curve formula: TOC: $y = 6.788x + 9.463$

Ver Creation: 2019/03/05 17:42

 r^2 value: TOC: $r^2 = 0.99963$

Comment:

Operator: Fusion1 (Fusion1)

Basic Analysis Type: TOC

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**Operator:** Fusion1 (Fusion1)**Ver Creation:** 2019/02/21 17:57**Comment:**

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	ICSpurgeRinseVolume	12.0 ml
UVReactorPrerinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPrerinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPrerinses	1	SyringeSpeedWaste	10
ICSpurgeTime	1.00 mins	SyringeSpeedAcid	7
DetectorSweepFlow	500 ml/min	SyringeSpeedReagent	7
PreSpurgeTime	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
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Report History

Report History				
Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/04/26 06:09

StarLIMS Run: 632947, 633273
Analysis: TOC
Method: 415.1, SM 5310 C

CCV: 11-GEN-05-77C 50 ppm LCS: 11-GEN-05-77D 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-74A

ICS TV: 25.0 ppm ICS % R = 2

Spike ID: 11-GEN-05-700 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-77M

21 % H3PO4: 11-GEN-05-77L

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: NA

Analyzed By: CES	Date Analyzed: 4/25/19
Reviewed By: <i>[Signature]</i>	Date Reviewed: 04/26/19



Case Narrative

Method: 6850

Analysis: Perchlorate

Analysis SOP: LC-MS-CLO4

ALS WO ID(s): 1910478; 1910480; 1910483;
1911288

Client: ALS Laboratories (Houston, TX)

Matrix: Water

ELMS Batch (HBN): 2241 (237388)

General Set Information: There were four 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. 50 μL 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 0.45 μm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1910480001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

Method QC data: The method blank (LMB 649380) was less than 1/2 the CRDL. The recovery for the LCS (649381) was within acceptable parameters.



MS/MSD Analysis: MS/MSD was performed on samples 1910837002/03 of Work Order 1910837. 4.0µl of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4.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 – 649378) is reported from the analysis of the Laboratory Control Sample (LCS – 649381) at a level of 4.0µg/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: 19MARI03).

Thomas Bosch	April 24, 2019
Analyst	Date



00937960

ANALYTICAL REPORT

Report Date: April 25, 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: **34-1911288**

Project ID: HS19041072

Purchase Order: HS19041072

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_041719_BIX	1911288001	04/17/19	04/19/19	

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ANALYTICAL REPORT

Workorder: **34-1911288**Client: ALS Environmental
(Houston)

Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: LH18/24-SP650_041719_BIX		Sampling Site: NA		Collected: 04/17/2019	
Lab ID: 1911288001		Media: 125 mL Nalgene		Received: 04/19/2019	
Matrix: Water		Sampling Parameter: NA			
Analysis Method - EPA 6850, DoD QSM					
Preparation: Not Applicable			Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2241 (HBN: 237388) Analyzed: 04/23/2019 10:16		Instrument ID: LCMS04 Percent Solid: NA 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 04/24/2019 07:51	/S/ Stephen Brose 04/25/2019 07:42

Laboratory Contact Information

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Email: als@alt.lab@ALSGlobal.com
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ANALYTICAL REPORT

Workorder: 34-1911288

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.pjllabs.com
	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.com
	Utah (TNI)	UT00953	http://lams.nelac-institute.org/search
	Nevada (TNI)	UT00953201-1	https://ndep.nv.gov/water/lab-certification
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
	Oklahoma (TNI)	IJ# 9980	http://www.deq.state.ok.us/CSDnew/labcert.htm
	Texas (TNI)	T104704456-18-9	https://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_list.pdf
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	http://www.aihaaccreditedlabs.org
	DOECAP-AP	L18-606	http://www.pjllabs.com
	Washington	C596	https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.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

00937963

Analysis Information

Workorder: 1911288**Limits:** Client SOW/Contract Specified**Preparation:** NA**Analysis:** EPA 6850, DoD QSM**Basis:** DoD QSM**Batch:** NA**Batch:** ELMS/2241 (HBN: 237388)**Prepared By:** NA**Analyzed By:** Thomas Bosch

Blank

LMB: 649380**Analyzed:** 04/23/2019 09:20**Units:** ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 649381**Analyzed:** 04/23/2019 08:53**Dilution:** 1**Units:** ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.01	4.00	100	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1910837001**Analyzed:** 04/23/2019 10:30**Dilution:** 1**Units:** ug/L**MS:** 1910837002**Analyzed:** 04/23/2019 10:43**Dilution:** 1**Units:** ug/L**MSD:** 1910837003**Analyzed:** 04/23/2019 10:57**Dilution:** 1**Units:** ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	3.81	4	95.1	78.8	123.8	3.95	98.8	3.74	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 04/24/2019 07:52	/S/ Stephen Brose 04/25/2019 07:42

Symbols and Definitions

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

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



W

1911288

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: Dept of Defense

COC ID: 11164

SUBCONTRACT TO:

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

Phone: +1 801 266 7700

1911288

**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: HS19041072
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19041072-02	LH18/24-SP650_041719_BIX	Water	17 Apr 2019 14:00
SUB_Perch-6850			26 Apr 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: J. MAKINTI

Date/Time: 4/18/19 18:00

Received By: _____

Date/Time: _____

Cooler ID(s): _____

Temperature(s): _____

RIGHT SOLUTIONS | RIGHT PARTNER



ALS Environmental
CHAIN-OF-CUSTODY

[illegible]

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

<div style="display: flex; justify-content: space-between;"> ALS-SALT LAKE CITY-RELATED INFORMATION REPORT (CRIS) 1911288 </div> COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)																	
Client Name: <u>ALS Houston</u>				Project/Task/Site: _____													
Date/Time of Receipt: <u>19-Apr-2019 1005</u>				Number of Coolers Received: <u>1</u>													
Condition of Coolers: <u>Acceptable</u> Unacceptable				Temperature Control: <u>Present</u> Not Included													
Cooler Custody Seals: <u>Present</u> Absent/NA <u>Intact</u> Broken/NA				Location Temp Taken: <u>Control</u> Between Samples													
Container Custody Seals: <u>Present</u> Absent/NA <u>Intact</u> Broken/NA				Are all temperatures within project specific guidelines? <u>Yes</u> No/NA													
Ice Present: <u>Yes</u> No/NA <u>Frozen</u> Melted/NA				VOA Headspace Present? <u>Yes</u> No/NA													
pH Check Performed:		Metals Cyanide Sulfide Ammonia		Yes/No/NA Yes/No/NA Yes/No/NA Yes/No/NA		Total Phenolics TPH - 418.1 COD TKN		Yes/No/NA Yes/No/NA Yes/No/NA Yes/No/NA		NO3/NO2 Oil & Grease Total Phosphorous Gross A.B, Gamma Spec		Yes/No/NA Yes/No/NA Yes/No/NA Yes/No/NA					
<u>Cooler Received</u>		<u>DCL Cooler No.</u>		<u>Temp.</u>		<u>Cooler Received</u>		<u>DCL Cooler No.</u>		<u>Temp.</u>		<u>Cooler Received</u>		<u>DCL Cooler No.</u>		<u>Temp.</u>	
1		C19 9334		23 °C		4		C19		°C		7		C19		°C	
2		C19		°C		5		C19		°C		8		C19		°C	
3		C19		°C		6		C19		°C		9		C19		°C	
Taken By: <u>Penny A. Foote</u>				<u>Penny A. Foote</u>				Date: <u>19-Apr-2019</u>									
Signature				Printed Name													

CLIENT-RELATED INFORMATION

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

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES ☐ No ☐

Response Required Within 24 Hours

PROJECT MANAGEMENT

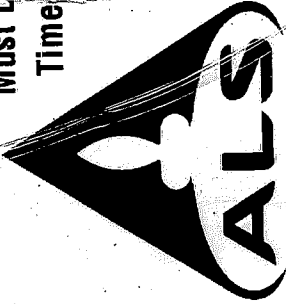
PROJECT MANAGER COMMENTS:

ALS Project Manager: _____ Printed Name

Returned to Sample Receipt by: _____ Signature

Date: _____

Must Deliver Next Business Day
Time and Temperature Sensitive!



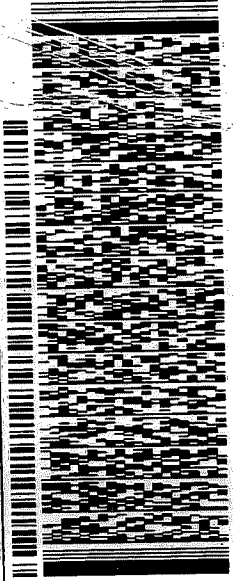
ORIGIN ID:SGRA (281) 530-5656
CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON, TX 77039
UNITED STATES US

SHIP DATE: 19APR19
ACTWT: 9.65 LB
CAD: 300130.CAF3211
DIMS: 14x11x10 IN
BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE

SALT LAKE CITY UT 84123

(801) 266-7700
REF: HS19041072 RJ



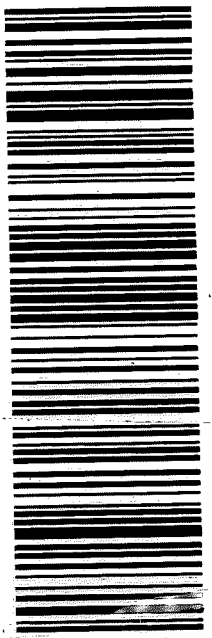
FedEx
Express



TRK# 4809 7832 9383
FRI - 19 APR 3:00P
STANDARD OVERNIGHT

AX BTFA

84123
UT-US SLC



RT 907
ST 22
5 15:00
A 9383 04.19

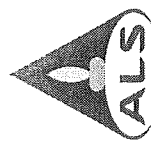
Date:		Time: 18:30	
Set:		Jm	
		ALS Item	

JUSTDY SEAL

Part # 159468-434 RH2 EXP 01/20 **

551C1/27E5/104C

1181171806050149



Batch Worklist

Batch: ELMS/2241

Rule: EPA 6850, DoD QSM Water

Created: 4/23/2019 07:43

Analyst: T. Bosch

Instrument:

Status: WP

HBN: 237388



Workorder: 1910478 [ENV_LVL4]
 Workorder: 1910480 [ENV_LVL4]
 Workorder: 1910483 [ENV_LVL4]
 Workorder: 1910837 [ENV_LVL4]
 Workorder: 1911288 [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	649377	CCV for HBN 237388 [ELMS/2241]				CCV	3		E685041C3Q	5311		4/25/2019	
2	649378	RLVS for HBN 237388 [ELMS/2241]				RLVS	3		E685041C3Q	5311		4/25/2019	
3	649379	ICS for HBN 237388 [ELMS/2241]				ICS	3		E6850.D3Q	5311		4/25/2019	
4	649380	LMB for HBN 237388 [ELMS/2241]				LMB	3		E6850Q413Q	5311		4/25/2019	
5	649381	LCS for HBN 237388 [ELMS/2241]				LCS	3		E6850Q413Q	5311		4/25/2019	
6	1910478001	LH18/24-SP650_041019_BIX				SAMPLE	3	1910478001-A	E6850Q41.3	5480	5/8/2019	4/25/2019	
7	1910480001	LH18/24-SP140_041019				SAMPLE	3	1910480001-A	E6850Q41.3	5480	5/8/2019	4/25/2019	
8	1910483001	LH18/24-SP650_041019_BIX				SAMPLE	3	1910483001-A	E6850Q41.3	5480	5/8/2019	4/25/2019	
9	1910837001	43MW01				SAMPLE	3	1910837001-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
10	1910837002	43MW01MS				MS	3	1910837002-A	E6850Q413Q	5480		4/25/2019	
11	1910837003	43MW01MSD				MSD	3	1910837003-A	E6850Q413Q	5480		4/25/2019	
12	1910837004	43MW03				SAMPLE	3	1910837004-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
13	1910837005	43MW04				SAMPLE	3	1910837005-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
14	1910837006	43MW05				SAMPLE	3	1910837006-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
15	1910837007	43MW06				SAMPLE	3	1910837007-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
16	649382	CCV for HBN 237388 [ELMS/2241]				CCV	3		E685041C3Q	5311		4/25/2019	
17	1910837008	DUP040919				FLDDUP	3	1910837008-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
18	1910837009	EB041019				EQBK	3	1910837009-A	E6850Q41.3	5480	5/8/2019	4/29/2019	
19	1911288001	LH18/24-SP650_041719_BIX				SAMPLE	3	1911288001-A	E6850Q41.3	5480	5/15/2019	5/2/2019	
20	649383	CCV for HBN 237388 [ELMS/2241]				CCV	3		E685041C3Q	5311		4/25/2019	



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #()'s: 1910478 (001); 1910480 (001); 1910483 (001); 1911288 (001);
 1910837 (001-09) ELMS Batch/HBN ID: 2241 (237388)
 Prep Date: 04/22/2019 Analysis Date: 04/23/2019 Analyst: T. Bosch
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\APR\23APR19D.s
 Reported DL: 1.0µg/L Reported LOD: 2.0µg/L Reported LOQ: 4.0µg/L

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by TNB. 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 AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

STANDARDS: Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

CALIBRATION CURVE: Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.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:** 35µL
Column: KP-RPPX C8 separator, 250mm **Mobile Phase:** 70% Eluent A1; 30% Eluent B1

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: 4.0µL of QC Solution Horizon ID 41830 was used for LCS 649381; Target = 4.0µg/L. ASTM type II water was used for LMB 649380.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1910837002/03 (Client ID: 43MW01). 4.0µL of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. Spike target = 4.0µg/L.

COMMENTS:

- 1) Results reported in µg/L. Field sample 1910480001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has 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: \\ALS\TWS013\LCMS\LCMS04\2019\APR\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\237388-DoD-ALS-Hstn LCMS4 or through \\ALS\TWS013\DATA\REVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 649378) is reported from the analysis of the Laboratory Control Sample (LCS – 649381) at a level 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, many of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03).

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.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDG: ELMS: 2241 HBN: 237388 1910837 / 1911288		
Sample Set IDs if Applicable: 1910478 / 1910480 / 1910483		
<u>Calibration standards analyzed and meets criteria</u>	TB	SN
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SN
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SN
<u>MSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SB
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary</u> NC/CAR#		
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB



STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK		Description - 6850 WKG Std 100.ug/L			
Standard: 43702		Created By: Thomas Bosch	Amount: 10 mL		
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM	Expires: 09/18/2019		
MFG Lot: TNB: 09/18/2018			Usable: Yes		
Pipette ID: Not Provided			Lab Lot: CLO4 WRK		
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	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
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	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: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
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
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: 41831		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/09/2018 10:05AM		Expires: 05/09/2019	
MFG Lot: TNB: 05/09/2018				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
41830	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	05/09/2019



STANDARD REPORT

Constituent

Working Standard - CLO4 QC INT

CLO4 QC INT		Description - 6850 QC Intrmdt Std-QC 10ug/mL			
Standard: 41830		Created By: Thomas Bosch	Amount: 10 mL		
MFG: ALS/SLC		Create Date: 05/09/2018 10:05AM	Expires: 05/09/2019		
MFG Lot: TNB: 05/09/2018			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



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

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730		Created By: Thomas Bosch	Amount: 25 mL		
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM	Expires: 09/20/2019		
MFG Lot: TNB: 05/09/2018		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
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



STANDARD REPORT

Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK		Description - Perchlorate ISTD Stock	
Standard: 43729		Created By: Thomas Bosch	Amount: 1 mL
MFG: Cambridge Isotope		Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026
MFG Lot: SDFF-012A		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



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

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.

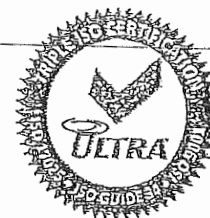
Expiration of Certification:

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.





Certificate of Analysis



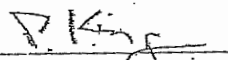
ISO Guide 34 Reference Material

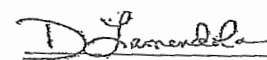
Product Number: ICC-013
Lot Number: CP-0860

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



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New Haven, CT 06513
USA



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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

Date Certified: Jun 25, 2018

Expiration: Jul 25, 2020

Sample Size: 100 mL

Components: 1

Storage Condition: Ambient ($>5^\circ\text{C}$)

Included on ISO/IEC 17025 Scope of Accreditation: Yes

Included on ISO 17034 Scope of Accreditation: Yes



Signal Word: None

Component	SRM #	Prepared Concentration ($\mu\text{g/mL}$)
ClO_4 Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is $\pm 0.24\%$.

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 $0.2\ \mu\text{m}$ 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 $\pm 0.5\%$ 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



Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

Quality Standards:
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification: $\geq 98\%$

Labeled CAS Number: NA

Unlabeled CAS Number: 7601-89-0

MW*: 130.4

Chemical Formula: NaCl^*O_4

Storage: Store at room temperature away from light and moisture.

Stability: See storage and expiration date.

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.

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/NCSL 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.

* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 $\mu\text{g/mL}$
Chemical Purity of Neat Material(s)	98%
LCMS for Concentration	109.4 \pm 2.8 $\mu\text{g/mL}$ (k=2)



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	
*	649377	CCV@25	Vial 71	1	Control	1	1.36054e6	8.855	24.00623
*	649381	QC@4.0	Vial 72	1	Control	2	2.53898e5	9.046	4.01121
*	649379	ICS@4.0	Vial 73	1	Control	3	1.82631e5	8.636	3.34158
*	649380	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1910478001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1910480001	1K	Vial 76	1	Sample	6	3.37161e5	9.026	5552.18188
*	1910483001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1911288001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1910837001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1910837002	MS	Vial 80	1	Sample	10	2.21785e5	9.050	3.80586
*	1910837003	MSD	Vial 81	1	Sample	11	2.20802e5	9.038	3.95111
*	1910837004		Vial 82	1	Sample	12	0.00000	0.000	0.00000
*	1910837005		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1910837006		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	649382	CCV@25	Vial 71	1	Control	15	1.31128e6	8.938	24.26925
*	1910837007		Vial 85	1	Sample	16	6.42400e4	9.045	1.26400
*	1910837008		Vial 86	1	Sample	17	0.00000	0.000	0.00000
*	1910837009		Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1909952003	10K	Vial 88	1	Sample	19	5.40192e5	9.131	9.36492e4
*	649383	CCV@25	Vial 71	1	Control	20	1.31963e6	8.922	24.70624

# *	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	649377	CCV@25	Vial 71	1	Control	1	4.18181e5	8.869	24.80861
*	649381	QC@4.0	Vial 72	1	Control	2	8.36399e4	9.058	4.29372
*	649379	ICS@4.0	Vial 73	1	Control	3	6.48502e4	8.654	3.82172
*	649380	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1910478001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1910480001	1K	Vial 76	1	Sample	6	1.09251e5	9.041	5913.57786
*	1910483001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1911288001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1910837001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1910837002	MS	Vial 80	1	Sample	10	7.41215e4	9.057	4.12337
*	1910837003	MSD	Vial 81	1	Sample	11	7.23834e4	9.061	4.20632
*	1910837004		Vial 82	1	Sample	12	0.00000	0.000	0.00000
*	1910837005		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1910837006		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	649382	CCV@25	Vial 71	1	Control	15	4.00971e5	8.953	24.95975
*	1910837007		Vial 85	1	Sample	16	2.34854e4	9.061	1.36511
*	1910837008		Vial 86	1	Sample	17	0.00000	0.000	0.00000
*	1910837009		Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1909952003	10K	Vial 88	1	Sample	19	1.70464e5	9.151	9.83177e4
*	649383	CCV@25	Vial 71	1	Control	20	4.01823e5	8.937	25.30992

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
--	-----	-----	----	-----	----	-----	-----	-----	
*	649377	CCV@25	Vial 71	1	Control	1	1.72840e5	8.867	5.00000
*	649381	QC@4.0	Vial 72	1	Control	2	2.08542e5	9.066	5.00000
*	649379	ICS@4.0	Vial 73	1	Control	3	1.81824e5	8.654	5.00000
*	649380	LMB	Vial 74	1	Control	4	2.16871e5	9.008	5.00000
*	1910478001		Vial 75	1	Sample	5	1.72857e5	8.404	5.00000
*	1910480001	1K	Vial 76	1	Sample	6	1.97149e5	9.050	5000.00000
*	1910483001		Vial 77	1	Sample	7	1.65412e5	8.420	5.00000
*	1911288001		Vial 78	1	Sample	8	1.81749e5	8.489	5.00000

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount		
*	1910837001	Vial	79	1	Sample	9	1.87599e5	9.028	5.00000	
*	1910837002	MS	Vial	80	1	Sample	10	1.92507e5	9.073	5.00000
*	1910837003	MSD	Vial	81	1	Sample	11	1.84256e5	9.062	5.00000
*	1910837004	Vial	82	1	Sample	12	1.80138e5	8.810	5.00000	
*	1910837005	Vial	83	1	Sample	13	1.97954e5	9.090	5.00000	
*	1910837006	Vial	84	1	Sample	14	1.83017e5	9.051	5.00000	
*	649382	CCV@25	Vial	71	1	Control	15	1.64671e5	8.965	5.00000
*	1910837007	Vial	85	1	Sample	16	1.84879e5	9.067	5.00000	
*	1910837008	Vial	86	1	Sample	17	1.96777e5	8.752	5.00000	
*	1910837009	Vial	87	1	Sample	18	1.91613e5	9.161	5.00000	
*	1909952003	10K	Vial	88	1	Sample	19	1.83509e5	9.157	5.00000e4
*	649383	CCV@25	Vial	71	1	Control	20	1.62618e5	8.942	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

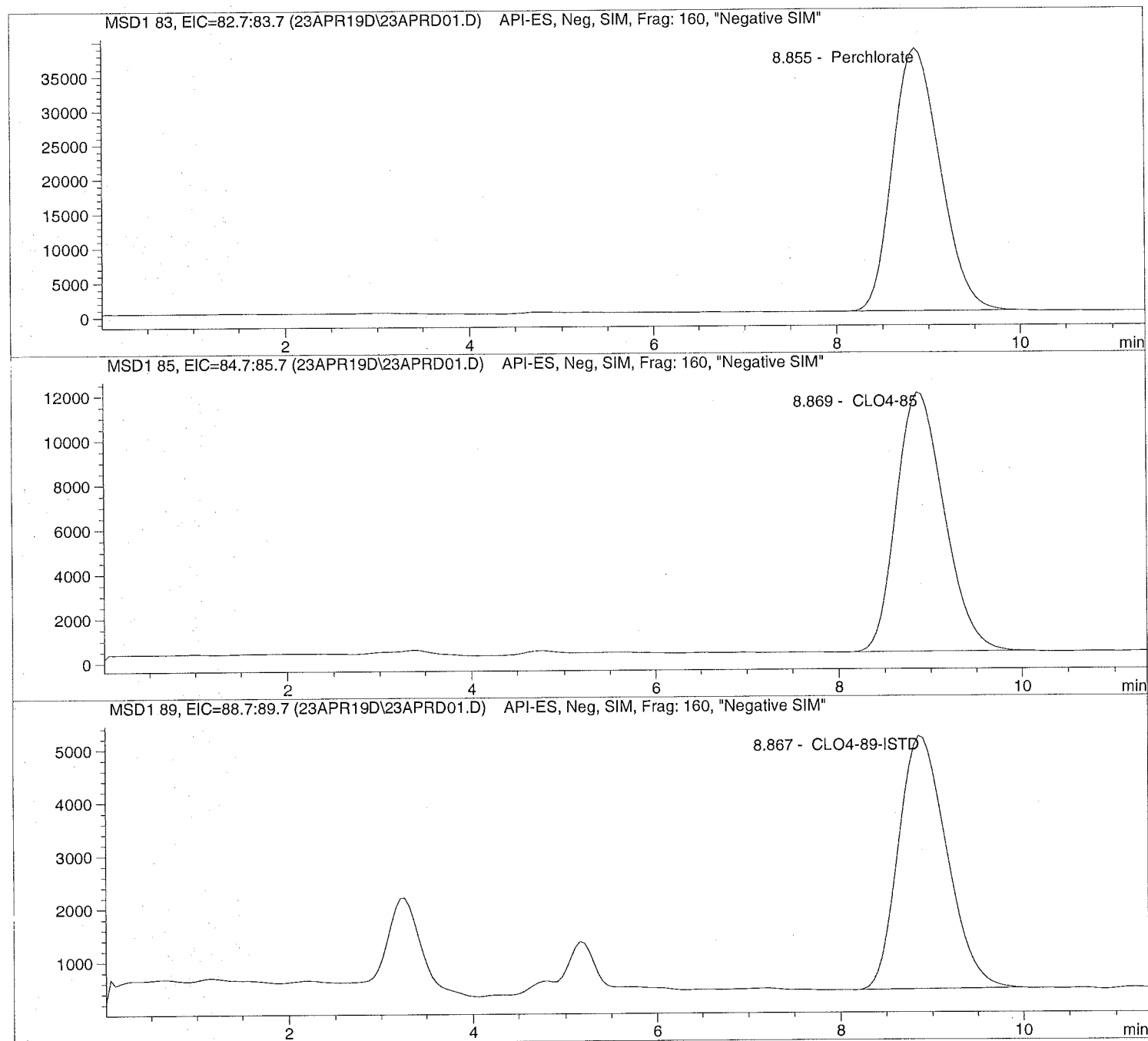
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	==	=====	=====	=====
1	Vial 71	649377 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	649381 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	649379 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	649380 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1910478001	CLO4-AQN	1	Sample		
6	Vial 76	1910480001 1K	CLO4-AQN	1	Sample		
7	Vial 77	1910483001	CLO4-AQN	1	Sample		
8	Vial 78	1911288001	CLO4-AQN	1	Sample		
9	Vial 79	1910837001	CLO4-AQN	1	Sample		
10	Vial 80	1910837002 MS	CLO4-AQN	1	Sample		
11	Vial 81	1910837003 MSD	CLO4-AQN	1	Sample		
12	Vial 82	1910837004	CLO4-AQN	1	Sample		
13	Vial 83	1910837005	CLO4-AQN	1	Sample		
14	Vial 84	1910837006	CLO4-AQN	1	Sample		
15	Vial 71	649382 CCV@25	CLO4-AQN	1	Ctrl Samp		
16	Vial 85	1910837007	CLO4-AQN	1	Sample		
17	Vial 86	1910837008	CLO4-AQN	1	Sample		
18	Vial 87	1910837009	CLO4-AQN	1	Sample		
19	Vial 71	649383 CCV@25	CLO4-AQN	1	Ctrl Samp		

Injection Date: 4/23/2019 08:37:56
Sample Name: 649377 CCV@25
Acq Operator: TNB

Seq Line: 1
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  08:37:56      Seq Line:           1
Sample Name:     649377   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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

```
=====
                          Sample Information
=====
```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.855	PBA	1360543.6	24.0062	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.869	PBA	418181.2	24.8086	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.867	PBA	172839.5	5.0000	CLO4-89-ISTD

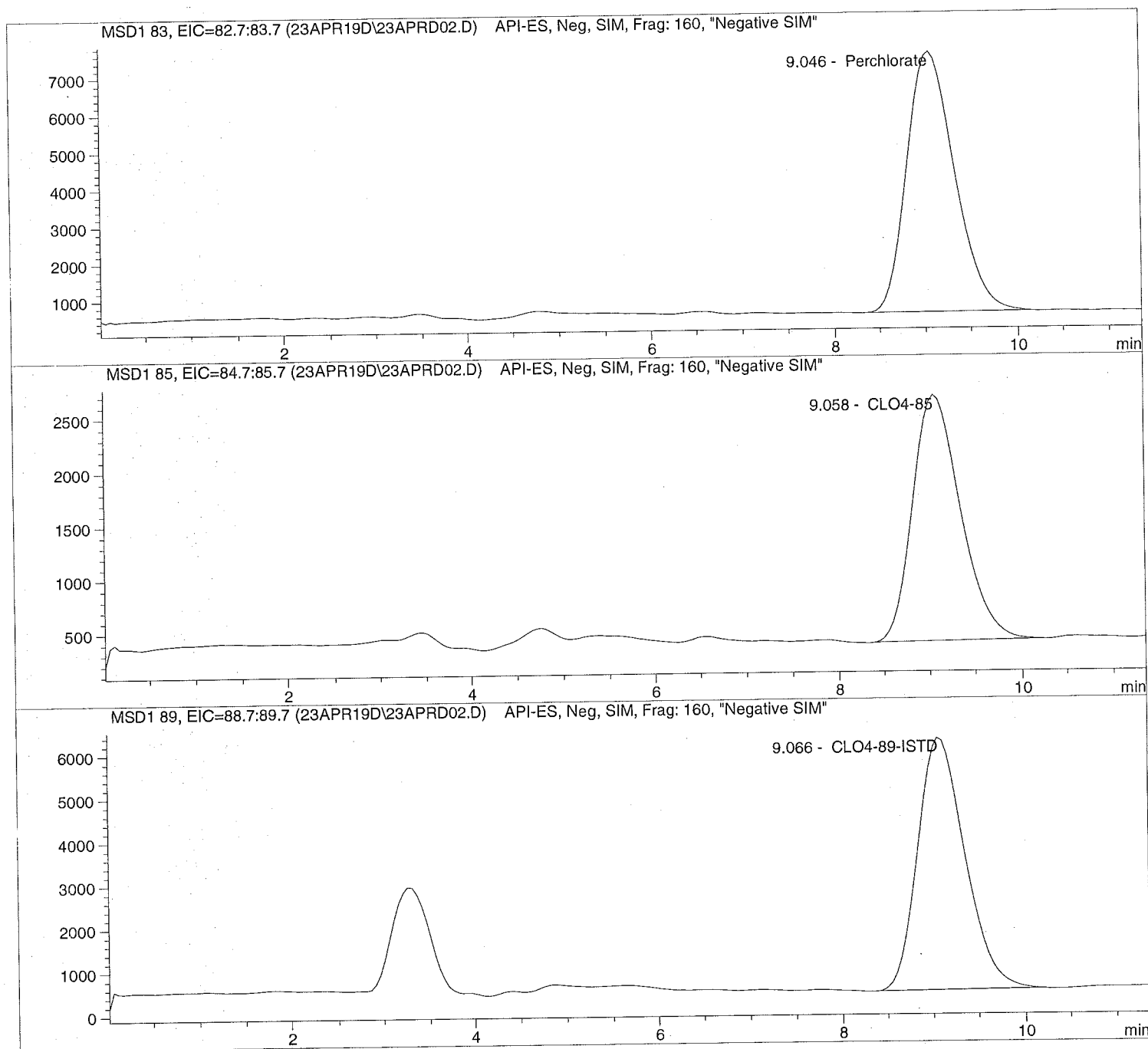
```
=====
*** End of Report ***
=====
```


Injection Date: 4/23/2019 08:53:38
Sample Name: 649381 QC@4.0
Acq Operator: TNB

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 08:53:38 Seq Line: 2
Sample Name: 649381 QC@4.0 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.046	PBA	253897.8	4.0112	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.058	PBA	83639.9	4.2937	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.066	PBA	208541.6	5.0000	CLO4-89-ISTD

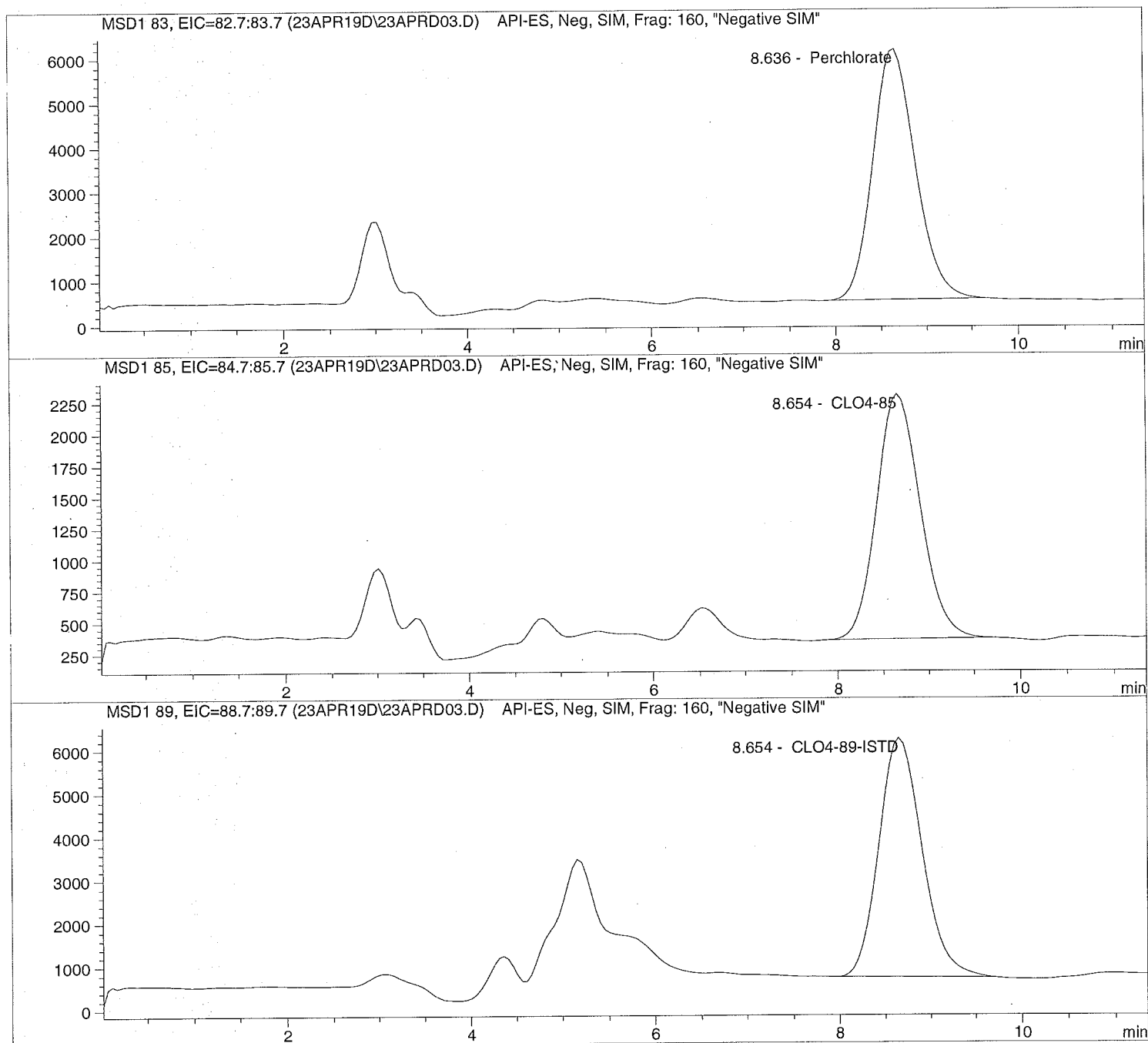
*** End of Report ***

Injection Date: 4/23/2019 09:07:01
Sample Name: 649379 ICS@4.0
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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 09:07:01
Sample Name: 649379 ICS@4.0
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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.636	PBA	182630.9	3.3416	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.654	PBA	64850.2	3.8217	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.654	PBA	181823.6	5.0000	CLO4-89-ISTD

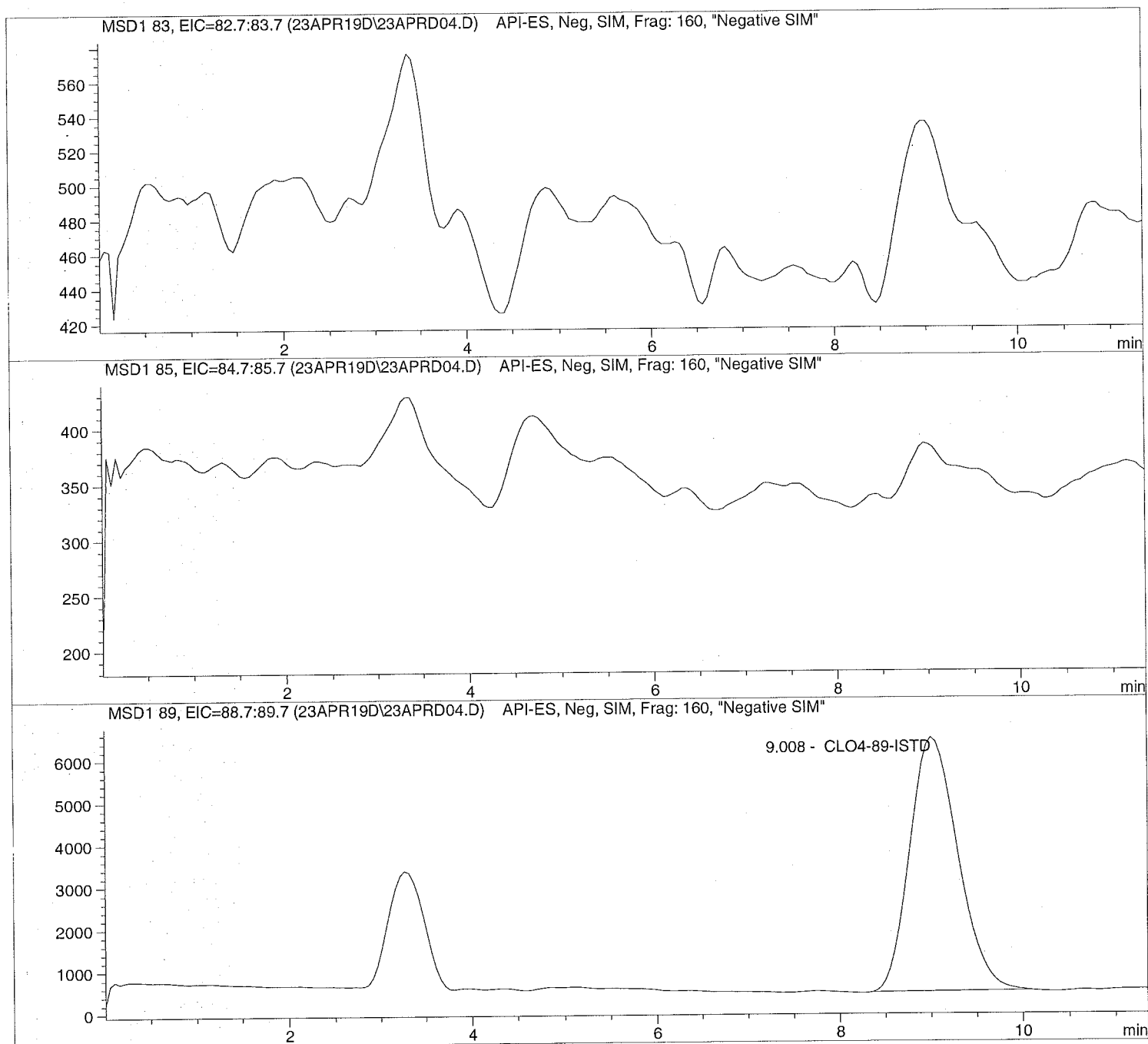
*** End of Report ***

Injection Date: 4/23/2019 09:20:26
Sample Name: 649380 LMB
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  09:20:26      Seq Line:      4
Sample Name:    649380    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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
9.008	PBA	216871.1	5.0000	CLO4-89-ISTD

=====

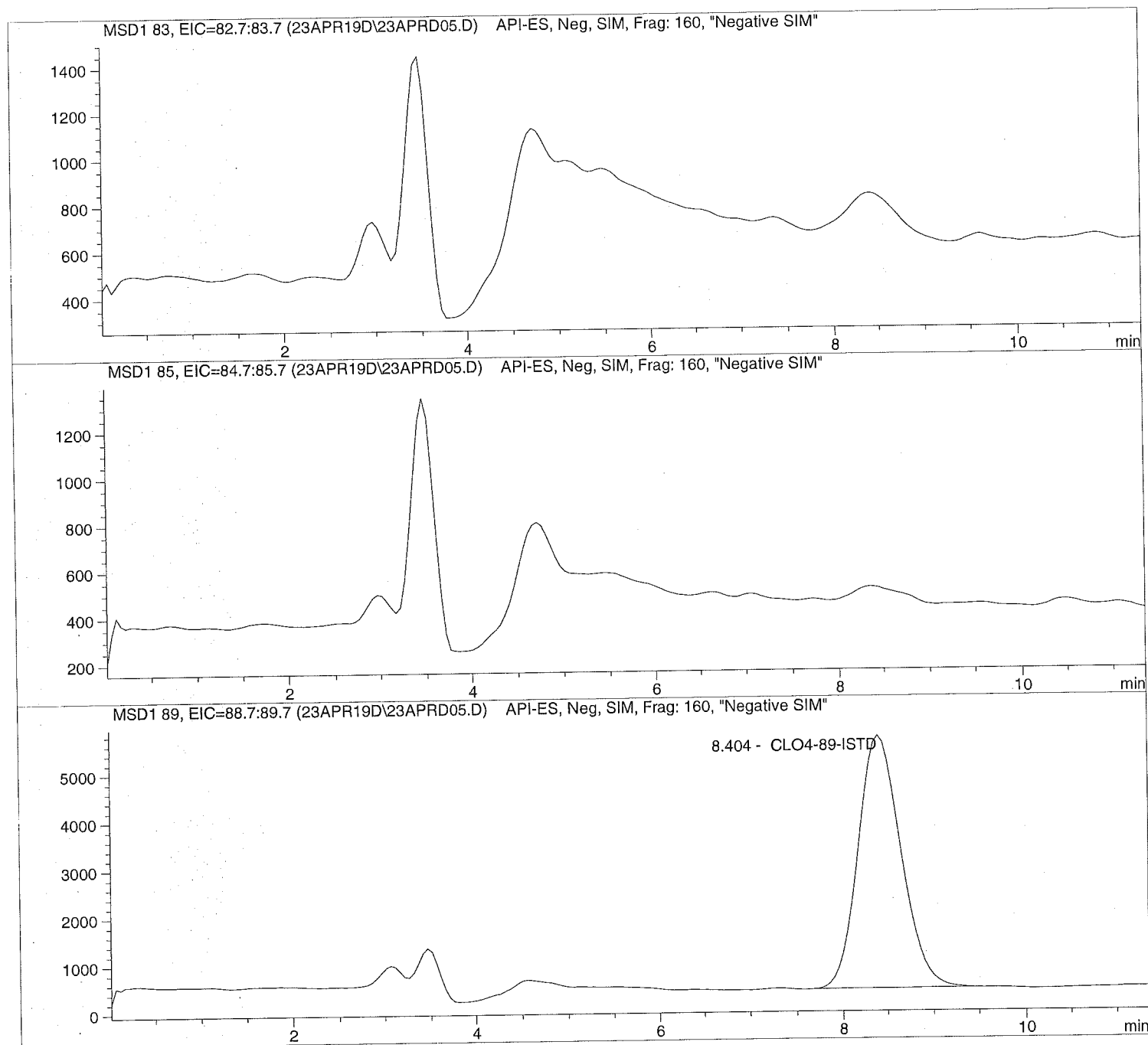
*** End of Report ***

Injection Date: 4/23/2019 09:36:37
Sample Name: 1910478001
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 09:36:37 Seq Line: 5
Sample Name: 1910478001 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.404	PBA	172857.1	5.0000	CLO4-89-ISTD

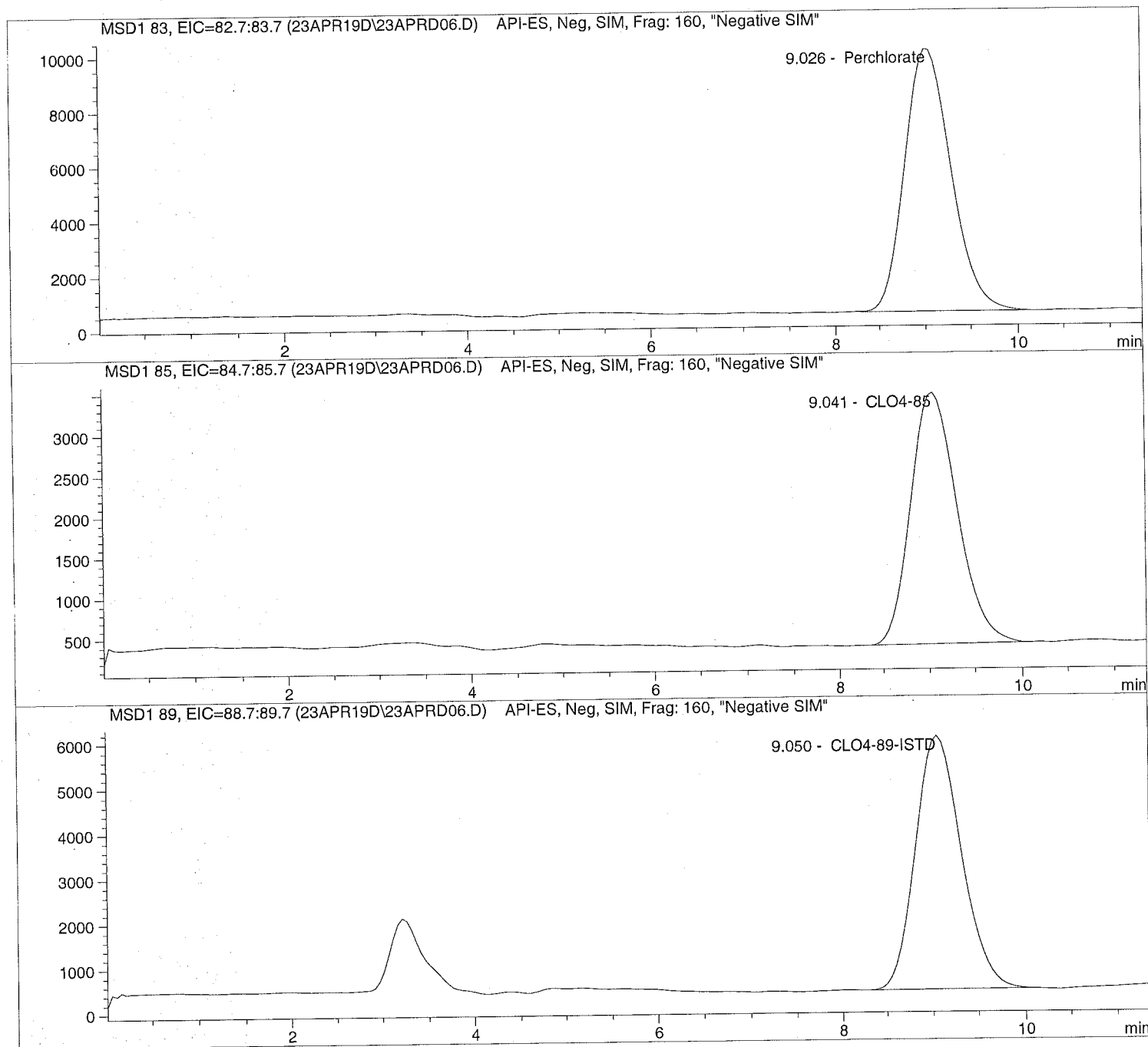
*** End of Report ***

Injection Date: 4/23/2019 09:49:59
Sample Name: 1910480001 1K
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  09:49:59      Seq Line:      6
Sample Name:    1910480001  1K           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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.026	BBA	337160.7	5552.1819	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.041	PBA	109251.5	5913.5779	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.050	PBA	197148.5	5000.0000	CLO4-89-ISTD

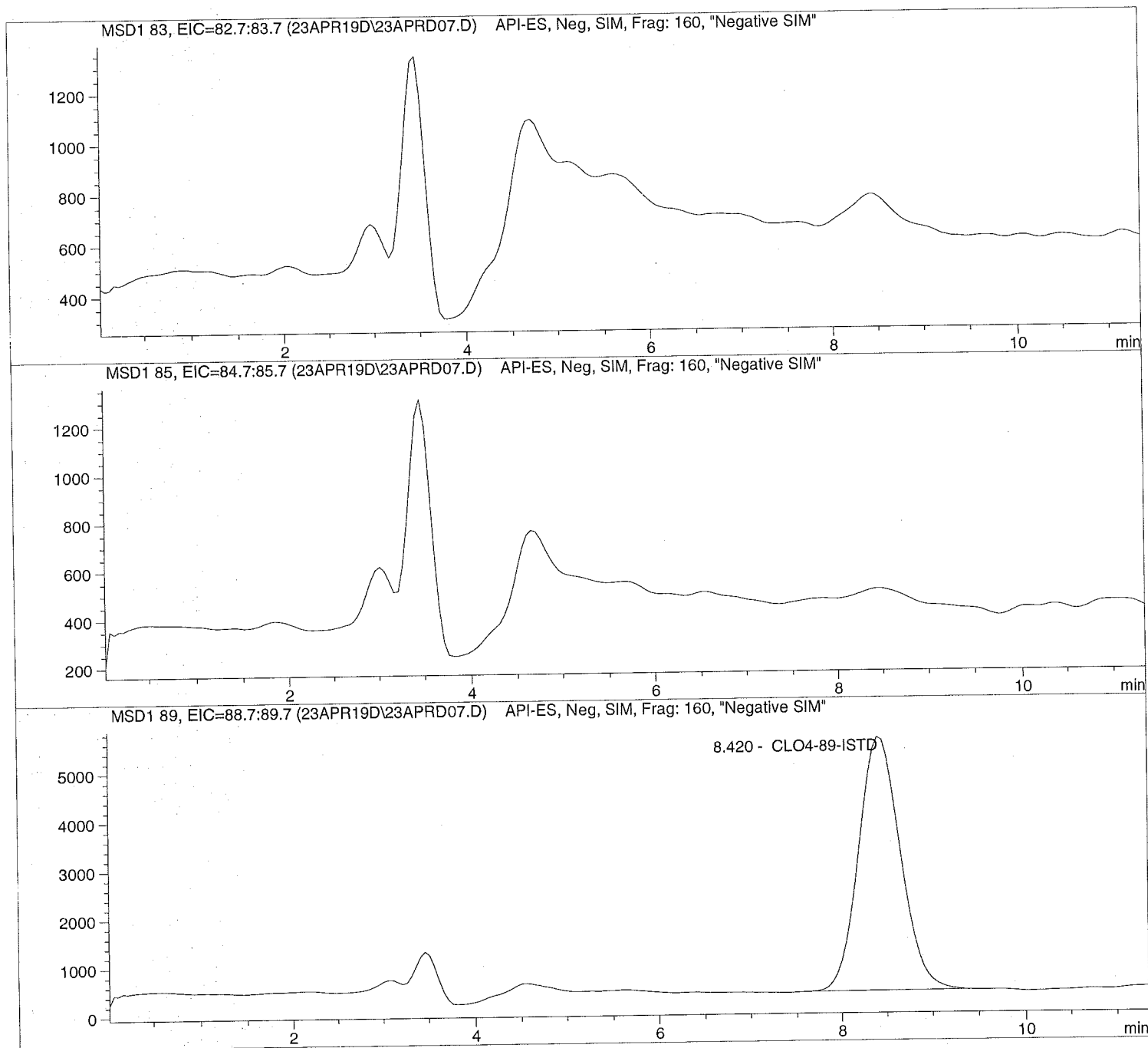
*** End of Report ***

Injection Date: 4/23/2019 10:03:26
Sample Name: 1910483001
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:03:26      Seq Line:      7
Sample Name:    1910483001      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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.420	PBA	165412.1	5.0000	CLO4-89-ISTD

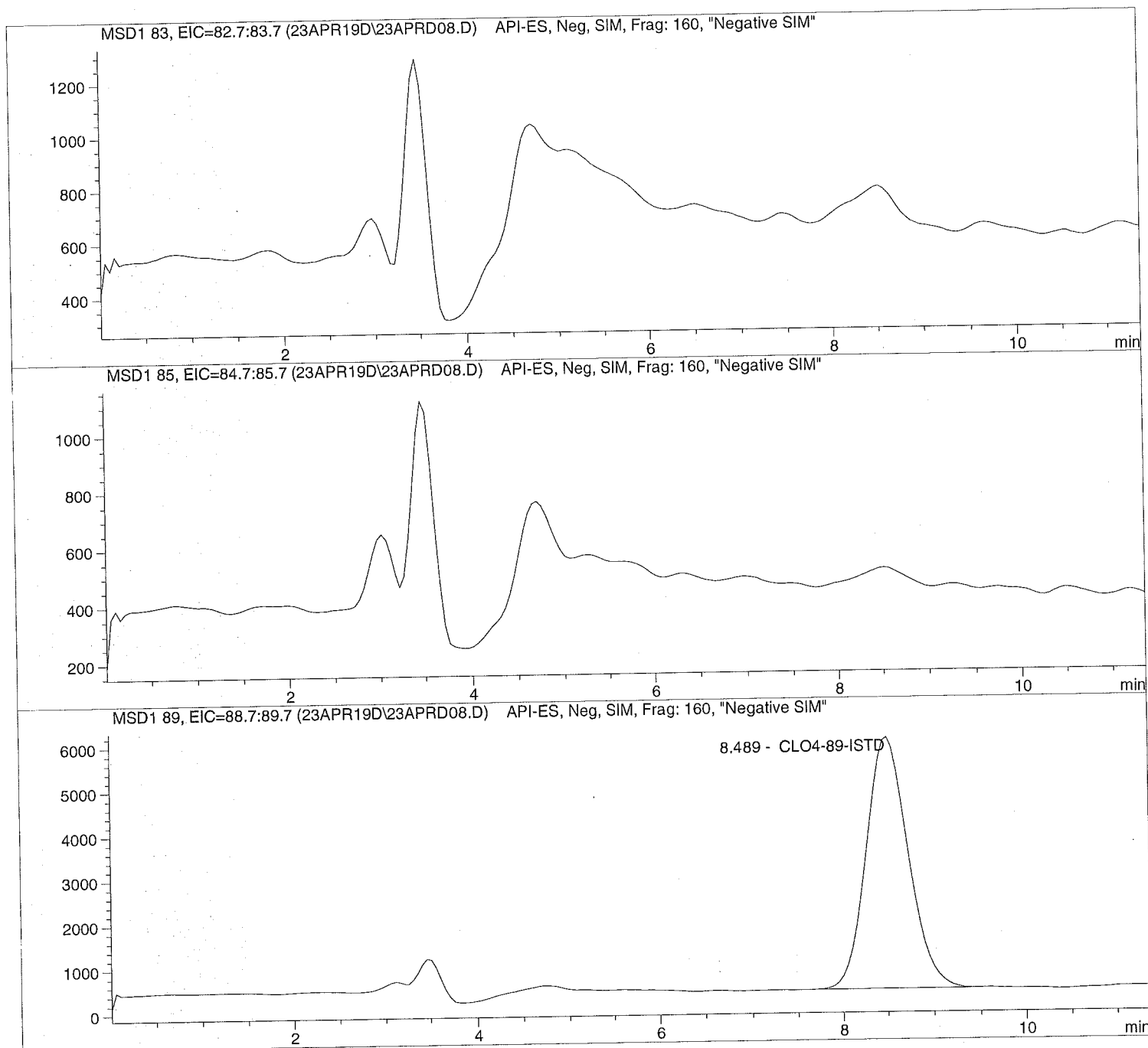
*** End of Report ***

Injection Date: 4/23/2019 10:16:48
Sample Name: 1911288001
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 10:16:48 Seq Line: 8
Sample Name: 1911288001 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.489	BBA	181749.4	5.0000	CLO4-89-ISTD

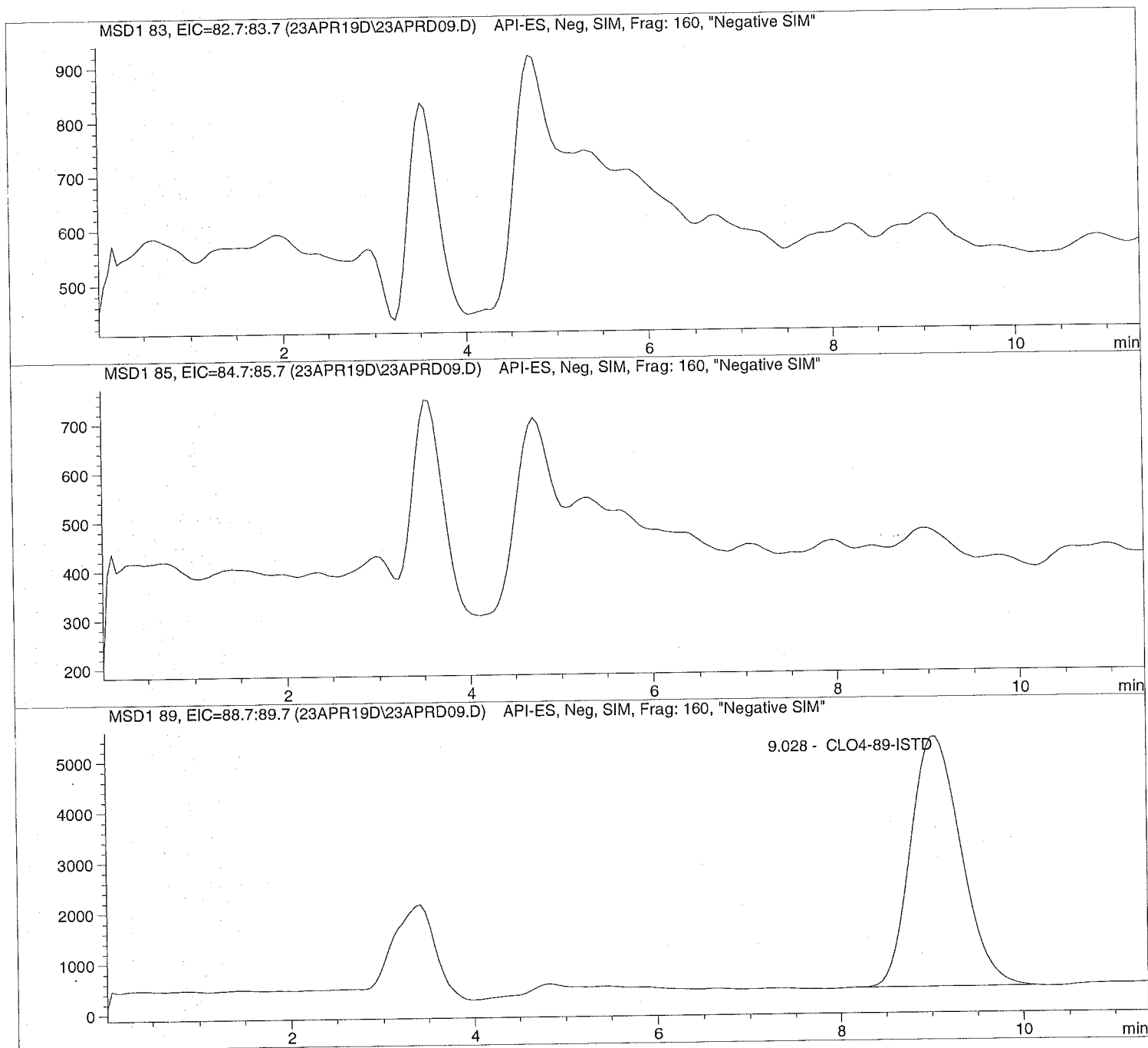
*** End of Report ***

Injection Date: 4/23/2019 10:30:16
Sample Name: 1910837001
Acq Operator: TNB

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:30:16      Seq Line:          9
Sample Name:    1910837001      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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
9.028	BBA	187599.0	5.0000	CLO4-89-ISTD

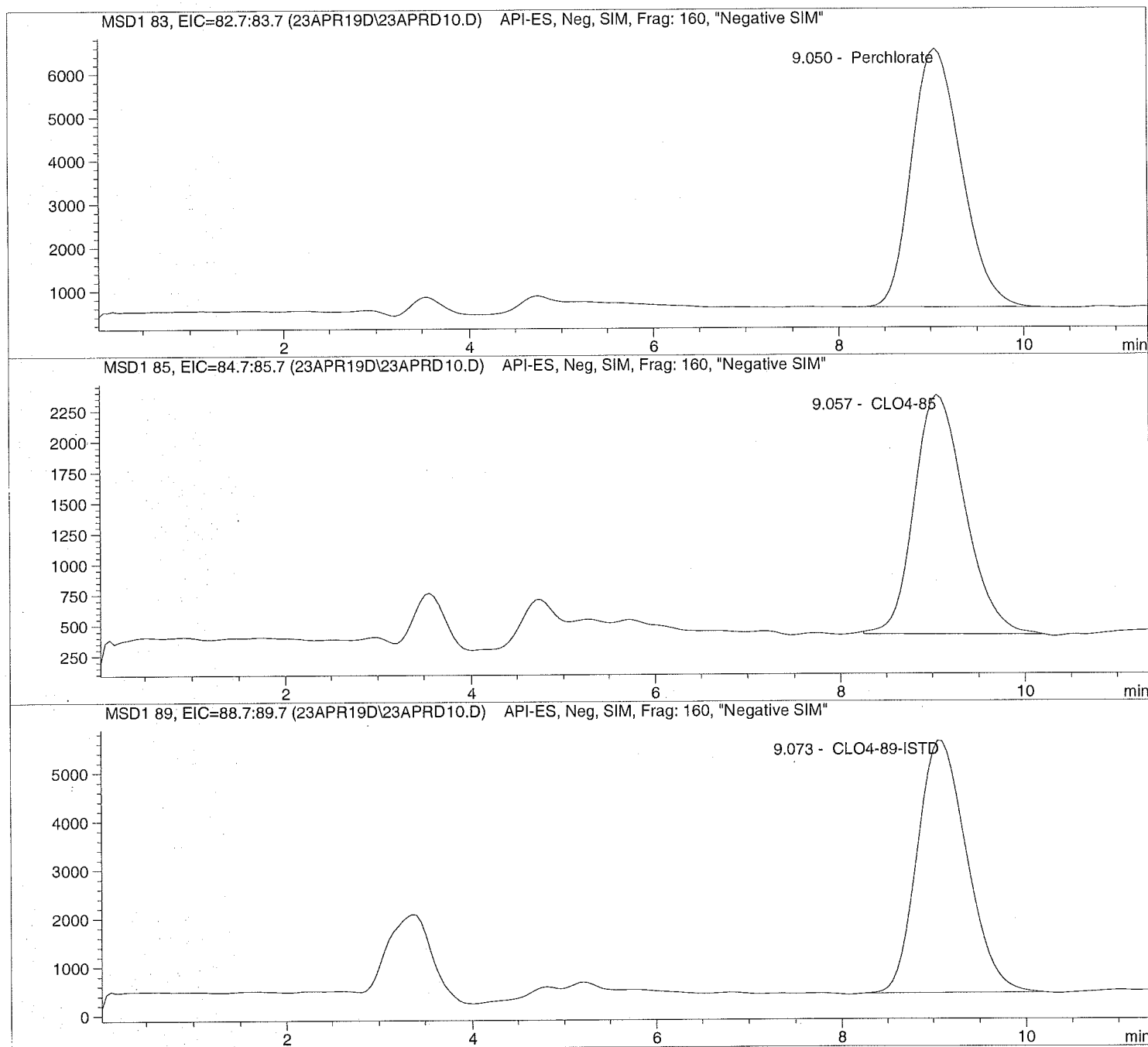
=====
*** End of Report ***
=====

Injection Date: 4/23/2019 10:43:43
Sample Name: 1910837002 MS
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:43:43      Seq Line:          10
Sample Name:    1910837002  MS           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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.050	PBA	221785.2	3.8059	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.057	BBA	74121.5	4.1234	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.073	PBA	192506.7	5.0000	CLO4-89-ISTD

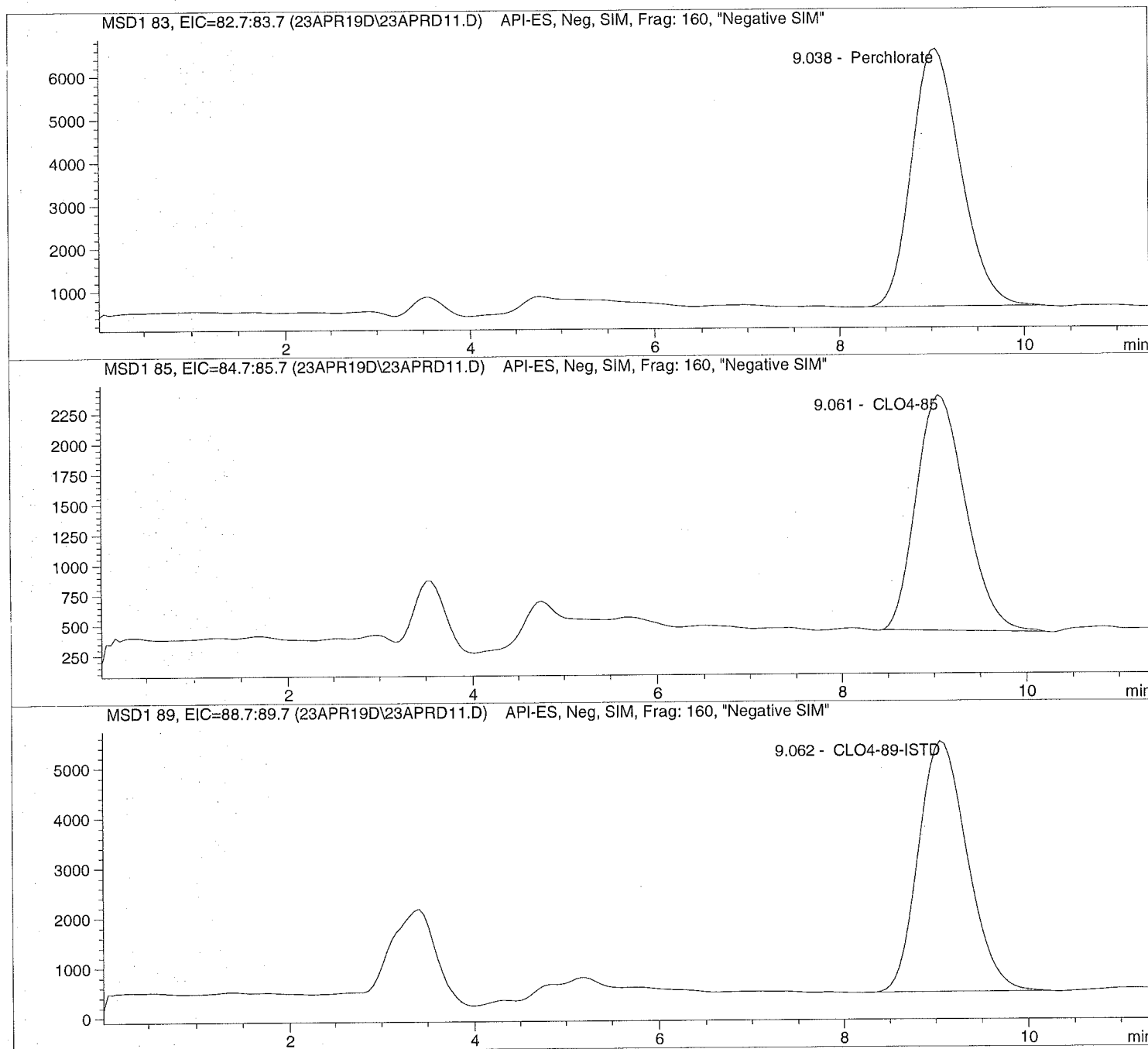
*** End of Report ***

Injection Date: 4/23/2019 10:57:05
Sample Name: 1910837003 MSD
Acq Operator: TNB

Seq Line: 11
Location: Vial 81
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:57:05      Seq Line:           11
Sample Name:    1910837003  MSD           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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
9.038	PBA	220802.4	3.9511	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.061	BBA	72383.4	4.2063	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.062	PBA	184256.2	5.0000	CLO4-89-ISTD

=====

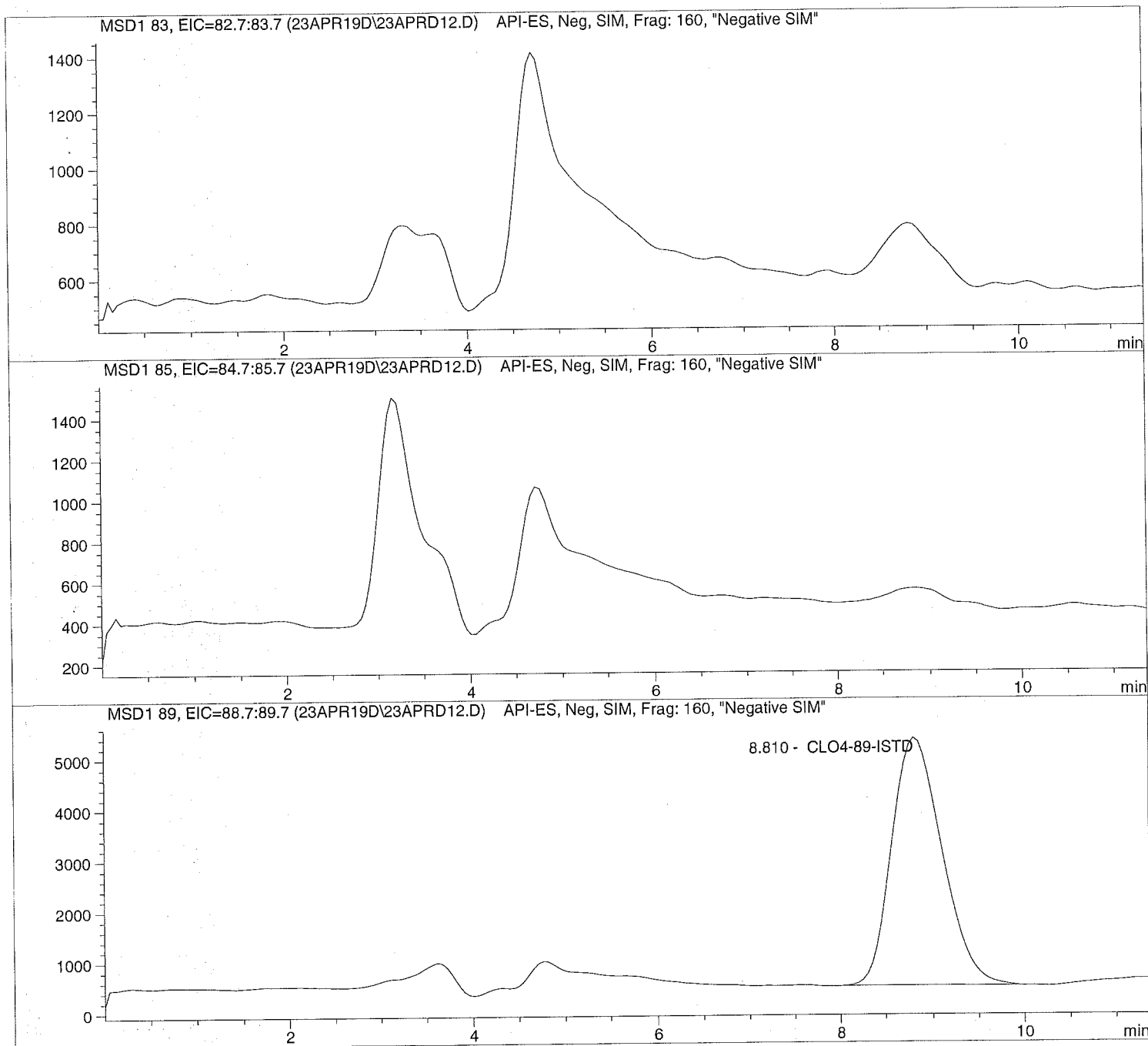
*** End of Report ***

Injection Date: 4/23/2019 11:10:26
Sample Name: 1910837004
Acq Operator: TNB

Seq Line: 12
Location: Vial 82
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  11:10:26      Seq Line:           12
Sample Name:    1910837004              Location:           Vial 82
Acq Operator:   TNB                     Inj. No.:           1
                                           Inj. Vol.:          35 µl
=====
```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

```
=====
Sample Information
=====
```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.810	PBA	180138.5	5.0000	CLO4-89-ISTD

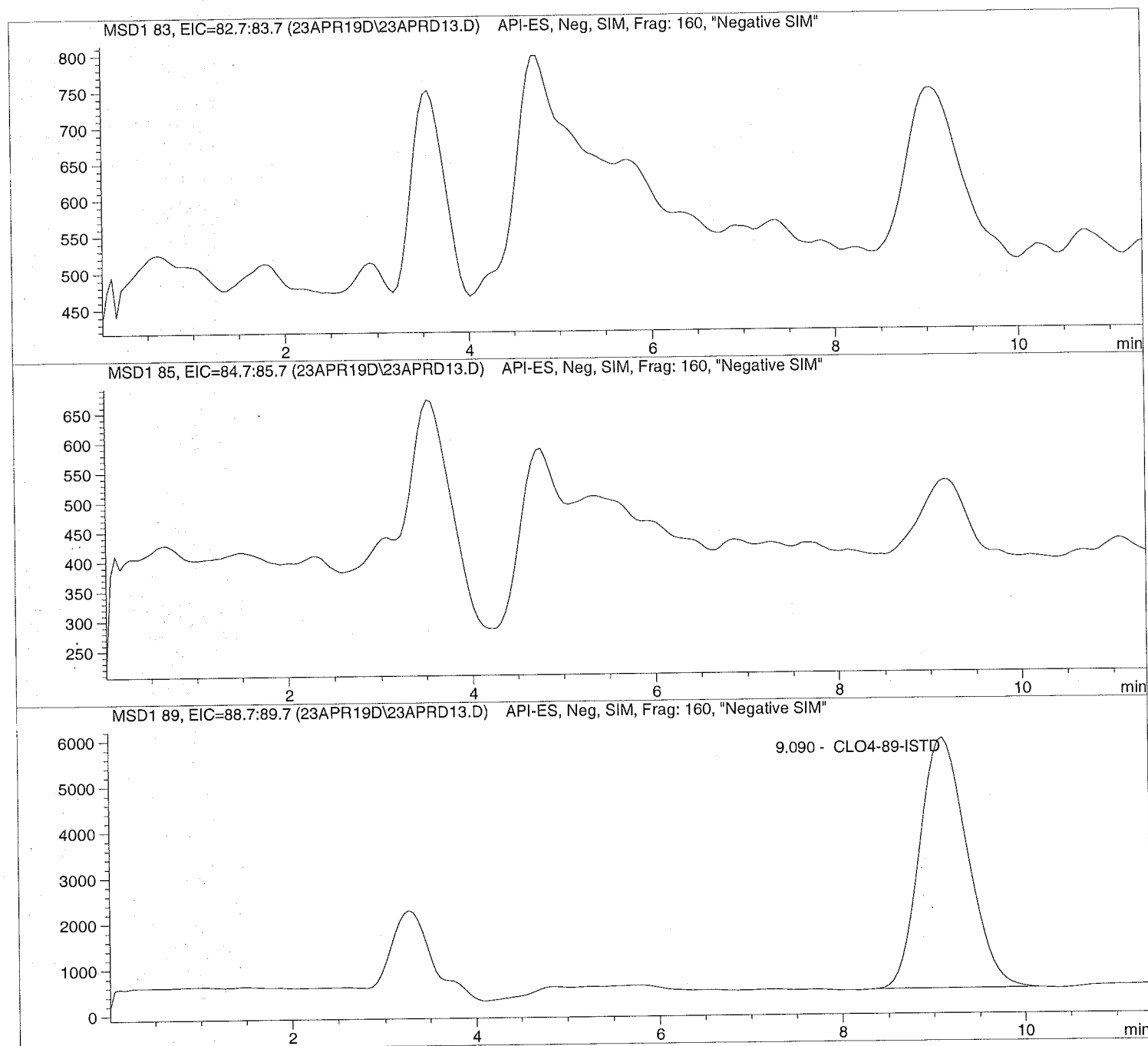
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 11:23:52
Sample Name: 1910837005
Acq Operator: TNB

Seq Line: 13
Location: Vial 83
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  11:23:52      Seq Line:           13
Sample Name:    1910837005              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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
9.090	BBA	197954.5	5.0000	CLO4-89-ISTD

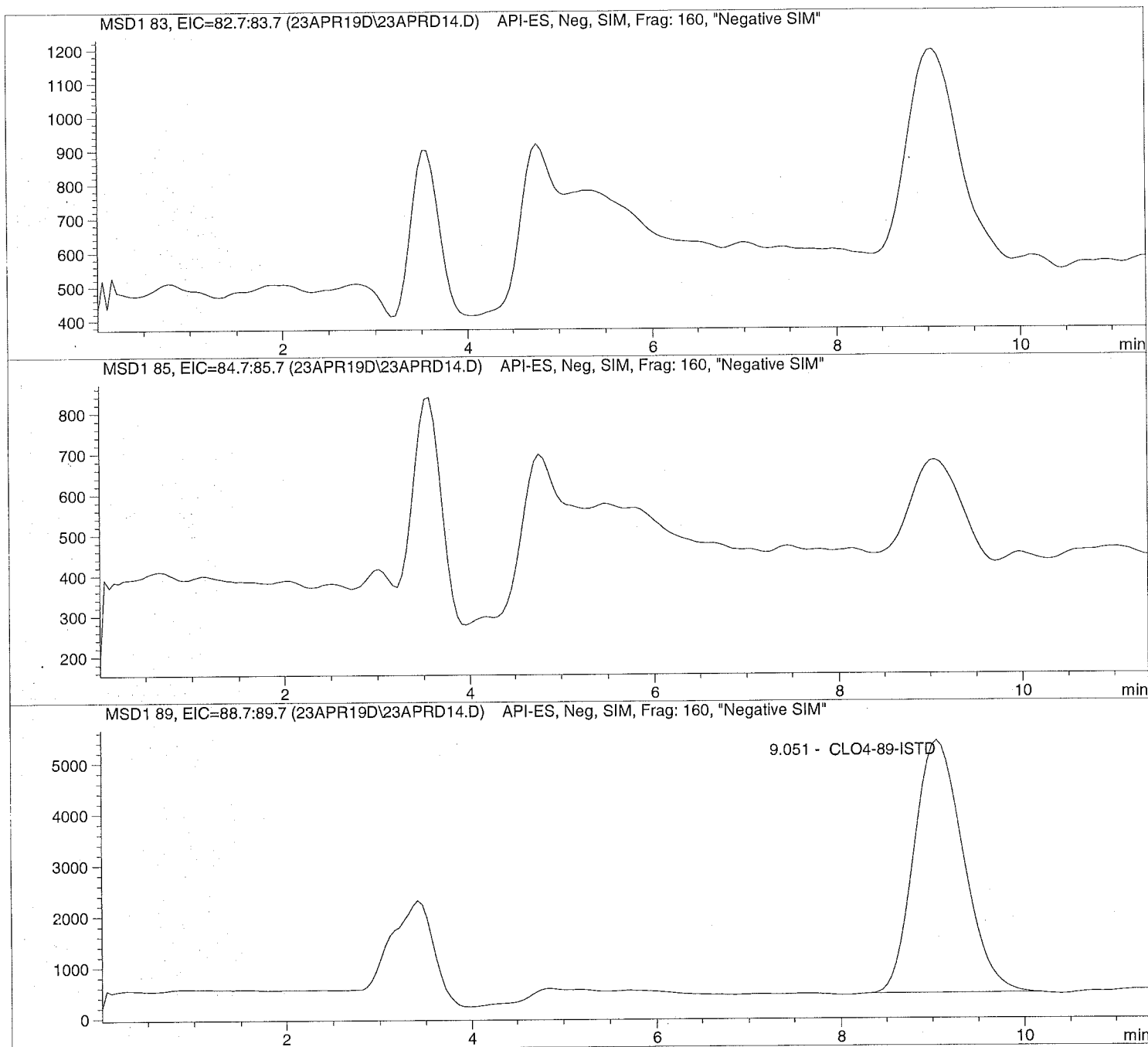
=====
*** End of Report ***
=====

Injection Date: 4/23/2019 11:37:15
Sample Name: 1910837006
Acq Operator: TNB

Seq Line: 14
Location: Vial 84
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  11:37:15      Seq Line:           14
Sample Name:    1910837006                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-DP2.M
Last Changed:   4/12/2019  07:54:13
=====
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
9.051	BBA	183017.4	5.0000	CLO4-89-ISTD

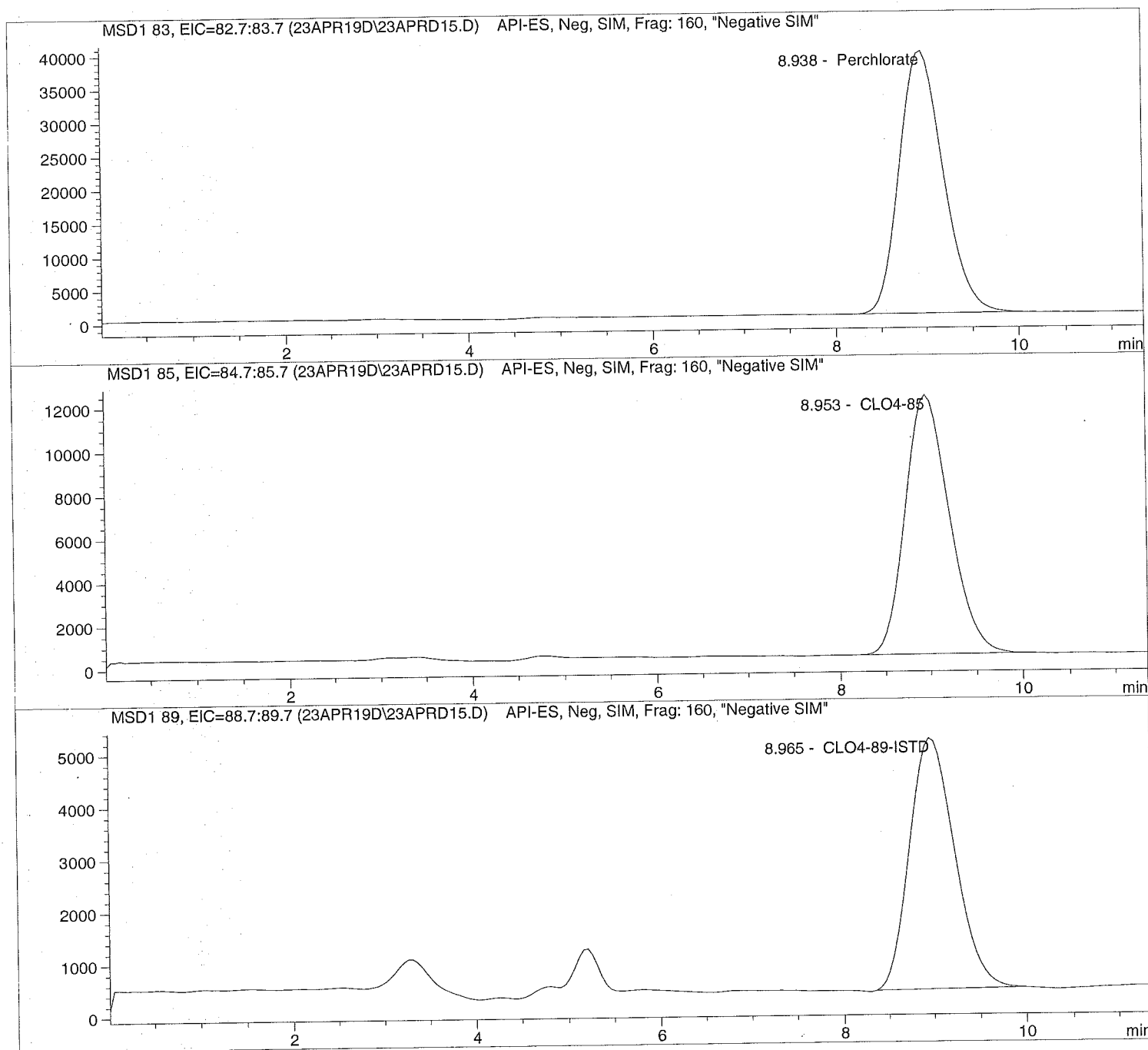
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 11:50:37
Sample Name: 649382 CCV@25
Acq Operator: TNB

Seq Line: 15
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 11:50:37
Sample Name: 649382 CCV@25
Acq Operator: TNB

Seq Line: 15
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.938	PBA	1311276.0	24.2693	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.953	BBA	400971.3	24.9597	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.965	PBA	164670.7	5.0000	CLO4-89-ISTD

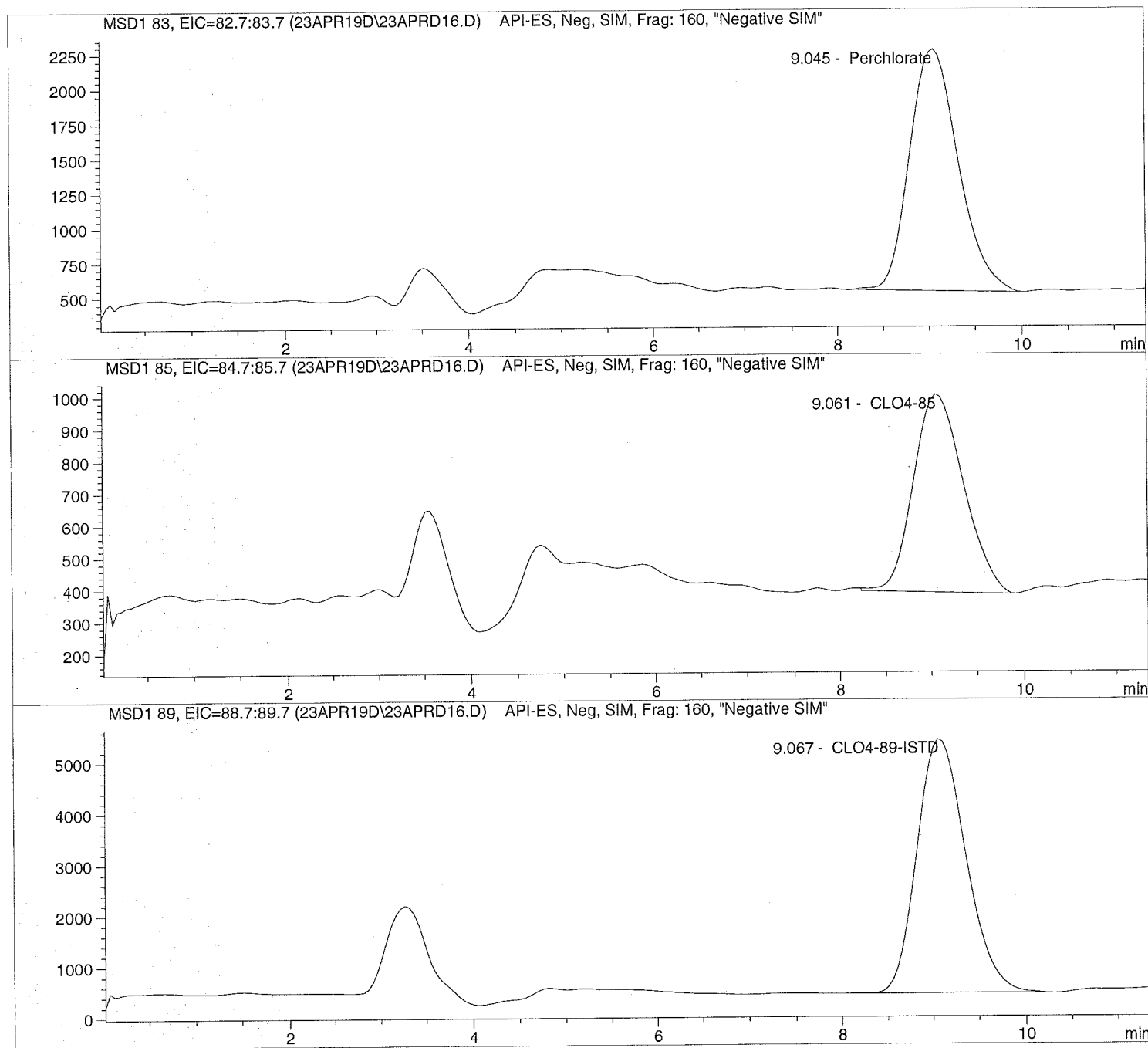
*** End of Report ***

Injection Date: 4/23/2019 12:03:59
Sample Name: 1910837007
Acq Operator: TNB

Seq Line: 16
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 12:03:59
Sample Name: 1910837007
Acq Operator: TNB

Seq Line: 16
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.045	BBA	64240.0	1.2640	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.061	BBA	23485.4	1.3651	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.067	PBA	184879.5	5.0000	CLO4-89-ISTD

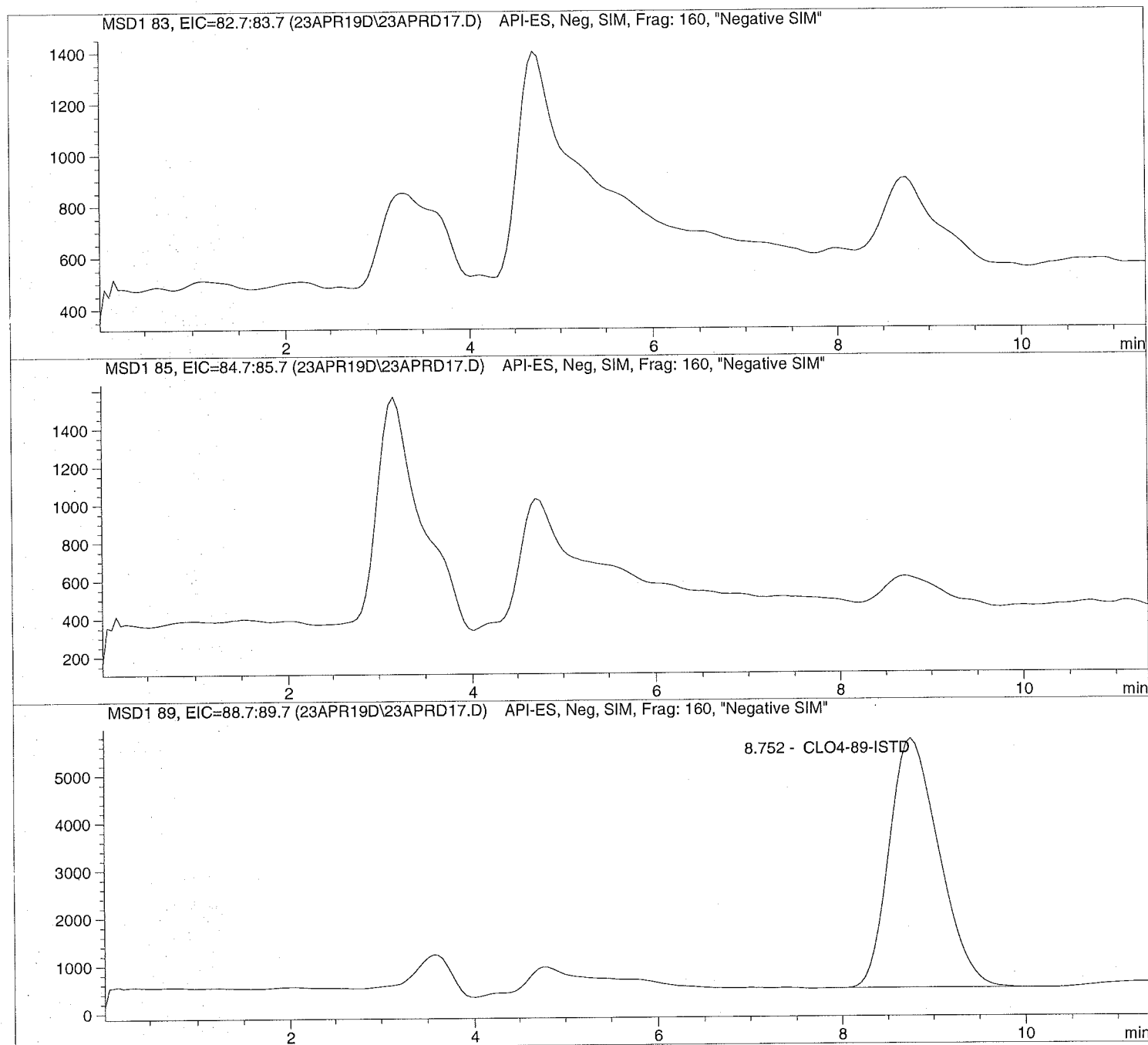
*** End of Report ***

Injection Date: 4/23/2019 12:17:22
Sample Name: 1910837008
Acq Operator: TNB

Seq Line: 17
Location: Vial 86
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  12:17:22      Seq Line:          17
Sample Name:    1910837008              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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.752	PBA	196776.6	5.0000	CLO4-89-ISTD

=====

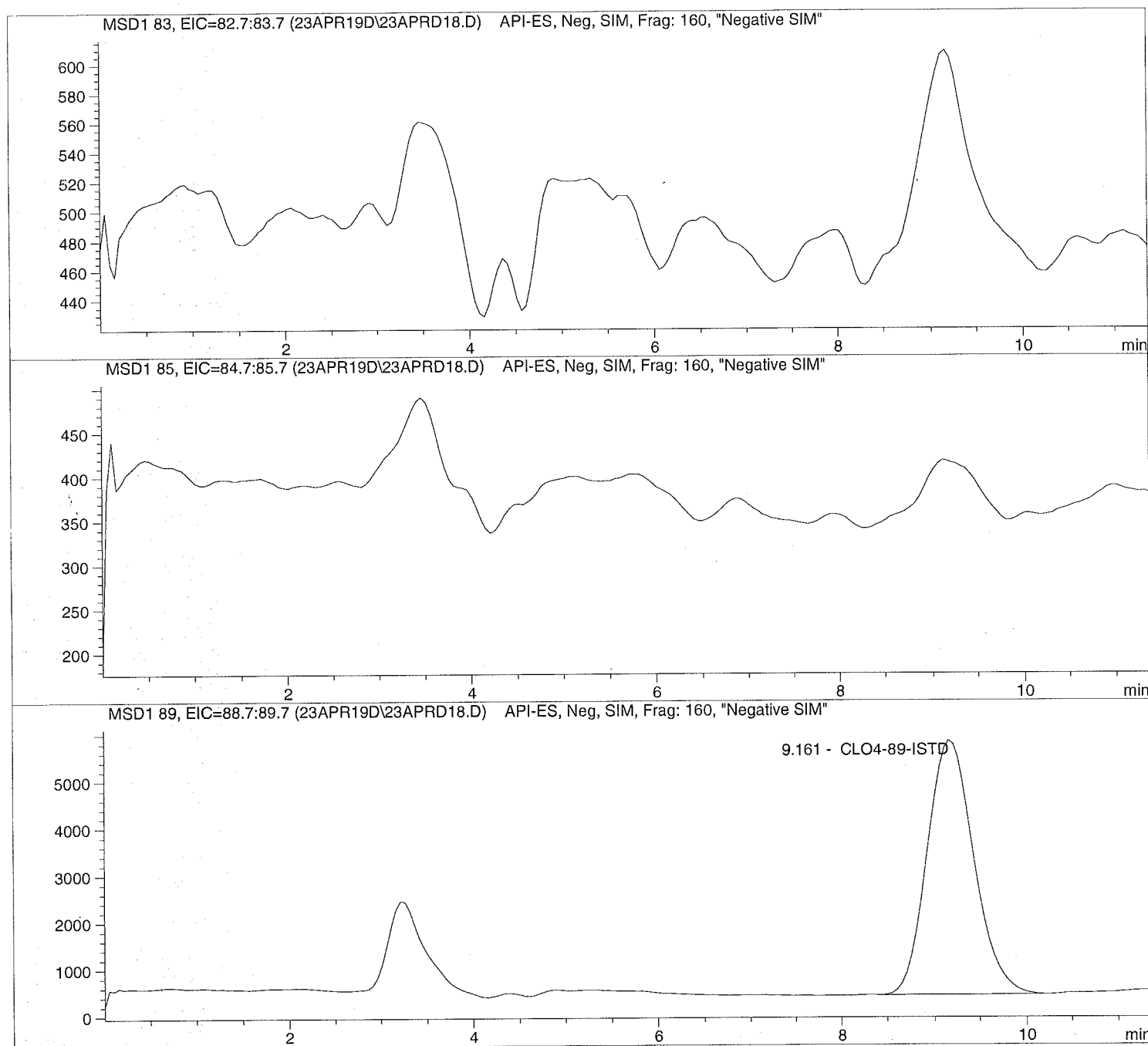
*** End of Report ***

Injection Date: 4/23/2019 12:30:43
Sample Name: 1910837009
Acq Operator: TNB

Seq Line: 18
Location: Vial 87
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 12:30:43
Sample Name: 1910837009
Acq Operator: TNB

Seq Line: 18
Location: Vial 87
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.161	BBA	191613.1	5.0000	CLO4-89-ISTD

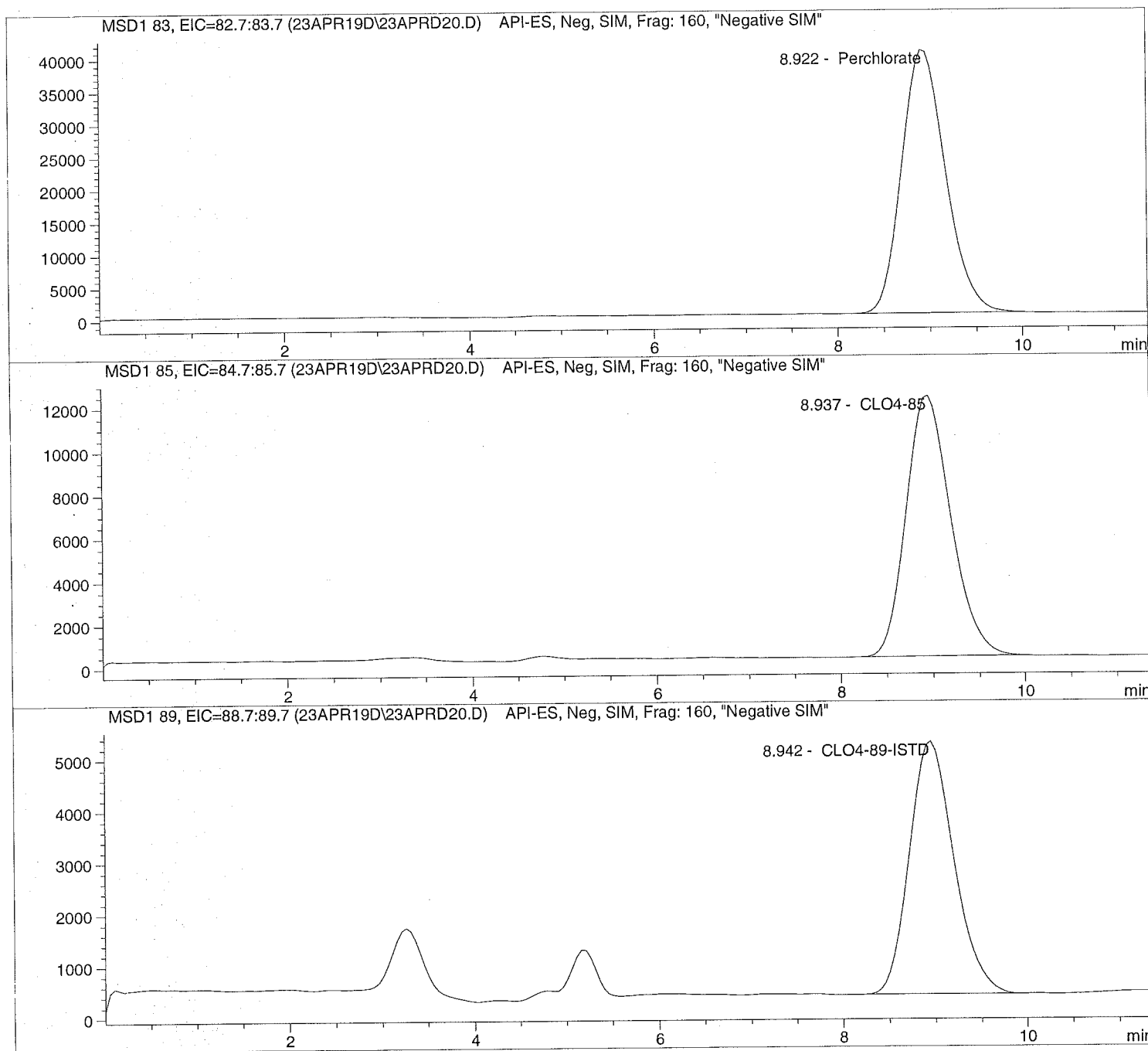
*** End of Report ***

Injection Date: 4/23/2019 13:01:17
Sample Name: 649383 CCV@25
Acq Operator: TNB

Seq Line: 20
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 13:01:17 Seq Line: 20
Sample Name: 649383 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.922	PBA	1319634.0	24.7062	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.937	PBA	401823.2	25.3099	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.942	PBA	162618.0	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 : 3/19/2019 2:35:19 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
8.744	1 1	1.00000	7.76074e4	1.28854e-5	1	Perchlorate
	2	2.00000	1.35273e5	1.47849e-5		
	3	5.00000	3.37764e5	1.48033e-5		
	4	10.00000	6.83454e5	1.46316e-5		
	5	25.00000	2.08433e6	1.19943e-5		
	6	50.00000	4.13334e6	1.20968e-5		
	7	75.00000	5.99313e6	1.25143e-5		
8.755	2 1	1.00000	2.36780e4	4.22333e-5	1	CLO4-85
	2	2.00000	4.69486e4	4.25998e-5		
	3	5.00000	1.06124e5	4.71147e-5		
	4	10.00000	2.13523e5	4.68335e-5		
	5	25.00000	6.14295e5	4.06971e-5		
	6	50.00000	1.19814e6	4.17315e-5		
	7	75.00000	1.78355e6	4.20509e-5		
8.766	3 1	5.00000	2.73208e5	1.83011e-5	+I1	CLO4-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5		
	3	5.00000	2.33196e5	2.14412e-5		
	4	5.00000	2.34454e5	2.13262e-5		
	5	5.00000	2.50568e5	1.99547e-5		
	6	5.00000	2.30977e5	2.16472e-5		

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min
Curve Type : Quadratic
Origin : Ignored
Calibration Level Weights:/
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333

Compound: CLO4-85

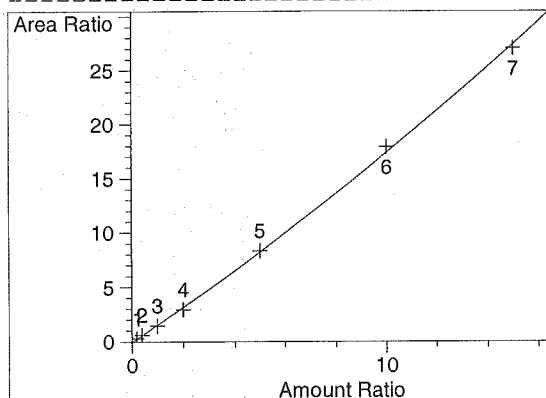
Time Window : From 6.650 min To 12.505 min
Curve Type : Quadratic
Origin : Ignored
Calibration Level Weights:/
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333

Compound: CLO4-89-ISTD

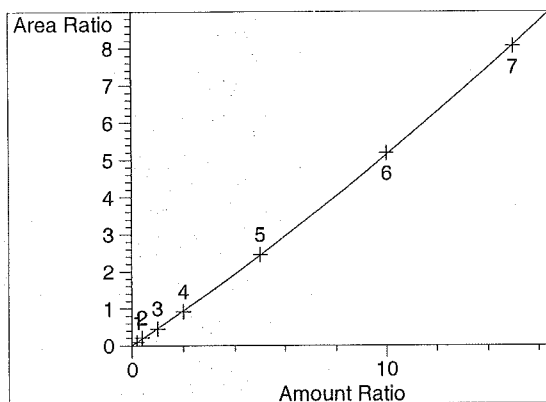
Time Window : From 6.659 min To 12.466 min
Curve Type : Linear
Origin : Included
Calibration Level Weights:/
Level 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

=====
Peak Sum Table
=====

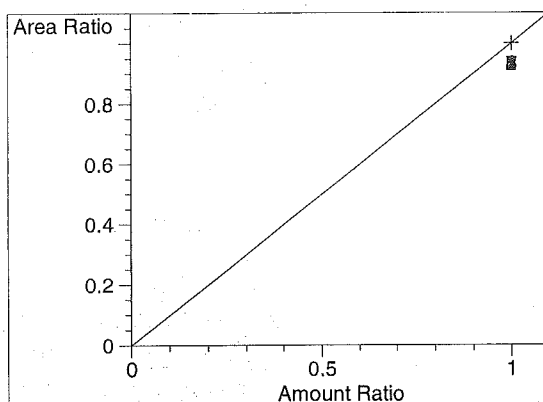
No Entries in table
=====

=====
Calibration Curves
=====

Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation: 0.99957
Residual Std. Dev.: 0.30744
Formula: $y = ax^2 + bx + c$
a: 1.76988e-2
b: 1.56480
c: -4.92430e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755
MSD1 85, EIC=84.7:85.7
Correlation: 0.99983
Residual Std. Dev.: 0.03473
Formula: $y = ax^2 + bx + c$
a: 5.13396e-3
b: 4.62055e-1
c: 4.97209e-4
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766
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 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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
CL04@ 1.0ug/L	Vial 73	1	Control	3	7.76074e4	8.744	1.06245
CL04@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	8.992	2.06969
CL04@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	8.586	4.73474
CL04@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	8.698	9.27727
CL04@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	8.451	25.29036
CL04@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	8.810	51.36844
CL04@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	8.586	74.16754
ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	8.702	9.25940

Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
CL04@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	8.755	9.30535e-1
CL04@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	9.012	2.24255
CL04@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	8.602	4.86656
CL04@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	8.713	9.64312
CL04@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	8.468	25.12159
CL04@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	8.825	50.46721
CL04@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	8.603	74.72019
ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	8.721	9.54024

Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
CL04@ 1.0ug/L	Vial 73	1	Control	3	2.73208e5	8.766	5.00000
CL04@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	9.012	5.00000
CL04@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	8.609	5.00000
CL04@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	8.716	5.00000
CL04@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	8.472	5.00000
CL04@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	8.825	5.00000
CL04@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	8.610	5.00000
ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	8.725	5.00000

*** End of Report ***

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\MAR\19MAR19I.S

Sequence Table:

Method and Injection Info Part:

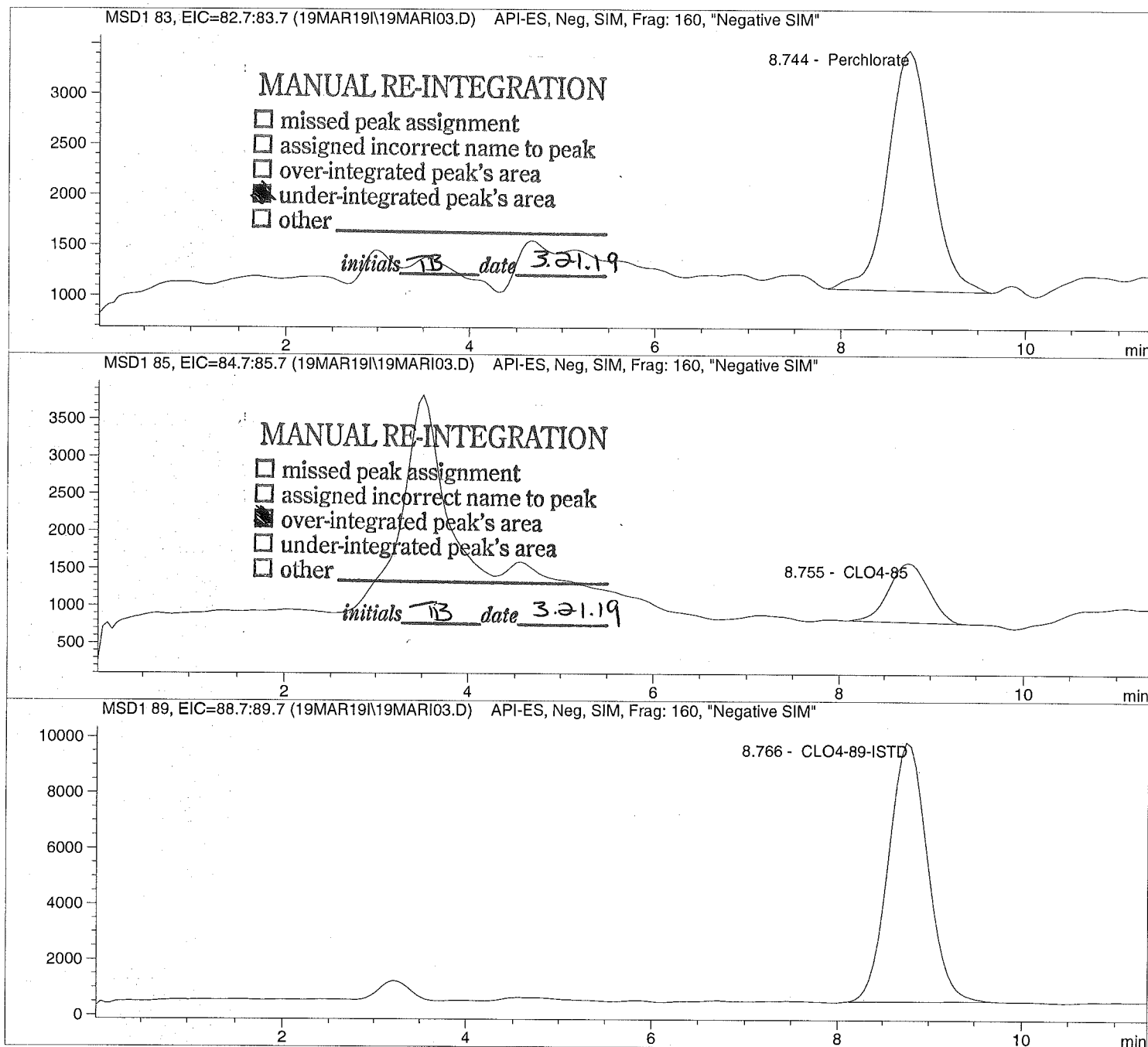
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	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 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.744	MM	77607.4	1.0625	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	MM	23678.0	0.9305	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

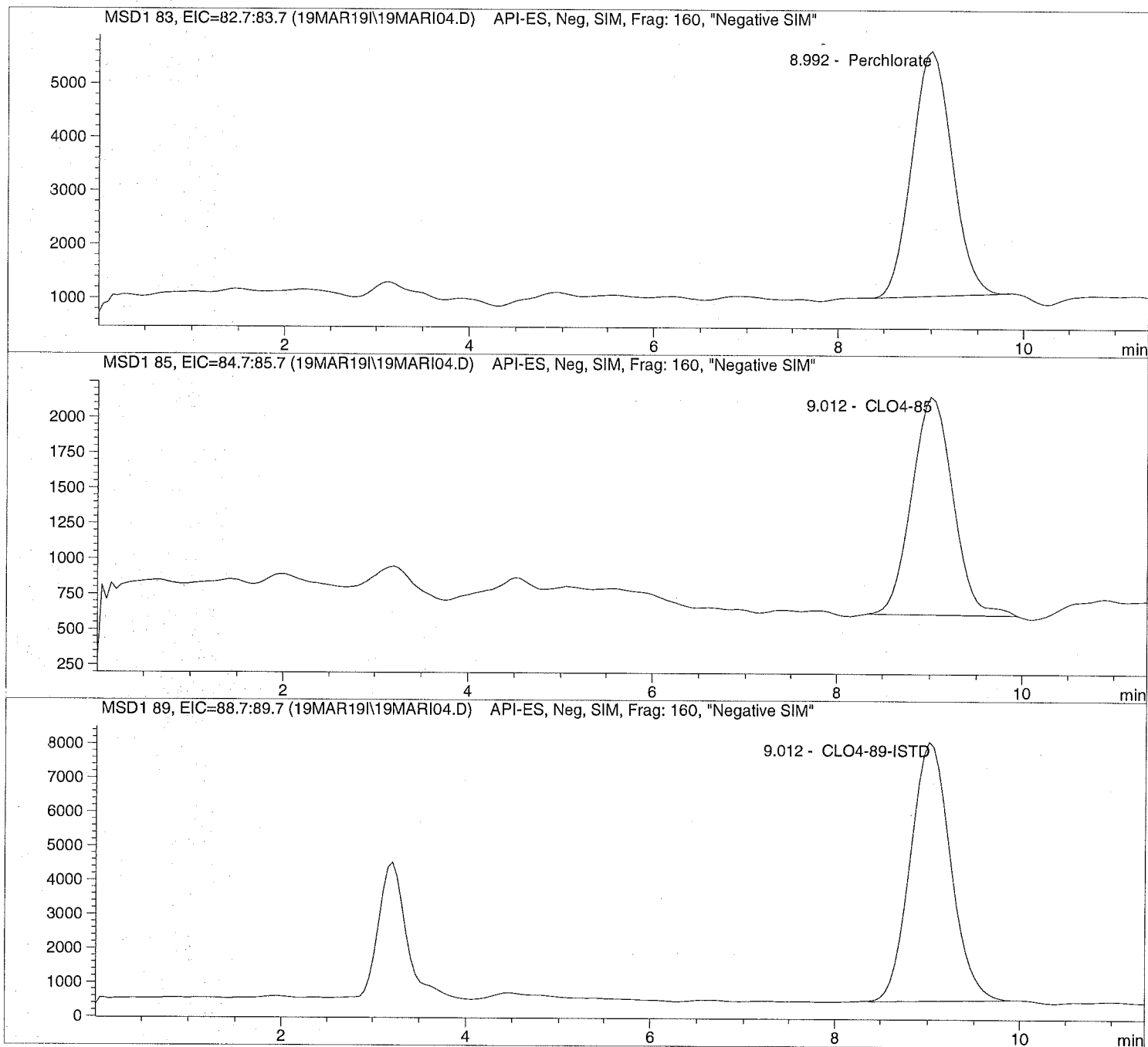
*** End of Report ***

Injection Date: 3/19/2019 09:53:00
Sample Name: CLO4@ 2.0ug/L
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:53:00 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.992	BBA	135272.8	2.0697	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

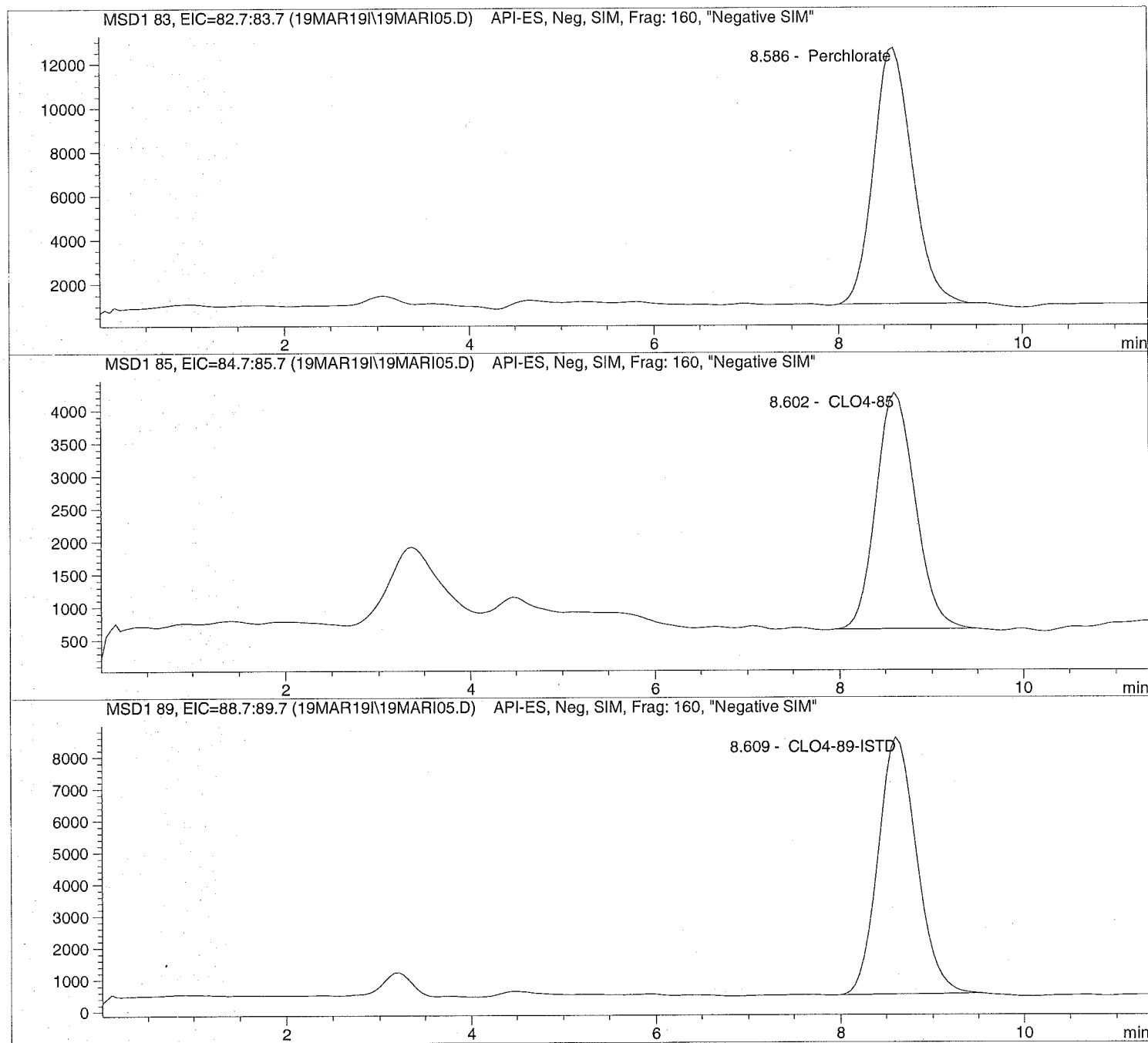
*** End of Report ***

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI05.D

Sample Name: CLO4@ 5.0ug/L

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 10:19:32

Seq Line: 6

Sample Name: CLO4@ 10.ug/L

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

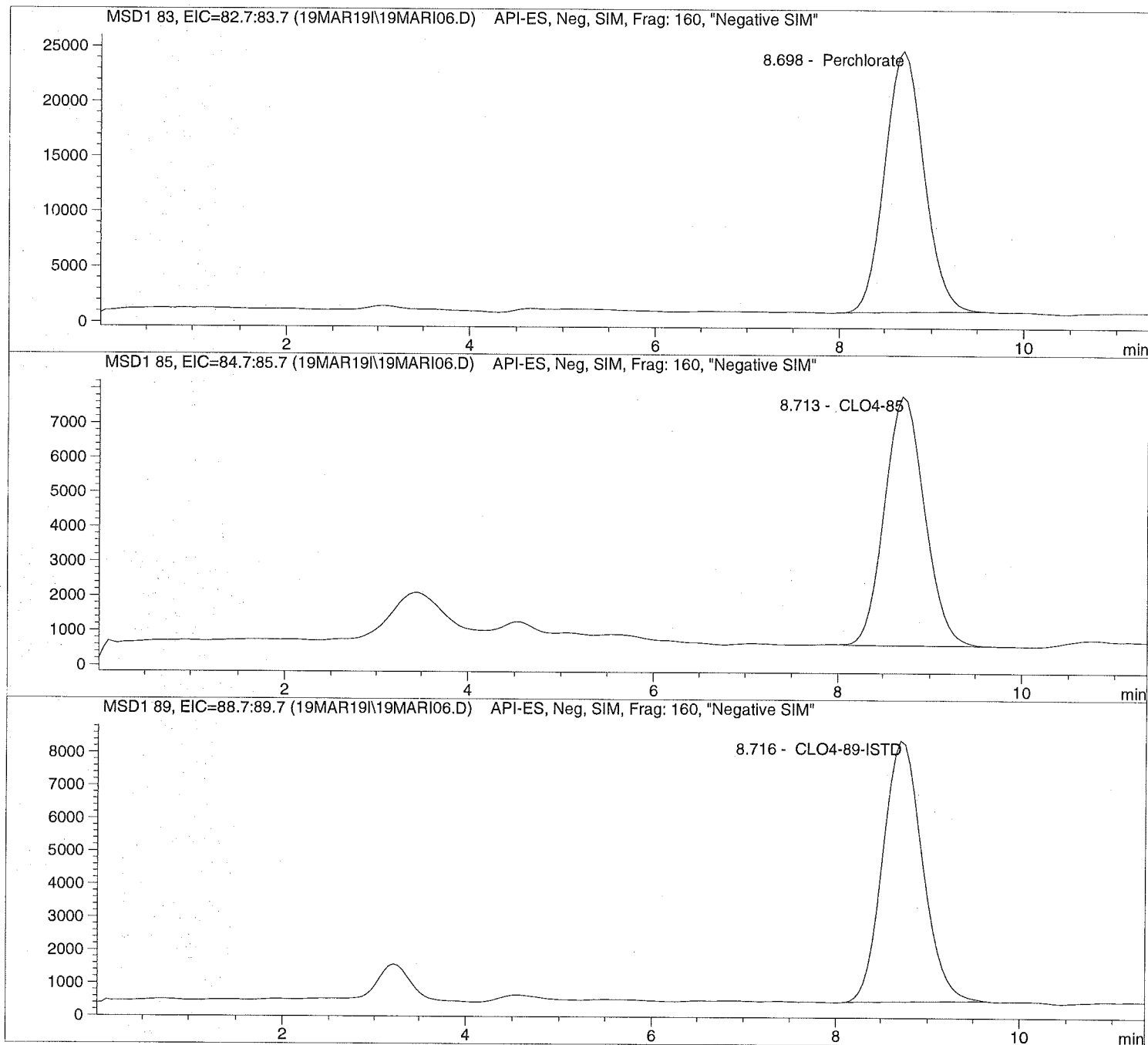
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI06.D Sample Name: CLO4@ 10.ug/L

Injection Date: 3/19/2019 10:19:32 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.698	PBA	683454.4	9.2773	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

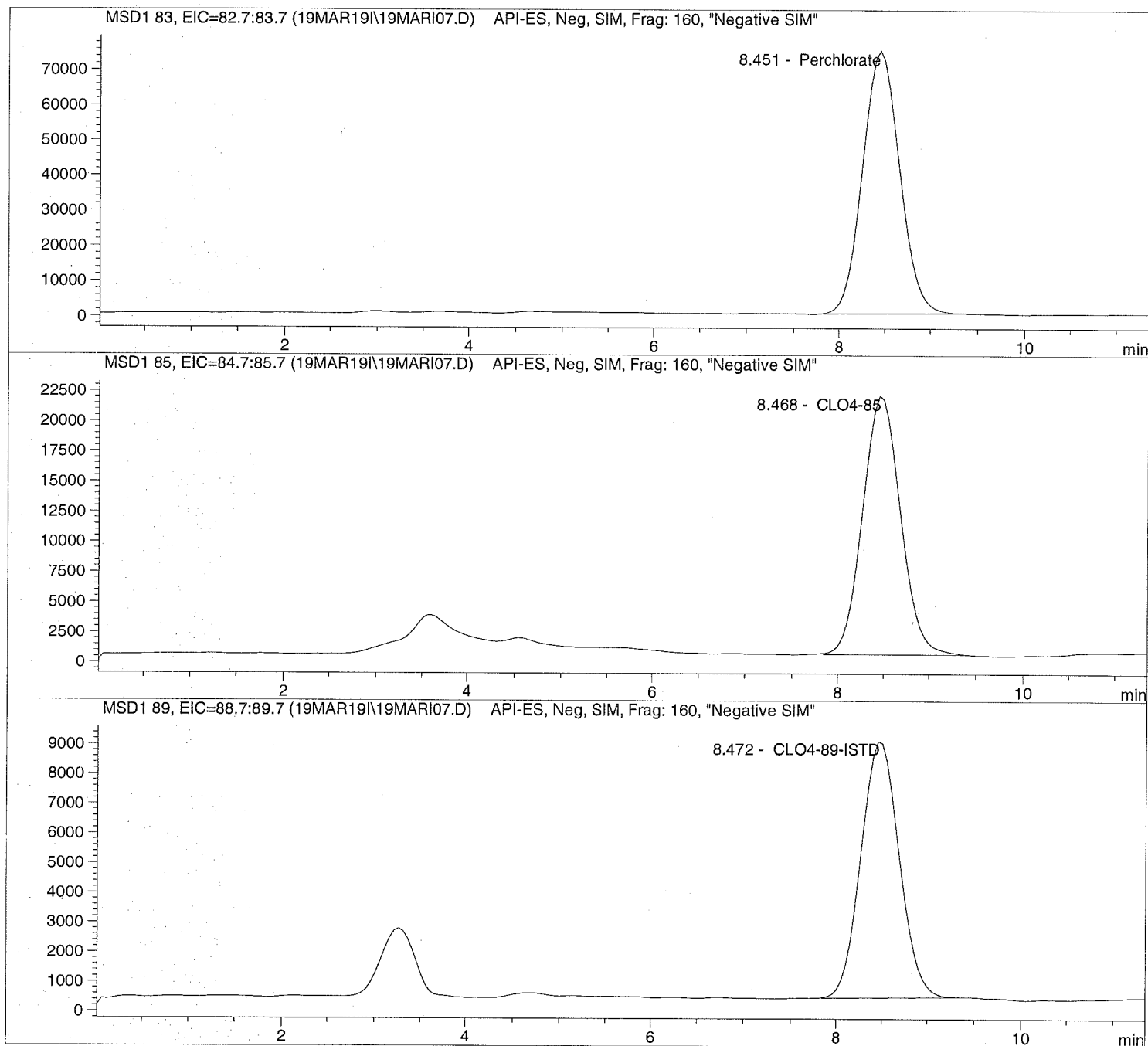
*** End of Report ***

Injection Date: 3/19/2019 10:32:49
Sample Name: CLO4@ 25.ug/L
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 10:32:49 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.451	PBA	2084327.4	25.2904	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.468	BBA	614294.8	25.1216	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D

Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05

Seq Line: 8

Sample Name: CLO4@ 50.ug/L

Location: Vial 78

Acq Operator: TNB

Inj. No.: 1

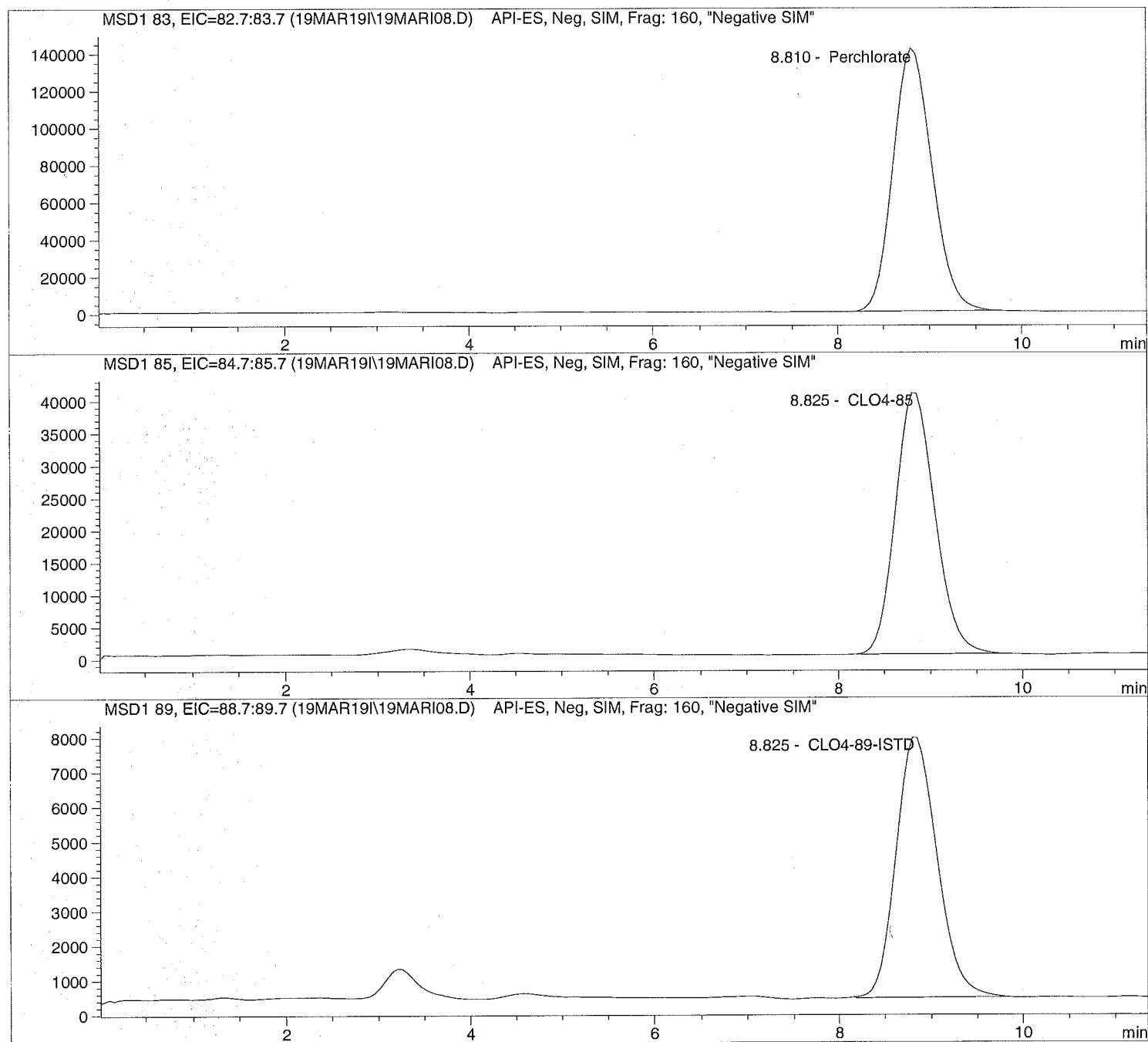
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D

Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.810	PBA	4133340.5	51.3684	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.4672	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 10:59:22

Seq Line: 9

Sample Name: CLO4@ 75.ug/L

Location: Vial 79

Acq Operator: TNB

Inj. No.: 1

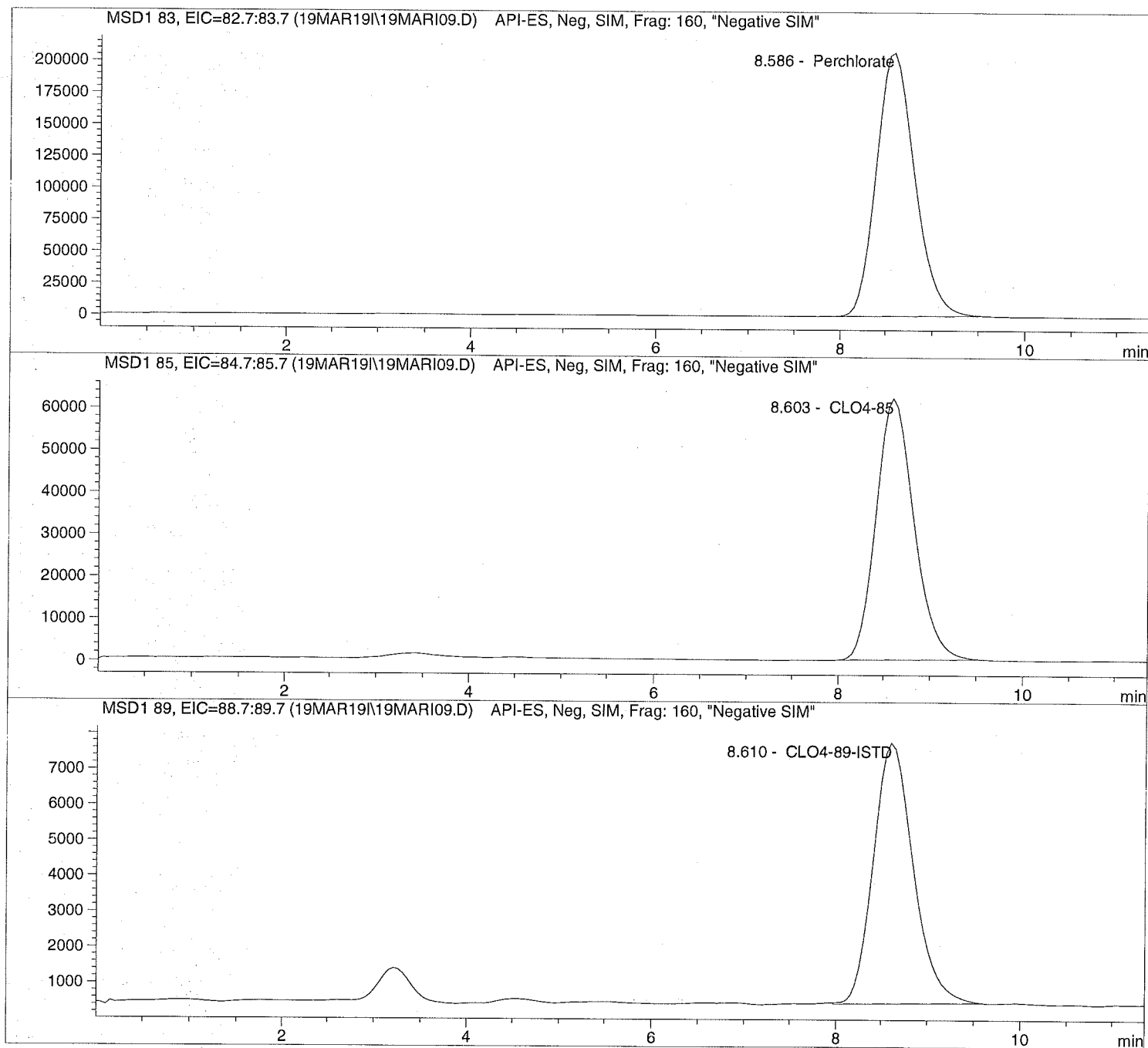
Inj. Vol.: 30 μ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI09.D Sample Name: CLO4@ 75.ug/L

Injection Date: 3/19/2019 10:59:22 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

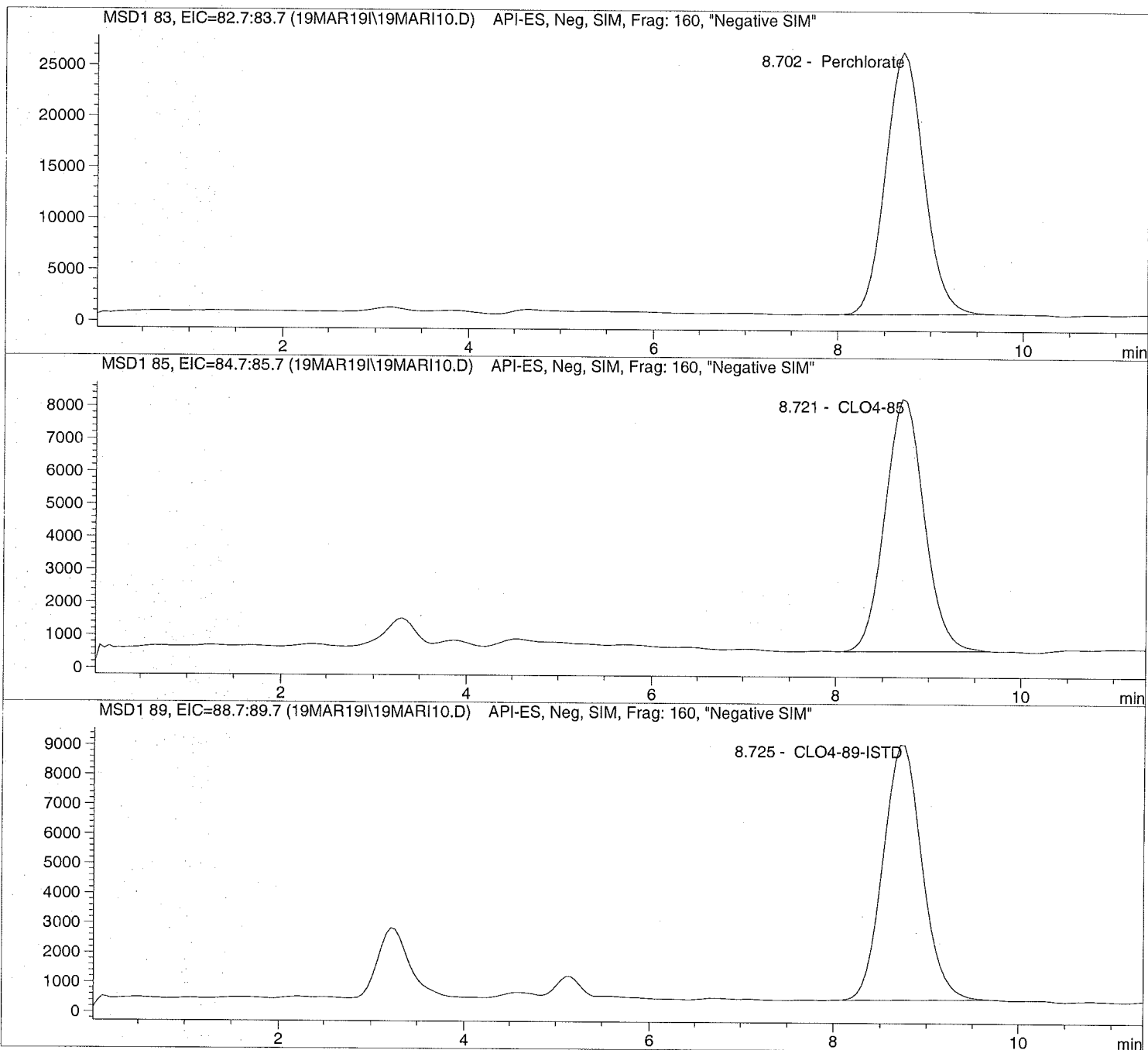
*** End of Report ***

Injection Date: 3/19/2019 11:12:42
Sample Name: ICAL Verf@10ug/L
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D

Sample Name: ICAL Verf@10ug/L

Injection Date: 3/19/2019 11:12:42

Seq Line: 10

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal

Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

*** End of Report ***



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

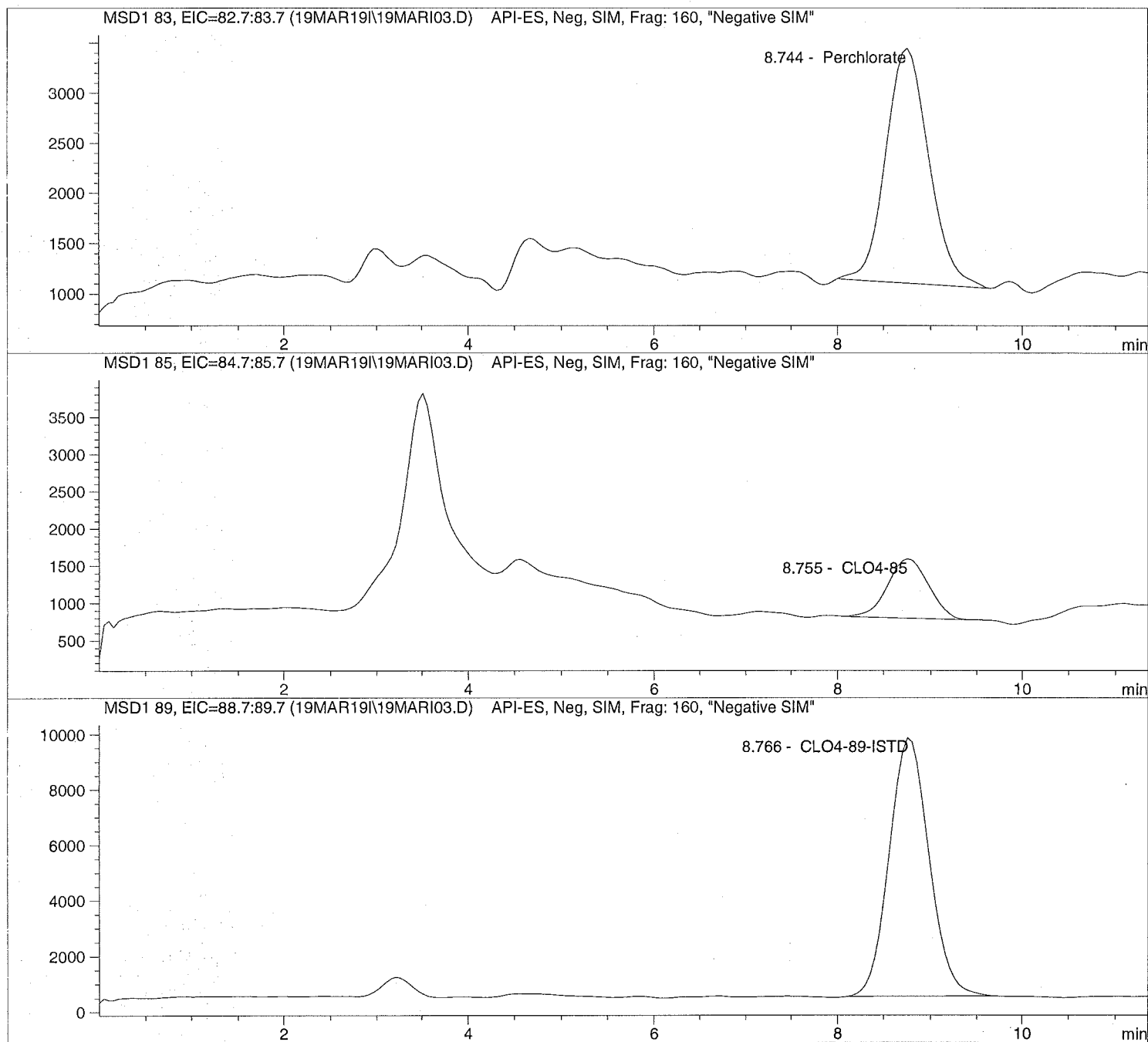
Unmodified

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:38:25

Perchlorate analysis



```
=====
Injection Date:  3/19/2019  09:39:40      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-DP2.M
Last Changed:      3/19/2019  14:38:25
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:          Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.744	BBA	74166.3	1.0224	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	BBA	24138.1	0.9487	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
Work Order: HS19040654

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19040654-01	LH18/24-SP140_041019	Water		10-Apr-2019 14:00	11-Apr-2019 09:00	<input type="checkbox"/>

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
Work Order:

CASE NARRATIVE

Work Order Comments

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

Metals by Method SW6020**Batch ID: 139800**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

Wet Chemistry by Method SW7196**Batch ID: R336864**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 GW Treatment Plant Monthly Influent Samples
 Sample ID: LH18/24-SP140_041019
 Collection Date: 10-Apr-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19040654
 Lab ID:HS19040654-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
METALS BY ICPMS BY SW6020A		Method:SW6020				Prep:SW3010A / 15-Apr-2019		Analyst: JHD
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	16-Apr-2019 23:35
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	16-Apr-2019 23:35
HEXAVALENT CHROMIUM BY SW7196A		Method:SW7196						Analyst: MZD
Chromium, Hexavalent	0.0100	U	0.00600	0.0100	0.0100	mg/L	1	11-Apr-2019 12:10
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	25-Apr-2019 17:26

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

WEIGHT LOG

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19040654

Batch ID: 139800 **Method:** METALS BY ICPMS BY SW6020A **Prep:** 3010A

SamplID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19040654-01	1	10	10 (mL)	1

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19040654

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID 139800	Test Name : METALS BY ICPMS BY SW6020A		Matrix: Water			
HS19040654-01	LH18/24-SP140_041019	10 Apr 2019 14:00		15 Apr 2019 08:30	16 Apr 2019 23:35	1
Batch ID R336864	Test Name : HEXAVALENT CHROMIUM BY SW7196A		Matrix: Water			
HS19040654-01	LH18/24-SP140_041019	10 Apr 2019 14:00			11 Apr 2019 12:10	1
Batch ID R337297	Test Name : SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Matrix: Water			
HS19040654-01	LH18/24-SP140_041019	10 Apr 2019 14:00			25 Apr 2019 17:26	1

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19040654

QC BATCH REPORT

Batch ID: 139800 (0)		Instrument: ICPMS05		Method: ICP-MS METALS BY SW6020A					
MBLK	Sample ID: MBLK-139800	Units: mg/L		Analysis Date: 16-Apr-2019 22:45					
Client ID:	Run ID: ICPMS05_336650	SeqNo: 5038034		PrepDate: 15-Apr-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.00250	0.00200							U
Silver	0.000500	0.00200							U
LCS	Sample ID: LCS-139800	Units: mg/L		Analysis Date: 16-Apr-2019 22:48					
Client ID:	Run ID: ICPMS05_336650	SeqNo: 5038035		PrepDate: 15-Apr-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.05057	0.00200	0.05	0	101	80 - 120			
Silver	0.05065	0.00200	0.05	0	101	80 - 120			
MS	Sample ID: HS19040658-01MS	Units: mg/L		Analysis Date: 16-Apr-2019 22:58					
Client ID:	Run ID: ICPMS05_336650	SeqNo: 5038040		PrepDate: 15-Apr-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.05136	0.00200	0.05	0.000747	101	80 - 120			
Silver	0.04992	0.00200	0.05	0.000017	99.8	80 - 120			
MSD	Sample ID: HS19040658-01MSD	Units: mg/L		Analysis Date: 16-Apr-2019 23:01					
Client ID:	Run ID: ICPMS05_336650	SeqNo: 5038041		PrepDate: 15-Apr-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.05176	0.00200	0.05	0.000747	102	80 - 120	0.05136	0.78	20
Silver	0.04999	0.00200	0.05	0.000017	99.9	80 - 120	0.04992	0.14	20
PDS	Sample ID: HS19040658-01PDS	Units: mg/L		Analysis Date: 16-Apr-2019 23:03					
Client ID:	Run ID: ICPMS05_336650	SeqNo: 5038042		PrepDate: 15-Apr-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Selenium	0.101	0.00200	0.1	0.000747	100	75 - 125			
Silver	0.0996	0.00200	0.1	0.000017	99.6	75 - 125			

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19040654

QC BATCH REPORT

Batch ID: 139800 (0)		Instrument: ICPMS05		Method: ICP-MS METALS BY SW6020A						
SD	Sample ID: HS19040658-01SD	Units: mg/L		Analysis Date: 16-Apr-2019 22:56						
Client ID:	Run ID: ICPMS05_336650		SeqNo: 5038039		PrepDate: 15-Apr-2019		DF: 5			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	Limit	Qual
Selenium	0.0125	0.0100					0.000747	0	10	U
Silver	0.00250	0.0100					0.000017	0	10	U

The following samples were analyzed in this batch: HS19040654-01

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19040654

QC BATCH REPORT

Batch ID: R336864 (0)		Instrument: UV-2450		Method: HEXAVALENT CHROMIUM BY SW7196A						
MBLK	Sample ID: MBLK-336864	Units: mg/L		Analysis Date: 11-Apr-2019 12:10						
Client ID:	Run ID: UV-2450_336864		SeqNo: 5041191		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.0100	0.0100								U
LCS	Sample ID: LCS-336864	Units: mg/L		Analysis Date: 11-Apr-2019 12:10						
Client ID:	Run ID: UV-2450_336864		SeqNo: 5041192		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.243	0.0100	0.25	0	97.2	90 - 111				
MS	Sample ID: HS19040652-01MS	Units: mg/L		Analysis Date: 11-Apr-2019 12:10						
Client ID:	Run ID: UV-2450_336864		SeqNo: 5041195		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.242	0.0100	0.25	-0.003	98.0	90 - 111				
MSD	Sample ID: HS19040652-01MSD	Units: mg/L		Analysis Date: 11-Apr-2019 12:10						
Client ID:	Run ID: UV-2450_336864		SeqNo: 5041196		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.251	0.0100	0.25	-0.003	102	90 - 111	0.242	3.65	20	
The following samples were analyzed in this batch: HS19040654-01										

ALS Houston, US

Date: 29-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19040654

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Texas	T10470231-18-21	30-Apr-2019
North Dakota	R193 2018-2019	30-Apr-2019
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kentucky	123043 - 2018	30-Apr-2019
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
California	2919, 2018-2019	30-Apr-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020

Client:	Bhate Environmental Associates, Inc.	SAMPLE TRACKING
Project:	LH18/24 GW Treatment Plant Monthly Influent Samples	
Work Order:	HS19040654	

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19040654-01	LH18/24-SP140_041019	Login	4/11/2019 11:03:58 AM	RPG	WET070
HS19040654-01	LH18/24-SP140_041019	Login	4/11/2019 11:03:58 AM	RPG	WET070
HS19040654-01	LH18/24-SP140_041019	Login	4/11/2019 11:03:58 AM	RPG	MET033

ALS Houston, US

Date: 29-Apr-19

Sample Receipt Checklist

Client Name: Bhate Environmental
 Work Order: HS19040654

Date/Time Received: **11-Apr-2019 09:00**
 Received by: **PMG**

Checklist completed by: Raegen Giga 11-Apr-2019
 eSignature Date

Reviewed by: RJ Modashia 11-Apr-2019
 eSignature Date

Matrices: **water**

Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	4.7c uc/c IR 25		
Cooler(s)/Kit(s):	25587		
Date/Time sample(s) sent to storage:	04/11/2019 11:00		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:


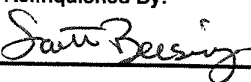

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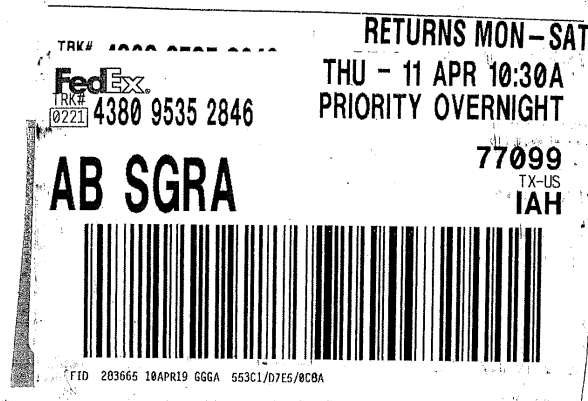
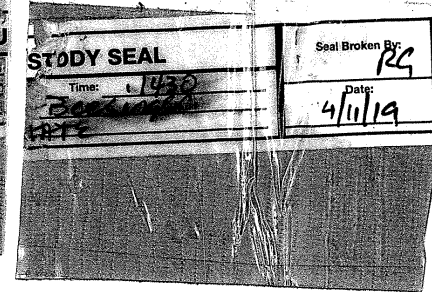
Corrective Action:

HS19040654

Name Of Lab Shipping To: ALS 10450 Stancliff Rd., Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: RJ Modshia

Bhate Environmental Associates, Inc.
H18/24 GW Treatment Plant Monthly Influent Samples

Project: BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			Project No. NWO1312.0150.0 16.0001		Analyses																
Job: GROUNDWATER TREATMENT PLANT MONTHLY INFLUENT SAMPLES																					
Prepared By: Scott Beesinger			P.O. Number		MS / MSD	No. OF CONTAINERS	SILVER & SELENIUM	HEXAVALENT CHROMIUM	PERCHLORATE												
Field Sample I.D.			Sample Matrix							Date / Time		Remarks (Preservatives, etc.)									
LH18/24-SP140_041019			Water							04/10/19 / 14:00		HNO3									
LH18/24-SP140_041019			Water							04/10/19 / 14:00		NONE									
Additional Remarks: STANDARD TURN AROUND TIME																					
Relinquished By: 		Date 04/10/19	Time 14:30	Received By: 		Date 4/11/19	Time 09:00	Relinquished By:		Date	Time	Received By:		Date	Time						
For Lab Use Only																					
Received At Lab By:		Date	Time	Airbill No.		Opened By:		Date	Time	Temp of Container	Seal No.	Condition									
Remarks:																					





Case Narrative

Method: 6850

Analysis: Perchlorate

Analysis SOP: LC-MS-CLO4

ALS WO ID(s): 1910478; 1910480; 1910483;
1911288

Client: ALS Laboratories (Houston, TX)

Matrix: Water

ELMS Batch (HBN): 2241 (237388)

General Set Information: There were four 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. 50 μL 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 0.45 μm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1910480001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

Method QC data: The method blank (LMB 649380) was less than 1/2 the CRDL. The recovery for the LCS (649381) was within acceptable parameters.



MS/MSD Analysis: MS/MSD was performed on samples 1910837002/03 of Work Order 1910837. 4.0µl of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4.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 – 649378) is reported from the analysis of the Laboratory Control Sample (LCS – 649381) at a level of 4.0µg/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: 19MARI03).

Thomas Bosch	April 24, 2019
Analyst	Date



ANALYTICAL REPORT

Report Date: April 25, 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: **34-1910480**

Project ID: HS19040654

Purchase Order: HS19040654

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP140_041019	1910480001	04/10/19	04/12/19	



ANALYTICAL REPORT

Workorder: **34-1910480**Client: ALS Environmental
(Houston)

Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: LH18/24-SP140_041019		Sampling Site: NA		Collected: 04/10/2019		
Lab ID: 1910480001		Media: 125 mL Nalgene		Received: 04/12/2019		
Matrix: Water		Sampling Parameter: NA				
Analysis Method - EPA 6850, DoD QSM						
Preparation: Not Applicable			Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2241 (HBN: 237388) Analyzed: 04/23/2019 09:49		Instrument ID: LCMS04 Percent Solid: NA Report Basis: Wet	
Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	5600	1000	2000	4000	1000	

Comments

Workorder: 1910480

Field sample 1910480001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has 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 04/24/2019 07:51	/S/ Stephen Brose 04/25/2019 07:42

Laboratory Contact Information

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

Phone: (801) 266-7700
Email: als@ALSglobal.com
Web: www.als.com



ANALYTICAL REPORT

Workorder: **34-1910480**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.pjllabs.com
	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.com
	Utah (TNI)	UT00953	http://lams.nelac-institute.org/search
	Nevada (TNI)	UT00953201-1	https://ndep.nv.gov/water/lab-certification
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
	Oklahoma (TNI)	IJ# 9980	http://www.deq.state.ok.us/CSDnew/labcert.htm
	Texas (TNI)	T104704456-18-9	https://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_list.pdf
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	http://www.aihaaccreditedlabs.org
	DOECAP-AP	L18-606	http://www.pjllabs.com
	Washington	C596	https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.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

00938072

Analysis Information

Workorder: 1910480

Limits: Client SOW/Contract Specified

Preparation: NA

Analysis: EPA 6850, DoD QSM

Basis: DoD QSM

Batch: NA

Batch: ELMS/2241 (HBN: 237388)

Prepared By: NA

Analyzed By: Thomas Bosch

Blank

LMB: 649380

Analyzed: 04/23/2019 09:20

Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 649381

Analyzed: 04/23/2019 08:53

Dilution: 1

Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.01	4.00	100	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1910837001

Analyzed: 04/23/2019 10:30

Dilution: 1

Units: ug/L

MS: 1910837002

Analyzed: 04/23/2019 10:43

Dilution: 1

Units: ug/L

MSD: 1910837003

Analyzed: 04/23/2019 10:57

Dilution: 1

Units: ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	3.81	4	95.1	78.8	123.8	3.95	98.8	3.74	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 04/24/2019 07:52	/S/ Stephen Brose 04/25/2019 07:42

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



10450 Stancliff Rd, Ste 210
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F: +1 281 530 5887
www.alsglobal.com

18690/2

Subcontract Chain of Custody

COC ID: 11113

SUBCONTRACT TO:

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

Phone: +1 801 266 7700

1910480

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: HS19040654
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19040654-01	LH18/24-SP140_041019	Water	10 Apr 2019 14:00
SUB_Perch-6850			25 Apr 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: R. Guss
Received By: Jamir Russell
Cooler ID(s): _____

Date/Time: 4/11/19 1800
Date/Time: 04-12-19 9:55
Temperature(s): _____

RIGHT SOLUTIONS | RIGHT PARTNER



23 of 410

[illegible]

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: <u>ALS Houston</u>		Project/Task/Site: <u>1910480</u>							
Date/Time of Receipt: <u>04-12-19 9:55</u>		Number of Coolers Received: <u>1</u>							
Condition of Coolers: <u>Acceptable/Unacceptable</u>		Temperature Control: <u>Present/Not Included</u>							
Cooler Custody Seals: <u>Present/Absent/NA</u>		Location Temp Taken: <u>Control/Between Samples</u>							
Container Custody Seals: <u>Present/Absent/NA</u>		Are all temperatures within project specific guidelines? <u>Yes/No/NA</u>							
Ice Present: <u>Frozen/Melted/NA</u>		VOA Headspace Present? <u>Yes/No/NA</u>							
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	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	
1	C19	3 °C	4	C19	°C	7	C19	°C	
2	C19	°C	5	C19	°C	8	C19	°C	
3	C19	°C	6	C19	°C	9	C19	°C	
Taken By: <u>Jamir Jussier</u>		Signature		Tamm Vartassee		Printed Name		04-12-19	
								Date	

CLIENT-RELATED INFORMATION

- | | | | |
|--|---|--|---|
| <input type="checkbox"/> Missing Cooler | <input type="checkbox"/> Missing Samples/Bottles | <input type="checkbox"/> Incorrect Preservation | <input type="checkbox"/> Insufficient Sample Volume |
| <input type="checkbox"/> Cooler Conditions | <input type="checkbox"/> Broken/Leaking Samples | <input type="checkbox"/> pH Criteria Not Met | <input type="checkbox"/> Chain of Custody Problems |
| <input type="checkbox"/> Missing Paperwork | <input type="checkbox"/> Incorrect Bottle Type | <input type="checkbox"/> Residual Chlorine Present | <input type="checkbox"/> Other: |
| <input type="checkbox"/> Missing/Incorrect Bottle Labels | <input type="checkbox"/> Cooler Temperatures Out of Range | <input type="checkbox"/> 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: _____ Returned to Sample Receipt by: _____ Date: _____
 Printed Name Signature



**Must Deliver Next Business Day
Time and Temperature Sensitive!**

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

SHIP DATE: 11APR19
ACTWGT: 8.65 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

TO **PAUL POPE**
ALS LABORATORY GROUP
960 WEST LEVOY DRIVE

SALT LAKE CITY UT 84123

(800) 366-9136

REF: HS19040654/653/652 RJ



FedEx
Express



TRK# 4809 7832 8001
0201

FRI - 12 APR 3:00P
STANDARD OVERNIGHT

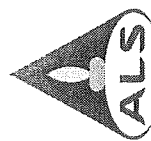
AX BTFA

84123

UT-US **SLC**



ALS
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Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887



Batch Worklist

Batch: ELMS/2241

Rule: EPA 6850, DoD QSM Water

Created: 4/23/2019 07:43

Analyst: T. Bosch

Instrument:

Status: WP

HBN: 237388



Workorder: 1910478 [ENV_LVL4]
 Workorder: 1910480 [ENV_LVL4]
 Workorder: 1910483 [ENV_LVL4]
 Workorder: 1910837 [ENV_LVL4]
 Workorder: 1911288 [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	649377	CCV for HBN 237388 [ELMS/2241]				CCV	3		E685041C3Q	5311		4/25/2019	
2	649378	RLVS for HBN 237388 [ELMS/2241]				RLVS	3		E685041C3Q	5311		4/25/2019	
3	649379	ICS for HBN 237388 [ELMS/2241]				ICS	3		E6850.D3Q	5311		4/25/2019	
4	649380	LMB for HBN 237388 [ELMS/2241]				LMB	3		E6850Q413Q	5311		4/25/2019	
5	649381	LCS for HBN 237388 [ELMS/2241]				LCS	3		E6850Q413Q	5311		4/25/2019	
6	1910478001	LH18/24-SP650_041019_BIX				SAMPLE	3	1910478001-A	E6850Q41.3	5480	5/8/2019	4/25/2019	
7	1910480001	LH18/24-SP140_041019				SAMPLE	3	1910480001-A	E6850Q41.3	5480	5/8/2019	4/25/2019	
8	1910483001	LH18/24-SP650_041019_BIX				SAMPLE	3	1910483001-A	E6850Q41.3	5480	5/8/2019	4/25/2019	
9	1910837001	43MW01				SAMPLE	3	1910837001-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
10	1910837002	43MW01MS				MS	3	1910837002-A	E6850Q413Q	5480		4/25/2019	
11	1910837003	43MW01MSD				MSD	3	1910837003-A	E6850Q413Q	5480		4/25/2019	
12	1910837004	43MW03				SAMPLE	3	1910837004-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
13	1910837005	43MW04				SAMPLE	3	1910837005-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
14	1910837006	43MW05				SAMPLE	3	1910837006-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
15	1910837007	43MW06				SAMPLE	3	1910837007-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
16	649382	CCV for HBN 237388 [ELMS/2241]				CCV	3		E685041C3Q	5311		4/25/2019	
17	1910837008	DUP040919				FLDDUP	3	1910837008-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
18	1910837009	EB041019				EQBK	3	1910837009-A	E6850Q41.3	5480	5/8/2019	4/29/2019	
19	1911288001	LH18/24-SP650_041719_BIX				SAMPLE	3	1911288001-A	E6850Q41.3	5480	5/15/2019	5/2/2019	
20	649383	CCV for HBN 237388 [ELMS/2241]				CCV	3		E685041C3Q	5311		4/25/2019	



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #()'s: 1910478 (001); 1910480 (001); 1910483 (001); 1911288 (001); 1910837 (001-09)
 ELMS Batch/HBN ID: 2241 (237388)
 Prep Date: 04/22/2019 Analysis Date: 04/23/2019 Analyst: T. Bosch
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\APR\23APR19D.s
 Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by TNB. 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 AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

STANDARDS: Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

CALIBRATION CURVE: Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.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:** 35µL
Column: KP-RPPX C8 separator, 250mm **Mobile Phase:** 70% Eluent A1; 30% Eluent B1

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: 4.0µL of QC Solution Horizon ID 41830 was used for LCS 649381; Target = 4.0µg/L. ASTM type II water was used for LMB 649380.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1910837002/03 (Client ID: 43MW01). 4.0µL of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. Spike target = 4.0µg/L.

COMMENTS:

- 1) Results reported in µg/L. Field sample 1910480001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has 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\APR\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\237388-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATA\REVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 649378) is reported from the analysis of the Laboratory Control Sample (LCS – 649381) at a level 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, many of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03).

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.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDG: ELMS: 2241 HBN: 237388 1910837 / 1911288		
Sample Set IDs if Applicable: 1910478 / 1910480 / 1910483		
Calibration standards analyzed and meets criteria	TB	SN
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
Method Blanks analyzed and meet acceptance criteria	TB	SB
Retention Time Windows checked	TB	SN
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	SN
MSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed	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 checked	TB	SB
Preparation and analysis calculations checked	TB	SB
NCRs are completed as necessary NC/CAR#		
Report forms are complete and accurate	TB	SB
Manual integrations checked	TB	SB



STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK		Description - 6850 WKG Std 100.ug/L			
Standard: 43702		Created By: Thomas Bosch	Amount: 10 mL		
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM	Expires: 09/18/2019		
MFG Lot: TNB: 09/18/2018			Usable: Yes		
Pipette ID: Not Provided			Lab Lot: CLO4 WRK		
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	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
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	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: 43701		Created By: Thomas Bosch	Amount: 10 mL		
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM	Expires: 09/18/2019		
MFG Lot: TNB: 09/18/2018			Usable: Yes		
Pipette ID: Not Provided			Lab Lot: CLO4 INT		
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
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: 41831		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/09/2018 10:05AM		Expires: 05/09/2019	
MFG Lot: TNB: 05/09/2018				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
41830	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	05/09/2019



STANDARD REPORT

Constituent

Working Standard - CLO4 QC INT

CLO4 QC INT		Description - 6850 QC Intrmdt Std-QC 10ug/mL			
Standard: 41830		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/09/2018 10:05AM		Expires: 05/09/2019	
MFG Lot: TNB: 05/09/2018				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



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

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730		Created By: Thomas Bosch	Amount: 25 mL		
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM	Expires: 09/20/2019		
MFG Lot: TNB: 05/09/2018		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
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



STANDARD REPORT

Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729		Created By: Thomas Bosch	Amount: 1 mL
MFG: Cambridge Isotope		Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026
MFG Lot: SDFF-012A		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



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

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.





Certificate of Analysis



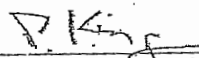
ISO Guide 34 Reference Material

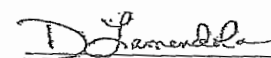
Product Number: ICC-013
Lot Number: CP-0860

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 QAVRA

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

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



Signal Word: None

Component	SRM #	Prepared Concentration ($\mu\text{g/mL}$)
ClO_4 Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is $\pm 0.24\%$.

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 $0.2 \mu\text{m}$ 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 $\pm 0.5\%$ 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

Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

Quality Standards:
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification: $\geq 98\%$
Labeled CAS Number: NA
Unlabeled CAS Number: 7601-89-0
MW*: 130.4
Chemical Formula: NaClO₄
Storage: Store at room temperature away from light and moisture.
Stability: See storage and expiration date.

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.

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/NCSL 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.

* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 µg/mL
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	109.4 ± 2.8 µg/mL (k=2)



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	
*	649377	CCV@25	Vial 71	1	Control	1	1.36054e6	8.855	24.00623
*	649381	QC@4.0	Vial 72	1	Control	2	2.53898e5	9.046	4.01121
*	649379	ICS@4.0	Vial 73	1	Control	3	1.82631e5	8.636	3.34158
*	649380	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1910478001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1910480001	1K	Vial 76	1	Sample	6	3.37161e5	9.026	5552.18188
*	1910483001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1911288001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1910837001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1910837002	MS	Vial 80	1	Sample	10	2.21785e5	9.050	3.80586
*	1910837003	MSD	Vial 81	1	Sample	11	2.20802e5	9.038	3.95111
*	1910837004		Vial 82	1	Sample	12	0.00000	0.000	0.00000
*	1910837005		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1910837006		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	649382	CCV@25	Vial 71	1	Control	15	1.31128e6	8.938	24.26925
*	1910837007		Vial 85	1	Sample	16	6.42400e4	9.045	1.26400
*	1910837008		Vial 86	1	Sample	17	0.00000	0.000	0.00000
*	1910837009		Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1909952003	10K	Vial 88	1	Sample	19	5.40192e5	9.131	9.36492e4
*	649383	CCV@25	Vial 71	1	Control	20	1.31963e6	8.922	24.70624

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
---	-----	-----	---	-----	---	-----	-----	-----	
*	649377	CCV@25	Vial 71	1	Control	1	4.18181e5	8.869	24.80861
*	649381	QC@4.0	Vial 72	1	Control	2	8.36399e4	9.058	4.29372
*	649379	ICS@4.0	Vial 73	1	Control	3	6.48502e4	8.654	3.82172
*	649380	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1910478001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1910480001	1K	Vial 76	1	Sample	6	1.09251e5	9.041	5913.57786
*	1910483001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1911288001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1910837001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1910837002	MS	Vial 80	1	Sample	10	7.41215e4	9.057	4.12337
*	1910837003	MSD	Vial 81	1	Sample	11	7.23834e4	9.061	4.20632
*	1910837004		Vial 82	1	Sample	12	0.00000	0.000	0.00000
*	1910837005		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1910837006		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	649382	CCV@25	Vial 71	1	Control	15	4.00971e5	8.953	24.95975
*	1910837007		Vial 85	1	Sample	16	2.34854e4	9.061	1.36511
*	1910837008		Vial 86	1	Sample	17	0.00000	0.000	0.00000
*	1910837009		Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1909952003	10K	Vial 88	1	Sample	19	1.70464e5	9.151	9.83177e4
*	649383	CCV@25	Vial 71	1	Control	20	4.01823e5	8.937	25.30992

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
--	-----	-----	----	-----	----	-----	-----	-----	
*	649377	CCV@25	Vial 71	1	Control	1	1.72840e5	8.867	5.00000
*	649381	QC@4.0	Vial 72	1	Control	2	2.08542e5	9.066	5.00000
*	649379	ICS@4.0	Vial 73	1	Control	3	1.81824e5	8.654	5.00000
*	649380	LMB	Vial 74	1	Control	4	2.16871e5	9.008	5.00000
*	1910478001		Vial 75	1	Sample	5	1.72857e5	8.404	5.00000
*	1910480001	1K	Vial 76	1	Sample	6	1.97149e5	9.050	5000.00000
*	1910483001		Vial 77	1	Sample	7	1.65412e5	8.420	5.00000
*	1911288001		Vial 78	1	Sample	8	1.81749e5	8.489	5.00000

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount		
*	1910837001	Vial	79	1	Sample	9	1.87599e5	9.028	5.00000	
*	1910837002	MS	Vial	80	1	Sample	10	1.92507e5	9.073	5.00000
*	1910837003	MSD	Vial	81	1	Sample	11	1.84256e5	9.062	5.00000
*	1910837004	Vial	82	1	Sample	12	1.80138e5	8.810	5.00000	
*	1910837005	Vial	83	1	Sample	13	1.97954e5	9.090	5.00000	
*	1910837006	Vial	84	1	Sample	14	1.83017e5	9.051	5.00000	
*	649382	CCV@25	Vial	71	1	Control	15	1.64671e5	8.965	5.00000
*	1910837007	Vial	85	1	Sample	16	1.84879e5	9.067	5.00000	
*	1910837008	Vial	86	1	Sample	17	1.96777e5	8.752	5.00000	
*	1910837009	Vial	87	1	Sample	18	1.91613e5	9.161	5.00000	
*	1909952003	10K	Vial	88	1	Sample	19	1.83509e5	9.157	5.00000e4
*	649383	CCV@25	Vial	71	1	Control	20	1.62618e5	8.942	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

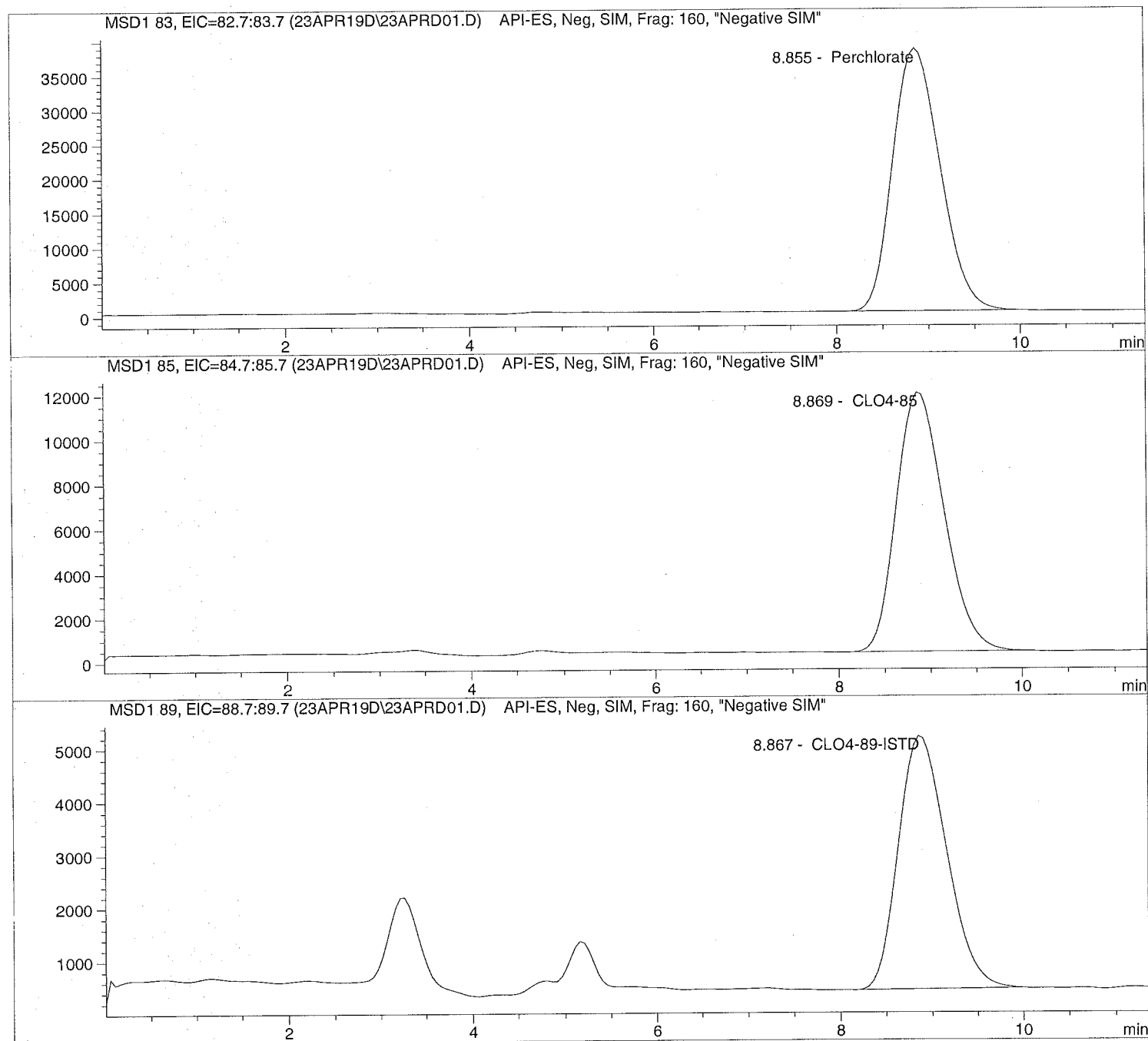
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	==	=====	=====	=====
1	Vial 71	649377 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	649381 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	649379 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	649380 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1910478001	CLO4-AQN	1	Sample		
6	Vial 76	1910480001 1K	CLO4-AQN	1	Sample		
7	Vial 77	1910483001	CLO4-AQN	1	Sample		
8	Vial 78	1911288001	CLO4-AQN	1	Sample		
9	Vial 79	1910837001	CLO4-AQN	1	Sample		
10	Vial 80	1910837002 MS	CLO4-AQN	1	Sample		
11	Vial 81	1910837003 MSD	CLO4-AQN	1	Sample		
12	Vial 82	1910837004	CLO4-AQN	1	Sample		
13	Vial 83	1910837005	CLO4-AQN	1	Sample		
14	Vial 84	1910837006	CLO4-AQN	1	Sample		
15	Vial 71	649382 CCV@25	CLO4-AQN	1	Ctrl Samp		
16	Vial 85	1910837007	CLO4-AQN	1	Sample		
17	Vial 86	1910837008	CLO4-AQN	1	Sample		
18	Vial 87	1910837009	CLO4-AQN	1	Sample		
19	Vial 71	649383 CCV@25	CLO4-AQN	1	Ctrl Samp		

Injection Date: 4/23/2019 08:37:56
Sample Name: 649377 CCV@25
Acq Operator: TNB

Seq Line: 1
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  08:37:56      Seq Line:          1
Sample Name:     649377    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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

```
=====
                          Sample Information
=====
```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.855	PBA	1360543.6	24.0062	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.869	PBA	418181.2	24.8086	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.867	PBA	172839.5	5.0000	CLO4-89-ISTD

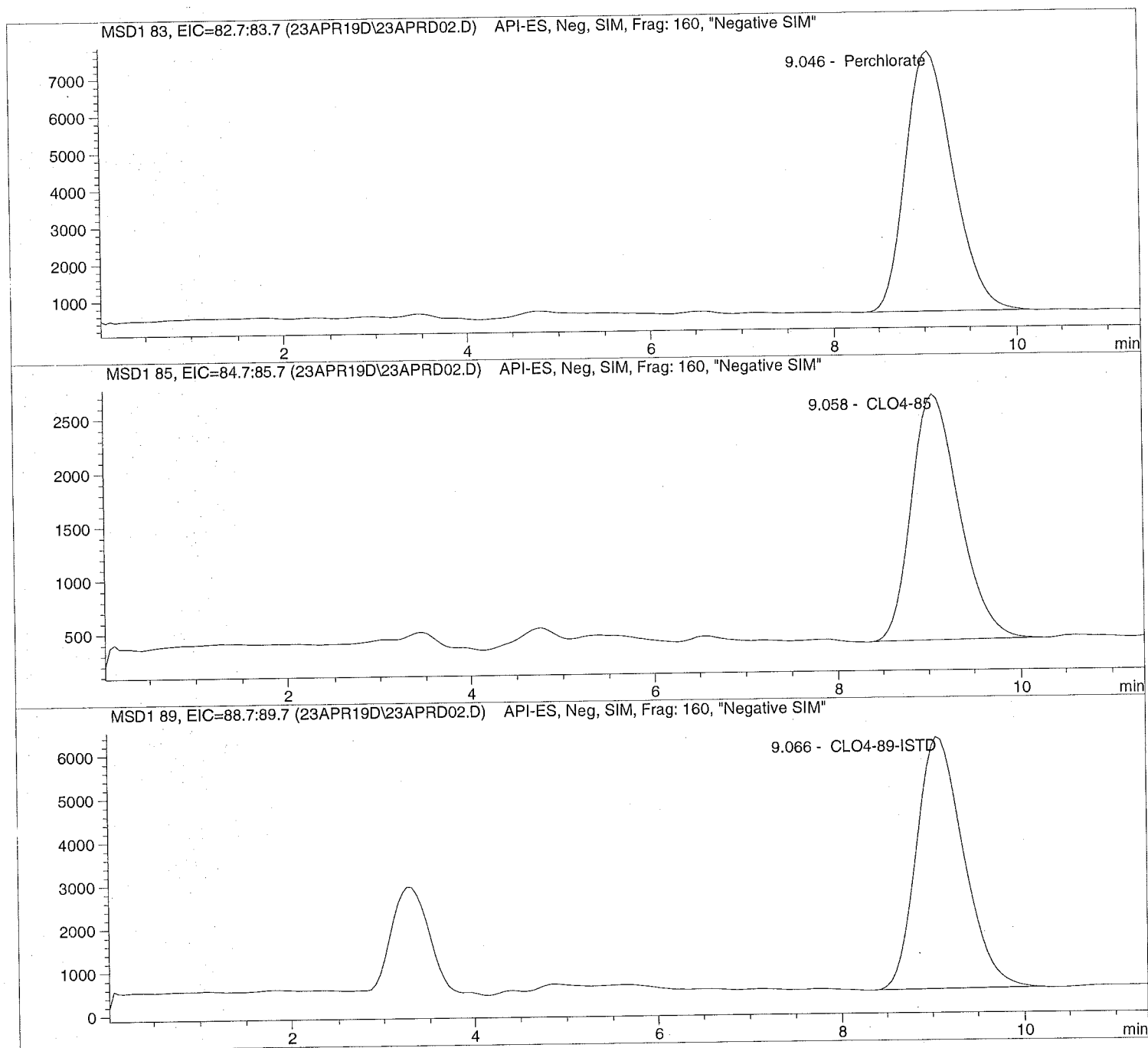
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 08:53:38
Sample Name: 649381 QC@4.0
Acq Operator: TNB

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 08:53:38 Seq Line: 2
Sample Name: 649381 QC@4.0 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.046	PBA	253897.8	4.0112	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.058	PBA	83639.9	4.2937	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.066	PBA	208541.6	5.0000	CLO4-89-ISTD

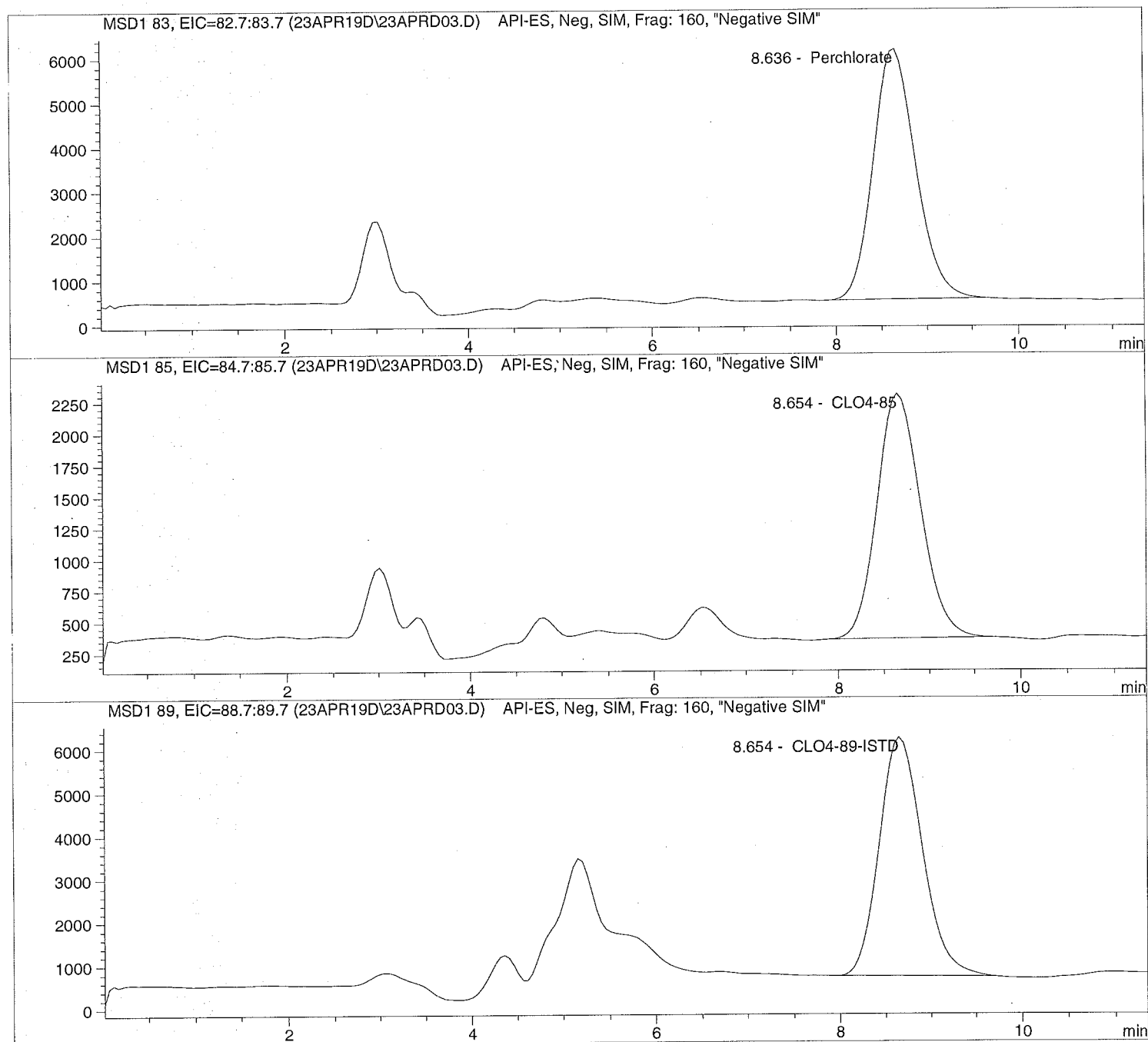
*** End of Report ***

Injection Date: 4/23/2019 09:07:01
Sample Name: 649379 ICS@4.0
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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 09:07:01
Sample Name: 649379 ICS@4.0
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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.636	PBA	182630.9	3.3416	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.654	PBA	64850.2	3.8217	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.654	PBA	181823.6	5.0000	CLO4-89-ISTD

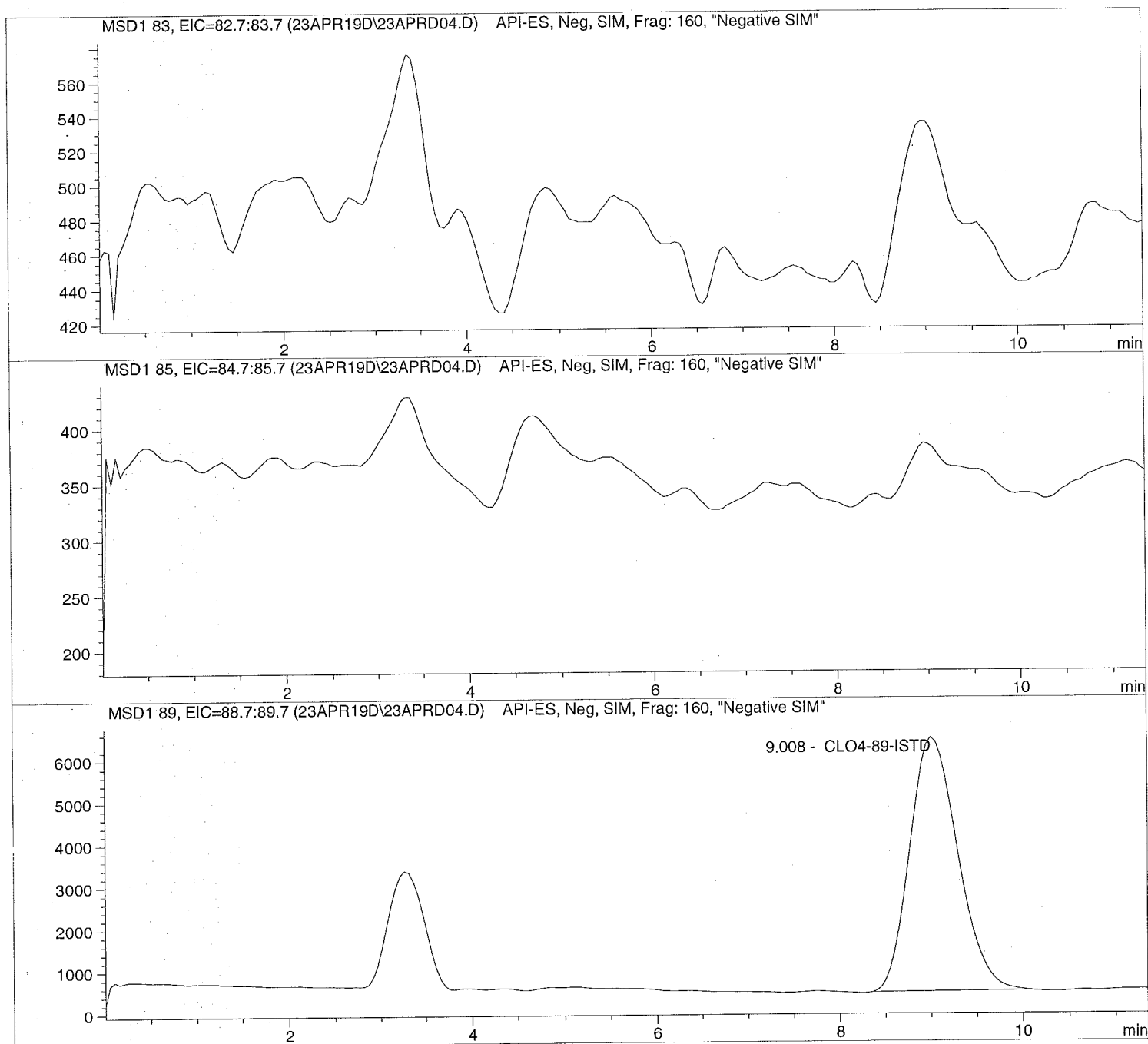
*** End of Report ***

Injection Date: 4/23/2019 09:20:26
Sample Name: 649380 LMB
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  09:20:26      Seq Line:      4
Sample Name:    649380    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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
9.008	PBA	216871.1	5.0000	CLO4-89-ISTD

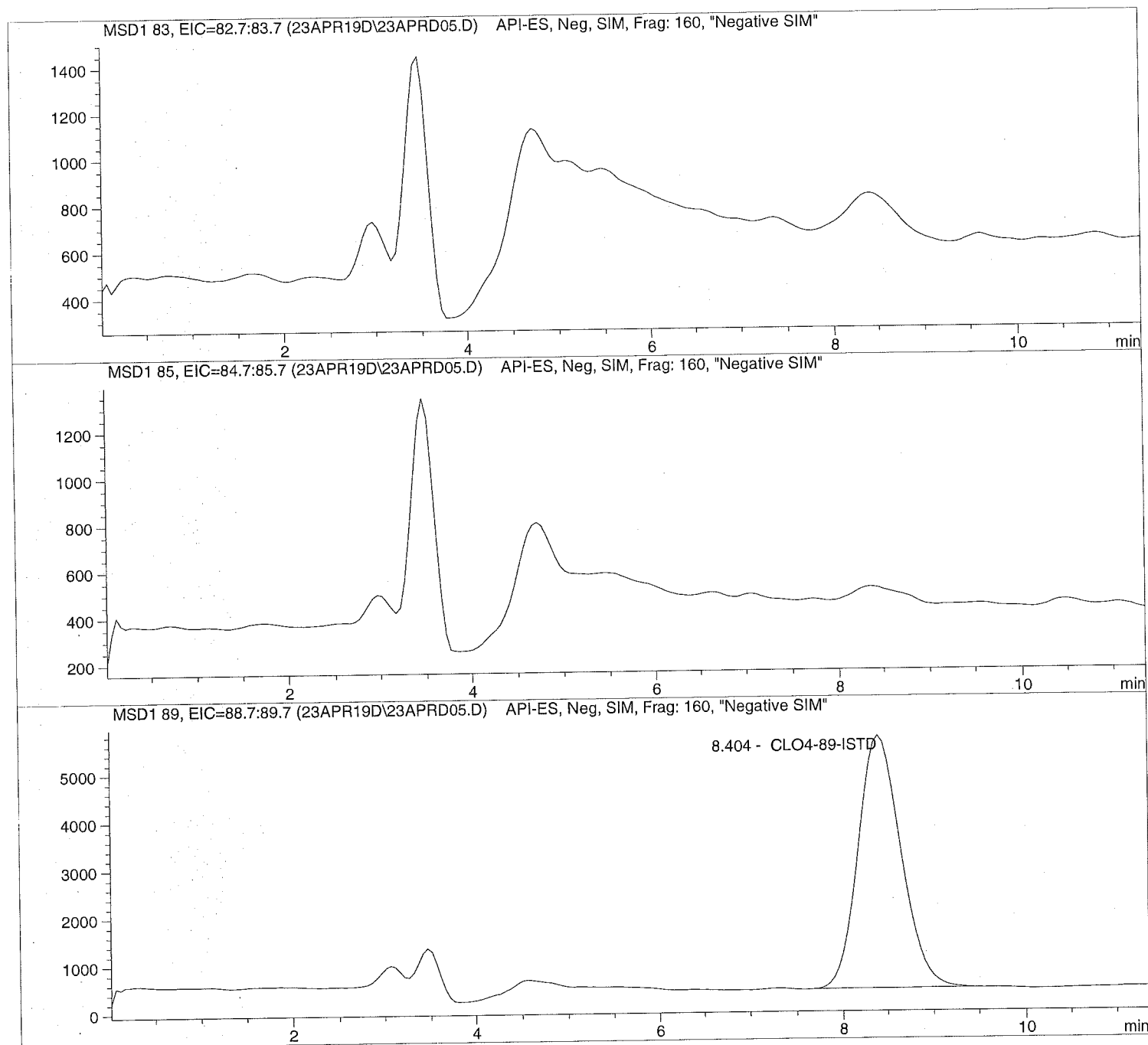
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 09:36:37
Sample Name: 1910478001
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  09:36:37      Seq Line:      5
Sample Name:    1910478001      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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.404	PBA	172857.1	5.0000	CLO4-89-ISTD

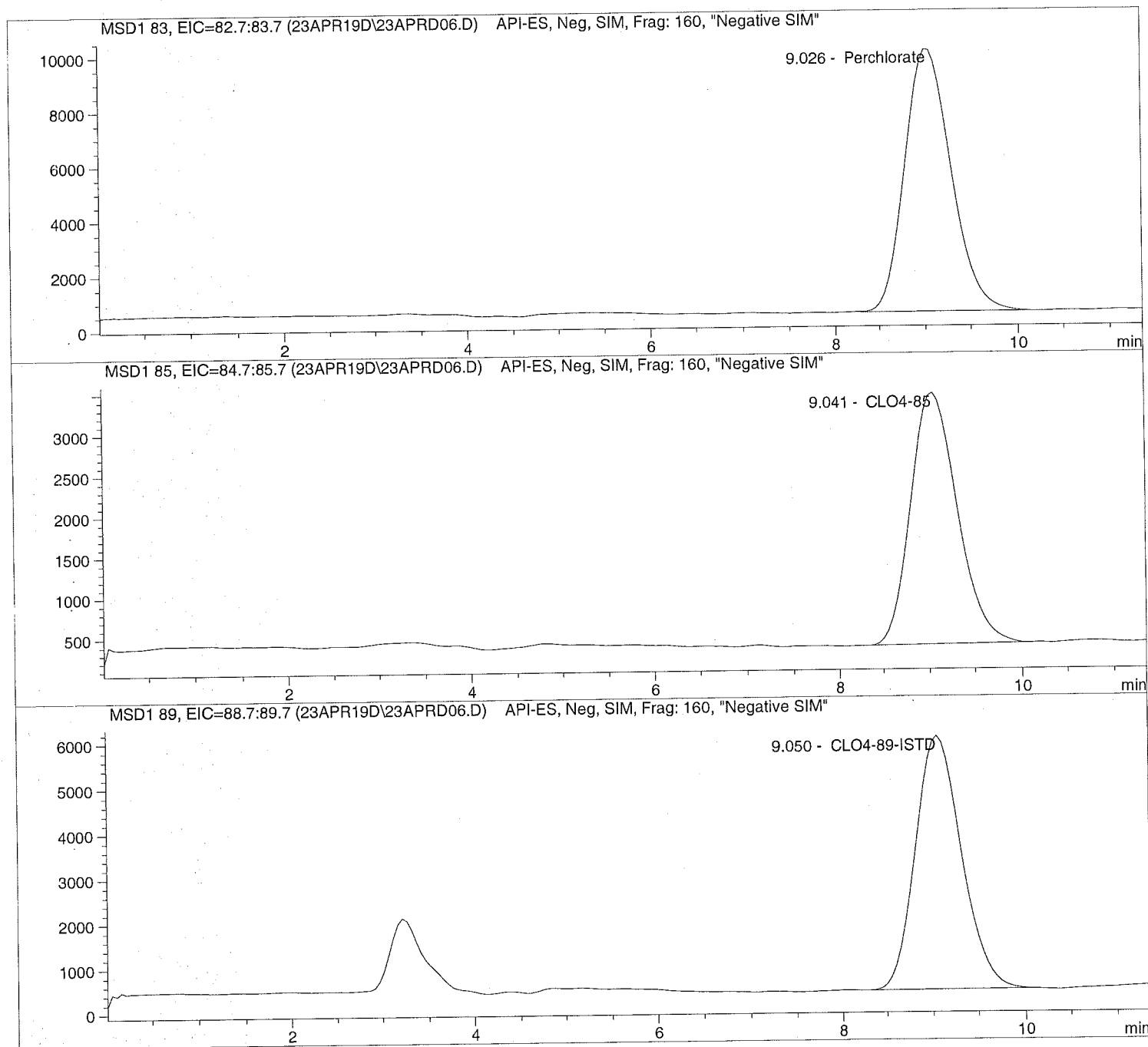
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 09:49:59
Sample Name: 1910480001 1K
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  09:49:59      Seq Line:        6
Sample Name:    1910480001  1K           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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.026	BBA	337160.7	5552.1819	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.041	PBA	109251.5	5913.5779	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.050	PBA	197148.5	5000.0000	CLO4-89-ISTD

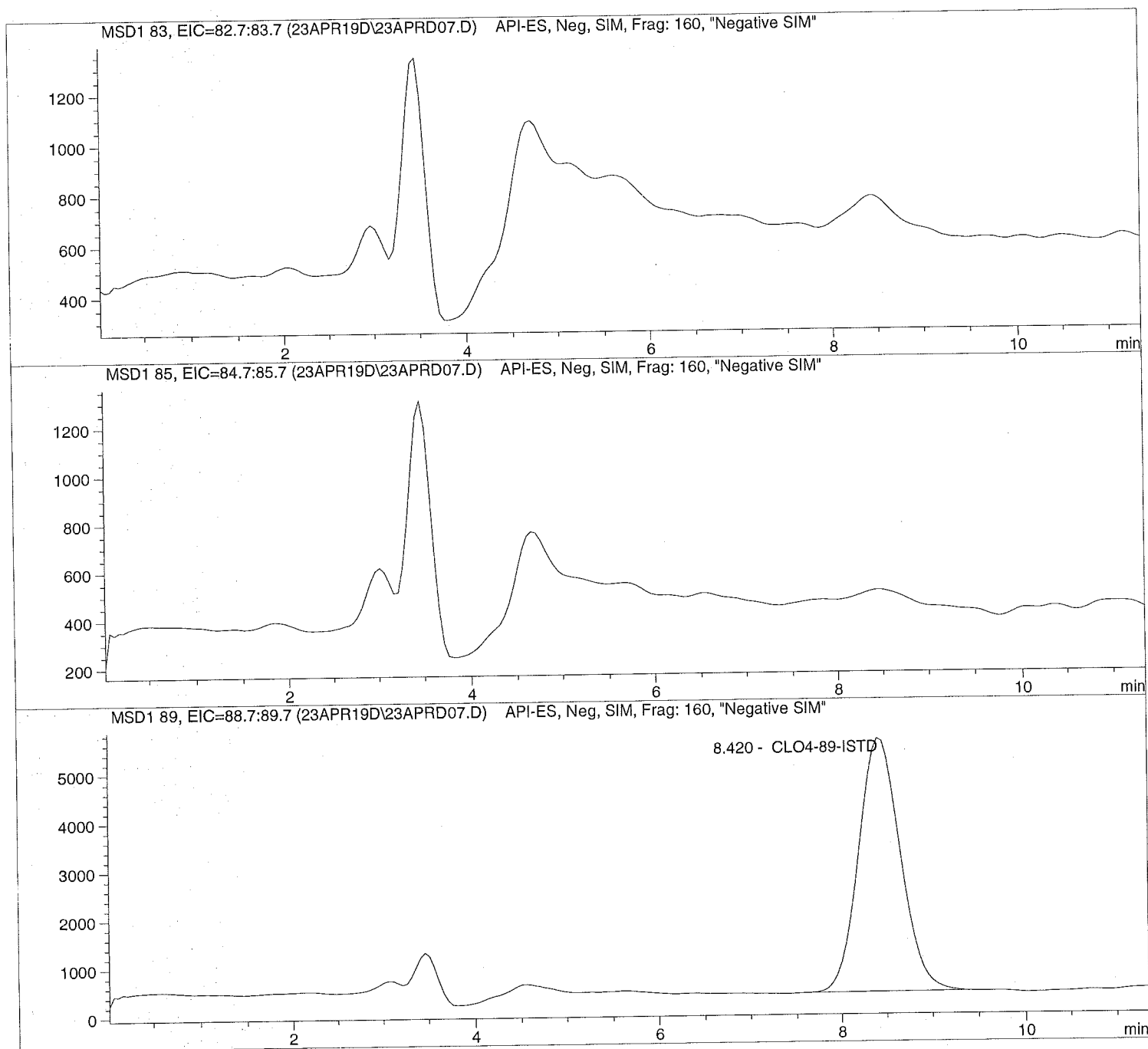
*** End of Report ***

Injection Date: 4/23/2019 10:03:26
Sample Name: 1910483001
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 10:03:26 Seq Line: 7
Sample Name: 1910483001 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.420	PBA	165412.1	5.0000	CLO4-89-ISTD

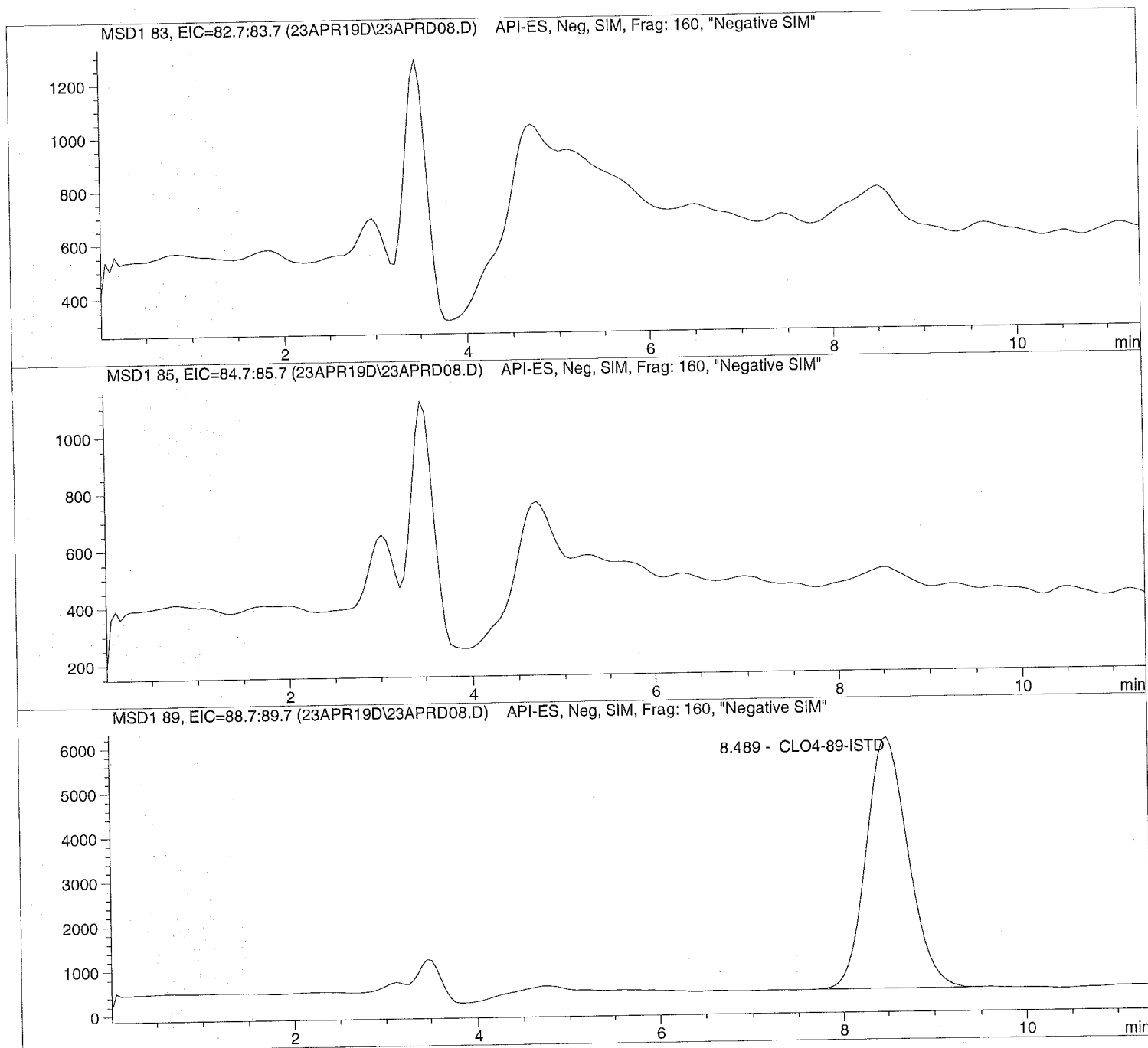
*** End of Report ***

Injection Date: 4/23/2019 10:16:48
Sample Name: 1911288001
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:16:48      Seq Line:      8
Sample Name:    1911288001      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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.489	BBA	181749.4	5.0000	CLO4-89-ISTD

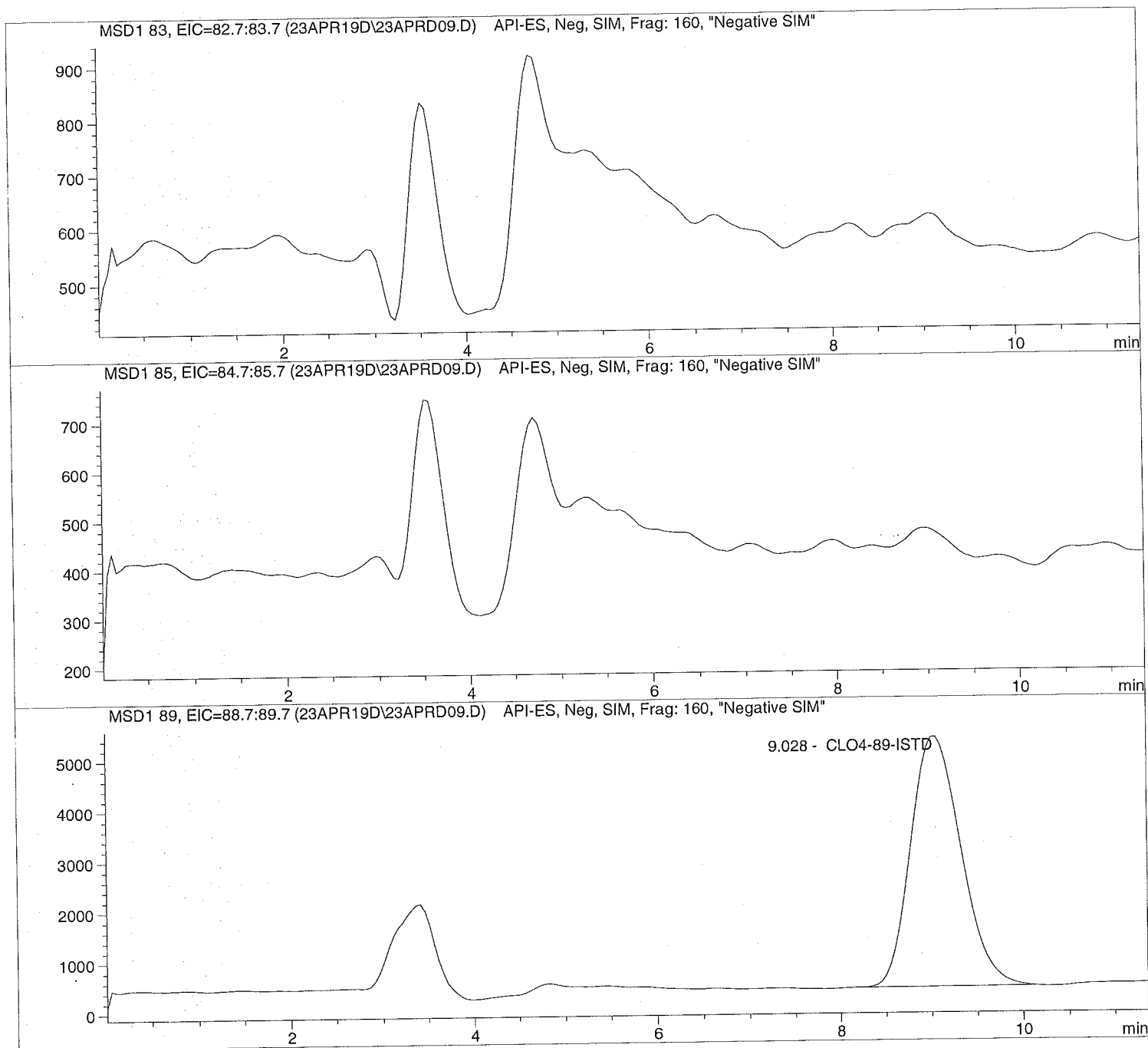
*** End of Report ***

Injection Date: 4/23/2019 10:30:16
Sample Name: 1910837001
Acq Operator: TNB

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:30:16      Seq Line:          9
Sample Name:    1910837001      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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
9.028	BBA	187599.0	5.0000	CLO4-89-ISTD

=====

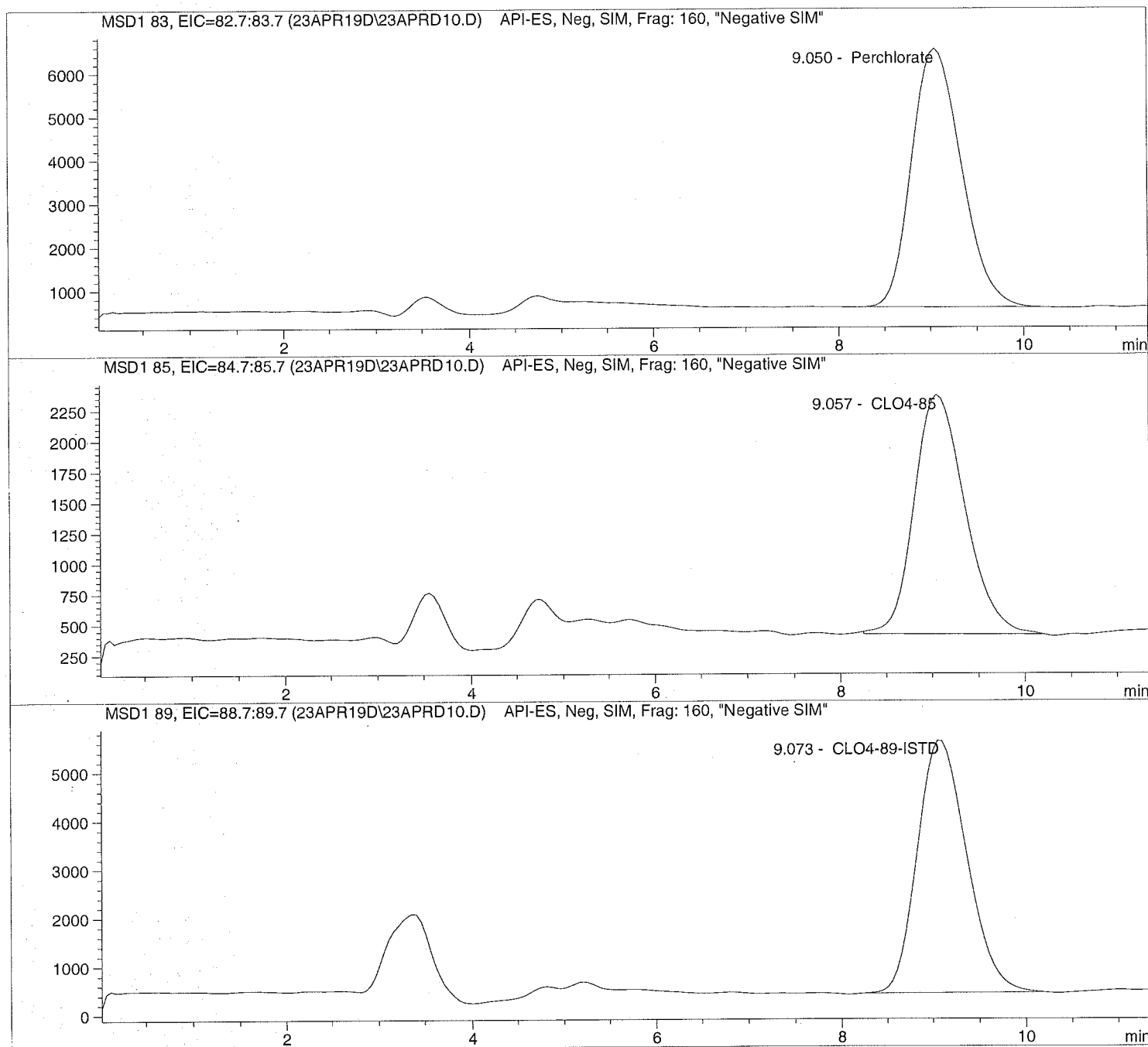
*** End of Report ***

Injection Date: 4/23/2019 10:43:43
Sample Name: 1910837002 MS
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:43:43      Seq Line:          10
Sample Name:    1910837002  MS           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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
9.050	PBA	221785.2	3.8059	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.057	BBA	74121.5	4.1234	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.073	PBA	192506.7	5.0000	CLO4-89-ISTD

=====

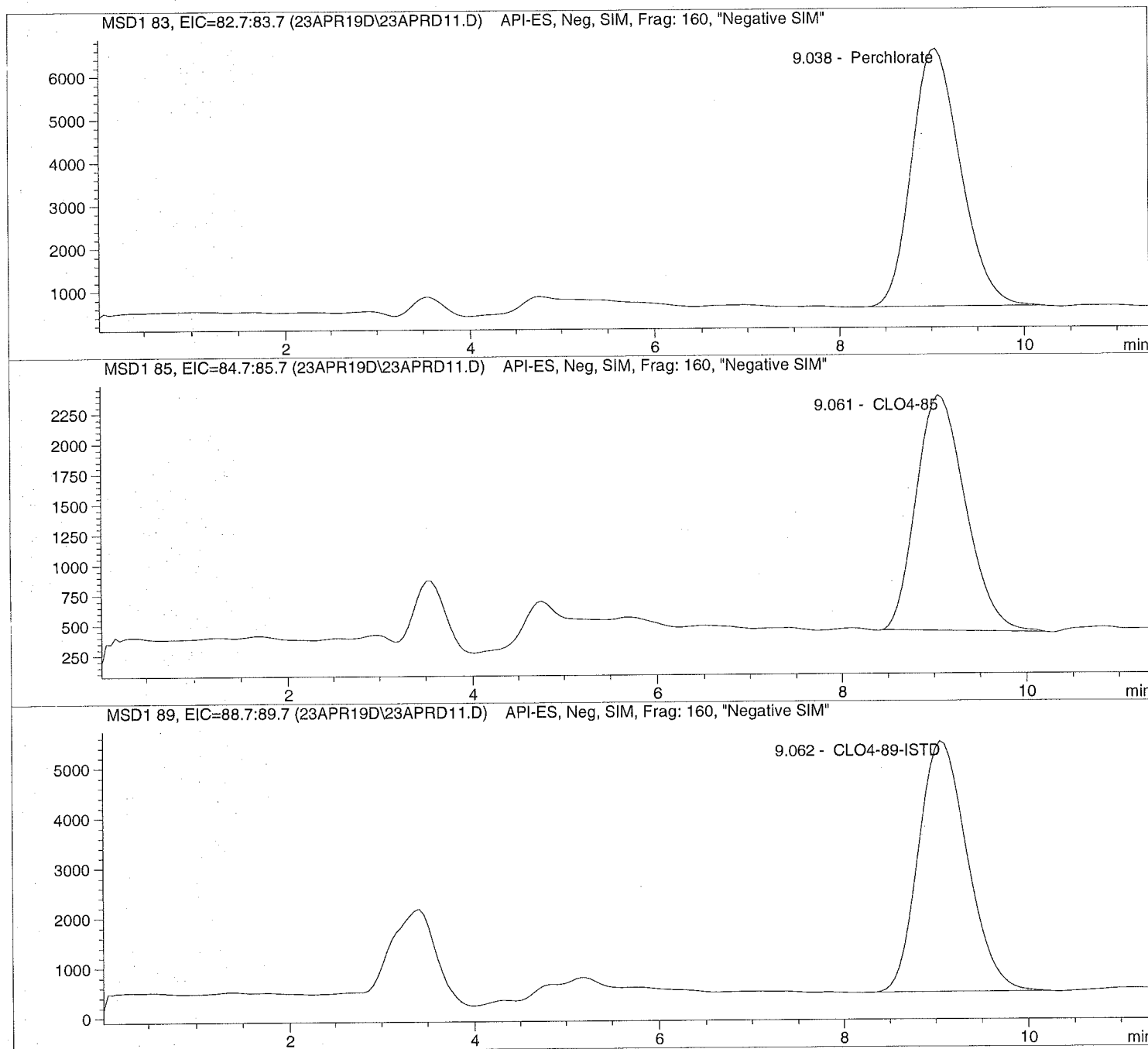
*** End of Report ***

Injection Date: 4/23/2019 10:57:05
Sample Name: 1910837003 MSD
Acq Operator: TNB

Seq Line: 11
Location: Vial 81
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 10:57:05 Seq Line: 11
Sample Name: 1910837003 MSD 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.038	PBA	220802.4	3.9511	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.061	BBA	72383.4	4.2063	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.062	PBA	184256.2	5.0000	CLO4-89-ISTD

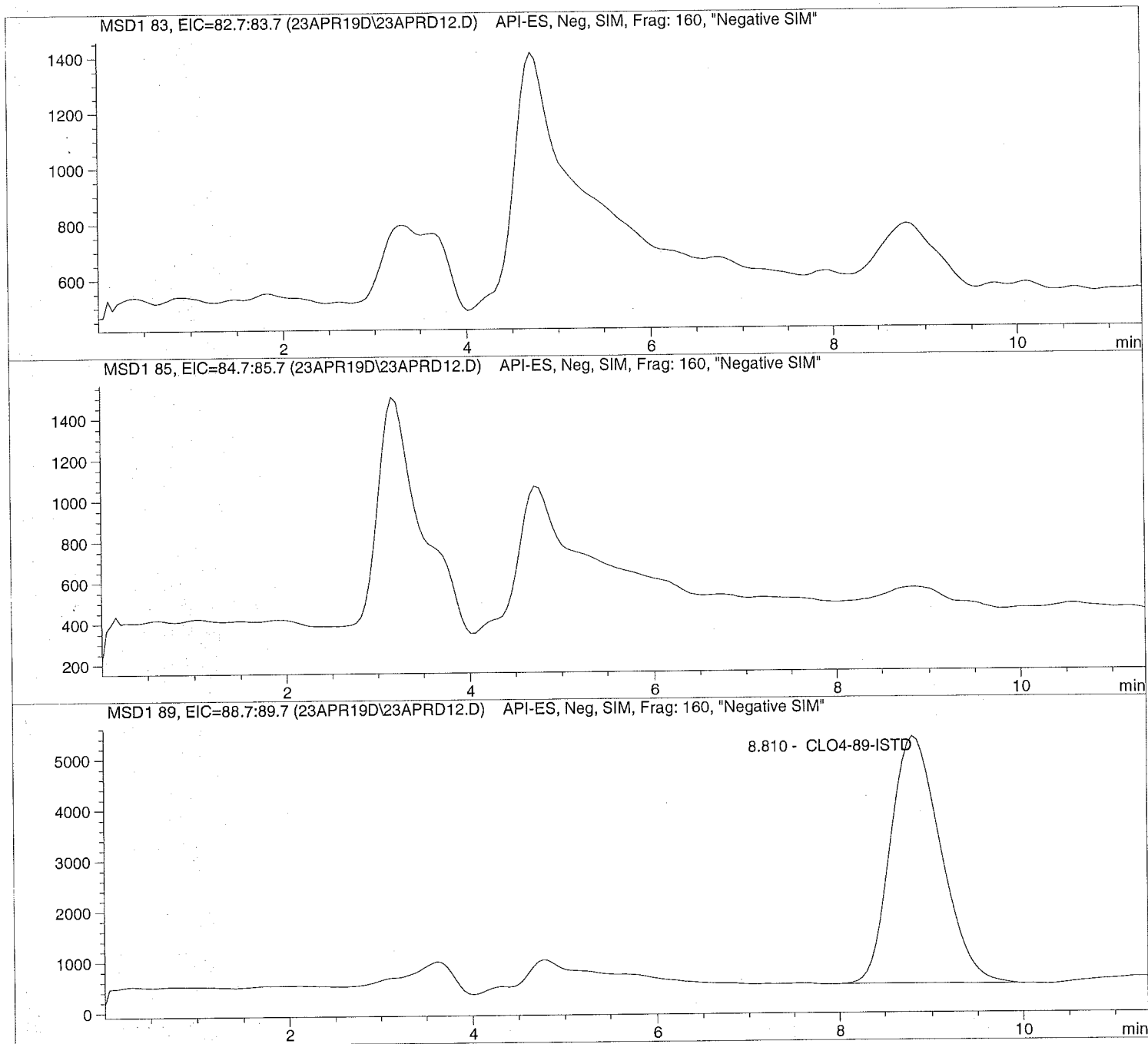
*** End of Report ***

Injection Date: 4/23/2019 11:10:26
Sample Name: 1910837004
Acq Operator: TNB

Seq Line: 12
Location: Vial 82
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 11:10:26 Seq Line: 12
Sample Name: 1910837004 Location: Vial 82
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.810	PBA	180138.5	5.0000	CLO4-89-ISTD

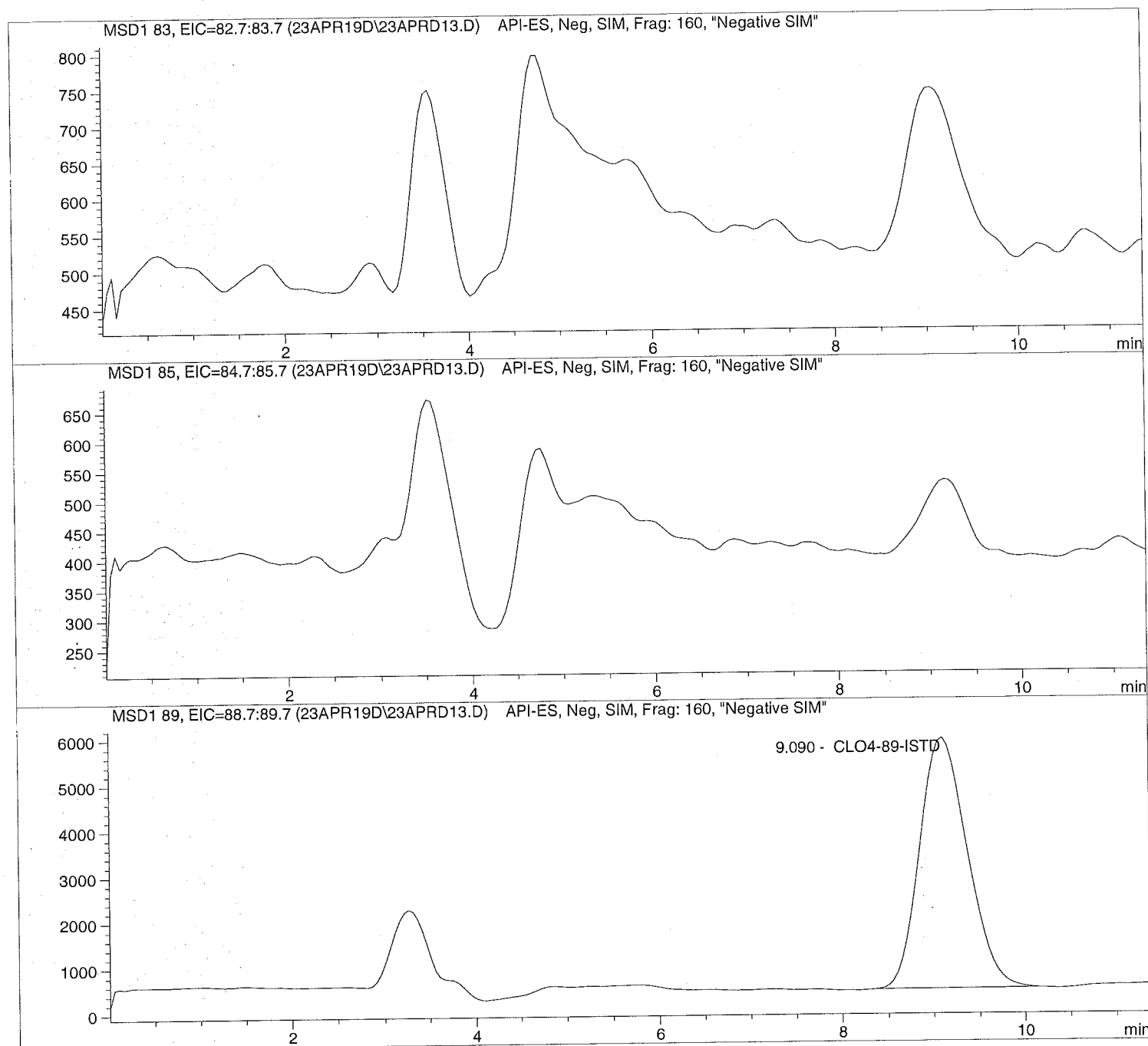
*** End of Report ***

Injection Date: 4/23/2019 11:23:52
Sample Name: 1910837005
Acq Operator: TNB

Seq Line: 13
Location: Vial 83
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  11:23:52      Seq Line:          13
Sample Name:    1910837005      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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
9.090	BBA	197954.5	5.0000	CLO4-89-ISTD

=====

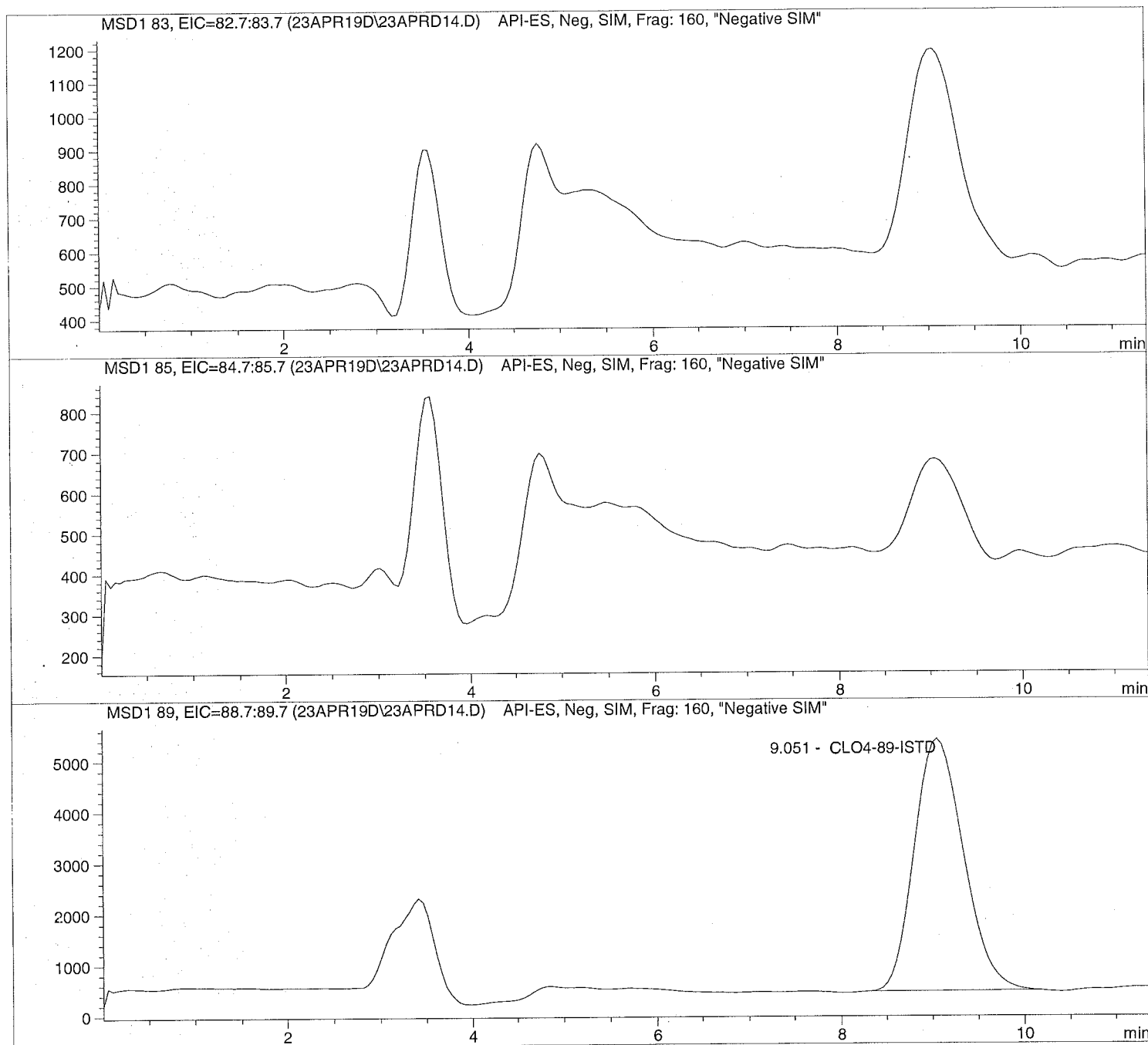
*** End of Report ***

Injection Date: 4/23/2019 11:37:15
Sample Name: 1910837006
Acq Operator: TNB

Seq Line: 14
Location: Vial 84
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  11:37:15      Seq Line:           14
Sample Name:    1910837006              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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
9.051	BBA	183017.4	5.0000	CLO4-89-ISTD

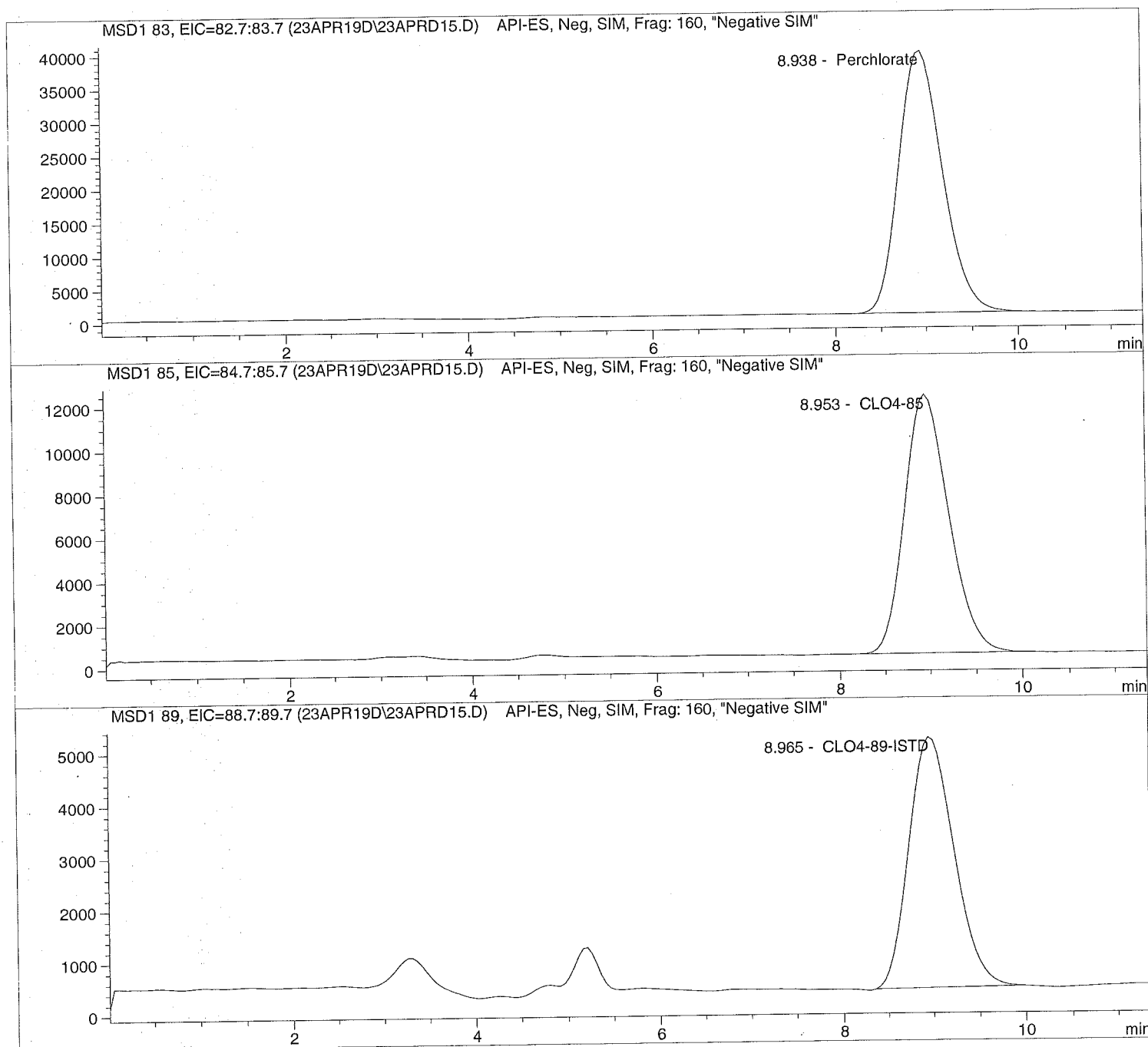
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 11:50:37
Sample Name: 649382 CCV@25
Acq Operator: TNB

Seq Line: 15
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 11:50:37
Sample Name: 649382 CCV@25
Acq Operator: TNB

Seq Line: 15
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.938	PBA	1311276.0	24.2693	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.953	BBA	400971.3	24.9597	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.965	PBA	164670.7	5.0000	CLO4-89-ISTD

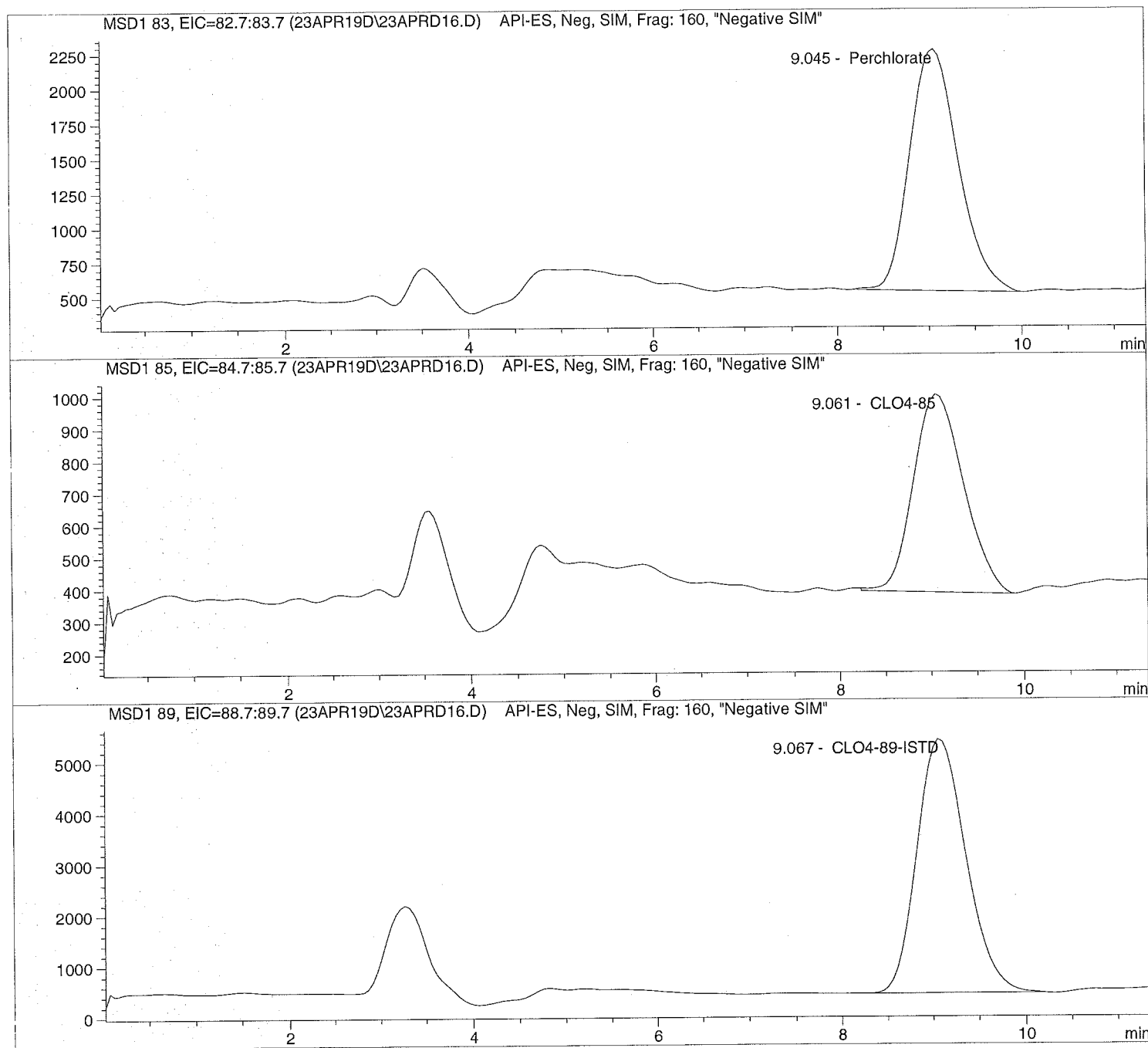
*** End of Report ***

Injection Date: 4/23/2019 12:03:59
Sample Name: 1910837007
Acq Operator: TNB

Seq Line: 16
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 12:03:59
Sample Name: 1910837007
Acq Operator: TNB

Seq Line: 16
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.045	BBA	64240.0	1.2640	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.061	BBA	23485.4	1.3651	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.067	PBA	184879.5	5.0000	CLO4-89-ISTD

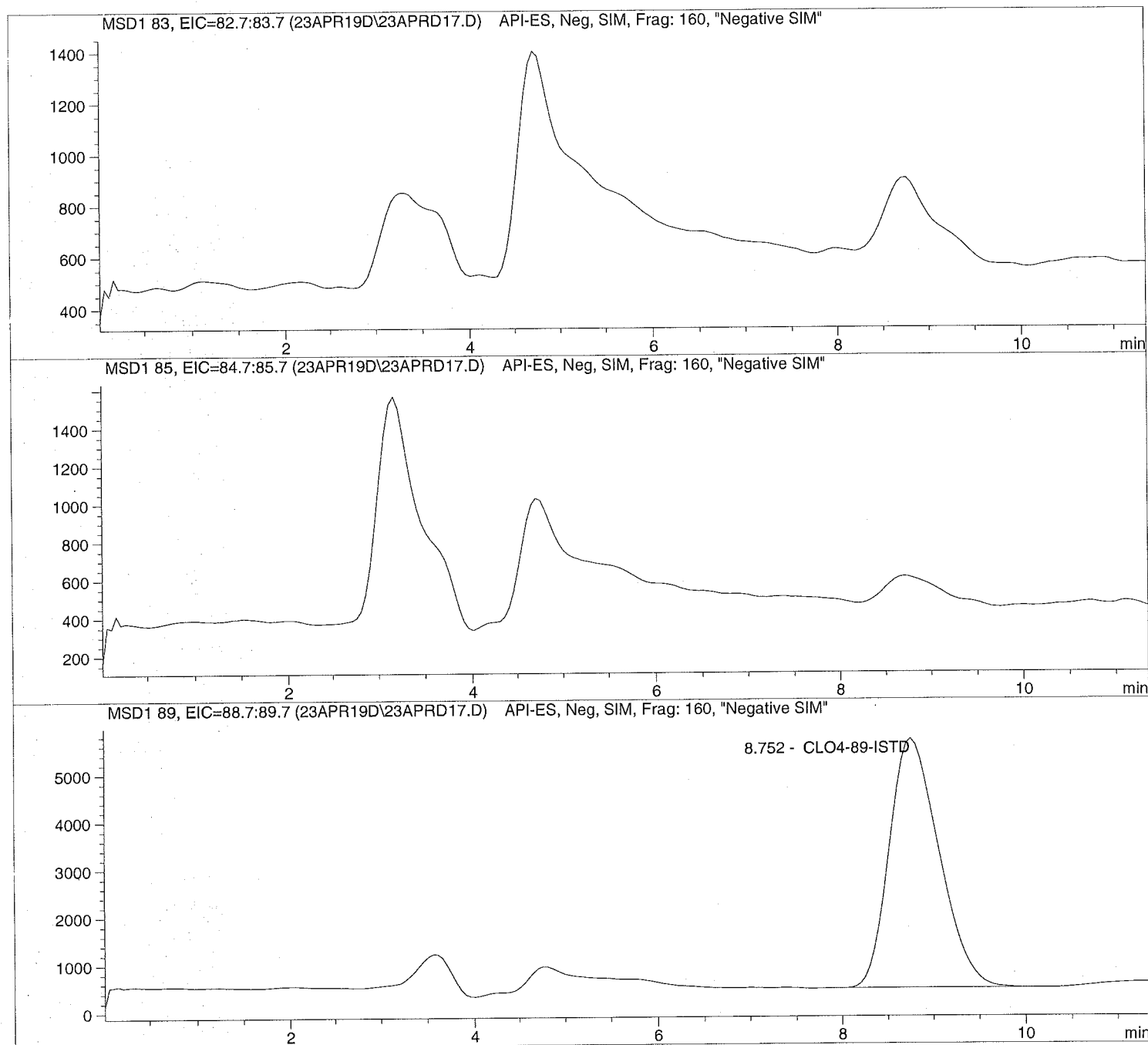
*** End of Report ***

Injection Date: 4/23/2019 12:17:22
Sample Name: 1910837008
Acq Operator: TNB

Seq Line: 17
Location: Vial 86
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  12:17:22      Seq Line:          17
Sample Name:    1910837008              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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.752	PBA	196776.6	5.0000	CLO4-89-ISTD

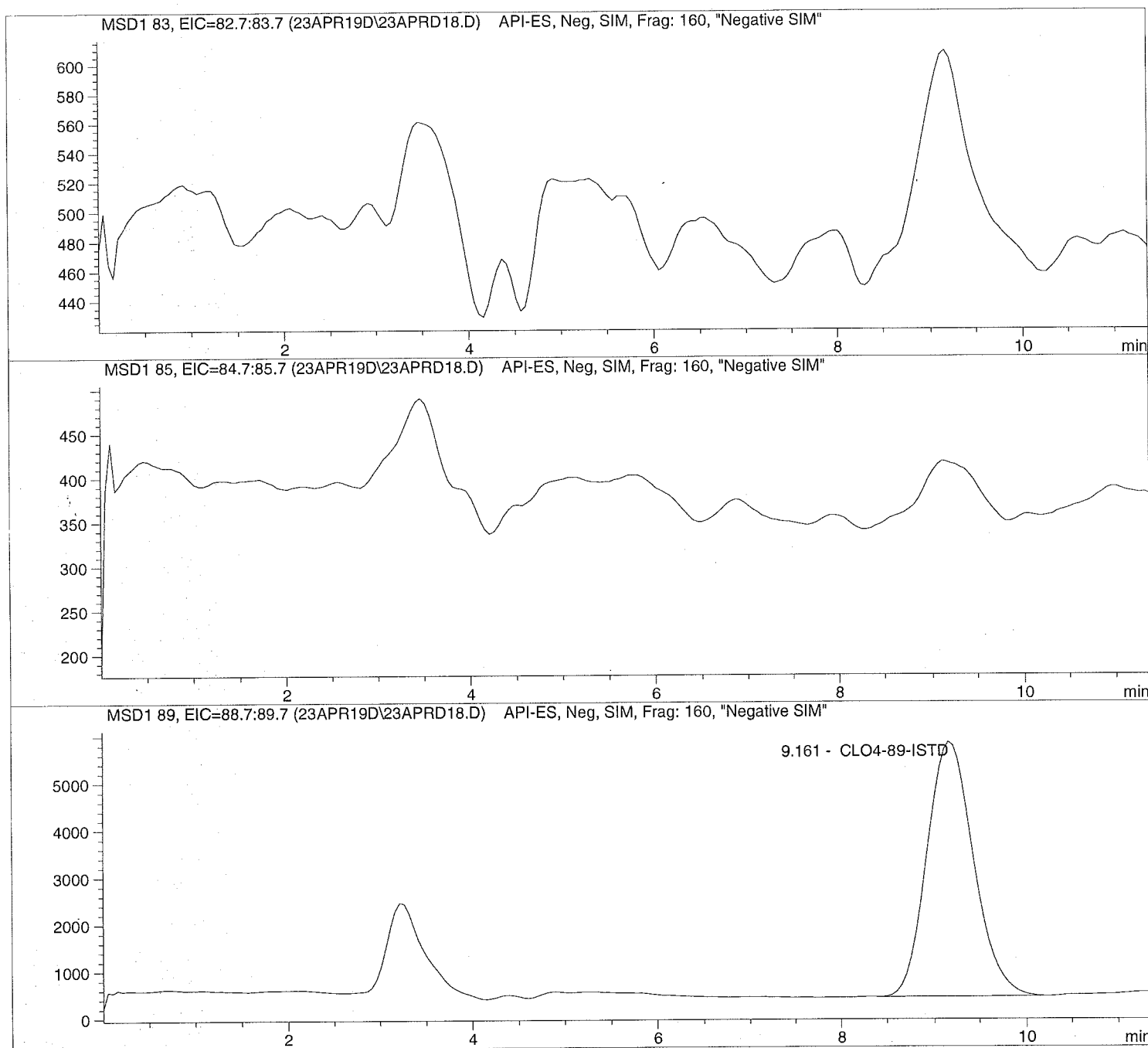
=====
*** End of Report ***
=====

Injection Date: 4/23/2019 12:30:43
Sample Name: 1910837009
Acq Operator: TNB

Seq Line: 18
Location: Vial 87
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 12:30:43
Sample Name: 1910837009
Acq Operator: TNB

Seq Line: 18
Location: Vial 87
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.161	BBA	191613.1	5.0000	CLO4-89-ISTD

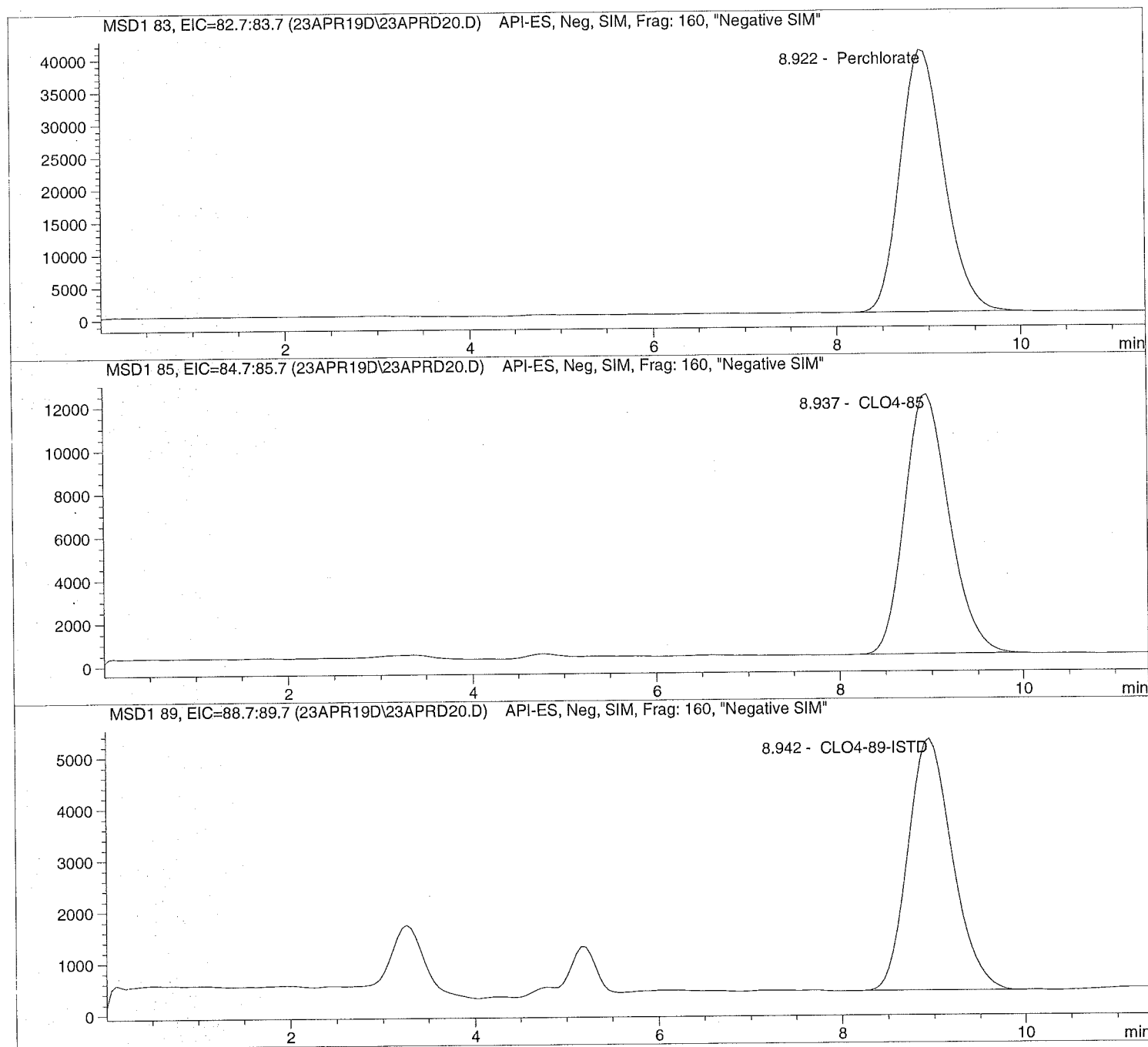
*** End of Report ***

Injection Date: 4/23/2019 13:01:17
Sample Name: 649383 CCV@25
Acq Operator: TNB

Seq Line: 20
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis




```
=====
Injection Date:  4/23/2019  13:01:17      Seq Line:           20
Sample Name:    649383   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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019, 07:52:58 am
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
8.922	PBA	1319634.0	24.7062	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.937	PBA	401823.2	25.3099	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.942	PBA	162618.0	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 : 3/19/2019 2:35:19 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	Lvl	Amount	Area	Amt/Area	Ref Grp	Name
[min]	Sig					
8.744	1	1.00000	7.76074e4	1.28854e-5	1	Perchlorate
	2	2.00000	1.35273e5	1.47849e-5		
	3	5.00000	3.37764e5	1.48033e-5		
	4	10.00000	6.83454e5	1.46316e-5		
	5	25.00000	2.08433e6	1.19943e-5		
	6	50.00000	4.13334e6	1.20968e-5		
	7	75.00000	5.99313e6	1.25143e-5		
8.755	2	1.00000	2.36780e4	4.22333e-5	1	CLO4-85
	2	2.00000	4.69486e4	4.25998e-5		
	3	5.00000	1.06124e5	4.71147e-5		
	4	10.00000	2.13523e5	4.68335e-5		
	5	25.00000	6.14295e5	4.06971e-5		
	6	50.00000	1.19814e6	4.17315e-5		
	7	75.00000	1.78355e6	4.20509e-5		
8.766	3	5.00000	2.73208e5	1.83011e-5	+I1	CLO4-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5		
	3	5.00000	2.33196e5	2.14412e-5		
	4	5.00000	2.34454e5	2.13262e-5		
	5	5.00000	2.50568e5	1.99547e-5		
	6	5.00000	2.30977e5	2.16472e-5		

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min
Curve Type : Quadratic
Origin : Ignored
Calibration Level Weights:/
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333

Compound: CLO4-85

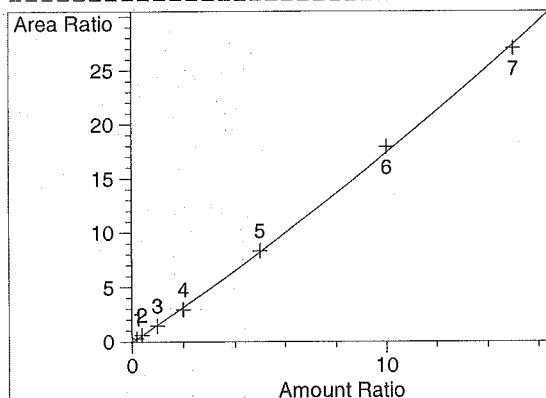
Time Window : From 6.650 min To 12.505 min
Curve Type : Quadratic
Origin : Ignored
Calibration Level Weights:/
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333

Compound: CLO4-89-ISTD

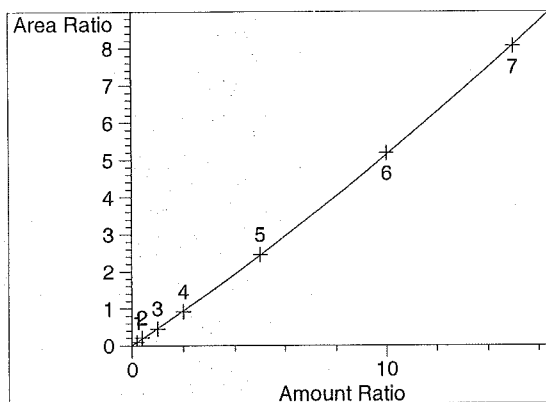
Time Window : From 6.659 min To 12.466 min
Curve Type : Linear
Origin : Included
Calibration Level Weights:/
Level 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

=====
Peak Sum Table
=====

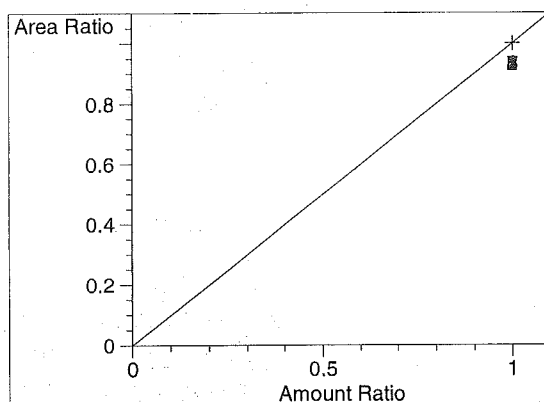
No Entries in table
=====

=====
Calibration Curves
=====

Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation: 0.99957
Residual Std. Dev.: 0.30744
Formula: $y = ax^2 + bx + c$
a: 1.76988e-2
b: 1.56480
c: -4.92430e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755
MSD1 85, EIC=84.7:85.7
Correlation: 0.99983
Residual Std. Dev.: 0.03473
Formula: $y = ax^2 + bx + c$
a: 5.13396e-3
b: 4.62055e-1
c: 4.97209e-4
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766
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 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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
CL04@ 1.0ug/L	Vial 73	1	Control	3	7.76074e4	8.744	1.06245
CL04@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	8.992	2.06969
CL04@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	8.586	4.73474
CL04@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	8.698	9.27727
CL04@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	8.451	25.29036
CL04@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	8.810	51.36844
CL04@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	8.586	74.16754
ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	8.702	9.25940

Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
CL04@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	8.755	9.30535e-1
CL04@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	9.012	2.24255
CL04@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	8.602	4.86656
CL04@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	8.713	9.64312
CL04@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	8.468	25.12159
CL04@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	8.825	50.46721
CL04@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	8.603	74.72019
ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	8.721	9.54024

Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
CL04@ 1.0ug/L	Vial 73	1	Control	3	2.73208e5	8.766	5.00000
CL04@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	9.012	5.00000
CL04@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	8.609	5.00000
CL04@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	8.716	5.00000
CL04@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	8.472	5.00000
CL04@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	8.825	5.00000
CL04@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	8.610	5.00000
ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	8.725	5.00000

*** End of Report ***

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\MAR\19MAR19I.S

Sequence Table:

Method and Injection Info Part:

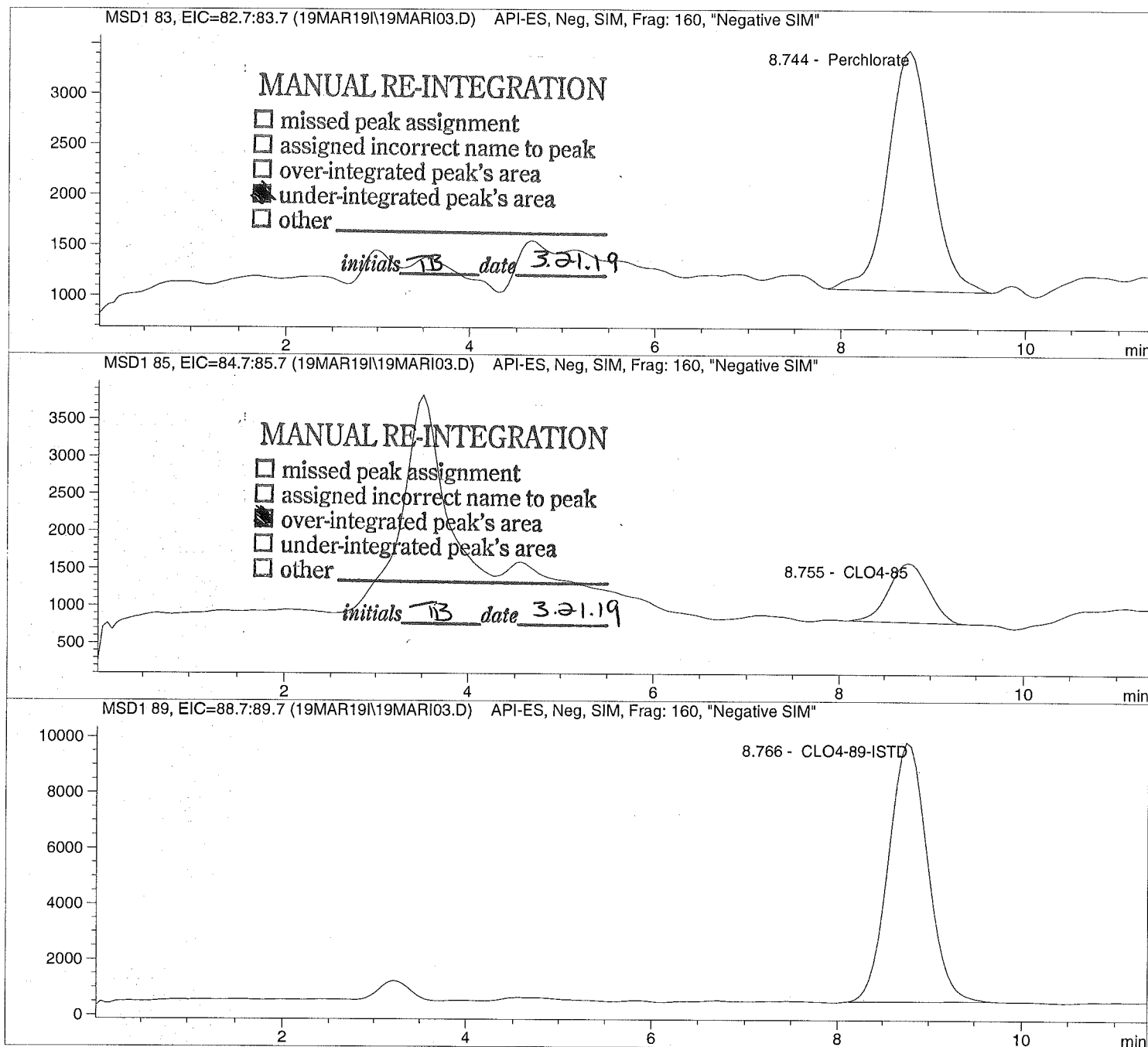
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	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 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.744	MM	77607.4	1.0625	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	MM	23678.0	0.9305	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

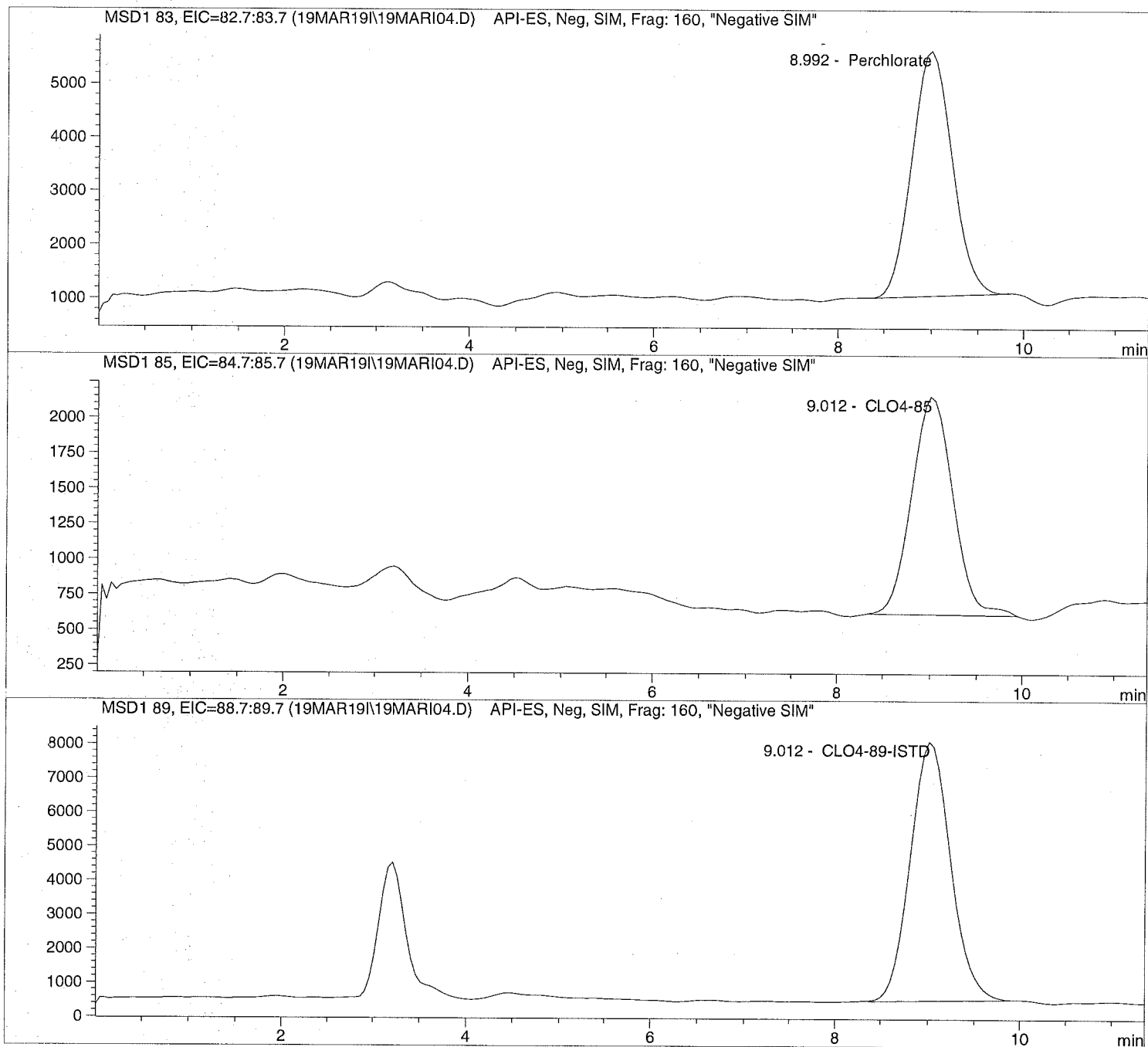
*** End of Report ***

Injection Date: 3/19/2019 09:53:00
Sample Name: CLO4@ 2.0ug/L
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:53:00 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.992	BBA	135272.8	2.0697	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

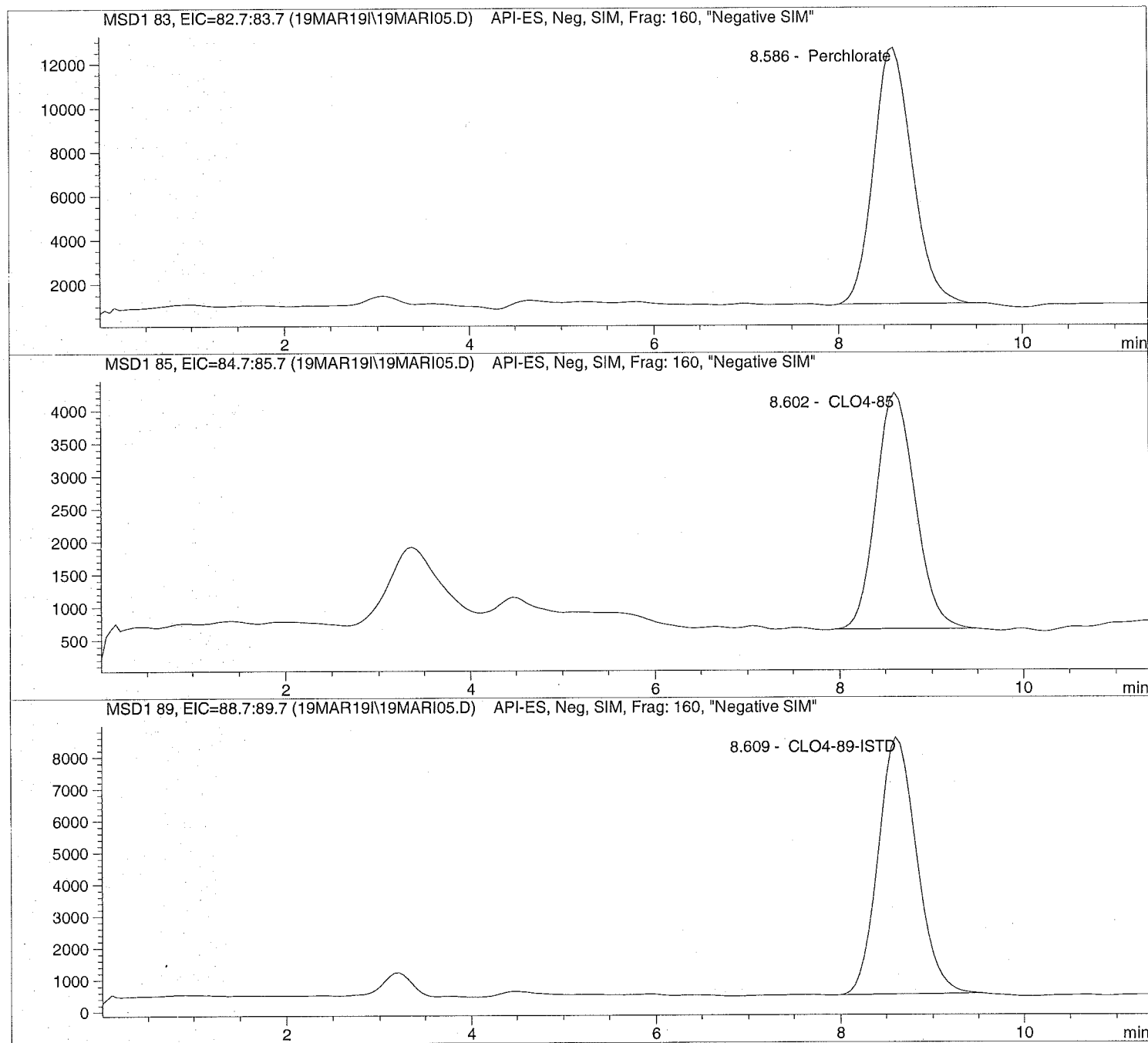
*** End of Report ***

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI05.D

Sample Name: CLO4@ 5.0ug/L

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 10:19:32

Seq Line: 6

Sample Name: CLO4@ 10.ug/L

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

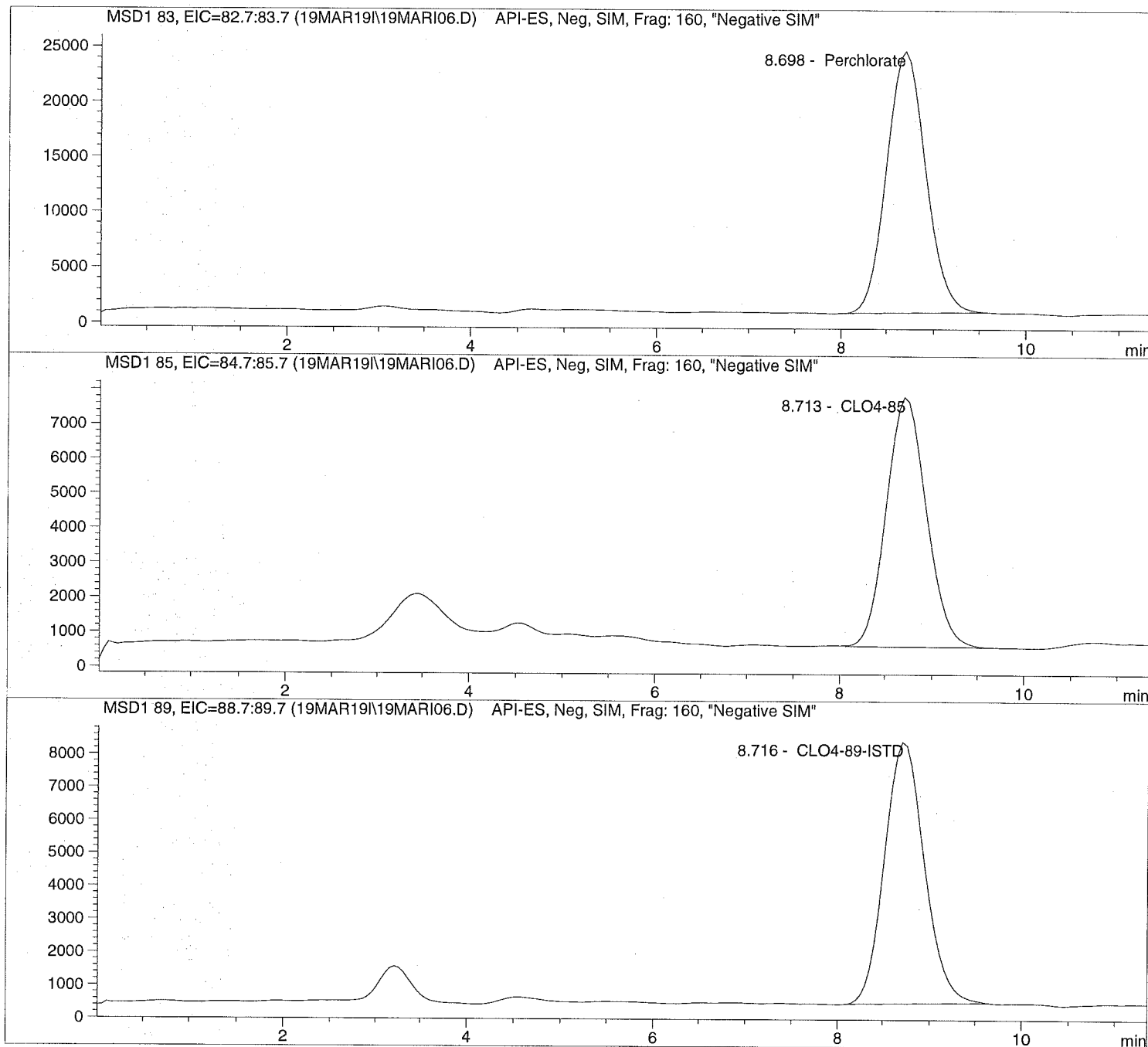
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI06.D

Sample Name: CLO4@ 10.ug/L

Injection Date: 3/19/2019 10:19:32
Sample Name: CLO4@ 10.ug/L
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.698	PBA	683454.4	9.2773	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

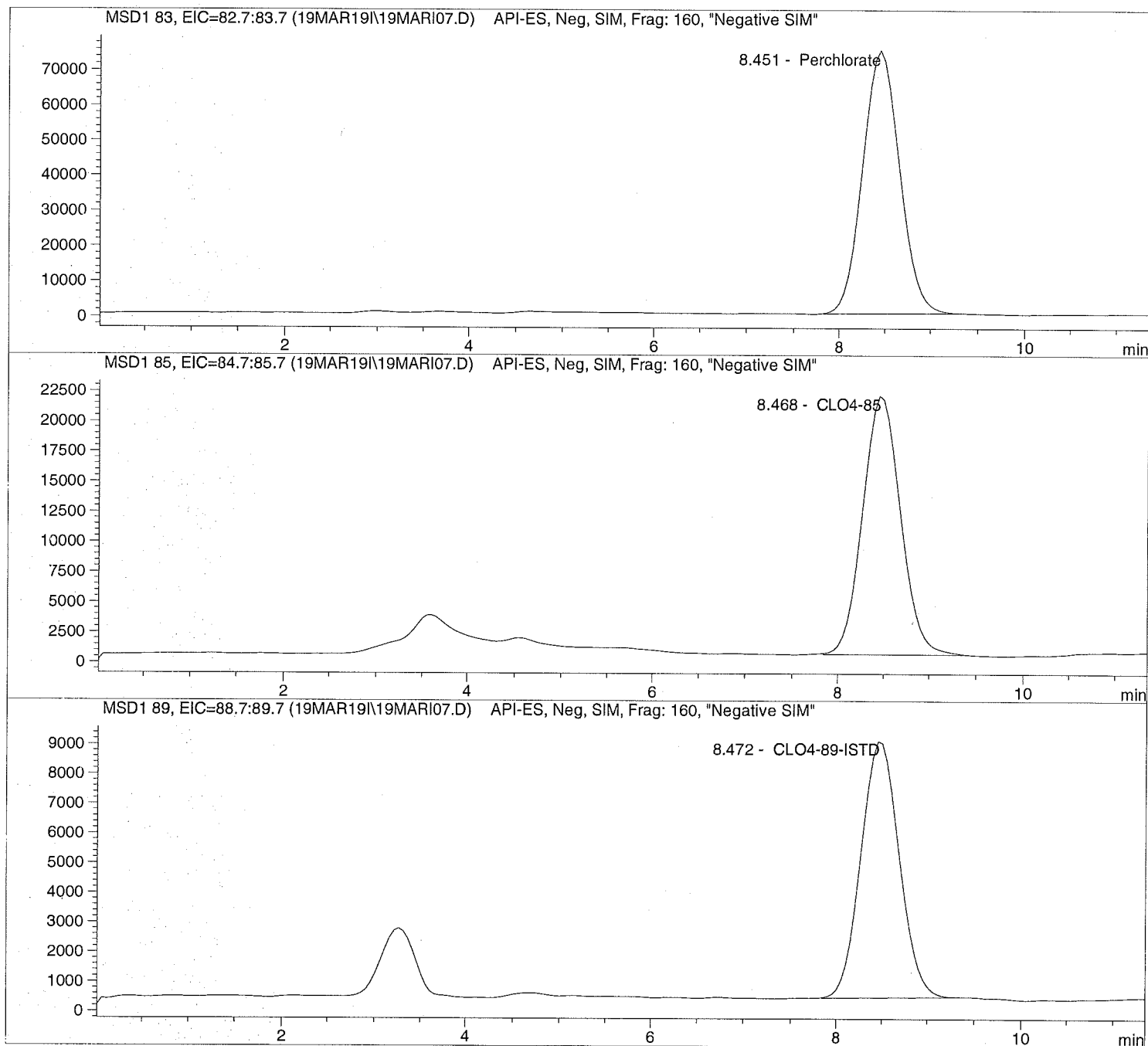
*** End of Report ***

Injection Date: 3/19/2019 10:32:49
Sample Name: CLO4@ 25.ug/L
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 10:32:49 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.451	PBA	2084327.4	25.2904	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.468	BBA	614294.8	25.1216	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D

Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05

Seq Line: 8

Sample Name: CLO4@ 50.ug/L

Location: Vial 78

Acq Operator: TNB

Inj. No.: 1

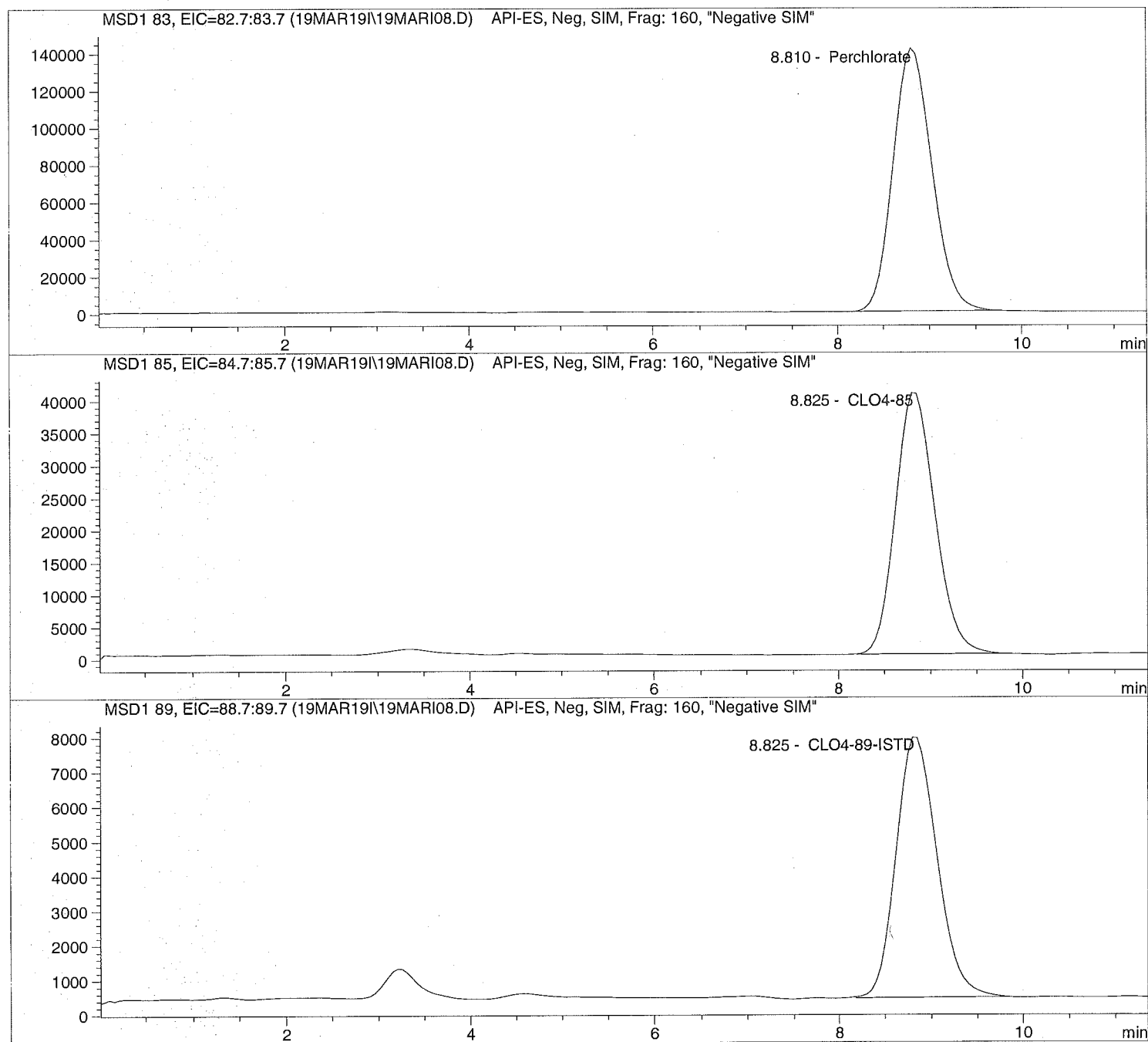
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D

Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.810	PBA	4133340.5	51.3684	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.4672	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 10:59:22

Seq Line: 9

Sample Name: CLO4@ 75.ug/L

Location: Vial 79

Acq Operator: TNB

Inj. No.: 1

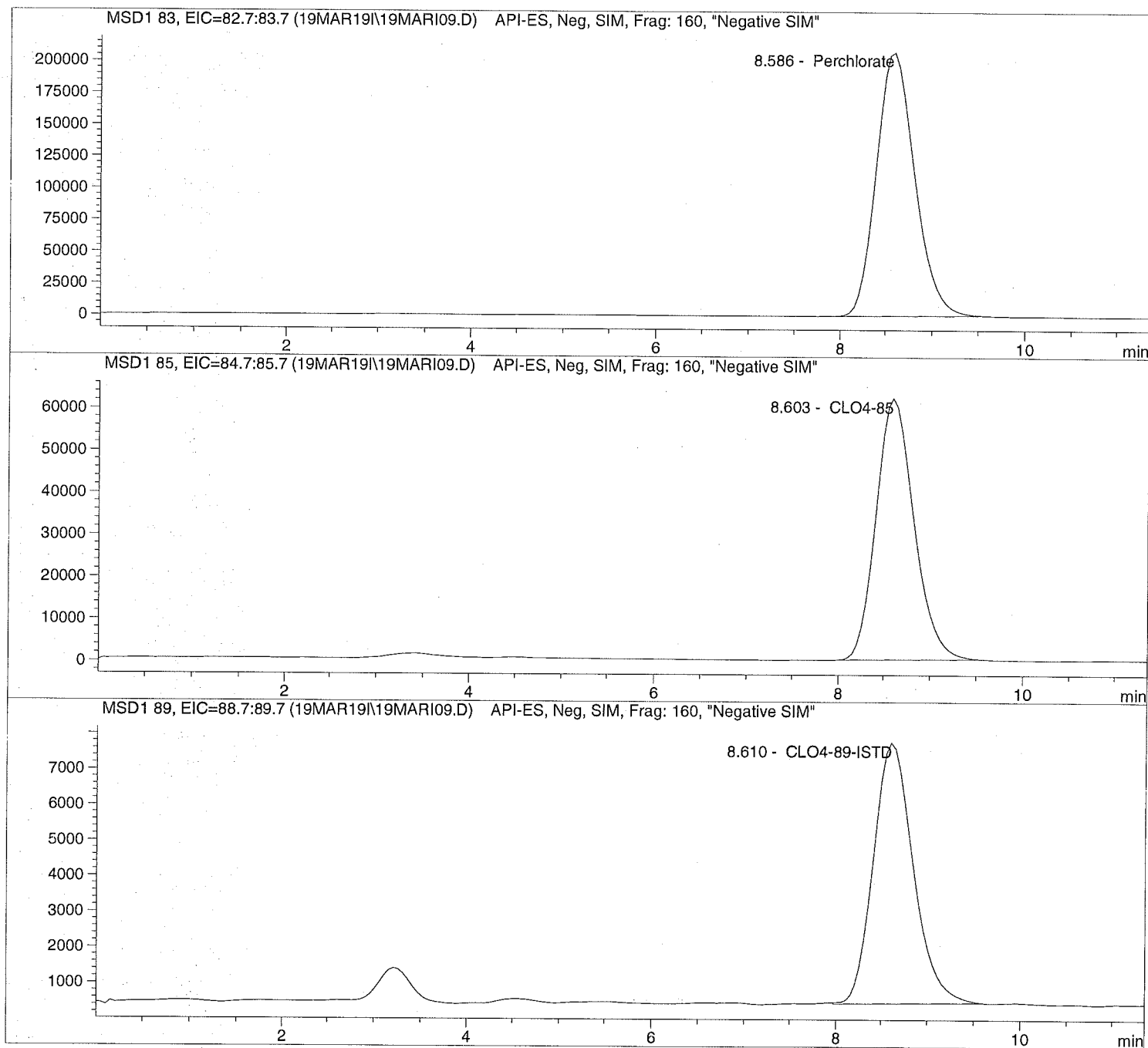
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI09.D Sample Name: CLO4@ 75.ug/L

Injection Date: 3/19/2019 10:59:22 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

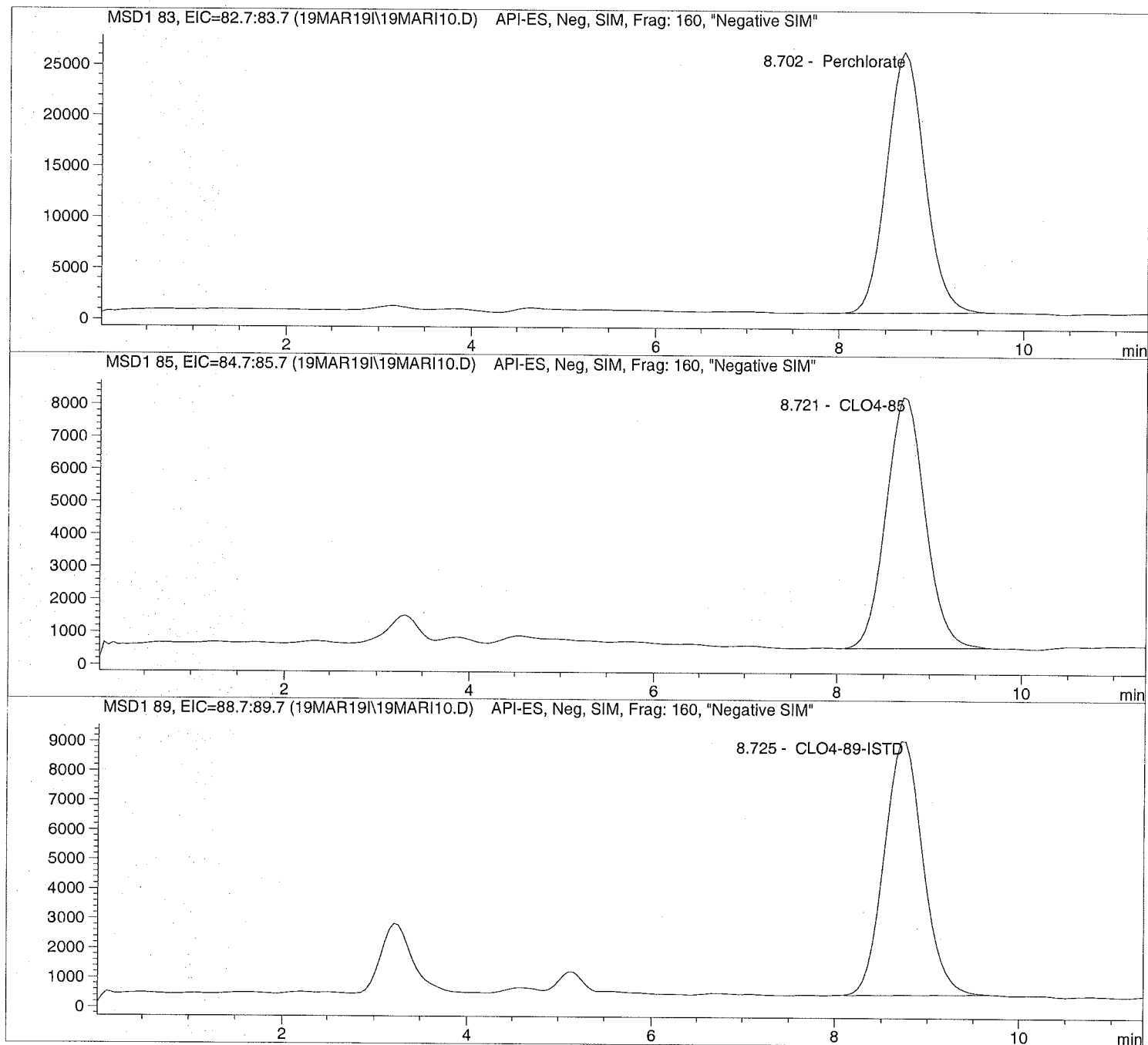
*** End of Report ***

Injection Date: 3/19/2019 11:12:42
Sample Name: ICAL Verf@10ug/L
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 30 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D

Sample Name: ICAL Verf@10ug/L

Injection Date: 3/19/2019 11:12:42

Seq Line: 10

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal

Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

*** End of Report ***



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

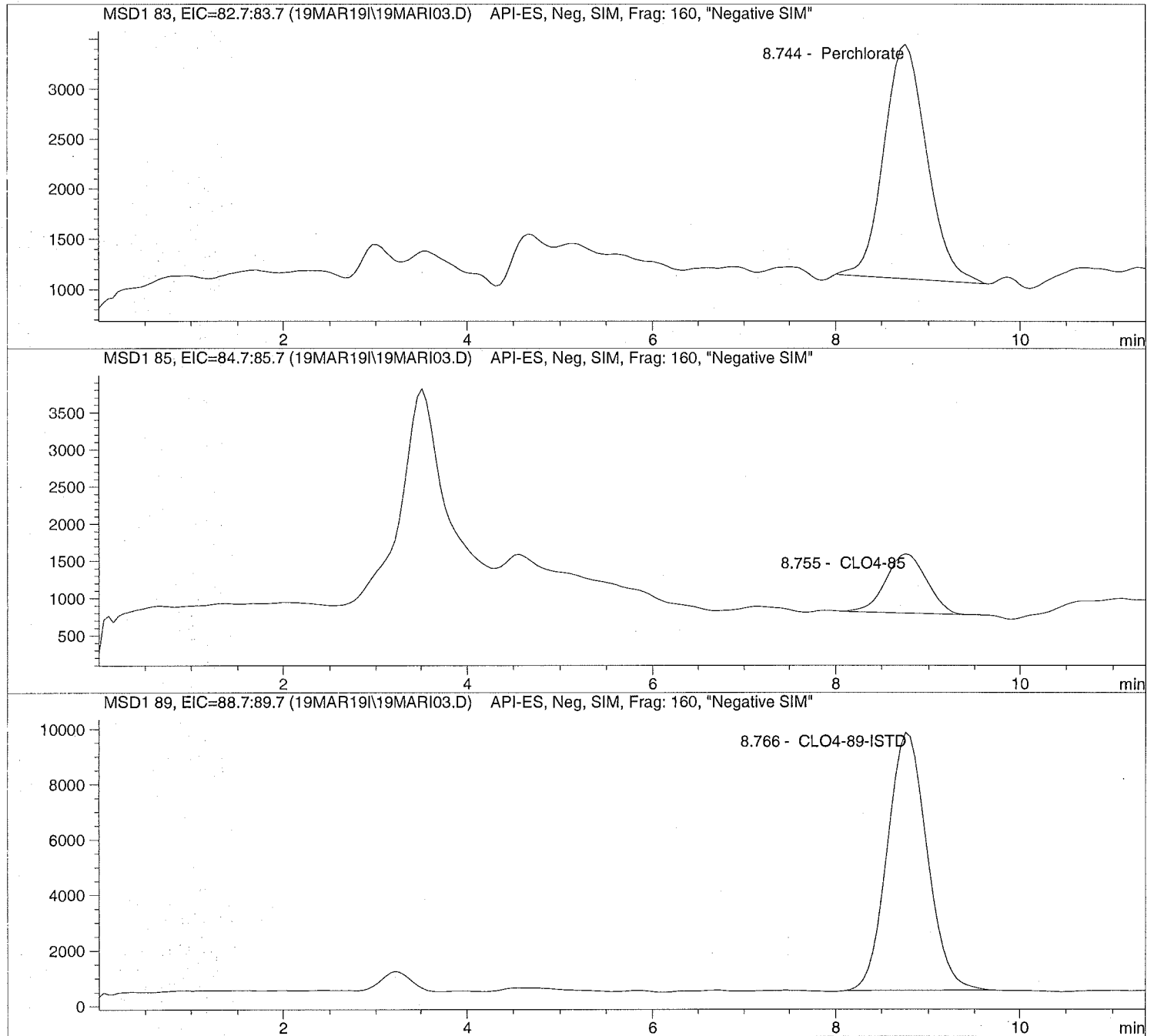
Unmodified

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:38:25

Perchlorate analysis



=====

Injection Date:	3/19/2019 09:39:40	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-DP2.M
Last Changed: 3/19/2019 14:38:25

Perchlorate analysis

=====

Sample Information

=====

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.744	BBA	74166.3	1.0224	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	BBA	24138.1	0.9487	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

=====

*** End of Report ***

=====

ALS Houston, US

Date: 25-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19040653

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19040653-01	LH18/24-SP650_041019	Water		10-Apr-2019 14:00	11-Apr-2019 09:00	<input type="checkbox"/>
HS19040653-02	LH18/24-SP650_041019_BIX	Water		10-Apr-2019 14:00	11-Apr-2019 09:00	<input type="checkbox"/>

ALS Houston, US

Date: 25-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order:

CASE NARRATIVE

Work Order Comments

- The analysis for Perchlorate was subcontracted to ALS Salt Lake City, UT. Final report attached.
 - The analysis for TOC was subcontracted to ALS Environmental in Kelso, WA. Final report attached.
-

WetChemistry by Method E350.3**Batch ID: R336526**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

WetChemistry by Method E365.3**Batch ID: R336521**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

ALS Houston, US

Date: 25-Apr-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
 Sample ID: LH18/24-SP650_041019
 Collection Date: 10-Apr-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19040653
 Lab ID:HS19040653-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
AMMONIA AS N BY E350.3(ISE)		Method:E350.3					Analyst: KVL	
Nitrogen, Ammonia (As N)	15		0.20	0.10	0.20	mg/L	1	12-Apr-2019 14:20
ORTHO PHOSPHATE (PO4) AS P BY E365.3		Method:E365.3					Analyst: MZD	
Phosphorus, Total Orthophosphate (As P)	3.92		0.100	0.200	0.250	mg/L	10	11-Apr-2019 11:44
SUBCONTRACT ANALYSIS - TOC ANALYSIS		Method:NA					Analyst: SUBK	
Subcontract Analysis	See Attached		0	0		NA	1	19-Apr-2019 09:11

ALS Houston, US

Date: 25-Apr-19

Client:	Bhate Environmental Associates, Inc.	ANALYTICAL REPORT
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS19040653
Sample ID:	LH18/24-SP650_041019_BIX	Lab ID:HS19040653-02
Collection Date:	10-Apr-2019 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	25-Apr-2019 17:26

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

ALS Houston, US

Date: 25-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19040653

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R336521	Test Name : ORTHO PHOSPHATE (PO4) AS P BY E365.3			Matrix: Water		
HS19040653-01	LH18/24-SP650_041019	10 Apr 2019 14:00			11 Apr 2019 11:44	10
Batch ID R336526	Test Name : AMMONIA AS N BY E350.3(ISE)			Matrix: Water		
HS19040653-01	LH18/24-SP650_041019	10 Apr 2019 14:00			12 Apr 2019 14:20	1
Batch ID R336898	Test Name : SUBCONTRACT ANALYSIS - TOC ANALYSIS			Matrix: Water		
HS19040653-01	LH18/24-SP650_041019	10 Apr 2019 14:00			19 Apr 2019 09:11	1
Batch ID R337297	Test Name : SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			Matrix: Water		
HS19040653-02	LH18/24-SP650_041019_BIX	10 Apr 2019 14:00			25 Apr 2019 17:26	1

ALS Houston, US

Date: 25-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19040653

QC BATCH REPORT NEW

Batch ID: R336521 (0)		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3					
MBLK	Sample ID: MBLK-336521	Units: mg/L		Analysis Date: 11-Apr-2019 11:44					
Client ID:	Run ID: UV-2450_336521	SeqNo: 5033937		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.0200	0.0250							U
LCS	Sample ID: LCS-336521	Units: mg/L		Analysis Date: 11-Apr-2019 11:44					
Client ID:	Run ID: UV-2450_336521	SeqNo: 5033938		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.246	0.0250	0.25	0	98.4	85 - 115			
MS	Sample ID: HS19040553-02MS	Units: mg/L		Analysis Date: 11-Apr-2019 11:44					
Client ID:	Run ID: UV-2450_336521	SeqNo: 5033940		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.286	0.0250	0.25	0.042	97.6	80 - 120			
MSD	Sample ID: HS19040553-02MSD	Units: mg/L		Analysis Date: 11-Apr-2019 11:44					
Client ID:	Run ID: UV-2450_336521	SeqNo: 5033941		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.294	0.0250	0.25	0.042	101	80 - 120	0.286	2.76	20

The following samples were analyzed in this batch: HS19040653-01

ALS Houston, US

Date: 25-Apr-19

Client:	Bhate Environmental Associates, Inc.	QUALIFIERS, ACRONYMS, UNITS
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19040653	

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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Texas	T10470231-18-21	30-Apr-2019
North Dakota	R193 2018-2019	30-Apr-2019
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kentucky	123043 - 2018	30-Apr-2019
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
California	2919, 2018-2019	30-Apr-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020

Client:	Bhate Environmental Associates, Inc.	SAMPLE TRACKING
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
Work Order:	HS19040653	

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19040653-01	LH18/24-SP650_041019	Login	4/11/2019 10:42:26 AM	RPG	WET309
HS19040653-01	LH18/24-SP650_041019	Login	4/11/2019 10:42:26 AM	RPG	WET309
HS19040653-01	LH18/24-SP650_041019	Login	4/11/2019 10:42:26 AM	RPG	Sub
HS19040653-02	LH18/24-SP650_041019_BIX	Login	4/11/2019 10:42:26 AM	RPG	Sub

ALS Houston, US

Date: 25-Apr-19

Sample Receipt Checklist

Client Name: Bhate Environmental
 Work Order: HS19040653

Date/Time Received: **11-Apr-2019 09:00**
 Received by: **PMG**

Checklist completed by: Raegen Giga 11-Apr-2019
 eSignature Date

Reviewed by: RJ Modashia 11-Apr-2019
 eSignature Date

Matrices: **Water**

Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	4.7c uc/c IR 25		
Cooler(s)/Kit(s):	25587		
Date/Time sample(s) sent to storage:	04/11/2019 10:55		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:

HS19040653

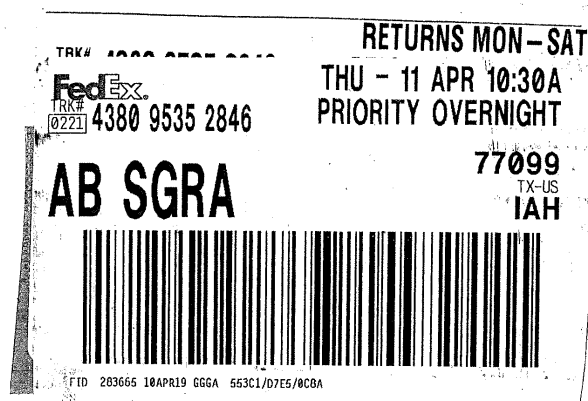
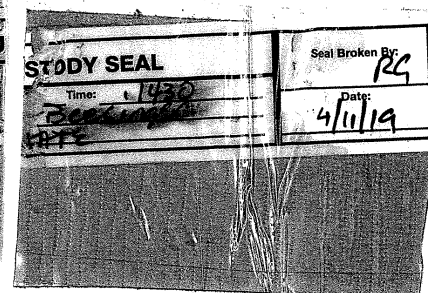
Bhate Environmental Associates, Inc.
LH18/24 Longhorn GW Treatment Plant Weekly Sample

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: R.J Modshia

[illegible]

25587 41c.
4.70
425°
C1150.00





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F : +1 360 636 1068
www.alsglobal.com

April 18, 2019

Analytical Report for Service Request No: K1903297

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

RE: HS19040653

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory April 12, 2019
For your reference, these analyses have been assigned our service request number **K1903297**.

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
Project Manager



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ALS Group USA, Corp
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Kelso, WA 98626
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Table of Contents

Acronyms

Qualifiers

State Certifications, Accreditations, And Licenses

Chain of Custody

General Chemistry

Raw Data

 General Chemistry

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjllabs.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/bsdwlabservice.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/analyte is offered by that state.



Chain of Custody

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K1903997

Subcontract Chain of Custody

COC ID: 11112

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: HS19040653
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19040653-01	LH18/24-SP650_041019	Water	10 Apr 2019 14:00
TOC Analysis for DOD Level IV			19 Apr 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: R Cugs Date/Time: 4/11/19 18:00
Received By: J Morrow ALS-Kelso Date/Time: 4/12/19 09:20
Cooler ID(s): _____ Temperature(s): _____

WILLIAMS (HONOLULU) PARTNER



Cooler Receipt and Preservation Form

Client ALS - Houston Service Request K19 03297
Received: 4/12/19 Opened: 4/12/19 By: Don Unloaded: 4/12/19 By: Don

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? 1 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	Tracking Number	NA	Filed
0.0	0.1	1.2	1.3	+0.1	392	1112	4809 7832 8012	NA	

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:

RUSH



General Chemistry

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Analytical Report

Client: ALS Environmental - US
Project: HS19040653
Sample Matrix: Water
Analysis Method: SM 5310 C
Prep Method: None

Service Request: K1903297
Date Collected: 04/10/19
Date Received: 04/12/19
Units: mg/L
Basis: NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_041019	K1903297-001	2.37	0.50	0.20	0.07	1	04/16/19 15:00	
Method Blank	K1903297-MB	ND U	0.50	0.20	0.07	1	04/16/19 13:06	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS19040653
Sample Matrix: Water

Service Request: K1903297
Date Collected: 04/10/19
Date Received: 04/12/19

Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
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
Batch QC	K1903133-002DUP	50	20	7	912	908	910	<1	10	04/16/19
Batch QC	K1903133-003DUP	50	20	7	944	934	939	1	10	04/16/19
Batch QC	K1903192-002DUP	0.50	0.20	0.07	1.05	1.05	1.05	<1	10	04/16/19
Batch QC	K1903227-001DUP	0.50	0.20	0.07	3.38	3.30	3.34	3	10	04/16/19
Batch QC	K1903227-002DUP	0.50	0.20	0.07	3.35	3.29	3.32	2	10	04/16/19
Batch QC	K1903227-003DUP	0.50	0.20	0.07	ND U	0.14 J	NC	NC	10	04/16/19
Batch QC	K1903227-004DUP	0.50	0.20	0.07	ND U	0.42 J	NC	NC	10	04/16/19
LH18/24-SP650_041019	K1903297-001DUP	0.50	0.20	0.07	2.37	2.39	2.38	<1	10	04/16/19
Batch QC	K1903367-001DUP	0.50	0.20	0.07	ND U	ND U	NC	NC	10	04/16/19
Batch QC	K1903367-002DUP	0.50	0.20	0.07	ND U	ND U	NC	NC	10	04/16/19

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.

QA/QC Report

Client: ALS Environmental - US
Project: HS19040653
Sample Matrix: Water

Service Request: K1903297
Date Collected: 04/10/19
Date Received: 04/12/19
Date Analyzed: 04/16/19
Date Extracted: NA

Matrix Spike Summary
Carbon, Total Organic

Sample Name: LH18/24-SP650_041019
Lab Code: K1903297-001
Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
Basis: NA

Matrix Spike
K1903297-001MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic	2.37	29.3	25.0	108	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.

QA/QC Report

Client: ALS Environmental - US
Project: HS19040653
Sample Matrix: Water

Service Request: K1903297
Date Analyzed: 04/16/19
Date Extracted: NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 632160

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1903297-LCS	26.9	25.0	107	83-117

Client: ALS Environmental - US
Project: HS19040653

Service Request: K1903297

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	632160	KQ1904985-02	04/16/19 12:36	25.0	25.7	103	90-110
CCV2	632160	KQ1904985-06	04/16/19 16:26	25.0	25.4	102	90-110
CCV3	632160	KQ1904985-07	04/16/19 21:36	25.0	25.1	100	90-110
CCV4	632160	KQ1904985-08	04/17/19 03:15	25.0	25.2	101	90-110

Client: ALS Environmental - US
Project: HS19040653

Service Request: K1903297

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	632160	KQ1904985-01	04/16/19 12:51	0.50	0.20	0.07	ND	U
CCB2	632160	KQ1904985-03	04/16/19 16:40	0.50	0.20	0.07	ND	U
CCB3	632160	KQ1904985-04	04/16/19 21:51	0.50	0.20	0.07	ND	U
CCB4	632160	KQ1904985-05	04/17/19 03:30	0.50	0.20	0.07	ND	U



Raw Data

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General Chemistry

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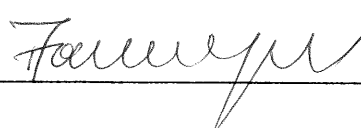
Work Request # ^{Original} (K1403076, 3133, 3192, 3221, 3227, 3297, 3367)
 Tier: II II I I II IV I
 Date Analyzed: 4/16/19
 Analyst: RED Run # TOC: 632160
 Analysis: DOC: 632162

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? yes/no/NA
(LCS % rec, MS/DMS % rec, DUP or MS/DMS RPDs, etc.)
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? yes/no/NA
(e.g. Special MRLs, QC on a specific sample, Form V)
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: K1403076-1 reports being overdiluted, but this sample requires a minimum dilution due to being dirty.
K1403076 samples reanalyzed past hold.

Final Approved by: 

Date: 04/18/19

DQREPORT

Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 632160 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
K1903076-001	Carbon, Total Organic	N/A		Water	0.44 mg/L	10 ml	10 mg/L U	20	2	10			4/16/19 20:40	N	II
K1903076-002	Carbon, Total Organic	N/A		Water	0.95 mg/L	10 ml	19 mg/L	20	2	10			4/16/19 22:34	N	II
K1903076-003	Carbon, Total Organic	N/A		Water	2.02 mg/L	10 ml	40 mg/L	20	2	10			4/16/19 23:03	N	II
K1903076-004	Carbon, Total Organic	N/A		Water	1.25 mg/L	10 ml	25 mg/L	20	2	10			4/16/19 23:31	N	II
K1903076-005	Carbon, Total Organic	N/A		Water	2.29 mg/L	10 ml	46 mg/L	20	2	10			4/16/19 23:59	N	II
K1903076-006	Carbon, Total Organic	N/A		Water	2.68 mg/L	10 ml	54 mg/L	20	2	10			4/17/19 00:27	N	II
K1903076-007	Carbon, Total Organic	N/A		Water	32.80 mg/L	10 ml	328000 mg/L	10000	700	5000			4/17/19 00:55	N	II
K1903133-002	Carbon, Total Organic	N/A		Water	9.12 mg/L	10 ml	912 mg/L	100	7	50			4/16/19 18:48	N	II
K1903133-003	Carbon, Total Organic	N/A		Water	9.44 mg/L	10 ml	944 mg/L	100	7	50			4/16/19 19:16	N	II
K1903192-002	Carbon, Total Organic	N/A		Drinking Water	1.06 mg/L	10 ml	1.05 mg/L	1	0.07	0.50			4/16/19 15:57	N	I
K1903221-001	Carbon, Total Organic	N/A		Water	2.11 mg/L	10 ml	21.1 mg/L	10	0.7	5.0			4/16/19 20:12	N	I
K1903227-001	Carbon, Total Organic	N/A		Water	3.38 mg/L	10 ml	3.38 mg/L	1	0.07	0.50			4/16/19 16:55	N	II
K1903227-002	Carbon, Total Organic	N/A		Water	3.35 mg/L	10 ml	3.35 mg/L	1	0.07	0.50			4/16/19 17:23	N	II
K1903227-003	Carbon, Total Organic	N/A		Water	0.18 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/16/19 17:51	N	II
K1903227-004	Carbon, Total Organic	N/A		Water	0.45 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/16/19 18:19	N	II
K1903297-001	Carbon, Total Organic	N/A		Water	2.37 mg/L	10 ml	2.37 mg/L	1	0.07	0.50			4/16/19 15:00	N	IV
K1903367-001	Carbon, Total Organic	N/A		Reagent Water	0.01 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/16/19 13:50	N	I
K1903367-002	Carbon, Total Organic	N/A		Reagent Water	0.02 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/16/19 14:18	N	I
KQ1904985-01	Carbon, Total Organic	CCB		Reagent Water	0.01 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/16/19 12:51	N	I
KQ1904985-01	Carbon, Total Organic	CCB		Reagent Water	0.01 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/16/19 12:51	N	I
KQ1904985-02	Carbon, Total Organic	CCV		Reagent Water	25.66 mg/L	10 ml	25.7 mg/L	1					4/16/19 12:36	N	I
KQ1904985-02	Carbon, Total Organic	CCV		Reagent Water	25.66 mg/L	10 ml	25.7 mg/L	1					4/16/19 12:36	N	I
KQ1904985-03	Carbon, Total Organic	CCB		Reagent Water	0.02 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/16/19 16:40	N	I
KQ1904985-03	Carbon, Total Organic	CCB		Reagent Water	0.02 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/16/19 16:40	N	I
KQ1904985-04	Carbon, Total Organic	CCB		Reagent Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/16/19 21:51	N	I
KQ1904985-04	Carbon, Total Organic	CCB		Reagent Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/16/19 21:51	N	I
KQ1904985-05	Carbon, Total Organic	CCB		Reagent Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/17/19 03:30	N	I
KQ1904985-05	Carbon, Total Organic	CCB		Reagent Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/17/19 03:30	N	I
KQ1904985-06	Carbon, Total Organic	CCV		Reagent Water	25.41 mg/L	10 ml	25.4 mg/L	1					4/16/19 16:26	N	I

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

04/18/19
[Signature]

Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 632160 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
KQ1904985-06	Carbon, Total Organic	CCV		Reagent Water	25.41 mg/L	10 ml	25.4 mg/L	1					4/16/19 16:26	N	I
KQ1904985-07	Carbon, Total Organic	CCV		Reagent Water	25.12 mg/L	10 ml	25.1 mg/L	1					4/16/19 21:36	N	I
KQ1904985-07	Carbon, Total Organic	CCV		Reagent Water	25.12 mg/L	10 ml	25.1 mg/L	1					4/16/19 21:36	N	I
KQ1904985-08	Carbon, Total Organic	CCV		Reagent Water	25.23 mg/L	10 ml	25.2 mg/L	1					4/17/19 03:15	N	I
KQ1904985-08	Carbon, Total Organic	CCV		Reagent Water	25.23 mg/L	10 ml	25.2 mg/L	1					4/17/19 03:15	N	I
KQ1904985-09	Carbon, Total Organic	MDL		Reagent Water	0.25 mg/L	10 ml	0.25 mg/L	J 1	0.07	0.50			4/16/19 14:46	N	I
KQ1904985-10	Carbon, Total Organic	N/A		Water	2.37 mg/L	10 mL	2.37 mg/L	1	0.07	0.50			4/16/19 15:00:00	N	II
KQ1904985-11	Carbon, Total Organic	MS	KQ1904985-10	Water	29.27 mg/L	10 mL	29.3 mg/L	1	0.07	0.50	108		4/16/19 15:28:00	N	II
KQ1904985-13	Carbon, Total Organic	DUP	KQ1904985-10	Water	2.39 mg/L	10 mL	2.39 mg/L	1	0.07	0.50		<1	4/16/19 15:00:00	N	II
KQ1904985-14	Carbon, Total Organic	MB		Reagent Water	0.01 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			4/16/19 13:06	N	I
KQ1904985-14	Carbon, Total Organic	MB		Reagent Water	0.01 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			4/16/19 13:06	N	I
KQ1904985-15	Carbon, Total Organic	LCS		Reagent Water	26.86 mg/L	10 ml	26.9 mg/L	1	0.07	0.50	107		4/16/19 13:20	N	I
KQ1904985-15	Carbon, Total Organic	LCS		Reagent Water	26.86 mg/L	10 ml	26.9 mg/L	1	0.07	0.50	107		4/16/19 13:20	N	I
KQ1904985-16	Carbon, Total Organic	MS	K1903297-001	Water	29.27 mg/L	10 ml	29.3 mg/L	1	0.07	0.50	108		4/16/19 15:28	N	IV
KQ1904985-17	Carbon, Total Organic	DUP	K1903367-001	Reagent Water	0.03 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50		NC	4/16/19 13:50	N	I
KQ1904985-18	Carbon, Total Organic	DUP	K1903367-002	Reagent Water	0.05 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50		NC	4/16/19 14:18	N	I
KQ1904985-19	Carbon, Total Organic	DUP	K1903297-001	Water	2.39 mg/L	10 ml	2.39 mg/L	1	0.07	0.50		<1	4/16/19 15:00	N	IV
KQ1904985-20	Carbon, Total Organic	DUP	K1903192-002	Drinking Water	1.05 mg/L	10 ml	1.05 mg/L	1	0.07	0.50		<1	4/16/19 15:57	N	I
KQ1904985-21	Carbon, Total Organic	DUP	K1903227-001	Water	3.30 mg/L	10 ml	3.30 mg/L	1	0.07	0.50		3	4/16/19 16:55	N	II
KQ1904985-22	Carbon, Total Organic	DUP	K1903227-002	Water	3.29 mg/L	10 ml	3.29 mg/L	1	0.07	0.50		2	4/16/19 17:23	N	II
KQ1904985-23	Carbon, Total Organic	DUP	K1903227-003	Water	0.14 mg/L	10 ml	0.14 mg/L	J 1	0.07	0.50		NC	4/16/19 17:51	N	II
KQ1904985-24	Carbon, Total Organic	DUP	K1903227-004	Water	0.42 mg/L	10 ml	0.42 mg/L	J 1	0.07	0.50		NC	4/16/19 18:19	N	II
KQ1904985-25	Carbon, Total Organic	DUP	K1903133-002	Water	9.08 mg/L	10 ml	908 mg/L	100	7	50		<1	4/16/19 18:48	N	II
KQ1904985-26	Carbon, Total Organic	DUP	K1903133-003	Water	9.34 mg/L	10 ml	934 mg/L	100	7	50		1	4/16/19 19:16	N	II
KQ1904985-27	Carbon, Total Organic	DUP	K1903221-001	Water	2.19 mg/L	10 ml	21.9 mg/L	10	0.7	5.0		4	4/16/19 20:12	N	I
KQ1904985-28	Carbon, Total Organic	DUP	K1903076-001	Water	0.33 mg/L	10 ml	7 mg/L	J 20	2	10		NC	4/16/19 20:40	N	II
KQ1904985-29	Carbon, Total Organic	DUP	K1903076-002	Water	0.76 mg/L	10 ml	15 mg/L	20	2	10		22*	4/16/19 22:34	N	II
KQ1904985-30	Carbon, Total Organic	DUP	K1903076-003	Water	1.91 mg/L	10 ml	38 mg/L	20	2	10		5	4/16/19 23:03	N	II
KQ1904985-31	Carbon, Total Organic	DUP	K1903076-004	Water	1.10 mg/L	10 ml	22 mg/L	20	2	10		12	4/16/19 23:31	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

00938195

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 632160 Method/Testcode: 415.1/TOC T

<u>Lab Code</u>	<u>Target Analytes</u>	<u>QC</u>	<u>Parent Sample</u>	<u>Matrix</u>	<u>Raw Result</u>	<u>Sample Amt.</u>	<u>Final Result</u>	<u>Dil</u>	<u>MDL</u>	<u>PQL</u>	<u>% Rec</u>	<u>% RSD</u>	<u>Date Analyzed</u>	<u>QC?</u>	<u>Tier</u>
KQ1904985-32	Carbon, Total Organic	DUP	K1903076-005	Water	2.04 mg/L	10 ml	41 mg/L	20	2	10		12	4/16/19 23:59	N	II
KQ1904985-33	Carbon, Total Organic	DUP	K1903076-006	Water	2.97 mg/L	10 ml	59 mg/L	20	2	10		10	4/17/19 00:27	N	II
KQ1904985-34	Carbon, Total Organic	DUP	K1903076-007	Water	33.40 mg/L	10 ml	334000 mg/L	10000	700	5000		2	4/17/19 00:55	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Printed 4/17/19 15:20

Results Summary

Page 3 of 3

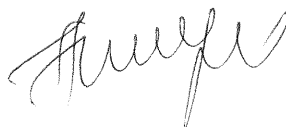
Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

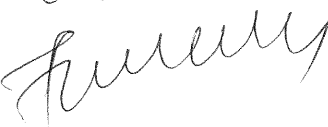
Analysis Lot: 632162 Method/Testcode: 415.1/TOC D

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1903076-003	Carbon, Dissolved Organic	N/A		Water	0.78 mg/L	10 ml	16 mg/L	20	2	10			4/17/19 03:59	N	II
KQ1904986-01	Carbon, Dissolved Organic	CCB		Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/17/19 03:30	N	II
KQ1904986-02	Carbon, Dissolved Organic	CCB		Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/17/19 06:17	N	II
KQ1904986-03	Carbon, Dissolved Organic	CCV		Water	25.23 mg/L	10 ml	25.2 mg/L	1					4/17/19 03:15	N	II
KQ1904986-04	Carbon, Dissolved Organic	CCV		Water	24.72 mg/L	10 ml	24.7 mg/L	1					4/17/19 06:02	N	II
KQ1904986-05	Carbon, Dissolved Organic	DUP	K1903076-003	Water	0.70 mg/L	10 ml	14 mg/L	20	2	10		10	4/17/19 03:59	N	II
KQ1904986-06	Carbon, Dissolved Organic	MS	K1903076-003	Water	27.36 mg/L	10 ml	547 mg/L	20	2	10	106		4/17/19 04:27	N	II
KQ1904986-07	Carbon, Dissolved Organic	MB		Water	-0.01 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/16/19 22:05	N	II
KQ1904986-08	Carbon, Dissolved Organic	LCS		Water	26.24 mg/L	10 ml	26.2 mg/L	1	0.07	0.50	105		4/16/19 22:20	N	II

04/18/19


indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

0.052	0.052	0.052	0.052	OBSERVATIONS	7	0.0521
0.050	0.050	0.050	0.050	STD Deviation	0.02630	0.0501
0.068				AVERAGE	0.03489	ABOVE
0.043	0.043	0.043	0.043	UCL	0.06118	0.0434
0.031	0.031	0.031	0.031	LCL	0.00859	0.0306
0.000						BELOW
0.000						BELOW
				OBSERVATIONS	4	BELOW
				STD Deviation	0.01407	BELOW
				AVERAGE	0.04405	BELOW
				UCL	0.05812	BELOW
				LCL	0.02998	BELOW
						BELOW
				OBSERVATIONS	4	BELOW
				STD Deviation	0.01407	BELOW
				AVERAGE	0.04405	BELOW
				UCL	0.05812	BELOW
				LCL	0.02998	BELOW
						BELOW
				OBSERVATIONS	4	BELOW
				STD Deviation	0.01121	BELOW
				AVERAGE	0.04405	BELOW
						BELOW
						BELOW
						BELOW
						BELOW
						BELOW
						BELOW
						BELOW

04/18/19


TOC: 632160
DOC: 632162

Schedule: 04162019

Version: 5

Instrument: Fusion1

Last Saved by: Fusion1 (Fusion1)

Last Saved on: 2019/04/16 16:59 - Tuesday

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	K1903367-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
4	Sample	K1903367-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
5	Sample	MDL	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
6	Sample	K1903297-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
7	Sample	K1903297-001.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
8	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
9	Sample	K1903192-002.01	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
10	Sample	K1903227-001.04	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K1903227-002.04	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	K1903227-003.04	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	K1903227-004.04	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K1903133-002.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1903133-003.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1903221-001.10 10x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1903076-001.01 20x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	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
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	K1903076-002.01 20x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K1903076-003.01 20x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	K1903076-004.01 20x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K1903076-005.01 20x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K1903076-006.01 20x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K1903076-007.01 10000x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
27	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	8	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
28	Sample	FB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
29	Sample	K1903076-003.01 doc 20x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1903076-003.01 ms doc 20x	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
31	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	6	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 - 04162019

Tuesday, April 16, 2019 09:54 AM

(View - Repts, Unused Repts, Meta-Data, Signature, History)
Printed on 2019/04/17 09:21 -
Wednesday

Report Summary Information

Company Location: Gen Chem Lab
Schedule Name: 04162019
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)
Comment:

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

Report Results

04/18/19
[Signature]

Sample Type: Clean				From Schedule Version 2		
Pos	Analysis Type	Sample ID		Start Time		
♦ (clean)		Clean		2019/04/16 09:54		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	11.41	19.02	7.61	49.72	05:24
2	TC Clean	32.48	35.69	3.20	49.80	07:18
3	TC Clean	3.50	6.75	3.25	49.86	07:02
4	TC Clean	2.05	5.38	3.33	49.84	07:03

Sample Type: Clean				From Schedule Version 3		
Pos	Analysis Type	Sample ID		Start Time		
♦ (clean)		Clean		2019/04/16 10:26		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	13.32	16.30	2.98	49.68	05:23
2	TC Clean	5.10	8.16	3.06	49.84	07:19
3	TC Clean	2.21	5.26	3.06	49.87	07:00

4	TC Clean	1.42	4.62	3.19	49.86	07:03
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Sample Type: Clean

From Schedule Version 4

Pos	Analysis Type	Sample ID			Start Time	
♦ (clean)		Clean			2019/04/16 11:03	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	13.28	16.26	2.98	49.80	05:23
2	TC Clean	4.38	7.60	3.22	49.81	07:17
3	TC Clean	1.78	4.80	3.03	49.85	07:02
4	TC Clean	1.25	4.32	3.08	49.88	07:03

Sample Type: Blank (Creating v1245)

From Schedule Version 4

Pos	Analysis Type	Sample ID			Start Time	
♦ (blank)		Reagent/Acid Blank			2019/04/16 11:35	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.84	3.76	2.92	49.77	05:25
2	TC Clean	3.67	6.67	2.99	49.87	07:18
3	TC Clean	1.61	4.52	2.91	49.88	07:03
4	TC Clean	1.71	4.57	2.86	49.86	06:59
5	Reagent Blank	5.02	8.04	3.02	49.83	08:11
6	Acid Blank	1.42	4.25	2.83	49.71	05:31

Sample Type: Sample

From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
♦	D	TOC	RB	0.4757 ppm	0.0000 ppm	0.0000%	2019/04/16 12:21		
Rep #	Base Analysis Type		ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC		0.4757	4.7568	12.08	15.02	2.94	50.01	10:34
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>		<u>Calibration</u>			
1:10		(TC) 8.8511 (IC) (v1245)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)			

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 4

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.7036 ppm (PASS)	0.0000 ppm	0%	2019/04/16 12:36

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.7036	257.0360	183.94	186.76	2.82	50.02	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 4

	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)	0.0521 ppm (PASS)	0.0000 ppm	0%	2019/04/16 12:51

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0521	0.5208	9.82	12.84	3.03	50.01	10:31

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	1	TOC	MB1	0.0501 ppm	0.0000 ppm	0.0000%	2019/04/16 13:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0501	0.5007	9.19	12.26	3.07	50.02	10:30

Dilution

1:10

Blank Contribution

(TC) 8.8511 (IC) (v1245)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS

From Schedule Version 4

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦	C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	26.9079 ppm (PASS)	0.0000 ppm	0%	2019/04/16 13:20

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	26.9079	269.0794	192.11	195.03	2.91	50.01	10:29

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)**STD Conc - Pos C**

25 ppmC

Sample Type: Sample

From Schedule Version 4

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
2	TOC	ICS	0.5029 ppm	0.0000 ppm	0.0000%	2019/04/16 13:35

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5029	5.0293	12.26	15.29	3.02	50.01	10:31

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
3	TOC	K1903367-001.01	0.0656 ppm	0.0166 ppm	25.2400%	2019/04/16 13:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0539	0.5390	9.22	12.31	3.09	50.00	10:28
2	TOC	0.0773	0.7733	9.38	12.42	3.05	50.00	10:27

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
4	TOC	K1903367-002.01	0.0834 ppm	0.0216 ppm	25.8400%	2019/04/16 14:18

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0682	0.6819	9.31	12.40	3.09	50.00	10:26
2	TOC	0.0987	0.9869	9.52	12.65	3.13	49.99	10:25

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
5	TOC	MDL	0.2937 ppm	0.0000 ppm	0.0000%	2019/04/16 14:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2937	2.9374	10.84	13.94	3.09	49.99	10:34

Dilution**Blank Contribution****Method****Calibration**

1:10 (TC) 8.8511 (IC) CAS_salt_010711 CAS_salt_010711
(v1245) (v4) (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
6	TOC	K1903297-001.01	2.4196 ppm	0.0145 ppm	0.6000%	2019/04/16 15:00

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.4094	24.0940	25.21	28.18	2.97	49.97	10:27
2	TOC	2.4299	24.2988	25.35	28.42	3.08	49.94	10:28

Dilution 1:10 Blank Contribution (TC) 8.8511 (IC) (v1245) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
7	TOC	K1903297-001.01 ms	29.3103 ppm	0.0000 ppm	0.0000%	2019/04/16 15:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	29.3103	293.1035	207.81	210.86	3.06	49.95	10:32

Dilution 1:10 Blank Contribution (TC) 8.8511 (IC) (v1245) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
8	TOC	RB	0.3011 ppm	0.0000 ppm	0.0000%	2019/04/16 15:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3011	3.0111	10.90	13.99	3.10	49.97	10:33

Dilution 1:10 Blank Contribution (TC) 8.8511 (IC) (v1245) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
9	TOC	K1903192-002.01	1.0976 ppm	0.0020 ppm	0.1800%	2019/04/16 15:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0990	10.9899	16.31	19.40	3.09	49.95	10:29
2	TOC	1.0962	10.9619	16.29	19.44	3.15	49.96	10:25

Dilution 1:10 Blank Contribution (TC) 8.8511 (IC) (v1245) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 4

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	0 / infinity	25.4568	0.0000	0%	2019/04/16 16:26

				ppm [25 ppm]	(NA / NA)	ppm (PASS)	ppm			
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.4568	254.5684	182.26	185.33	3.07	49.95	10:34
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos B</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		50 ppmC		

<u>Sample Type</u> : Check Standard --> CCB						From Schedule Version 4				
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)	0.0680 ppm (PASS)	0.0000 ppm	0%	2019/04/16 16:40
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0680	0.6799	9.92	12.93	3.00	49.98	10:32
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos D</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		0 ppmC		

Sample Type: Sample

From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
♦	10	TOC	K1903227-001.04	3.3836 ppm	0.0623 ppm	1.8400%	2019/04/16 16:55		

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.4277	34.2768	32.12	35.20	3.08	49.95	10:28
2	TOC	3.3396	33.3958	31.52	34.54	3.02	49.96	10:26

Dilution

1:10

Blank Contribution

(TC) 8.8511 (IC) (v1245)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

<u>Sample Type</u> : Sample						From Schedule Version 5				
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time				
♦	11	TOC	K1903227-002.04	3.3609 ppm	0.0402 ppm	1.2000%	2019/04/16 17:23			
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time		
1	TOC	3.3894	33.8938	31.86	34.93	3.07	49.97	10:27		
2	TOC	3.3325	33.3251	31.47	34.46	2.99	49.99	10:31		

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
12	TOC	K1903227-003.04	0.2079 ppm	0.0296 ppm	14.2300%	2019/04/16 17:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2288	2.2877	10.40	13.45	3.05	49.99	10:31
2	TOC	0.1869	1.8693	10.12	12.98	2.86	49.99	10:24

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
13	TOC	K1903227-004.04	0.4756 ppm	0.0230 ppm	4.8400%	2019/04/16 18:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4919	4.9189	12.19	15.03	2.84	50.01	10:28
2	TOC	0.4593	4.5933	11.97	14.97	3.01	50.01	10:24

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
14	TOC	K1903133-002.01 100x	9.1446 ppm	0.0317 ppm	0.3500%	2019/04/16 18:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.1670	91.6698	71.08	74.03	2.96	50.02	10:26
2	TOC	9.1222	91.2219	70.77	73.84	3.07	50.02	10:29

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
15	TOC	K1903133-003.01 100x	9.4324 ppm	0.0697 ppm	0.7400%	2019/04/16 19:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.4817	94.8165	73.21	76.28	3.07	50.03	10:28
2	TOC	9.3831	93.8310	72.54	75.52	2.98	50.04	10:27

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
16	TOC	RB	0.1250 ppm	0.0395 ppm	31.5900%	2019/04/16 19:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1529	1.5290	9.89	12.86	2.97	50.04	10:29
2	TOC	0.0971	0.9707	9.51	12.42	2.91	50.07	10:30

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	K1903221-001.10 10x	2.1972 ppm	0.0574 ppm	2.6100%	2019/04/16 20:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.1566	21.5660	23.49	26.53	3.04	50.08	10:28
2	TOC	2.2378	22.3778	24.04	27.12	3.08	50.09	10:26

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	K1903076-001.01 20x	0.4290 ppm	0.0783 ppm	18.2600%	2019/04/16 20:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4844	4.8437	12.14	15.22	3.08	50.09	10:28
2	TOC	0.3736	3.7359	11.39	14.47	3.08	50.11	10:26

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
19	TOC	RB	0.1147 ppm	0.1145 ppm	99.8400%	2019/04/16 21:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0337	0.3372	9.08	12.03	2.95	50.12	10:29
2	TOC	0.1956	1.9563	10.18	13.17	2.99	50.12	10:27

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)**Sample Type:** Check Standard --> CCV 25 ppm

From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.1634 ppm (PASS)	0.0000 ppm	0%	2019/04/16 21:36

Pos	Base Analysis	ID	Rep	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run
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	Type		#							Time
B	TOC	25 ppm	1	25.1634	251.6338	180.27	183.25	2.98	50.13	10:31
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos B</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		50 ppmC		

Sample Type: Check Standard --> CCB From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0434 ppm (PASS)	0.0000 ppm	0%	2019/04/16 21:51
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0434	0.4339	9.76	12.81	3.05	50.14	10:30
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos D</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		0 ppmC		

Sample Type: Sample From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	20	TOC	MB2	0.0306 ppm	0.0000 ppm	0.0000%	2019/04/16 22:05

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0306	0.3063	9.06	12.10	3.04	50.16	10:32

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.8511 (IC) (v1245)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦	C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	26.2815 ppm (PASS)	0.0000 ppm	0%	2019/04/16 22:20
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	26.2815	262.8154	187.86	190.82	2.96	50.15	10:29
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos C</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		25 ppmC		

Sample Type: Sample

From Schedule Version 5

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
21	TOC	K1903076-002.01 20x	0.9021 ppm	0.1349 ppm	14.9500%	2019/04/16 22:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9975	9.9749	15.62	18.70	3.08	50.15	10:27
2	TOC	0.8067	8.0671	14.33	17.33	3.00	50.14	10:28

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
22	TOC	K1903076-003.01 20x	2.0081 ppm	0.0731 ppm	3.6400%	2019/04/16 23:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.0598	20.5981	22.83	25.80	2.96	50.14	10:27
2	TOC	1.9564	19.5639	22.13	25.22	3.09	50.16	10:25

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
23	TOC	K1903076-004.01 20x	1.2177 ppm	0.1015 ppm	8.3300%	2019/04/16 23:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.2895	12.8948	17.60	20.71	3.10	50.14	10:28
2	TOC	1.1460	11.4599	16.63	19.55	2.92	50.16	10:25

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
24	TOC	K1903076-005.01 20x	2.2080 ppm	0.1773 ppm	8.0300%	2019/04/16 23:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.3334	23.3339	24.69	27.78	3.09	50.17	10:30
2	TOC	2.0826	20.8265	22.99	25.94	2.95	50.14	10:32

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
25	TOC	K1903076-006.01 20x	2.8704 ppm	0.2040 ppm	7.1100%	2019/04/17 00:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
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1	TOC	2.7261	27.2614	27.36	30.57	3.21	50.15	10:27
2	TOC	3.0146	30.1460	29.31	32.29	2.98	50.12	10:27

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
26	TOC	K1903076-007.01 10000x	33.1423 ppm	0.4242 ppm	1.2800%	2019/04/17 00:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	32.8423	328.4235	231.78	234.84	3.06	50.14	10:27
2	TOC	33.4422	334.4223	235.86	238.88	3.03	50.12	10:26

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
27	TOC	RB	0.0714 ppm	0.1157 ppm	162.0700%	2019/04/17 01:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3297	3.2969	11.09	14.06	2.97	50.13	10:28
2	TOC	0.1190	1.1902	9.66	12.73	3.07	50.14	10:30
3	TOC	0.1072	1.0723	9.58	12.45	2.87	50.13	10:28
4	TOC	0.0000	0.0000	8.62	11.84	3.21	50.16	10:28
5	TOC	0.0022	0.0219	8.87	12.06	3.19	50.12	10:26
6	TOC	0.0131	0.1310	8.94	11.95	3.01	50.12	10:25
7	TOC	0.0000	0.0000	8.47	11.68	3.21	50.14	10:27
8	TOC	0.0000	0.0000	8.59	11.61	3.03	50.11	10:30

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.2789 ppm (PASS)	0.0000 ppm	0%	2019/04/17 03:15

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.2789	252.7888	181.05	184.13	3.08	50.11	10:30

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos B

50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/04/17 03:30

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	9.26	12.39	3.13	50.11	10:32

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	28	TOC	FB	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/17 03:45

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.67	11.85	3.18	50.12	10:29

Dilution

1:10

Blank Contribution

(TC) 8.8511 (IC) (v1245)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	29	TOC	K1903076-003.01 doc 20x	0.7832 ppm	0.0541 ppm	6.9000%	2019/04/17 03:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8214	8.2144	14.43	17.46	3.04	50.10	10:29
2	TOC	0.7450	7.4498	13.91	16.98	3.07	50.10	10:24

Dilution

1:10

Blank Contribution

(TC) 8.8511 (IC) (v1245)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	30	TOC	K1903076-003.01 ms doc 20x	27.4005 ppm	0.0000 ppm	0.0000%	2019/04/17 04:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	27.4005	274.0049	194.84	197.94	3.09	50.11	10:28

Dilution

1:10

Blank Contribution

(TC) 8.8511 (IC) (v1245)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
31	TOC	RB	0.0002 ppm	0.0005 ppm	244.9500%	2019/04/17 04:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0012	0.0116	8.86	12.08	3.22	50.10	10:26
2	TOC	0.0000	0.0000	8.33	11.38	3.05	50.10	10:25
3	TOC	0.0000	0.0000	8.26	11.38	3.12	50.10	10:27
4	TOC	0.0000	0.0000	8.16	11.30	3.14	50.10	10:31
5	TOC	0.0000	0.0000	7.93	11.02	3.09	50.12	10:30
6	TOC	0.0000	0.0000	7.92	11.05	3.13	50.11	10:27

Dilution

1:10

Blank Contribution(TC) 8.8511 (IC)
(v1245)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)**Sample Type:** Check Standard --> CCV 25 ppm

From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.7665 ppm (PASS)	0.0000 ppm	0%	2019/04/17 06:02

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.7665	247.6650	177.58	180.61	3.04	50.11	10:31

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos B

50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/04/17 06:17

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	8.66	11.91	3.25	50.10	10:34

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_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
v1244	2.4323	1.4770	0.0000	0.0000	0.0000	2019/04/10 13:35	Fusion1 (Fusion1)
v1245	1.6743	1.4170	0.0000	0.0000	0.0000	2019/04/16 12:21	Fusion1 (Fusion1)

Calibrations**Name: CAS_salt_010711 (TOC)**

Version: v30 Calibration curve formula: TOC: $y = 6.788x + 9.463$

Ver Creation: 2019/03/05 17:42 r^2 value: TOC: $r^2 = 0.99963$

Comment:

Operator: Fusion1 (Fusion1)

Basic Analysis Type TOC

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 Operator: Fusion1 (Fusion1)

Ver Creation: 2019/02/21 17:57

Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	ICSpurgeRinseVolume	12.0 ml
UVReactorPrerinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPrerinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPrerinses	1	SyringeSpeedWaste	10
ICSpurgeTime	1.00 mins	SyringeSpeedAcid	7
DetectorSweepFlow	500 ml/min	SyringeSpeedReagent	7

PreSpurgeTime	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
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Report History

Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/04/17 06:33

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	C] CCV 25 ppm [25 p	1	25.704	0.0441	25.6596	25.65955	25.7	4/16/2019
3	[TOC] CCB [0 ppm]	1	0.052	0.0441	0.0081	0.00805	<0.5	4/16/2019
4	MB1	1	0.050	0.0441	0.0061	0.00605	<0.5	4/16/2019
5	[TOC] LCS [24ppm]	1	26.908	0.0441	26.8639	26.86385	26.9	4/16/2019
6	K1903367-001	1	0.054	0.0441	0.0099	0.00985	<0.5	4/16/2019
7	K1903367-001d	1	0.077	0.0441	0.0333	0.03325	<0.5	4/16/2019
8	K1903367-002	1	0.068	0.0441	0.0242	0.02415	<0.5	4/16/2019
9	K1903367-002d	1	0.099	0.0441	0.0547	0.05465	<0.5	4/16/2019
10	MDL	1	0.294	0.0441	0.2497	0.24965	<0.5	4/16/2019
11	K1903297-001	1	2.409	0.0441	2.3654	2.36535	2.4	4/16/2019
12	K1903297-001d	1	2.430	0.0441	2.3859	2.38585	2.39	4/16/2019
13	K1903297-001ms	1	29.310	0.0441	29.2663	29.26625	29.27	4/16/2019
14	K1903192-002	1	1.099	0.0441	1.0550	1.05495	1.05	4/16/2019
15	K1903192-002d	1	1.096	0.0441	1.0522	1.05215	1.1	4/16/2019
16	C] CCV 25 ppm [25 p	1	25.457	0.0441	25.4128	25.41275	25.4	4/16/2019
17	[TOC] CCB [0 ppm]	1	0.068	0.0441	0.0240	0.02395	<0.5	4/16/2019
18	K1903227-001	1	3.428	0.0441	3.3837	3.38365	3.4	4/16/2019
19	K1903227-001d	1	3.340	0.0441	3.2956	3.29555	3.3	4/16/2019
20	K1903227-002	1	3.389	0.0441	3.3454	3.34535	3.35	4/16/2019
21	K1903227-002d	1	3.333	0.0441	3.2885	3.28845	3.29	4/16/2019
22	K1903227-003	1	0.229	0.0441	0.1848	0.18475	<0.5	4/16/2019
23	K1903227-003d	1	0.187	0.0441	0.1429	0.14285	<0.5	4/16/2019
24	K1903227-004	1	0.492	0.0441	0.4479	0.44785	<0.5	4/16/2019
25	K1903227-004d	1	0.459	0.0441	0.4153	0.41525	<0.5	4/16/2019

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)

Analyzed By: <i>BED</i>	Date Analyzed: <i>4/16/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>04/18/19</i>

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

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER)

Method: Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
26	K1903133-002	100	9.167	0.0441	9.1230	912.295	912.30	4/16/2019
27	K1903133-002d	100	9.122	0.0441	9.0782	907.815	907.82	4/16/2019
28	K1903133-003	100	9.482	0.0441	9.4377	943.765	943.8	4/16/2019
29	K1903133-003d	100	9.383	0.0441	9.3391	933.905	933.9	4/16/2019
30	K1903221-001	10	2.157	0.0441	2.1126	21.1255	21.1	4/16/2019
31	K1903221-001d	10	2.238	0.0441	2.1938	21.9375	21.9	4/16/2019
32	K1903076-001	20	0.484	0.0441	0.4404	8.807	8.8	4/16/2019
33	K1903076-001d	20	0.374	0.0441	0.3296	6.591	6.6	4/16/2019
34	C] CCV 25 ppm [25 p	1	25.163	0.0441	25.1194	25.11935	25.1	4/16/2019
35	[TOC] CCB [0 ppm]	1	0.043	0.0441	-0.0006	-0.00065	<0.5	4/16/2019
36	K1903076-002	20	0.998	0.0441	0.9535	19.069	19.1	4/16/2019
37	K1903076-002d	20	0.807	0.0441	0.7627	15.253	15.3	4/16/2019
38	K1903076-003	20	2.060	0.0441	2.0158	40.315	40.3	4/16/2019
39	K1903076-003d	20	1.956	0.0441	1.9124	38.247	38.2	4/16/2019
40	K1903076-004	20	1.290	0.0441	1.2455	24.909	24.9	4/16/2019
41	K1903076-004d	20	1.146	0.0441	1.1020	22.039	22.0	4/16/2019
42	K1903076-005	20	2.333	0.0441	2.2894	45.787	45.8	4/16/2019
43	K1903076-005d	20	2.083	0.0441	2.0386	40.771	40.8	4/16/2019
44	K1903076-006	20	2.726	0.0441	2.6821	53.641	53.6	4/17/2019
45	K1903076-006d	20	3.015	0.0441	2.9706	59.411	59.4	4/17/2019
46	K1903076-007	10000	32.842	0.0441	32.7983	327982.5	327982.5	4/17/2019
47	K1903076-007d	10000	33.442	0.0441	33.3982	333981.5	333981.5	4/17/2019
48	C] CCV 25 ppm [25 p	1	25.279	0.0441	25.2349	25.23485	25.2	4/17/2019
49	[TOC] CCB [0 ppm]	1	0.000	0.0441	-0.0441	-0.04405	<0.5	4/17/2019
50		1		0.0000	0.0000	0	<0.5	

Analyzed By: BCD	Date Analyzed: 4/16/19
Reviewed By: [Signature]	Date Reviewed: 04/18/19

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	MB2	1	0.031	0.0441	-0.0135	-0.01345	<0.5	4/16/2019
3	[TOC] LCS [24ppm]	1	26.282	0.0441	26.2375	26.23745	26.2	4/16/2019
4	C] CCV 25 ppm [25 p	1	25.279	0.0441	25.2349	25.23485	25.2	4/17/2019
5	[TOC] CCB [0 ppm]	1	0.000	0.0441	-0.0441	-0.04405	<0.5	4/17/2019
6	K1903076-003	20	0.821	0.0441	0.7774	15.547	15.55	4/17/2019
7	K1903076-003d	20	0.745	0.0441	0.7010	14.019	14.0	4/17/2019
8	K1903076-003ms	20	27.401	0.0441	27.3565	547.129	547	4/17/2019
9	C] CCV 25 ppm [25 p	1	24.767	0.0441	24.7225	24.72245	24.72	4/17/2019
10	[TOC] CCB [0 ppm]	1	0.000	0.0441	-0.0441	-0.04405	<0.5	4/17/2019
11		1		0.0000	0.0000	0	<0.5	
12		1		0.0000	0.0000	0	<0.5	
13		1		0.0000	0.0000	0	<0.5	
14		1		0.0000	0.0000	0	<0.5	
15		1		0.0000	0.0000	0	<0.5	
16		1		0.0000	0.0000	0	<0.5	
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: <i>Bcb</i>	Date Analyzed: <i>4/16/19</i>
Reviewed By: <i>Thurman</i>	Date Reviewed: <i>4/18/19</i>

Revision 1, 2010 R:\WETANALYSES\TOC\TEMPLATE\TOCwaterLIMS

StarLIMS Run: 632160, 632162
Analysis: TOC/DOC
Method: 9060, 415.1, SM 5310 C, 9060A

CCV: 11-GEN-05-77C 50 ppm LCS: 11-GEN-05-77D 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-74A

ICS TV: 25.0 ppm ICS % R = 2

Spike ID: 11-GEN-05-700 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-77I

21 % H₃PO₄: 11-GEN-05-77H

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: NA

Analyzed By: <i>BCD</i>	Date Analyzed: <i>4/16/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>04/18/19</i>



Case Narrative

Method: 6850

Analysis: Perchlorate

Analysis SOP: LC-MS-CLO4

ALS WO ID(s): 1910478; 1910480; 1910483;
1911288

Client: ALS Laboratories (Houston, TX)

Matrix: Water

ELMS Batch (HBN): 2241 (237388)

General Set Information: There were four 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. 50 μL 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 0.45 μm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1910480001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

Method QC data: The method blank (LMB 649380) was less than 1/2 the CRDL. The recovery for the LCS (649381) was within acceptable parameters.



MS/MSD Analysis: MS/MSD was performed on samples 1910837002/03 of Work Order 1910837. 4.0µl of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4.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 – 649378) is reported from the analysis of the Laboratory Control Sample (LCS – 649381) at a level of 4.0µg/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: 19MARI03).

Thomas Bosch	April 24, 2019
Analyst	Date



00938220

ANALYTICAL REPORT

Report Date: April 25, 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: **34-1910483**

Project ID: HS19040653

Purchase Order: HS19040653

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_041019_BIX	1910483001	04/10/19	04/12/19	

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ANALYTICAL REPORT

Workorder: **34-1910483**Client: ALS Environmental
(Houston)

Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: LH18/24-SP650_041019_BIX		Sampling Site: NA		Collected: 04/10/2019	
Lab ID: 1910483001		Media: 125 mL Nalgene		Received: 04/12/2019	
Matrix: Water		Sampling Parameter: NA			
Analysis Method - EPA 6850, DoD QSM					
Preparation: Not Applicable			Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2241 (HBN: 237388) Analyzed: 04/23/2019 10:03		Instrument ID: LCMS04 Percent Solid: NA 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 04/24/2019 07:51	/S/ Stephen Brose 04/25/2019 07:42

Laboratory Contact Information

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Salt Lake City, Utah 84123Phone: (801) 266-7700
Email: als@alt.lab@ALSGlobal.com
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ANALYTICAL REPORT

Workorder: 34-1910483

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.pjllabs.com
	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.com
	Utah (TNI)	UT00953	http://lams.nelac-institute.org/search
	Nevada (TNI)	UT00953201-1	https://ndep.nv.gov/water/lab-certification
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
	Oklahoma (TNI)	IJ# 9980	http://www.deq.state.ok.us/CSDnew/labcert.htm
	Texas (TNI)	T104704456-18-9	https://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_list.pdf
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	http://www.aihaaccreditedlabs.org
	DOECAP-AP	L18-606	http://www.pjllabs.com
	Washington	C596	https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.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

00938223

Analysis Information

Workorder: 1910483**Limits:** Client SOW/Contract Specified**Preparation:** NA**Analysis:** EPA 6850, DoD QSM**Basis:** DoD QSM**Batch:** NA**Batch:** ELMS/2241 (HBN: 237388)**Prepared By:** NA**Analyzed By:** Thomas Bosch

Blank

LMB: 649380**Analyzed:** 04/23/2019 09:20**Units:** ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 649381**Analyzed:** 04/23/2019 08:53**Dilution:** 1**Units:** ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.01	4.00	100	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1910837001**Analyzed:** 04/23/2019 10:30**Dilution:** 1**Units:** ug/L**MS:** 1910837002**Analyzed:** 04/23/2019 10:43**Dilution:** 1**Units:** ug/L**MSD:** 1910837003**Analyzed:** 04/23/2019 10:57**Dilution:** 1**Units:** ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	3.81	4	95.1	78.8	123.8	3.95	98.8	3.74	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 04/24/2019 07:52	/S/ Stephen Brose 04/25/2019 07:42

Symbols and Definitions

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

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



W

1910483

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Subcontract Chain of Custody

COC ID: 11111

18698#2

1910483

SUBCONTRACT TO:

ALS Laboratory Group
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Salt Lake City, UT 84123

Phone: +1 801 266 7700

CUSTOMER INFORMATION:

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**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: HS19040653
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19040653-02	LH18/24-SP650_041019_BIX	Water	10 Apr 2019 14:00
	SUB_Perch-6850		19 Apr 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:

Received By:

Cooler ID(s):

Date/Time:

Date/Time:

Temperature(s):

[illegible]

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: <u>ALS Houston</u>		Project/Task/Site: <u>1910483</u>				
Date/Time of Receipt: <u>04-12-19 9:55</u>		Number of Coolers Received: <u>1</u>				
Condition of Coolers: <u>Acceptable/Unacceptable</u>		Temperature Control: <u>Present/Not Included</u>				
Cooler Custody Seals: <u>Present/Absent/NA</u>		Location Temp Taken: <u>Control/Between Samples</u>				
Container Custody Seals: <u>Present/Absent/NA</u>		Are all temperatures within project specific guidelines? <u>Yes/No/NA</u>				
Ice Present: <u>Frozen/Melted/NA</u>		VOA Headspace Present? <u>Yes/No/NA</u>				
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	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 <u>9309</u>	<u>3</u> °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By: Tam Vartasleep Tam Vartasleep 04-12-19
Signature Printed Name Date

CLIENT-RELATED INFORMATION

- | | | | |
|---|--|---|--|
| <input type="checkbox"/> Missing Cooler
<input type="checkbox"/> Cooler Conditions
<input type="checkbox"/> Missing Paperwork
<input type="checkbox"/> Missing/Incorrect Bottle Labels | <input type="checkbox"/> Missing Samples/Bottles
<input type="checkbox"/> Broken/Leaking Samples
<input type="checkbox"/> Incorrect Bottle Type
<input type="checkbox"/> Cooler Temperatures Out of Range | <input type="checkbox"/> Incorrect Preservation
<input type="checkbox"/> pH Criteria Not Met
<input type="checkbox"/> Residual Chlorine Present
<input type="checkbox"/> Head Space in Bottles | <input type="checkbox"/> Insufficient Sample Volume
<input type="checkbox"/> Chain of Custody Problems
<input type="checkbox"/> Other: |
|---|--|---|--|

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: _____ Returned to Sample Receipt by: _____ Date: _____
Printed Name Signature



**Must Deliver Next Business Day
Time and Tempature Sensitive!**

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

SHIP DATE: 11APR19
ACTWGT: 8.65 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

TO **PAUL POPE**
ALS LABORATORY GROUP
960 WEST LEVOY DRIVE

SALT LAKE CITY UT 84123

(800) 368-9135

REF: HS19040654/653/652 RJ



FedEx
Express



TRK# 4809 7832 8001
0201

FRI - 12 APR 3:00P
STANDARD OVERNIGHT

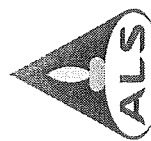
AX BTFA

84123

UT-US SLC



ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887



Batch Worklist

Batch: ELMS/2241

Rule: EPA 6850, DoD QSM Water

Created: 4/23/2019 07:43

Analyst: T. Bosch

Instrument:

Status: WP

HBN: 237388



Workorder: 1910478 [ENV_LVL4]
 Workorder: 1910480 [ENV_LVL4]
 Workorder: 1910483 [ENV_LVL4]
 Workorder: 1910837 [ENV_LVL4]
 Workorder: 1911288 [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	649377	CCV for HBN 237388 [ELMS/2241]				CCV	3		E685041C3Q	5311		4/25/2019	
2	649378	RLVS for HBN 237388 [ELMS/2241]				RLVS	3		E685041C3Q	5311		4/25/2019	
3	649379	ICS for HBN 237388 [ELMS/2241]				ICS	3		E6850.D3Q	5311		4/25/2019	
4	649380	LMB for HBN 237388 [ELMS/2241]				LMB	3		E6850Q413Q	5311		4/25/2019	
5	649381	LCS for HBN 237388 [ELMS/2241]				LCS	3		E6850Q413Q	5311		4/25/2019	
6	1910478001	LH18/24-SP650_041019_BIX				SAMPLE	3	1910478001-A	E6850Q41.3	5480	5/8/2019	4/25/2019	
7	1910480001	LH18/24-SP140_041019				SAMPLE	3	1910480001-A	E6850Q41.3	5480	5/8/2019	4/25/2019	
8	1910483001	LH18/24-SP650_041019_BIX				SAMPLE	3	1910483001-A	E6850Q41.3	5480	5/8/2019	4/25/2019	
9	1910837001	43MW01				SAMPLE	3	1910837001-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
10	1910837002	43MW01MS				MS	3	1910837002-A	E6850Q413Q	5480		4/25/2019	
11	1910837003	43MW01MSD				MSD	3	1910837003-A	E6850Q413Q	5480		4/25/2019	
12	1910837004	43MW03				SAMPLE	3	1910837004-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
13	1910837005	43MW04				SAMPLE	3	1910837005-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
14	1910837006	43MW05				SAMPLE	3	1910837006-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
15	1910837007	43MW06				SAMPLE	3	1910837007-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
16	649382	CCV for HBN 237388 [ELMS/2241]				CCV	3		E685041C3Q	5311		4/25/2019	
17	1910837008	DUP040919				FLDDUP	3	1910837008-A	E6850Q41.3	5480	5/7/2019	4/29/2019	
18	1910837009	EB041019				EQBK	3	1910837009-A	E6850Q41.3	5480	5/8/2019	4/29/2019	
19	1911288001	LH18/24-SP650_041719_BIX				SAMPLE	3	1911288001-A	E6850Q41.3	5480	5/15/2019	5/2/2019	
20	649383	CCV for HBN 237388 [ELMS/2241]				CCV	3		E685041C3Q	5311		4/25/2019	



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #()'s: 1910478 (001); 1910480 (001); 1910483 (001); 1911288 (001); 1910837 (001-09)
 ELMS Batch/HBN ID: 2241 (237388)
 Prep Date: 04/22/2019 Analysis Date: 04/23/2019 Analyst: T. Bosch
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\APR\23APR19D.s
 Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by TNB. 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 AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

STANDARDS: Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

CALIBRATION CURVE: Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.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: 35µL
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

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: 4.0µL of QC Solution Horizon ID 41830 was used for LCS 649381; Target = 4.0µg/L. ASTM type II water was used for LMB 649380.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1910837002/03 (Client ID: 43MW01). 4.0µL of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. Spike target = 4.0µg/L.

COMMENTS:

- 1) Results reported in µg/L. Field sample 1910480001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has 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\APR\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\237388-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATA\REVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 649378) is reported from the analysis of the Laboratory Control Sample (LCS – 649381) at a level 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, many of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03).

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.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDG: ELMS: 2241 HBN: 237388 1910837 / 1911288		
Sample Set IDs if Applicable: 1910478 / 1910480 / 1910483		
Calibration standards analyzed and meets criteria	TB	SN
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
Method Blanks analyzed and meet acceptance criteria	TB	SB
Retention Time Windows checked	TB	SN
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	SN
MSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed	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 checked	TB	SB
Preparation and analysis calculations checked	TB	SB
NCRs are completed as necessary NC/CAR#		
Report forms are complete and accurate	TB	SB
Manual integrations checked	TB	SB



STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK		Description - 6850 WKG Std 100.ug/L			
Standard: 43702		Created By: Thomas Bosch	Amount: 10 mL		
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM	Expires: 09/18/2019		
MFG Lot: TNB: 09/18/2018			Usable: Yes		
Pipette ID: Not Provided			Lab Lot: CLO4 WRK		
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	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
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	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: 43701		Created By: Thomas Bosch	Amount: 10 mL		
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM	Expires: 09/18/2019		
MFG Lot: TNB: 09/18/2018			Usable: Yes		
Pipette ID: Not Provided			Lab Lot: CLO4 INT		
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
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: 41831		Created By: Thomas Bosch			
MFG: ALS/SLC		Create Date: 05/09/2018 10:05AM			
MFG Lot: TNB: 05/09/2018		Amount: 10 mL			
Pipette ID: Not Provided		Expires: 05/09/2019			
		Usable: Yes			
		Lab Lot: CLO4 QC WRK 100.ug/L			
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
41830	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	05/09/2019



STANDARD REPORT

Constituent

Working Standard - CLO4 QC INT

CLO4 QC INT		Description - 6850 QC Intrmdt Std-QC 10ug/mL			
Standard: 41830		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/09/2018 10:05AM		Expires: 05/09/2019	
MFG Lot: TNB: 05/09/2018				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



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

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730		Created By: Thomas Bosch	Amount: 25 mL		
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM	Expires: 09/20/2019		
MFG Lot: TNB: 05/09/2018		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
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



STANDARD REPORT

Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729			Amount: 1 mL
MFG: Cambridge Isotope			Expires: 04/28/2026
MFG Lot: SDFF-012A			Usable: Yes
Part ID: OLM-7310-S			Lab Lot: CLO4ISTDSTK
Created By: Thomas Bosch			
Create Date: 09/20/2018 09:09AM			
Verified By: Thomas Bosch			
Verify Date:			
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



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

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.





Certificate of Analysis



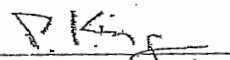
ISO Guide 34 Reference Material

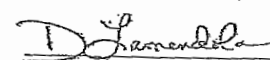
Product Number: ICC-013
Lot Number: CP-0860

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 QAVRA



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

Date Certified: Jun 25, 2018

Expiration: Jul 25, 2020

Sample Size: 100 mL

Components: 1

Storage Condition: Ambient ($>5^\circ\text{C}$)

Included on ISO/IEC 17025 Scope of Accreditation: Yes

Included on ISO 17034 Scope of Accreditation: Yes



Signal Word: None

Component	SRM #	Prepared Concentration ($\mu\text{g/mL}$)
ClO_4 Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is $\pm 0.24\%$.

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 $0.2\ \mu\text{m}$ 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 $\pm 0.5\%$ 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



Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

Quality Standards:

ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification: $\geq 98\%$
 Labeled CAS Number: NA
 Unlabeled CAS Number: 7601-89-0
 MW*: 130.4
 Chemical Formula: NaCl^*O_4
 Storage: Store at room temperature away from light and moisture.
 Stability: See storage and expiration date.

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.

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/NCSL 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.

* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 $\mu\text{g/mL}$
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	109.4 \pm 2.8 $\mu\text{g/mL}$ (k=2)



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	
*	649377	CCV@25	Vial 71	1	Control	1	1.36054e6	8.855	24.00623
*	649381	QC@4.0	Vial 72	1	Control	2	2.53898e5	9.046	4.01121
*	649379	ICS@4.0	Vial 73	1	Control	3	1.82631e5	8.636	3.34158
*	649380	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1910478001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1910480001	1K	Vial 76	1	Sample	6	3.37161e5	9.026	5552.18188
*	1910483001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1911288001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1910837001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1910837002	MS	Vial 80	1	Sample	10	2.21785e5	9.050	3.80586
*	1910837003	MSD	Vial 81	1	Sample	11	2.20802e5	9.038	3.95111
*	1910837004		Vial 82	1	Sample	12	0.00000	0.000	0.00000
*	1910837005		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1910837006		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	649382	CCV@25	Vial 71	1	Control	15	1.31128e6	8.938	24.26925
*	1910837007		Vial 85	1	Sample	16	6.42400e4	9.045	1.26400
*	1910837008		Vial 86	1	Sample	17	0.00000	0.000	0.00000
*	1910837009		Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1909952003	10K	Vial 88	1	Sample	19	5.40192e5	9.131	9.36492e4
*	649383	CCV@25	Vial 71	1	Control	20	1.31963e6	8.922	24.70624

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
---	-----	-----	---	-----	---	-----	-----	-----	
*	649377	CCV@25	Vial 71	1	Control	1	4.18181e5	8.869	24.80861
*	649381	QC@4.0	Vial 72	1	Control	2	8.36399e4	9.058	4.29372
*	649379	ICS@4.0	Vial 73	1	Control	3	6.48502e4	8.654	3.82172
*	649380	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1910478001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1910480001	1K	Vial 76	1	Sample	6	1.09251e5	9.041	5913.57786
*	1910483001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1911288001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1910837001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1910837002	MS	Vial 80	1	Sample	10	7.41215e4	9.057	4.12337
*	1910837003	MSD	Vial 81	1	Sample	11	7.23834e4	9.061	4.20632
*	1910837004		Vial 82	1	Sample	12	0.00000	0.000	0.00000
*	1910837005		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1910837006		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	649382	CCV@25	Vial 71	1	Control	15	4.00971e5	8.953	24.95975
*	1910837007		Vial 85	1	Sample	16	2.34854e4	9.061	1.36511
*	1910837008		Vial 86	1	Sample	17	0.00000	0.000	0.00000
*	1910837009		Vial 87	1	Sample	18	0.00000	0.000	0.00000
*	1909952003	10K	Vial 88	1	Sample	19	1.70464e5	9.151	9.83177e4
*	649383	CCV@25	Vial 71	1	Control	20	4.01823e5	8.937	25.30992

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
---	-----	-----	---	-----	---	-----	-----	-----	
*	649377	CCV@25	Vial 71	1	Control	1	1.72840e5	8.867	5.00000
*	649381	QC@4.0	Vial 72	1	Control	2	2.08542e5	9.066	5.00000
*	649379	ICS@4.0	Vial 73	1	Control	3	1.81824e5	8.654	5.00000
*	649380	LMB	Vial 74	1	Control	4	2.16871e5	9.008	5.00000
*	1910478001		Vial 75	1	Sample	5	1.72857e5	8.404	5.00000
*	1910480001	1K	Vial 76	1	Sample	6	1.97149e5	9.050	5000.00000
*	1910483001		Vial 77	1	Sample	7	1.65412e5	8.420	5.00000
*	1911288001		Vial 78	1	Sample	8	1.81749e5	8.489	5.00000

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount		
*	1910837001	Vial	79	1	Sample	9	1.87599e5	9.028	5.00000	
*	1910837002	MS	Vial	80	1	Sample	10	1.92507e5	9.073	5.00000
*	1910837003	MSD	Vial	81	1	Sample	11	1.84256e5	9.062	5.00000
*	1910837004	Vial	82	1	Sample	12	1.80138e5	8.810	5.00000	
*	1910837005	Vial	83	1	Sample	13	1.97954e5	9.090	5.00000	
*	1910837006	Vial	84	1	Sample	14	1.83017e5	9.051	5.00000	
*	649382	CCV@25	Vial	71	1	Control	15	1.64671e5	8.965	5.00000
*	1910837007	Vial	85	1	Sample	16	1.84879e5	9.067	5.00000	
*	1910837008	Vial	86	1	Sample	17	1.96777e5	8.752	5.00000	
*	1910837009	Vial	87	1	Sample	18	1.91613e5	9.161	5.00000	
*	1909952003	10K	Vial	88	1	Sample	19	1.83509e5	9.157	5.00000e4
*	649383	CCV@25	Vial	71	1	Control	20	1.62618e5	8.942	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

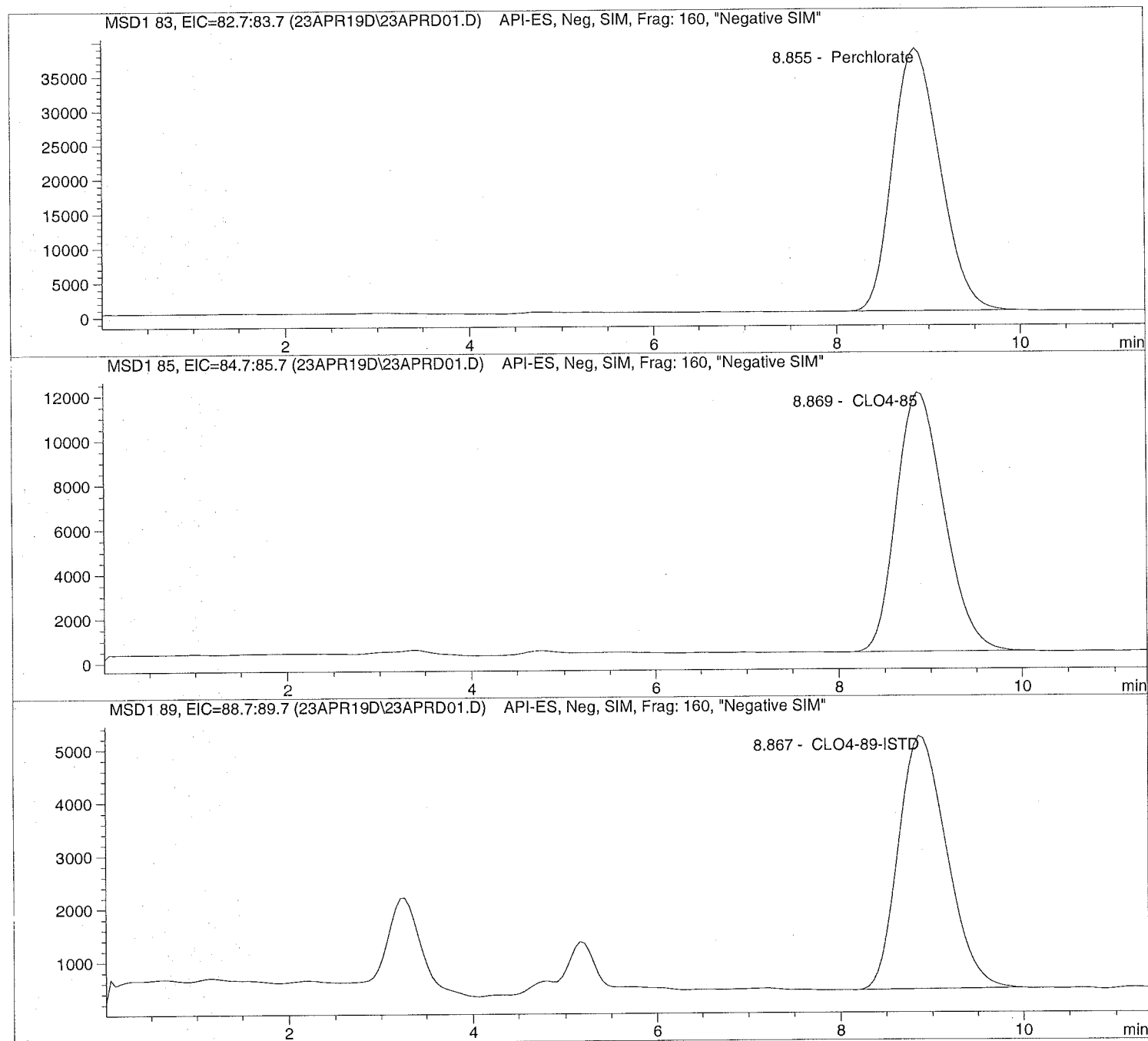
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	==	=====	=====	=====
1	Vial 71	649377 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	649381 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	649379 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	649380 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1910478001	CLO4-AQN	1	Sample		
6	Vial 76	1910480001 1K	CLO4-AQN	1	Sample		
7	Vial 77	1910483001	CLO4-AQN	1	Sample		
8	Vial 78	1911288001	CLO4-AQN	1	Sample		
9	Vial 79	1910837001	CLO4-AQN	1	Sample		
10	Vial 80	1910837002 MS	CLO4-AQN	1	Sample		
11	Vial 81	1910837003 MSD	CLO4-AQN	1	Sample		
12	Vial 82	1910837004	CLO4-AQN	1	Sample		
13	Vial 83	1910837005	CLO4-AQN	1	Sample		
14	Vial 84	1910837006	CLO4-AQN	1	Sample		
15	Vial 71	649382 CCV@25	CLO4-AQN	1	Ctrl Samp		
16	Vial 85	1910837007	CLO4-AQN	1	Sample		
17	Vial 86	1910837008	CLO4-AQN	1	Sample		
18	Vial 87	1910837009	CLO4-AQN	1	Sample		
19	Vial 71	649383 CCV@25	CLO4-AQN	1	Ctrl Samp		

Injection Date: 4/23/2019 08:37:56
Sample Name: 649377 CCV@25
Acq Operator: TNB

Seq Line: 1
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  08:37:56      Seq Line:           1
Sample Name:    649377   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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

```
=====
                          Sample Information
=====
```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.855	PBA	1360543.6	24.0062	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.869	PBA	418181.2	24.8086	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.867	PBA	172839.5	5.0000	CLO4-89-ISTD

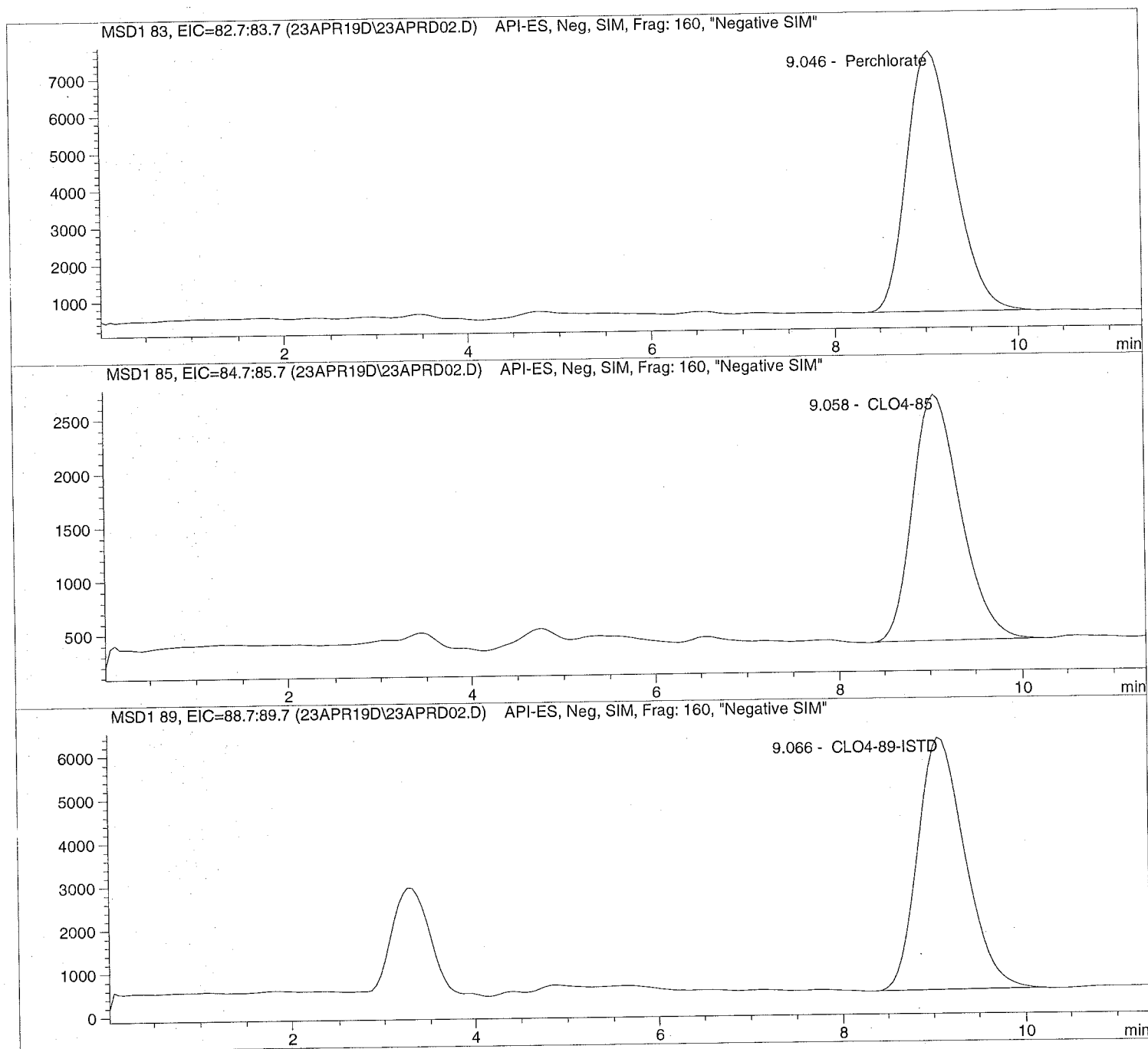
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 08:53:38
Sample Name: 649381 QC@4.0
Acq Operator: TNB

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 08:53:38 Seq Line: 2
Sample Name: 649381 QC@4.0 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.046	PBA	253897.8	4.0112	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.058	PBA	83639.9	4.2937	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.066	PBA	208541.6	5.0000	CLO4-89-ISTD

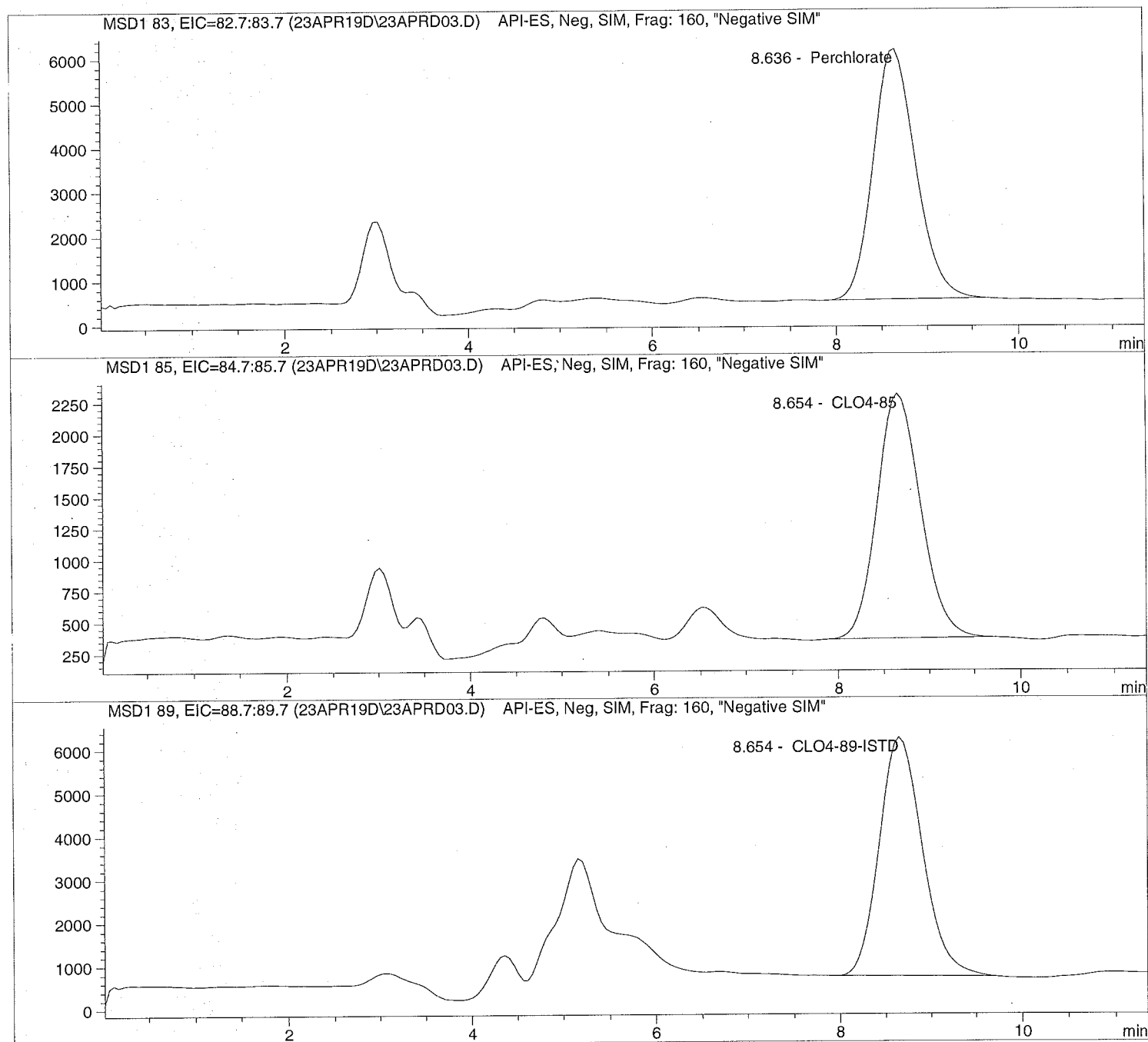
*** End of Report ***

Injection Date: 4/23/2019 09:07:01
Sample Name: 649379 ICS@4.0
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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 09:07:01
Sample Name: 649379 ICS@4.0
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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.636	PBA	182630.9	3.3416	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.654	PBA	64850.2	3.8217	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.654	PBA	181823.6	5.0000	CLO4-89-ISTD

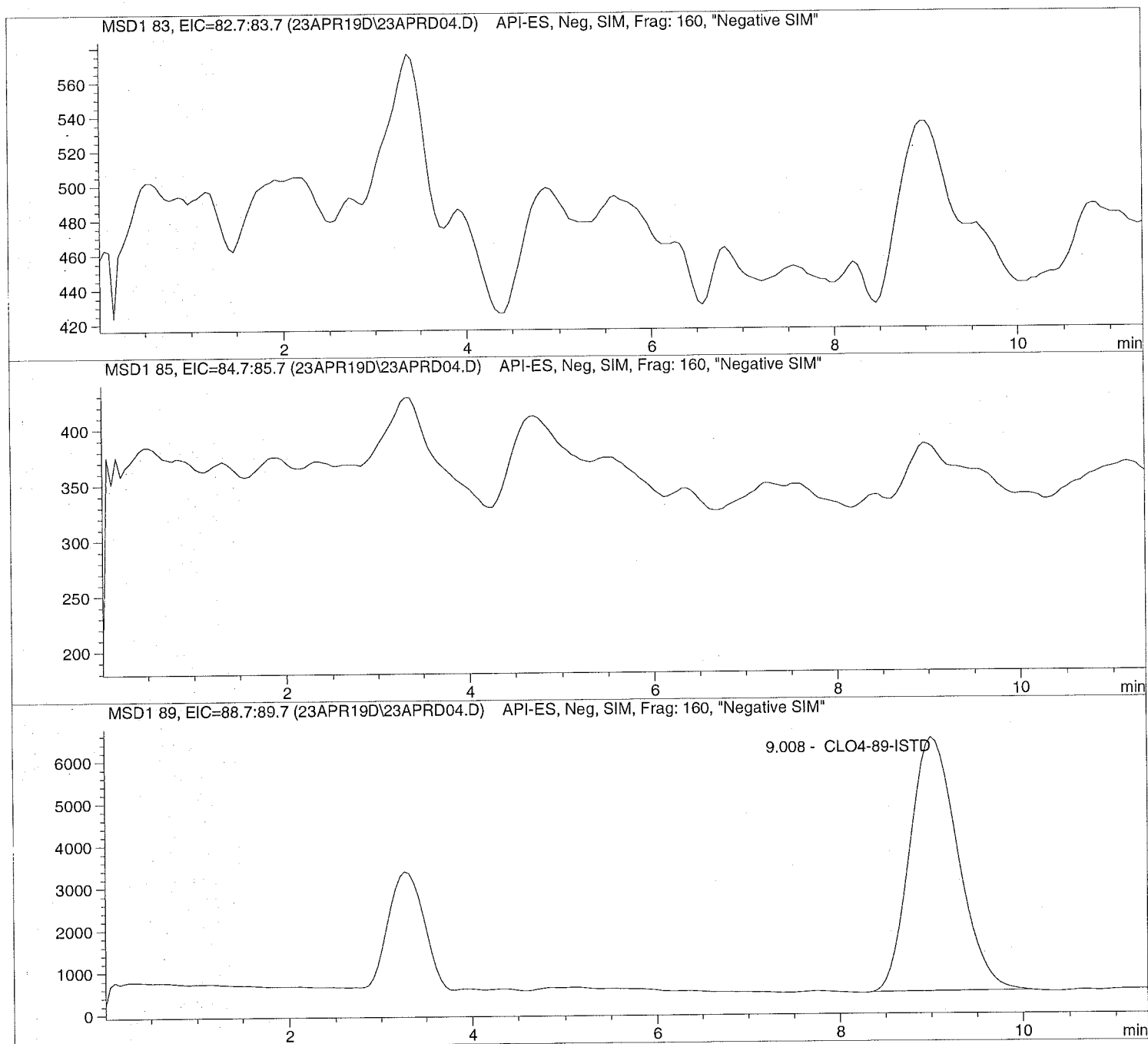
*** End of Report ***

Injection Date: 4/23/2019 09:20:26
Sample Name: 649380 LMB
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  09:20:26      Seq Line:      4
Sample Name:    649380    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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
9.008	PBA	216871.1	5.0000	CLO4-89-ISTD

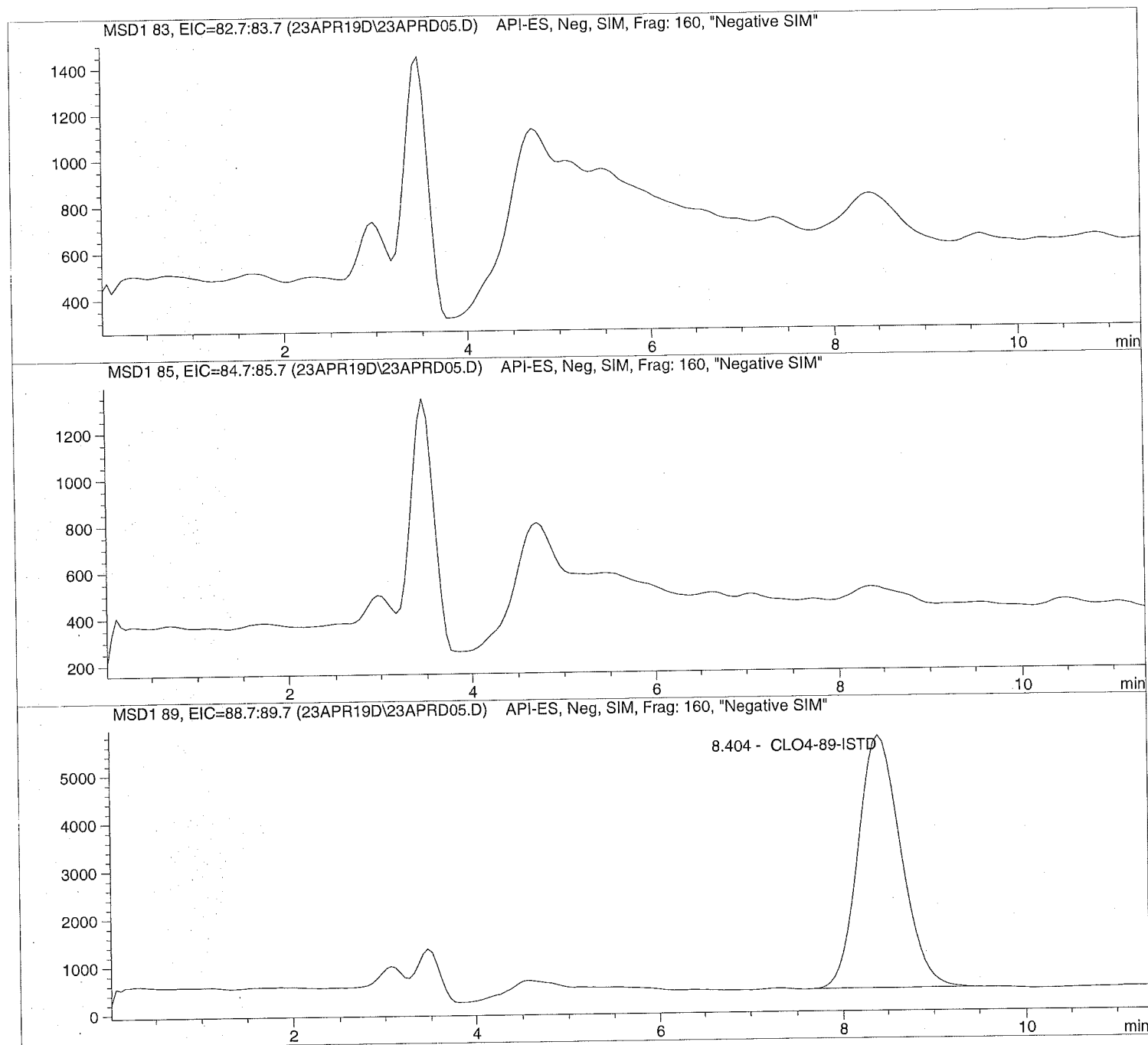
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 09:36:37
Sample Name: 1910478001
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  09:36:37      Seq Line:      5
Sample Name:    1910478001      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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.404	PBA	172857.1	5.0000	CLO4-89-ISTD

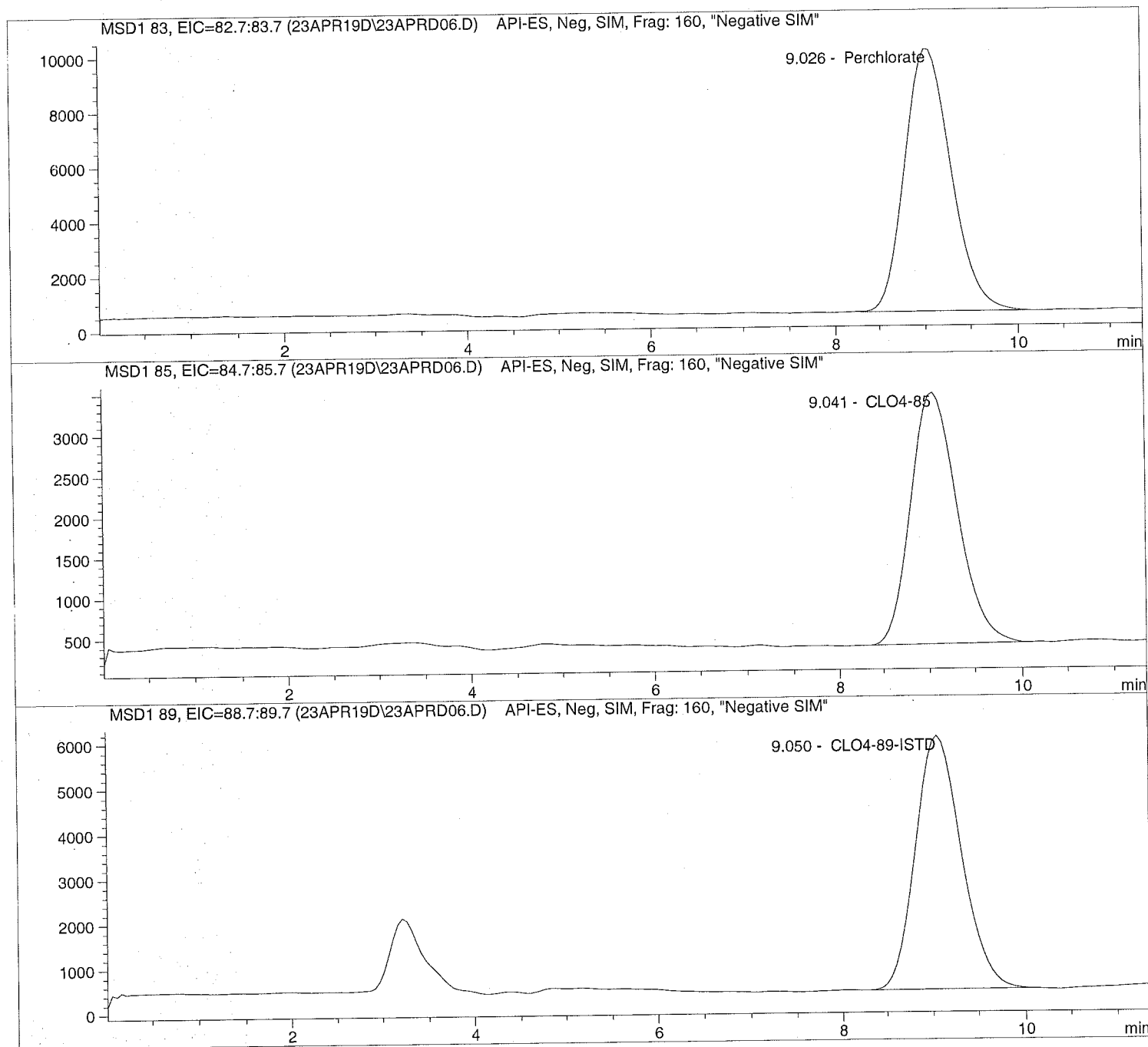
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 09:49:59
Sample Name: 1910480001 1K
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  09:49:59      Seq Line:      6
Sample Name:    1910480001  1K           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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.026	BBA	337160.7	5552.1819	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.041	PBA	109251.5	5913.5779	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.050	PBA	197148.5	5000.0000	CLO4-89-ISTD

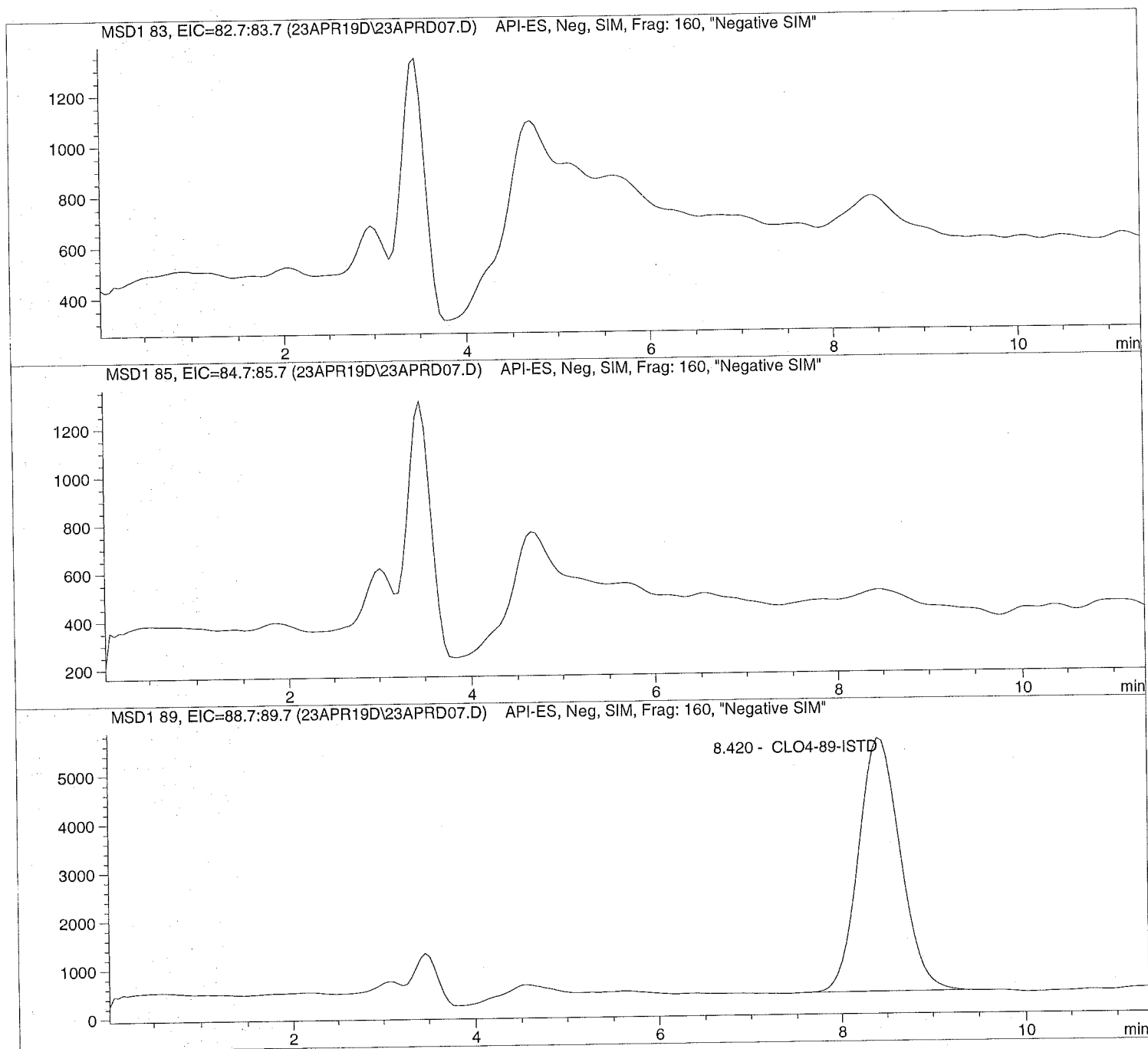
*** End of Report ***

Injection Date: 4/23/2019 10:03:26
Sample Name: 1910483001
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:03:26      Seq Line:      7
Sample Name:    1910483001      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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.420	PBA	165412.1	5.0000	CLO4-89-ISTD

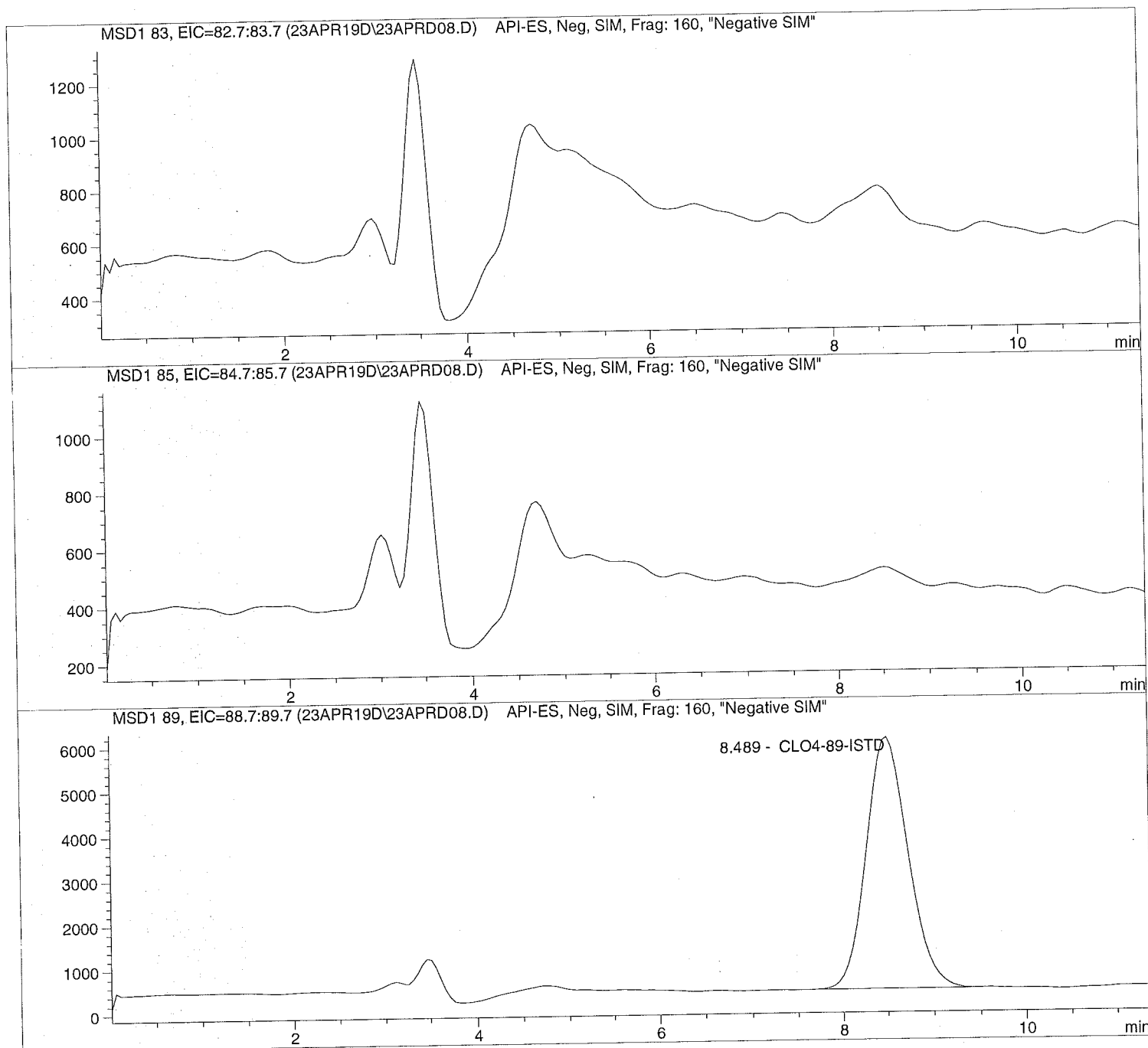
```
=====
*** End of Report ***
=====
```


Injection Date: 4/23/2019 10:16:48
Sample Name: 1911288001
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 10:16:48
Sample Name: 1911288001
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.489	BBA	181749.4	5.0000	CLO4-89-ISTD

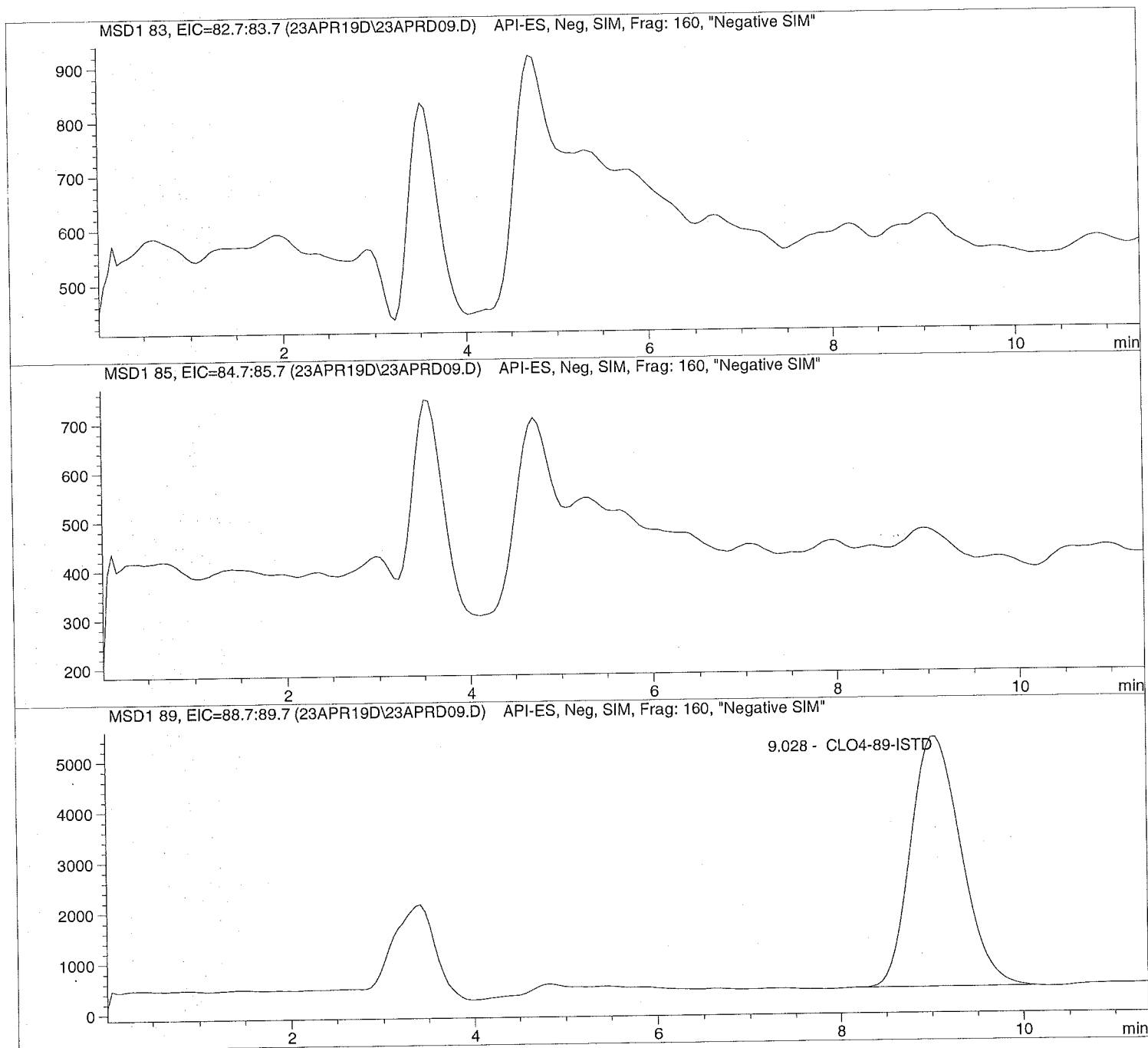
*** End of Report ***

Injection Date: 4/23/2019 10:30:16
Sample Name: 1910837001
Acq Operator: TNB

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:30:16      Seq Line:          9
Sample Name:    1910837001      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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
9.028	BBA	187599.0	5.0000	CLO4-89-ISTD

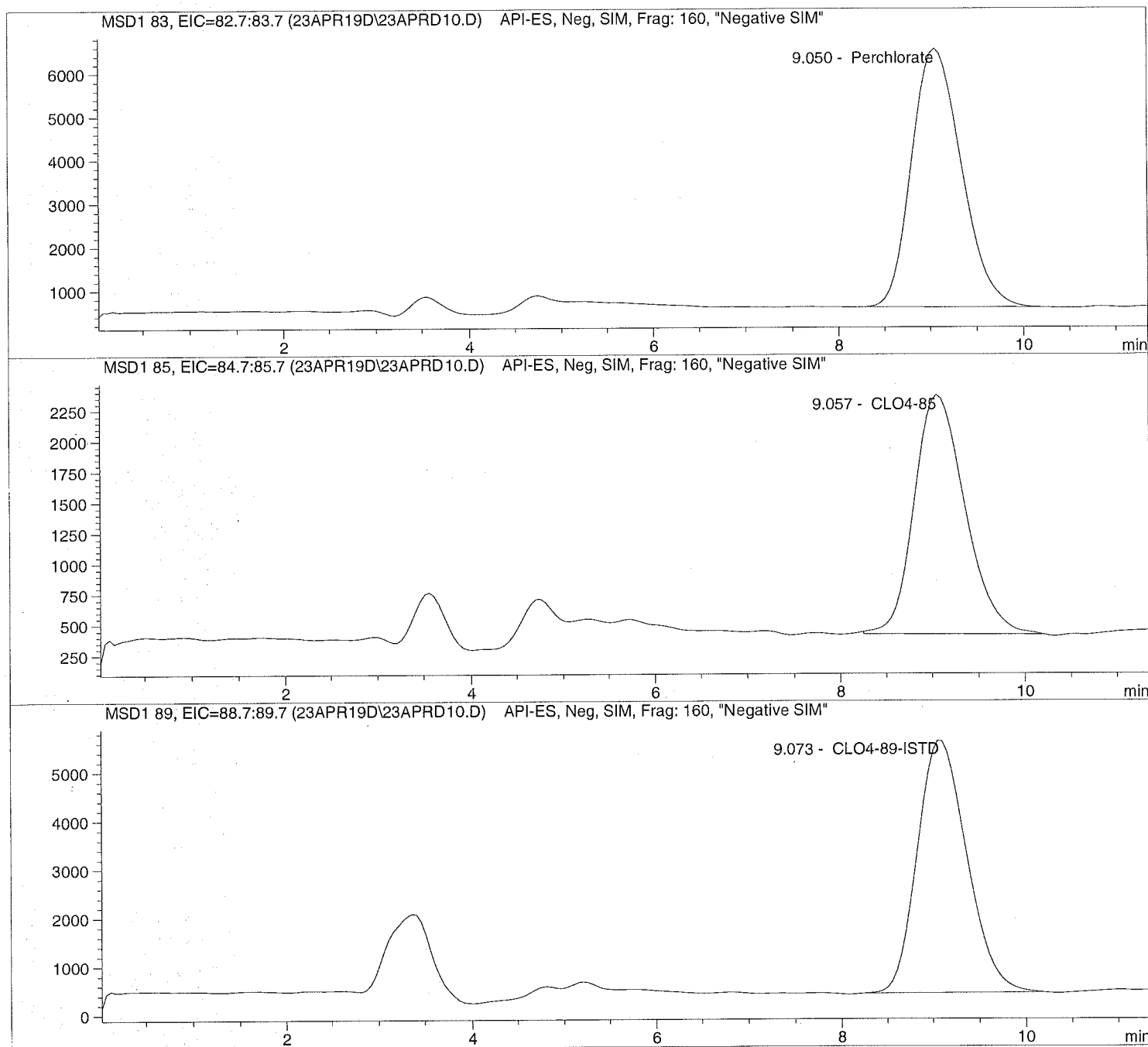
=====
*** End of Report ***
=====

Injection Date: 4/23/2019 10:43:43
Sample Name: 1910837002 MS
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:43:43      Seq Line:           10
Sample Name:    1910837002   MS           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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
9.050	PBA	221785.2	3.8059	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.057	BBA	74121.5	4.1234	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.073	PBA	192506.7	5.0000	CLO4-89-ISTD

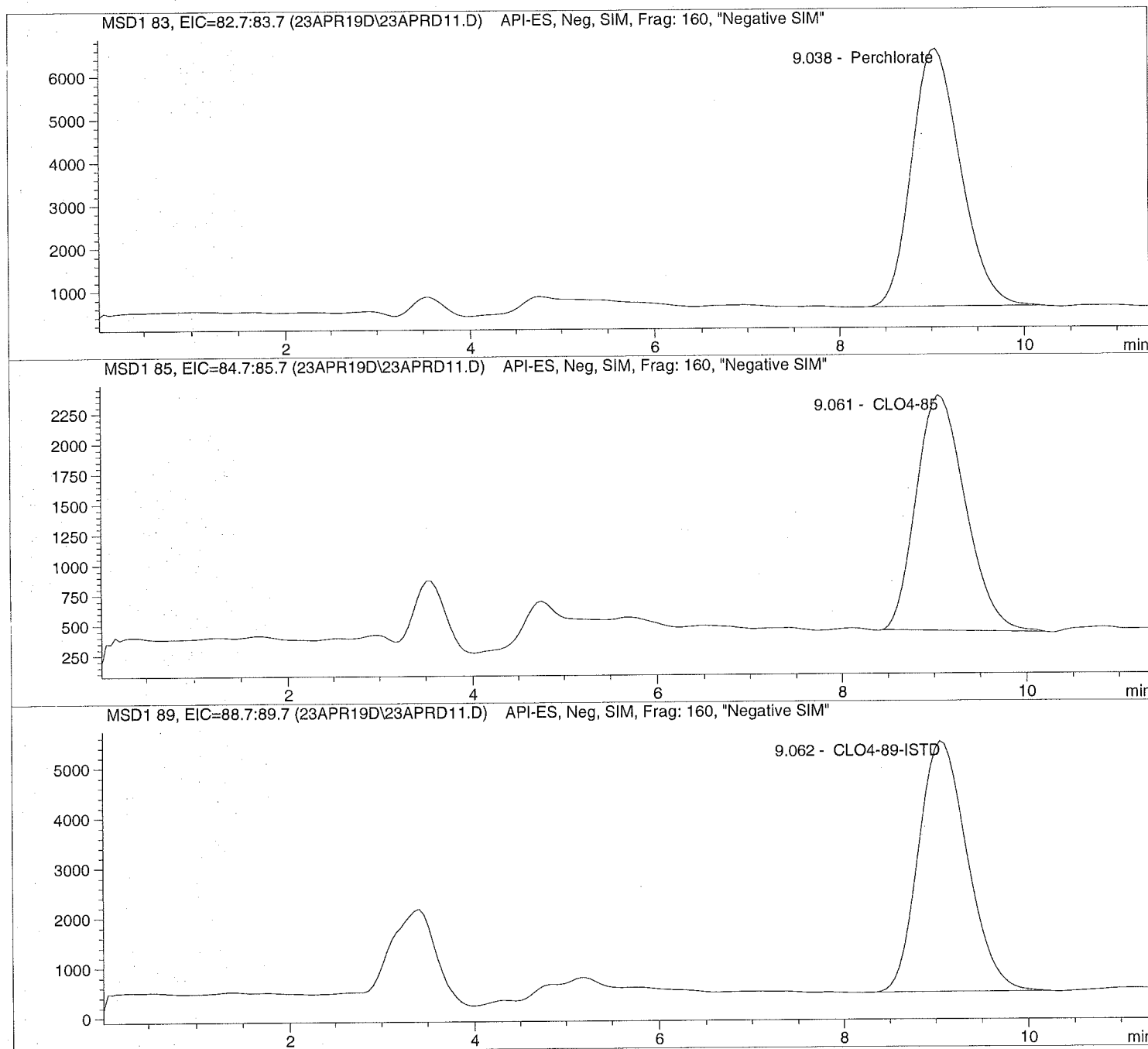
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 10:57:05
Sample Name: 1910837003 MSD
Acq Operator: TNB

Seq Line: 11
Location: Vial 81
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  10:57:05      Seq Line:           11
Sample Name:    1910837003  MSD           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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
9.038	PBA	220802.4	3.9511	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.061	BBA	72383.4	4.2063	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.062	PBA	184256.2	5.0000	CLO4-89-ISTD

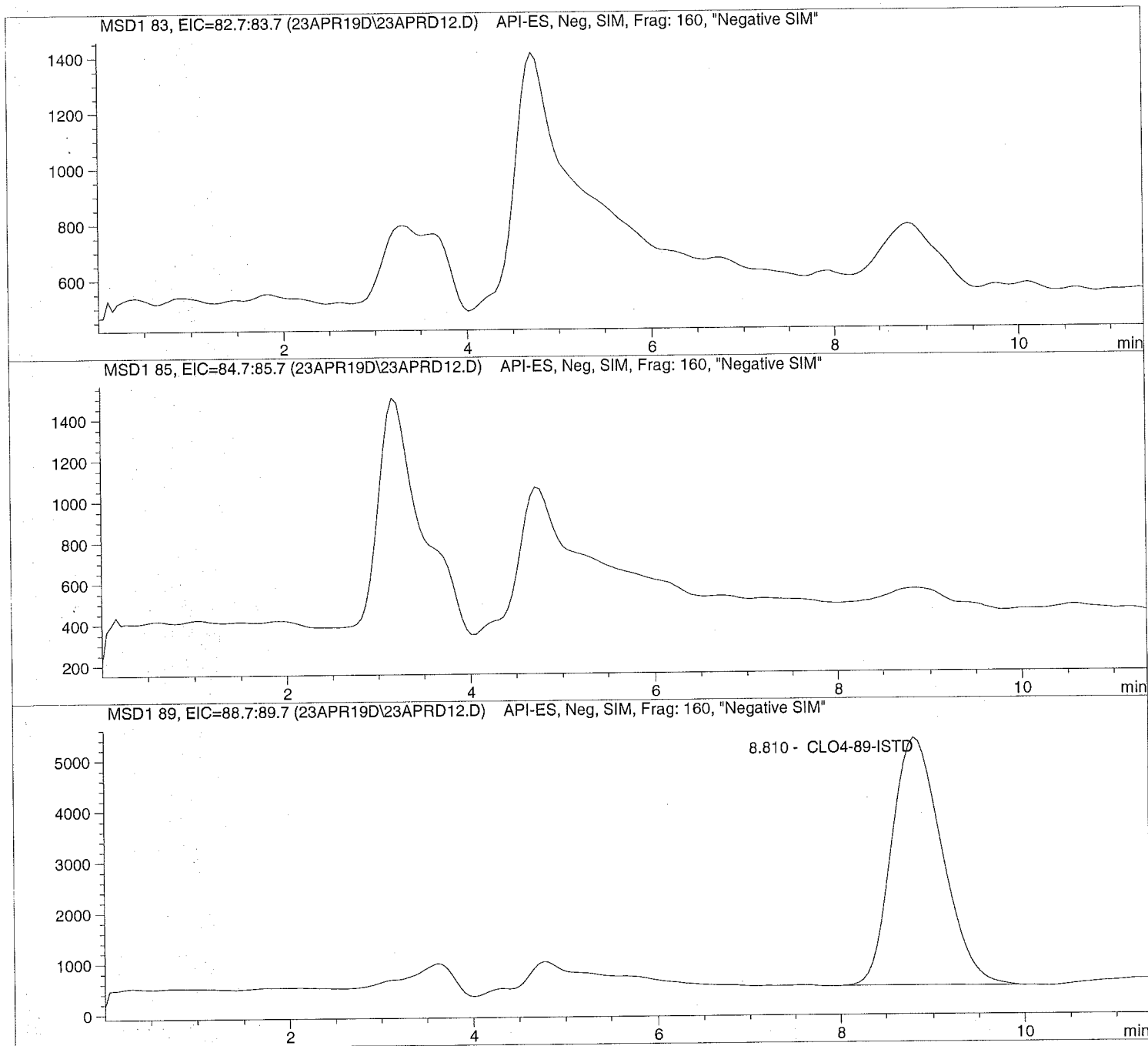
```
=====
*** End of Report ***
=====
```


Injection Date: 4/23/2019 11:10:26
Sample Name: 1910837004
Acq Operator: TNB

Seq Line: 12
Location: Vial 82
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  11:10:26      Seq Line:           12
Sample Name:    1910837004              Location:           Vial 82
Acq Operator:   TNB                      Inj. No.:           1
                                           Inj. Vol.:          35 µl
=====
```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.810	PBA	180138.5	5.0000	CLO4-89-ISTD

=====

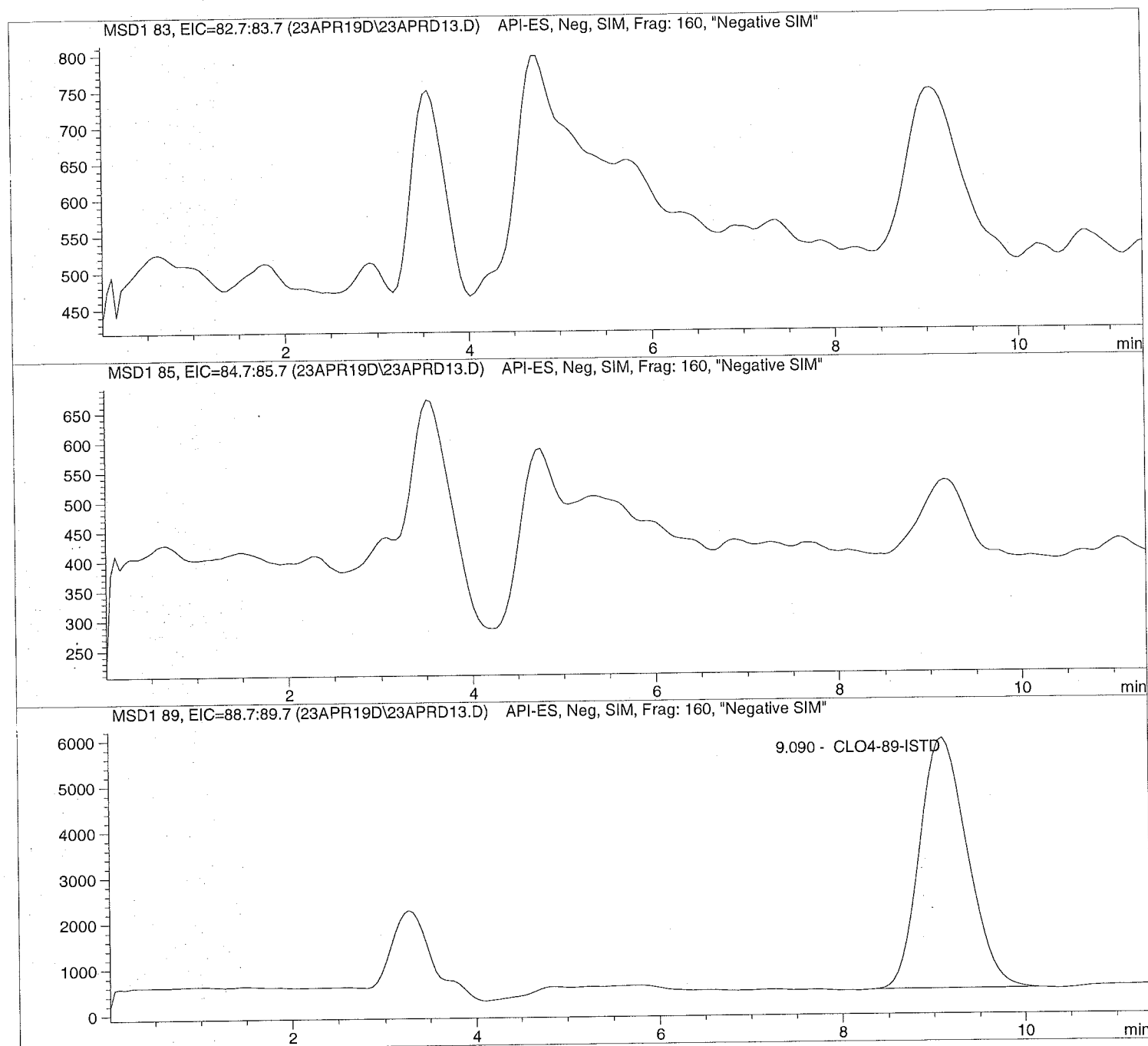
*** End of Report ***

Injection Date: 4/23/2019 11:23:52
Sample Name: 1910837005
Acq Operator: TNB

Seq Line: 13
Location: Vial 83
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  11:23:52      Seq Line:           13
Sample Name:    1910837005              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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
9.090	BBA	197954.5	5.0000	CLO4-89-ISTD

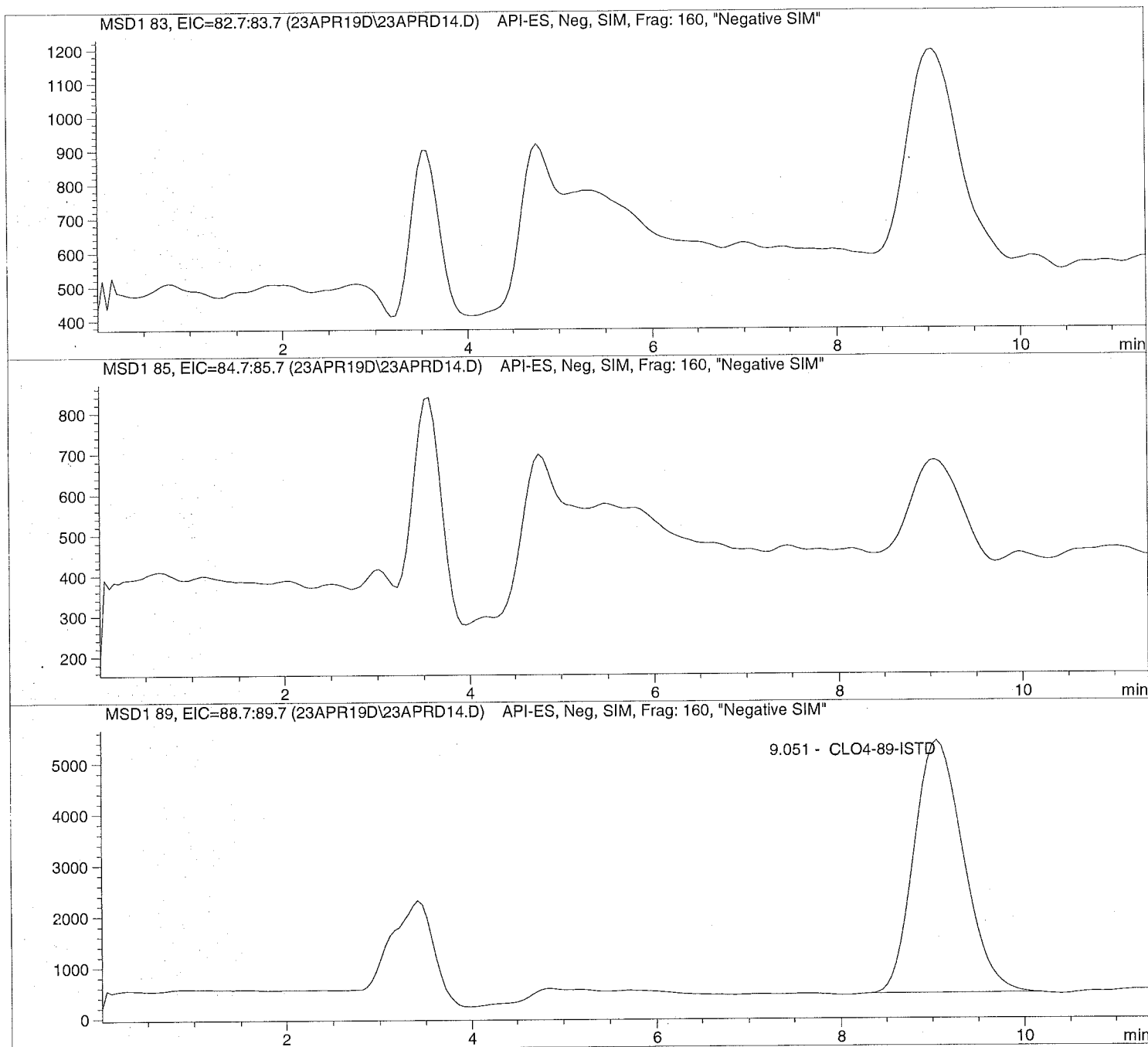
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 11:37:15
Sample Name: 1910837006
Acq Operator: TNB

Seq Line: 14
Location: Vial 84
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  4/23/2019  11:37:15      Seq Line:           14
Sample Name:    1910837006                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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
9.051	BBA	183017.4	5.0000	CLO4-89-ISTD

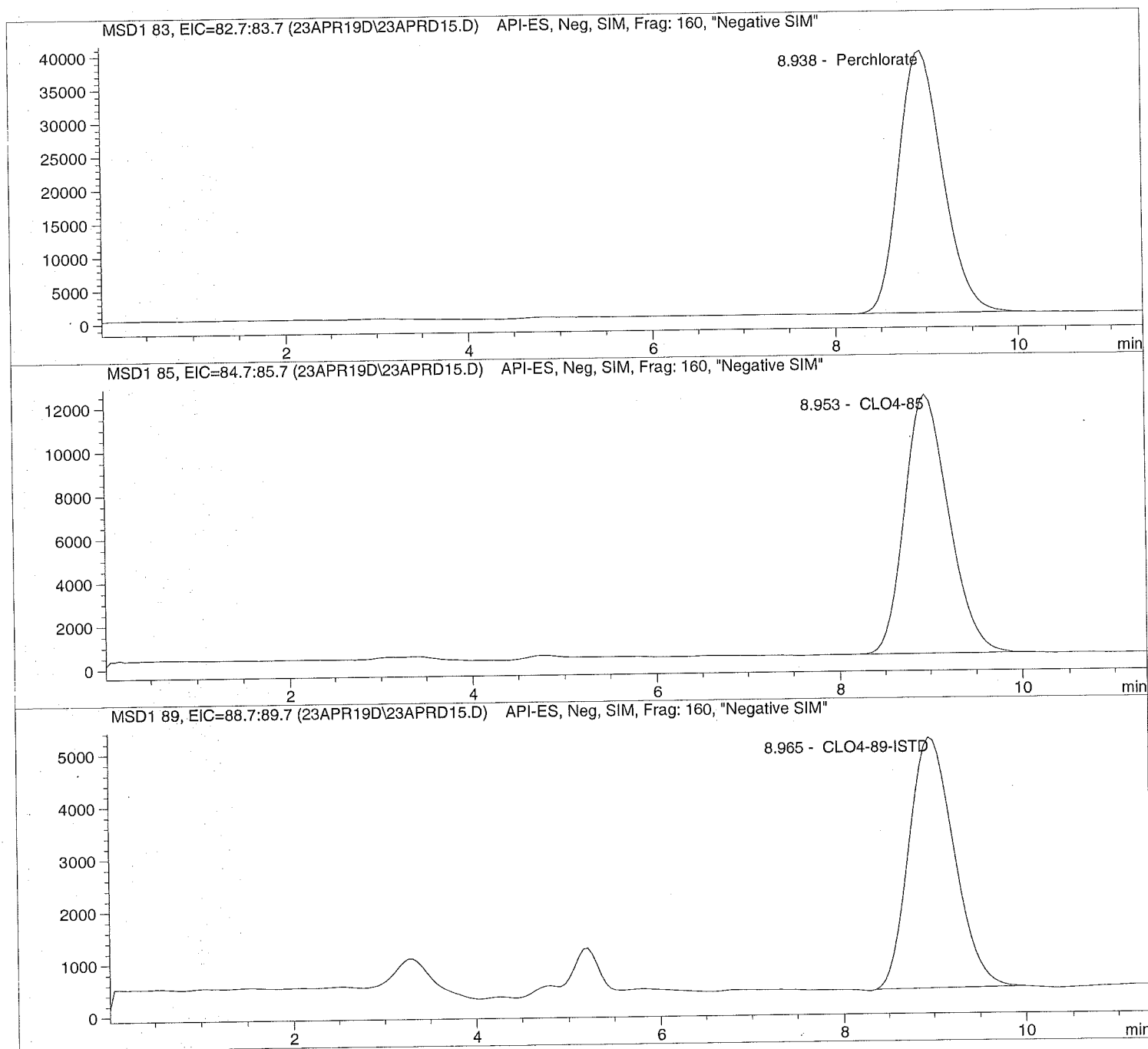
```
=====
*** End of Report ***
=====
```

Injection Date: 4/23/2019 11:50:37
Sample Name: 649382 CCV@25
Acq Operator: TNB

Seq Line: 15
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 11:50:37
Sample Name: 649382 CCV@25
Acq Operator: TNB

Seq Line: 15
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.938	PBA	1311276.0	24.2693	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.953	BBA	400971.3	24.9597	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.965	PBA	164670.7	5.0000	CLO4-89-ISTD

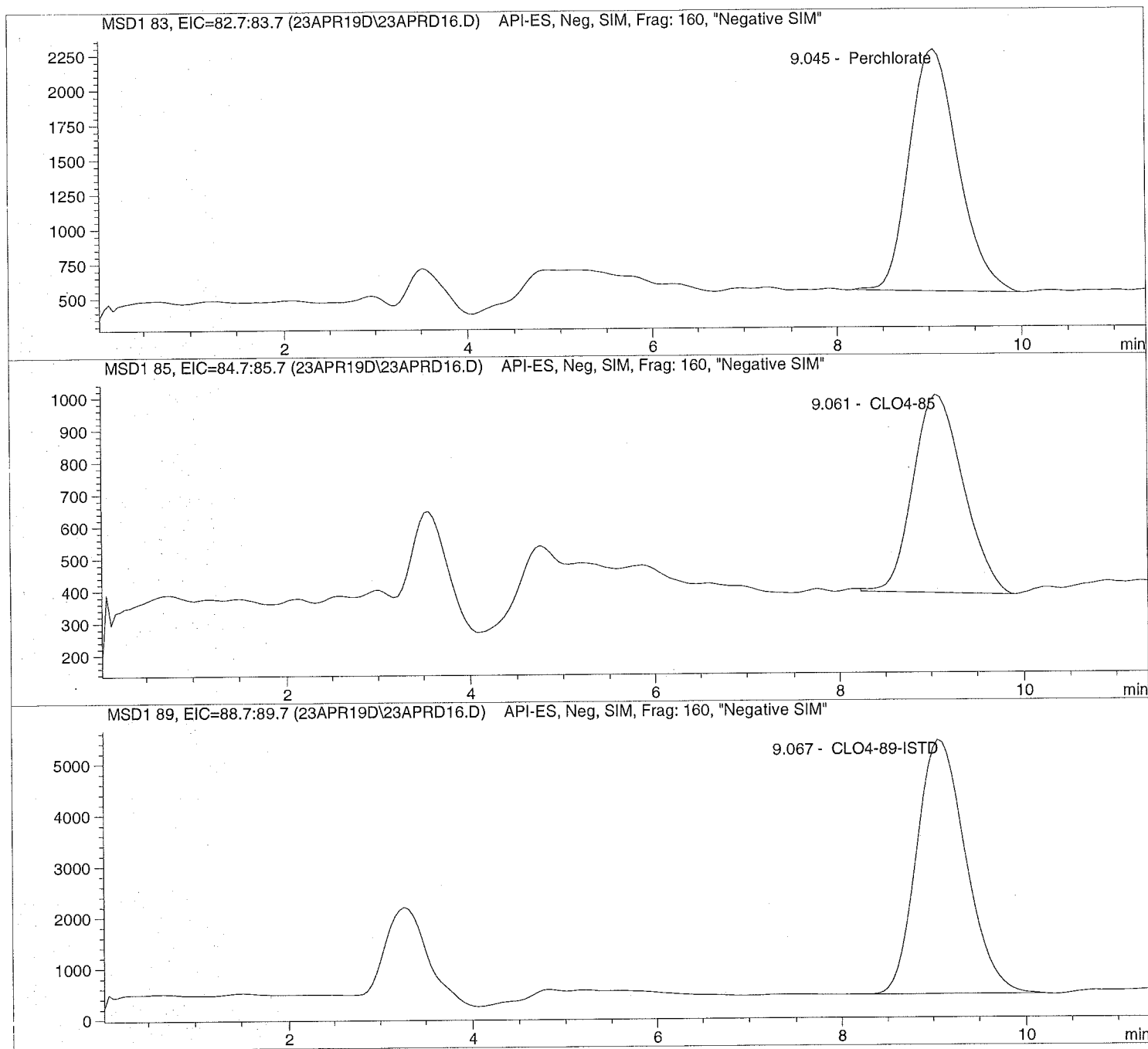
*** End of Report ***

Injection Date: 4/23/2019 12:03:59
Sample Name: 1910837007
Acq Operator: TNB

Seq Line: 16
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 12:03:59
Sample Name: 1910837007
Acq Operator: TNB

Seq Line: 16
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.045	BBA	64240.0	1.2640	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.061	BBA	23485.4	1.3651	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.067	PBA	184879.5	5.0000	CLO4-89-ISTD

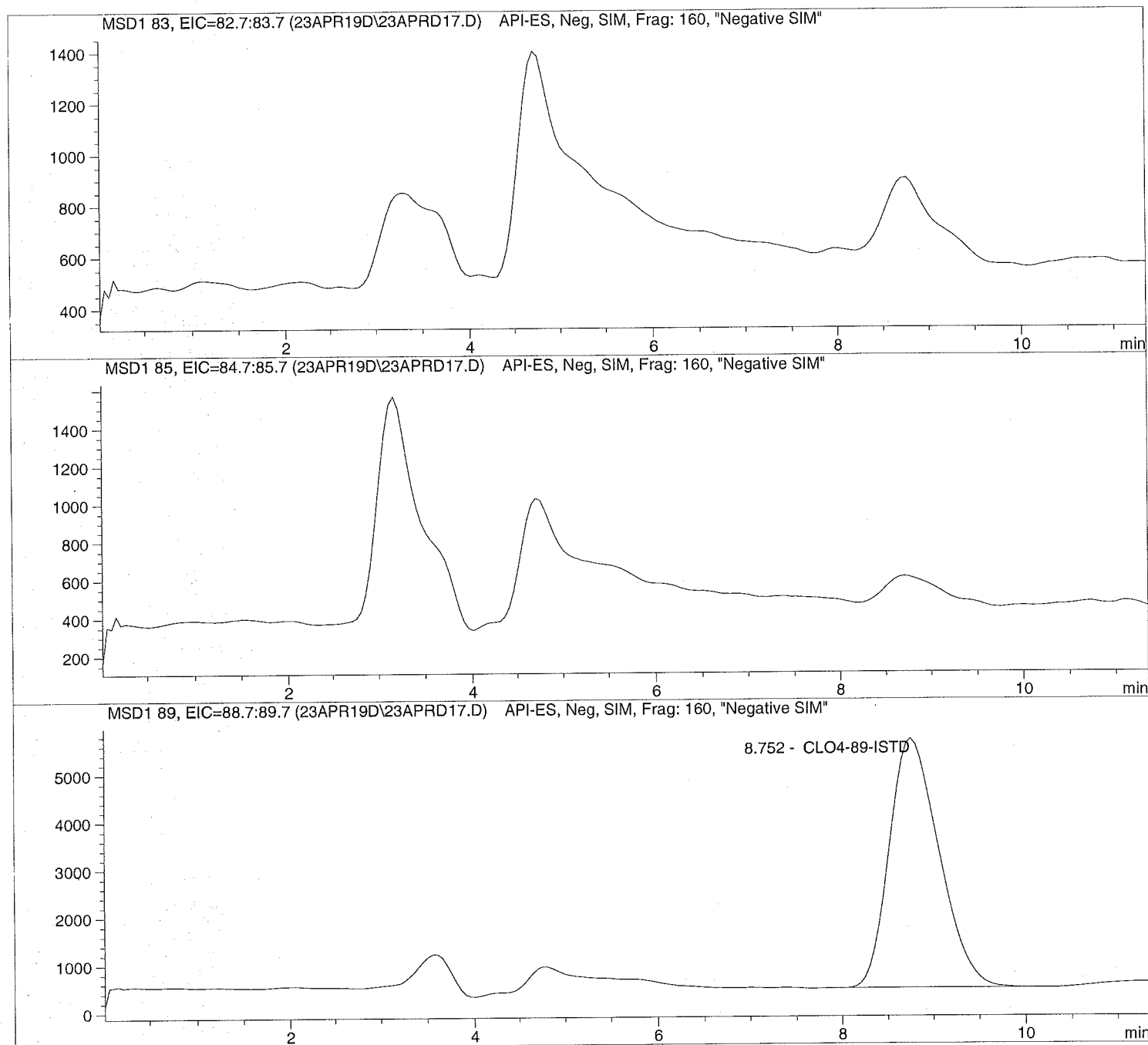
*** End of Report ***

Injection Date: 4/23/2019 12:17:22
Sample Name: 1910837008
Acq Operator: TNB

Seq Line: 17
Location: Vial 86
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 12:17:22 Seq Line: 17
Sample Name: 1910837008 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.752	PBA	196776.6	5.0000	CLO4-89-ISTD

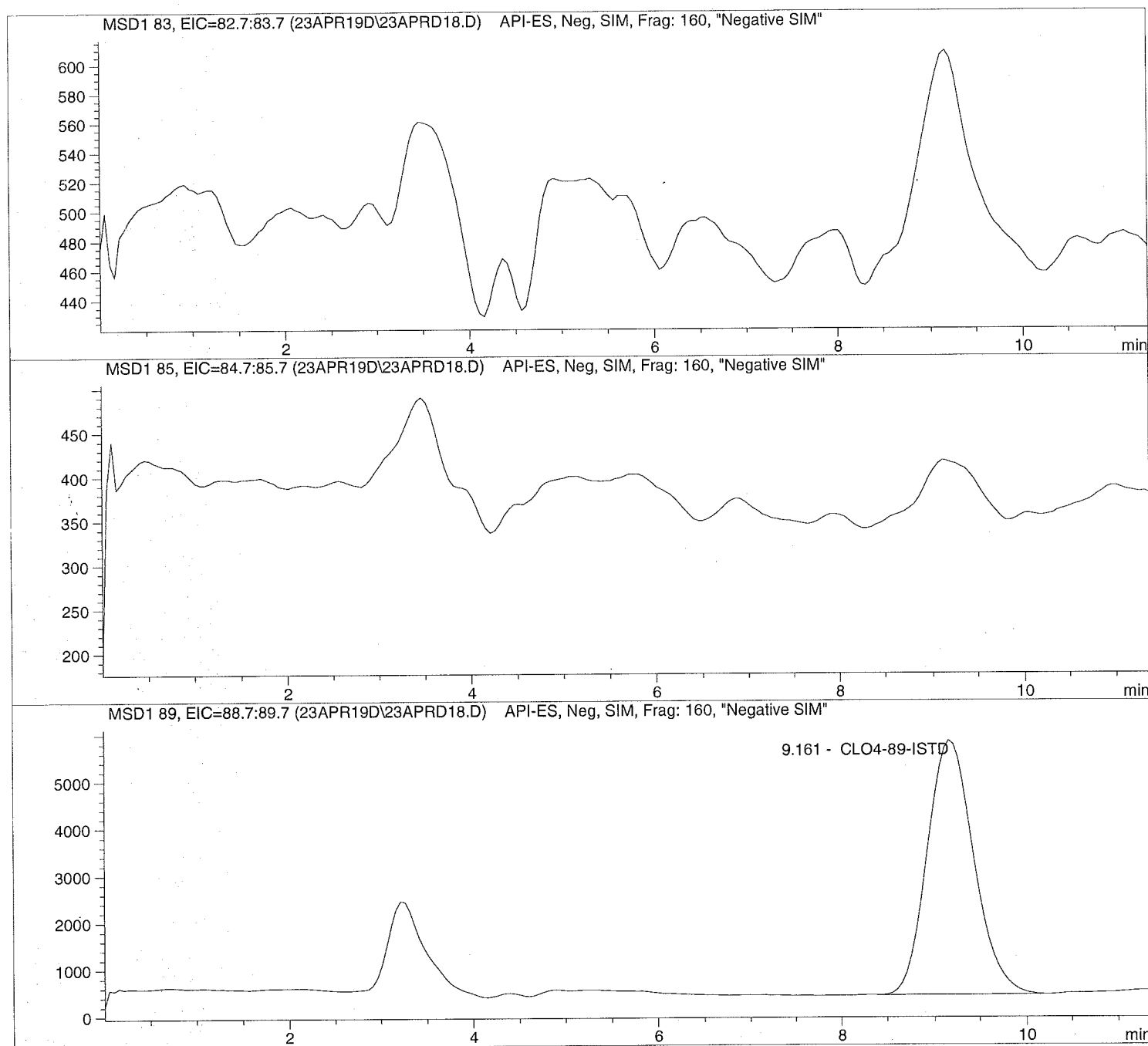
*** End of Report ***

Injection Date: 4/23/2019 12:30:43
Sample Name: 1910837009
Acq Operator: TNB

Seq Line: 18
Location: Vial 87
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 12:30:43
Sample Name: 1910837009
Acq Operator: TNB

Seq Line: 18
Location: Vial 87
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.161	BBA	191613.1	5.0000	CLO4-89-ISTD

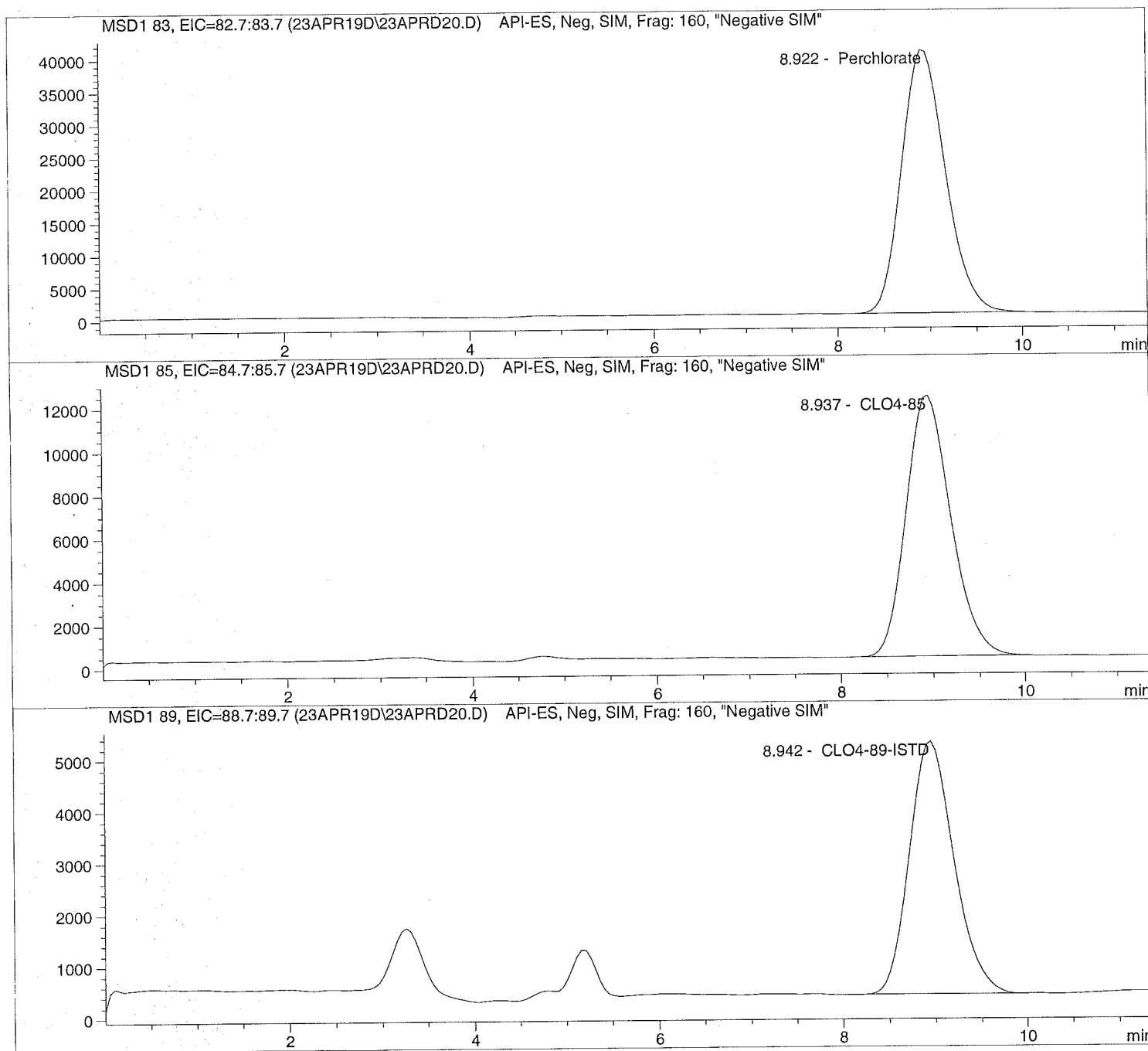
*** End of Report ***

Injection Date: 4/23/2019 13:01:17
Sample Name: 649383 CCV@25
Acq Operator: TNB

Seq Line: 20
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 4/23/2019 13:01:17 Seq Line: 20
Sample Name: 649383 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.922	PBA	1319634.0	24.7062	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.937	PBA	401823.2	25.3099	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.942	PBA	162618.0	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 : 3/19/2019 2:35:19 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

#

#	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	Lvl	Amount	Area	Amt/Area	Ref Grp	Name
[min]	Sig					
8.744	1	1.00000	7.76074e4	1.28854e-5	1	Perchlorate
	2	2.00000	1.35273e5	1.47849e-5		
	3	5.00000	3.37764e5	1.48033e-5		
	4	10.00000	6.83454e5	1.46316e-5		
	5	25.00000	2.08433e6	1.19943e-5		
	6	50.00000	4.13334e6	1.20968e-5		
	7	75.00000	5.99313e6	1.25143e-5		
8.755	2	1.00000	2.36780e4	4.22333e-5	1	CLO4-85
	2	2.00000	4.69486e4	4.25998e-5		
	3	5.00000	1.06124e5	4.71147e-5		
	4	10.00000	2.13523e5	4.68335e-5		
	5	25.00000	6.14295e5	4.06971e-5		
	6	50.00000	1.19814e6	4.17315e-5		
	7	75.00000	1.78355e6	4.20509e-5		
8.766	3	5.00000	2.73208e5	1.83011e-5	+I1	CLO4-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5		
	3	5.00000	2.33196e5	2.14412e-5		
	4	5.00000	2.34454e5	2.13262e-5		
	5	5.00000	2.50568e5	1.99547e-5		
	6	5.00000	2.30977e5	2.16472e-5		

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min
Curve Type : Quadratic
Origin : Ignored
Calibration Level Weights:/
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333

Compound: CLO4-85

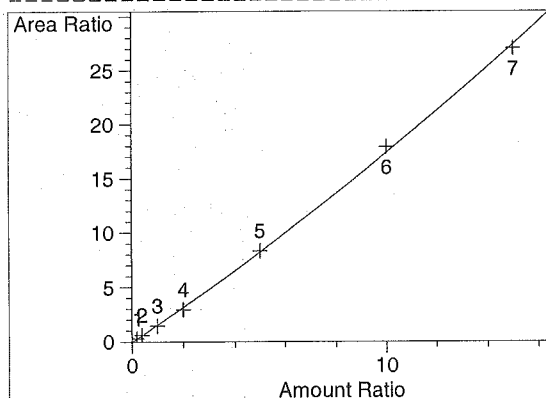
Time Window : From 6.650 min To 12.505 min
Curve Type : Quadratic
Origin : Ignored
Calibration Level Weights:/
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333

Compound: CLO4-89-ISTD

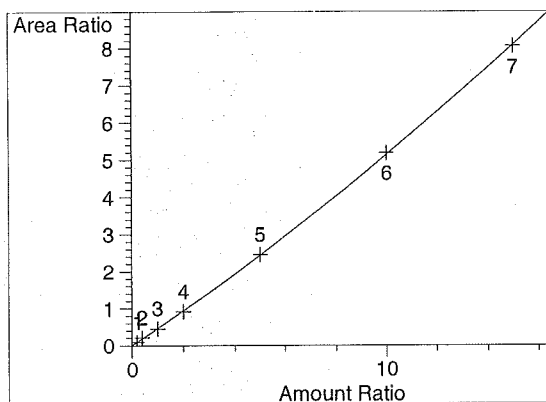
Time Window : From 6.659 min To 12.466 min
Curve Type : Linear
Origin : Included
Calibration Level Weights:/
Level 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

=====
Peak Sum Table
=====

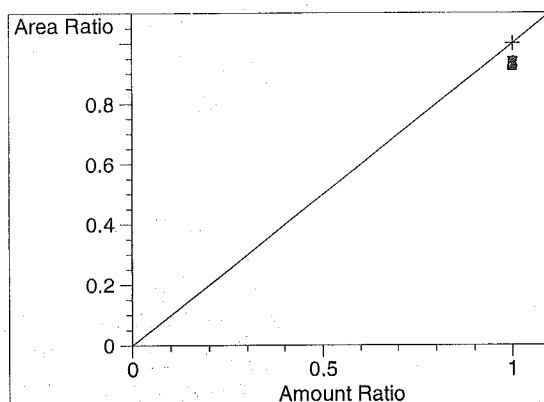
No Entries in table
=====

=====
Calibration Curves
=====

Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation: 0.99957
Residual Std. Dev.: 0.30744
Formula: $y = ax^2 + bx + c$
a: 1.76988e-2
b: 1.56480
c: -4.92430e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755
MSD1 85, EIC=84.7:85.7
Correlation: 0.99983
Residual Std. Dev.: 0.03473
Formula: $y = ax^2 + bx + c$
a: 5.13396e-3
b: 4.62055e-1
c: 4.97209e-4
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766
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 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	7.76074e4	8.744	1.06245
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	8.992	2.06969
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	8.586	4.73474
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	8.698	9.27727
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	8.451	25.29036
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	8.810	51.36844
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	8.586	74.16754
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	8.702	9.25940

##	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
##	-----	-----	---	-----	---	-----	-----	-----
##	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	8.755	9.30535e-1
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	9.012	2.24255
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	8.602	4.86656
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	8.713	9.64312
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	8.468	25.12159
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	8.825	50.46721
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	8.603	74.72019
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	8.721	9.54024

##	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	2.73208e5	8.766	5.00000
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	9.012	5.00000
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	8.609	5.00000
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	8.716	5.00000
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	8.472	5.00000
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	8.825	5.00000
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	8.610	5.00000
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	8.725	5.00000

*** End of Report ***

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\MAR\19MAR19I.S

Sequence Table:

Method and Injection Info Part:

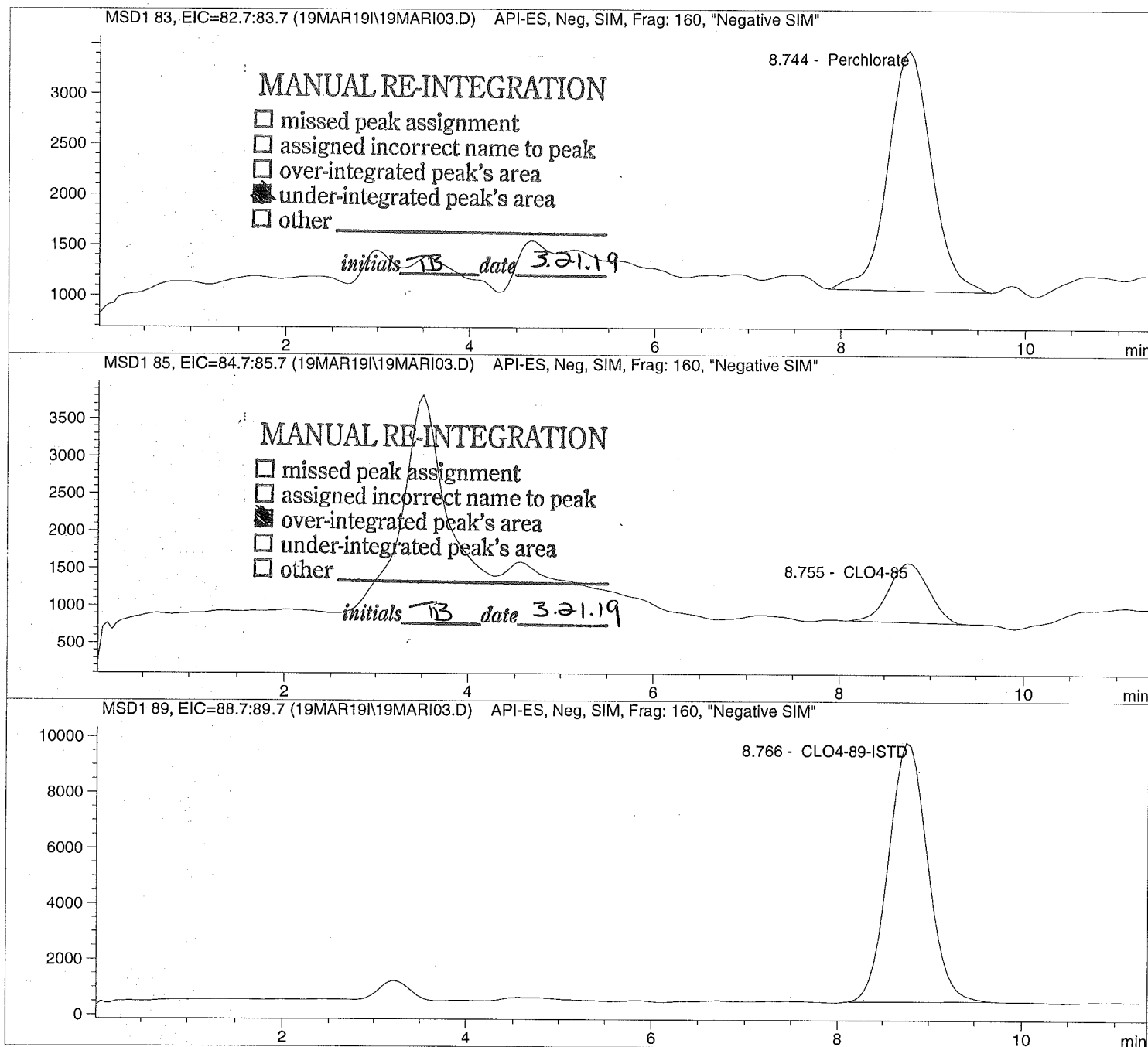
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	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 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.744	MM	77607.4	1.0625	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	MM	23678.0	0.9305	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

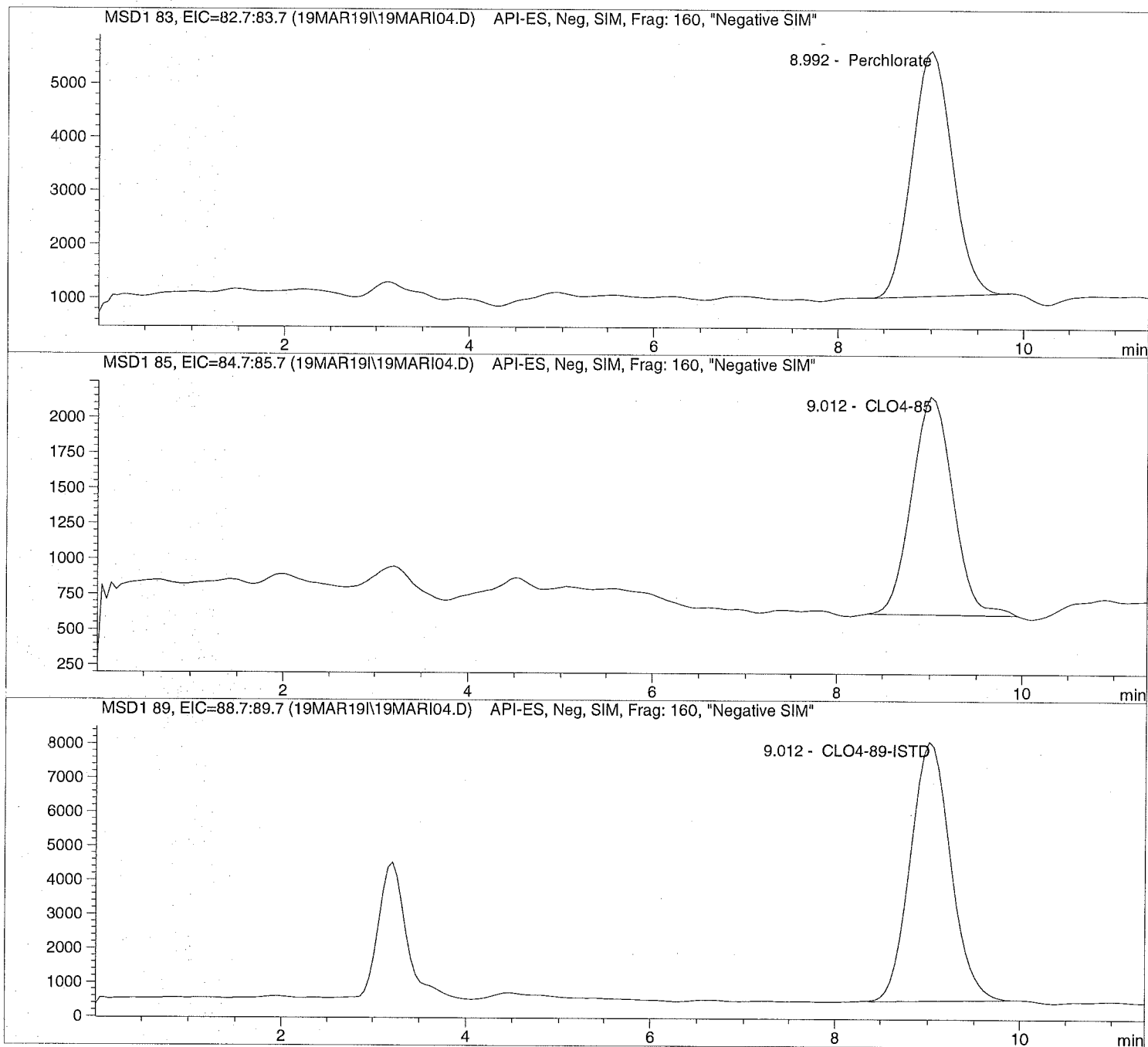
*** End of Report ***

Injection Date: 3/19/2019 09:53:00
Sample Name: CLO4@ 2.0ug/L
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:53:00 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.992	BBA	135272.8	2.0697	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

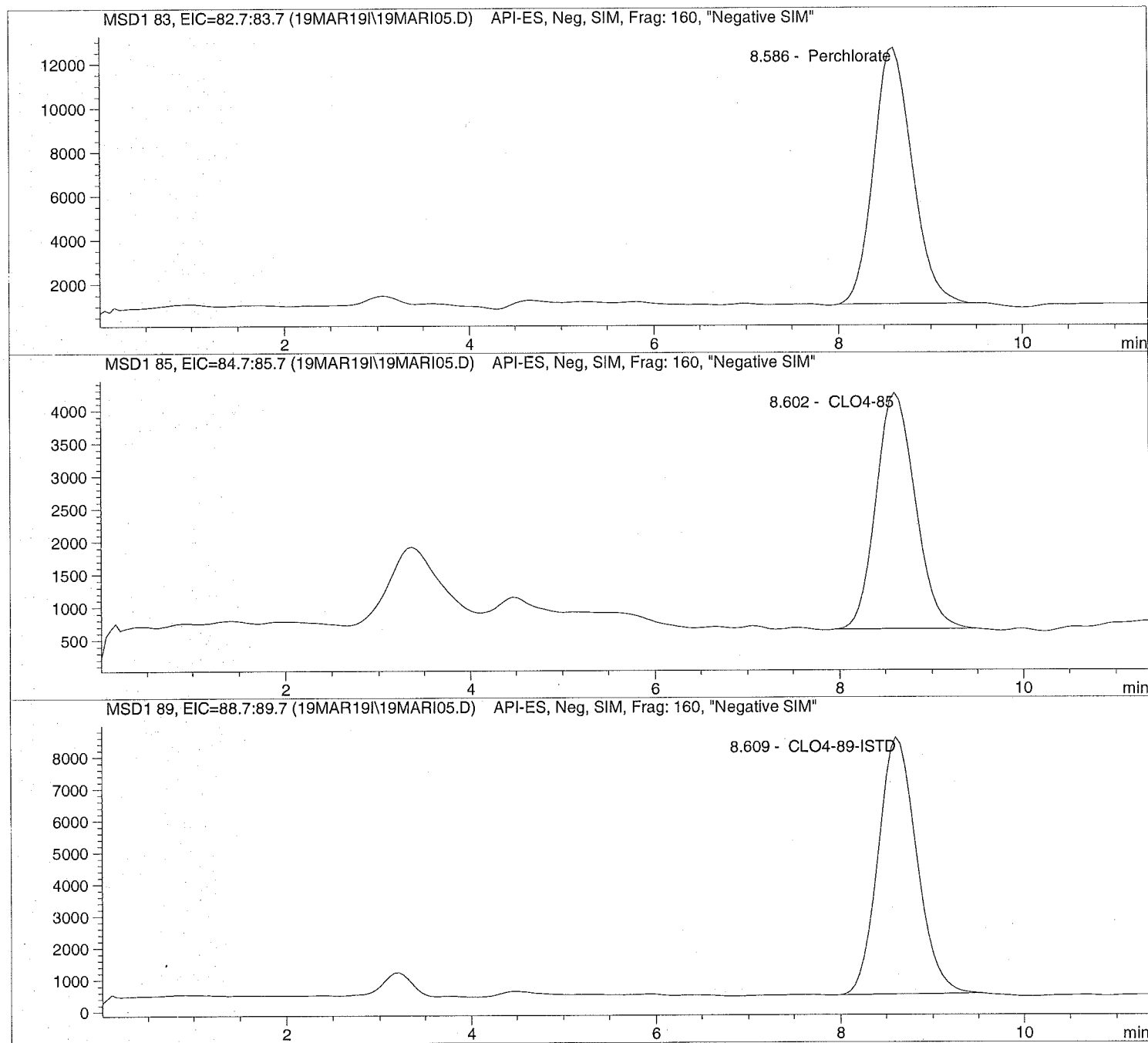
*** End of Report ***

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI05.D

Sample Name: CLO4@ 5.0ug/L

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 10:19:32

Seq Line: 6

Sample Name: CLO4@ 10.ug/L

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

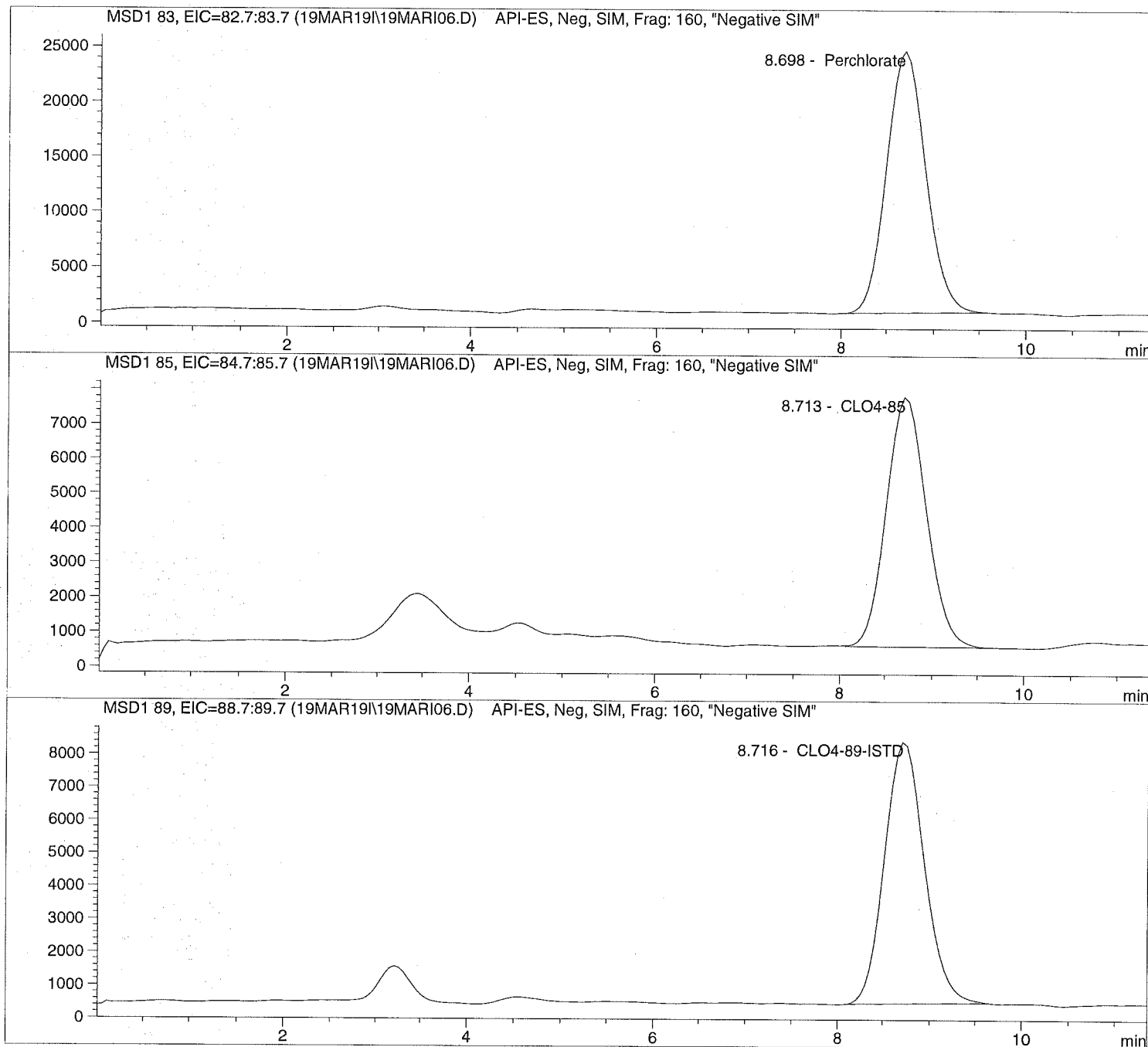
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI06.D

Sample Name: CLO4@ 10.ug/L

Injection Date: 3/19/2019 10:19:32
Sample Name: CLO4@ 10.ug/L
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.698	PBA	683454.4	9.2773	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

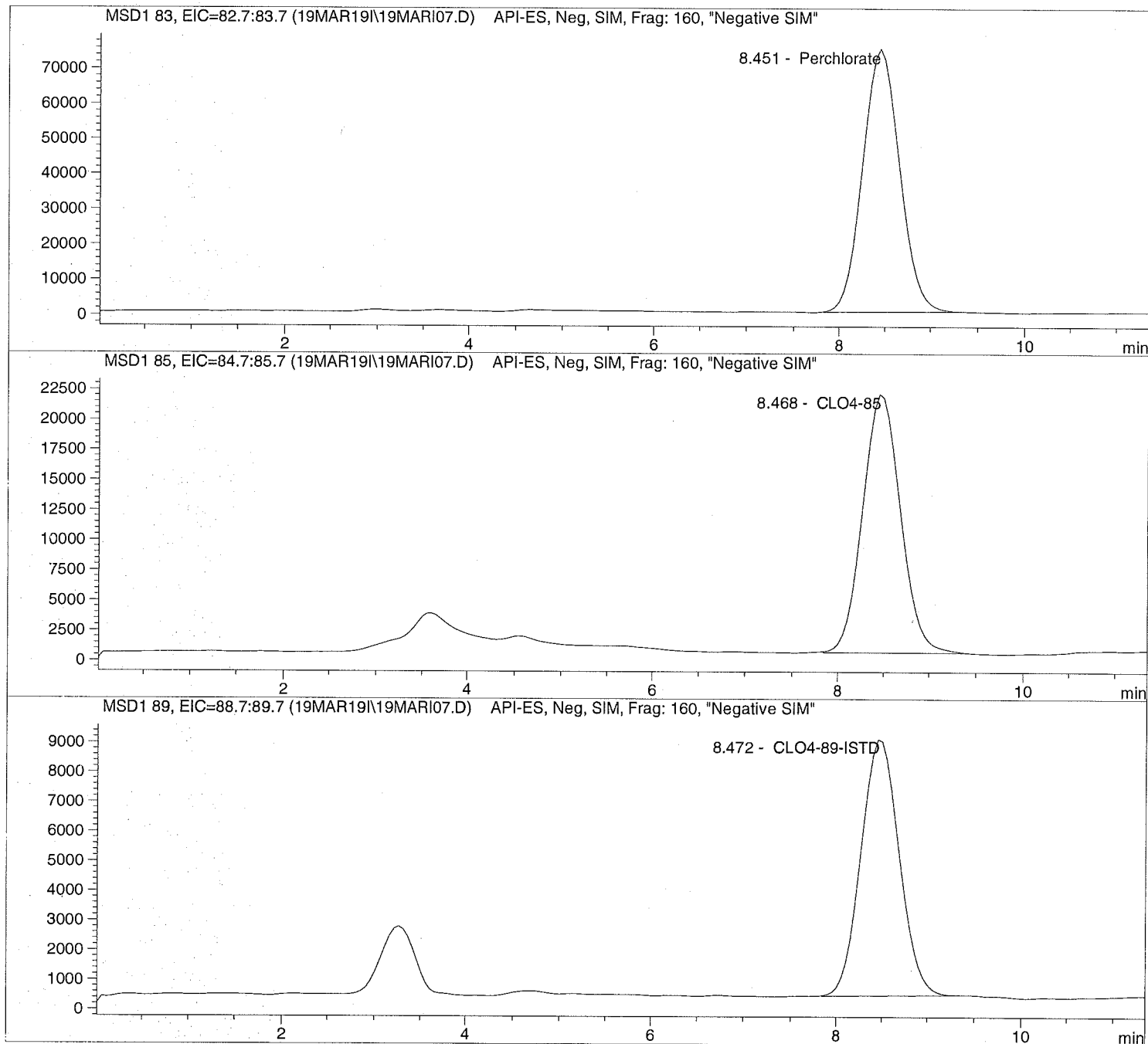
*** End of Report ***

Injection Date: 3/19/2019 10:32:49
Sample Name: CLO4@ 25.ug/L
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 10:32:49 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.451	PBA	2084327.4	25.2904	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.468	BBA	614294.8	25.1216	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D

Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05

Seq Line: 8

Sample Name: CLO4@ 50.ug/L

Location: Vial 78

Acq Operator: TNB

Inj. No.: 1

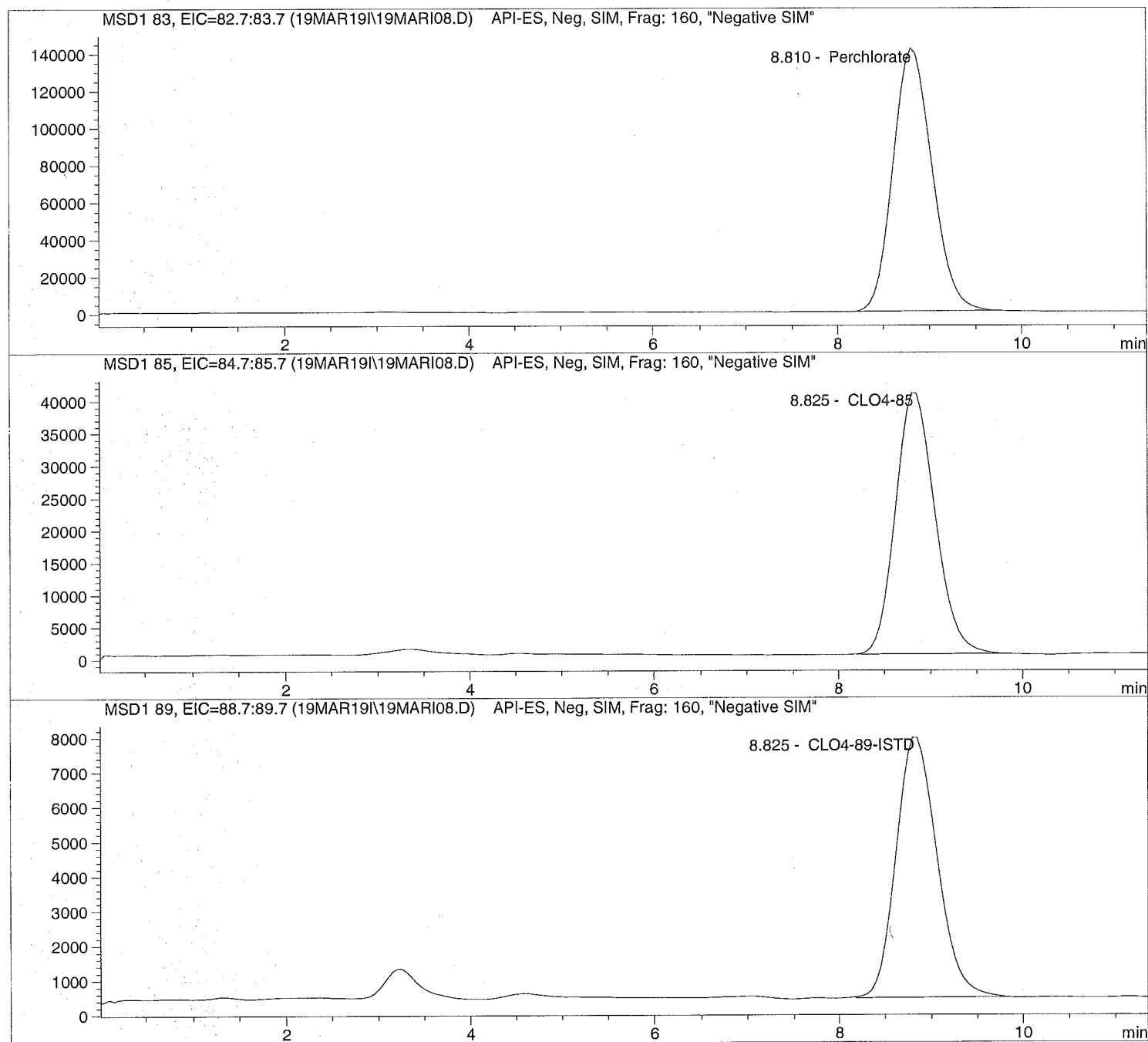
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D

Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.810	PBA	4133340.5	51.3684	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.4672	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 10:59:22

Seq Line: 9

Sample Name: CLO4@ 75.ug/L

Location: Vial 79

Acq Operator: TNB

Inj. No.: 1

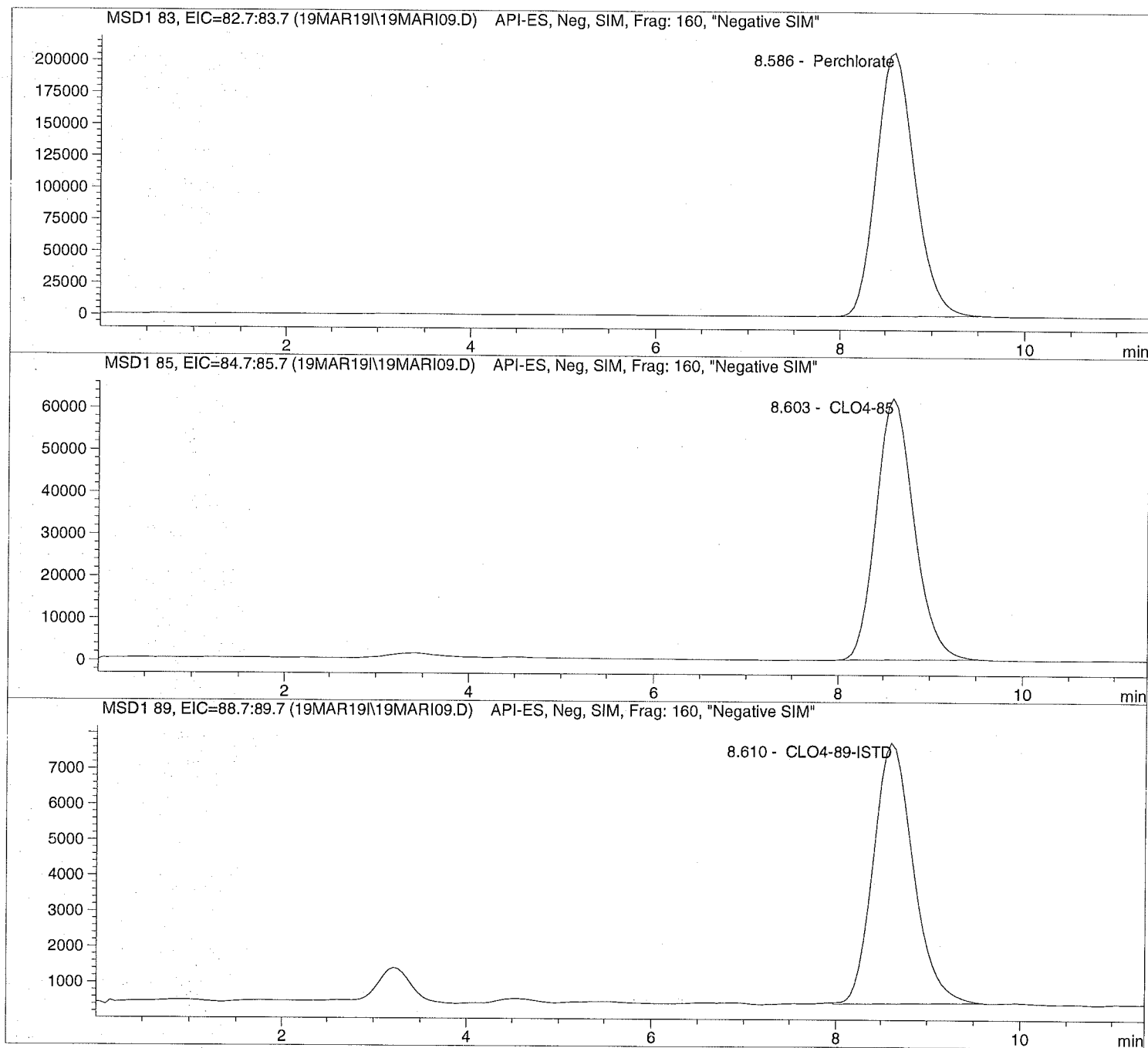
Inj. Vol.: 30 μ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI09.D Sample Name: CLO4@ 75.ug/L

Injection Date: 3/19/2019 10:59:22 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

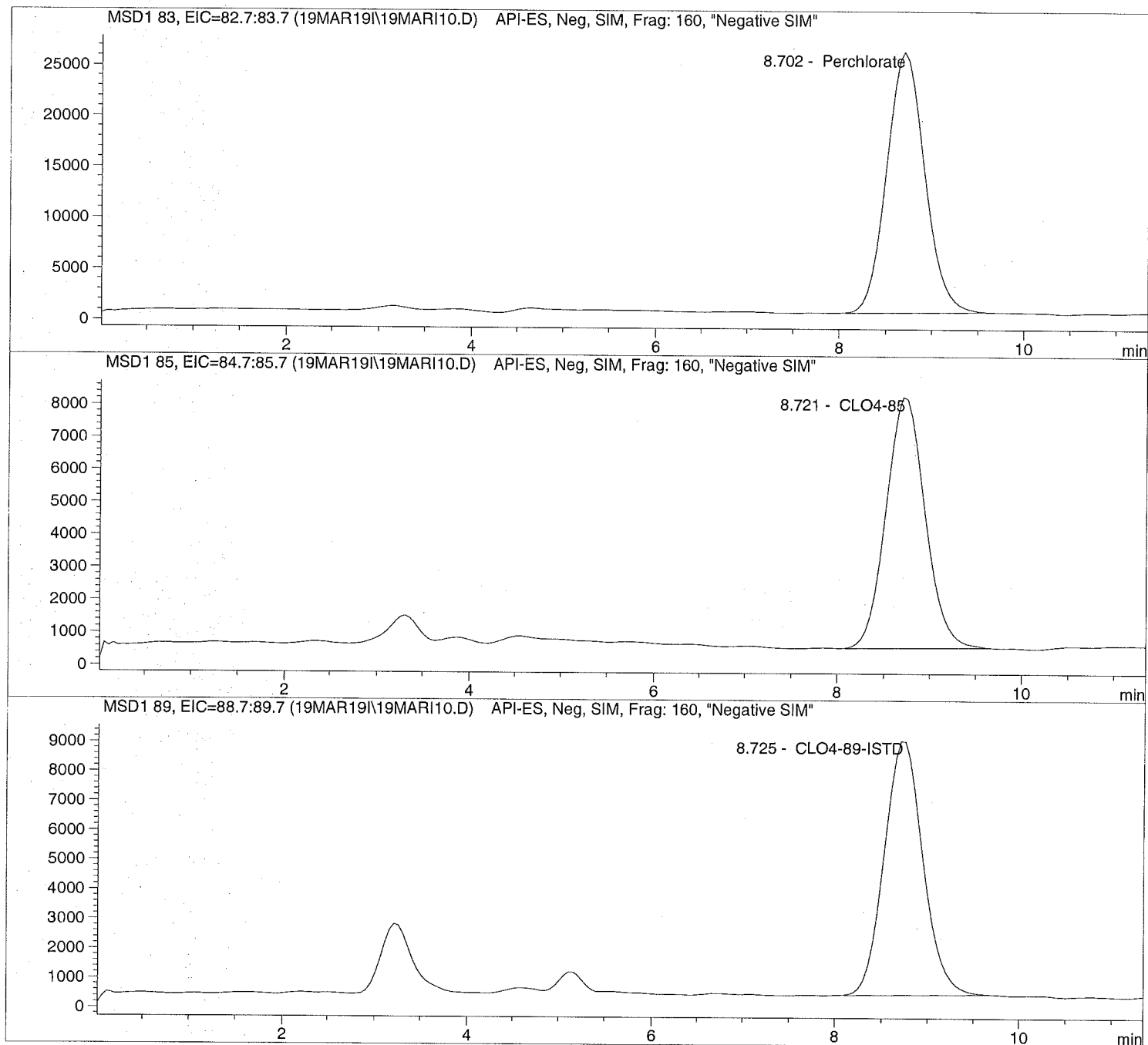
*** End of Report ***

Injection Date: 3/19/2019 11:12:42
Sample Name: ICAL Verf@10ug/L
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D

Sample Name: ICAL Verf@10ug/L

Injection Date: 3/19/2019 11:12:42

Seq Line: 10

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal

Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

*** End of Report ***



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

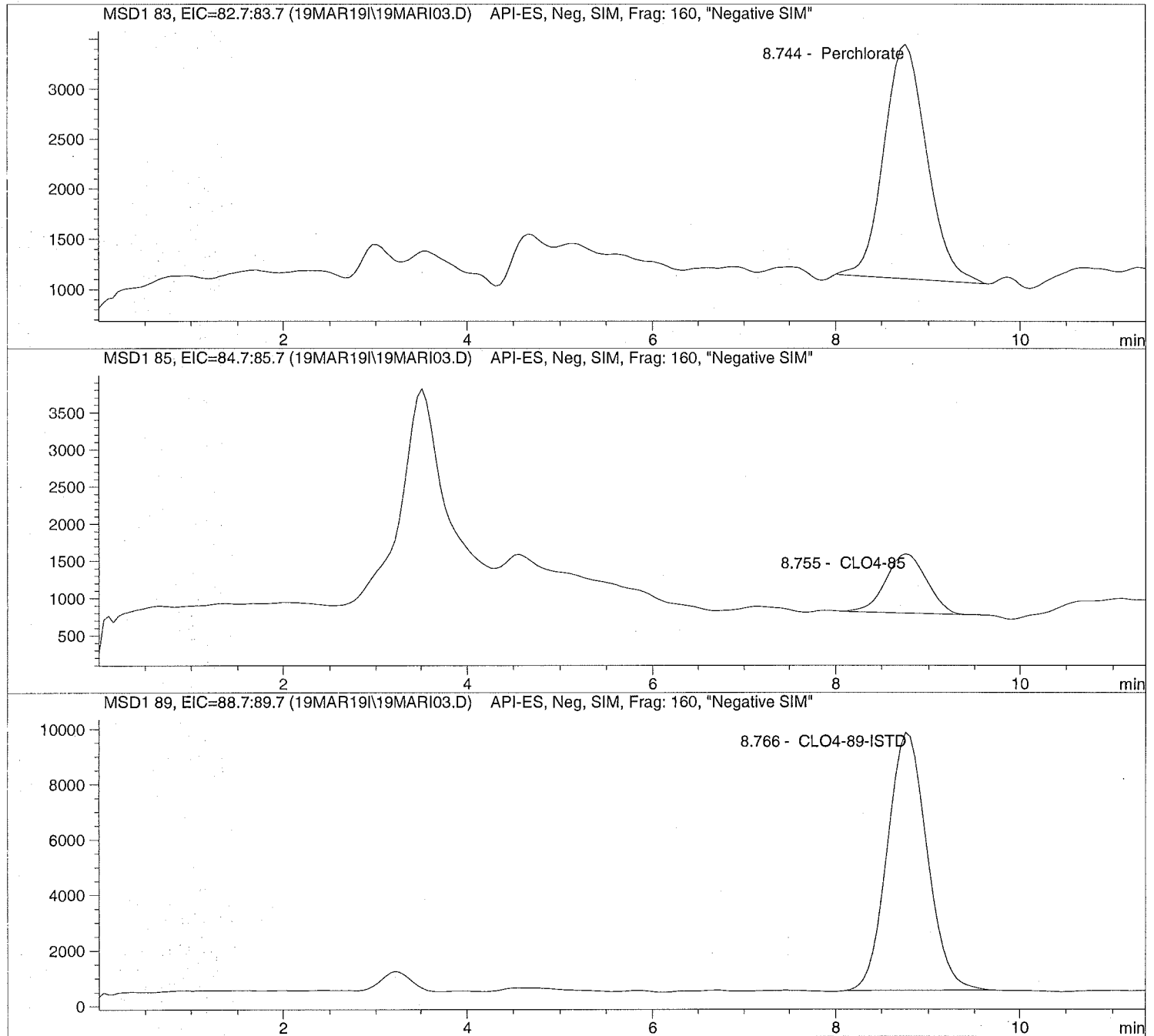
Unmodified

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:38:25

Perchlorate analysis



=====

Injection Date:	3/19/2019 09:39:40	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-DP2.M
Last Changed: 3/19/2019 14:38:25

Perchlorate analysis

=====

Sample Information

=====

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.744	BBA	74166.3	1.0224	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	BBA	24138.1	0.9487	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

=====

*** End of Report ***

=====



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

May 15, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19050138**

Laboratory Results for: **Longhorn GW Treatment Plant Bi-Weekly Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on May 02, 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: DAYNA.FISHER

RJ Modashia
Project Manager



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

May 23, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19050397**

Laboratory Results for: **LH18/24 Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on May 08, 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



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May 23, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19050398**

Laboratory Results for: **LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples**

Dear Marcia,

ALS Environmental received 3 sample(s) on May 08, 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



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May 23, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19050401**

Laboratory Results for: **LH18/24 GW Treatment Plant Monthly Influent Samples**

Dear Marcia,

ALS Environmental received 1 sample(s) on May 08, 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



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June 03, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19050886**

Laboratory Results for: **LH18/24 Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on May 15, 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



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May 29, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19050920**

Laboratory Results for: **LHAAP 18 24**

Dear Marcia,

ALS Environmental received 2 sample(s) on May 15, 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



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June 03, 2019

Marcia Olive
Bhate Environmental Associates, Inc.
445 Union Blvd Ste 129
Lakewood, CO 80228

Work Order: **HS19051289**

Laboratory Results for: **LH18/24 Longhorn GW Treatment Plant Weekly Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on May 22, 2019 for the analysis presented in the following report.

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

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

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

Sincerely,

Generated By: JUMOKE.LAWAL

RJ Modashia
Project Manager

ALS Houston, US

Date: 03-jun-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19051289

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19051289-01	LH18/24-SP650_052119	Water		21-May-2019 14:00	22-May-2019 09:20	<input type="checkbox"/>
HS19051289-02	LH18/24-SP650_052119_BIX	Water		21-May-2019 14:00	22-May-2019 09:20	<input type="checkbox"/>

ALS Houston, US

Date: 03-Jun-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order:

CASE NARRATIVE

Work Order Comments

- 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 Holland, MI. Final report attached.
-

WetChemistry by Method E365.3**Batch ID: R339400**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

WetChemistry by Method E350.3**Batch ID: R339366**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

ALS Houston, US

Date: 03-Jun-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
 Sample ID: LH18/24-SP650_052119
 Collection Date: 21-May-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19051289
 Lab ID:HS19051289-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
AMMONIA AS N BY E350.3(ISE)		Method:E350.3					Analyst: RG	
Nitrogen, Ammonia (As N)	11		0.20	0.10	0.20	mg/L	1	29-May-2019 11:30
ORTHO PHOSPHATE (PO4) AS P BY E365.3		Method:E365.3					Analyst: KVL	
Phosphorus, Total Orthophosphate (As P)	2.47		0.100	0.200	0.250	mg/L	10	22-May-2019 18:19
SUBCONTRACT ANALYSIS - TOC ANALYSIS		Method:NA					Analyst: SUBK	
Subcontract Analysis	See Attached		0	0		NA	1	31-May-2019 09:09

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

ALS Houston, US

Date: 03-Jun-19

Client:	Bhate Environmental Associates, Inc.	ANALYTICAL REPORT
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS19051289
Sample ID:	LH18/24-SP650_052119_BIX	Lab ID:HS19051289-02
Collection Date:	21-May-2019 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	03-Jun-2019 09:25

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

ALS Houston, US

Date: 03-Jun-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19051289

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R339366	Test Name : AMMONIA AS N BY E350.3(ISE)			Matrix: Water		
HS19051289-01	LH18/24-SP650_052119	21 May 2019 14:00			29 May 2019 11:30	1
Batch ID R339400	Test Name : ORTHO PHOSPHATE (PO4) AS P BY E365.3			Matrix: Water		
HS19051289-01	LH18/24-SP650_052119	21 May 2019 14:00			22 May 2019 18:19	10
Batch ID R339529	Test Name : SUBCONTRACT ANALYSIS - TOC ANALYSIS			Matrix: Water		
HS19051289-01	LH18/24-SP650_052119	21 May 2019 14:00			31 May 2019 09:09	1
Batch ID R339630	Test Name : SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			Matrix: Water		
HS19051289-02	LH18/24-SP650_052119_BIX	21 May 2019 14:00			03 Jun 2019 09:25	1

ALS Houston, US

Date: 03-Jun-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19051289

QC BATCH REPORT

Batch ID: R339366 (0)		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
MBLK	Sample ID: MBLK-R339366	Units: mg/L		Analysis Date: 29-May-2019 11:30						
Client ID:	Run ID: WetChem_HS_339366		SeqNo: 5096552		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.10	0.20								U
LCS	Sample ID: LCS-R339366	Units: mg/L		Analysis Date: 29-May-2019 11:30						
Client ID:	Run ID: WetChem_HS_339366		SeqNo: 5096551		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.48	0.20	10	0	105	85 - 115				
MS	Sample ID: HS19051199-01MS	Units: mg/L		Analysis Date: 29-May-2019 11:30						
Client ID:	Run ID: WetChem_HS_339366		SeqNo: 5096554		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.69	0.20	10	0.3169	104	80 - 120				
MSD	Sample ID: HS19051199-01MSD	Units: mg/L		Analysis Date: 29-May-2019 11:30						
Client ID:	Run ID: WetChem_HS_339366		SeqNo: 5096553		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.81	0.20	10	0.3169	105	80 - 120	10.69	1.12	20	
The following samples were analyzed in this batch: HS19051289-01										

ALS Houston, US

Date: 03-Jun-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19051289

QC BATCH REPORT

Batch ID: R339400 (0)		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3					
MBLK	Sample ID: MBLK-R339400	Units: mg/L		Analysis Date: 22-May-2019 18:19					
Client ID:	Run ID: UV-2450_339400		SeqNo: 5097260		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.0200	0.0250							U
LCS	Sample ID: LCS-R339400	Units: mg/L		Analysis Date: 22-May-2019 18:19					
Client ID:	Run ID: UV-2450_339400		SeqNo: 5097259		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.248	0.0250	0.25	0	99.2	85 - 115			
MS	Sample ID: HS19051289-01MS	Units: mg/L		Analysis Date: 22-May-2019 18:19					
Client ID: LH18/24-SP650_052119	Run ID: UV-2450_339400		SeqNo: 5097262		PrepDate:		DF: 10		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	5.03	0.250	2.5	2.47	102	80 - 120			
MSD	Sample ID: HS19051289-01MSD	Units: mg/L		Analysis Date: 22-May-2019 18:19					
Client ID: LH18/24-SP650_052119	Run ID: UV-2450_339400		SeqNo: 5097261		PrepDate:		DF: 10		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	4.98	0.250	2.5	2.47	100	80 - 120	5.03	0.999	20
The following samples were analyzed in this batch: HS19051289-01									

ALS Houston, US

Date: 03-Jun-19

Client:	Bhate Environmental Associates, Inc.	QUALIFIERS, ACRONYMS, UNITS
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19051289	

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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020
Texas	TX104704231-19-23	30-Apr-2020

Client:	Bhate Environmental Associates, Inc.	SAMPLE TRACKING
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
Work Order:	HS19051289	

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19051289-01	LH18/24-SP650_052119	Login	22/05/2019 11:49:20	NDR	WET250
HS19051289-01	LH18/24-SP650_052119	Login	22/05/2019 11:49:20	NDR	WET250
HS19051289-01	LH18/24-SP650_052119	Login	22/05/2019 11:49:20	NDR	Sub
HS19051289-02	LH18/24-SP650_052119_BIX	Login	22/05/2019 11:49:20	NDR	Sub

ALS Houston, US

Date: 03-Jun-19

Sample Receipt Checklist

Client Name: Bhate Environmental
 Work Order: HS19051289

Date/Time Received: **22-May-2019 09:20**
 Received by: **NDR**

Checklist completed by: Nilesh D. Ranchod 22-May-2019
 eSignature Date

Reviewed by: RJ Modashia 22-May-2019
 eSignature Date

Matrices: **Water**

Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:N/A
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	3.0C /3.0c UC/C IR25		
Cooler(s)/Kit(s):	43734		
Date/Time sample(s) sent to storage:	05/22/2019 12:30PM		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:

Fax: 205-918-4050

Chain of Custody and Analytical Request

CQC Number(1):

LIMS Number: _____

Facility/Base I.D.: LHAAP

Project/Site Name: LHAAP / GWT^P

Client Name:

Collected by: **Scott Beesinger**

[illegible]

COMMENTS:

STANDARD TAT

HS19051289

Bhate Environmental Associates, Inc.
118/24 Longhorn GW Treatment Plant Weekly Samp

Custody Transfers Prior to Receipt by Laboratory			Sample Delivered Details / Laboratory Receipt		
Surrendered By (Signed)	Date	Time	Received by (signed)	Date	Time
<u>[Signature]</u>	<u>5/21/9</u>	<u>1430</u>	<u>Nicole R. [Signature]</u>	<u>5-22-19</u>	<u>09:20</u>
1. _____			1. _____		
2. _____			2. _____		
3. _____			3. _____		
			Delivered Directly To Lab: _____ Method of Shipment: _____ Fed Ex Airbill Number: _____ Analytical Lab: ALS 10450 Standaft Rd. Suite 270 Houston, TX 77099 (H1) 530-5656 Lab Receipt #: _____ Delivery Date/Time: _____		
1.) Chain of Custody Number & date collected & custody number from OR as shown on _____					

1.) Chain of Custody Number = date collected + custody number (e.g. 09-02-1999-01)

2.) Sample Type (SA) Codes: N = Normal Sample, TB = Trip Blank (-s) Sample, FD = Field Duplicate (-s) Samples, FR = Field Replicate (-s) Samples, EB = Equipment Blank (-s) Samples, MS = Matrix Spike, SD = Matrix Spike Duplicate, AB = Ambient Blank (-s)

5.) Sample Number: Unique sample number collected from a north direction to south. (1) Sample, 1B = Trip Blank (2) Sample, FD = Field Duplicate (3) Samples, FR = Field Replicate (4) Samples, EB = Equipment Blank (5) Samples, MS = Matrix Spike, SD = Matrix Spike Duplicate, AB = Ambient Blank (6)

4.) Matrix Codes: GS = Soil Gas, WG = Groundwater, MX = Surface Material, etc.



S.) Sample Analysis Requested: Acetic Acid, Methanol, and Toluene, in Water

5. Sample Analysis Requested: Analytical method requested and number of containers provided for each.

6.) Quality assurance samples are assigned by date (ddmmyy) and the sample number associated with the sample (01, 02, etc) (e.g. Equipment blank collected in association with MYW-1 on 10/10/99 will be designated 10109901 in the Equipment Blank Log of Control).

TEMP 41C 3.0

1K X 25

 ALS 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	CUSTOMER SEAL		Seal Broken By:  Date: 05/22/19
	Date: 5/21/19	Time: 1430	
	Name: Scott Beesiner		
	Company: BHATE		

43734

MAY 22 2019



Must Deliver Next Business Day
Time and Temperature Sensitive!

43734

ORIGIN ID: SGRA (303) 587-2450
 SCOTT BEESINER
 BHATE ENVIRONMENTAL ASSOCIATES
 1203-B EAST GRAND AVE. PMB202
 MARSHALL, TX 75670
 UNITED STATES US

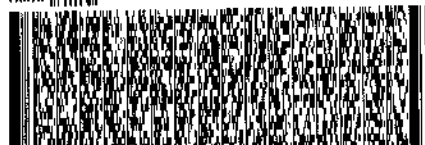
SHIP DATE: 02MAY19
 ACTWGT: 1.00 LB MAN
 CAD: 300130/CAFE9211
 DIMS: 26x14x14 IN

TO **CLIENT SERVICES**
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON TX 77099

(281) 530-5656

REF: LONGHORN GW TREATMENT PLANT - BO 65296 - RJ

RMA: 11111111

FedEx
Express

FedEx
 4809 7833 4599

WED - 22 MAY 10:30A
 PRIORITY OVERNIGHT

AB SGRA

77099
 TX-US
 IAH



FTP 162785 21MAY19 GCGA 553C1/D66C/MCBA



ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

May 31, 2019

Analytical Report for Service Request No: K1904714

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

RE: HS19051289

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory May 23, 2019
For your reference, these analyses have been assigned our service request number **K1904714**.

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
Project Manager



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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.pjllabs.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/bsdwlabservice.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/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
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Phone (360)577- 7222 Fax (360)636- 1068
www.alsglobal.com



Client: ALS Environmental - US
Project: HS19051289
Sample Matrix: Water

Service Request: K1904714
Date Received: 05/23/2019

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:

One water sample was received for analysis at ALS Environmental on 05/23/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The sample was stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by

Kelley Duvjey

Date

05/31/2019



Chain of Custody

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Subcontract Chain of Custody

SAMPLING STATE: Dept of Defense

COC ID: 11350

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 Standliff 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 Standliff Rd, Ste 210
Phone: +1 281 530 5656
Reference: HS19051289
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19051289-01	LH18/24-SP650_052119	Water	21 May 2019 14:00
TOC Analysis for DOD Level IV			31 May 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: J. M. M. M.
Received By: N. Pedersen
Cooler ID(s): _____

Date/Time: 5/22/19 18:00
Date/Time: 5-23-19 9:50
Temperature(s): _____

RIGHT SOLUTIONS | RIGHT PARTNER

11 May 2019

Page 1 of 1



Cooler Receipt and Preservation Form

Client AIS Houston Service Request K19Received: 5.23.19 Opened: 5.23.19 By: NP Unloaded: 5.23.19 By: NP

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	0.5				0.2	11350	4809 7834 1763	

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:

RUSH



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
Project: HS19051289
Sample Matrix: Water
Analysis Method: SM 5310 C
Prep Method: None

Service Request: K1904714
Date Collected: 05/21/19
Date Received: 05/23/19
Units: mg/L
Basis: NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_052119	K1904714-001	1.65	0.50	0.20	0.07	1	05/24/19 16:28	
Method Blank	K1904714-MB	ND U	0.50	0.20	0.07	1	05/24/19 13:50	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project HS19051289
Sample Matrix: Water

Service Request: K1904714
Date Collected: 05/21/19
Date Received: 05/23/19
Date Analyzed: 05/24/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name: LH18/24-SP650_052119
Lab Code: K1904714-001

Units: mg/L
Basis: NA

Analyte Name	Analysis Method	LOQ	LOD	MDL	Sample Result	Duplicate Sample K1904714-001DUP	Average	RPD	RPD Limit
						Result			
Carbon, Total Organic	SM 5310 C	0.50	0.20	0.07	1.65	1.68	1.67	2	10

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.

QA/QC Report

Client: ALS Environmental - US
Project: HS19051289
Sample Matrix: Water

Service Request: K1904714
Date Analyzed: 05/24/19
Date Extracted: NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 636915

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1904714-LCS	25.1	25.0	100	83-117

Client: ALS Environmental - US
Project: HS19051289

Service Request: K1904714

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	636915	KQ1907129-01	05/24/19 13:21	25.0	24.6	98	90-110
CCV2	636915	KQ1907129-02	05/24/19 17:25	25.0	24.5	98	90-110
CCV3	636915	KQ1907129-03	05/24/19 22:07	25.0	24.1	96	90-110
CCV4	636915	KQ1907129-04	05/25/19 03:05	25.0	23.6	94	90-110

Client: ALS Environmental - US
Project: HS19051289

Service Request: K1904714

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	636915	KQ1907129-05	05/24/19 13:36	0.50	0.20	0.07	ND	U
CCB2	636915	KQ1907129-06	05/24/19 17:39	0.50	0.20	0.07	ND	U
CCB3	636915	KQ1907129-07	05/24/19 22:50	0.50	0.20	0.07	ND	U
CCB4	636915	KQ1907129-08	05/25/19 03:19	0.50	0.20	0.07	ND	U



Raw Data

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General Chemistry

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Work Request # (Original) K1904547, 4594, 4614, 468, 4667, 470, 4714, 4716, 4679, 4715, 4597, 473, 4684, 4686, 4718
 Tier: II II II II II II IV III II IV II IV III IV III
 Date Analyzed: 5/24/19 TOC: 636915, 636916, 636917
 Analyst: BCP Run # DOC: 636919
 Analysis: 5/24/19 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: K1904618-2/3/4 and K1904667-1 are overdiluted, and have been sent for reanalysis, K1904716-1/1d, K1904594-4/4d, K1904594-5/5d, K1904716-1/1d, K1904718-1/1d, and K1904718-2/2d report a high % RSD. However these samples are less than 5x the MRL.

Final Approved by: Francis

Date: 05/29/19

DQREPORT

Analytical Results Summary

00938352

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot:

636915

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?
K1904547-001	Carbon, Total Organic	N/A		Water	17.90 mg/L	10 mL	3580 mg/L	200	20	100			5/25/19 00:44:00	N
K1904594-001	Carbon, Total Organic	N/A		Ground Water	7.02 mg/L	10 mL	7.02 mg/L	1	0.07	0.50			5/24/19 16:57:00	N
K1904594-002	Carbon, Total Organic	N/A		Ground Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/24/19 17:54:00	N
K1904594-003	Carbon, Total Organic	N/A		Ground Water	0.20 mg/L	10 mL	0.20 mg/L	J 1	0.07	0.50			5/24/19 18:22:00	N
K1904594-004	Carbon, Total Organic	N/A		Ground Water	0.47 mg/L	10 mL	0.47 mg/L	J 1	0.07	0.50			5/24/19 18:50:00	N
K1904594-005	Carbon, Total Organic	N/A		Ground Water	0.42 mg/L	10 mL	0.42 mg/L	J 1	0.07	0.50			5/24/19 19:18:00	N
K1904594-006	Carbon, Total Organic	N/A		Ground Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/24/19 19:46:00	N
K1904614-001	Carbon, Total Organic	N/A		Water	1.65 mg/L	10 mL	1.65 mg/L	1	0.07	0.50			5/24/19 20:14:00	N
K1904614-002	Carbon, Total Organic	N/A		Water	1.46 mg/L	10 mL	1.46 mg/L	1	0.07	0.50			5/24/19 20:43:00	N
K1904618-001	Carbon, Total Organic	N/A		Water	0.95 mg/L	10 mL	95 mg/L	100	7	50			5/24/19 21:11:00	N
K1904618-002	Carbon, Total Organic	N/A		Water	0.47 mg/L	10 mL	47 mg/L	J 100	7	50			5/24/19 21:39:00	Y
K1904618-003	Carbon, Total Organic	N/A		Water	0.48 mg/L	10 mL	48 mg/L	J 100	7	50			5/24/19 22:07:00	N
K1904618-004	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	50 mg/L	U 100	7	50			5/24/19 23:34:00	N
K1904667-001	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	50 mg/L	U 100	7	50			5/25/19 01:12:00	N
K1904667-002	Carbon, Total Organic	N/A		Water	2.06 mg/L	10 mL	2.06 mg/L	1	0.07	0.50			5/25/19 01:40:00	N
K1904710-001	Carbon, Total Organic	N/A		Water	2.21 mg/L	10 mL	2.21 mg/L	1	0.07	0.50			5/24/19 15:32:00	N
K1904710-002	Carbon, Total Organic	N/A		Water	2.24 mg/L	10 mL	2.24 mg/L	1	0.07	0.50			5/24/19 16:00:00	N
K1904714-001	Carbon, Total Organic	N/A		Water	1.65 mg/L	10 mL	1.65 mg/L	1	0.07	0.50			5/24/19 16:28:00	N
K1904716-001	Carbon, Total Organic	N/A		Ground Water	0.15 mg/L	10 mL	0.15 mg/L	J 1	0.07	0.50			5/24/19 14:35:00	Y
KQ1907129-01	Carbon, Total Organic	CCV		Ground Water	24.62 mg/L	10 mL	24.6 mg/L	1					5/24/19 13:21:00	N
KQ1907129-02	Carbon, Total Organic	CCV		Ground Water	24.54 mg/L	10 mL	24.5 mg/L	1					5/24/19 17:25:00	N
KQ1907129-03	Carbon, Total Organic	CCV		Ground Water	24.11 mg/L	10 mL	24.1 mg/L	1					5/24/19 22:07:00	N
KQ1907129-04	Carbon, Total Organic	CCV		Ground Water	23.57 mg/L	10 mL	23.6 mg/L	1					5/25/19 03:05:00	N
KQ1907129-05	Carbon, Total Organic	CCB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/24/19 13:36:00	N
KQ1907129-06	Carbon, Total Organic	CCB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/24/19 17:39:00	N
KQ1907129-07	Carbon, Total Organic	CCB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/24/19 22:50:00	N
KQ1907129-08	Carbon, Total Organic	CCB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/25/19 03:19:00	N

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Printed 5/29/19 13:23

34 of 168 Results Summary

05/29/19
Jain

Analytical Results Summary

00938353

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot:

636915

Method/Testcode: SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	POL	% Rec	% RSD	Date Analyzed	QC? T
KQ1907129-09	Carbon, Total Organic	MB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/24/19 13:50:00	N
KQ1907129-10	Carbon, Total Organic	LCS		Ground Water	25.12 mg/L	10 mL	25.1 mg/L	1	0.07	0.50	100		5/24/19 14:05:00	N
KQ1907129-11	Carbon, Total Organic	MS	K1904716-001	Ground Water	25.06 mg/L	10 mL	25.1 mg/L	1	0.07	0.50	100		5/24/19 15:03:00	N
KQ1907129-12	Carbon, Total Organic	MS	K1904618-002	Water	26.07 mg/L	10 mL	2610 mg/L	100	7	50	102		5/25/19 00:02:00	N
KQ1907129-13	Carbon, Total Organic	DUP	K1904716-001	Ground Water	0.11 mg/L	10 mL	0.11 mg/L J	1	0.07	0.50		32*	5/24/19 14:35:00	N
KQ1907129-14	Carbon, Total Organic	DUP	K1904710-001	Water	2.25 mg/L	10 mL	2.25 mg/L	1	0.07	0.50		2	5/24/19 15:32:00	N
KQ1907129-15	Carbon, Total Organic	DUP	K1904710-002	Water	2.22 mg/L	10 mL	2.22 mg/L	1	0.07	0.50		<1	5/24/19 16:00:00	N
KQ1907129-16	Carbon, Total Organic	DUP	K1904714-001	Water	1.68 mg/L	10 mL	1.68 mg/L	1	0.07	0.50		2	5/24/19 16:28:00	N
KQ1907129-17	Carbon, Total Organic	DUP	K1904594-001	Ground Water	7.00 mg/L	10 mL	7.00 mg/L	1	0.07	0.50		<1	5/24/19 16:57:00	N
KQ1907129-18	Carbon, Total Organic	DUP	K1904594-002	Ground Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	5/24/19 17:54:00	N
KQ1907129-19	Carbon, Total Organic	DUP	K1904594-003	Ground Water	0.21 mg/L	10 mL	0.21 mg/L J	1	0.07	0.50		2	5/24/19 18:22:00	N
KQ1907129-20	Carbon, Total Organic	DUP	K1904594-004	Ground Water	0.27 mg/L	10 mL	0.27 mg/L J	1	0.07	0.50		54*	5/24/19 18:50:00	N
KQ1907129-21	Carbon, Total Organic	DUP	K1904594-005	Ground Water	0.32 mg/L	10 mL	0.32 mg/L J	1	0.07	0.50		27*	5/24/19 19:18:00	N
KQ1907129-22	Carbon, Total Organic	DUP	K1904594-006	Ground Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	5/24/19 19:46:00	N
KQ1907129-23	Carbon, Total Organic	DUP	K1904614-001	Water	1.62 mg/L	10 mL	1.62 mg/L	1	0.07	0.50		2	5/24/19 20:14:00	N
KQ1907129-24	Carbon, Total Organic	DUP	K1904614-002	Water	1.46 mg/L	10 mL	1.46 mg/L	1	0.07	0.50		<1	5/24/19 20:43:00	N
KQ1907129-25	Carbon, Total Organic	DUP	K1904618-001	Water	0.98 mg/L	10 mL	98 mg/L	100	7	50		3	5/24/19 21:11:00	N
KQ1907129-26	Carbon, Total Organic	DUP	K1904618-002	Water	0.47 mg/L	10 mL	47 mg/L J	100	7	50		<1	5/24/19 21:39:00	N
KQ1907129-27	Carbon, Total Organic	DUP	K1904618-003	Water	0.47 mg/L	10 mL	47 mg/L J	100	7	50		3	5/24/19 22:07:00	N
KQ1907129-28	Carbon, Total Organic	DUP	K1904618-004	Water	0.00 mg/L	10 mL	50 mg/L U	100	7	50		NC	5/24/19 23:34:00	N
KQ1907129-29	Carbon, Total Organic	DUP	K1904547-001	Water	17.64 mg/L	10 mL	3530 mg/L	200	20	100		1	5/25/19 00:44:00	N
KQ1907129-30	Carbon, Total Organic	DUP	K1904667-001	Water	0.00 mg/L	10 mL	50 mg/L U	100	7	50		NC	5/25/19 01:12:00	N
KQ1907129-31	Carbon, Total Organic	DUP	K1904667-002	Water	2.07 mg/L	10 mL	2.07 mg/L	1	0.07	0.50		<1	5/25/19 01:40:00	N

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

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Analytical Results Summary

00938354

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot:

636916

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?
K1904679-001	Carbon, Total Organic	N/A		Water	11.53 mg/L	10 mL	57.6 mg/L	5	0.4	2.5			5/25/19 02:08:00	N
K1904679-002	Carbon, Total Organic	N/A		Water	1.25 mg/L	10 mL	12.5 mg/L	10	0.7	5.0			5/25/19 02:37:00	N
K1904679-003	Carbon, Total Organic	N/A		Water	0.87 mg/L	10 mL	0.87 mg/L	1	0.07	0.50			5/25/19 03:34:00	N
K1904679-004	Carbon, Total Organic	N/A		Water	0.42 mg/L	10 mL	0.42 mg/L	J 1	0.07	0.50			5/25/19 04:02:00	N
K1904715-001	Carbon, Total Organic	N/A		Water	2.96 mg/L	10 mL	2.96 mg/L	1	0.07	0.50			5/25/19 04:30:00	N
K1904715-002	Carbon, Total Organic	N/A		Water	3.88 mg/L	10 mL	3.88 mg/L	1	0.07	0.50			5/25/19 04:58:00	N
K1904715-003	Carbon, Total Organic	N/A		Water	2.91 mg/L	10 mL	2.91 mg/L	1	0.07	0.50			5/25/19 05:26:00	N
K1904715-004	Carbon, Total Organic	N/A		Water	1.08 mg/L	10 mL	1.08 mg/L	1	0.07	0.50			5/25/19 05:55:00	N
K1904715-005	Carbon, Total Organic	N/A		Water	1.09 mg/L	10 mL	1.09 mg/L	1	0.07	0.50			5/25/19 06:23:00	N
K1904715-006	Carbon, Total Organic	N/A		Water	2.95 mg/L	10 mL	2.95 mg/L	1	0.07	0.50			5/25/19 06:51:00	Y
K1904715-007	Carbon, Total Organic	N/A		Water	3.04 mg/L	10 mL	3.04 mg/L	1	0.07	0.50			5/25/19 08:47:00	N
K1904715-008	Carbon, Total Organic	N/A		Water	4.20 mg/L	10 mL	4.20 mg/L	1	0.07	0.50			5/25/19 09:15:00	N
K1904715-009	Carbon, Total Organic	N/A		Water	1.37 mg/L	10 mL	1.37 mg/L	1	0.07	0.50			5/25/19 09:43:00	N
KQ1907130-01	Carbon, Total Organic	CCV		Water	24.11 mg/L	10 mL	24.1 mg/L	1					5/25/19 22:35:00	N
KQ1907130-02	Carbon, Total Organic	CCV		Water	23.57 mg/L	10 mL	23.6 mg/L	1					5/25/19 03:05:00	N
KQ1907130-03	Carbon, Total Organic	CCV		Water	23.98 mg/L	10 mL	24.0 mg/L	1					5/25/19 07:48:00	N
KQ1907130-04	Carbon, Total Organic	CCV		Water	24.37 mg/L	10 mL	24.4 mg/L	1					5/25/19 12:05:00	N
KQ1907130-05	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/25/19 22:50:00	N
KQ1907130-06	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/25/19 03:19:00	N
KQ1907130-07	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/25/19 08:03:00	N
KQ1907130-08	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/25/19 12:20:00	N
KQ1907130-09	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/25/19 23:04:00	N
KQ1907130-10	Carbon, Total Organic	LCS		Water	24.46 mg/L	10 mL	24.5 mg/L	1	0.07	0.50	98		5/25/19 23:19:00	N
KQ1907130-11	Carbon, Total Organic	MS	K1904715-006	Water	28.02 mg/L	10 mL	28.0 mg/L	1	0.07	0.50	100		5/25/19 07:19:00	N
KQ1907130-12	Carbon, Total Organic	DUP	K1904679-001	Water	11.27 mg/L	10 mL	56.4 mg/L	5	0.4	2.5		2	5/25/19 02:08:00	N
KQ1907130-13	Carbon, Total Organic	DUP	K1904679-002	Water	1.22 mg/L	10 mL	12.2 mg/L	10	0.7	5.0		3	5/25/19 02:37:00	N
KQ1907130-14	Carbon, Total Organic	DUP	K1904679-003	Water	0.95 mg/L	10 mL	0.95 mg/L	1	0.07	0.50		9	5/25/19 03:34:00	N
KQ1907130-15	Carbon, Total Organic	DUP	K1904679-004	Water	0.41 mg/L	10 mL	0.41 mg/L	J 1	0.07	0.50		2	5/25/19 04:02:00	N
KQ1907130-16	Carbon, Total Organic	DUP	K1904715-001	Water	2.94 mg/L	10 mL	2.94 mg/L	1	0.07	0.50		<1	5/25/19 04:30:00	N
KQ1907130-17	Carbon, Total Organic	DUP	K1904715-002	Water	3.90 mg/L	10 mL	3.90 mg/L	1	0.07	0.50		<1	5/25/19 04:58:00	N
KQ1907130-18	Carbon, Total Organic	DUP	K1904715-003	Water	2.90 mg/L	10 mL	2.90 mg/L	1	0.07	0.50		<1	5/25/19 05:26:00	N
KQ1907130-19	Carbon, Total Organic	DUP	K1904715-004	Water	1.08 mg/L	10 mL	1.08 mg/L	1	0.07	0.50		<1	5/25/19 05:55:00	N
KQ1907130-20	Carbon, Total Organic	DUP	K1904715-005	Water	1.06 mg/L	10 mL	1.06 mg/L	1	0.07	0.50		3	5/25/19 06:23:00	N
KQ1907130-21	Carbon, Total Organic	DUP	K1904715-006	Water	2.90 mg/L	10 mL	2.90 mg/L	1	0.07	0.50		2	5/25/19 06:51:00	N
KQ1907130-22	Carbon, Total Organic	DUP	K1904715-007	Water	2.98 mg/L	10 mL	2.98 mg/L	1	0.07	0.50		2	5/25/19 08:47:00	N
KQ1907130-23	Carbon, Total Organic	DUP	K1904715-008	Water	4.13 mg/L	10 mL	4.13 mg/L	1	0.07	0.50		2	5/25/19 09:15:00	N

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:** 636916 **Method/Testcode:** SM 5310 C/TOC T

<u>Lab Code</u>	<u>Target Analytes</u>	<u>QC</u>	<u>Parent Sample</u>	<u>Matrix</u>	<u>Raw Result</u>	<u>Sample Amt.</u>	<u>Final Result</u>	<u>Dil</u>	<u>MDL</u>	<u>PQL</u>	<u>% Rec</u>	<u>% RSD</u>	<u>Date Analyzed</u>	<u>QC?</u>	<u>Tier</u>
KQ1907130-24	Carbon, Total Organic	DUP	K1904715-009	Water	1.37 mg/L	10 mL	1.37 mg/L	1	0.07	0.50		<1	5/25/19 09:43:00	N	IV

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 636917 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?
K1904597-001	Carbon, Total Organic	N/A		Water	8.03 mg/L	10 mL	803 mg/L	100	7	50			5/25/19 13:59:00	N
K1904597-002	Carbon, Total Organic	N/A		Water	7.05 mg/L	10 mL	705 mg/L	100	7	50			5/25/19 14:27:00	N
K1904713-001	Carbon, Total Organic	N/A		Ground Water	1.27 mg/L	10 mL	1.27 mg/L	1	0.07	0.50			5/25/19 15:23:00	N
K1904713-002	Carbon, Total Organic	N/A		Ground Water	1.45 mg/L	10 mL	1.45 mg/L	1	0.07	0.50			5/25/19 15:51:00	N
K1904713-003	Carbon, Total Organic	N/A		Ground Water	0.70 mg/L	10 mL	0.70 mg/L	1	0.07	0.50			5/25/19 16:19:00	N
K1904713-004	Carbon, Total Organic	N/A		Ground Water	1.59 mg/L	10 mL	1.59 mg/L	1	0.07	0.50			5/25/19 16:47:00	N
K1904715-011	Carbon, Total Organic	N/A		Water	1.33 mg/L	10 mL	1.33 mg/L	1	0.07	0.50			5/25/19 10:12:00	Y
K1904715-016	Carbon, Total Organic	N/A		Water	8.57 mg/L	10 mL	8.57 mg/L	1	0.07	0.50			5/25/19 11:09:00	N
K1904715-017	Carbon, Total Organic	N/A		Water	6.24 mg/L	10 mL	6.24 mg/L	1	0.07	0.50			5/25/19 11:37:00	N
K1904715-018	Carbon, Total Organic	N/A		Water	40.02 mg/L	10 mL	40.0 mg/L	1	0.07	0.50			5/25/19 12:34:00	N
K1904715-019	Carbon, Total Organic	N/A		Water	12.59 mg/L	10 mL	12.6 mg/L	1	0.07	0.50			5/25/19 13:03:00	N
K1904715-020	Carbon, Total Organic	N/A		Water	17.75 mg/L	10 mL	17.8 mg/L	1	0.07	0.50			5/25/19 13:31:00	N
KQ1907131-01	Carbon, Total Organic	CCV		Water	23.98 mg/L	10 mL	24.0 mg/L	1					5/25/19 07:48:00	N
KQ1907131-02	Carbon, Total Organic	CCV		Water	24.37 mg/L	10 mL	24.4 mg/L	1					5/25/19 12:05:00	N
KQ1907131-03	Carbon, Total Organic	CCV		Water	23.98 mg/L	10 mL	24.0 mg/L	1					5/25/19 17:15:00	N
KQ1907131-04	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/25/19 08:03:00	N
KQ1907131-05	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/25/19 12:20:00	N
KQ1907131-06	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/25/19 17:30:00	N
KQ1907131-07	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/25/19 08:18:00	N
KQ1907131-08	Carbon, Total Organic	LCS		Water	24.71 mg/L	10 mL	24.7 mg/L	1	0.07	0.50	99		5/25/19 08:32:00	N
KQ1907131-09	Carbon, Total Organic	MS	K1904715-011	Water	26.81 mg/L	10 mL	26.8 mg/L	1	0.07	0.50	102		5/25/19 10:40:00	N
KQ1907131-10	Carbon, Total Organic	DUP	K1904715-011	Water	1.30 mg/L	10 mL	1.30 mg/L	1	0.07	0.50		2	5/25/19 10:12:00	N
KQ1907131-11	Carbon, Total Organic	DUP	K1904715-016	Water	8.90 mg/L	10 mL	8.90 mg/L	1	0.07	0.50		4	5/25/19 11:09:00	N
KQ1907131-12	Carbon, Total Organic	DUP	K1904715-017	Water	6.27 mg/L	10 mL	6.27 mg/L	1	0.07	0.50		<1	5/25/19 11:37:00	N
KQ1907131-13	Carbon, Total Organic	DUP	K1904715-018	Water	40.34 mg/L	10 mL	40.3 mg/L	1	0.07	0.50		<1	5/25/19 12:34:00	N I
KQ1907131-14	Carbon, Total Organic	DUP	K1904715-019	Water	12.20 mg/L	10 mL	12.2 mg/L	1	0.07	0.50		3	5/25/19 13:03:00	N I
KQ1907131-15	Carbon, Total Organic	DUP	K1904715-020	Water	17.66 mg/L	10 mL	17.7 mg/L	1	0.07	0.50		<1	5/25/19 13:31:00	N I
KQ1907131-16	Carbon, Total Organic	DUP	K1904597-001	Water	7.76 mg/L	10 mL	776 mg/L	100	7	50		3	5/25/19 13:59:00	N
KQ1907131-17	Carbon, Total Organic	DUP	K1904597-002	Water	7.04 mg/L	10 mL	704 mg/L	100	7	50		<1	5/25/19 14:27:00	N
KQ1907131-18	Carbon, Total Organic	DUP	K1904713-001	Ground Water	1.28 mg/L	10 mL	1.28 mg/L	1	0.07	0.50		<1	5/25/19 15:23:00	N
KQ1907131-19	Carbon, Total Organic	DUP	K1904713-002	Ground Water	1.45 mg/L	10 mL	1.45 mg/L	1	0.07	0.50		<1	5/25/19 15:51:00	N I
KQ1907131-20	Carbon, Total Organic	DUP	K1904713-003	Ground Water	0.68 mg/L	10 mL	0.68 mg/L	1	0.07	0.50		3	5/25/19 16:19:00	N I

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:** 636917 **Method/Testcode:** SM 5310 C/TOC T

<u>Lab Code</u>	<u>Target Analytes</u>	<u>QC</u>	<u>Parent Sample</u>	<u>Matrix</u>	<u>Raw Result</u>	<u>Sample Amt.</u>	<u>Final Result</u>	<u>Dil</u>	<u>MDL</u>	<u>PQL</u>	<u>% Rec</u>	<u>% RSD</u>	<u>Date Analyzed</u>	<u>QC? T</u>
KQ1907131-21	Carbon, Total Organic	DUP	K1904713-004	Ground Water	1.55 mg/L	10 mL	1.55 mg/L	1	0.07	0.50		2	5/25/19 16:47:00	N

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: 636919 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?
K1904684-001	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	10.77 mg/L	10 mL	10.8 mg/L	1	0.07	0.50			5/25/19 19:11:00	N
K1904684-002	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	2.40 mg/L	10 mL	2.40 mg/L	1	0.07	0.50			5/25/19 19:39:00	Y
K1904684-003	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	2.77 mg/L	10 mL	2.77 mg/L	1	0.07	0.50			5/25/19 20:37:00	N
K1904684-004	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	8.57 mg/L	10 mL	8.57 mg/L	1	0.07	0.50			5/25/19 21:34:00	N
K1904686-001	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	4.98 mg/L	10 mL	4.98 mg/L	1	0.07	0.50			5/25/19 22:02:00	N
K1904686-002	Carbon, Dissolved Organic (DOC)	N/A		Ground Water	12.28 mg/L	10 mL	12.3 mg/L	1	0.07	0.50			5/25/19 22:31:00	N
K1904716-001	Carbon, Dissolved Organic (DOC)	N/A		Ground Water	0.26 mg/L	10 mL	0.26 mg/L	J 1	0.07	0.50			5/25/19 18:14:00	Y
K1904718-001	Carbon, Dissolved Organic (DOC)	N/A		Ground Water	0.47 mg/L	10 mL	0.47 mg/L	J 1	0.07	0.50			5/25/19 22:59:00	N
K1904718-002	Carbon, Dissolved Organic (DOC)	N/A		Ground Water	0.24 mg/L	10 mL	0.24 mg/L	J 1	0.07	0.50			5/25/19 23:27:00	N
KQ1907132-01	Carbon, Dissolved Organic (DOC)	CCV		Ground Water	23.98 mg/L	10 mL	24.0 mg/L	1					5/25/19 17:15:00	N
KQ1907132-02	Carbon, Dissolved Organic (DOC)	CCV		Ground Water	23.80 mg/L	10 mL	23.8 mg/L	1					5/25/19 21:05:00	N
KQ1907132-03	Carbon, Dissolved Organic (DOC)	CCV		Ground Water	23.87 mg/L	10 mL	23.9 mg/L	1					5/26/19 00:23:00	N
KQ1907132-04	Carbon, Dissolved Organic (DOC)	CCB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/25/19 17:30:00	N
KQ1907132-05	Carbon, Dissolved Organic (DOC)	CCB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/25/19 21:19:00	N
KQ1907132-06	Carbon, Dissolved Organic (DOC)	CCB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/26/19 00:38:00	N
KQ1907132-07	Carbon, Dissolved Organic (DOC)	MB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/25/19 17:45:00	N
KQ1907132-08	Carbon, Dissolved Organic (DOC)	LCS		Ground Water	24.79 mg/L	10 mL	24.8 mg/L	1	0.07	0.50	99		5/25/19 17:59:00	N
KQ1907132-09	Carbon, Dissolved Organic (DOC)	MS	K1904716-001	Ground Water	25.39 mg/L	10 mL	25.4 mg/L	1	0.07	0.50	101		5/25/19 18:42:00	N
KQ1907132-11	Carbon, Dissolved Organic (DOC)	DUP	K1904716-001	Ground Water	0.15 mg/L	10 mL	0.15 mg/L	J 1	0.07	0.50		54*	5/25/19 18:14:00	N
KQ1907132-16	Carbon, Dissolved Organic (DOC)	DUP	K1904686-001	Surface Water	4.91 mg/L	10 mL	4.91 mg/L	1	0.07	0.50		1	5/25/19 22:02:00	N
KQ1907132-17	Carbon, Dissolved Organic (DOC)	DUP	K1904686-002	Ground Water	12.23 mg/L	10 mL	12.2 mg/L	1	0.07	0.50		<1	5/25/19 22:31:00	N
KQ1907132-18	Carbon, Dissolved Organic (DOC)	DUP	K1904718-001	Ground Water	0.29 mg/L	10 mL	0.29 mg/L	J 1	0.07	0.50		48*	5/25/19 22:59:00	N
KQ1907132-19	Carbon, Dissolved Organic (DOC)	DUP	K1904718-002	Ground Water	0.28 mg/L	10 mL	0.28 mg/L	J 1	0.07	0.50		17*	5/25/19 23:27:00	N

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

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Results Summary05/29/19
Heavily

Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 636919 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?	Tie
KQ1907132-20	Carbon, Dissolved Organic MS (DOC)		K1904684-002	Surface Water	27.21 mg/L	10 mL	27.2 mg/L	1	0.07	0.50	99		5/25/19 20:08:00	N	I
KQ1907132-21	Carbon, Dissolved Organic DUP (DOC)		K1904684-001	Surface Water	10.94 mg/L	10 mL	10.9 mg/L	1	0.07	0.50		2	5/25/19 19:11:00	N	I
KQ1907132-22	Carbon, Dissolved Organic DUP (DOC)		K1904684-002	Surface Water	2.35 mg/L	10 mL	2.35 mg/L	1	0.07	0.50		2	5/25/19 19:39:00	N	II
KQ1907132-23	Carbon, Dissolved Organic DUP (DOC)		K1904684-003	Surface Water	2.79 mg/L	10 mL	2.79 mg/L	1	0.07	0.50		<1	5/25/19 20:37:00	N	II
KQ1907132-24	Carbon, Dissolved Organic DUP (DOC)		K1904684-004	Surface Water	8.94 mg/L	10 mL	8.94 mg/L	1	0.07	0.50		4	5/25/19 21:34:00	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

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	C] CCV 25 ppm [25 p	1	23.978	0.0000	23.9780	23.978	24.0	5/25/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/25/2019
4	MB3	1	0.000	0.0000	0.0000	0	<0.5	5/25/2019
5	[TOC] LCS [25ppm]	1	24.708	0.0000	24.7077	24.7077	24.7	5/25/2019
6	K1904715-011	1	1.332	0.0000	1.3315	1.3315	1.33	5/25/2019
7	K1904715-011d	1	1.301	0.0000	1.3010	1.301	1.3	5/25/2019
8	K1904715-011ms	1	26.806	0.0000	26.8061	26.8061	27	5/25/2019
9	K1904715-016	1	8.570	0.0000	8.5704	8.5704	8.57	5/25/2019
10	K1904715-016d	1	8.904	0.0000	8.9036	8.9036	8.90	5/25/2019
11	K1904715-017	1	6.238	0.0000	6.2378	6.2378	6.2	5/25/2019
12	K1904715-017d	1	6.265	0.0000	6.2651	6.2651	6.27	5/25/2019
13	C] CCV 25 ppm [25 p	1	24.367	0.0000	24.3668	24.3668	24.37	5/25/2019
14	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/25/2019
15	K1904715-018	1	40.018	0.0000	40.0182	40.0182	40.0	5/25/2019
16	K1904715-018d	1	40.342	0.0000	40.3419	40.3419	40.3	5/25/2019
17	K1904715-019	1	12.595	0.0000	12.5948	12.5948	12.59	5/25/2019
18	K1904715-019d	1	12.198	0.0000	12.1984	12.1984	12.2	5/25/2019
19	K1904715-020	1	17.752	0.0000	17.7522	17.7522	17.8	5/25/2019
20	K1904715-020d	1	17.660	0.0000	17.6597	17.6597	17.66	5/25/2019
21	K1904597-001	100	8.028	0.0000	8.0276	802.76	802.76	5/25/2019
22	K1904597-001d	100	7.761	0.0000	7.7611	776.11	776.1	5/25/2019
23	K1904597-002	100	7.049	0.0000	7.0488	704.88	704.9	5/25/2019
24	K1904597-002d	100	7.043	0.0000	7.0428	704.28	704.28	5/25/2019
25	K1904713-001	1	1.272	0.0000	1.2720	1.272	1.27	5/25/2019

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)

Analyzed By: <i>BCP</i>	Date Analyzed: <i>5/24/19</i>
Reviewed By: <i>Thompson</i>	Date Reviewed: <i>05/29/19</i>

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

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER)

Method: Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
26	K1904713-001d	1	1.279	0.0000	1.2786	1.2786	1.28	5/25/2019
27	K1904713-002	1	1.455	0.0000	1.4545	1.4545	1.45	5/25/2019
28	K1904713-002d	1	1.454	0.0000	1.4542	1.4542	1.5	5/25/2019
29	K1904713-003	1	0.699	0.0000	0.6989	0.6989	0.7	5/25/2019
30	K1904713-003d	1	0.680	0.0000	0.6797	0.6797	0.7	5/25/2019
31	K1904713-004	1	1.585	0.0000	1.5850	1.585	1.6	5/25/2019
32	K1904713-004d	1	1.549	0.0000	1.5486	1.5486	1.5	5/25/2019
33	C] CCV 25 ppm [25 p	1	23.979	0.0000	23.9794	23.9794	24.0	5/25/2019
34	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/25/2019
35		1		0.0000	0.0000	0	<0.5	
36		1		0.0000	0.0000	0	<0.5	
37		1		0.0000	0.0000	0	<0.5	
38		1		0.0000	0.0000	0	<0.5	
39		1		0.0000	0.0000	0	<0.5	
40		1		0.0000	0.0000	0	<0.5	
41		1		0.0000	0.0000	0	<0.5	
42		1		0.0000	0.0000	0	<0.5	
43		1		0.0000	0.0000	0	<0.5	
44		1		0.0000	0.0000	0	<0.5	
45		1		0.0000	0.0000	0	<0.5	
46		1		0.0000	0.0000	0	<0.5	
47		1		0.0000	0.0000	0	<0.5	
48		1		0.0000	0.0000	0	<0.5	
49		1		0.0000	0.0000	0	<0.5	
50		1		0.0000	0.0000	0	<0.5	

Analyzed By: <i>BCP</i>	Date Analyzed: <i>5/29/19</i>
Reviewed By: <i>Henry</i>	Date Reviewed: <i>05/29/19</i>

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	C] CCV 25 ppm [25 p	1	24.111	0.0000	24.1106	24.1106	24.1	5/24/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/24/2019
4	MB2	1	0.000	0.0000	0.0000	0	<0.5	5/24/2019
5	[TOC] LCS [24ppm]	1	24.464	0.0000	24.4640	24.464	24.5	5/24/2019
6	K1904679-001	5	11.526	0.0000	11.5257	57.6285	57.63	5/25/2019
7	K1904679-001d	5	11.271	0.0000	11.2706	56.353	56.4	5/25/2019
8	K1904679-002	10	1.252	0.0000	1.2518	12.518	13	5/25/2019
9	K1904679-002d	10	1.215	0.0000	1.2151	12.151	12.15	5/25/2019
10	C] CCV 25 ppm [25 p	1	23.566	0.0000	23.5658	23.5658	23.57	5/25/2019
11	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/25/2019
12	K1904679-003	1	0.866	0.0000	0.8663	0.8663	0.87	5/25/2019
13	K1904679-003d	1	0.952	0.0000	0.9523	0.9523	0.95	5/25/2019
14	K1904679-004	1	0.421	0.0000	0.4209	0.4209	<0.5	5/25/2019
15	K1904679-004d	1	0.413	0.0000	0.4134	0.4134	<0.5	5/25/2019
16	K1904715-001	1	2.956	0.0000	2.9564	2.9564	3.0	5/25/2019
17	K1904715-001d	1	2.944	0.0000	2.9435	2.9435	2.94	5/25/2019
18	K1904715-002	1	3.879	0.0000	3.8787	3.8787	3.9	5/25/2019
19	K1904715-002d	1	3.902	0.0000	3.9021	3.9021	3.9	5/25/2019
20	K1904715-003	1	2.909	0.0000	2.9093	2.9093	2.91	5/25/2019
21	K1904715-003d	1	2.897	0.0000	2.8968	2.8968	2.90	5/25/2019
22	K1904715-004	1	1.078	0.0000	1.0780	1.078	1.1	5/25/2019
23	K1904715-004d	1	1.082	0.0000	1.0818	1.0818	1.1	5/25/2019
24	K1904715-005	1	1.091	0.0000	1.0914	1.0914	1.09	5/25/2019
25	K1904715-005d	1	1.060	0.0000	1.0603	1.0603	1.06	5/25/2019

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)

Analyzed By: <i>BCP</i>	Date Analyzed: <i>5/24/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>05/29/19</i>

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	K1904715-006	1	2.953	0.0000	2.9533	2.9533	2.95	5/25/2019
27	K1904715-006d	1	2.904	0.0000	2.9043	2.9043	2.90	5/25/2019
28	K1904715-006ms	1	28.017	0.0000	28.0166	28.0166	28.0	5/25/2019
29	C] CCV 25 ppm [25 p	1	23.978	0.0000	23.9780	23.978	24.0	5/25/2019
30	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/25/2019
31	K1904715-007	1	3.041	0.0000	3.0407	3.0407	3.0	5/25/2019
32	K1904715-007d	1	2.983	0.0000	2.9825	2.9825	3.0	5/25/2019
33	K1904715-008	1	4.196	0.0000	4.1963	4.1963	4.2	5/25/2019
34	K1904715-008d	1	4.130	0.0000	4.1300	4.13	4.1	5/25/2019
35	K1904715-009	1	1.373	0.0000	1.3726	1.3726	1.4	5/25/2019
36	K1904715-009d	1	1.375	0.0000	1.3748	1.3748	1.4	5/25/2019
37	C] CCV 25 ppm [25 p	1	24.367	0.0000	24.3668	24.3668	24.4	5/25/2019
38	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/25/2019
39		1		0.0000	0.0000	0	<0.5	
40		1		0.0000	0.0000	0	<0.5	
41		1		0.0000	0.0000	0	<0.5	
42		1		0.0000	0.0000	0	<0.5	
43		1		0.0000	0.0000	0	<0.5	
44		1		0.0000	0.0000	0	<0.5	
45		1		0.0000	0.0000	0	<0.5	
46		1		0.0000	0.0000	0	<0.5	
47		1		0.0000	0.0000	0	<0.5	
48		1		0.0000	0.0000	0	<0.5	
49		1		0.0000	0.0000	0	<0.5	
50		1		0.0000	0.0000	0	<0.5	

Analyzed By: <i>BCD</i>	Date Analyzed: <i>5/29/19</i>
Reviewed By: <i>Thompson</i>	Date Reviewed: <i>05/29/19</i>

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	C] CCV 25 ppm [25]	1	24.619	0.0000	24.6186	24.6186	24.6	5/24/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/24/2019
4	MBI	1	0.000	0.0000	0.0000	0	<0.5	5/24/2019
5	[TOC] LCS [24ppm]	1	25.116	0.0000	25.1159	25.1159	25.1	5/24/2019
6	K1904716-001	1	0.153	0.0000	0.1531	0.1531	<0.5	5/24/2019
7	K1904716-001d	1	0.111	0.0000	0.1111	0.1111	<0.5	5/24/2019
8	K1904716-001ms	1	25.056	0.0000	25.0556	25.0556	25	5/24/2019
9	K1904710-001	1	2.205	0.0000	2.2050	2.205	2.21	5/24/2019
10	K1904710-001d	1	2.248	0.0000	2.2481	2.2481	2.25	5/24/2019
11	K1904710-002	1	2.237	0.0000	2.2374	2.2374	2.2	5/24/2019
12	K1904710-002d	1	2.217	0.0000	2.2166	2.2166	2.22	5/24/2019
13	K1904714-001	1	1.652	0.0000	1.6518	1.6518	1.65	5/24/2019
14	K1904714-001d	1	1.678	0.0000	1.6783	1.6783	1.68	5/24/2019
15	K1904594-001	1	7.016	0.0000	7.0158	7.0158	7.0	5/24/2019
16	K1904594-001d	1	7.004	0.0000	7.0038	7.0038	7.0	5/24/2019
17	C] CCV 25 ppm [25]	1	24.537	0.0000	24.5370	24.537	24.54	5/24/2019
18	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/24/2019
19	K1904594-002	1	0.000	0.0000	0.0000	0	<0.5	5/24/2019
20	K1904594-002d	1	0.000	0.0000	0.0000	0	<0.5	5/24/2019
21	K1904594-003	1	0.203	0.0000	0.2030	0.203	<0.5	5/24/2019
22	K1904594-003d	1	0.207	0.0000	0.2070	0.207	<0.5	5/24/2019
23	K1904594-004	1	0.471	0.0000	0.4711	0.4711	<0.5	5/24/2019
24	K1904594-004d	1	0.272	0.0000	0.2720	0.272	<0.5	5/24/2019
25	K1904594-005	1	0.416	0.0000	0.4160	0.416	<0.5	5/24/2019

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: <i>Bcd</i>	Date Analyzed <i>5/24/19</i>		
Reviewed By: <i>Heather</i>	Date Reviewed <i>05/29/19</i>		

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	K1904594-005d	1	0.317	0.0000	0.3165	0.3165	<0.5	5/24/2019
27	K1904594-006	1	0.000	0.0000	0.0000	0	<0.5	5/24/2019
28	K1904594-006d	1	0.000	0.0000	0.0000	0	<0.5	5/24/2019
29	K1904614-001	1	1.649	0.0000	1.6490	1.649	1.6	5/24/2019
30	K1904614-001d	1	1.618	0.0000	1.6179	1.6179	1.6	5/24/2019
31	K1904614-002	1	1.456	0.0000	1.4563	1.4563	1.5	5/24/2019
32	K1904614-002d	1	1.456	0.0000	1.4558	1.4558	1.5	5/24/2019
33	K1904618-001	100	0.949	0.0000	0.9492	94.92	94.9	5/24/2019
34	K1904618-001d	100	0.982	0.0000	0.9822	98.22	98.2	5/24/2019
35	K1904618-002	100	0.468	0.0000	0.4675	46.75	46.8	5/24/2019
36	K1904618-002d	100	0.471	0.0000	0.4710	47.1	47.1	5/24/2019
37	K1904618-003	100	0.480	0.0000	0.4797	47.97	48.0	5/24/2019
38	K1904618-003d	100	0.465	0.0000	0.4650	46.5	46.5	5/24/2019
39	C] CCV 25 ppm [25 p	1	24.111	0.0000	24.1106	24.1106	24.1	5/24/2019
40	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/24/2019
41	K1904618-004	100	0.000	0.0000	0.0000	0	<0.5	5/24/2019
42	K1904618-004d	100	0.000	0.0000	0.0000	0	<0.5	5/24/2019
43	K1904618-002ms	100	26.071	0.0000	26.0707	2607.07	2607.1	5/25/2019
44	K1904547-001	200	17.897	0.0000	17.8966	3579.32	3579.3	5/25/2019
45	K1904547-001d	200	17.645	0.0000	17.6447	3528.94	3528.9	5/25/2019
46	K1904667-001	100	0.000	0.0000	0.0000	0	<0.5	5/25/2019
47	K1904667-001d	100	0.000	0.0000	0.0000	0	<0.5	5/25/2019
48	K1904667-002	1	2.060	0.0000	2.0601	2.0601	2.1	5/25/2019
49	K1904667-002d	1	2.072	0.0000	2.0724	2.0724	2.1	5/25/2019
50	C] CCV 25 ppm [25 p	1	23.566	0.0000	23.5658	23.5658	23.6	5/25/2019

Analyzed By: <i>BD</i>	Date Analyzed: <i>5/24/19</i>
Reviewed By: <i>Hung</i>	Date Reviewed: <i>05/29/19</i>

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	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/25/2019
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: *BCD*Date Analyzed *5/24/19*Reviewed By: *[Signature]*Date Reviewed *05/29/19*

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	C] CCV 25 ppm [25 r	1	23.979	0.0000	23.9794	23.9794	24.0	5/25/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/25/2019
4	MB4	1	0.000	0.0000	0.0000	0	<0.5	5/25/2019
5	[TOC] LCS [25ppm]	1	24.794	0.0000	24.7942	24.7942	24.8	5/25/2019
6	K1904716-001	1	0.264	0.0000	0.2642	0.2642	<0.5	5/25/2019
7	K1904716-001d	1	0.152	0.0000	0.1523	0.1523	<0.5	5/25/2019
8	K1904716-001ms	1	25.393	0.0000	25.3933	25.3933	25	5/25/2019
9	K1904684-001	1	10.773	0.0000	10.7732	10.7732	10.77	5/25/2019
10	K1904684-001d	1	10.940	0.0000	10.9403	10.9403	10.94	5/25/2019
11	K1904684-002	1	2.403	0.0000	2.4025	2.4025	2.4	5/25/2019
12	K1904684-002d	1	2.347	0.0000	2.3473	2.3473	2.35	5/25/2019
13	K1904684-002ms	1	27.210	0.0000	27.2097	27.2097	27.21	5/25/2019
14	K1904684-003	1	2.771	0.0000	2.7713	2.7713	2.77	5/25/2019
15	K1904684-003d	1	2.792	0.0000	2.7922	2.7922	2.8	5/25/2019
16	C] CCV 25 ppm [25 r	1	23.805	0.0000	23.8048	23.8048	23.8	5/25/2019
17	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/25/2019
18	K1904684-004	1	8.565	0.0000	8.5652	8.5652	8.6	5/25/2019
19	K1904684-004d	1	8.939	0.0000	8.9391	8.9391	8.9	5/25/2019
20	K1904686-001	1	4.979	0.0000	4.9785	4.9785	4.98	5/25/2019
21	K1904686-001d	1	4.910	0.0000	4.9095	4.9095	4.91	5/25/2019
22	K1904686-002	1	12.277	0.0000	12.2766	12.2766	12.3	5/25/2019
23	K1904686-002d	1	12.229	0.0000	12.2286	12.2286	12.2	5/25/2019
24	K1904718-001	1	0.472	0.0000	0.4723	0.4723	<0.5	5/25/2019
25	K1904718-001d	1	0.290	0.0000	0.2899	0.2899	<0.5	5/25/2019

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)

Analyzed By: <i>kd</i>	Date Analyzed: <i>5/29/19</i>
Reviewed By: <i>fruy</i>	Date Reviewed: <i>05/29/19</i>

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	K1904718-002	1	0.238	0.0000	0.2376	0.2376	<0.5	5/25/2019
27	K1904718-002d	1	0.282	0.0000	0.2815	0.2815	<0.5	5/25/2019
28	C] CCV 25 ppm [25 F	1	23.873	0.0000	23.8734	23.8734	23.9	5/26/2019
29	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/26/2019
30		1		0.0000	0.0000	0	<0.5	
31		1		0.0000	0.0000	0	<0.5	
32		1		0.0000	0.0000	0	<0.5	
33		1		0.0000	0.0000	0	<0.5	
34		1		0.0000	0.0000	0	<0.5	
35		1		0.0000	0.0000	0	<0.5	
36		1		0.0000	0.0000	0	<0.5	
37		1		0.0000	0.0000	0	<0.5	
38		1		0.0000	0.0000	0	<0.5	
39		1		0.0000	0.0000	0	<0.5	
40		1		0.0000	0.0000	0	<0.5	
41		1		0.0000	0.0000	0	<0.5	
42		1		0.0000	0.0000	0	<0.5	
43		1		0.0000	0.0000	0	<0.5	
44		1		0.0000	0.0000	0	<0.5	
45		1		0.0000	0.0000	0	<0.5	
46		1		0.0000	0.0000	0	<0.5	
47		1		0.0000	0.0000	0	<0.5	
48		1		0.0000	0.0000	0	<0.5	
49		1		0.0000	0.0000	0	<0.5	
50		1		0.0000	0.0000	0	<0.5	

Analyzed By: <i>BCP</i>	Date Analyzed: <i>5/24/19</i>
Reviewed By: <i>Thurman</i>	Date Reviewed: <i>05/29/19</i>

TOC: 636915,
636916,
636917
DOC: 636919

Schedule: 05242019

Version: 8

Instrument: Fusion1

Last Saved by: Fusion1 (Fusion1)

Last Saved on: 2019/05/24 12:28 - Friday

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	K1904716-001.07	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
4	Sample	K1904716-001.07 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
5	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
6	Sample	K1904710-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
7	Sample	K1904710-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
8	Sample	K1904714-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
9	Sample	K1904594-001.11	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
10	Sample	K1904594-002.11	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K1904594-003.12	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	K1904594-004.11	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	K1904594-005.11	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K1904594-006.11	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1904614-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K1904614-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1904618-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1904618-002.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	Sample	K1904618-003.01 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	K1904618-004.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K1904618-002.01 ms 100x	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
23	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K1904547-001.01 200x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K1904667-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K1904667-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
27	Sample	K1904679-001.15 5x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
28	Sample	K1904679-002.15 10x	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	K1904679-003.14	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1904679-004.14	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
31	Sample	K1904715-001.11	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
32	Sample	K1904715-002.11	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
33	Sample	K1904715-003.11	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
34	Sample	K1904715-004.11	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
35	Sample	K1904715-005.11	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
36	Sample	K1904715-006.11	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
37	Sample	K1904715-006.11 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
38	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

Printed on: May 29, 2019 09:22:15

05/29/19
Fusion1

Schedule: 05242019

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Page	Use	Status
D	Check Standard	TOC/ CCB (0 ppm)	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
40	Sample	RB	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
C	Check Standard	TOC/ LCS (25.0 ppm)	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
41	Sample	K1904715-002.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
42	Sample	K1904715-003.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
43	Sample	K1904715-015.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
44	Sample	K1904715-017.11 sec	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
45	Sample	RB	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
46	Sample	K1904715-017.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
47	Sample	K1904715-017.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
48	Check Standard	TOC/ CCB (25.000125 ppm)	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
D	Check Standard	TOC/ CCB (0 ppm)	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
49	Sample	RB	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
50	Sample	K1904715-015.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
51	Sample	K1904715-015.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
52	Sample	K1904715-015.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
53	Sample	K1904715-015.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
54	Sample	K1904715-015.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
55	Sample	K1904715-015.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
56	Sample	K1904715-015.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
57	Sample	K1904715-015.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
58	Check Standard	TOC/ CCB (25.000125 ppm)	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
D	Check Standard	TOC/ CCB (0 ppm)	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
59	Sample	RB	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
C	Check Standard	TOC/ LCS (25.0 ppm)	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
60	Sample	K1904715-015.11	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
61	Sample	K1904715-001.02 ppm sec	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
62	Sample	RB	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
63	Sample	K1904934-001.05 doc	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
64	Sample	K1904934-002.05 doc	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
65	Sample	K1904934-002.05 sec doc	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
66	Sample	RB	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
67	Sample	K1904934-003.05 doc	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
68	Check Standard	TOC/ CCB (25.000125 ppm)	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
D	Check Standard	TOC/ CCB (0 ppm)	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
69	Sample	K1904934-001.05 doc	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
70	Sample	K1904934-002.05 doc	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
71	Sample	K1904715-001.02 doc	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
72	Sample	RB	CAS_sml_010711 (CAS_sml_010711)	2	True	Ready
73	Check Standard	TOC/ CCB (25.000125 ppm)	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
D	Check Standard	TOC/ CCB (0 ppm)	CAS_sml_010711 (CAS_sml_010711)	1	True	Ready
					False	

Fusion Report - 05242019

Friday, May 24, 2019 10:30 AM

(View - Reps, Unused Reps, Meta-Data, Signature, History)
Printed on 2019/05/29 09:22 -
Wednesday

Report Summary Information

Company Location: Gen Chem Lab
Schedule Name: 05242019
Instrument Name: Fusion1
Report Version: 1 of 1
Report Creation by Operators (schedule version): Fusion1 (Fusion1) (v2)
Fusion1 (Fusion1) (v3)
Fusion1 (Fusion1) (v5)
Fusion1 (Fusion1) (v6)
Fusion1 (Fusion1) (v8)
Comment:
Engine Version: 1.1.5.1
Firmware Version: 1.2.0696
Connection: RS232 COM1

Report Results

05/29/19
Fusion1

Sample Type: Clean

From Schedule Version 2

	Pos	Analysis Type	Sample ID		Start Time	
◆	(clean)		Clean		2019/05/24 10:30	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	14.07	17.29	3.22	49.94	07:57
2	TC Clean	6.92	10.04	3.12	49.78	07:18
3	TC Clean	2.48	5.56	3.08	49.69	07:02
4	TC Clean	1.55	4.76	3.20	49.66	07:03

Sample Type: Clean

From Schedule Version 3

	Pos	Analysis Type	Sample ID		Start Time	
◆	(clean)		Clean		2019/05/24 11:05	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	11.95	14.93	2.98	49.80	07:58
2	TC Clean	4.18	7.21	3.03	49.63	07:13
3	TC Clean	1.92	4.77	2.85	49.64	07:02

4	TC Clean	1.53	4.54	3.01	49.63	07:01
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Sample Type: Clean

From Schedule Version 5

Pos	Analysis Type	Sample ID			Start Time	
♦ (clean)		Clean			2019/05/24 11:39	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	12.06	14.97	2.90	49.79	07:58
2	TC Clean	3.59	6.68	3.08	49.64	07:16
3	TC Clean	1.83	4.89	3.06	49.87	07:03
4	TC Clean	1.33	4.32	2.99	49.73	07:01

Sample Type: Blank (Creating v1260)

From Schedule Version 6

Pos	Analysis Type	Sample ID			Start Time	
♦ (blank)		Reagent/Acid Blank			2019/05/24 12:15	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	11.97	14.96	2.98	49.85	07:59
2	TC Clean	3.57	6.65	3.07	49.70	07:17
3	TC Clean	1.65	4.65	3.00	49.67	07:02
4	TC Clean	1.05	4.19	3.14	49.65	07:02
5	Reagent Blank	3.50	6.42	2.91	49.70	08:12
6	Acid Blank	1.27	4.19	2.92	49.83	08:02

Sample Type: Sample

From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
◆	D	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/24 13:06		
Rep #	Base Analysis Type		ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC		0.0000	0.0000	7.72	10.68	2.96	49.95	10:30
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>		<u>Calibration</u>			
1:10		(TC) 8.7499 (IC) (v1260)		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)	24.6186 ppm (PASS)	0.0000 ppm	0%	2019/05/24 13:21

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.6186	246.1859	176.57	179.59	3.02	49.92	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%	2019/05/24 13:36

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.02	9.06	3.03	49.99	10:33

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 8

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/24 13:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.40	8.36	2.95	50.01	10:35

Dilution

1:10

Blank Contribution

(TC) 8.7499 (IC) (v1260)

Method

CAS_salt_010711 (v4)

Calibration

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)	25.1159 ppm (PASS)	0.0000 ppm	0%	2019/05/24 14:05

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	25.1159	251.1594	179.95	182.81	2.87	49.98	10:31

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos C

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	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/24 14:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.70	10.81	3.11	49.93	10:31

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
3	TOC	K1904716-001.07	0.1321 ppm	0.0297 ppm	22.4800%	2019/05/24 14:35

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1531	1.5308	9.79	12.79	3.00	49.98	10:30
2	TOC	0.1111	1.1109	9.50	12.60	3.09	49.94	10:30

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
4	TOC	K1904716-001.07 ms	25.0556 ppm	0.0000 ppm	0.0000%	2019/05/24 15:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	25.0556	250.5562	178.83	181.77	2.95	49.90	10:31

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
5	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/24 15:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.25	10.24	2.99	49.86	10:31

Dilution

1:10

Blank Contribution

(TC) 8.7499 (IC)

Method

CAS_salt_010711

Calibration

CAS_salt_010711

(v1260)

(v4)

(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
6	TOC	K1904710-001.01	2.2265 ppm	0.0305 ppm	1.3700%	2019/05/24 15:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.2050	22.0495	23.72	26.79	3.07	49.87	10:28
2	TOC	2.2481	22.4812	24.01	27.04	3.03	49.96	10:26

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
7	TOC	K1904710-002.01	2.2270 ppm	0.0147 ppm	0.6600%	2019/05/24 16:00

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.2374	22.3736	23.94	26.92	2.98	49.91	10:30
2	TOC	2.2166	22.1659	23.80	26.74	2.94	49.98	10:25

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
8	TOC	K1904714-001.01	1.6650 ppm	0.0188 ppm	1.1300%	2019/05/24 16:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.6518	16.5177	19.96	23.22	3.26	49.90	10:29
2	TOC	1.6783	16.7828	20.14	23.09	2.95	49.87	10:26

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
9	TOC	K1904594-001.11	7.0098 ppm	0.0085 ppm	0.1200%	2019/05/24 16:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.0158	70.1584	56.37	59.48	3.11	49.86	10:27
2	TOC	7.0038	70.0376	56.29	59.23	2.94	49.87	10:27

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_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
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◊	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.5370 ppm (PASS)	0.0000 ppm	0%	2019/05/24 17:25
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Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.5370	245.3697	176.02	179.04	3.03	49.92	10:29

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%	2019/05/24 17:39

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.88	8.79	2.91	49.92	10:33

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	10	TOC	K1904594-002.11	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/24 17:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.69	8.70	3.00	49.92	10:28
2	TOC	0.0000	0.0000	5.59	8.59	3.00	49.91	10:29

Dilution

1:10

Blank Contribution

(TC) 8.7499 (IC) (v1260)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	11	TOC	K1904594-003.12	0.2050 ppm	0.0028 ppm	1.3700%	2019/05/24 18:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2030	2.0302	10.13	13.10	2.97	49.90	10:28
2	TOC	0.2070	2.0700	10.16	13.18	3.03	49.92	10:25

Dilution

1:10

Blank Contribution

(TC) 8.7499 (IC) (v1260)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
12	TOC	K1904594-004.11	0.3716 ppm	0.1408 ppm	37.9100%	2019/05/24 18:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4711	4.7114	11.95	15.09	3.14	49.91	10:27
2	TOC	0.2720	2.7197	10.60	13.77	3.18	49.93	10:26

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
13	TOC	K1904594-005.11	0.3663 ppm	0.0704 ppm	19.2300%	2019/05/24 19:18

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4160	4.1605	11.57	14.57	2.99	49.95	10:28
2	TOC	0.3165	3.1646	10.90	14.00	3.10	49.94	10:25

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
14	TOC	K1904594-006.11	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/24 19:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.07	9.22	3.15	49.96	10:29
2	TOC	0.0000	0.0000	6.24	9.16	2.92	49.99	10:27

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
15	TOC	K1904614-001.01	1.6334 ppm	0.0220 ppm	1.3500%	2019/05/24 20:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.6490	16.4897	19.94	22.86	2.92	50.00	10:32
2	TOC	1.6179	16.1788	19.73	22.72	2.99	49.99	10:31

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
16	TOC	K1904614-002.01	1.4561 ppm	0.0003 ppm	0.0200%	2019/05/24 20:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4563	14.5627	18.64	21.68	3.04	49.99	10:28

2	TOC	1.4558	14.5583	18.63	21.66	3.03	50.00	10:28
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Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	K1904618-001.01 100x	0.9657 ppm	0.0233 ppm	2.4200%	2019/05/24 21:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9492	9.4920	15.19	18.13	2.94	50.00	10:30
2	TOC	0.9822	9.8220	15.42	18.34	2.92	50.01	10:29

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	K1904618-002.01 100x	0.4692 ppm	0.0025 ppm	0.5300%	2019/05/24 21:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4675	4.6746	11.92	14.92	2.99	50.03	10:26
2	TOC	0.4710	4.7100	11.95	14.98	3.03	50.03	10:25

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
19	TOC	K1904618-003.01 100x	0.4723 ppm	0.0104 ppm	2.2100%	2019/05/24 22:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4797	4.7969	12.01	15.09	3.08	50.05	10:28
2	TOC	0.4650	4.6496	11.91	15.03	3.12	50.06	10:31

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_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)	24.1106 ppm (PASS)	0.0000 ppm	0%	2019/05/24 22:35

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.1106	241.1063	173.12	176.14	3.02	50.06	10:33

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_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%	2019/05/24 22:50

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.74	8.69	2.95	50.06	10:33

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)**STD Conc - Pos D**

0 ppmC

Sample Type: Sample

From Schedule Version 8

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/24 23:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.19	8.19	3.00	50.07	10:30

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)**Method**CAS_salt_010711
(v4)**Calibration**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)	24.4640 ppm (PASS)	0.0000 ppm	0%	2019/05/24 23:19

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.4640	244.6405	175.52	178.56	3.04	50.08	10:29

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)**STD Conc - Pos C**

25 ppmC

Sample Type: Sample

From Schedule Version 8

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Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
21	TOC	K1904618-004.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/24 23:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.64	8.78	3.14	50.06	10:30
2	TOC	0.0000	0.0000	4.96	8.04	3.08	50.08	10:25

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
22	TOC	K1904618-002.01 ms 100x	26.0707 ppm	0.0000 ppm	0.0000%	2019/05/25 00:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.0707	260.7066	185.72	188.72	3.00	50.09	10:30

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
23	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/25 00:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.63	8.75	3.12	50.08	10:28
2	TOC	0.0000	0.0000	5.25	8.28	3.02	50.08	10:28

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
24	TOC	K1904547-001.01 200x	17.7706 ppm	0.1781 ppm	1.0000%	2019/05/25 00:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	17.8966	178.9660	130.23	133.30	3.07	50.10	10:29
2	TOC	17.6447	176.4469	128.52	131.63	3.11	50.10	10:28

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
25	TOC	K1904667-001.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/25 01:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.54	9.61	3.07	50.12	10:25

2	TOC	0.0000	0.0000	5.67	8.77	3.11	50.12	10:30
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Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
26	TOC	K1904667-002.01	2.0663 ppm	0.0086 ppm	0.4200%	2019/05/25 01:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.0601	20.6014	22.73	25.73	2.99	50.14	10:29
2	TOC	2.0724	20.7237	22.82	25.91	3.10	50.13	10:28

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
27	TOC	K1904679-001.15 5x	11.3982 ppm	0.1804 ppm	1.5800%	2019/05/25 02:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	11.5257	115.2575	86.99	89.90	2.92	50.13	10:31
2	TOC	11.2706	112.7059	85.25	88.31	3.05	50.13	10:27

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
28	TOC	K1904679-002.15 10x	1.2335 ppm	0.0259 ppm	2.1000%	2019/05/25 02:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.2518	12.5179	17.25	20.43	3.18	50.14	10:30
2	TOC	1.2151	12.1511	17.00	20.15	3.15	50.17	10:26

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_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)	23.5658 ppm (PASS)	0.0000 ppm	0%	2019/05/25 03:05

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.5658	235.6584	169.43	172.53	3.10	50.16	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%	2019/05/25 03:19

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.74	8.82	3.07	50.13	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 8

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	29	TOC	K1904679-003.14	0.9093 ppm	0.0608 ppm	6.6900%	2019/05/25 03:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8663	8.6626	14.63	17.71	3.08	50.10	10:27
2	TOC	0.9523	9.5229	15.21	18.24	3.03	50.11	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7499 (IC) (v1260)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	30	TOC	K1904679-004.14	0.4172 ppm	0.0053 ppm	1.2700%	2019/05/25 04:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4209	4.2091	11.61	14.83	3.22	50.09	10:27
2	TOC	0.4134	4.1339	11.56	14.71	3.16	50.10	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7499 (IC) (v1260)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	31	TOC	K1904715-001.11	2.9500 ppm	0.0092 ppm	0.3100%	2019/05/25 04:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.9564	29.5643	28.82	31.85	3.03	50.09	10:27

2	TOC	2.9435	29.4347	28.73	31.76	3.03	50.10	10:27
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Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
32	TOC	K1904715-002.11	3.8904 ppm	0.0166 ppm	0.4300%	2019/05/25 04:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.8787	38.7866	35.08	38.10	3.03	50.12	10:24
2	TOC	3.9021	39.0208	35.24	38.41	3.17	50.09	10:28

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
33	TOC	K1904715-003.11	2.9030 ppm	0.0089 ppm	0.3100%	2019/05/25 05:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.9093	29.0929	28.50	31.58	3.08	50.12	10:28
2	TOC	2.8968	28.9677	28.41	31.40	2.98	50.10	10:26

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
34	TOC	K1904715-004.11	1.0799 ppm	0.0027 ppm	0.2500%	2019/05/25 05:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0780	10.7795	16.07	19.17	3.11	50.10	10:28
2	TOC	1.0818	10.8179	16.09	19.07	2.97	50.10	10:31

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
35	TOC	K1904715-005.11	1.0758 ppm	0.0220 ppm	2.0400%	2019/05/25 06:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0914	10.9136	16.16	19.17	3.01	50.09	10:30
2	TOC	1.0603	10.6028	15.95	19.07	3.12	50.11	10:28

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
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36	TOC	K1904715-006.11	2.9288 ppm	0.0347 ppm	1.1800%	2019/05/25 06:51		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.9533	29.5334	28.80	31.86	3.06	50.09	10:27
2	TOC	2.9043	29.0428	28.46	31.63	3.17	50.10	10:28

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
37	TOC	K1904715-006.11 ms	28.0166 ppm	0.0000 ppm	0.0000%	2019/05/25 07:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	28.0166	280.1661	198.92	202.04	3.12	50.11	10:34

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
38	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/25 07:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.37	9.49	3.13	50.10	10:29

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_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)	23.9780 ppm (PASS)	0.0000 ppm	0%	2019/05/25 07:48

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.9780	239.7804	172.22	175.41	3.18	50.11	10:34

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_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	0 / infinity	0.0000	0.0000	0%	2019/05/25 08:03

				ppm]	(NA / NA)	ppm (PASS)	ppm			
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.25	8.37	3.12	50.12	10:32
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos D</u>		
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	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/25 08:18

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.76	7.88	3.13	50.11	10:31

Dilution

1:10

Blank Contribution

(TC) 8.7499 (IC)
(v1260)

Method

CAS_salt_010711
(v4)

Calibration

CAS_salt_010711
(v30)

<u>Sample Type:</u> 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)	24.7077 ppm (PASS)	0.0000 ppm	0%	2019/05/25 08:32	
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.7077	247.0772	177.18	180.17	2.99	50.10	10:36
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos C</u>		
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	K1904715-007.11	3.0116 ppm	0.0411 ppm	1.3700%	2019/05/25 08:47		

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.0407	30.4070	29.39	32.62	3.23	50.11	10:31
2	TOC	2.9825	29.8251	28.99	32.15	3.16	50.08	10:28

Dilution	Blank Contribution	Method	Calibration
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1:10

(TC) 8.7499 (IC)
(v1260)CAS_salt_010711
(v4)CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
41	TOC	K1904715-008.11	4.1631 ppm	0.0469 ppm	1.1300%	2019/05/25 09:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.1963	41.9628	37.23	40.27	3.03	50.08	10:25
2	TOC	4.1300	41.2998	36.78	39.89	3.11	50.08	10:28

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
42	TOC	K1904715-009.11	1.3737 ppm	0.0016 ppm	0.1100%	2019/05/25 09:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.3726	13.7259	18.07	21.26	3.19	50.05	10:31
2	TOC	1.3748	13.7480	18.08	21.16	3.08	50.06	10:26

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
43	TOC	K1904715-011.11	1.3162 ppm	0.0216 ppm	1.6400%	2019/05/25 10:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.3315	13.3149	17.79	20.78	3.00	50.08	10:29
2	TOC	1.3010	13.0100	17.58	20.73	3.15	50.08	10:25

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
44	TOC	K1904715-011.11 ms	26.8061 ppm	0.0000 ppm	0.0000%	2019/05/25 10:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.8061	268.0608	190.71	193.84	3.13	50.06	10:29

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
45	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/25 10:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
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1	TOC	0.0000	0.0000	5.67	8.83	3.16	50.07	10:30
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 8.7499 (IC) (v1260)		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)			
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
46	TOC	K1904715-016.11	8.7370 ppm	0.2356 ppm	2.7000%	2019/05/25 11:09		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.5704	85.7036	66.92	70.09	3.16	50.07	10:26
2	TOC	8.9036	89.0360	69.19	72.43	3.24	50.07	10:25
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 8.7499 (IC) (v1260)		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)			
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
47	TOC	K1904715-017.11	6.2515 ppm	0.0193 ppm	0.3100%	2019/05/25 11:37		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.2378	62.3784	51.09	54.39	3.30	50.06	10:29
2	TOC	6.2651	62.6509	51.28	54.30	3.03	50.06	10:28
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 8.7499 (IC) (v1260)		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)			

<u>Sample Type:</u> 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)	24.3668 ppm (PASS)	0.0000 ppm	0%	2019/05/25 12:05	
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.3668	243.6682	174.86	177.87	3.01	50.04	10:29
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>	<u>Calibration</u>		<u>STD Conc - Pos B</u>			
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)		50 ppmC			

<u>Sample Type:</u> 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%	2019/05/25 12:20	

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	8.85	2.99	50.02	10:33

Completion State Success - Criteria met.
Success Action Do Nothing
Method CAS_salt_010711 (v4)
Calibration CAS_salt_010711 (v30)
STD Conc - Pos D 0 ppmC

Sample Type: Sample

From Schedule Version 8

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
48	TOC	K1904715-018.11	40.1800 ppm	0.2289 ppm	0.5700%	2019/05/25 12:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	40.0182	400.1819	280.39	283.31	2.92	50.03	10:33
2	TOC	40.3419	403.4185	282.59	285.62	3.03	50.07	10:27

Dilution 1:10
Blank Contribution (TC) 8.7499 (IC) (v1260)
Method CAS_salt_010711 (v4)
Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
49	TOC	K1904715-019.11	12.3966 ppm	0.2803 ppm	2.2600%	2019/05/25 13:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	12.5948	125.9485	94.24	97.17	2.93	50.04	10:30
2	TOC	12.1984	121.9841	91.55	94.54	2.99	50.05	10:29

Dilution 1:10
Blank Contribution (TC) 8.7499 (IC) (v1260)
Method CAS_salt_010711 (v4)
Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
50	TOC	K1904715-020.11	17.7060 ppm	0.0654 ppm	0.3700%	2019/05/25 13:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	17.7522	177.5223	129.25	132.17	2.92	50.05	10:28
2	TOC	17.6597	176.5971	128.62	131.73	3.11	50.06	10:26

Dilution 1:10
Blank Contribution (TC) 8.7499 (IC) (v1260)
Method CAS_salt_010711 (v4)
Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
51	TOC	K1904597-001.01 100x	7.8944 ppm	0.1884 ppm	2.3900%	2019/05/25 13:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.0276	80.2763	63.24	66.36	3.12	50.09	10:28
2	TOC	7.7611	77.6113	61.43	64.62	3.19	50.07	10:24

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
52	TOC	K1904597-002.01 100x	7.0458 ppm	0.0043 ppm	0.0600%	2019/05/25 14:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.0488	70.4884	56.60	59.72	3.12	50.09	10:31
2	TOC	7.0428	70.4280	56.56	59.66	3.10	50.09	10:26

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
53	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/25 14:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.88	11.13	3.25	50.09	10:26
2	TOC	0.0000	0.0000	6.77	10.06	3.30	50.07	10:24

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
54	TOC	K1904713-001.01	1.2753 ppm	0.0047 ppm	0.3700%	2019/05/25 15:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.2720	12.7198	17.38	20.50	3.12	50.07	10:26
2	TOC	1.2786	12.7860	17.43	20.46	3.03	50.04	10:25

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
55	TOC	K1904713-002.01	1.4544 ppm	0.0002 ppm	0.0100%	2019/05/25 15:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4545	14.5450	18.62	21.59	2.96	50.04	10:28
2	TOC	1.4542	14.5421	18.62	21.59	2.96	50.03	10:28

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
56	TOC	K1904713-003.01	0.6893 ppm	0.0135 ppm	1.9600%	2019/05/25 16:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6989	6.9890	13.49	16.55	3.05	50.02	10:27
2	TOC	0.6797	6.7975	13.36	16.49	3.13	50.02	10:26

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
57	TOC	K1904713-004.01	1.5668 ppm	0.0257 ppm	1.6400%	2019/05/25 16:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5850	15.8503	19.51	22.60	3.09	50.01	10:25
2	TOC	1.5486	15.4864	19.26	22.26	3.00	50.00	10:24

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_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)	23.9794 ppm (PASS)	0.0000 ppm	0%	2019/05/25 17:15

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.9794	239.7937	172.23	175.28	3.04	49.99	10:30

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_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%	2019/05/25 17:30

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.26	8.53	3.27	50.00	10:32

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 8

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
58	TOC	MB4	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/25 17:45

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.58	7.73	3.15	49.99	10:29

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_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)	24.7942 ppm (PASS)	0.0000 ppm	0%	2019/05/25 17:59

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.7942	247.9419	177.76	180.83	3.07	50.02	10:32

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos C

25 ppmC

Sample Type: Sample

From Schedule Version 8

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
59	TOC	K1904716-001.02 doc	0.2083 ppm	0.0791 ppm	37.9700%	2019/05/25 18:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2642	2.6416	10.54	13.69	3.15	50.03	10:27
2	TOC	0.1523	1.5234	9.78	12.83	3.05	50.05	10:26

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
60	TOC	K1904716-001.02 ms doc	25.3933 ppm	0.0000 ppm	0.0000%	2019/05/25 18:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	25.3933	253.9328	181.12	184.15	3.03	50.06	10:31

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_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%	2019/05/25 18:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.40	8.43	3.03	50.08	10:33

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
62	TOC	K1904684-001.08 doc	10.8568 ppm	0.1181 ppm	1.0900%	2019/05/25 19:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	10.7732	107.7324	81.88	84.93	3.06	50.07	10:28
2	TOC	10.9403	109.4030	83.01	86.06	3.05	50.11	10:25

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
63	TOC	K1904684-002.08 doc	2.3749 ppm	0.0391 ppm	1.6400%	2019/05/25 19:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.4025	24.0251	25.06	28.09	3.03	50.11	10:27
2	TOC	2.3473	23.4726	24.68	27.73	3.04	50.12	10:30

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
64	TOC	K1904684-002.08 ms doc	27.2097 ppm	0.0000 ppm	0.0000%	2019/05/25 20:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	27.2097	272.0974	193.45	196.51	3.07	50.13	10:34

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
65	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/25 20:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.61	8.73	3.12	50.15	10:34

DilutionBlank ContributionMethodCalibration

1:10

(TC) 8.7499 (IC)
(v1260)CAS_salt_010711
(v4)CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
66	TOC	K1904684-003.08 doc	2.7817 ppm	0.0148 ppm	0.5300%	2019/05/25 20:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.7713	27.7125	27.56	30.66	3.10	50.15	10:27
2	TOC	2.7922	27.9217	27.70	30.80	3.09	50.17	10:27

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_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)	23.8048 ppm (PASS)	0.0000 ppm	0%	2019/05/25 21:05

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.8048	238.0479	171.05	174.07	3.03	50.16	10:31

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_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%	2019/05/25 21:19

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.00	8.20	3.20	50.17	10:33

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 8

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
67	TOC	K1904684-004.08 doc	8.7522 ppm	0.2644 ppm	3.0200%	2019/05/25 21:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.5652	85.6520	66.89	69.81	2.92	50.19	10:32
2	TOC	8.9391	89.3910	69.43	72.35	2.92	50.19	10:27

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
68	TOC	K1904686-001.08 doc	4.9440 ppm	0.0489 ppm	0.9900%	2019/05/25 22:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.9785	49.7855	42.54	45.47	2.92	50.19	10:30
2	TOC	4.9095	49.0946	42.08	45.05	2.98	50.21	10:30

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
69	TOC	K1904686-002.08 doc	12.2526 ppm	0.0340 ppm	0.2800%	2019/05/25 22:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	12.2766	122.7664	92.08	94.99	2.91	50.19	10:27
2	TOC	12.2286	122.2861	91.76	94.84	3.08	50.20	10:27

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
70	TOC	K1904718-001.02 doc	0.3811 ppm	0.1290 ppm	33.8400%	2019/05/25 22:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4723	4.7232	11.96	14.92	2.96	50.20	10:30
2	TOC	0.2899	2.8994	10.72	13.65	2.93	50.20	10:24

Dilution

1:10

Blank Contribution(TC) 8.7499 (IC)
(v1260)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
71	TOC	K1904718-002.02 doc	0.2596 ppm	0.0310 ppm	11.9600%	2019/05/25 23:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2376	2.3764	10.36	13.39	3.03	50.18	10:27
2	TOC	0.2815	2.8154	10.66	13.69	3.03	50.18	10:30

Dilution

1:10

Blank Contribution

(TC) 8.7499 (IC)

Method

CAS_salt_010711

Calibration

CAS_salt_010711

		(v1260)			(v4)			(v30)		
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time				
72	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/25 23:55				
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time		
1	TOC	0.0000	0.0000	4.69	7.57	2.88	50.20	10:30		
2	TOC	0.0000	0.0000	4.50	7.59	3.09	50.17	10:25		
Dilution		Blank Contribution		Method	Calibration					
1:10		(TC) 8.7499 (IC) (v1260)		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)	23.8734 ppm (PASS)	0.0000 ppm	0%	2019/05/26 00:23	
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.8734	238.7344	171.51	174.58	3.06	50.15	10:30
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>	<u>Calibration</u>		<u>STD Conc - Pos B</u>			
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%	2019/05/26 00:38	
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.26	8.25	2.99	50.12	10:30
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>	<u>Calibration</u>		<u>STD Conc - Pos D</u>			
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)		0 ppmC			

Meta Data Used in this Report

Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1259	2.7557	2.3080	0.0000	0.0000	0.0000	2019/05/22 19:26	Fusion1 (Fusion1)
v1260	1.1683	1.2700	0.0000	0.0000	0.0000	2019/05/24 13:06	Fusion1 (Fusion1)

Calibrations

Name: CAS_salt_010711 (TOC)

Version: v30 Calibration curve formula: TOC: $y = 6.788x + 9.463$

Ver Creation: 2019/03/05 17:42 r^2 value: TOC: $r^2 = 0.99963$

Comment:

Operator: Fusion1 (Fusion1)

Basic Analysis Type: TOC

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 Operator: Fusion1 (Fusion1)

Ver Creation: 2019/02/21 17:57

Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	ICSpurgeRinseVolume	12.0 ml
UVReactorPrerinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPrerinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPrerinses	1	SyringeSpeedWaste	10
ICSpurgeTime	1.00 mins	SyringeSpeedAcid	7
DetectorSweepFlow	500 ml/min	SyringeSpeedReagent	7
PreSpurgeTime	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
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Report History

Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/05/26 00:55

StarLIMS Run: 636915, 636916, 636917, 636919
Analysis: TOC/DOC
Method: 415.1, SM 5310 C, 9060, 9060A

CCV: 11-GEN-05-77K 50 ppm LCS: 11-GEN-05-77D 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-74A

ICS TV: 25.0 ppm ICS % R = 2

Spike ID: 11-GEN-05-77J 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-78B

21 % H3PO4: 11-GEN-05-78C

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: NA

Analyzed By: <i>Red</i>	Date Analyzed: <i>5/29/19</i> <i>Red</i> <i>5/29/19</i>
Reviewed By: <i>Frank</i>	Date Reviewed: <i>05/29/19</i>



Case Narrative

Method: 6850

Analysis: Perchlorate

Analysis SOP: LC-MS-CLO4

ALS WO ID(s): 1914602, 1914603, 1914871, 1915147

Client: ALS Laboratories (Houston, TX)

Matrix: Water

ELMS Batch (HBN): 2256 (240075)

General Set Information: There were nine 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. 50 μL 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 0.45 μm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field samples 1914603004/05 was analyzed and reported from a 1:10,000 dilutions. The reporting limits have been adjusted accordingly.

Method QC data: The method blank (LMB 655029) was less than 1/2 the CRDL. The recovery for the LCS (655030) was within acceptable parameters.



MS/MSD Analysis: MS/MSD was performed on sample 1914602001 (Client ID: LH18/24-SP650_051419_BIX). 5.0µl of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 5.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 – 655027) is reported from the analysis of the Laboratory Control Sample (LCS – 655030) at a level of 4.0µg/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: 19MARI03).

Thomas Bosch	May 30, 2019
Analyst	Date



00938401

ANALYTICAL REPORT

Report Date: May 30, 2019

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Workorder: **34-1914871**

Project ID: HS19051289

Purchase Order: HS19051289

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_05119_BIX	1914871001	05/21/19	05/23/19	

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992

ALS GROUP USA, CORP. An ALS Limited Company

Environmental www.alsglobal.com

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ANALYTICAL REPORT

Workorder: **34-1914871**Client: ALS Environmental
(Houston)

Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: LH18/24-SP650_05119_BIX		Sampling Site: NA		Collected: 05/21/2019	
Lab ID: 1914871001		Media: 125 mL Nalgene		Received: 05/23/2019	
Matrix: Water		Sampling Parameter: NA			
Analysis Method - EPA 6850, DoD QSM					
Preparation: Not Applicable			Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2256 (HBN: 240075) Analyzed: 05/28/2019 12:08		Instrument ID: LCMS04 Percent Solid: NA 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 05/29/2019 10:39	/S/ Stephen Brose 05/30/2019 11:52

Laboratory Contact Information

ALS Environmental
960 W Levoy Drive
Salt Lake City, Utah 84123Phone: (801) 266-7700
Email: als.lt.lab@ALSGlobal.com
Web: www.alslsc.com



ANALYTICAL REPORT

Workorder: 34-1914871

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
	Nevada (TNI)	UT00953201-1	https://ndep.nv.gov/water/lab-certification
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
	Oklahoma (TNI)	IJ# 9980	http://www.deq.state.ok.us/CSDnew/labcert.htm
	Texas (TNI)	T104704456-18-9	https://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_list.pdf
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

00938404

Analysis Information

Workorder: 1914871

Limits: Client SOW/Contract Specified

Preparation: NA

Analysis: EPA 6850, DoD QSM

Basis: DoD QSM

Batch: NA

Batch: ELMS/2256 (HBN: 240075)

Prepared By: NA

Analyzed By: Thomas Bosch

Blank

LMB: 655029

Analyzed: 05/28/2019 10:08

Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 655030

Analyzed: 05/28/2019 09:39

Dilution: 1

Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.20	4.00	105	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1914602001

Analyzed: 05/28/2019 10:21

Dilution: 1

Units: ug/L

MS: 655031

Analyzed: 05/28/2019 10:34

Dilution: 1

Units: ug/L

MSD: 655032

Analyzed: 05/28/2019 10:48

Dilution: 1

Units: ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	5.09	5	102	78.8	123.8	4.88	97.7	4.08	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 05/29/2019 13:04	/S/ Stephen Brose 05/30/2019 11:52

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



1914871

10450 Standliff 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: Dept of Defense

COC ID: 11351

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 Standliff 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 Standliff Rd, Ste 210
Phone: +1 281 530 5656
Reference: HS19051289
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19051289-02	LH18/24-SP650_052119_BIX	Water	21 May 2019 14:00
SUB_Perch-6850			31 May 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:

Received By:

Cooler ID(s):

Date/Time:

Date/Time:

Temperature(s):

5/22/19 1800

5-23-19 1006

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11 May 2019

[illegible][illegible]

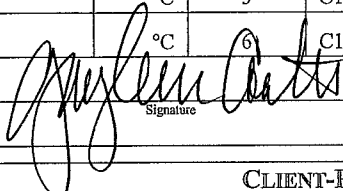
ALS-SALT LAKE CITY-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

1914871

Client Name: <u>ALS HOUSTON</u>		Project/Task/Site: <u>HS19051289</u>				
Date/Time of Receipt: <u>5-23-19 10:06</u>		Number of Coolers Received: <u>①</u>				
Condition of Coolers: <u>Acceptable/Unacceptable</u>		Temperature Control: <u>Present/Not Included</u>				
Cooler Custody Seals: <u>Present/Absent/NA</u>		Location Temp Taken: <u>Control/Between Samples</u>				
Container Custody Seals: <u>Present/Absent/NA</u>		Are all temperatures within project specific guidelines? <u>Yes/No/NA</u>				
Ice Present: <u>Yes/No/NA</u>		VOA Headspace Present? <u>Yes/No/NA</u>				
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	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 <u>9428</u>	<u>1</u> °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By:  GAYLEEN COATES 5-23-19
Signature Printed Name Date

CLIENT-RELATED INFORMATION

- | | | | |
|--|---|--|---|
| <input type="checkbox"/> Missing Cooler | <input type="checkbox"/> Missing Samples/Bottles | <input type="checkbox"/> Incorrect Preservation | <input type="checkbox"/> Insufficient Sample Volume |
| <input type="checkbox"/> Cooler Conditions | <input type="checkbox"/> Broken/Leaking Samples | <input type="checkbox"/> pH Criteria Not Met | <input type="checkbox"/> Chain of Custody Problems |
| <input type="checkbox"/> Missing Paperwork | <input type="checkbox"/> Incorrect Bottle Type | <input type="checkbox"/> Residual Chlorine Present | <input type="checkbox"/> Other: |
| <input type="checkbox"/> Missing/Incorrect Bottle Labels | <input type="checkbox"/> Cooler Temperatures Out of Range | <input type="checkbox"/> 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: _____ Returned to Sample Receipt by: _____ Date: _____
Printed Name Signature



**Must Deliver Next Business Day
Time and Temperature Sensitive!**

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

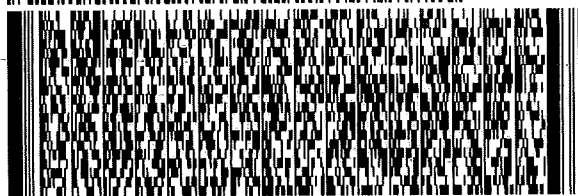
SHIP DATE: 22M
ACTWGT: 5.40 LB
CAD: 300130/CAFE32
DIMS: 14x11x10 IN
BILL THIRD PARTY

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

SALT LAKE CITY UT 84123

(801) 266-7700

REF: HS19051289 - RJ



FedEx
Express



AL10509081118JIT

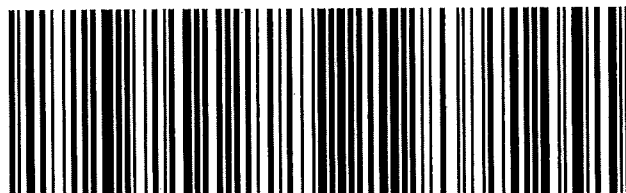
TRK# 4809 7834 1752
0201

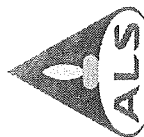
THU - 23 MAY 3:00P
STANDARD OVERNIGHT

AX BTFA

84123

UT-US **SLC**





Batch Worklist

Batch: ELMS/ 2256

Created: 5/28/2019 08:41

Instrument:

HBN: 240075

Rule: EPA 6850, DoD QSM Water

Analyst: T. Bosch

Status: WP



Workorder: 1914602 [ENV_LVL4]

Workorder: 1914603 [ENV_LVL4]

Workorder: 1914871 [ENV_LVL4]

Workorder: 1915147 [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	655026	CCV for HBN 240075 [ELMS/2256]				CCV	3		E685041C3Q	S311		5/29/2019	
2	655027	RLVS for HBN 240075 [ELMS/2256]				RLVS	3		E685041C3Q	S311		5/29/2019	
3	655028	ICS for HBN 240075 [ELMS/2256]				ICS	3		E6850.D3Q	S311		5/29/2019	
4	655029	LMB for HBN 240075 [ELMS/2256]				LMB	3		E6850Q413Q	S311		5/29/2019	
5	655030	LCS for HBN 240075 [ELMS/2256]				LCS	3		E6850Q413Q	S311		5/29/2019	
6	1914602001	LH18/24-SP650_051419_BIX				SAMPLE	3	1914602001-A	E6850Q41.3	S480	6/11/2019	5/31/2019	
7	655031	LH18/24-SP650...(1914602001MS)				MS	3		E6850Q413Q	S311		5/29/2019	
8	655032	LH18/24-SP65...(1914602001MSD)				MSD	3		E6850Q413Q	S311		5/29/2019	
9	1914603001	S0WW18-190516				SAMPLE	3	1914603001-A	E6850Q41.3	S480	6/13/2019	5/31/2019	
10	1914603002	S0WW17-190516				SAMPLE	3	1914603002-A	E6850Q41.3	S480	6/13/2019	5/31/2019	
11	1914603003	S0WW21-190516				SAMPLE	3	1914603003-A	E6850Q41.3	S480	6/13/2019	5/31/2019	
12	1914603004	S0WW12-190516				SAMPLE	3	1914603004-A	E6850Q41.3	S480	6/13/2019	5/31/2019	
13	1914603005	S0WW12-190517-FD				FLDDUP	3	1914603005-A	E6850Q41.3	S480	6/13/2019	5/31/2019	
14	1914871001	LH18/24-SP650_051119_BIX				SAMPLE	3	1914871001-A	E6850Q41.3	S480	6/18/2019	6/6/2019	
15	1915147001	S0WW15-190523				SAMPLE	3	1915147001-A	E6850Q41.3	S480	6/20/2019	5/29/2019	
16	1915147002	S0WW27-190523				SAMPLE	3	1915147002-A	E6850Q41.3	S480	6/20/2019	5/29/2019	
17	655033	CCV for HBN 240075 [ELMS/2256]				CCV	3		E685041C3Q	S311		5/29/2019	

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ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #()'s: 1914602 (001), 1914603 (001-05), 1914871 (001), 1915147 (001)
 ELMS Batch/HBN ID: 2256 (240075)
 Prep Date: 05/24/2019 Analysis Date: 05/28/2019 Analyst: T. Bosch
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\MAY\28MAY19D.s
 Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by Thomas 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 AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

STANDARDS: Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

CALIBRATION CURVE: Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.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: 35µL
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

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: 4.0µL of QC Solution Horizon ID 47516 was used for LCS 655030; Target = 4.0µg/L. ASTM type II water was used for LMB 655029.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1914602001 (Client ID: LH18/24-SP650_051419_BIX). 5.0µL of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. Spike target = 5.0µg/L.

COMMENTS:

- 1) Results reported in µg/L. Field samples 1914603004/05 required 1:10,000 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\MAY\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\240075-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATA\REVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 655027) is reported from the analysis of the Laboratory Control Sample (LCS – 655030) at a level of 4.0µg/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: 19MARI03).

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.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
<u>Batch(es)/SDG: ELM S: 2256 HBN: 240075</u>		
<u>Sample Set IDs if Applicable: 1914602/1914603/1914871/1915147</u>		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SB
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR#</u>		
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB



STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850 WKG Std 100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	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
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	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: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
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
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

Working Standard

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



STANDARD REPORT

Working Standard - CLO4ISTDWRK

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730		Created By: Thomas Bosch	Amount: 25 mL		
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM	Expires: 09/20/2019		
MFG Lot: TNB: 05/09/2018		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
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



STANDARD REPORT

Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729			Amount: 1 mL
MFG: Cambridge Isotope			Expires: 04/28/2026
MFG Lot: SDFF-012A			Usable: Yes
Part ID: OLM-7310-S			Lab Lot: CLO4ISTDSTK
Created By: Thomas Bosch			
Create Date: 09/20/2018 09:09AM			
Verified By: Thomas Bosch			
Verify Date:			
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



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

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	1.001 ± 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.

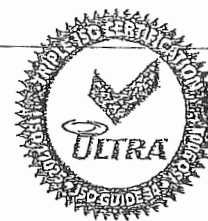
Expiration of Certification:

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.





Certificate of Analysis



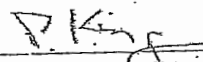
ISO Guide 34 Reference Material

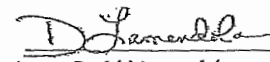
Product Number: ICC-013
Lot Number: CP-0860

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 QAVRA

125 Market Street
New Haven, CT 06513
USA



AccuStandard®

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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

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



Signal Word: None

Component	SRM #	Prepared Concentration ($\mu\text{g/mL}$)
ClO_4 Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is $\pm 0.24\%$.

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 $0.2\ \mu\text{m}$ 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 $\pm 0.5\%$ 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



Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

Quality Standards:

ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification: $\geq 98\%$
 Labeled CAS Number: NA
 Unlabeled CAS Number: 7601-89-0
 MW*: 130.4
 Chemical Formula: NaClO₄
 Storage: Store at room temperature away from light and moisture.
 Stability: See storage and expiration date.

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.

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.

* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 µg/mL
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	109.4 ± 2.8 µg/mL (k=2)



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	
*	655026	CCV@25	Vial 71	1	Control	1	2.51535e6	9.014	26.37917
*	655030	QC@4.0	Vial 72	1	Control	2	4.51078e5	8.943	4.19596
*	655028	ICS@4.0	Vial 73	1	Control	3	4.02631e5	8.668	4.27965
*	655029	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1914602001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	655031	146021S	Vial 76	1	Sample	6	4.52005e5	8.454	5.08666
*	655032	146021D	Vial 77	1	Sample	7	4.57024e5	8.493	4.88333
*	1914603001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1914603002		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1914603003		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1914603004	10K	Vial 81	1	Sample	11	6.15140e5	9.032	6.46842e4
*	1914603005	10K	Vial 82	1	Sample	12	7.46250e5	9.051	7.56269e4
*	1914871001		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1915147001		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	1915147002		Vial 85	1	Sample	15	0.00000	0.000	0.00000
*	655033	CCV@25	Vial 71	1	Control	16	2.26382e6	9.030	25.44543

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	655026	CCV@25	Vial 71	1	Control	1	7.44700e5	9.032	26.32416
*	655030	QC@4.0	Vial 72	1	Control	2	1.45202e5	8.967	4.39774
*	655028	ICS@4.0	Vial 73	1	Control	3	1.38337e5	8.681	4.78850
*	655029	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1914602001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	655031	146021S	Vial 76	1	Sample	6	1.50468e5	8.472	5.54931
*	655032	146021D	Vial 77	1	Sample	7	1.53323e5	8.504	5.36140
*	1914603001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1914603002		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1914603003		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1914603004	10K	Vial 81	1	Sample	11	1.94510e5	9.049	6.75291e4
*	1914603005	10K	Vial 82	1	Sample	12	2.32860e5	9.068	7.82104e4
*	1914871001		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1915147001		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	1915147002		Vial 85	1	Sample	15	0.00000	0.000	0.00000
*	655033	CCV@25	Vial 71	1	Control	16	6.82139e5	9.049	25.81384

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	655026	CCV@25	Vial 71	1	Control	1	2.89154e5	9.034	5.00000
*	655030	QC@4.0	Vial 72	1	Control	2	3.53403e5	8.961	5.00000
*	655028	ICS@4.0	Vial 73	1	Control	3	3.08985e5	8.691	5.00000
*	655029	LMB	Vial 74	1	Control	4	3.47474e5	9.079	5.00000
*	1914602001		Vial 75	1	Sample	5	3.09553e5	8.502	5.00000
*	655031	146021S	Vial 76	1	Sample	6	2.89563e5	8.478	5.00000
*	655032	146021D	Vial 77	1	Sample	7	3.05514e5	8.517	5.00000
*	1914603001		Vial 78	1	Sample	8	2.25289e5	8.279	5.00000
*	1914603002		Vial 79	1	Sample	9	2.22697e5	8.383	5.00000
*	1914603003		Vial 80	1	Sample	10	2.34373e5	8.224	5.00000
*	1914603004	10K	Vial 81	1	Sample	11	3.06845e5	9.055	5.00000e4
*	1914603005	10K	Vial 82	1	Sample	12	3.16468e5	9.072	5.00000e4
*	1914871001		Vial 83	1	Sample	13	2.66978e5	8.492	5.00000
*	1915147001		Vial 84	1	Sample	14	2.34476e5	8.342	5.00000
*	1915147002		Vial 85	1	Sample	15	2.47416e5	8.369	5.00000
*	655033	CCV@25	Vial 71	1	Control	16	2.70388e5	9.054	5.00000

Sequence Table:

Method and Injection Info Part:

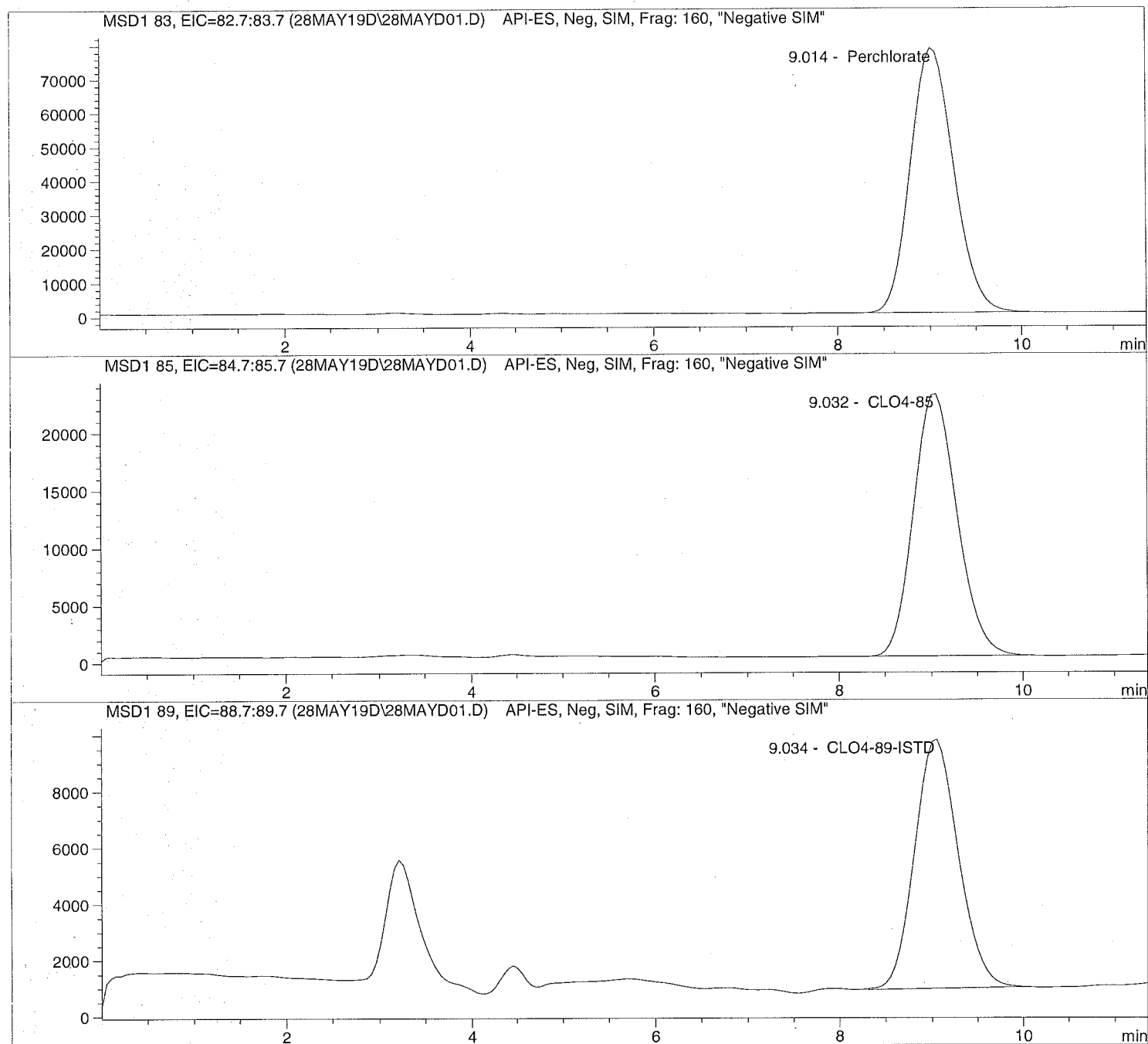
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	655026	CCV@25	CLO4-AQN	1	Ctrl Samp	
2	Vial 72	655030	QC@4.0	CLO4-AQN	1	Ctrl Samp	
3	Vial 73	655028	ICS@4.0	CLO4-AQN	1	Ctrl Samp	
4	Vial 74	655029	LMB	CLO4-AQN	1	Ctrl Samp	
5	Vial 75	1914602001		CLO4-AQN	1	Sample	
6	Vial 76	655031	146021S	CLO4-AQN	1	Sample	
7	Vial 77	655032	146021D	CLO4-AQN	1	Sample	
8	Vial 78	1914603001		CLO4-AQN	1	Sample	
9	Vial 79	1914603002		CLO4-AQN	1	Sample	
10	Vial 80	1914603003		CLO4-AQN	1	Sample	
11	Vial 81	1914603004	10K	CLO4-AQN	1	Sample	
12	Vial 82	1914603005	10K	CLO4-AQN	1	Sample	
13	Vial 83	1914871001		CLO4-AQN	1	Sample	
14	Vial 84	1915147001		CLO4-AQN	1	Sample	
15	Vial 85	1915147002		CLO4-AQN	1	Sample	
16	Vial 71	655033	CCV@25	CLO4-AQN	1	Ctrl Samp	

Injection Date: 5/28/2019 09:22:28
Sample Name: 655026 CCV@25
Acq Operator: TNB

Seq Line: 1
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 09:22:28 Seq Line: 1
Sample Name: 655026 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.014	PBA	2515348.3	26.3792	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.032	PBA	744700.3	26.3242	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.034	BBA	289154.0	5.0000	CLO4-89-ISTD

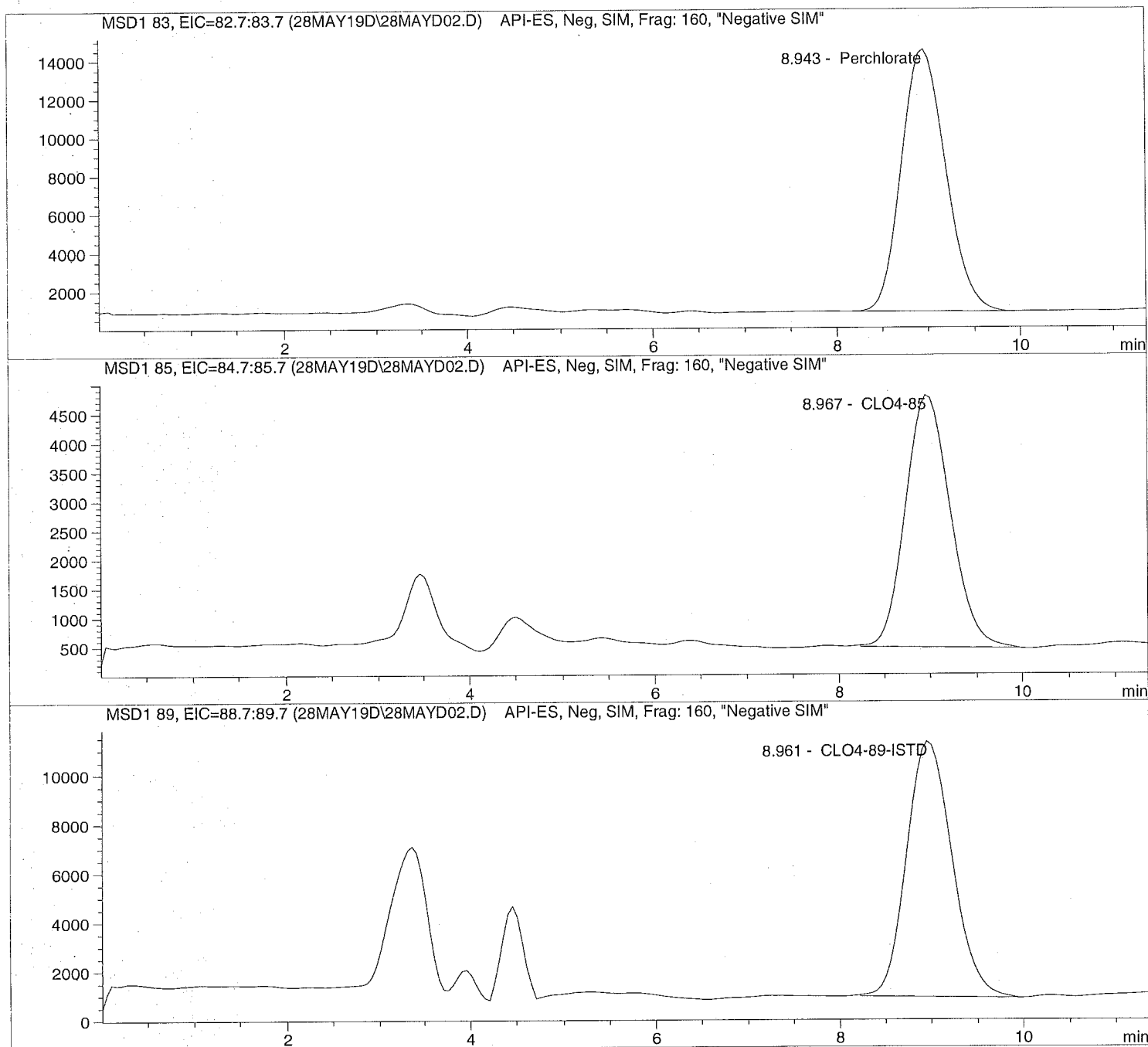
*** End of Report ***

Injection Date: 5/28/2019 09:39:12
Sample Name: 655030 QC@4.0
Acq Operator: TNB

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date: 5/28/2019 09:39:12      Seq Line: 2
Sample Name: 655030 QC@4.0              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-DP2.M
Last Changed: 4/12/2019 07:54:13
```

Perchlorate analysis

```
=====
Sample Information
=====
```

```
Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000
```

```
=====
LCMS Results
=====
```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.943	PBA	451078.5	4.1960	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.967	BBA	145201.9	4.3977	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.961	BBA	353402.8	5.0000	CLO4-89-ISTD

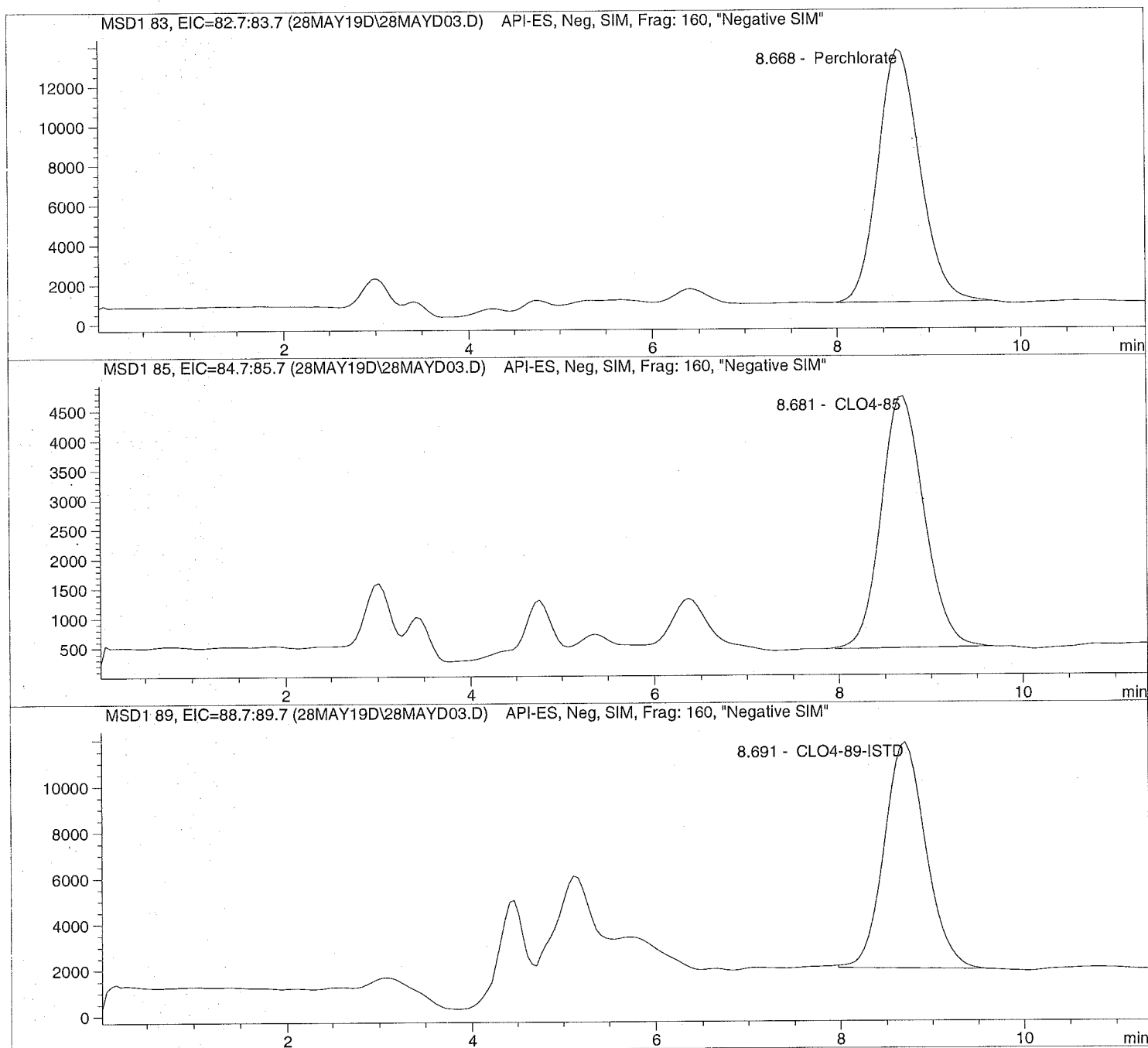
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=====
*** End of Report ***
=====
```

Injection Date: 5/28/2019 09:54:31
Sample Name: 655028 ICS@4.0
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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 09:54:31 Seq Line: 3
Sample Name: 655028 ICS@4.0 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.668	PBA	402631.1	4.2796	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.681	BBA	138337.3	4.7885	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.691	BBA	308984.7	5.0000	CLO4-89-ISTD

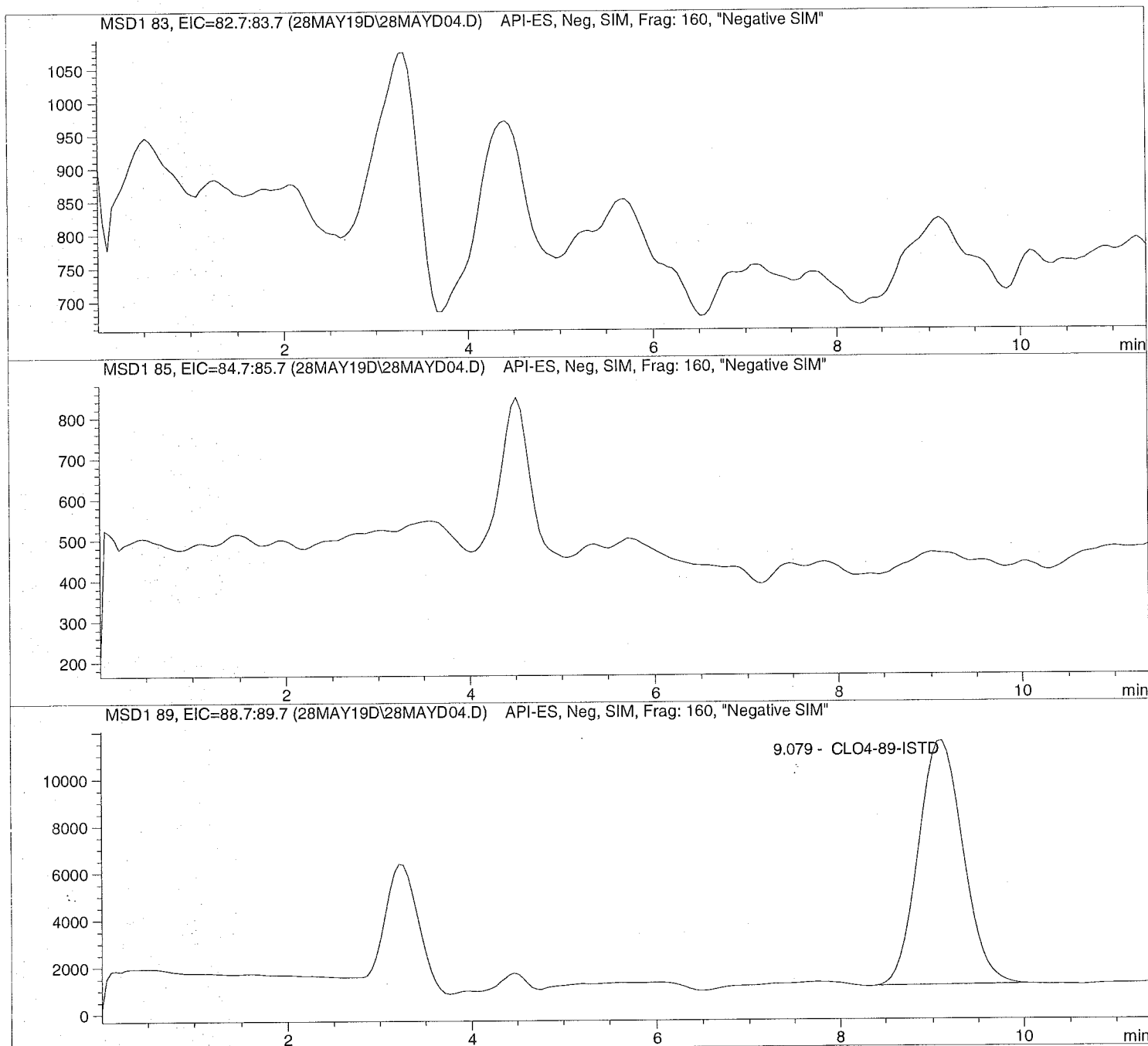
*** End of Report ***

Injection Date: 5/28/2019 10:08:00
Sample Name: 655029 LMB
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 10:08:00 Seq Line: 4
Sample Name: 655029 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.079	PBA	347474.2	5.0000	CLO4-89-ISTD

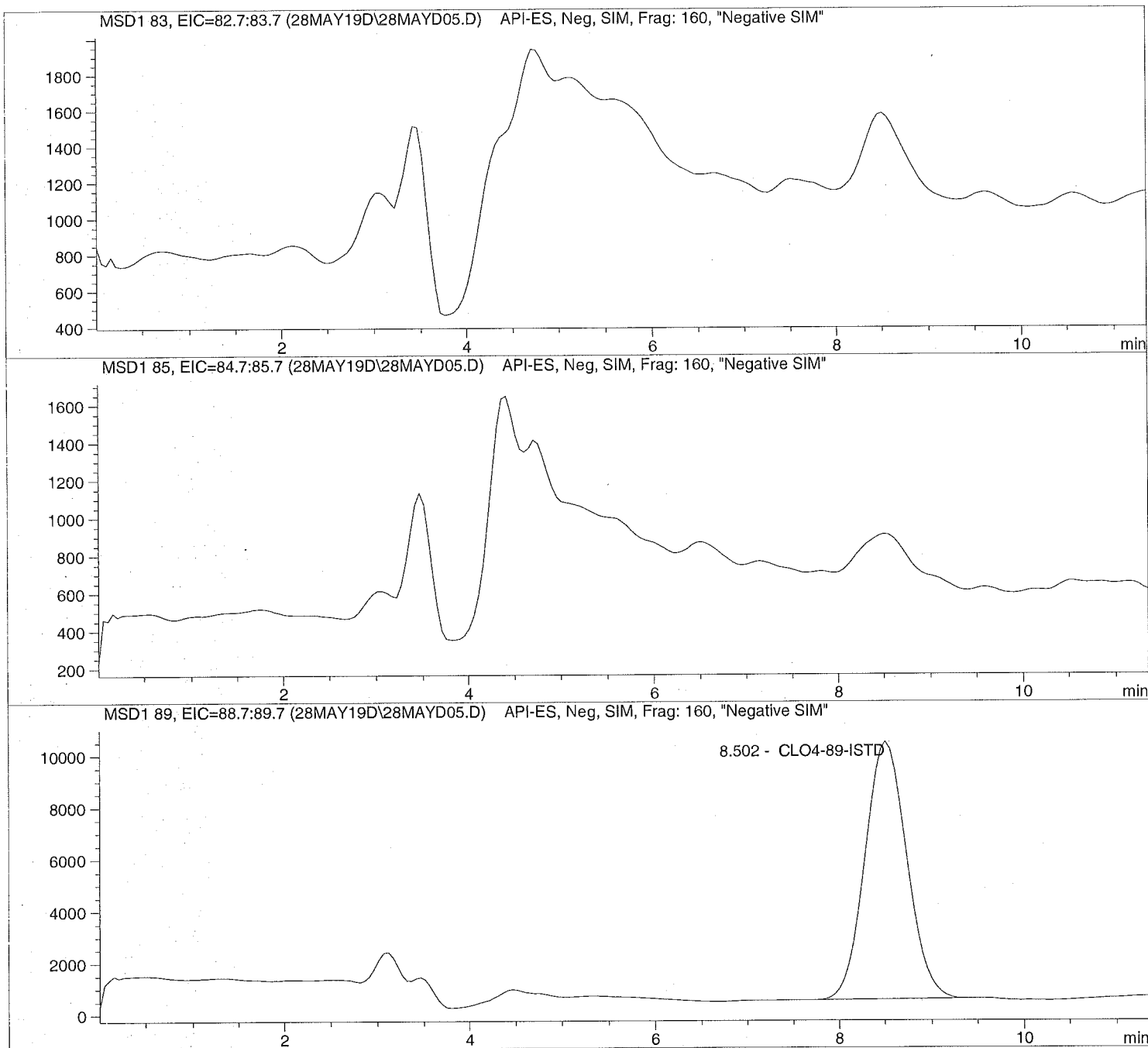
*** End of Report ***

Injection Date: 5/28/2019 10:21:23
Sample Name: 1914602001
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  5/28/2019  10:21:23      Seq Line:      5
Sample Name:    1914602001      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-DP2.M
Last Changed:   4/12/2019  07:54:13
=====
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.502	PBA	309553.4	5.0000	CLO4-89-ISTD

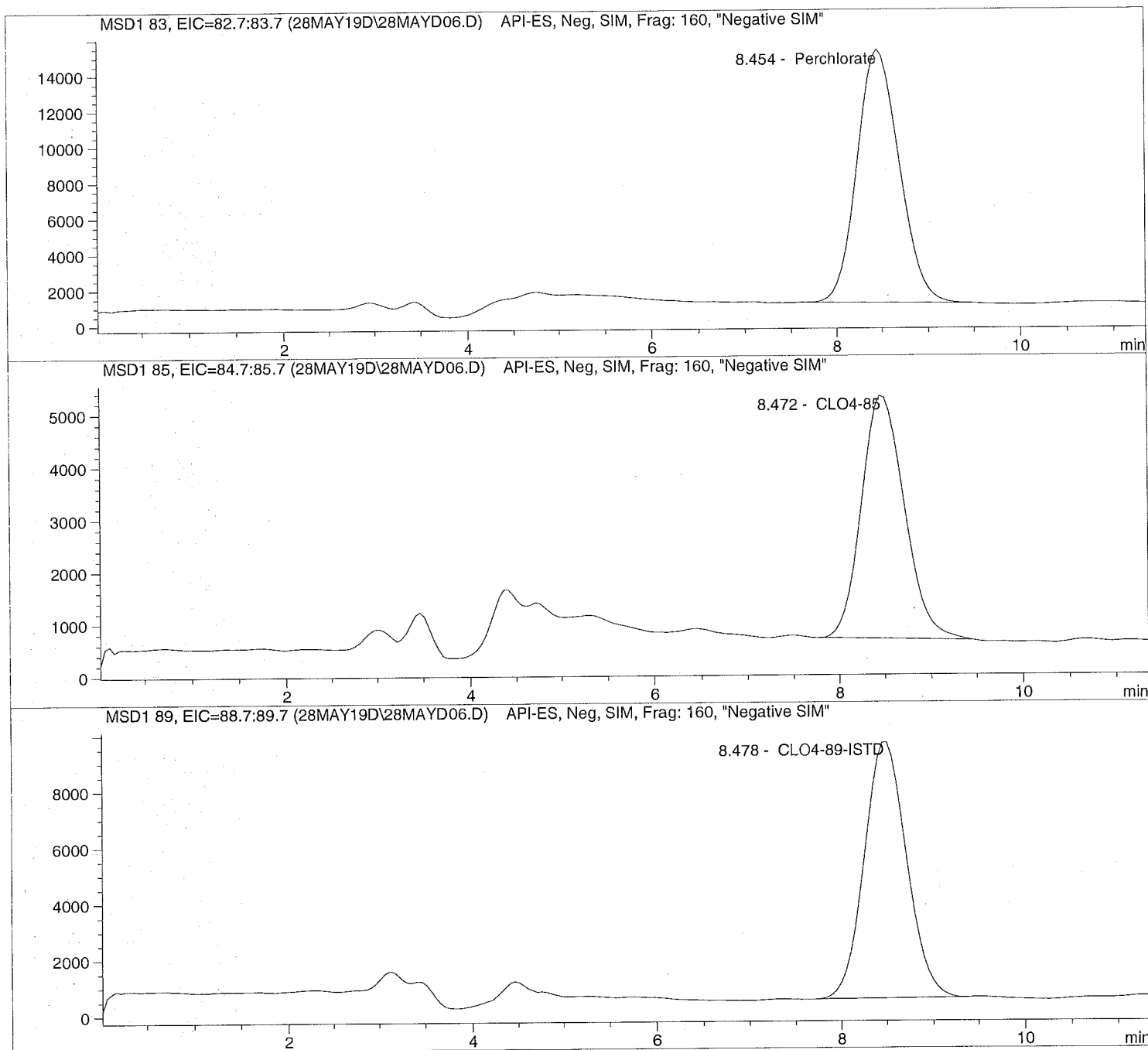
```
=====
*** End of Report ***
=====
```


Injection Date: 5/28/2019 10:34:49
Sample Name: 655031 146021S
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 10:34:49 Seq Line: 6
Sample Name: 655031 146021S 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.454	BBA	452005.2	5.0867	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	PBA	150468.2	5.5493	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.478	PBA	289563.3	5.0000	CLO4-89-ISTD

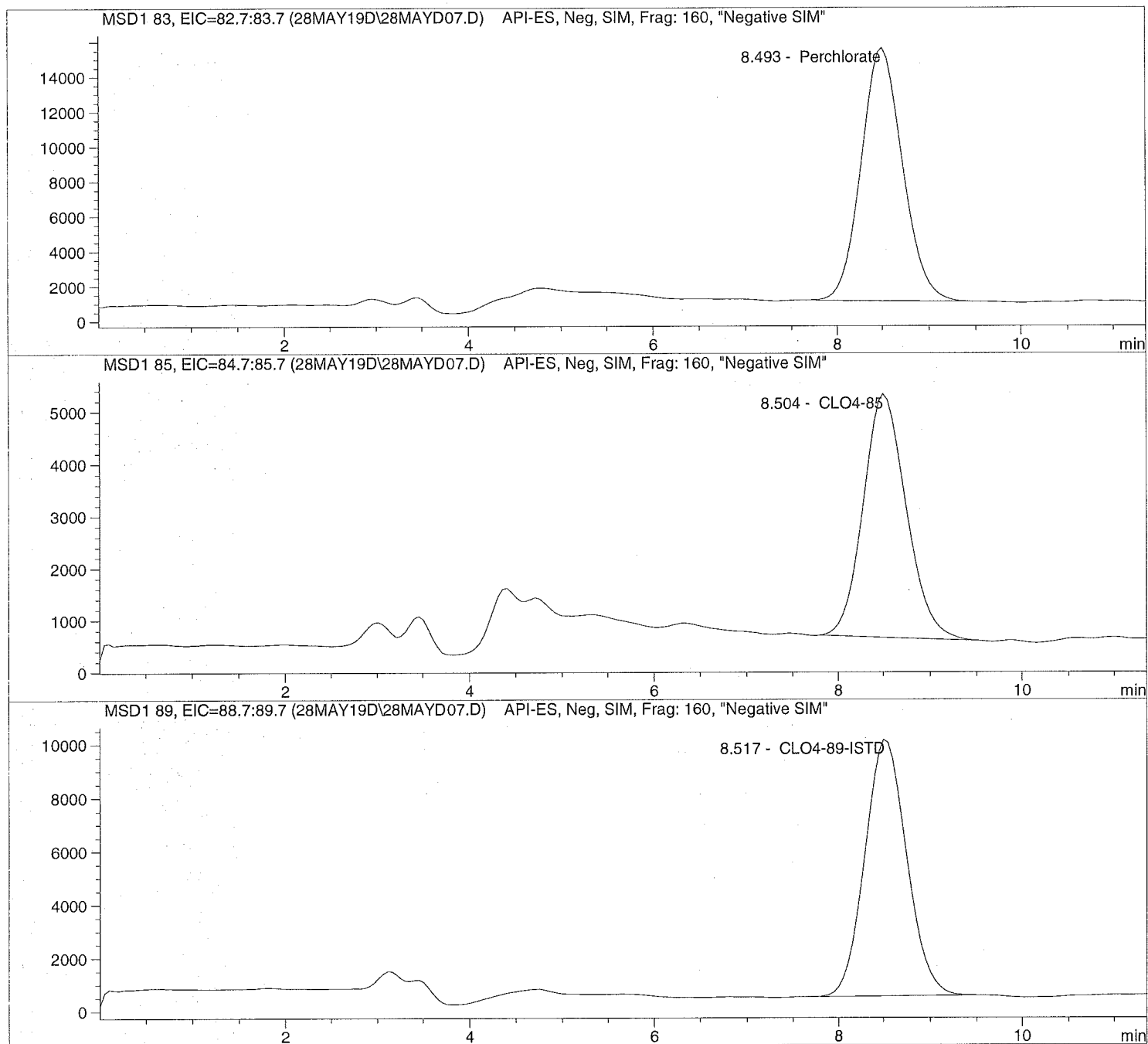
*** End of Report ***

Injection Date: 5/28/2019 10:48:16
Sample Name: 655032 146021D
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 10:48:16 Seq Line: 7
Sample Name: 655032 146021D 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.493	BBA	457024.3	4.8833	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.504	PBA	153322.9	5.3614	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.517	PBA	305513.7	5.0000	CLO4-89-ISTD

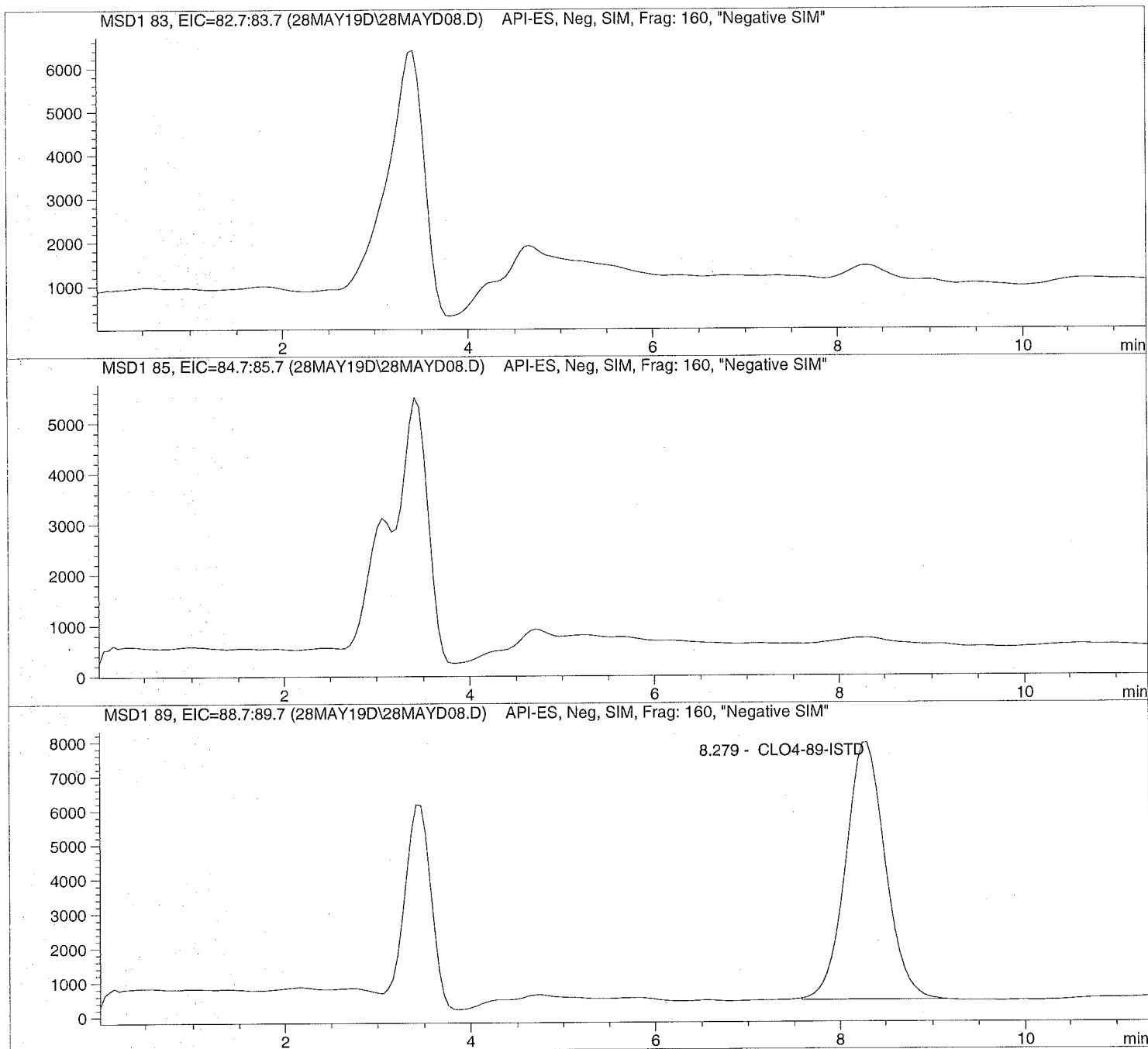
*** End of Report ***

Injection Date: 5/28/2019 11:01:42
Sample Name: 1914603001
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  5/28/2019  11:01:42      Seq Line:      8
Sample Name:    1914603001      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-DP2.M
Last Changed:   4/12/2019  07:54:13
=====
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.279	BBA	225288.9	5.0000	CLO4-89-ISTD

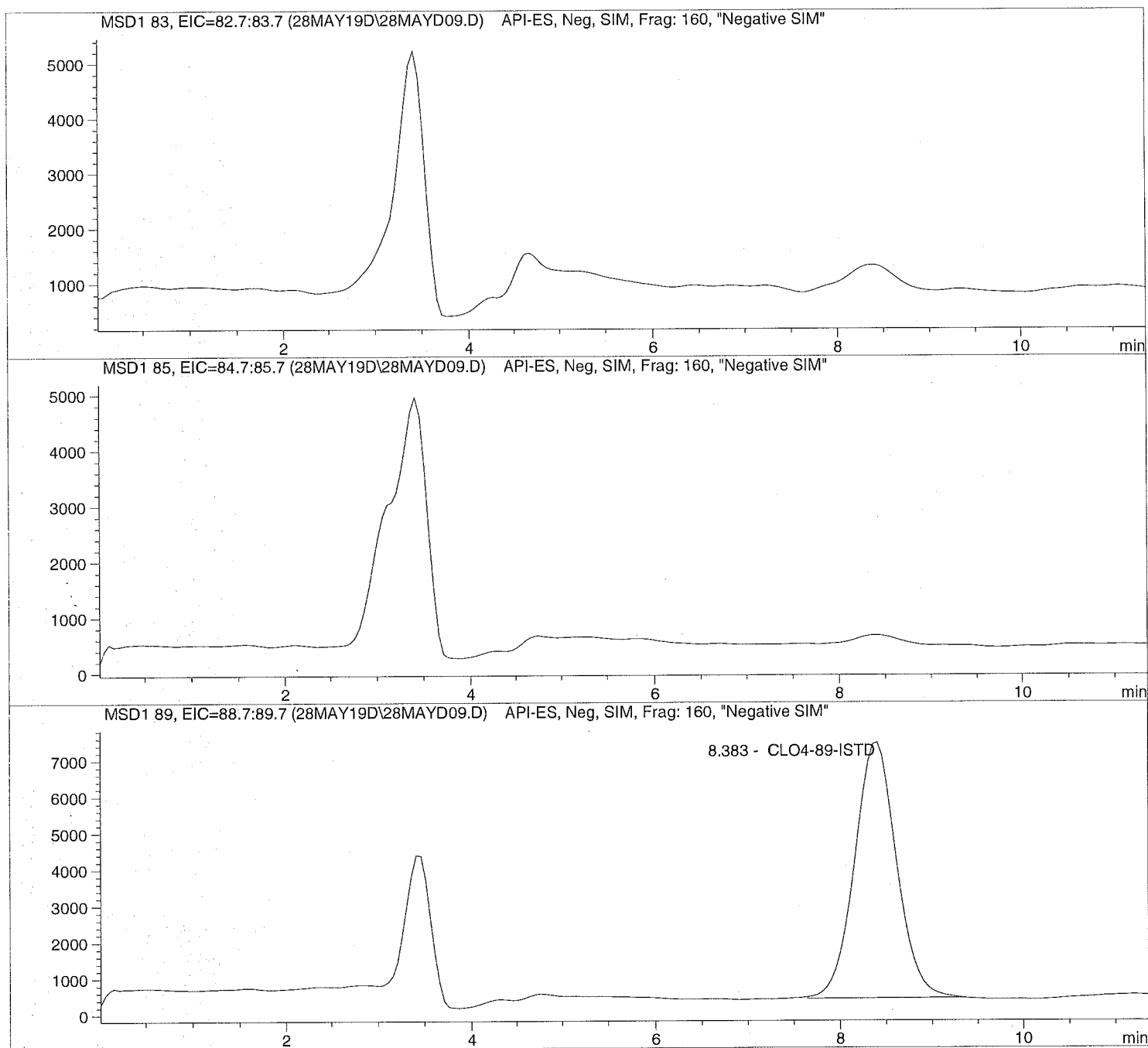
```
=====
*** End of Report ***
=====
```

Injection Date: 5/28/2019 11:15:07
Sample Name: 1914603002
Acq Operator: TNB

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 11:15:07 Seq Line: 9
Sample Name: 1914603002 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.383	BBA	222696.7	5.0000	CLO4-89-ISTD

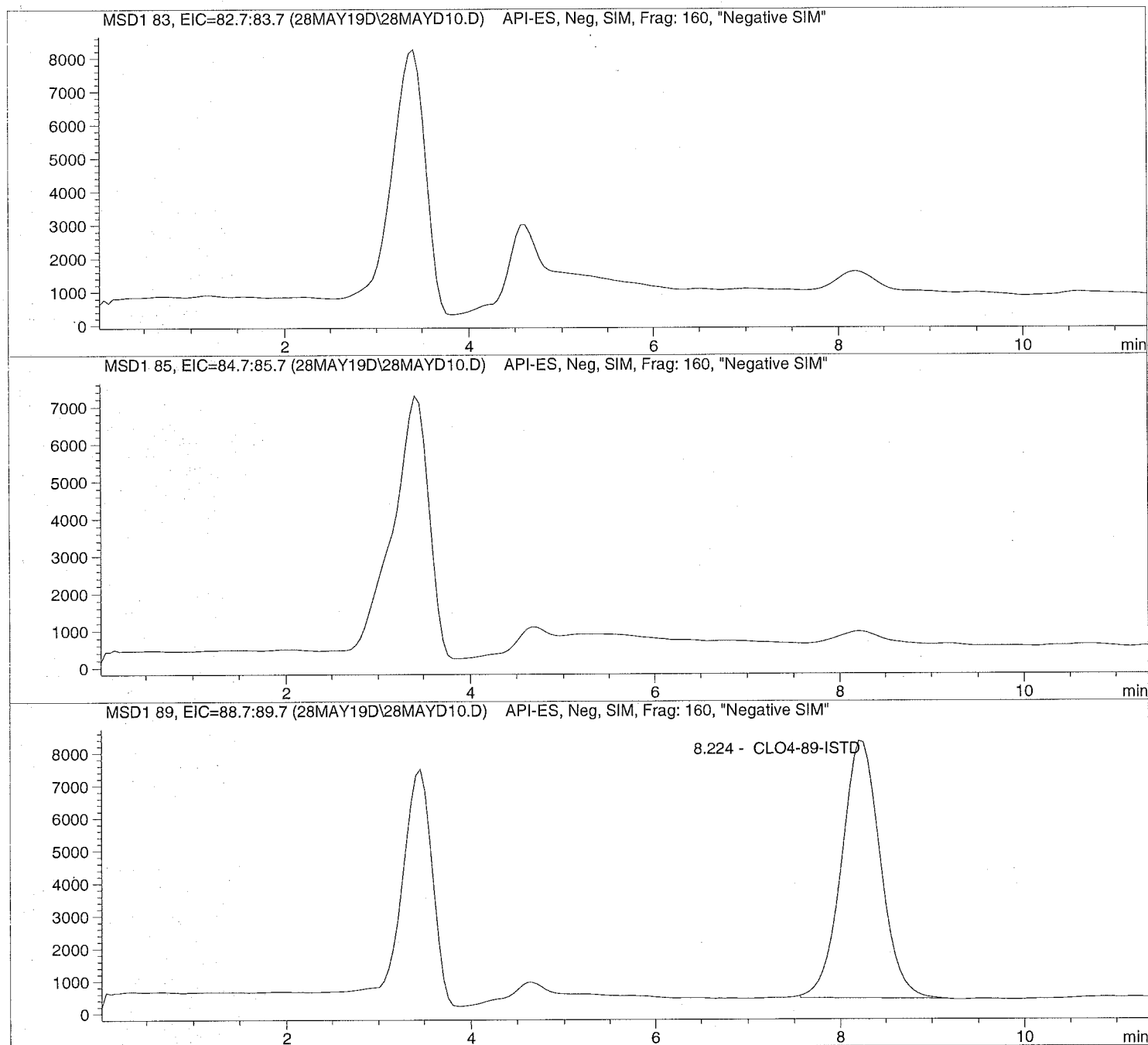
*** End of Report ***

Injection Date: 5/28/2019 11:28:30
Sample Name: 1914603003
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 11:28:30 Seq Line: 10
Sample Name: 1914603003 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.224	BBA	234372.9	5.0000	CLO4-89-ISTD

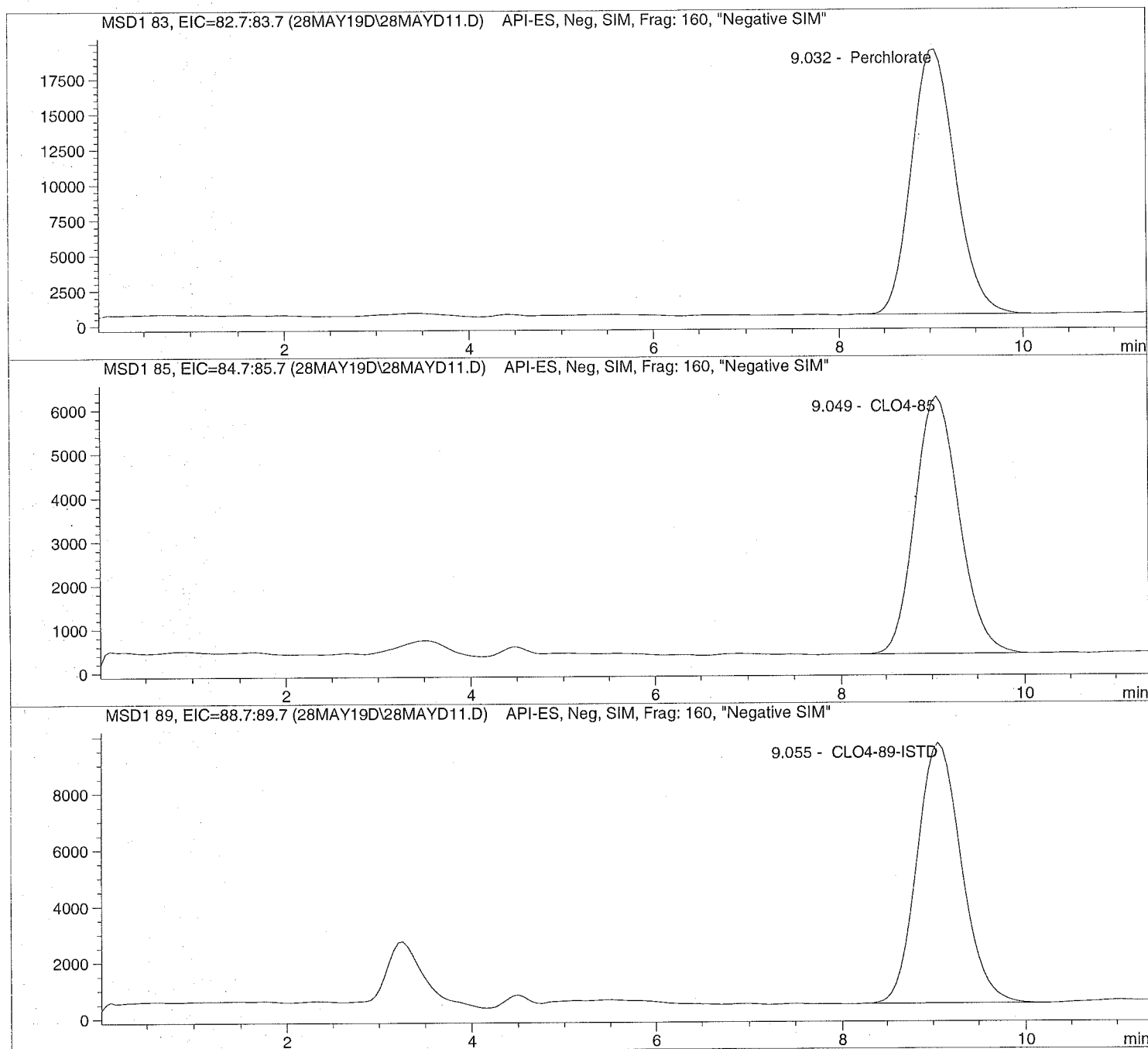
*** End of Report ***

Injection Date: 5/28/2019 11:41:53
Sample Name: 1914603004 10K
Acq Operator: TNB

Seq Line: 11
Location: Vial 81
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 11:41:53 Seq Line: 11
Sample Name: 1914603004 10K 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 10000.000000
Sample Amount: 0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.032	BBA	615140.4	64684.2479	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.049	BBA	194510.4	67529.1287	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.055	BBA	306844.5	50000.0000	CLO4-89-ISTD

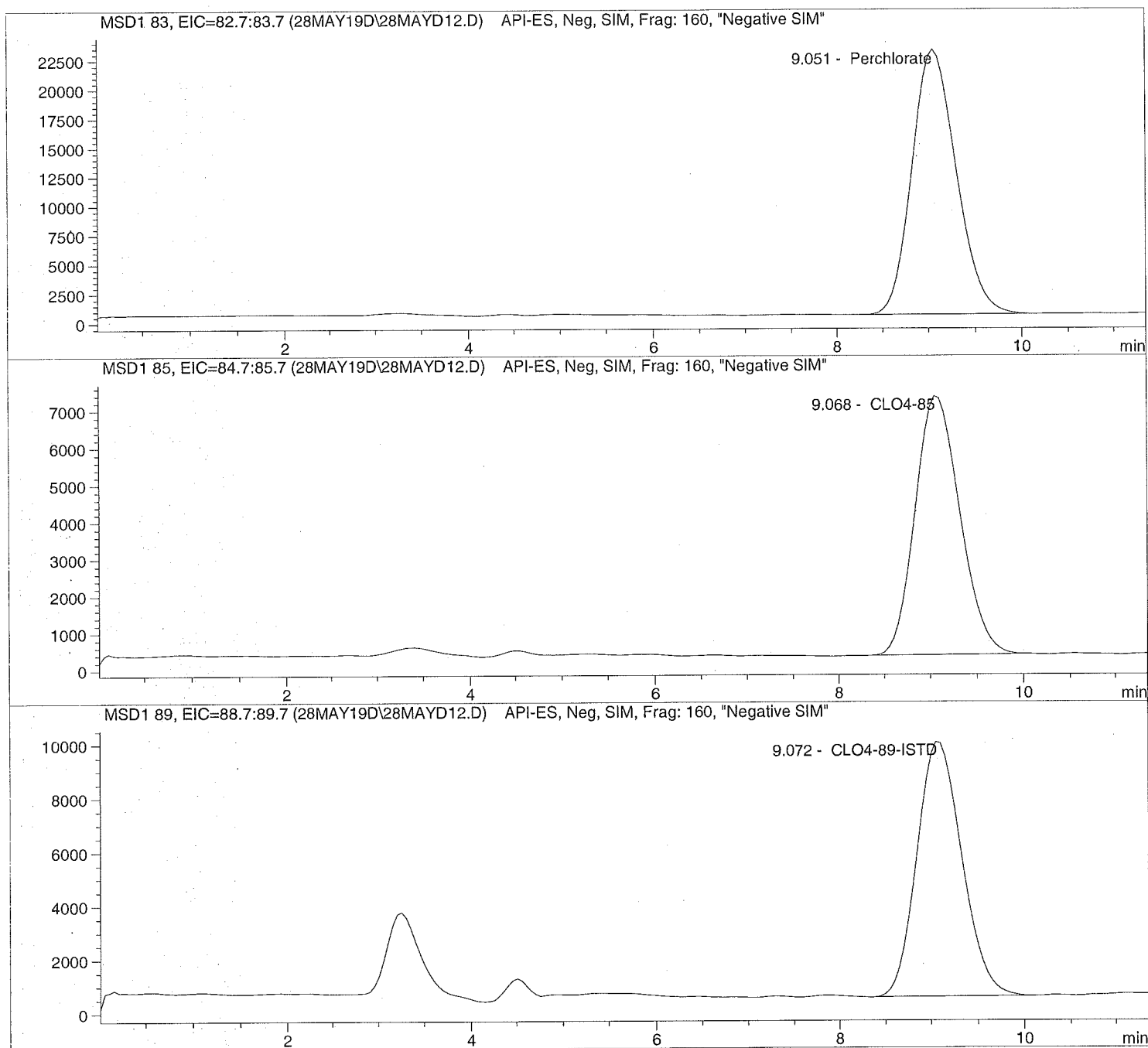
*** End of Report ***

Injection Date: 5/28/2019 11:55:16
Sample Name: 1914603005 10K
Acq Operator: TNB

Seq Line: 12
Location: Vial 82
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 11:55:16 Seq Line: 12
Sample Name: 1914603005 10K Location: Vial 82
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 10000.000000
Sample Amount: 0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.051	PBA	746250.2	75626.8976	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.068	BBA	232859.8	78210.3806	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.072	PBA	316467.9	50000.0000	CLO4-89-ISTD

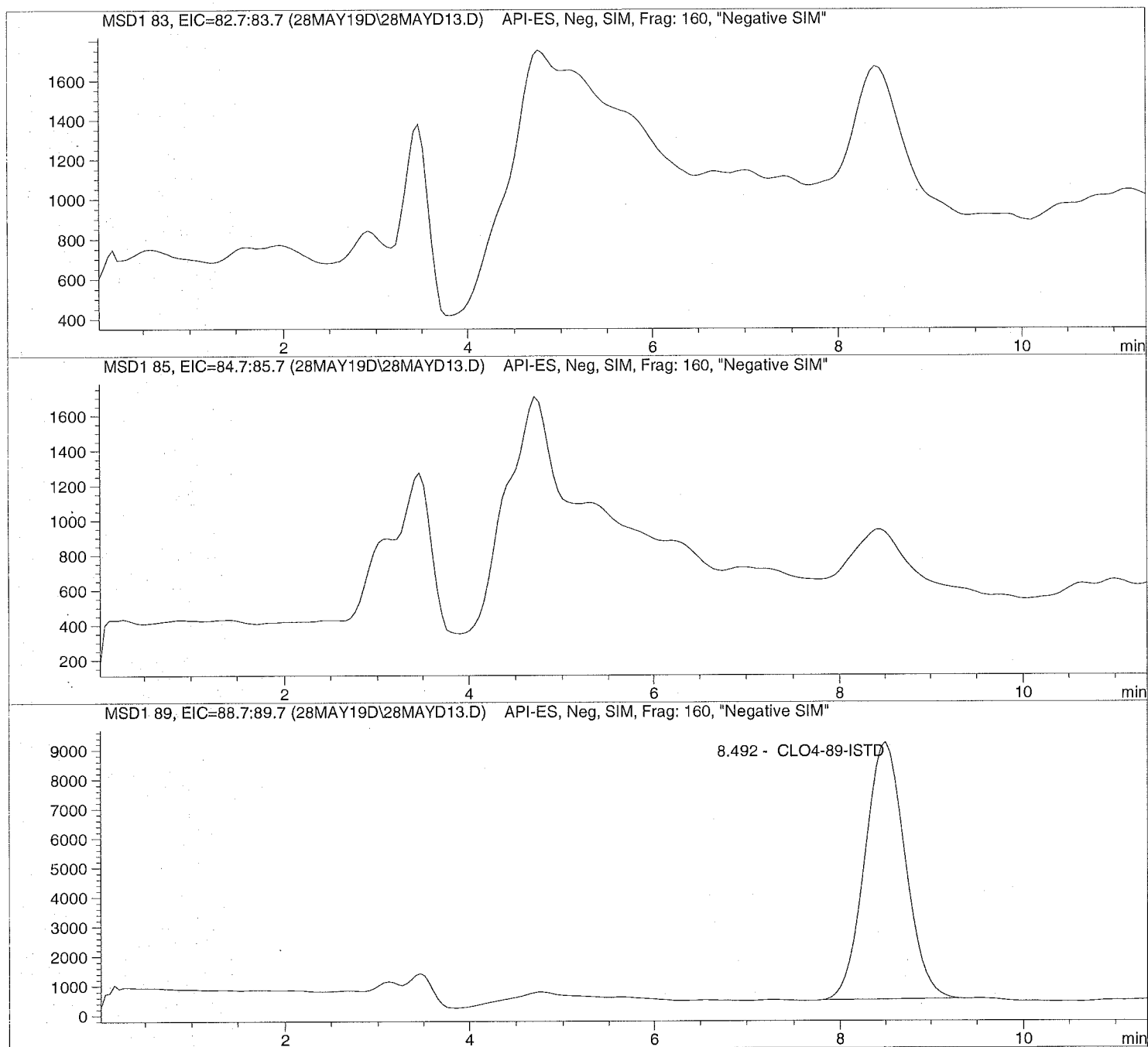
*** End of Report ***

Injection Date: 5/28/2019 12:08:42
Sample Name: 1914871001
Acq Operator: TNB

Seq Line: 13
Location: Vial 83
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  5/28/2019  12:08:42      Seq Line:      13
Sample Name:    1914871001      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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.492	PBA	266978.1	5.0000	CLO4-89-ISTD

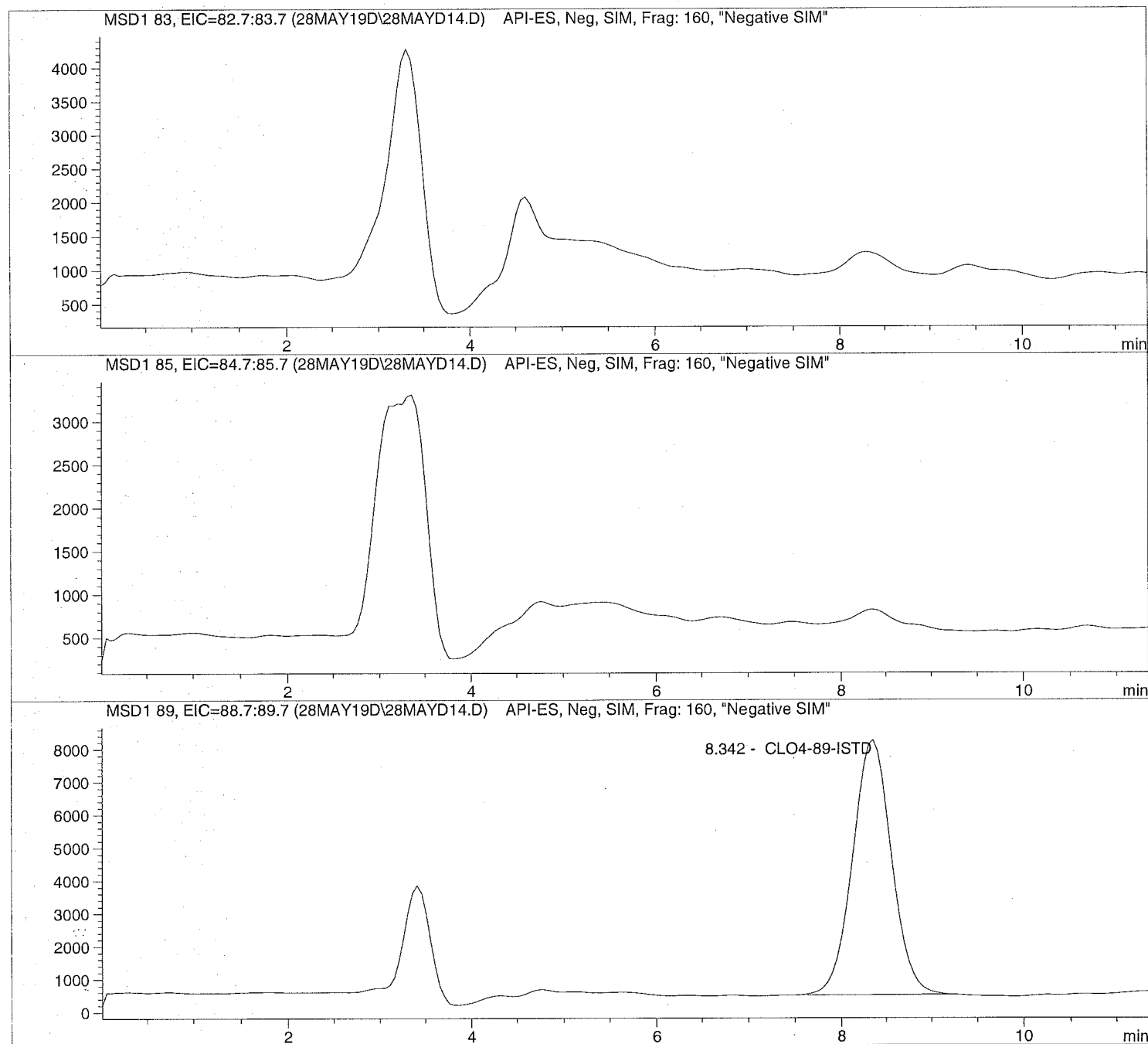
*** End of Report ***

Injection Date: 5/28/2019 12:22:08
Sample Name: 1915147001
Acq Operator: TNB

Seq Line: 14
Location: Vial 84
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 12:22:08 Seq Line: 14
Sample Name: 1915147001 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.342	BBA	234476.0	5.0000	CLO4-89-ISTD

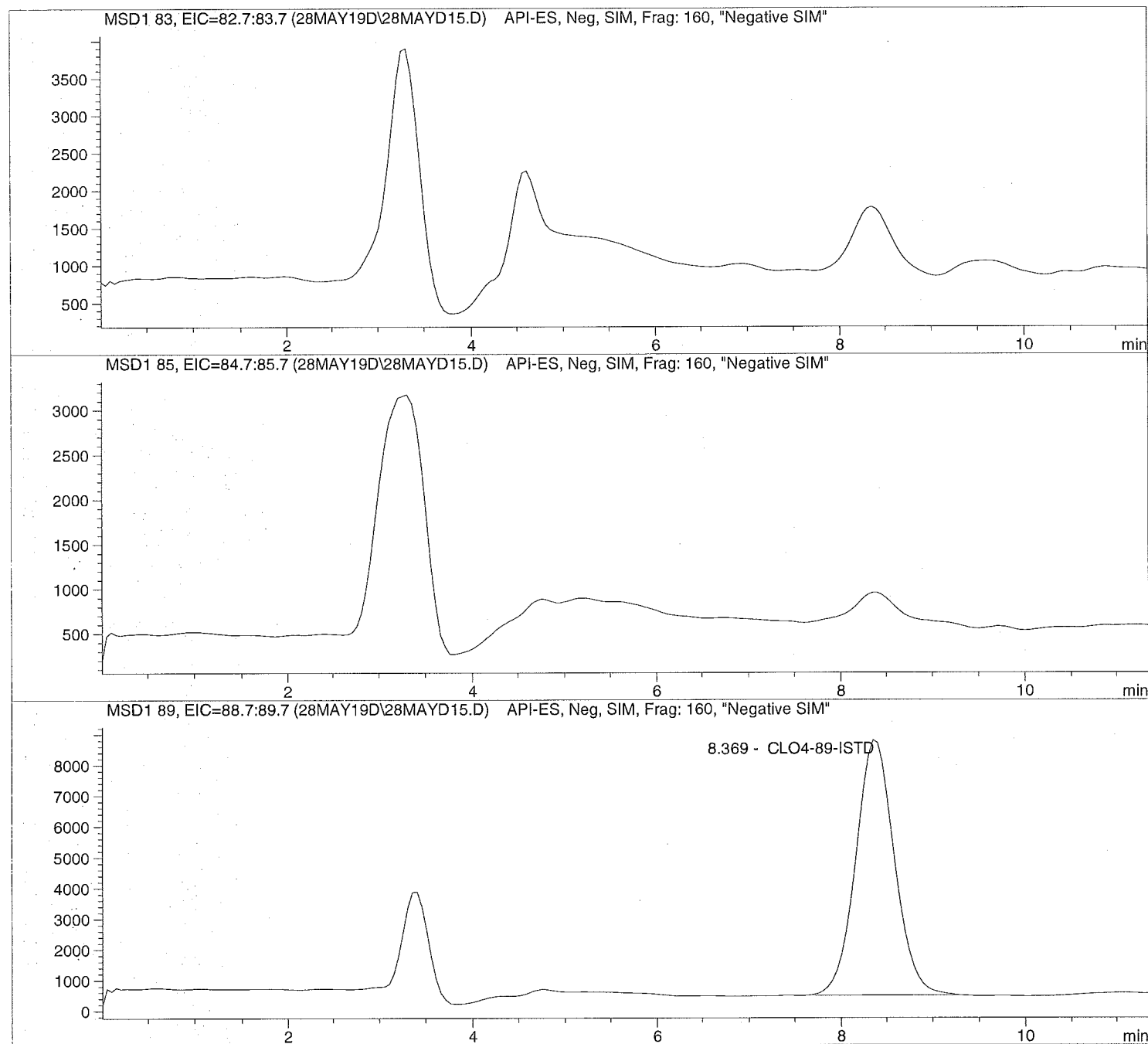
*** End of Report ***

Injection Date: 5/28/2019 12:35:29
Sample Name: 1915147002
Acq Operator: TNB

Seq Line: 15
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  5/28/2019  12:35:29      Seq Line:      15
Sample Name:    1915147002      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-DP2.M
Last Changed:   4/12/2019  07:54:13
=====
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.369	BBA	247415.5	5.0000	CLO4-89-ISTD

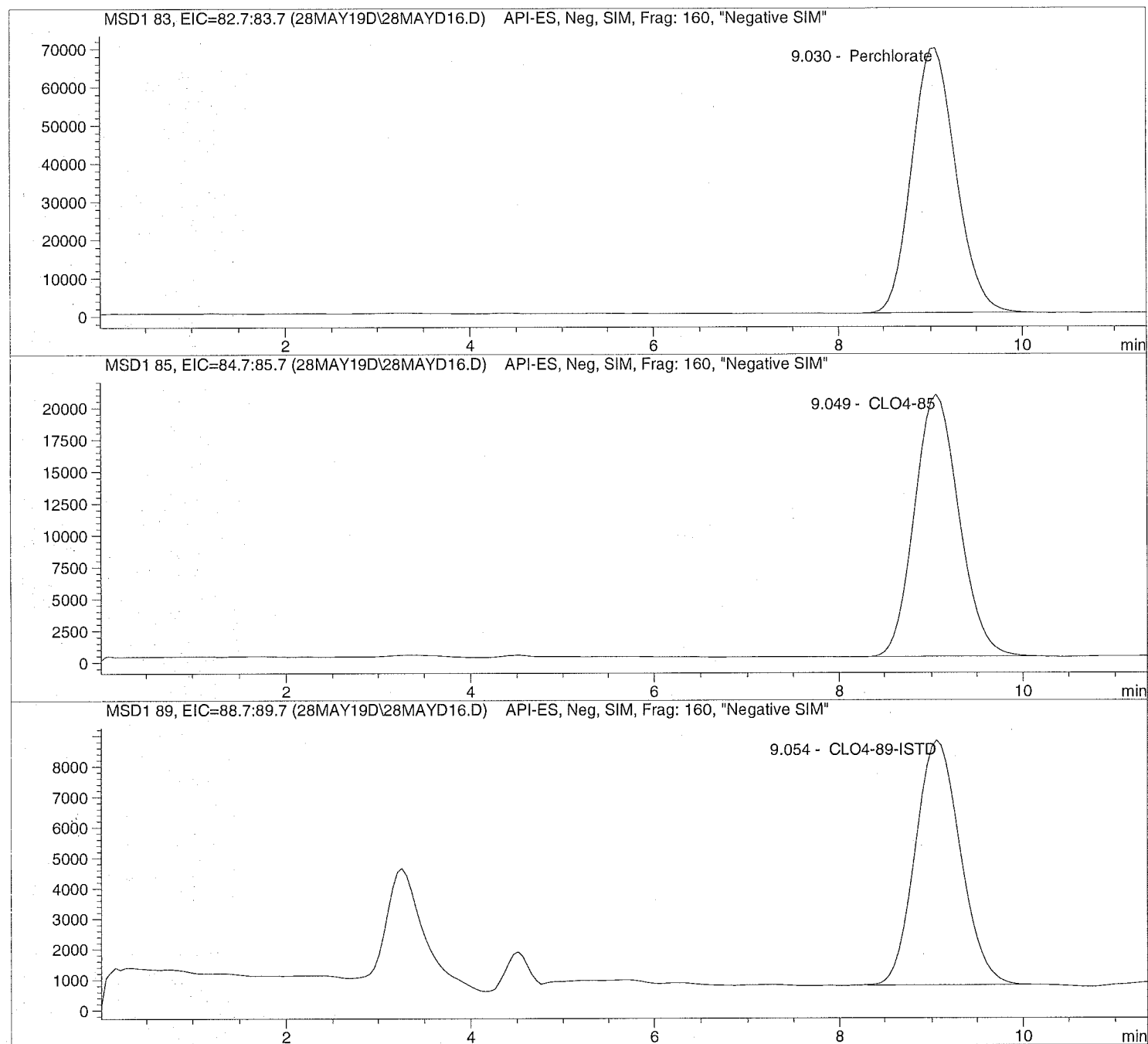
```
=====
*** End of Report ***
=====
```

Injection Date: 5/28/2019 13:28:26
Sample Name: 655033 CCV@25
Acq Operator: TNB

Seq Line: 16
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 13:28:26
Sample Name: 655033 CCV@25
Acq Operator: TNB

Seq Line: 16
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.030	PBA	2263822.8	25.4454	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.049	PBA	682139.4	25.8138	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.054	BBA	270387.5	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 : 3/19/2019 2:35:19 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

#

#	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 Lvl Amount Area Amt/Area Ref Grp Name

[min] Sig

RetTime [min]	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
8.744	1	1.00000	7.76074e4	1.28854e-5	1		Perchlorate
	2	2.00000	1.35273e5	1.47849e-5			
	3	5.00000	3.37764e5	1.48033e-5			
	4	10.00000	6.83454e5	1.46316e-5			
	5	25.00000	2.08433e6	1.19943e-5			
	6	50.00000	4.13334e6	1.20968e-5			
	7	75.00000	5.99313e6	1.25143e-5			
8.755	2	1.00000	2.36780e4	4.22333e-5	1		CLO4-85
	2	2.00000	4.69486e4	4.25998e-5			
	3	5.00000	1.06124e5	4.71147e-5			
	4	10.00000	2.13523e5	4.68335e-5			
	5	25.00000	6.14295e5	4.06971e-5			
	6	50.00000	1.19814e6	4.17315e-5			
	7	75.00000	1.78355e6	4.20509e-5			
8.766	3	5.00000	2.73208e5	1.83011e-5	+I1		CLO4-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5			
	3	5.00000	2.33196e5	2.14412e-5			
	4	5.00000	2.34454e5	2.13262e-5			
	5	5.00000	2.50568e5	1.99547e-5			
	6	5.00000	2.30977e5	2.16472e-5			

RetTime	Lvl	Amount	Area	Amt/Area	Ref Grp Name
---------	-----	--------	------	----------	--------------

[min]	Sig
-------	-----

7	5.00000	2.21504e5	2.25729e-5	
---	---------	-----------	------------	--

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min

Curve Type : Quadratic

Origin : Ignored

Calibration Level Weights:/

Level 1	: 1
Level 2	: 0.5
Level 3	: 0.2
Level 4	: 0.1
Level 5	: 0.04
Level 6	: 0.02
Level 7	: 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min

Curve Type : Quadratic

Origin : Ignored

Calibration Level Weights:/

Level 1	: 1
Level 2	: 0.5
Level 3	: 0.2
Level 4	: 0.1
Level 5	: 0.04
Level 6	: 0.02
Level 7	: 0.013333

Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min

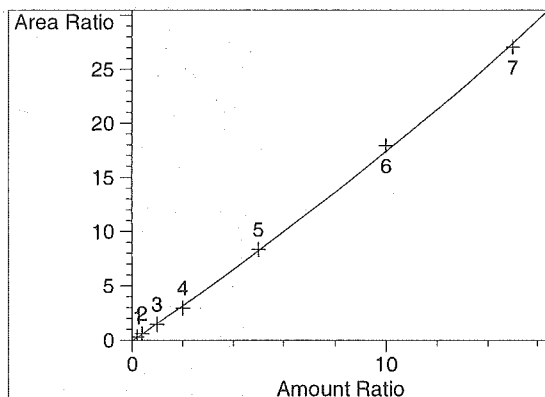
Curve Type : Linear

Origin : Included

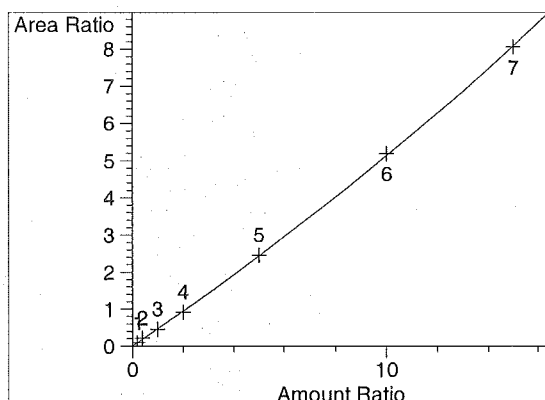
Calibration Level Weights:/

Level 1	: 1
Level 2	: 1
Level 3	: 1
Level 4	: 1
Level 5	: 1
Level 6	: 1
Level 7	: 1

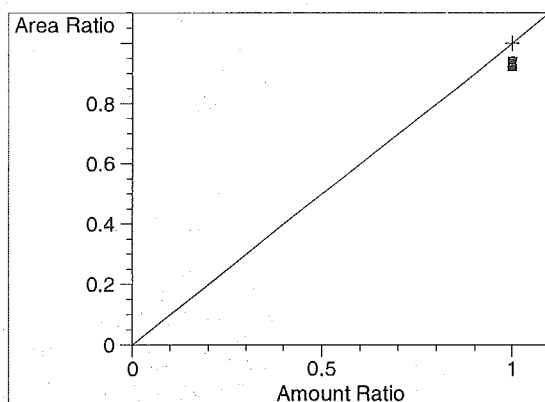
=====
Peak Sum Table
=====***No Entries in table***
=====

=====
Calibration Curves
=====

Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation: 0.99957
Residual Std. Dev.: 0.30744
Formula: $y = ax^2 + bx + c$
a: 1.76988e-2
b: 1.56480
c: -4.92430e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755
MSD1 85, EIC=84.7:85.7
Correlation: 0.99983
Residual Std. Dev.: 0.03473
Formula: $y = ax^2 + bx + c$
a: 5.13396e-3
b: 4.62055e-1
c: 4.97209e-4
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766
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 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	7.76074e4	8.744	1.06245
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	8.992	2.06969
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	8.586	4.73474
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	8.698	9.27727
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	8.451	25.29036
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	8.810	51.36844
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	8.586	74.16754
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	8.702	9.25940

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	8.755	9.30535e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	9.012	2.24255
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	8.602	4.86656
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	8.713	9.64312
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	8.468	25.12159
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	8.825	50.46721
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	8.603	74.72019
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	8.721	9.54024

#*	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	2.73208e5	8.766	5.00000
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	9.012	5.00000
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	8.609	5.00000
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	8.716	5.00000
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	8.472	5.00000
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	8.825	5.00000
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	8.610	5.00000
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	8.725	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

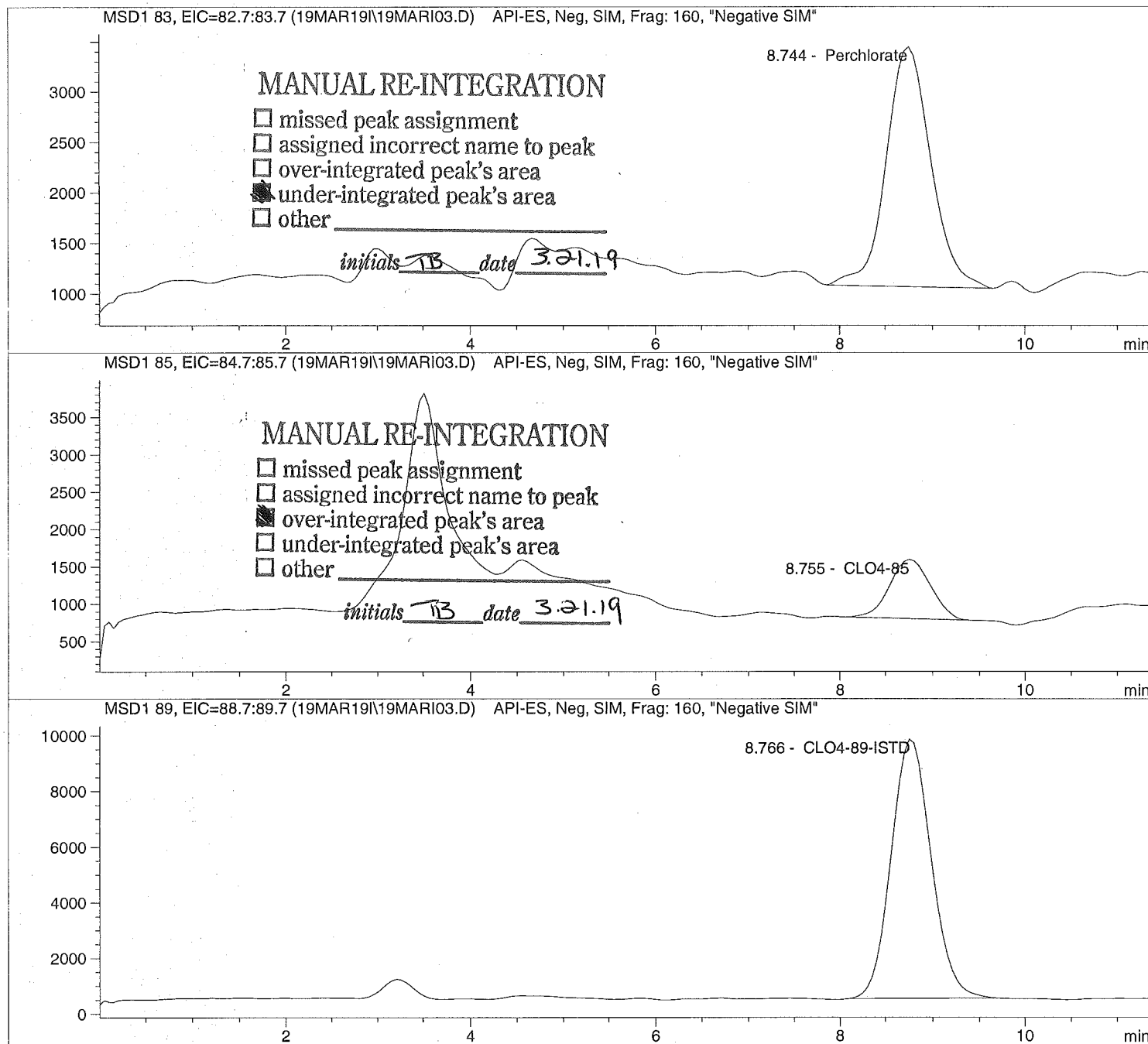
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	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 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:39:40 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.744	MM	77607.4	1.0625	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	MM	23678.0	0.9305	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

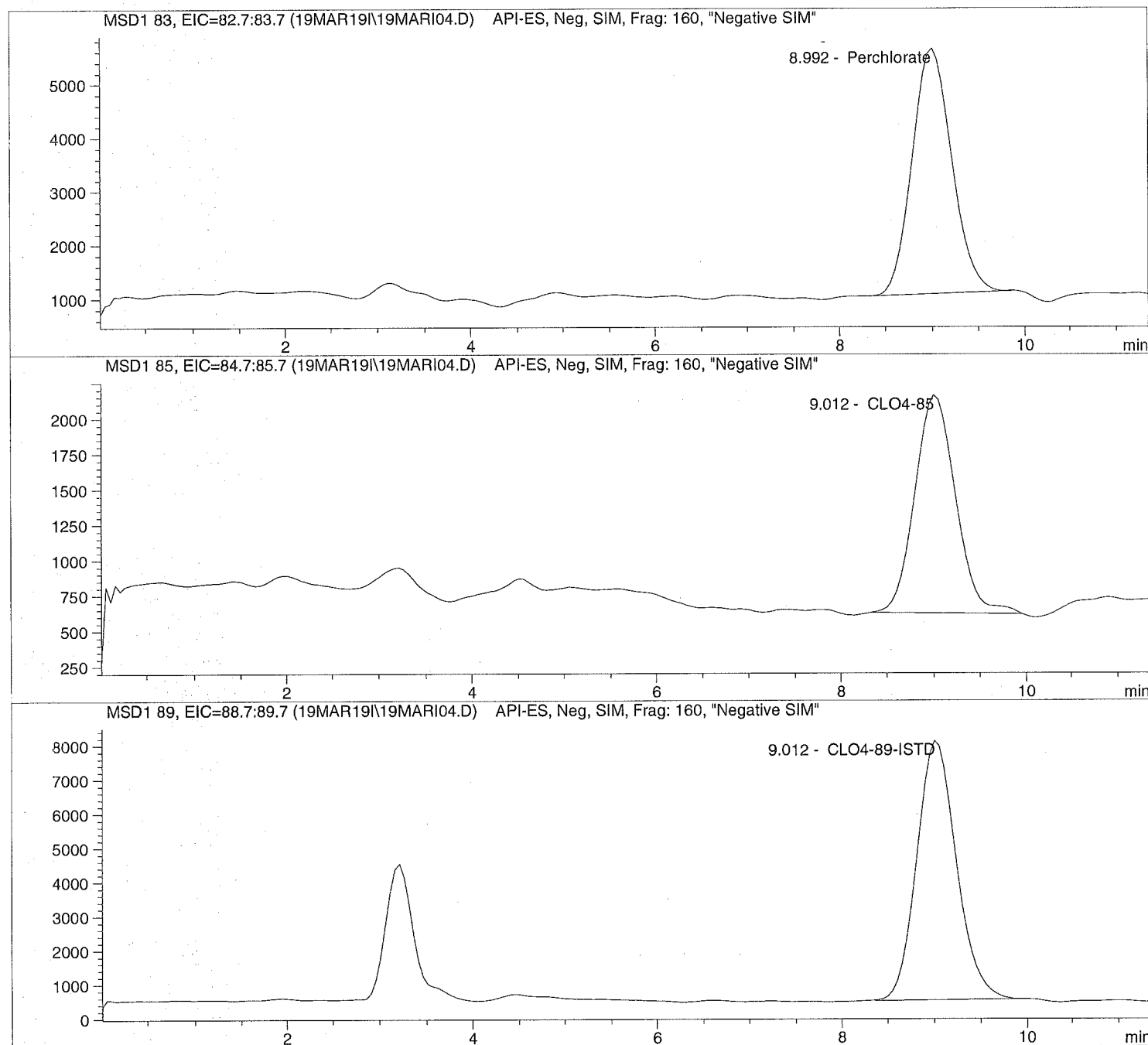
*** End of Report ***

Injection Date: 3/19/2019 09:53:00
Sample Name: CLO4@ 2.0ug/L
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:53:00 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.992	BBA	135272.8	2.0697	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

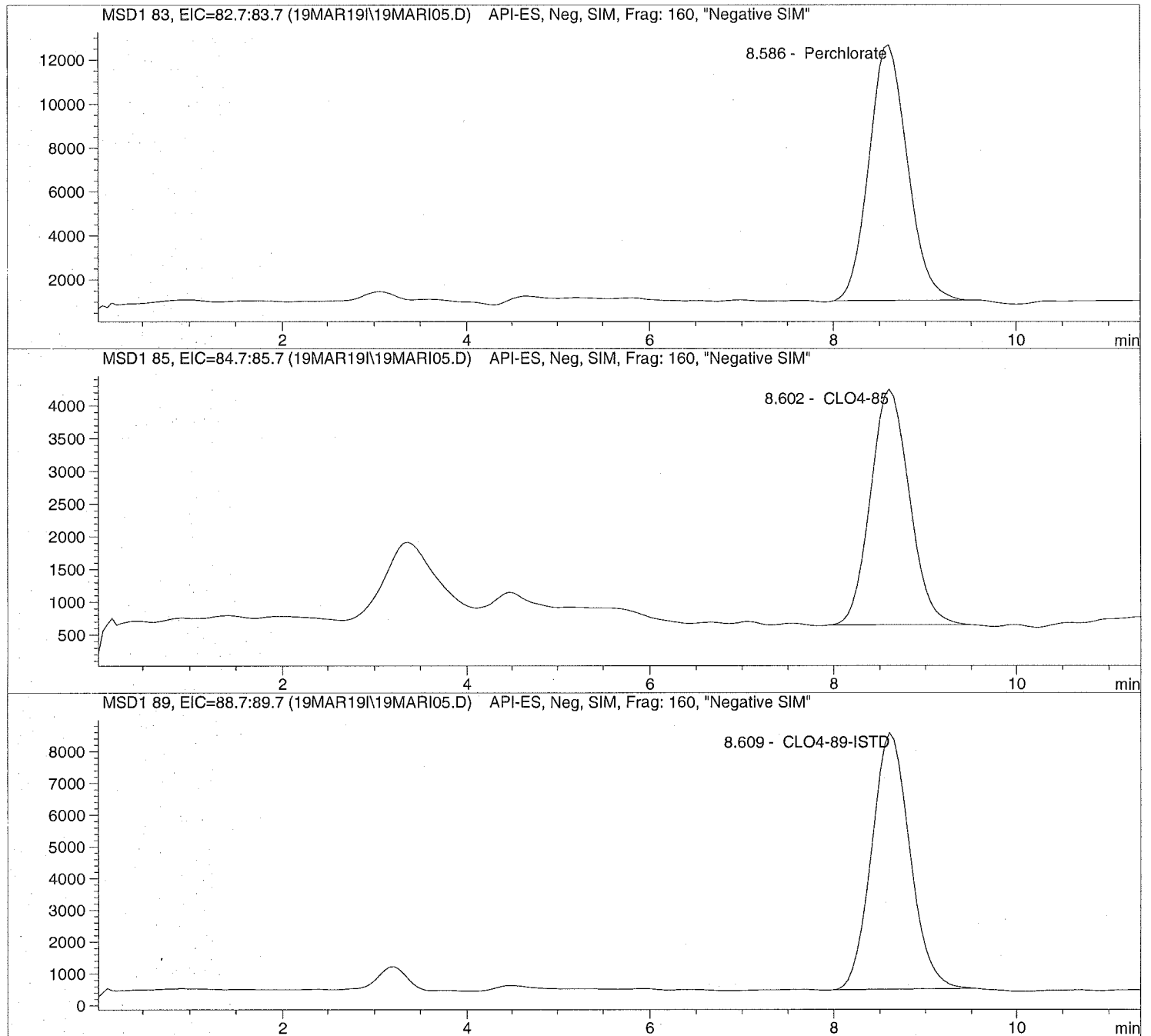
*** End of Report ***

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 10:06:16 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 10:19:32

Seq Line: 6

Sample Name: CLO4@ 10.ug/L

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

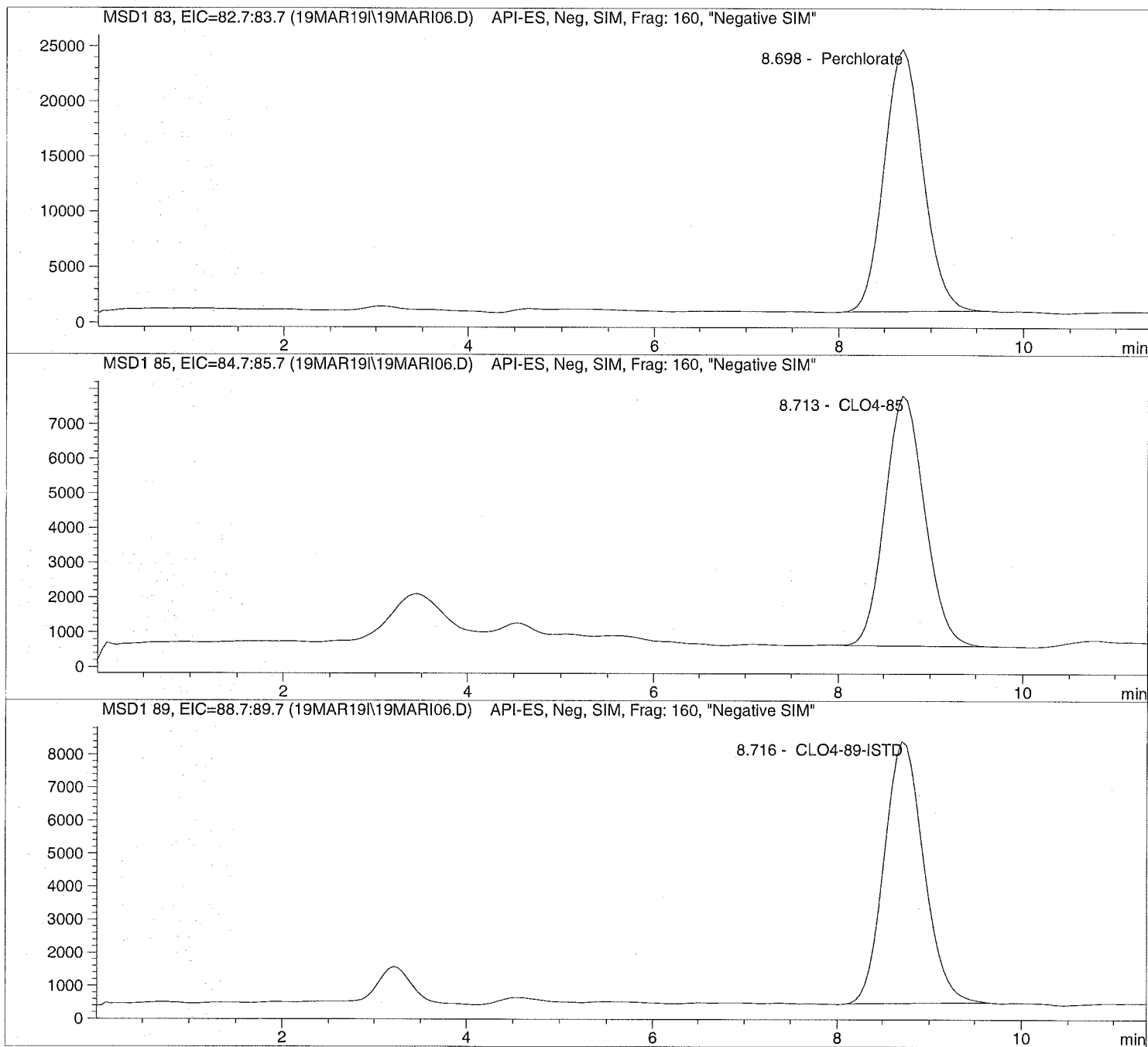
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date:  3/19/2019  10:19:32      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-DP2.M
Last Changed:      3/19/2019  14:35:22
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:          Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.698	PBA	683454.4	9.2773	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

Injection Date: 3/19/2019 10:32:49

Seq Line: 7

Sample Name: CLO4@ 25.ug/L

Location: Vial 77

Acq Operator: TNB

Inj. No.: 1

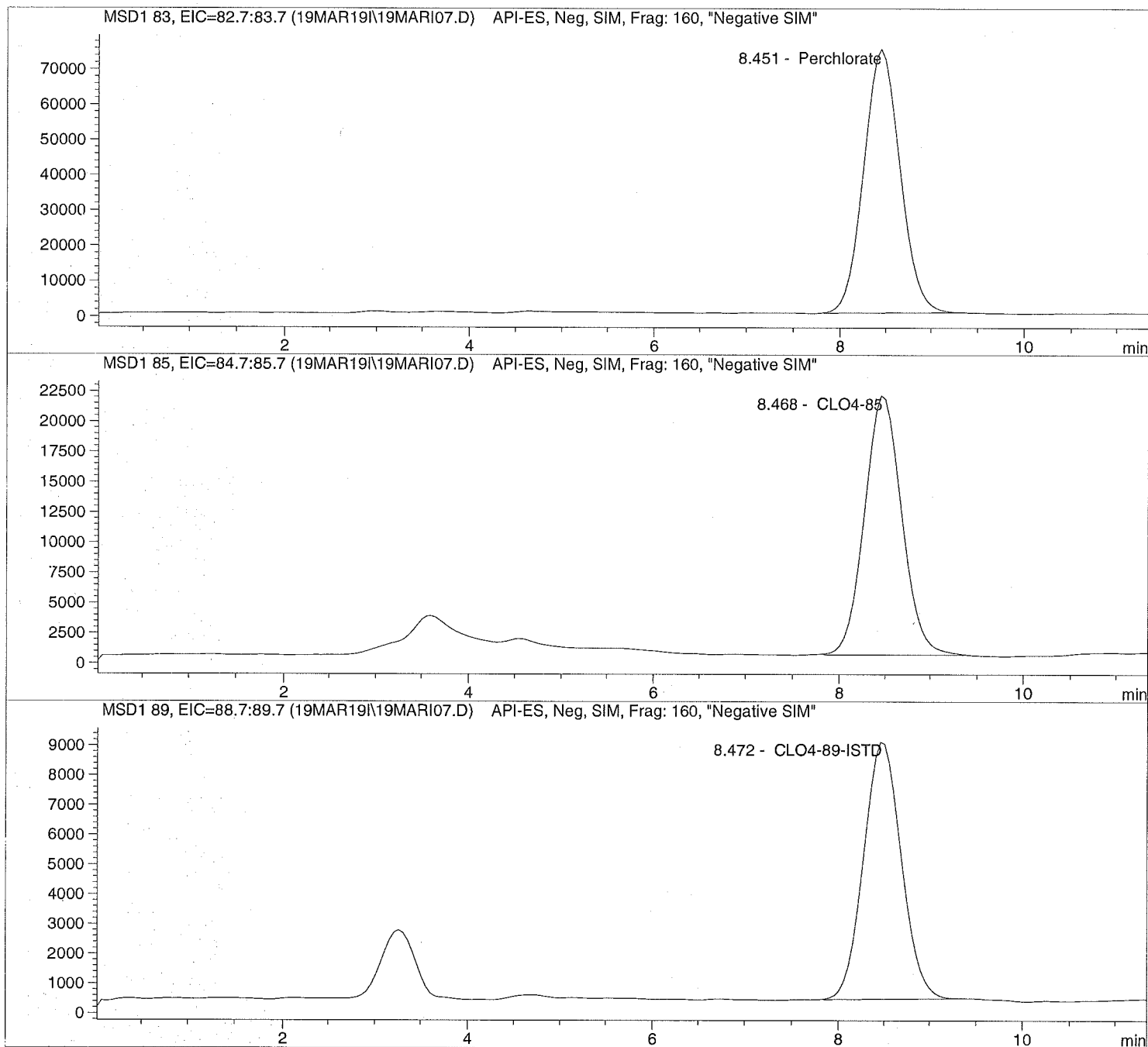
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 10:32:49 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.451	PBA	2084327.4	25.2904	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.468	BBA	614294.8	25.1216	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

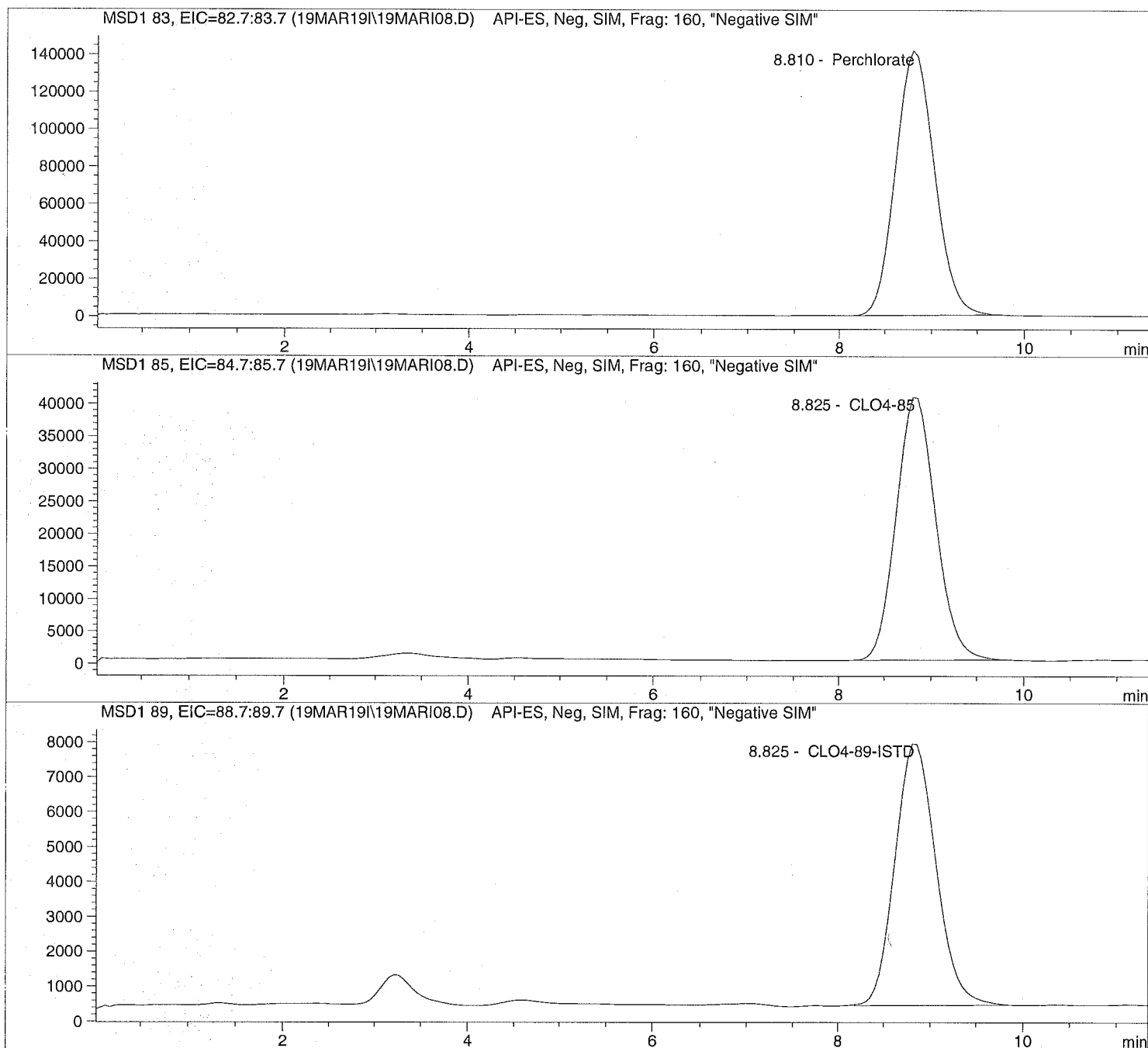
*** End of Report ***

Injection Date: 3/19/2019 10:46:05
Sample Name: CLO4@ 50.ug/L
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date: 3/19/2019 10:46:05      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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.810	PBA	4133340.5	51.3684	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.4672	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

=====

*** End of Report ***

Injection Date: 3/19/2019 10:59:22

Seq Line: 9

Sample Name: CLO4@ 75.ug/L

Location: Vial 79

Acq Operator: TNB

Inj. No.: 1

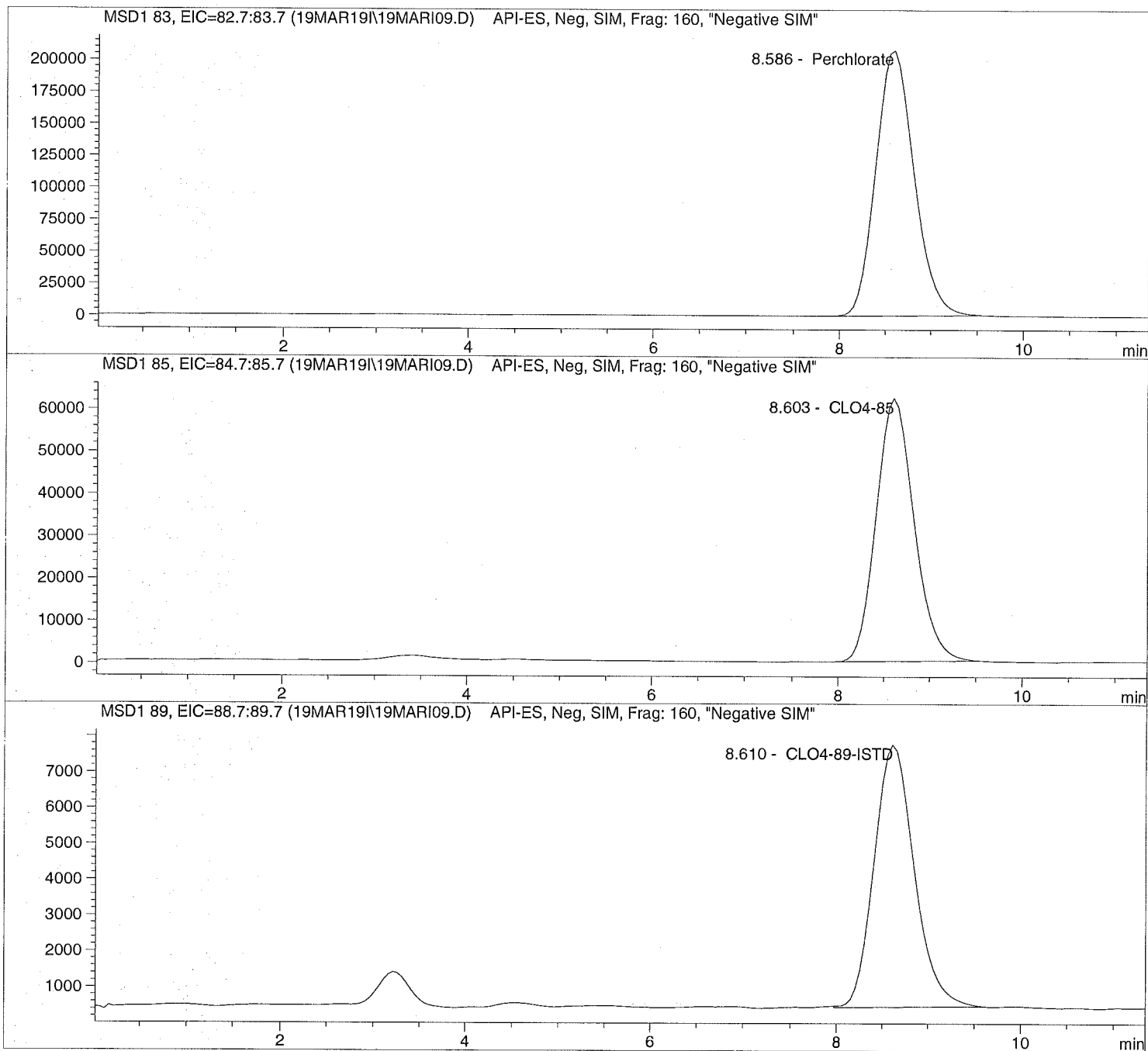
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date:  3/19/2019  10:59:22      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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

```
=====
                          Sample Information
=====
```

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

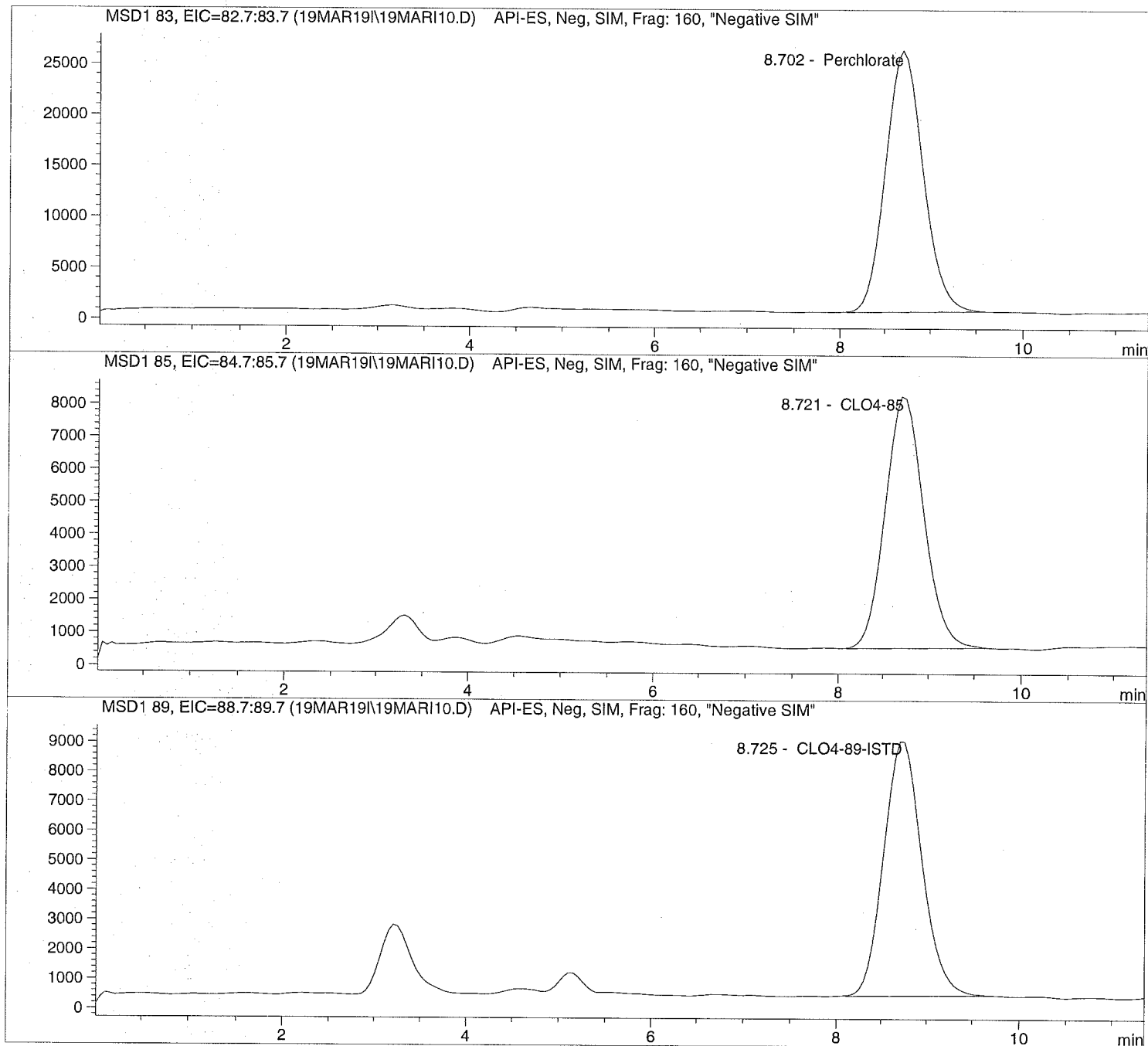
```
=====
*** End of Report ***
=====
```

Injection Date: 3/19/2019 11:12:42
Sample Name: ICAL Verf@10ug/L
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 11:12:42 Seq Line: 10
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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

*** End of Report ***



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Unmodified

Injection Date: 3/19/2019 09:39:40

Seq Line: 3

Sample Name: CLO4@ 1.0ug/L

Location: Vial 73

Acq Operator: TNB

Inj. No.: 1

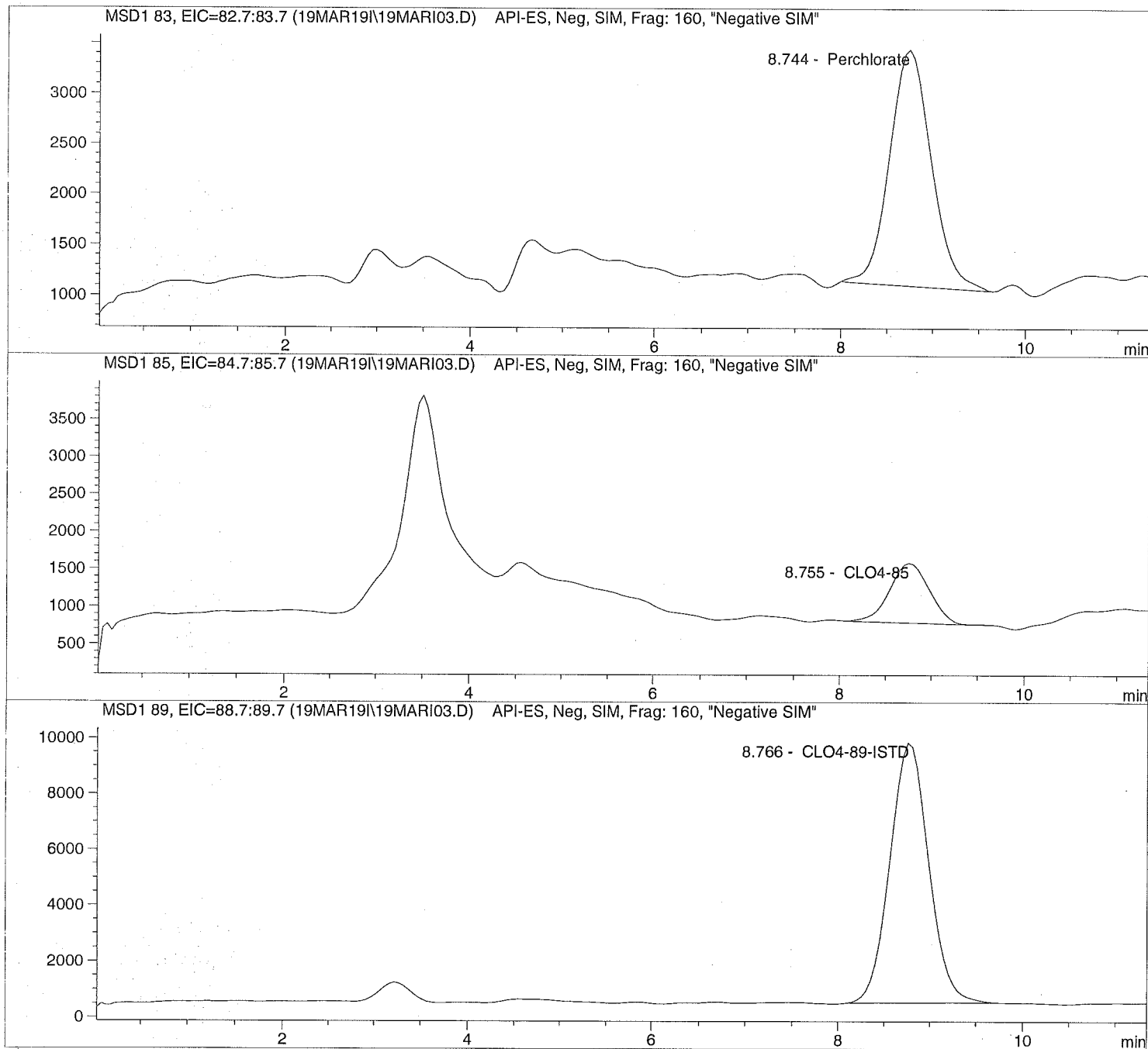
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:38:25

Perchlorate analysis



```
=====
Injection Date:  3/19/2019  09:39:40      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-DP2.M
Last Changed:   3/19/2019  14:38:25
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Tue, 19. Mar. 2019,02:35:19 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
8.744	BBA	74166.3	1.0224	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	BBA	24138.1	0.9487	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

ALS Houston, US

Date: 29-may-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP 18 24
Work Order: HS19050920

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19050920-01	LH 18/24-SP650_051419	Water		14-May-2019 14:00	15-May-2019 09:13	<input type="checkbox"/>
HS19050920-02	Trip Blank	Water	CG 040119 -193	14-May-2019 00:00	15-May-2019 09:13	<input type="checkbox"/>

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.**CASE NARRATIVE****Project:** LHAAP 18 24**Work Order:** HS19050920

GCMS Volatiles by Method SW8260**Batch ID: R339038**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method E300**Batch ID: R339348****Sample ID: HS19051023-01MS**

- MS and MSD are for an unrelated sample
-

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
 Project: LHAAP 18 24
 Sample ID: LH 18/24-SP650_051419
 Collection Date: 14-May-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19050920
 Lab ID:HS19050920-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD		Method:SW8260						Analyst: PC
8260C								
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	23-May-2019 15:14
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 15:14
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	23-May-2019 15:14
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	23-May-2019 15:14
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	23-May-2019 15:14
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	23-May-2019 15:14
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 15:14
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 15:14
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	23-May-2019 15:14
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	23-May-2019 15:14
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 15:14
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	23-May-2019 15:14
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	23-May-2019 15:14
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 15:14
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 15:14
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 15:14
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	23-May-2019 15:14
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	23-May-2019 15:14
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14

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

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
 Project: LHAAP 18 24
 Sample ID: LH 18/24-SP650_051419
 Collection Date: 14-May-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19050920
 Lab ID:HS19050920-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C			Method:SW8260					Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
cis-1,2-Dichloroethene	1.8		0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	23-May-2019 15:14
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	23-May-2019 15:14
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	23-May-2019 15:14
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	23-May-2019 15:14
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 15:14
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
Trichloroethene	0.56	J	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 15:14
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 15:14
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>88.7</i>			0	<i>81-118</i>	%REC	<i>1</i>	<i>23-May-2019 15:14</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>103</i>			0	<i>85-114</i>	%REC	<i>1</i>	<i>23-May-2019 15:14</i>
<i>Surr: Dibromofluoromethane</i>	<i>90.2</i>			0	<i>80-119</i>	%REC	<i>1</i>	<i>23-May-2019 15:14</i>
<i>Surr: Toluene-d8</i>	<i>108</i>			0	<i>89-112</i>	%REC	<i>1</i>	<i>23-May-2019 15:14</i>
ANIONS BY E300.0			Method:E300					Analyst: KMU
Chloride	231		2.00	5.00	5.00	mg/L	10	28-May-2019 18:51
Sulfate	24.1		2.00	5.00	5.00	mg/L	10	28-May-2019 18:51

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

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
 Project: LHAAP 18 24
 Sample ID: Trip Blank
 Collection Date: 14-May-2019 00:00

ANALYTICAL REPORT

WorkOrder:HS19050920
 Lab ID:HS19050920-02
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD		Method:SW8260						Analyst: PC
8260C								
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	23-May-2019 14:01
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 14:01
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	23-May-2019 14:01
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	23-May-2019 14:01
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	23-May-2019 14:01
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	23-May-2019 14:01
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 14:01
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 14:01
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	23-May-2019 14:01
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	23-May-2019 14:01
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 14:01
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	23-May-2019 14:01
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	23-May-2019 14:01
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 14:01
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 14:01
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 14:01
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	23-May-2019 14:01
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	23-May-2019 14:01
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01

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

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
 Project: LHAAP 18 24
 Sample ID: Trip Blank
 Collection Date: 14-May-2019 00:00

ANALYTICAL REPORT

WorkOrder:HS19050920
 Lab ID:HS19050920-02
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD		Method:SW8260						Analyst: PC
8260C								
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	23-May-2019 14:01
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	23-May-2019 14:01
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	23-May-2019 14:01
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	23-May-2019 14:01
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	23-May-2019 14:01
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	23-May-2019 14:01
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	23-May-2019 14:01
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>85.6</i>			0	<i>81-118</i>	<i>%REC</i>	<i>1</i>	<i>23-May-2019 14:01</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>103</i>			0	<i>85-114</i>	<i>%REC</i>	<i>1</i>	<i>23-May-2019 14:01</i>
<i>Surr: Dibromofluoromethane</i>	<i>90.7</i>			0	<i>80-119</i>	<i>%REC</i>	<i>1</i>	<i>23-May-2019 14:01</i>
<i>Surr: Toluene-d8</i>	<i>105</i>			0	<i>89-112</i>	<i>%REC</i>	<i>1</i>	<i>23-May-2019 14:01</i>

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

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.**Project:** LHAAP 18 24**WorkOrder:** HS19050920**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R339038	Test Name : VOLATILES ORGANICS BY METHOD 8260C			Matrix: Water		
HS19050920-01	LH 18/24-SP650_051419	14 May 2019 14:00			23 May 2019 15:14	1
HS19050920-02	Trip Blank	14 May 2019 00:00			23 May 2019 14:01	1
Batch ID R339348	Test Name : ANIONS BY E300.0			Matrix: Water		
HS19050920-01	LH 18/24-SP650_051419	14 May 2019 14:00			28 May 2019 18:51	10

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP 18 24
WorkOrder: HS19050920

QC BATCH REPORT

Batch ID: R339038 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MBLK	Sample ID: VBLKW-190523	Units: UG/L		Analysis Date: 23-May-2019 13:37					
Client ID:	Run ID: VOA6_339038	SeqNo: 5088106		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	0.50	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	0.50	1.0							U
1,1,2-Trichloroethane	0.50	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	0.50	1.0							U
1,2,3-Trichlorobenzene	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
Bromomethane	0.50	1.0							U

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP 18 24
WorkOrder: HS19050920

QC BATCH REPORT

Batch ID: R339038 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MBLK	Sample ID: VBLKW-190523	Units: UG/L		Analysis Date: 23-May-2019 13:37					
Client ID:	Run ID: VOA6_339038	SeqNo: 5088106		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	1.0	2.0							U
Carbon tetrachloride	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	42.31	1.0	50	0	84.6	81 - 118			
Surr: 4-Bromofluorobenzene	51.85	1.0	50	0	104	85 - 114			
Surr: Dibromofluoromethane	44.45	1.0	50	0	88.9	80 - 119			
Surr: Toluene-d8	54.01	1.0	50	0	108	89 - 112			

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP 18 24
WorkOrder: HS19050920

QC BATCH REPORT

Batch ID: R339038 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-190523		Units: UG/L		Analysis Date: 23-May-2019 12:49			
Client ID:		Run ID: VOA6_339038		SeqNo: 5088105		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	19.5	1.0	20	0	97.5	78 - 124			
1,1,1-Trichloroethane	19.76	1.0	20	0	98.8	74 - 131			
1,1,2,2-Tetrachloroethane	21.3	1.0	20	0	107	71 - 121			
1,1,2-Trichloroethane	21.63	1.0	20	0	108	80 - 119			
1,1-Dichloroethane	21.15	1.0	20	0	106	77 - 125			
1,1-Dichloroethene	19.2	1.0	20	0	96.0	71 - 131			
1,1-Dichloropropene	19.25	1.0	20	0	96.3	78 - 125			
1,2,3-Trichlorobenzene	23.82	1.0	20	0	119	69 - 129			
1,2,3-Trichloropropane	20.72	1.0	20	0	104	73 - 122			
1,2,4-Trichlorobenzene	21.55	1.0	20	0	108	69 - 130			
1,2,4-Trimethylbenzene	20.1	1.0	20	0	101	76 - 124			
1,2-Dibromo-3-chloropropane	21.37	1.0	20	0	107	62 - 128			
1,2-Dibromoethane	20.6	1.0	20	0	103	77 - 121			
1,2-Dichlorobenzene	20.04	1.0	20	0	100	80 - 119			
1,2-Dichloroethane	19.59	1.0	20	0	97.9	73 - 128			
1,2-Dichloropropane	21.97	1.0	20	0	110	78 - 122			
1,3,5-Trimethylbenzene	20.04	1.0	20	0	100	75 - 124			
1,3-Dichlorobenzene	19.64	1.0	20	0	98.2	80 - 119			
1,3-Dichloropropane	21.54	1.0	20	0	108	80 - 119			
1,4-Dichlorobenzene	19.74	1.0	20	0	98.7	79 - 118			
2,2-Dichloropropane	20.16	1.0	20	0	101	60 - 139			
2-Butanone	47.43	2.0	40	0	119	56 - 143			
2-Chlorotoluene	20.07	1.0	20	0	100	79 - 122			
2-Hexanone	44.27	2.0	40	0	111	57 - 139			
4-Chlorotoluene	20.07	1.0	20	0	100	78 - 122			
4-Isopropyltoluene	19.32	1.0	20	0	96.6	77 - 127			
4-Methyl-2-pentanone	45.74	2.0	40	0	114	67 - 130			
Acetone	40.23	2.0	40	0	101	39 - 160			
Benzene	21.84	1.0	20	0	109	79 - 120			
Bromobenzene	19.73	1.0	20	0	98.6	80 - 120			
Bromochloromethane	21.37	1.0	20	0	107	78 - 123			
Bromodichloromethane	20.71	1.0	20	0	104	79 - 125			
Bromoform	20.06	1.0	20	0	100	66 - 130			
Bromomethane	21.23	1.0	20	0	106	53 - 141			

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP 18 24
WorkOrder: HS19050920

QC BATCH REPORT

Batch ID: R339038 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-190523		Units: UG/L		Analysis Date: 23-May-2019 12:49			
Client ID:		Run ID: VOA6_339038		SeqNo: 5088105		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	46.74	2.0	40	0	117	64 - 133			
Carbon tetrachloride	17.45	1.0	20	0	87.2	72 - 136			
Chlorobenzene	20.98	1.0	20	0	105	82 - 118			
Chloroethane	19.26	1.0	20	0	96.3	60 - 138			
Chloroform	20.78	1.0	20	0	104	79 - 124			
Chloromethane	20.24	1.0	20	0	101	50 - 139			
cis-1,2-Dichloroethene	21.13	1.0	20	0	106	78 - 123			
cis-1,3-Dichloropropene	21.98	1.0	20	0	110	75 - 124			
Dibromochloromethane	19.61	1.0	20	0	98.1	74 - 126			
Dibromomethane	21.04	1.0	20	0	105	79 - 123			
Dichlorodifluoromethane	19.93	1.0	20	0	99.6	32 - 152			
Ethylbenzene	20.92	1.0	20	0	105	79 - 121			
Hexachlorobutadiene	19.44	1.0	20	0	97.2	66 - 134			
Isopropylbenzene	20.09	1.0	20	0	100	72 - 131			
m,p-Xylene	41.56	2.0	40	0	104	80 - 121			
Methylene chloride	22.29	2.0	20	0	111	74 - 124			
Naphthalene	22.91	1.0	20	0	115	61 - 128			
n-Butylbenzene	19.72	1.0	20	0	98.6	75 - 128			
n-Propylbenzene	19.52	1.0	20	0	97.6	76 - 126			
o-Xylene	21.13	1.0	20	0	106	78 - 122			
sec-Butylbenzene	19.19	1.0	20	0	95.9	77 - 126			
Styrene	21.17	1.0	20	0	106	78 - 123			
tert-Butylbenzene	19.28	1.0	20	0	96.4	78 - 124			
Tetrachloroethene	19.19	1.0	20	0	96.0	74 - 129			
Toluene	20.92	1.0	20	0	105	80 - 121			
trans-1,2-Dichloroethene	21.16	1.0	20	0	106	75 - 124			
trans-1,3-Dichloropropene	21.68	1.0	20	0	108	73 - 127			
Trichloroethene	20.35	1.0	20	0	102	79 - 123			
Trichlorofluoromethane	17.92	1.0	20	0	89.6	65 - 141			
Vinyl chloride	20.25	1.0	20	0	101	58 - 137			
Surr: 1,2-Dichloroethane-d4	47.78	1.0	50	0	95.6	81 - 118			
Surr: 4-Bromofluorobenzene	54.28	1.0	50	0	109	85 - 114			
Surr: Dibromofluoromethane	49.4	1.0	50	0	98.8	80 - 119			
Surr: Toluene-d8	46.25	1.0	50	0	92.5	89 - 112			

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP 18 24
WorkOrder: HS19050920

QC BATCH REPORT

Batch ID: R339038 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS19051208-01MS		Units: UG/L		Analysis Date: 23-May-2019 16:50			
Client ID:		Run ID: VOA6_339038		SeqNo: 5089895		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	17.41	1.0	20	0	87.0	78 - 124			
1,1,1-Trichloroethane	16.6	1.0	20	0	83.0	74 - 131			
1,1,2,2-Tetrachloroethane	21.34	1.0	20	0	107	71 - 121			
1,1,2-Trichloroethane	19.36	1.0	20	0	96.8	80 - 119			
1,1-Dichloroethane	16.85	1.0	20	0	84.2	77 - 125			
1,1-Dichloroethene	15.97	1.0	20	0	79.8	71 - 131			
1,1-Dichloropropene	18.18	1.0	20	0	90.9	78 - 125			
1,2,3-Trichlorobenzene	23.28	1.0	20	0	116	69 - 129			
1,2,3-Trichloropropane	20.1	1.0	20	0	100	73 - 122			
1,2,4-Trichlorobenzene	20.86	1.0	20	0	104	69 - 130			
1,2,4-Trimethylbenzene	19.56	1.0	20	0	97.8	76 - 124			
1,2-Dibromo-3-chloropropane	21.49	1.0	20	0	107	62 - 128			
1,2-Dibromoethane	18.38	1.0	20	0	91.9	77 - 121			
1,2-Dichlorobenzene	19.44	1.0	20	0	97.2	80 - 119			
1,2-Dichloroethane	15.78	1.0	20	0	78.9	73 - 128			
1,2-Dichloropropane	18.44	1.0	20	0	92.2	78 - 122			
1,3,5-Trimethylbenzene	20.39	1.0	20	0	102	75 - 124			
1,3-Dichlorobenzene	19.4	1.0	20	0	97.0	80 - 119			
1,3-Dichloropropane	19.16	1.0	20	0	95.8	80 - 119			
1,4-Dichlorobenzene	19.2	1.0	20	0	96.0	79 - 118			
2,2-Dichloropropane	15.29	1.0	20	0	76.4	60 - 139			
2-Butanone	39.69	2.0	40	0	99.2	56 - 143			
2-Chlorotoluene	20.32	1.0	20	0	102	79 - 122			
2-Hexanone	40.16	2.0	40	0	100	57 - 139			
4-Chlorotoluene	19.95	1.0	20	0	99.7	78 - 122			
4-Isopropyltoluene	20.56	1.0	20	0	103	77 - 127			
4-Methyl-2-pentanone	42.86	2.0	40	0	107	67 - 130			
Acetone	39.28	2.0	40	11.37	69.8	39 - 160			
Benzene	18.07	1.0	20	0	90.3	79 - 120			
Bromobenzene	18.37	1.0	20	0	91.9	80 - 120			
Bromochloromethane	16.33	1.0	20	0	81.6	78 - 123			
Bromodichloromethane	16.47	1.0	20	0	82.3	79 - 125			
Bromoform	17.35	1.0	20	0	86.7	66 - 130			
Bromomethane	12.22	1.0	20	0	61.1	53 - 141			

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP 18 24
WorkOrder: HS19050920

QC BATCH REPORT

Batch ID: R339038 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS19051208-01MS		Units: UG/L		Analysis Date: 23-May-2019 16:50			
Client ID:		Run ID: VOA6_339038		SeqNo: 5089895		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	35.81	2.0	40	0	89.5	64 - 133			
Carbon tetrachloride	15.71	1.0	20	0	78.5	72 - 136			
Chlorobenzene	18.87	1.0	20	0	94.3	82 - 118			
Chloroethane	17.53	1.0	20	0	87.6	60 - 138			
Chloroform	16.52	1.0	20	0	82.6	79 - 124			
Chloromethane	13.72	1.0	20	0	68.6	50 - 139			
cis-1,2-Dichloroethene	16.51	1.0	20	0	82.5	78 - 123			
cis-1,3-Dichloropropene	18.33	1.0	20	0	91.7	75 - 124			
Dibromochloromethane	17.38	1.0	20	0	86.9	74 - 126			
Dibromomethane	17.16	1.0	20	0	85.8	79 - 123			
Dichlorodifluoromethane	13.55	1.0	20	0	67.8	32 - 152			
Ethylbenzene	18.69	1.0	20	0	93.5	79 - 121			
Hexachlorobutadiene	19.72	1.0	20	0	98.6	66 - 134			
Isopropylbenzene	18.9	1.0	20	0	94.5	72 - 131			
m,p-Xylene	38.27	2.0	40	0	95.7	80 - 121			
Methylene chloride	17.13	2.0	20	0	85.7	74 - 124			
Naphthalene	22.01	1.0	20	0	110	61 - 128			
n-Butylbenzene	20.9	1.0	20	0	105	75 - 128			
n-Propylbenzene	20.99	1.0	20	0	105	76 - 126			
o-Xylene	19.56	1.0	20	0	97.8	78 - 122			
sec-Butylbenzene	21.38	1.0	20	0	107	77 - 126			
Styrene	18.43	1.0	20	0	92.1	78 - 123			
tert-Butylbenzene	20.87	1.0	20	0	104	78 - 124			
Tetrachloroethene	18.44	1.0	20	0	92.2	74 - 129			
Toluene	18.8	1.0	20	0	94.0	80 - 121			
trans-1,2-Dichloroethene	17.02	1.0	20	0	85.1	75 - 124			
trans-1,3-Dichloropropene	17.36	1.0	20	0	86.8	73 - 127			
Trichloroethene	17.35	1.0	20	0	86.8	79 - 123			
Trichlorofluoromethane	14.65	1.0	20	0	73.2	65 - 141			
Vinyl chloride	16.4	1.0	20	0	82.0	58 - 137			
Surr: 1,2-Dichloroethane-d4	45.37	1.0	50	0	90.7	81 - 118			
Surr: 4-Bromofluorobenzene	52.21	1.0	50	0	104	85 - 114			
Surr: Dibromofluoromethane	45.51	1.0	50	0	91.0	80 - 119			
Surr: Toluene-d8	53.95	1.0	50	0	108	89 - 112			

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP 18 24
WorkOrder: HS19050920

QC BATCH REPORT

Batch ID: R339038 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS19051208-01MSD		Units: UG/L		Analysis Date: 23-May-2019 17:14			
Client ID:		Run ID: VOA6_339038		SeqNo: 5089896		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	16.8	1.0	20	0	84.0	78 - 124	17.41	3.56	20
1,1,1-Trichloroethane	16.03	1.0	20	0	80.1	74 - 131	16.6	3.52	20
1,1,2,2-Tetrachloroethane	21.34	1.0	20	0	107	71 - 121	21.34	0	20
1,1,2-Trichloroethane	18.78	1.0	20	0	93.9	80 - 119	19.36	3.01	20
1,1-Dichloroethane	17.15	1.0	20	0	85.8	77 - 125	16.85	1.77	20
1,1-Dichloroethene	15.44	1.0	20	0	77.2	71 - 131	15.97	3.35	20
1,1-Dichloropropene	17.44	1.0	20	0	87.2	78 - 125	18.18	4.2	20
1,2,3-Trichlorobenzene	23.29	1.0	20	0	116	69 - 129	23.28	0.0635	20
1,2,3-Trichloropropane	20.35	1.0	20	0	102	73 - 122	20.1	1.24	20
1,2,4-Trichlorobenzene	21.11	1.0	20	0	106	69 - 130	20.86	1.2	20
1,2,4-Trimethylbenzene	19.32	1.0	20	0	96.6	76 - 124	19.56	1.24	20
1,2-Dibromo-3-chloropropane	21.51	1.0	20	0	108	62 - 128	21.49	0.124	20
1,2-Dibromoethane	18.04	1.0	20	0	90.2	77 - 121	18.38	1.89	20
1,2-Dichlorobenzene	19.66	1.0	20	0	98.3	80 - 119	19.44	1.11	20
1,2-Dichloroethane	15.95	1.0	20	0	79.8	73 - 128	15.78	1.05	20
1,2-Dichloropropane	18.62	1.0	20	0	93.1	78 - 122	18.44	0.948	20
1,3,5-Trimethylbenzene	20.28	1.0	20	0	101	75 - 124	20.39	0.566	20
1,3-Dichlorobenzene	19.51	1.0	20	0	97.5	80 - 119	19.4	0.524	20
1,3-Dichloropropane	18.59	1.0	20	0	92.9	80 - 119	19.16	3	20
1,4-Dichlorobenzene	19.48	1.0	20	0	97.4	79 - 118	19.2	1.4	20
2,2-Dichloropropane	14.72	1.0	20	0	73.6	60 - 139	15.29	3.77	20
2-Butanone	40.95	2.0	40	0	102	56 - 143	39.69	3.13	20
2-Chlorotoluene	20.12	1.0	20	0	101	79 - 122	20.32	0.972	20
2-Hexanone	39.44	2.0	40	0	98.6	57 - 139	40.16	1.82	20
4-Chlorotoluene	19.85	1.0	20	0	99.2	78 - 122	19.95	0.499	20
4-Isopropyltoluene	20.77	1.0	20	0	104	77 - 127	20.56	1.02	20
4-Methyl-2-pentanone	40.5	2.0	40	0	101	67 - 130	42.86	5.67	20
Acetone	39.93	2.0	40	11.37	71.4	39 - 160	39.28	1.64	20
Benzene	17.64	1.0	20	0	88.2	79 - 120	18.07	2.41	20
Bromobenzene	18.22	1.0	20	0	91.1	80 - 120	18.37	0.842	20
Bromochloromethane	16.23	1.0	20	0	81.2	78 - 123	16.33	0.571	20
Bromodichloromethane	16.33	1.0	20	0	81.6	79 - 125	16.47	0.839	20
Bromoform	17.2	1.0	20	0	86.0	66 - 130	17.35	0.86	20
Bromomethane	12.23	1.0	20	0	61.2	53 - 141	12.22	0.114	20

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP 18 24
WorkOrder: HS19050920

QC BATCH REPORT

Batch ID: R339038 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS19051208-01MSD		Units: UG/L		Analysis Date: 23-May-2019 17:14			
Client ID:		Run ID: VOA6_339038		SeqNo: 5089896		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	34.7	2.0	40	0	86.8	64 - 133	35.81	3.14	20
Carbon tetrachloride	15.13	1.0	20	0	75.7	72 - 136	15.71	3.74	20
Chlorobenzene	18.16	1.0	20	0	90.8	82 - 118	18.87	3.83	20
Chloroethane	17.12	1.0	20	0	85.6	60 - 138	17.53	2.37	20
Chloroform	15.97	1.0	20	0	79.9	79 - 124	16.52	3.38	20
Chloromethane	13.76	1.0	20	0	68.8	50 - 139	13.72	0.288	20
cis-1,2-Dichloroethene	16.39	1.0	20	0	81.9	78 - 123	16.51	0.729	20
cis-1,3-Dichloropropene	18.11	1.0	20	0	90.5	75 - 124	18.33	1.24	20
Dibromochloromethane	17.15	1.0	20	0	85.8	74 - 126	17.38	1.3	20
Dibromomethane	16.89	1.0	20	0	84.5	79 - 123	17.16	1.6	20
Dichlorodifluoromethane	12.94	1.0	20	0	64.7	32 - 152	13.55	4.6	20
Ethylbenzene	17.94	1.0	20	0	89.7	79 - 121	18.69	4.1	20
Hexachlorobutadiene	19.72	1.0	20	0	98.6	66 - 134	19.72	0.0309	20
Isopropylbenzene	18.21	1.0	20	0	91.1	72 - 131	18.9	3.72	20
m,p-Xylene	36.7	2.0	40	0	91.7	80 - 121	38.27	4.18	20
Methylene chloride	17.09	2.0	20	0	85.5	74 - 124	17.13	0.219	20
Naphthalene	22.06	1.0	20	0	110	61 - 128	22.01	0.222	20
n-Butylbenzene	20.89	1.0	20	0	104	75 - 128	20.9	0.0898	20
n-Propylbenzene	20.77	1.0	20	0	104	76 - 126	20.99	1.07	20
o-Xylene	18.77	1.0	20	0	93.8	78 - 122	19.56	4.12	20
sec-Butylbenzene	20.91	1.0	20	0	105	77 - 126	21.38	2.21	20
Styrene	17.89	1.0	20	0	89.4	78 - 123	18.43	2.97	20
tert-Butylbenzene	20.7	1.0	20	0	104	78 - 124	20.87	0.801	20
Tetrachloroethene	17.55	1.0	20	0	87.7	74 - 129	18.44	4.96	20
Toluene	17.95	1.0	20	0	89.7	80 - 121	18.8	4.63	20
trans-1,2-Dichloroethene	16.97	1.0	20	0	84.9	75 - 124	17.02	0.302	20
trans-1,3-Dichloropropene	16.91	1.0	20	0	84.6	73 - 127	17.36	2.62	20
Trichloroethene	17.05	1.0	20	0	85.3	79 - 123	17.35	1.74	20
Trichlorofluoromethane	14.24	1.0	20	0	71.2	65 - 141	14.65	2.79	20
Vinyl chloride	16.01	1.0	20	0	80.0	58 - 137	16.4	2.43	20
Surr: 1,2-Dichloroethane-d4	43.38	1.0	50	0	86.8	81 - 118	45.37	4.48	20
Surr: 4-Bromofluorobenzene	51.71	1.0	50	0	103	85 - 114	52.21	0.97	20
Surr: Dibromofluoromethane	45.46	1.0	50	0	90.9	80 - 119	45.51	0.114	20
Surr: Toluene-d8	53.15	1.0	50	0	106	89 - 112	53.95	1.49	20

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.

Project: LHAAP 18 24

WorkOrder: HS19050920

QC BATCH REPORT

Batch ID: R339038 (0)

Instrument: VOA6

Method: VOLATILES ORGANICS BY METHOD
8260C

The following samples were analyzed in this batch: HS19050920-01 HS19050920-02

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP 18 24
WorkOrder: HS19050920

QC BATCH REPORT

Batch ID: R339348 (0)		Instrument: ICS2100		Method: ANIONS BY E300.0					
MBLK	Sample ID: WBLKW1-052819	Units: mg/L		Analysis Date: 28-May-2019 11:52					
Client ID:	Run ID: ICS2100_339348	SeqNo: 5096228		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	0.500	0.500							U
Sulfate	0.500	0.500							U
LCS	Sample ID: WLCSW1-052819	Units: mg/L		Analysis Date: 28-May-2019 12:14					
Client ID:	Run ID: ICS2100_339348	SeqNo: 5096229		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	19.74	0.500	20	0	98.7	90 - 110			
Sulfate	19.67	0.500	20	0	98.3	90 - 110			
LCSD	Sample ID: WLCSDW1-052819	Units: mg/L		Analysis Date: 28-May-2019 12:28					
Client ID:	Run ID: ICS2100_339348	SeqNo: 5096230		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	19.3	0.500	20	0	96.5	90 - 110	19.74	2.29	20
Sulfate	19.12	0.500	20	0	95.6	90 - 110	19.67	2.8	20
MS	Sample ID: HS19051088-01MS	Units: mg/L		Analysis Date: 28-May-2019 13:31					
Client ID:	Run ID: ICS2100_339348	SeqNo: 5096232		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	75.35	0.500	10	67.15	82.0	80 - 120			O
Sulfate	29.22	0.500	10	20.1	91.1	80 - 120			
MS	Sample ID: HS19051023-01MS	Units: mg/L		Analysis Date: 28-May-2019 19:20					
Client ID:	Run ID: ICS2100_339348	SeqNo: 5096245		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	41.29	0.500	10	33.2	80.9	80 - 120			
Sulfate	137.1	0.500	10	133.1	39.8	80 - 120			SEO

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.

Project: LHAAP 18 24

WorkOrder: HS19050920

QC BATCH REPORT

Batch ID: R339348 (0)		Instrument: ICS2100		Method: ANIONS BY E300.0							
MSD		Sample ID: HS19051088-01MSD		Units: mg/L		Analysis Date: 28-May-2019 13:46					
Client ID:		Run ID: ICS2100_339348		SeqNo: 5096233		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	77.36	0.500	10	67.15	102	80 - 120	75.35	2.63	20	O	
Sulfate	30.15	0.500	10	20.1	100	80 - 120	29.22	3.15	20		

MSD		Sample ID: HS19051023-01MSD		Units: mg/L		Analysis Date: 28-May-2019 19:34					
Client ID:		Run ID: ICS2100_339348		SeqNo: 5096246		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Chloride	40.81	0.500	10	33.2	76.1	80 - 120	41.29	1.16	20	S	
Sulfate	135.2	0.500	10	133.1	21.4	80 - 120	137.1	1.35	20	SEO	

The following samples were analyzed in this batch: HS19050920-01

ALS Houston, US

Date: 29-May-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP 18 24
WorkOrder: HS19050920

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/L	Milligrams per Liter

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020
Texas	TX104704231-19-23	30-Apr-2020

Client: Bhate Environmental Associates, Inc.		SAMPLE TRACKING
Project:	LHAAP 18 24	
Work Order:	HS19050920	

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19050920-01	LH 18/24-SP650_051419	Login	15/05/2019 17:51:02	JRM	Disposed
HS19050920-01	LH 18/24-SP650_051419	Login	15/05/2019 17:51:02	JRM	Disposed
HS19050920-02	Trip Blank	Login	15/05/2019 17:51:02	JRM	Disposed

ALS Houston, US

Date: 29-May-19

Sample Receipt Checklist

Client Name: Bhate Environmental
Work Order: HS19050920

Date/Time Received: **15-May-2019 09:13**
Received by: **PMG**

Checklist completed by: Jared R. Mekan 15-May-2019
eSignature Date

Reviewed by: RJ Modashia 16-May-2019
eSignature Date

Matrices: **Water**Carrier name: **ALS Courier**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:N/A
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	2.5c/2.5c UC/C IR25		
Cooler(s)/Kit(s):	44244		
Date/Time sample(s) sent to storage:	05/15/2019 17:55		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:


Comments:

Corrective Action:

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210, Houston, Tx. 77099 ATTN: R.J. Modashia

Page 1 of 1[illegible]

 ALS 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax +1 281 530 5887	CUSTODY SEAL		Seal Broken By: JM
	Date: 5/14/19	Time: 1430	Date: 05/15/19
	Name: SCOTT BEESINGER		
	Company: B AMT		

44244 MAY 15 2019

**Must Deliver Next Business Day
Time and Temperature Sensitive!**



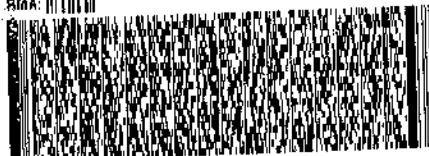
ORIGIN ID: SGRA (303) 597-2450
 SCOTT BEESINGER
 BEESINGER ENVIRONMENTAL ASSOCIATES
 1203-B EAST GRAND AVE. PHB202
 MARSHALL, TX 75670
 UNITED STATES US

SHIP DATE: 02MAY19
 ACTWT: 1.00 LB MAN
 CAD: 300130/CAFE9211
 DTMS: 26x14x14 IN

CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON TX 77099

(281) 590-6850
 REF: LONGHORN GW TREATMENT PLANT - BO 65296 - RJ

RMA: III III III



FedEx
 Express

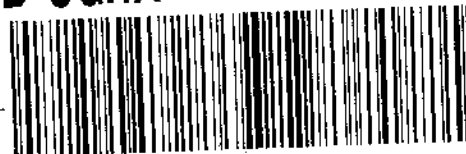


FedEx
 TRACKING 4809 7833 4603

WED - 15 MAY 10:30A
PRIORITY OVERNIGHT

77099
 TX-US
 IAH

AB SGRA



FTO 779562 14MAY19 SGRA 693C170667800A

ALS Houston, US

Date: 03-jun-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19050886

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19050886-01	LH18/24-SP650_051419	Water		14-May-2019 14:00	15-May-2019 09:13	<input type="checkbox"/>
HS19050886-02	LH18/24-SP650_051419_BIX	Water		14-May-2019 14:00	15-May-2019 09:13	<input type="checkbox"/>

ALS Houston, US

Date: 03-Jun-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order:

CASE NARRATIVE

Work Order Comments

- 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.

WetChemistry by Method E350.3**Batch ID: R338834**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method E365.3**Batch ID: R338503**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

ALS Houston, US

Date: 03-Jun-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
 Sample ID: LH18/24-SP650_051419
 Collection Date: 14-May-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19050886
 Lab ID:HS19050886-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
AMMONIA AS N BY E350.3(ISE)		Method:E350.3					Analyst: RG	
Nitrogen, Ammonia (As N)	14		0.20	0.10	0.20	mg/L	1	21-May-2019 14:00
ORTHO PHOSPHATE (PO4) AS P BY E365.3		Method:E365.3					Analyst: KVL	
Phosphorus, Total Orthophosphate (As P)	4.22		0.100	0.200	0.250	mg/L	10	15-May-2019 17:51
SUBCONTRACT ANALYSIS - TOC ANALYSIS		Method:NA					Analyst: SUBK	
Subcontract Analysis	See Attached		0	0		NA	1	26-May-2019 11:13

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

ALS Houston, US

Date: 03-Jun-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Sample ID: LH18/24-SP650_051419_BIX
Collection Date: 14-May-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19050886
Lab ID:HS19050886-02
Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	01-Jun-2019 11:51

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

ALS Houston, US

Date: 03-Jun-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19050886

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R338503	Test Name : ORTHO PHOSPHATE (PO4) AS P BY E365.3			Matrix: Water		
HS19050886-01	LH18/24-SP650_051419	14 May 2019 14:00			15 May 2019 17:51	10
Batch ID R338834	Test Name : AMMONIA AS N BY E350.3(ISE)			Matrix: Water		
HS19050886-01	LH18/24-SP650_051419	14 May 2019 14:00			21 May 2019 14:00	1
Batch ID R339170	Test Name : SUBCONTRACT ANALYSIS - TOC ANALYSIS			Matrix: Water		
HS19050886-01	LH18/24-SP650_051419	14 May 2019 14:00			26 May 2019 11:13	1
Batch ID R339602	Test Name : SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			Matrix: Water		
HS19050886-02	LH18/24-SP650_051419_BIX	14 May 2019 14:00			01 Jun 2019 11:51	1

ALS Houston, US

Date: 03-Jun-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19050886

QC BATCH REPORT

Batch ID: R338503 (0)		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3						
MBLK	Sample ID: MBLK-R338503	Units: mg/L		Analysis Date: 15-May-2019 17:51						
Client ID:	Run ID: UV-2450_338503	SeqNo: 5076707		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.0200	0.0250								U
LCS	Sample ID: LCS-R338503	Units: mg/L		Analysis Date: 15-May-2019 17:51						
Client ID:	Run ID: UV-2450_338503	SeqNo: 5076706		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.246	0.0250	0.25	0	98.4	85 - 115				
MS	Sample ID: HS19050886-01MS	Units: mg/L		Analysis Date: 15-May-2019 17:51						
Client ID: LH18/24-SP650_051419	Run ID: UV-2450_338503	SeqNo: 5076709		PrepDate:		DF: 10				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	6.72	0.250	2.5	4.22	100	80 - 120				
MSD	Sample ID: HS19050886-01MSD	Units: mg/L		Analysis Date: 15-May-2019 17:51						
Client ID: LH18/24-SP650_051419	Run ID: UV-2450_338503	SeqNo: 5076708		PrepDate:		DF: 10				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	6.72	0.250	2.5	4.22	100	80 - 120	6.72	0	20	
The following samples were analyzed in this batch: HS19050886-01										

ALS Houston, US

Date: 03-Jun-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19050886

QC BATCH REPORT

Batch ID: R338834 (0)		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
MBLK	Sample ID: MBLK-R338834	Units: mg/L		Analysis Date: 21-May-2019 14:00						
Client ID:	Run ID: WetChem_HS_338834		SeqNo: 5083325		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.10	0.20								U
LCS	Sample ID: LCS-R338834	Units: mg/L		Analysis Date: 21-May-2019 14:00						
Client ID:	Run ID: WetChem_HS_338834		SeqNo: 5083324		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.59	0.20	10	0	106	80 - 120				
MS	Sample ID: HS19050830-01MS	Units: mg/L		Analysis Date: 21-May-2019 14:00						
Client ID:	Run ID: WetChem_HS_338834		SeqNo: 5083327		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	9.712	0.20	10	0.1423	95.7	80 - 120				
MSD	Sample ID: HS19050830-01MSD	Units: mg/L		Analysis Date: 21-May-2019 14:00						
Client ID:	Run ID: WetChem_HS_338834		SeqNo: 5083326		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	9.861	0.20	10	0.1423	97.2	80 - 120	9.712	1.52	20	
The following samples were analyzed in this batch: HS19050886-01										

ALS Houston, US

Date: 03-Jun-19

Client:	Bhate Environmental Associates, Inc.	QUALIFIERS, ACRONYMS, UNITS
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19050886	

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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020
Texas	TX104704231-19-23	30-Apr-2020

Client:	Bhate Environmental Associates, Inc.	SAMPLE TRACKING
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
Work Order:	HS19050886	

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19050886-01	LH18/24-SP650_051419	Login	15/05/2019 12:39:59	JRM	WET250
HS19050886-01	LH18/24-SP650_051419	Login	15/05/2019 12:39:59	JRM	WET250
HS19050886-01	LH18/24-SP650_051419	Login	15/05/2019 12:39:59	JRM	Sub
HS19050886-02	LH18/24-SP650_051419_BIX	Login	15/05/2019 12:39:59	JRM	Sub

ALS Houston, US

Date: 03-Jun-19

Sample Receipt Checklist

Client Name: Bhate Environmental
 Work Order: HS19050886

Date/Time Received: **15-May-2019 09:13**
 Received by: **PMG**

Checklist completed by: Jared R. Makan 15-May-2019
 eSignature Date

Reviewed by: Corey Grandits 15-May-2019
 eSignature Date

Matrices: **Water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:N/A
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	2.5c/2.5c UC/C IR25		
Cooler(s)/Kit(s):	44244		
Date/Time sample(s) sent to storage:	05/15/2019 12:45		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:


Comments:

Corrective Action:

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stanchiff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: R.J Modshia

Page 1 of 1[illegible]

 ALS 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5856 Fax. +1 281 530 5887	CUSTODY SEAL		Seal Broken By: <i>SM</i>
	Date: <i>5/14/19</i>	Time: <i>1430</i>	Date: <i>05/15/19</i>
	Name: <i>Scott Beesinger</i>		
	Company: <i>BHNTX</i>		

44244 MAY 15 2019



Must Deliver Next Business Day
Time and Temperature Sensitive!

44244

ORIGIN ID: SGRA (303) 597-2450
SCOTT BEESINGER
STATE ENVIRONMENTAL ASSOCIATES
1203-B EAST GRAND AVE. PMB202
MARSHALL, TX 75670
UNITED STATES US

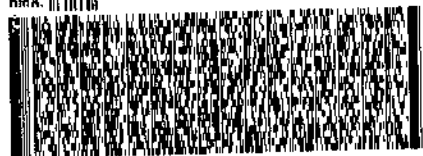
SHIP DATE: 02MAY19
ACTWGT: 1.00 LB MAX
CNO: 300130/CAFE3211
DIMS: 26x14x14 IN

CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON TX 77099

(281) 530-5858

REF: LONGHORN GW TREATMENT PLANT - BO 65296 - RJ

RMA: 11111111



FedEx
Express



FedEx
TRK 4809 7833 4603
0221

WED - 15 MAY 10:30A
PRIORITY OVERNIGHT

77099
TX-US
IAH

AB SGRA



770952 14MAY19 DGG 6530L/D660/00GA



Case Narrative

Method: 6850

Analysis: Perchlorate

Analysis SOP: LC-MS-CLO4

ALS WO ID(s): 1914602, 1914603, 1914871, 1915147

Client: ALS Laboratories (Houston, TX)

Matrix: Water

ELMS Batch (HBN): 2256 (240075)

General Set Information: There were nine 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. 50 μL 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 0.45 μm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field samples 1914603004/05 was analyzed and reported from a 1:10,000 dilutions. The reporting limits have been adjusted accordingly.

Method QC data: The method blank (LMB 655029) was less than 1/2 the CRDL. The recovery for the LCS (655030) was within acceptable parameters.



MS/MSD Analysis: MS/MSD was performed on sample 1914602001 (Client ID: LH18/24-SP650_051419_BIX). 5.0µl of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 5.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 – 655027) is reported from the analysis of the Laboratory Control Sample (LCS – 655030) at a level of 4.0µg/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: 19MARI03).

Thomas Bosch	May 30, 2019
Analyst	Date



ANALYTICAL REPORT

Report Date: May 30, 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: **34-1914602**

Project ID: HS19050886

Purchase Order: HS19050886

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_051419_BIX	1914602001	05/14/19	05/17/19	



ANALYTICAL REPORT

Workorder: **34-1914602**Client: ALS Environmental
(Houston)

Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: LH18/24-SP650_051419_BIX			Sampling Site: NA		Collected: 05/14/2019	
Lab ID: 1914602001			Media: 125 mL Nalgene		Received: 05/17/2019	
Matrix: Water			Sampling Parameter: NA			
Analysis Method - EPA 6850, DoD QSM						
Preparation: Not Applicable			Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2256 (HBN: 240075) Analyzed: 05/28/2019 10:21		Instrument ID: LCMS04 Percent Solid: NA 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 05/29/2019 10:39	/S/ Stephen Brose 05/30/2019 11:52

Laboratory Contact Information

ALS Environmental
960 W Levoy Drive
Salt Lake City, Utah 84123Phone: (801) 266-7700
Email: als.lt.lab@ALSGlobal.com
Web: www.alslsc.com



ANALYTICAL REPORT

Workorder: 34-1914602

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.pjllabs.com
	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.com
	Utah (TNI)	UT00953	http://lams.nelac-institute.org/search
	Nevada (TNI)	UT00953201-1	https://ndep.nv.gov/water/lab-certification
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
	Oklahoma (TNI)	IJ# 9980	http://www.deq.state.ok.us/CSDnew/labcert.htm
	Texas (TNI)	T104704456-18-9	https://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_list.pdf
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	http://www.aihaaccreditedlabs.org
	DOECAP-AP	L18-606	http://www.pjllabs.com
	Washington	C596	https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.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

00938529

Analysis Information

Workorder: 1914602

Limits: Client SOW/Contract Specified

Preparation: NA

Analysis: EPA 6850, DoD QSM

Basis: DoD QSM

Batch: NA

Batch: ELMS/2256 (HBN: 240075)

Prepared By: NA

Analyzed By: Thomas Bosch

Blank

LMB: 655029

Analyzed: 05/28/2019 10:08

Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 655030

Analyzed: 05/28/2019 09:39

Dilution: 1

Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.20	4.00	105	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1914602001

Analyzed: 05/28/2019 10:21

Dilution: 1

Units: ug/L

MS: 655031

Analyzed: 05/28/2019 10:34

Dilution: 1

Units: ug/L

MSD: 655032

Analyzed: 05/28/2019 10:48

Dilution: 1

Units: ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	5.09	5	102	78.8	123.8	4.88	97.7	4.08	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 05/29/2019 13:04	/S/ Stephen Brose 05/30/2019 11:52

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



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: Dept of Defense

COC ID: 11325

SUBCONTRACT TO:

1914602

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: HS19050886
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19050886-02	LH18/24-SP650_051419_BIX	Water	14 May 2019 14:00
SUB_Perch-6850			23 May 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:

5/16/19 1800

Received By:

Date/Time:

5-17-19 0903

Cooler ID(s):

Temperature(s):

RIGHT SOLUTIONS | RIGHT PARTNER

15 May 2019

Page 1 of 1

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

1914602

Client Name: <u>ALS HOUSTON</u>		Project/Task/Site: <u>HS19050886</u>	
Date/Time of Receipt: <u>5-17-19 0903</u>		Number of Coolers Received: <u>①</u>	
Condition of Coolers: <u>Acceptable/Unacceptable</u> Cooler Custody Seals: <u>Present/Absent/NA</u> Container Custody Seals: <u>Intact/Broken/NA</u> Ice Present: <u>Yes/No/NA</u> <u>Frozen/Melted/NA</u>		Temperature Control: <u>Present/Not Included</u> Location Temp Taken: <u>Control/Between Samples</u> Are all temperatures within project specific guidelines? <u>Yes/No/NA</u> VOA Headspace Present? <u>Yes/No/NA</u>	
pH Check Performed:	Metals Yes/No/NA Cyanide Yes/No/NA Sulfide Yes/No/NA Ammonia Yes/No/NA	Total Phenolics Yes/No/NA TPH - 418.1 Yes/No/NA COD Yes/No/NA TKN Yes/No/NA	NO3/NO2 Yes/No/NA Oil & Grease Yes/No/NA Total Phosphorous Yes/No/NA Gross A.B, Gamma Spec Yes/No/NA
Cooler Received	DCL Cooler No.	Temp.	Cooler Received
1	C19 <u>9403</u>	<u>2</u> °C	4
2	C19	°C	5
3	C19	°C	6
Taken By: <u>[Signature]</u>		Printed Name: <u>BARLEEN COATES</u>	
		Date: <u>5-17-19</u>	

CLIENT-RELATED INFORMATION

- | | | | |
|---|--|---|--|
| <input type="checkbox"/> Missing Cooler
<input type="checkbox"/> Cooler Conditions
<input type="checkbox"/> Missing Paperwork
<input type="checkbox"/> Missing/Incorrect Bottle Labels | <input type="checkbox"/> Missing Samples/Bottles
<input type="checkbox"/> Broken/Leaking Samples
<input type="checkbox"/> Incorrect Bottle Type
<input type="checkbox"/> Cooler Temperatures Out of Range | <input type="checkbox"/> Incorrect Preservation
<input type="checkbox"/> pH Criteria Not Met
<input type="checkbox"/> Residual Chlorine Present
<input type="checkbox"/> Head Space in Bottles | <input type="checkbox"/> Insufficient Sample Volume
<input type="checkbox"/> Chain of Custody Problems
<input type="checkbox"/> Other: |
|---|--|---|--|

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: _____ Returned to Sample Receipt by: _____ Date: _____
Printed Name Signature



**Must Deliver Next Business Day
Time and Tempature Sensitive!**

Part # 159469-434 RITZ EXP 01/20 #

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

SHIP DATE: 16MAY19
ACTWGT: 5.00 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

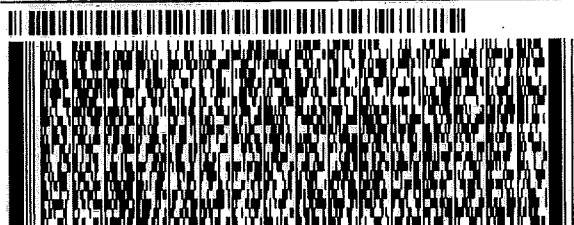
TO **SAMPLE RECEIVING
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE**

300130/CAFE3211

SALT LAKE CITY UT 84123

(801) 286-7700

REF: HS19050886 - RJ



**FedEx
Express**



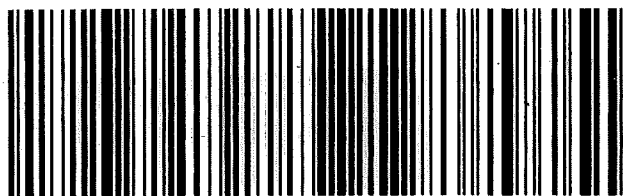
0105090811817

TRK# 4809 7833 8664
0201

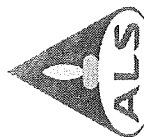
**FRI - 17 MAY 3:00P
STANDARD OVERNIGHT**

AX BTFA

**84123
UT-US SLC**



Batch Worklist



Batch: ELMS/ 2256

Created: 5/28/2019 08:41

Instrument:

HBN: 240075

Rule: EPA 6850, DoD QSM Water

Analyst: T. Bosch

Status: WP



Workorder: 1914602 [ENV_LVL4]

Workorder: 1914603 [ENV_LVL4]

Workorder: 1914871 [ENV_LVL4]

Workorder: 1915147 [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	655026	CCV for HBN 240075 [ELMS/2256]				CCV	3		E685041C3Q	S311		5/29/2019	
2	655027	RLVS for HBN 240075 [ELMS/2256]				RLVS	3		E685041C3Q	S311		5/29/2019	
3	655028	ICS for HBN 240075 [ELMS/2256]				ICS	3		E6850.D3Q	S311		5/29/2019	
4	655029	LMB for HBN 240075 [ELMS/2256]				LMB	3		E6850Q413Q	S311		5/29/2019	
5	655030	LCS for HBN 240075 [ELMS/2256]				LCS	3		E6850Q413Q	S311		5/29/2019	
6	1914602001	LH18/24-SP650_051419_BIX				SAMPLE	3	1914602001-A	E6850Q41.3	S480	6/11/2019	5/31/2019	
7	655031	LH18/24-SP650...(1914602001MS)				MS	3		E6850Q413Q	S311		5/29/2019	
8	655032	LH18/24-SP65...(1914602001MSD)				MSD	3		E6850Q413Q	S311		5/29/2019	
9	1914603001	S0WW18-190516				SAMPLE	3	1914603001-A	E6850Q41.3	S480	6/13/2019	5/31/2019	
10	1914603002	S0WW17-190516				SAMPLE	3	1914603002-A	E6850Q41.3	S480	6/13/2019	5/31/2019	
11	1914603003	S0WW21-190516				SAMPLE	3	1914603003-A	E6850Q41.3	S480	6/13/2019	5/31/2019	
12	1914603004	S0WW12-190516				SAMPLE	3	1914603004-A	E6850Q41.3	S480	6/13/2019	5/31/2019	
13	1914603005	S0WW12-190517-FD				FLDDUP	3	1914603005-A	E6850Q41.3	S480	6/13/2019	5/31/2019	
14	1914871001	LH18/24-SP650_051119_BIX				SAMPLE	3	1914871001-A	E6850Q41.3	S480	6/18/2019	6/6/2019	
15	1915147001	S0WW15-190523				SAMPLE	3	1915147001-A	E6850Q41.3	S480	6/20/2019	5/29/2019	
16	1915147002	S0WW27-190523				SAMPLE	3	1915147002-A	E6850Q41.3	S480	6/20/2019	5/29/2019	
17	655033	CCV for HBN 240075 [ELMS/2256]				CCV	3		E685041C3Q	S311		5/29/2019	

25 of 155



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #'s: 1914602 (001), 1914603 (001-05), 1914871 (001), 1915147 (001)
 ELMS Batch/HBN ID: 2256 (240075)
 Prep Date: 05/24/2019 Analysis Date: 05/28/2019 Analyst: T. Bosch
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\MAY\28MAY19D.s
 Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by Thomas 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 AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

STANDARDS: Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

CALIBRATION CURVE: Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.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: 35µL
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

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: 4.0µL of QC Solution Horizon ID 47516 was used for LCS 655030; Target = 4.0µg/L. ASTM type II water was used for LMB 655029.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1914602001 (Client ID: LH18/24-SP650_051419_BIX). 5.0µL of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. Spike target = 5.0µg/L.

COMMENTS:

- 1) Results reported in µg/L. Field samples 1914603004/05 required 1:10,000 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\MAY\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\240075-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATA\REVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 655027) is reported from the analysis of the Laboratory Control Sample (LCS – 655030) at a level of 4.0µg/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: 19MARI03).

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.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
<u>Batch(es)/SDG: ELM S: 2256 HBN: 240075</u>		
<u>Sample Set IDs if Applicable: 1914602/1914603/1914871/1915147</u>		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SB
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR#</u>		
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB



STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK		Description - 6850 WKG Std 100.ug/L			
Standard: 43702		Created By: Thomas Bosch	Amount: 10 mL		
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM	Expires: 09/18/2019		
MFG Lot: TNB: 09/18/2018		Usable: Yes			
Pipette ID: Not Provided		Lab Lot: CLO4 WRK			
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	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
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

ASTM H2O			Description - ASTM Type II Water
Standard: 109			Amount: 1000 L
MFG: DCL In House			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: 43701		Created By: Thomas Bosch	Amount: 10 mL		
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM	Expires: 09/18/2019		
MFG Lot: TNB: 09/18/2018			Usable: Yes		
Pipette ID: Not Provided			Lab Lot: CLO4 INT		
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
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



STANDARD REPORT

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730		Created By: Thomas Bosch	Amount: 25 mL		
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM	Expires: 09/20/2019		
MFG Lot: TNB: 05/09/2018		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
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



STANDARD REPORT

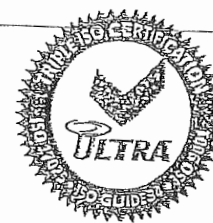
Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729		Created By: Thomas Bosch	Amount: 1 mL
MFG: Cambridge Isotope		Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026
MFG Lot: SDFF-012A		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



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

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	1.001 ± 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.

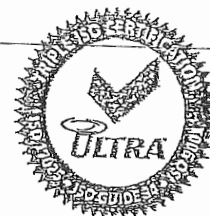
Expiration of Certification:

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.





Certificate of Analysis



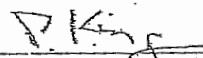
ISO Guide 34 Reference Material

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/QA



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

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



Signal Word: None

Component	SRM #	Prepared Concentration ($\mu\text{g/mL}$)
ClO_4 Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is $\pm 0.24\%$.

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 $0.2\ \mu\text{m}$ 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 $\pm 0.5\%$ 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



Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

Quality Standards:
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification: $\geq 98\%$
Labeled CAS Number: NA
Unlabeled CAS Number: 7601-89-0
MW*: 130.4
Chemical Formula: NaClO₄
Storage: Store at room temperature away from light and moisture.
Stability: See storage and expiration date.

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.

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/NCSL 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.

* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 µg/mL
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	109.4 ± 2.8 µg/mL (k=2)



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	
*	655026	CCV@25	Vial 71	1	Control	1	2.51535e6	9.014	26.37917
*	655030	QC@4.0	Vial 72	1	Control	2	4.51078e5	8.943	4.19596
*	655028	ICS@4.0	Vial 73	1	Control	3	4.02631e5	8.668	4.27965
*	655029	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1914602001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	655031	146021S	Vial 76	1	Sample	6	4.52005e5	8.454	5.08666
*	655032	146021D	Vial 77	1	Sample	7	4.57024e5	8.493	4.88333
*	1914603001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1914603002		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1914603003		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1914603004	10K	Vial 81	1	Sample	11	6.15140e5	9.032	6.46842e4
*	1914603005	10K	Vial 82	1	Sample	12	7.46250e5	9.051	7.56269e4
*	1914871001		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1915147001		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	1915147002		Vial 85	1	Sample	15	0.00000	0.000	0.00000
*	655033	CCV@25	Vial 71	1	Control	16	2.26382e6	9.030	25.44543

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	655026	CCV@25	Vial 71	1	Control	1	7.44700e5	9.032	26.32416
*	655030	QC@4.0	Vial 72	1	Control	2	1.45202e5	8.967	4.39774
*	655028	ICS@4.0	Vial 73	1	Control	3	1.38337e5	8.681	4.78850
*	655029	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1914602001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	655031	146021S	Vial 76	1	Sample	6	1.50468e5	8.472	5.54931
*	655032	146021D	Vial 77	1	Sample	7	1.53323e5	8.504	5.36140
*	1914603001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1914603002		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1914603003		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1914603004	10K	Vial 81	1	Sample	11	1.94510e5	9.049	6.75291e4
*	1914603005	10K	Vial 82	1	Sample	12	2.32860e5	9.068	7.82104e4
*	1914871001		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1915147001		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	1915147002		Vial 85	1	Sample	15	0.00000	0.000	0.00000
*	655033	CCV@25	Vial 71	1	Control	16	6.82139e5	9.049	25.81384

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	655026	CCV@25	Vial 71	1	Control	1	2.89154e5	9.034	5.00000
*	655030	QC@4.0	Vial 72	1	Control	2	3.53403e5	8.961	5.00000
*	655028	ICS@4.0	Vial 73	1	Control	3	3.08985e5	8.691	5.00000
*	655029	LMB	Vial 74	1	Control	4	3.47474e5	9.079	5.00000
*	1914602001		Vial 75	1	Sample	5	3.09553e5	8.502	5.00000
*	655031	146021S	Vial 76	1	Sample	6	2.89563e5	8.478	5.00000
*	655032	146021D	Vial 77	1	Sample	7	3.05514e5	8.517	5.00000
*	1914603001		Vial 78	1	Sample	8	2.25289e5	8.279	5.00000
*	1914603002		Vial 79	1	Sample	9	2.22697e5	8.383	5.00000
*	1914603003		Vial 80	1	Sample	10	2.34373e5	8.224	5.00000
*	1914603004	10K	Vial 81	1	Sample	11	3.06845e5	9.055	5.00000e4
*	1914603005	10K	Vial 82	1	Sample	12	3.16468e5	9.072	5.00000e4
*	1914871001		Vial 83	1	Sample	13	2.66978e5	8.492	5.00000
*	1915147001		Vial 84	1	Sample	14	2.34476e5	8.342	5.00000
*	1915147002		Vial 85	1	Sample	15	2.47416e5	8.369	5.00000
*	655033	CCV@25	Vial 71	1	Control	16	2.70388e5	9.054	5.00000

Sequence Table:

Method and Injection Info Part:

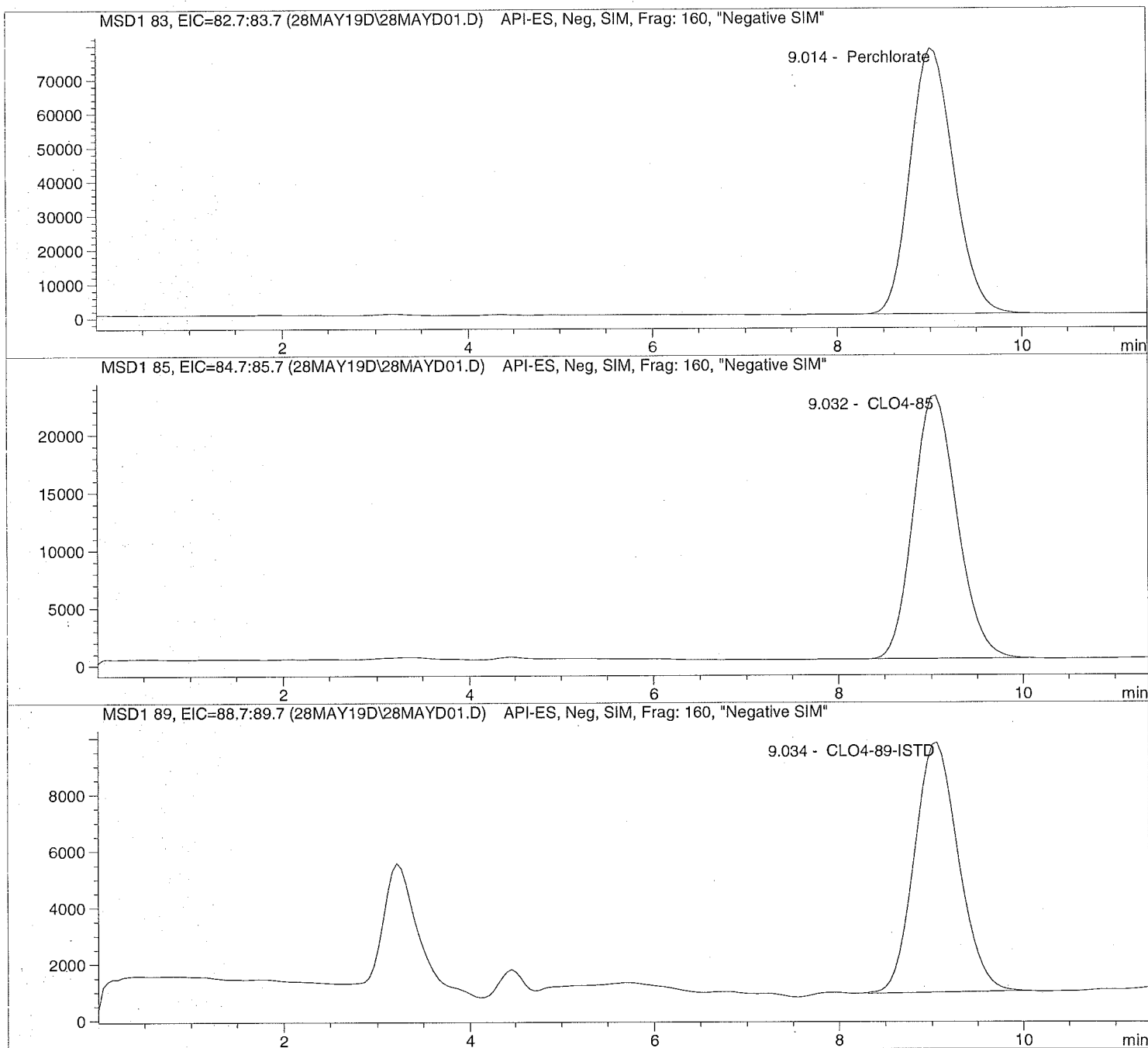
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	655026 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	655030 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	655028 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	655029 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1914602001	CLO4-AQN	1	Sample		
6	Vial 76	655031 146021S	CLO4-AQN	1	Sample		
7	Vial 77	655032 146021D	CLO4-AQN	1	Sample		
8	Vial 78	1914603001	CLO4-AQN	1	Sample		
9	Vial 79	1914603002	CLO4-AQN	1	Sample		
10	Vial 80	1914603003	CLO4-AQN	1	Sample		
11	Vial 81	1914603004 10K	CLO4-AQN	1	Sample		
12	Vial 82	1914603005 10K	CLO4-AQN	1	Sample		
13	Vial 83	1914871001	CLO4-AQN	1	Sample		
14	Vial 84	1915147001	CLO4-AQN	1	Sample		
15	Vial 85	1915147002	CLO4-AQN	1	Sample		
16	Vial 71	655033 CCV@25	CLO4-AQN	1	Ctrl Samp		

Injection Date: 5/28/2019 09:22:28
Sample Name: 655026 CCV@25
Acq Operator: TNB

Seq Line: 1
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 09:22:28 Seq Line: 1
Sample Name: 655026 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.014	PBA	2515348.3	26.3792	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.032	PBA	744700.3	26.3242	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.034	BBA	289154.0	5.0000	CLO4-89-ISTD

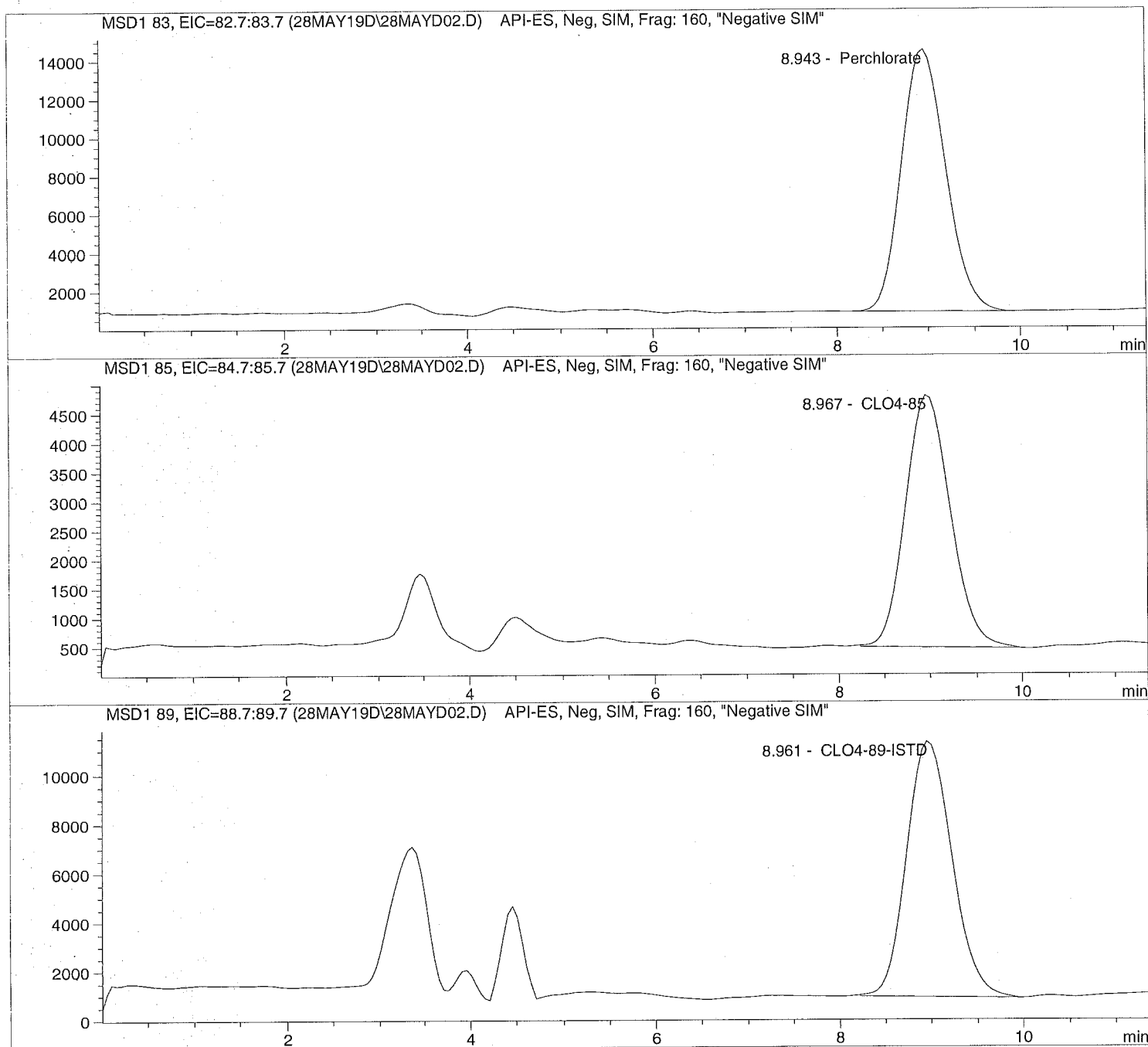
*** End of Report ***

Injection Date: 5/28/2019 09:39:12
Sample Name: 655030 QC@4.0
Acq Operator: TNB

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 09:39:12 Seq Line: 2
Sample Name: 655030 QC@4.0 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.943	PBA	451078.5	4.1960	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.967	BBA	145201.9	4.3977	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.961	BBA	353402.8	5.0000	CLO4-89-ISTD

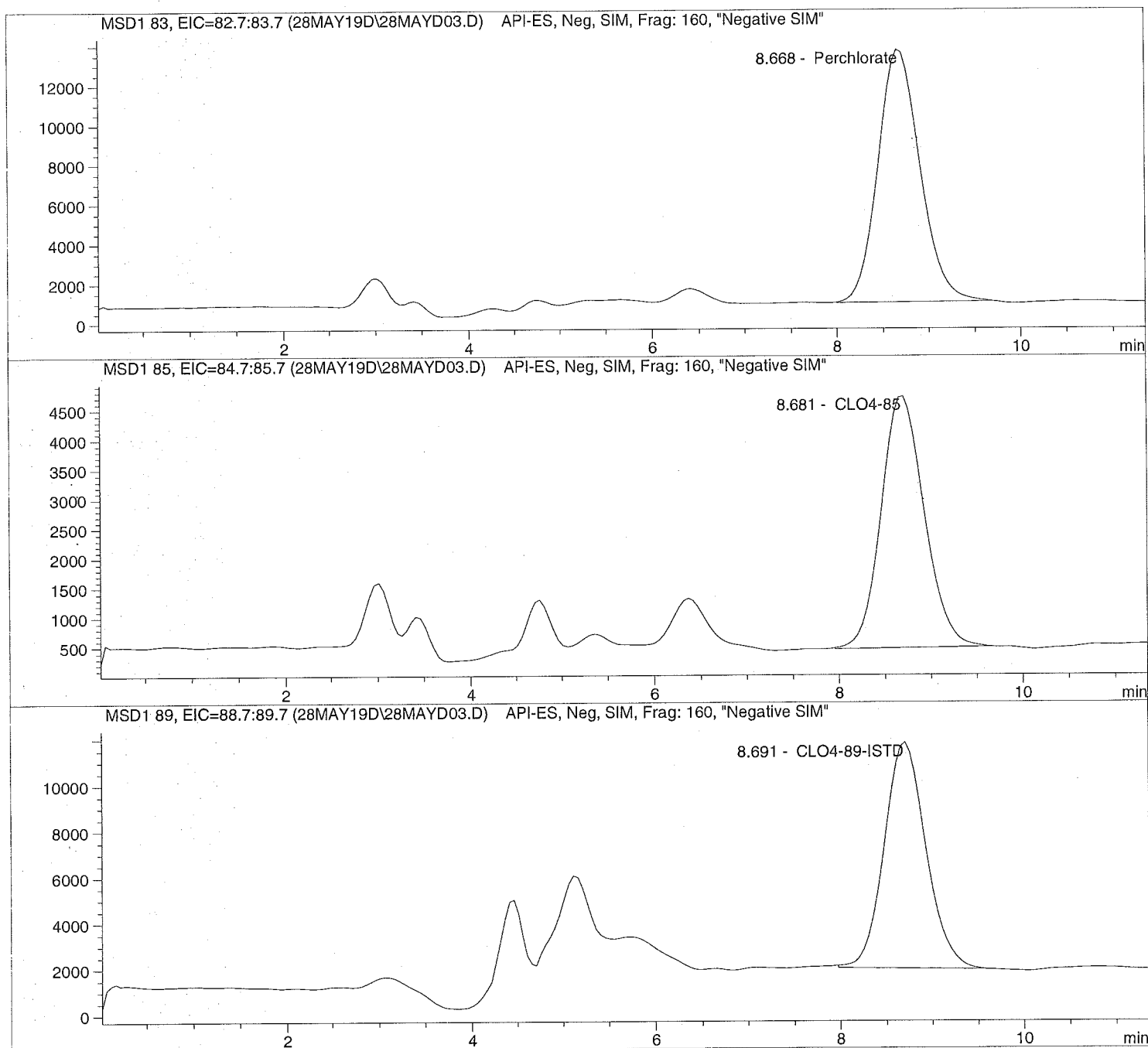
*** End of Report ***

Injection Date: 5/28/2019 09:54:31
Sample Name: 655028 ICS@4.0
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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 09:54:31 Seq Line: 3
Sample Name: 655028 ICS@4.0 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.668	PBA	402631.1	4.2796	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.681	BBA	138337.3	4.7885	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.691	BBA	308984.7	5.0000	CLO4-89-ISTD

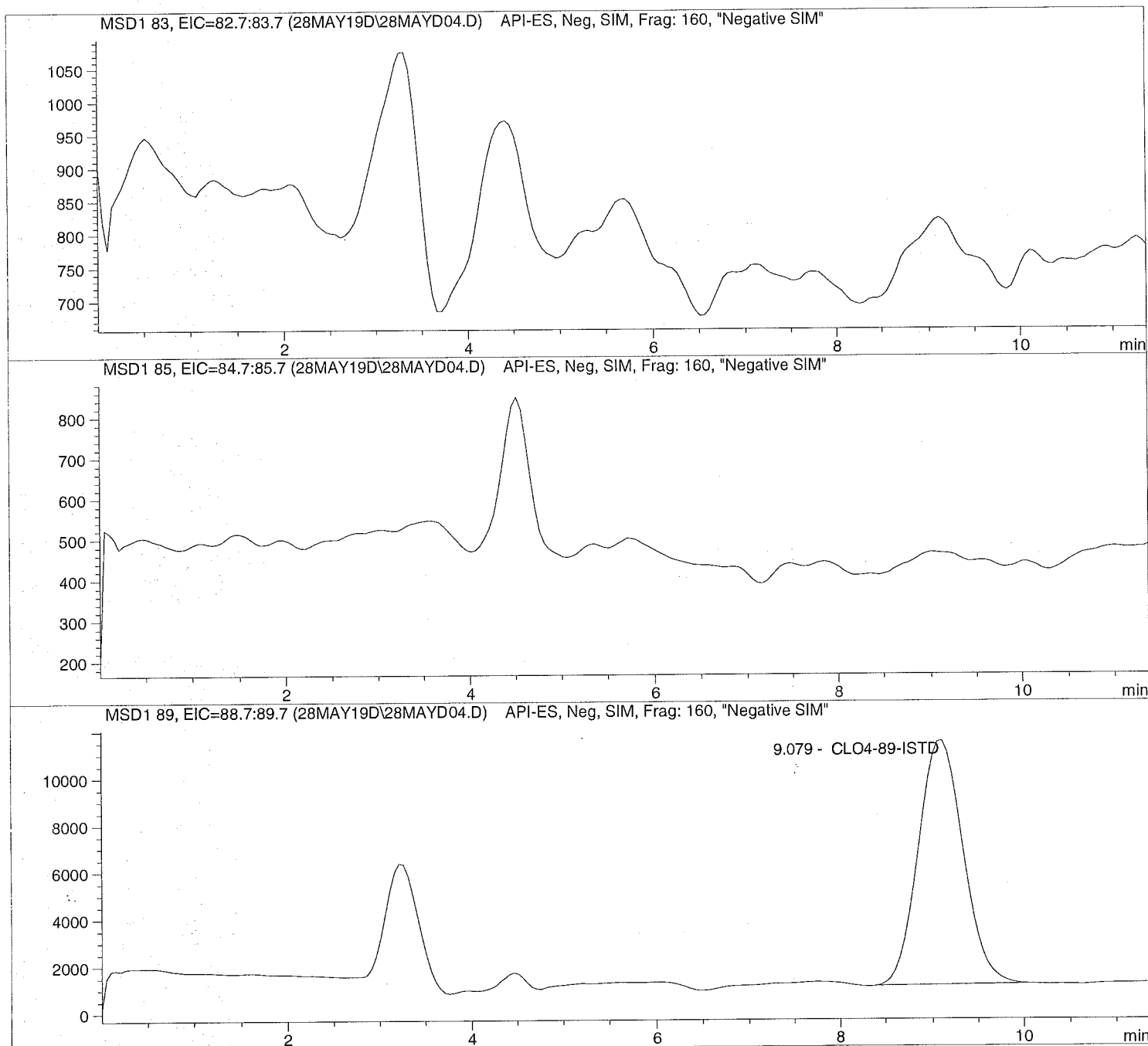
*** End of Report ***

Injection Date: 5/28/2019 10:08:00
Sample Name: 655029 LMB
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  5/28/2019  10:08:00      Seq Line:          4
Sample Name:    655029    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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
9.079	PBA	347474.2	5.0000	CLO4-89-ISTD

=====

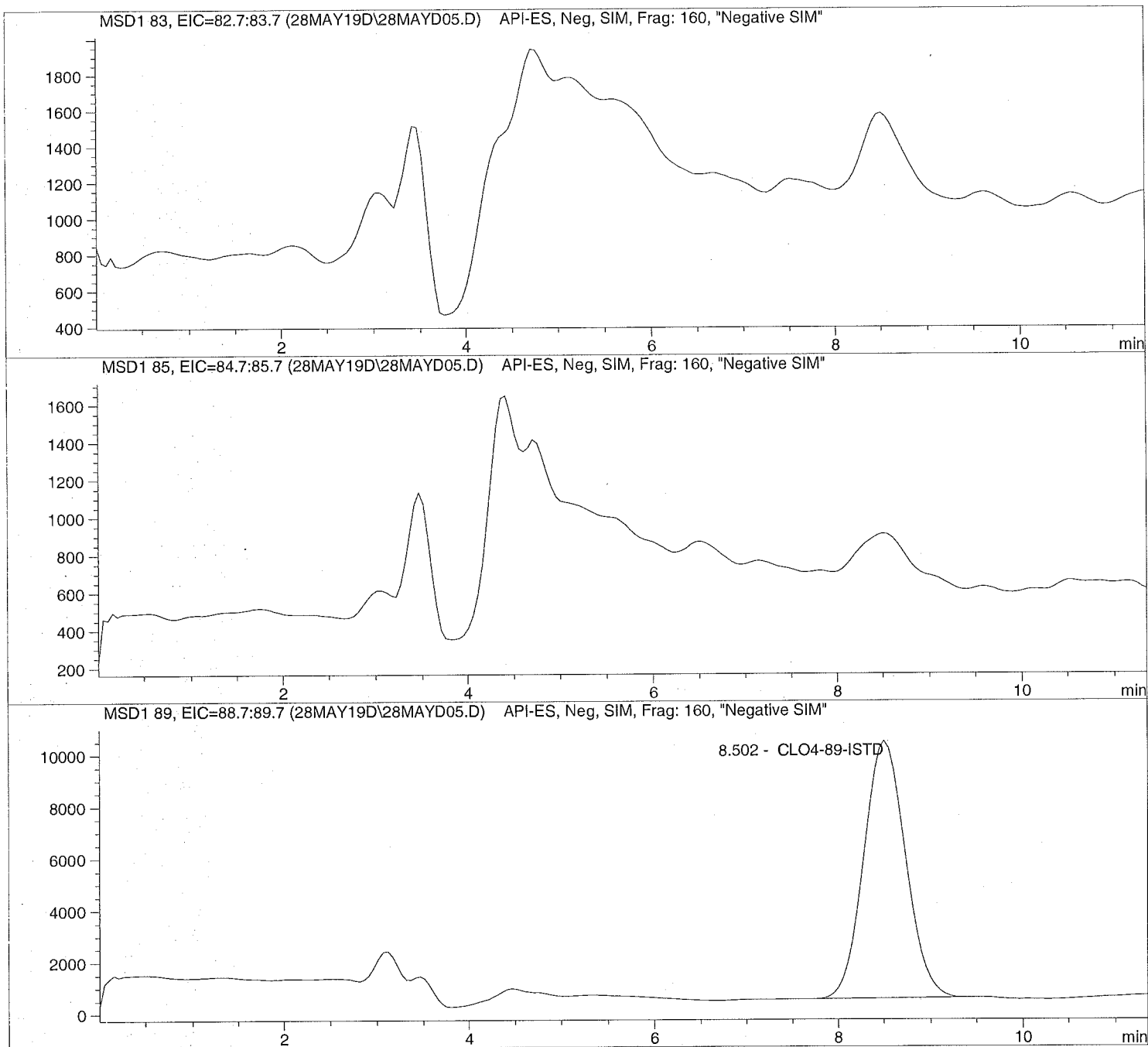
*** End of Report ***

Injection Date: 5/28/2019 10:21:23
Sample Name: 1914602001
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date:  5/28/2019  10:21:23      Seq Line:           5
Sample Name:    1914602001      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-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.502	PBA	309553.4	5.0000	CLO4-89-ISTD

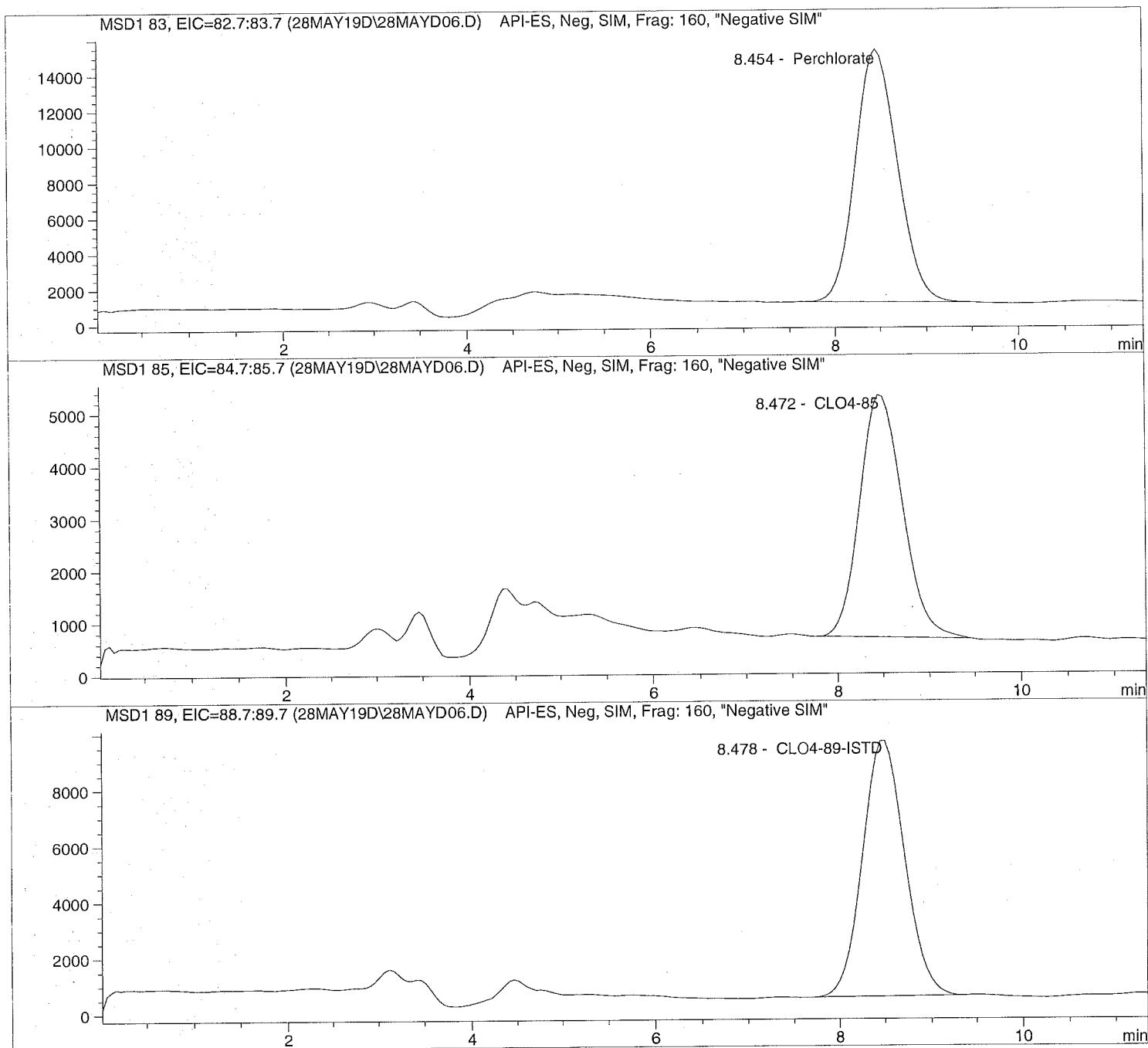
```
=====
*** End of Report ***
=====
```

Injection Date: 5/28/2019 10:34:49
Sample Name: 655031 146021S
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 10:34:49 Seq Line: 6
Sample Name: 655031 146021S 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.454	BBA	452005.2	5.0867	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	PBA	150468.2	5.5493	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.478	PBA	289563.3	5.0000	CLO4-89-ISTD

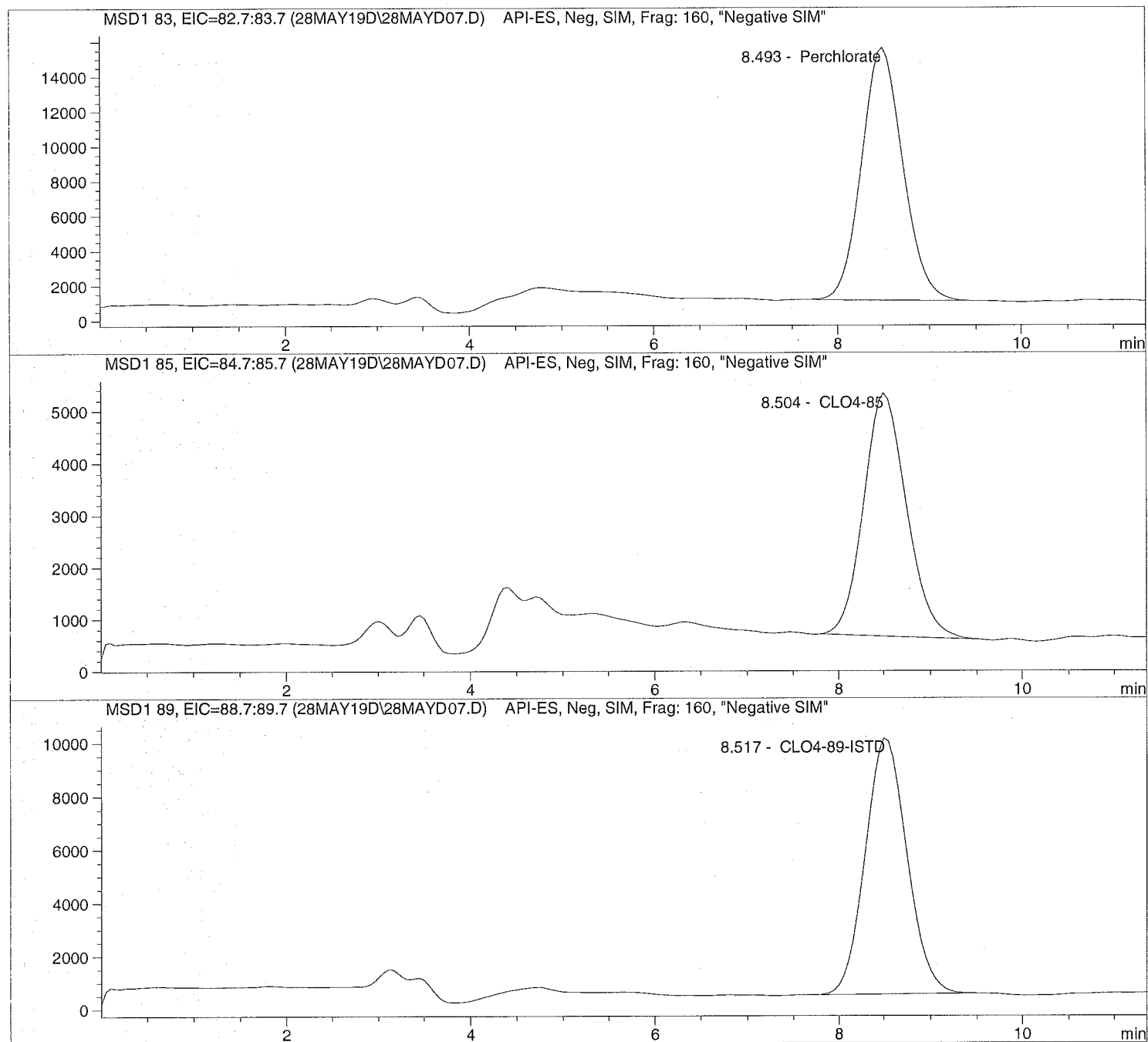
*** End of Report ***

Injection Date: 5/28/2019 10:48:16
Sample Name: 655032 146021D
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 10:48:16 Seq Line: 7
Sample Name: 655032 146021D 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.493	BBA	457024.3	4.8833	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.504	PBA	153322.9	5.3614	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.517	PBA	305513.7	5.0000	CLO4-89-ISTD

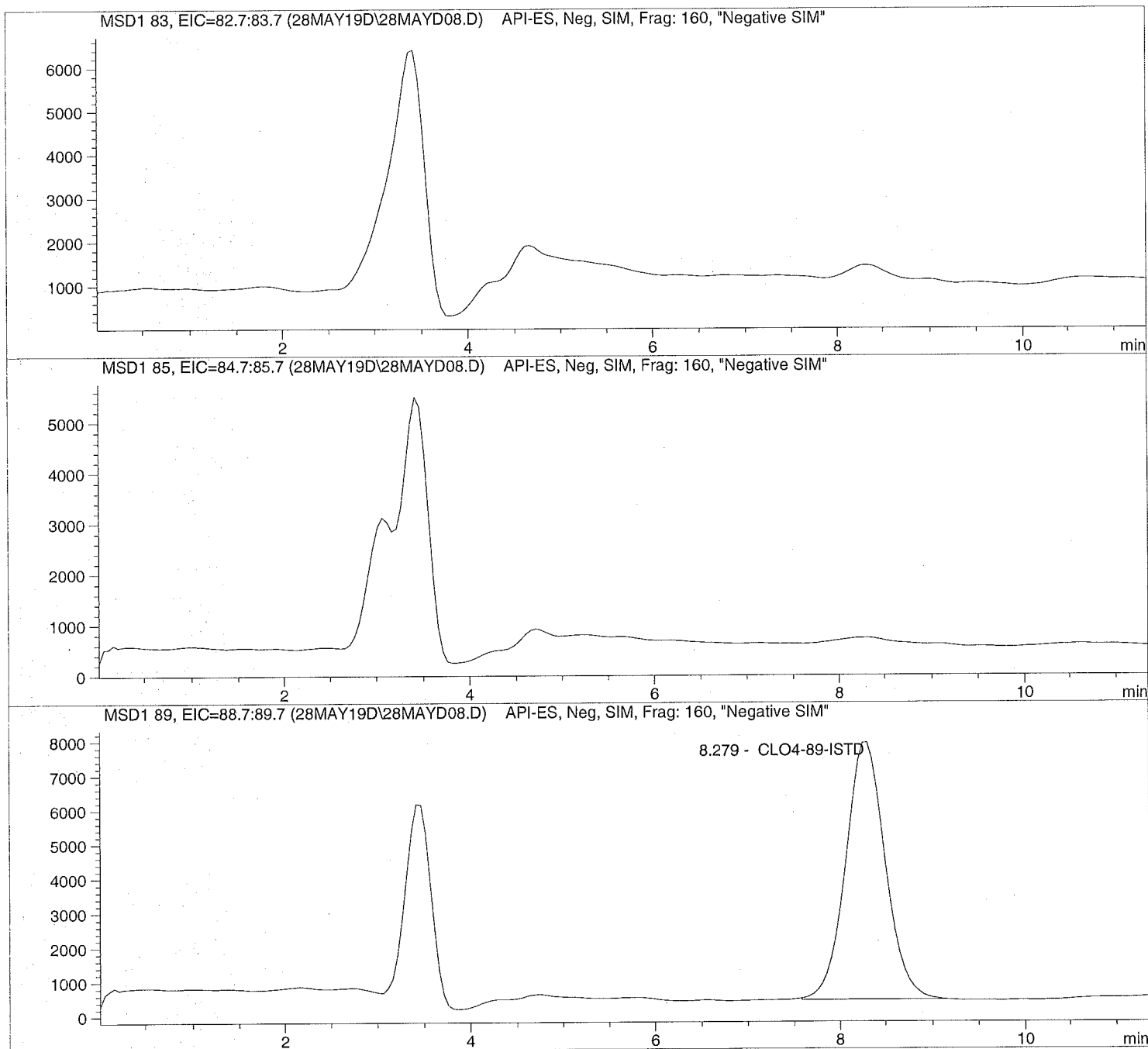
*** End of Report ***

Injection Date: 5/28/2019 11:01:42
Sample Name: 1914603001
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 11:01:42 Seq Line: 8
Sample Name: 1914603001 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.279	BBA	225288.9	5.0000	CLO4-89-ISTD

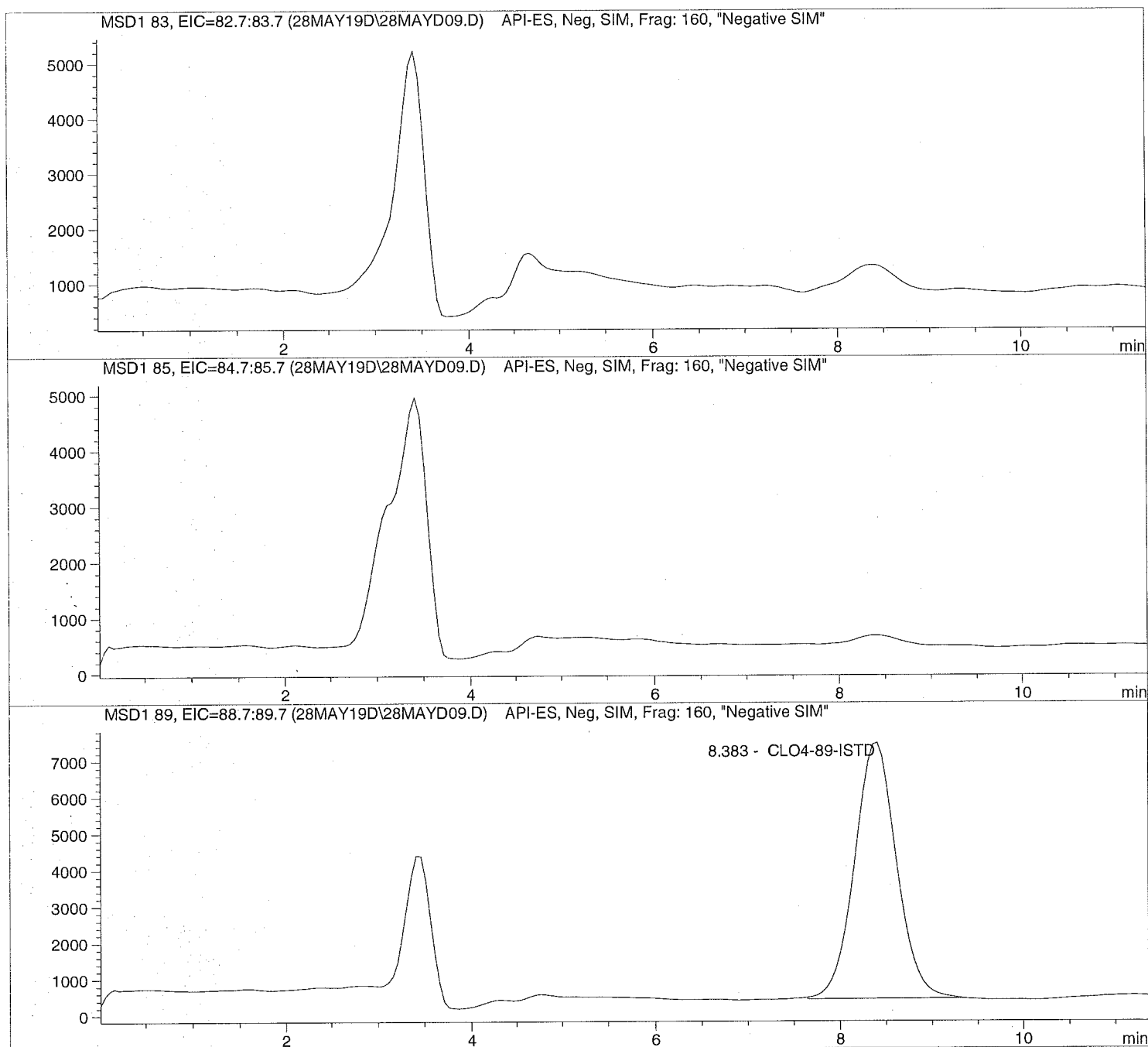
*** End of Report ***

Injection Date: 5/28/2019 11:15:07
Sample Name: 1914603002
Acq Operator: TNB

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 11:15:07 Seq Line: 9
Sample Name: 1914603002 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.383	BBA	222696.7	5.0000	CLO4-89-ISTD

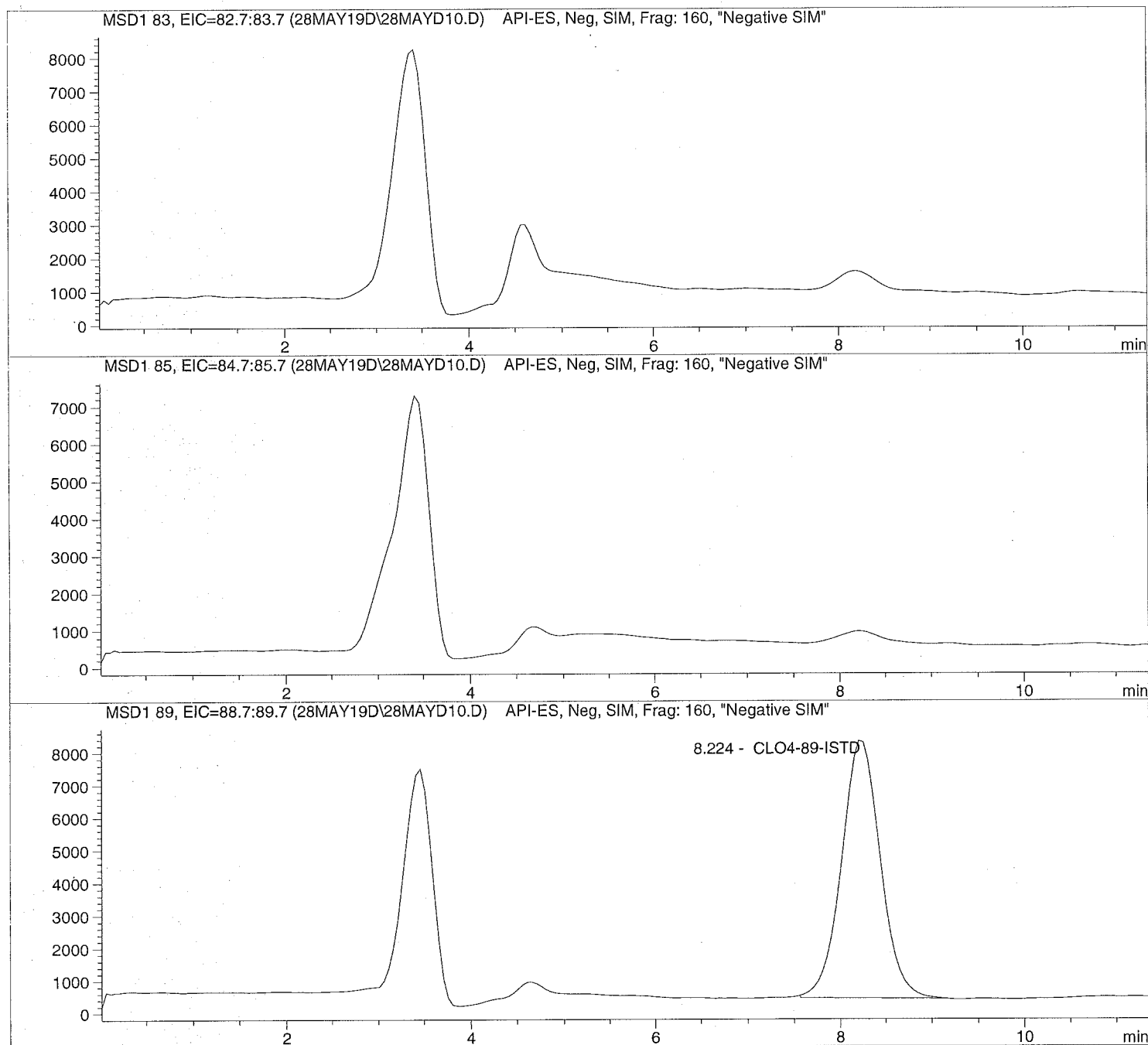
*** End of Report ***

Injection Date: 5/28/2019 11:28:30
Sample Name: 1914603003
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 11:28:30 Seq Line: 10
Sample Name: 1914603003 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.224	BBA	234372.9	5.0000	CLO4-89-ISTD

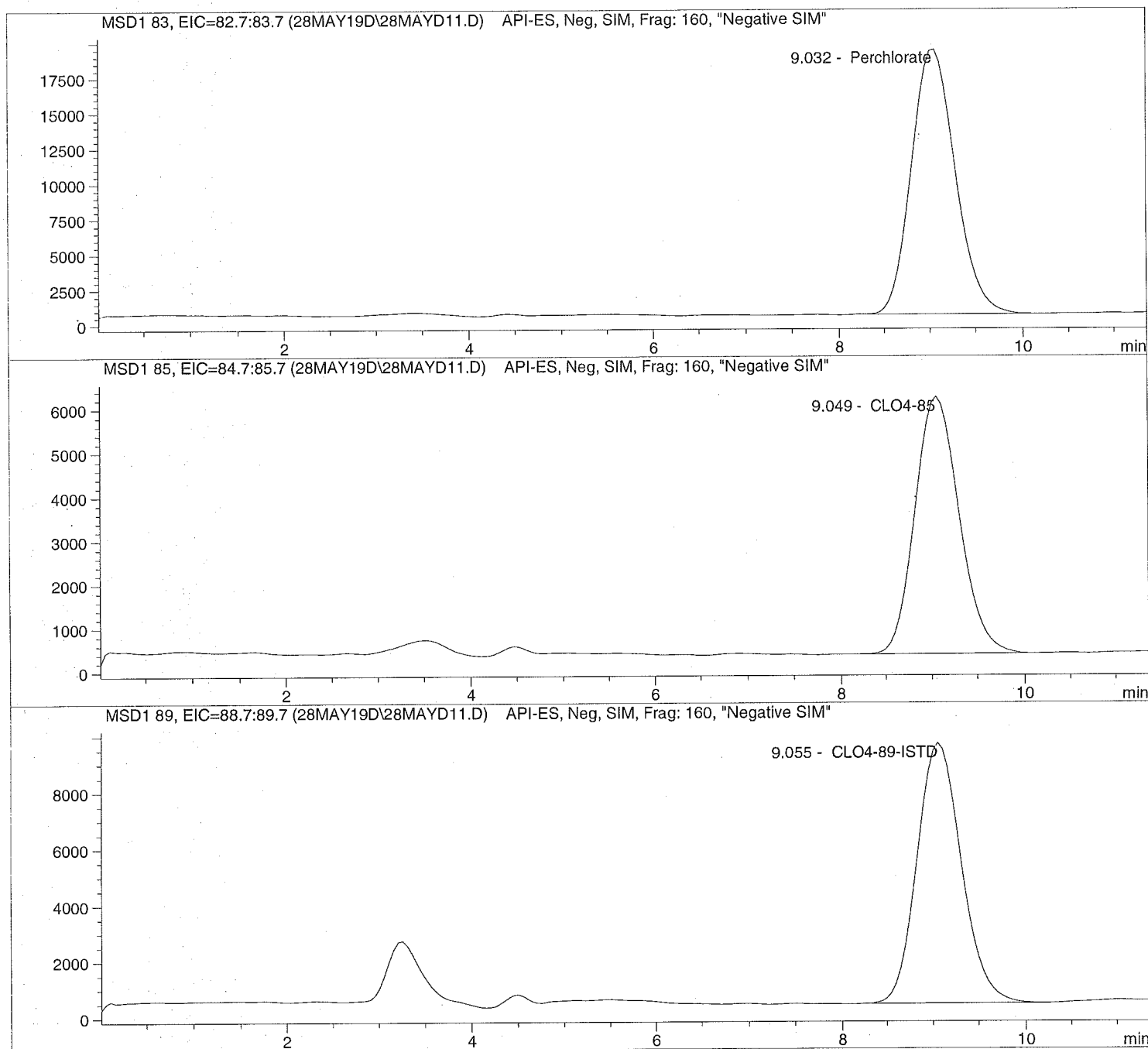
*** End of Report ***

Injection Date: 5/28/2019 11:41:53
Sample Name: 1914603004 10K
Acq Operator: TNB

Seq Line: 11
Location: Vial 81
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis




```
=====
Injection Date:  5/28/2019  11:41:53      Seq Line:      11
Sample Name:    1914603004   10K          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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       10000.000000
Sample Amount:  0.000
=====
```

=====

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.032	BBA	615140.4	64684.2479	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.049	BBA	194510.4	67529.1287	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.055	BBA	306844.5	50000.0000	CLO4-89-ISTD

=====

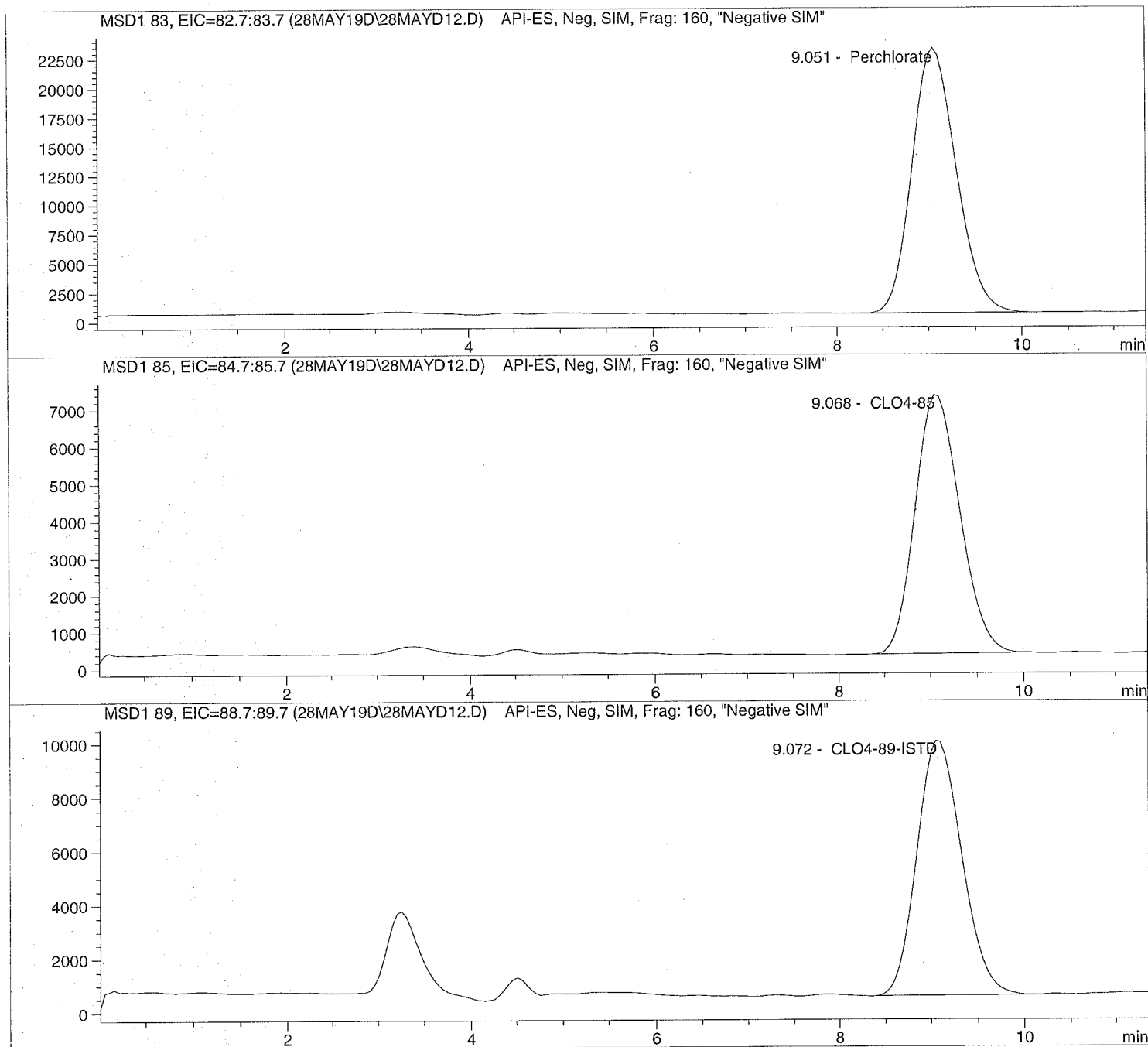
*** End of Report ***

Injection Date: 5/28/2019 11:55:16
Sample Name: 1914603005 10K
Acq Operator: TNB

Seq Line: 12
Location: Vial 82
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 11:55:16 Seq Line: 12
Sample Name: 1914603005 10K Location: Vial 82
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 10000.000000
Sample Amount: 0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.051	PBA	746250.2	75626.8976	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.068	BBA	232859.8	78210.3806	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.072	PBA	316467.9	50000.0000	CLO4-89-ISTD

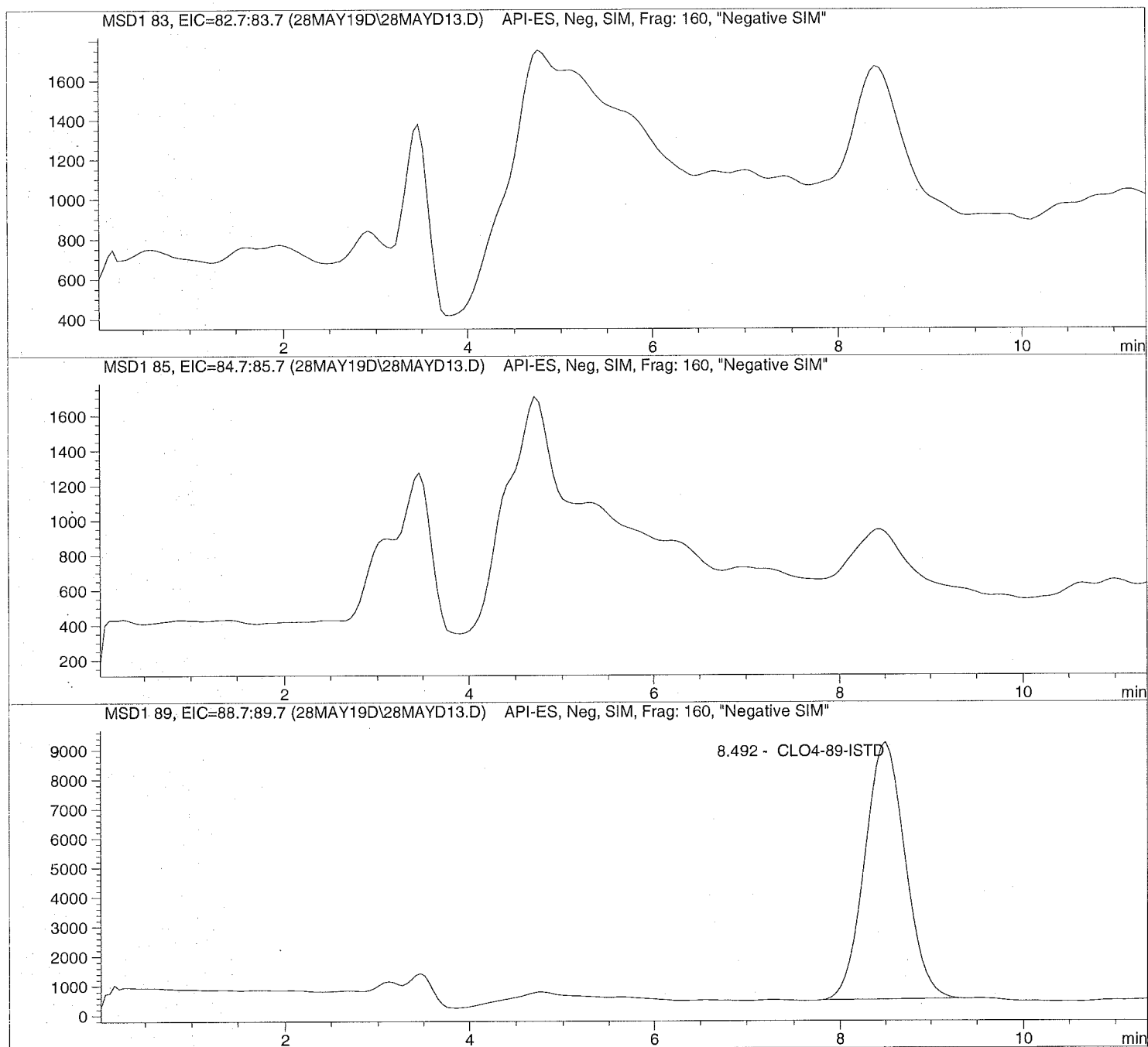
*** End of Report ***

Injection Date: 5/28/2019 12:08:42
Sample Name: 1914871001
Acq Operator: TNB

Seq Line: 13
Location: Vial 83
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 12:08:42 Seq Line: 13
Sample Name: 1914871001 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.492	PBA	266978.1	5.0000	CLO4-89-ISTD

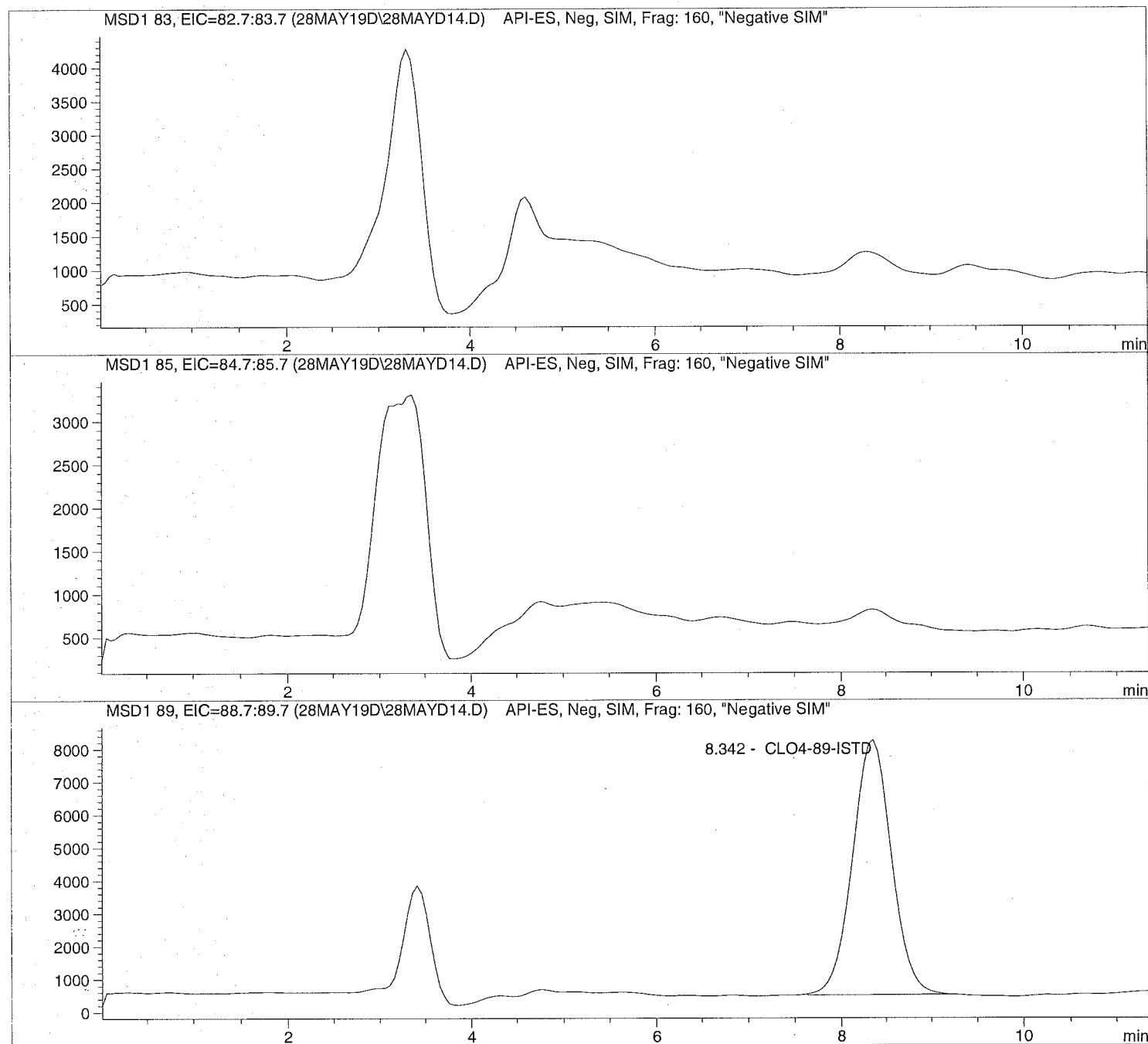
*** End of Report ***

Injection Date: 5/28/2019 12:22:08
Sample Name: 1915147001
Acq Operator: TNB

Seq Line: 14
Location: Vial 84
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 12:22:08 Seq Line: 14
Sample Name: 1915147001 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.342	BBA	234476.0	5.0000	CLO4-89-ISTD

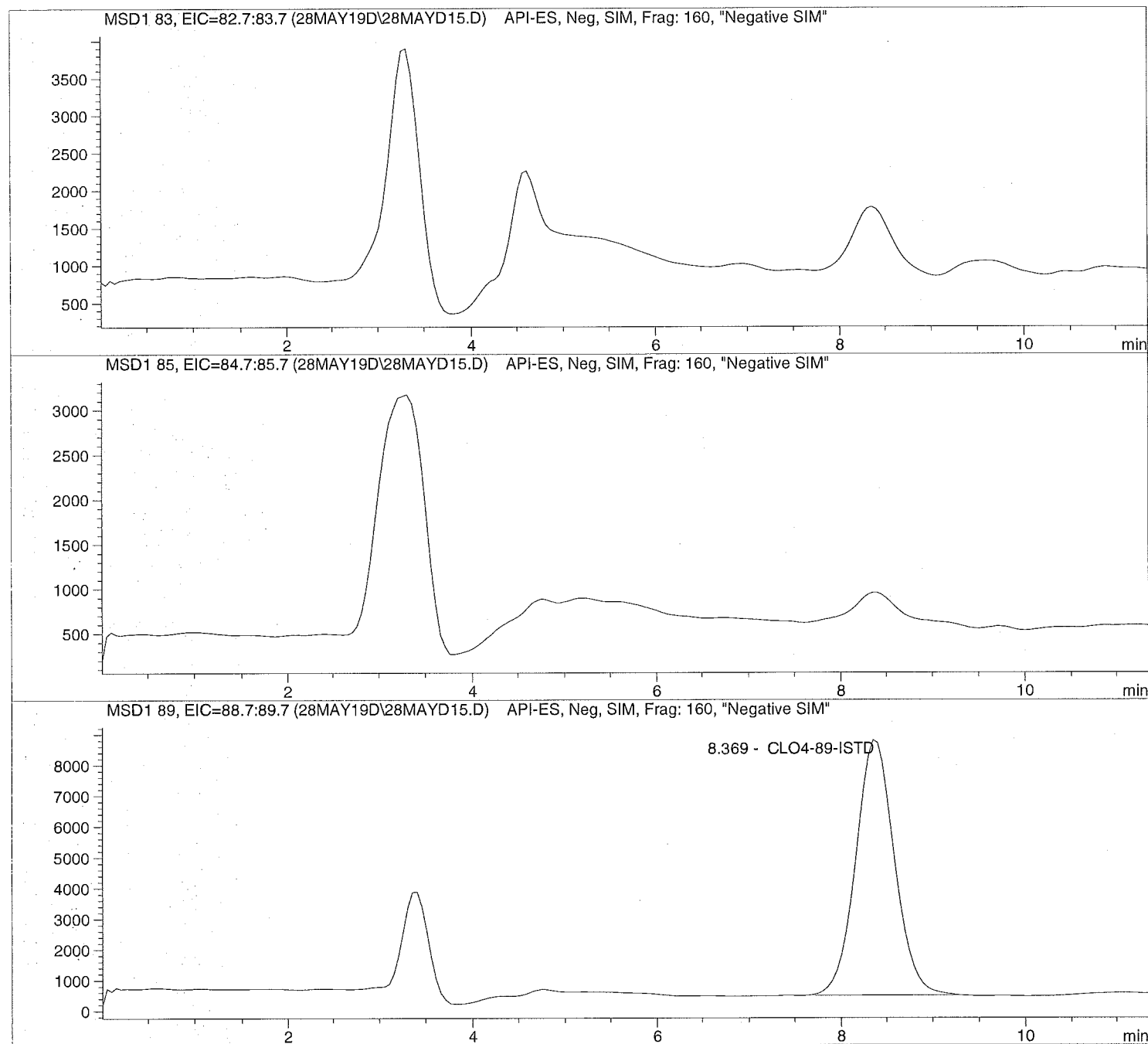
*** End of Report ***

Injection Date: 5/28/2019 12:35:29
Sample Name: 1915147002
Acq Operator: TNB

Seq Line: 15
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 μ l

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis




```
=====
Injection Date:  5/28/2019  12:35:29      Seq Line:      15
Sample Name:    1915147002      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-DP2.M
Last Changed:   4/12/2019  07:54:13
=====
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.369	BBA	247415.5	5.0000	CLO4-89-ISTD

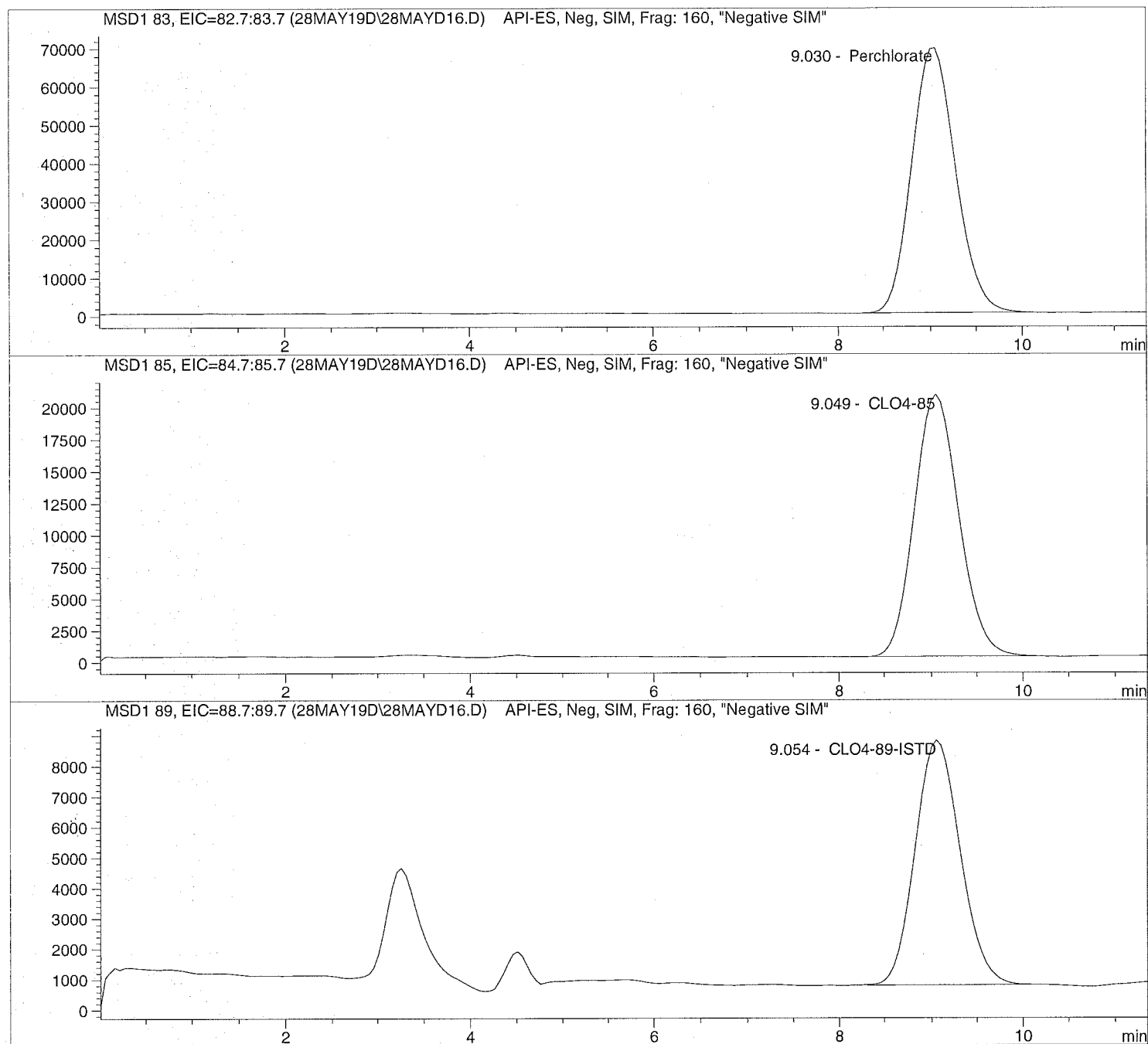
```
=====
*** End of Report ***
=====
```

Injection Date: 5/28/2019 13:28:26
Sample Name: 655033 CCV@25
Acq Operator: TNB

Seq Line: 16
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Injection Date: 5/28/2019 13:28:26 Seq Line: 16
Sample Name: 655033 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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
9.030	PBA	2263822.8	25.4454	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.049	PBA	682139.4	25.8138	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.054	BBA	270387.5	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 : 3/19/2019 2:35:19 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

#

#	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	Lvl	Amount	Area	Amt/Area	Ref Grp	Name
[min]	Sig					

8.744	1	1	1.00000	7.76074e4	1.28854e-5	1	Perchlorate
		2	2.00000	1.35273e5	1.47849e-5		
		3	5.00000	3.37764e5	1.48033e-5		
		4	10.00000	6.83454e5	1.46316e-5		
		5	25.00000	2.08433e6	1.19943e-5		
		6	50.00000	4.13334e6	1.20968e-5		
		7	75.00000	5.99313e6	1.25143e-5		
8.755	2	1	1.00000	2.36780e4	4.22333e-5	1	CLO4-85
		2	2.00000	4.69486e4	4.25998e-5		
		3	5.00000	1.06124e5	4.71147e-5		
		4	10.00000	2.13523e5	4.68335e-5		
		5	25.00000	6.14295e5	4.06971e-5		
		6	50.00000	1.19814e6	4.17315e-5		
		7	75.00000	1.78355e6	4.20509e-5		
8.766	3	1	5.00000	2.73208e5	1.83011e-5	+I1	CLO4-89-ISTD
		2	5.00000	2.24886e5	2.22335e-5		
		3	5.00000	2.33196e5	2.14412e-5		
		4	5.00000	2.34454e5	2.13262e-5		
		5	5.00000	2.50568e5	1.99547e-5		
		6	5.00000	2.30977e5	2.16472e-5		

RetTime	Lvl	Amount	Area	Amt/Area	Ref Grp Name
[min]	Sig				
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min

Curve Type : Quadratic

Origin : Ignored

Calibration Level Weights:/

Level 1 : 1

Level 2 : 0.5

Level 3 : 0.2

Level 4 : 0.1

Level 5 : 0.04

Level 6 : 0.02

Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min

Curve Type : Quadratic

Origin : Ignored

Calibration Level Weights:/

Level 1 : 1

Level 2 : 0.5

Level 3 : 0.2

Level 4 : 0.1

Level 5 : 0.04

Level 6 : 0.02

Level 7 : 0.013333

Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min

Curve Type : Linear

Origin : Included

Calibration Level Weights:/

Level 1 : 1

Level 2 : 1

Level 3 : 1

Level 4 : 1

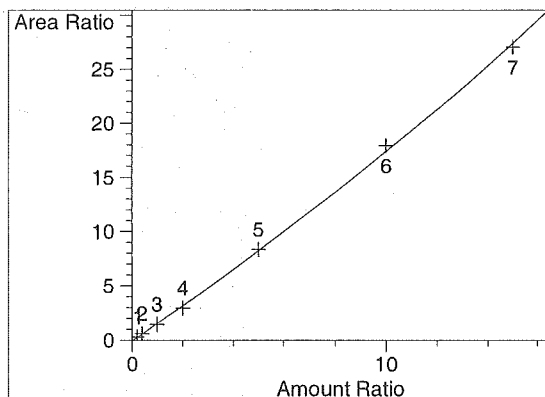
Level 5 : 1

Level 6 : 1

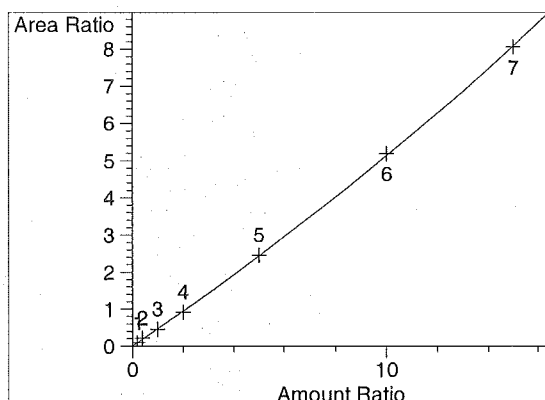
Level 7 : 1

=====
Peak Sum Table
=====

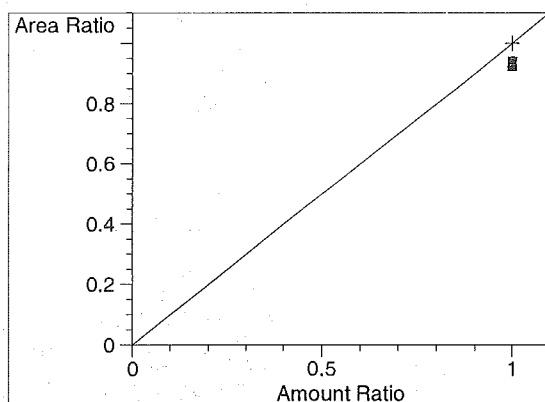
No Entries in table
=====

=====
Calibration Curves
=====

Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation: 0.99957
Residual Std. Dev.: 0.30744
Formula: $y = ax^2 + bx + c$
a: 1.76988e-2
b: 1.56480
c: -4.92430e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755
MSD1 85, EIC=84.7:85.7
Correlation: 0.99983
Residual Std. Dev.: 0.03473
Formula: $y = ax^2 + bx + c$
a: 5.13396e-3
b: 4.62055e-1
c: 4.97209e-4
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766
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 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	7.76074e4	1.06245
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	2.06969
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	4.73474
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	9.27727
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	25.29036
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	51.36844
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	74.16754
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	9.25940

Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
##							
##	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	9.30535e-1
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	2.24255
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	4.86656
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	9.64312
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	25.12159
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	50.46721
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	74.72019
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	9.54024

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	2.73208e5	5.00000
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	5.00000
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	5.00000
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	5.00000
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	5.00000
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	5.00000
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	5.00000
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

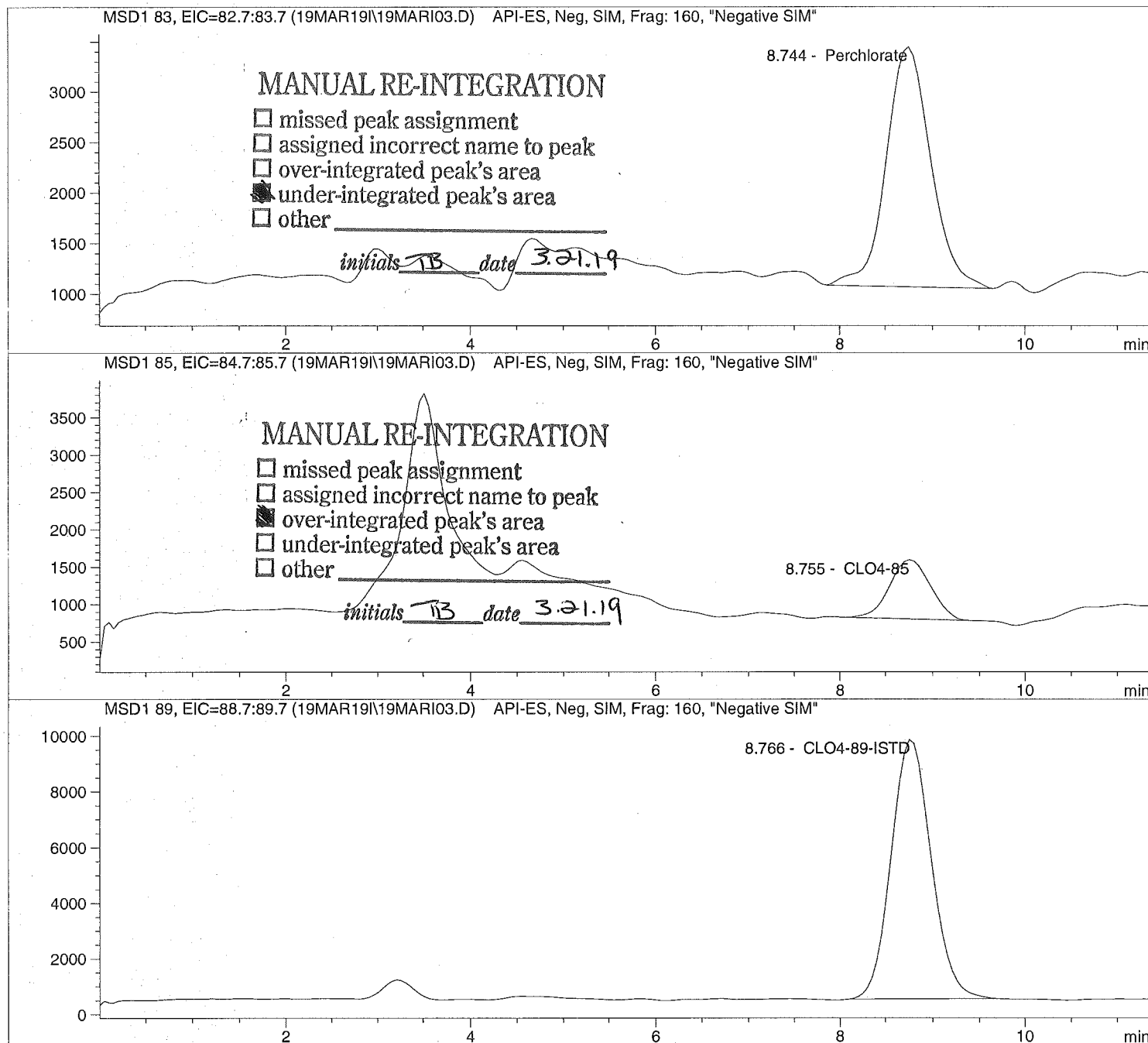
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	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 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:39:40 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.744	MM	77607.4	1.0625	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	MM	23678.0	0.9305	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

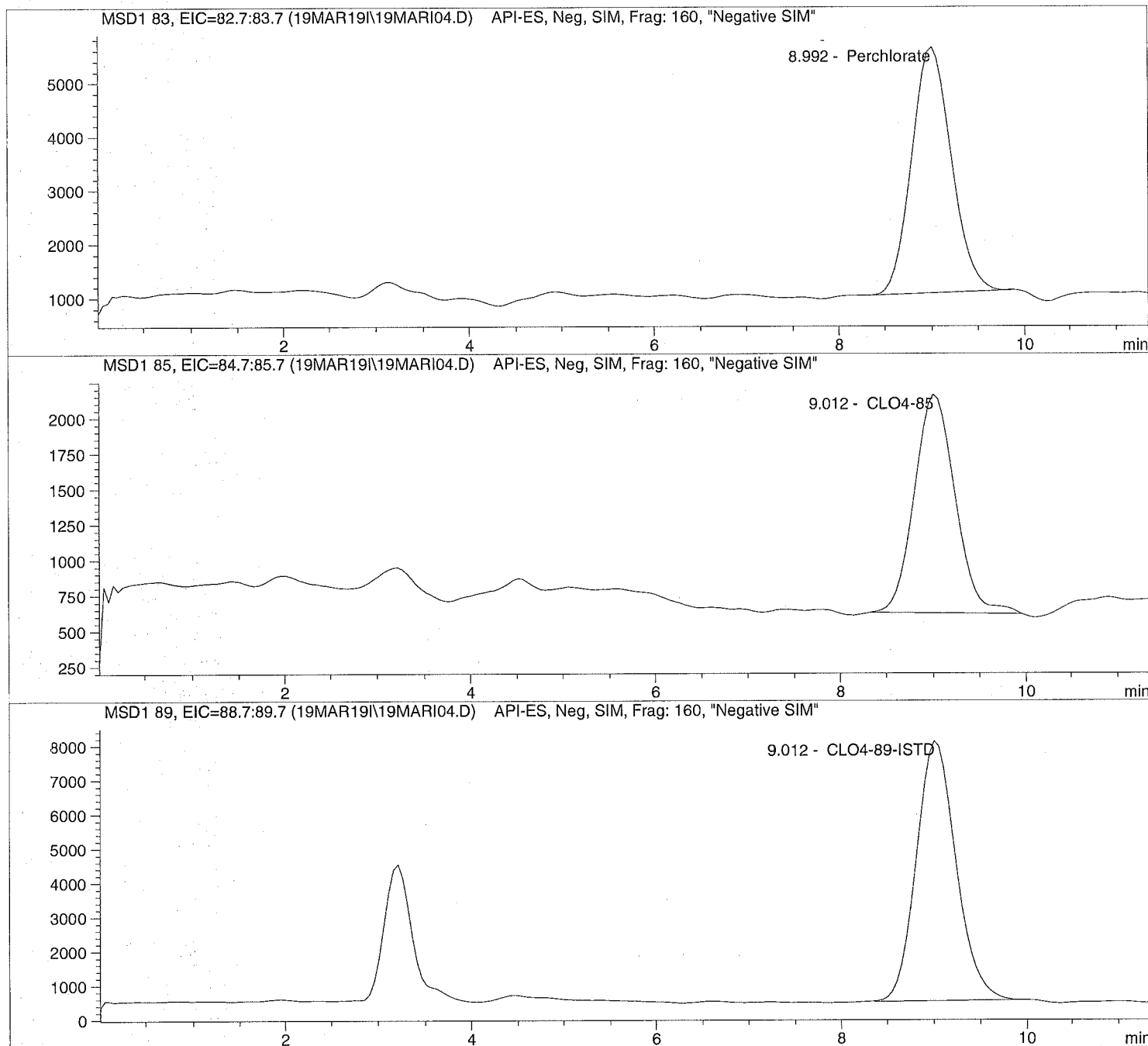
*** End of Report ***

Injection Date: 3/19/2019 09:53:00
Sample Name: CLO4@ 2.0ug/L
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 09:53:00 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.992	BBA	135272.8	2.0697	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

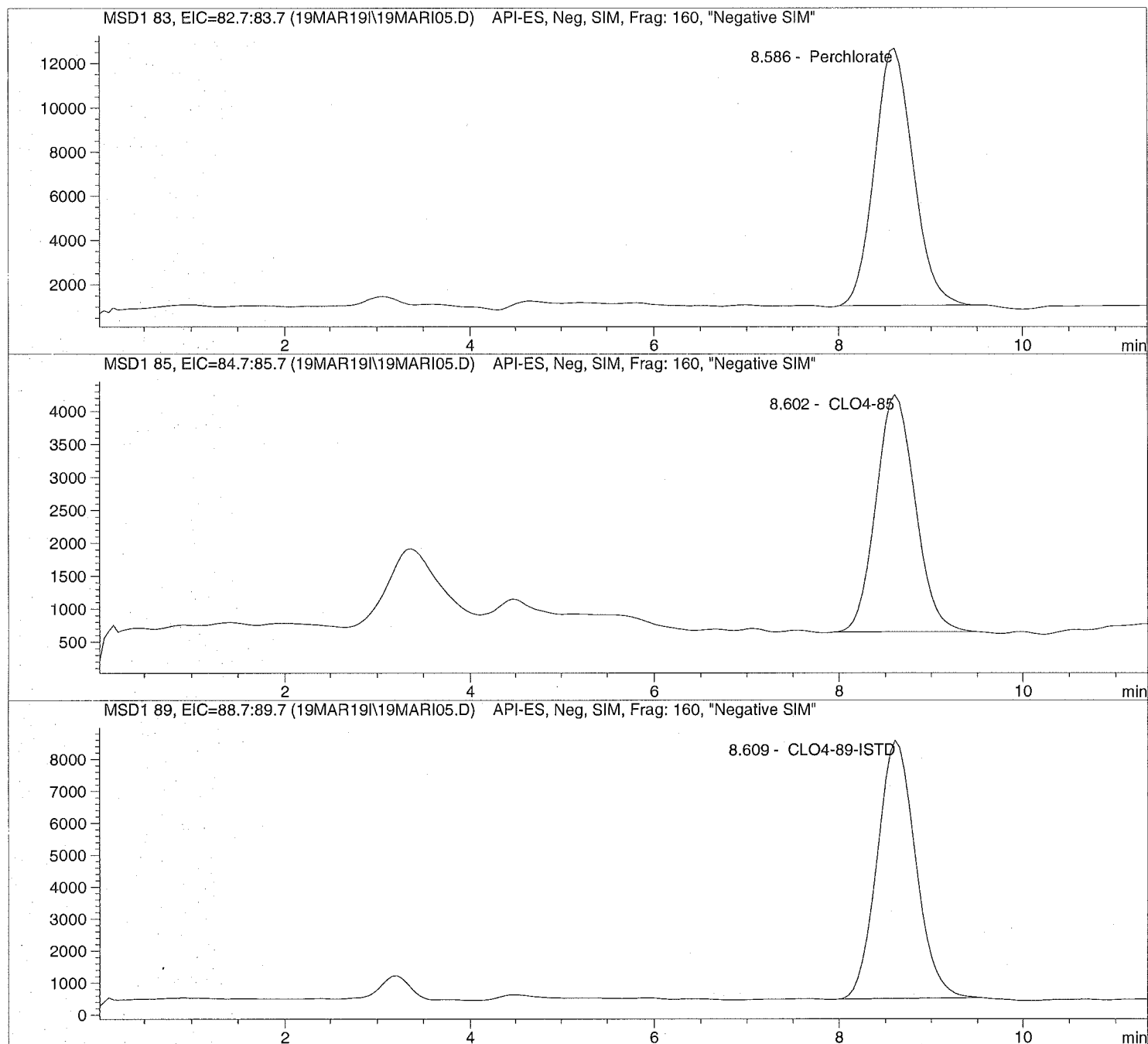
*** End of Report ***

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 10:06:16 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 10:19:32

Seq Line: 6

Sample Name: CLO4@ 10.ug/L

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

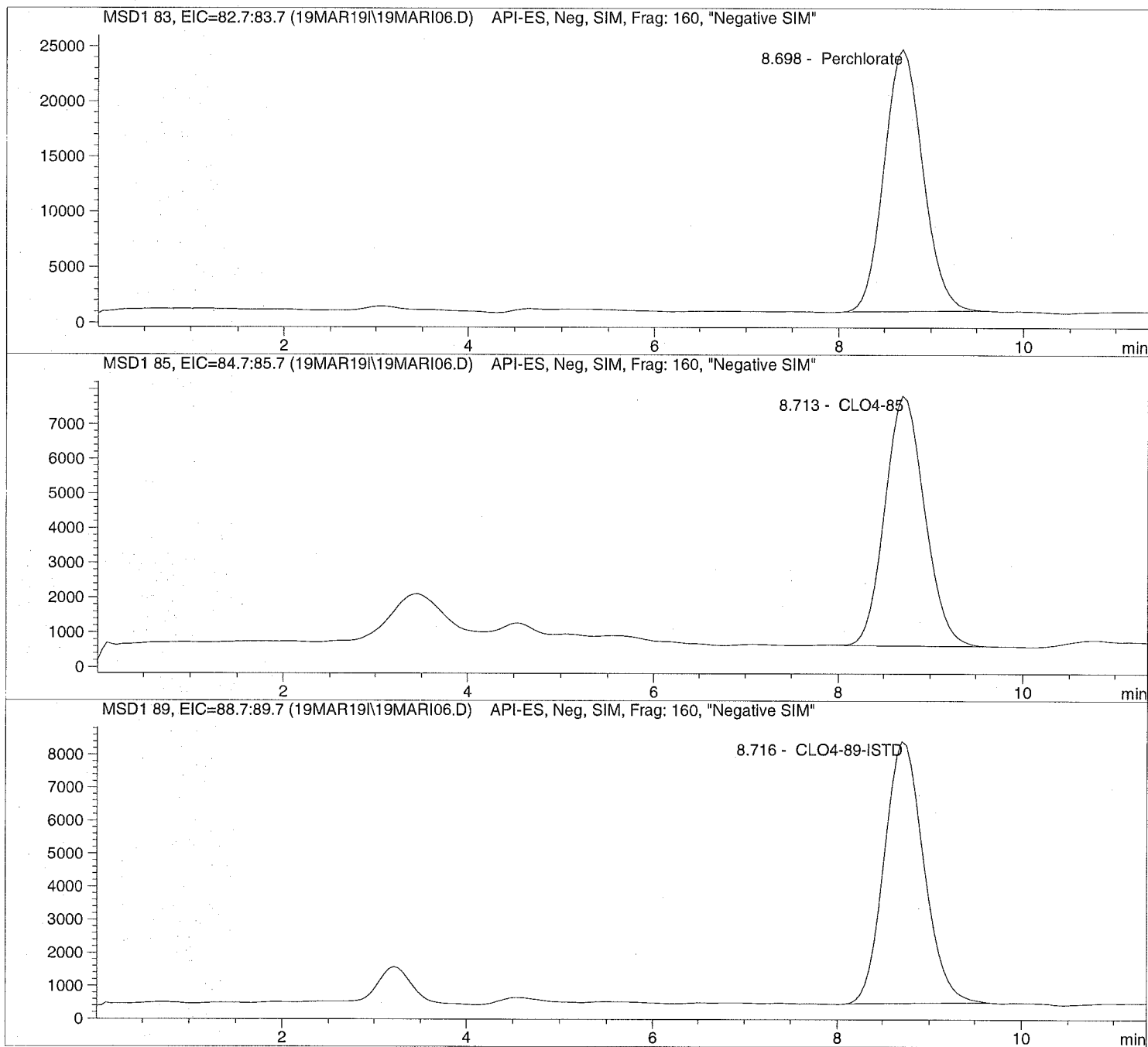
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis




```
=====
Injection Date:  3/19/2019  10:19:32      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-DP2.M
Last Changed:      3/19/2019  14:35:22
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:          Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.698	PBA	683454.4	9.2773	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

Injection Date: 3/19/2019 10:32:49

Seq Line: 7

Sample Name: CLO4@ 25.ug/L

Location: Vial 77

Acq Operator: TNB

Inj. No.: 1

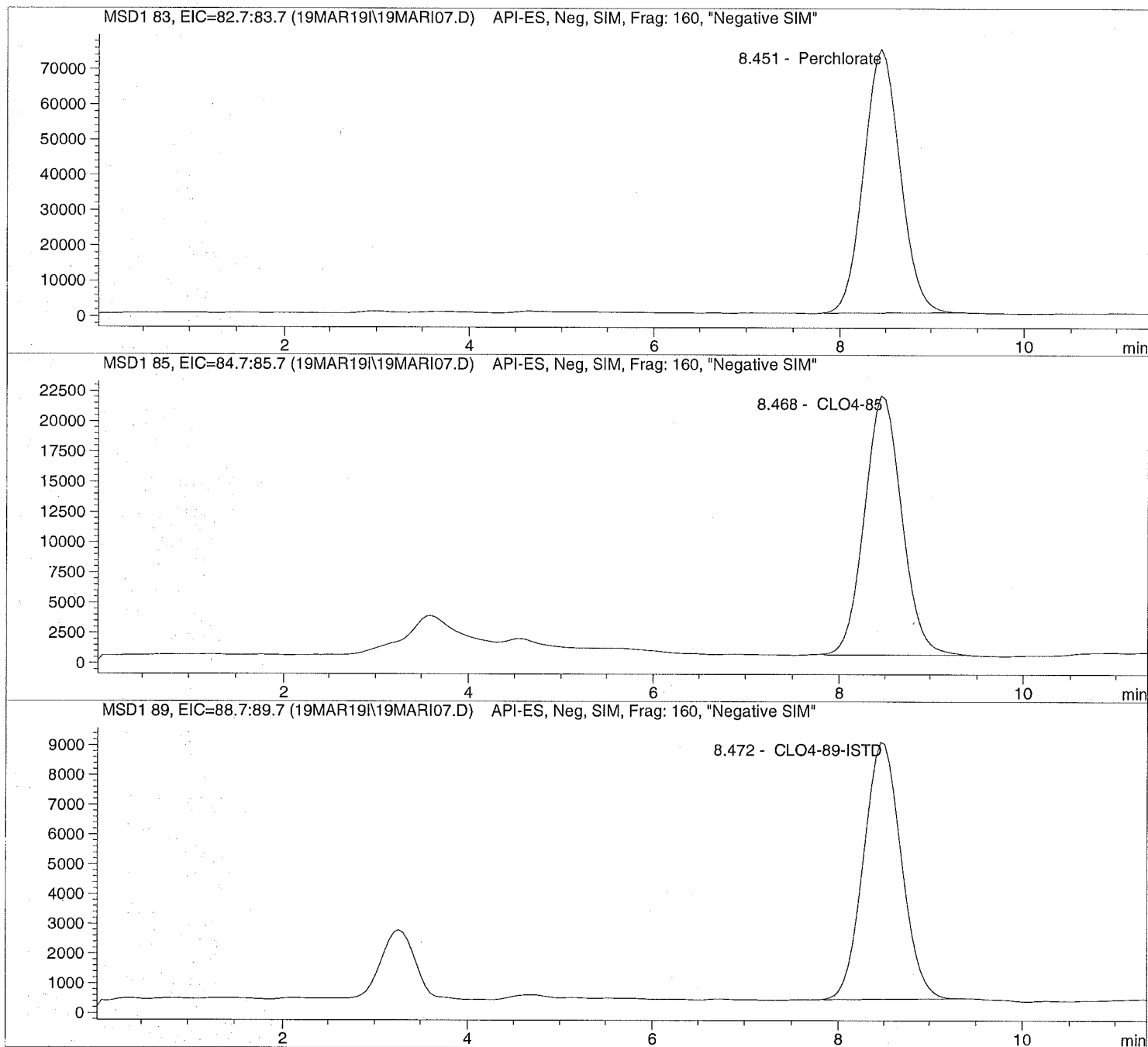
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 10:32:49 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.451	PBA	2084327.4	25.2904	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.468	BBA	614294.8	25.1216	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

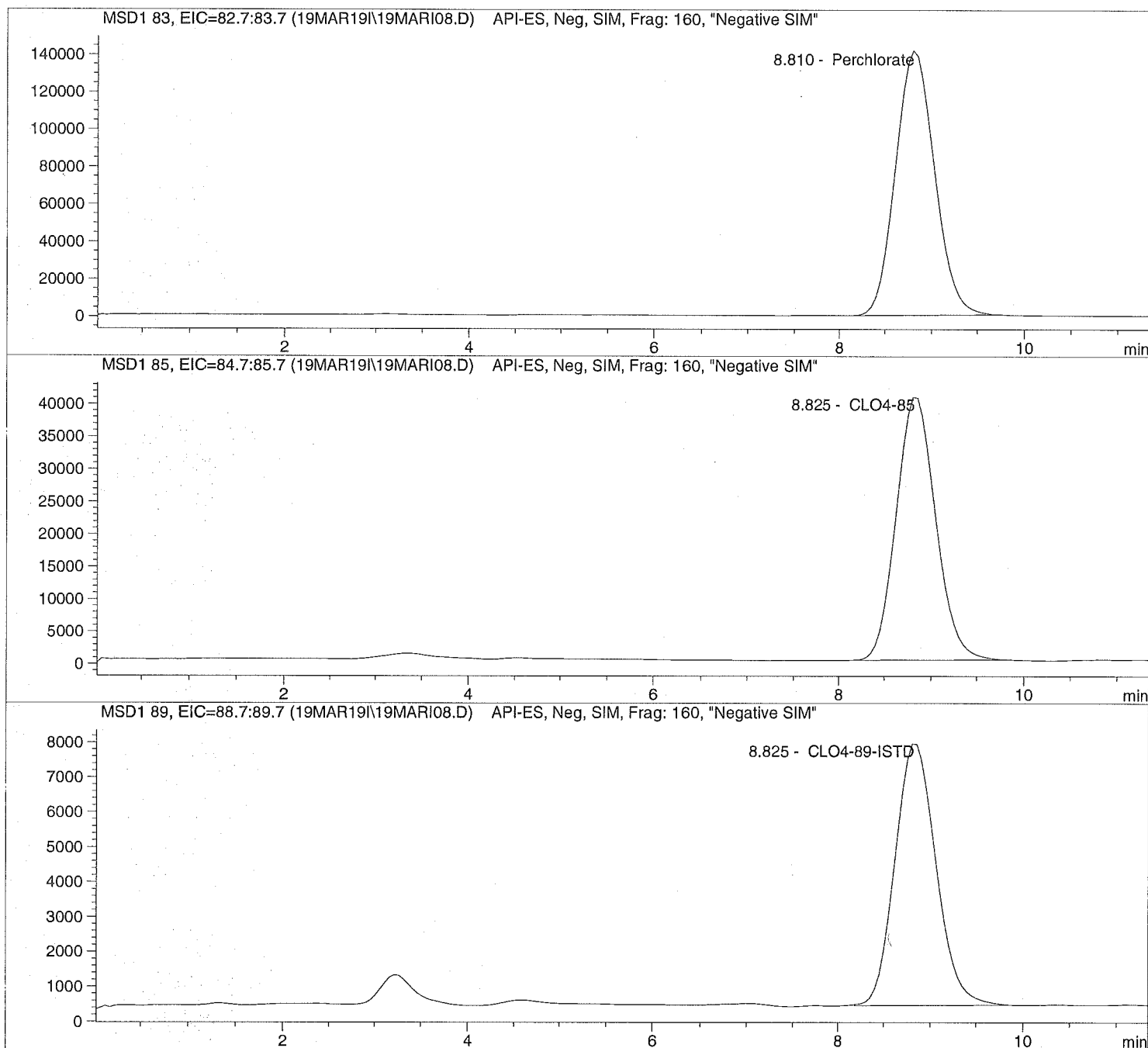
*** End of Report ***

Injection Date: 3/19/2019 10:46:05
Sample Name: CLO4@ 50.ug/L
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 10:46:05 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.810	PBA	4133340.5	51.3684	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.4672	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 10:59:22

Seq Line: 9

Sample Name: CLO4@ 75.ug/L

Location: Vial 79

Acq Operator: TNB

Inj. No.: 1

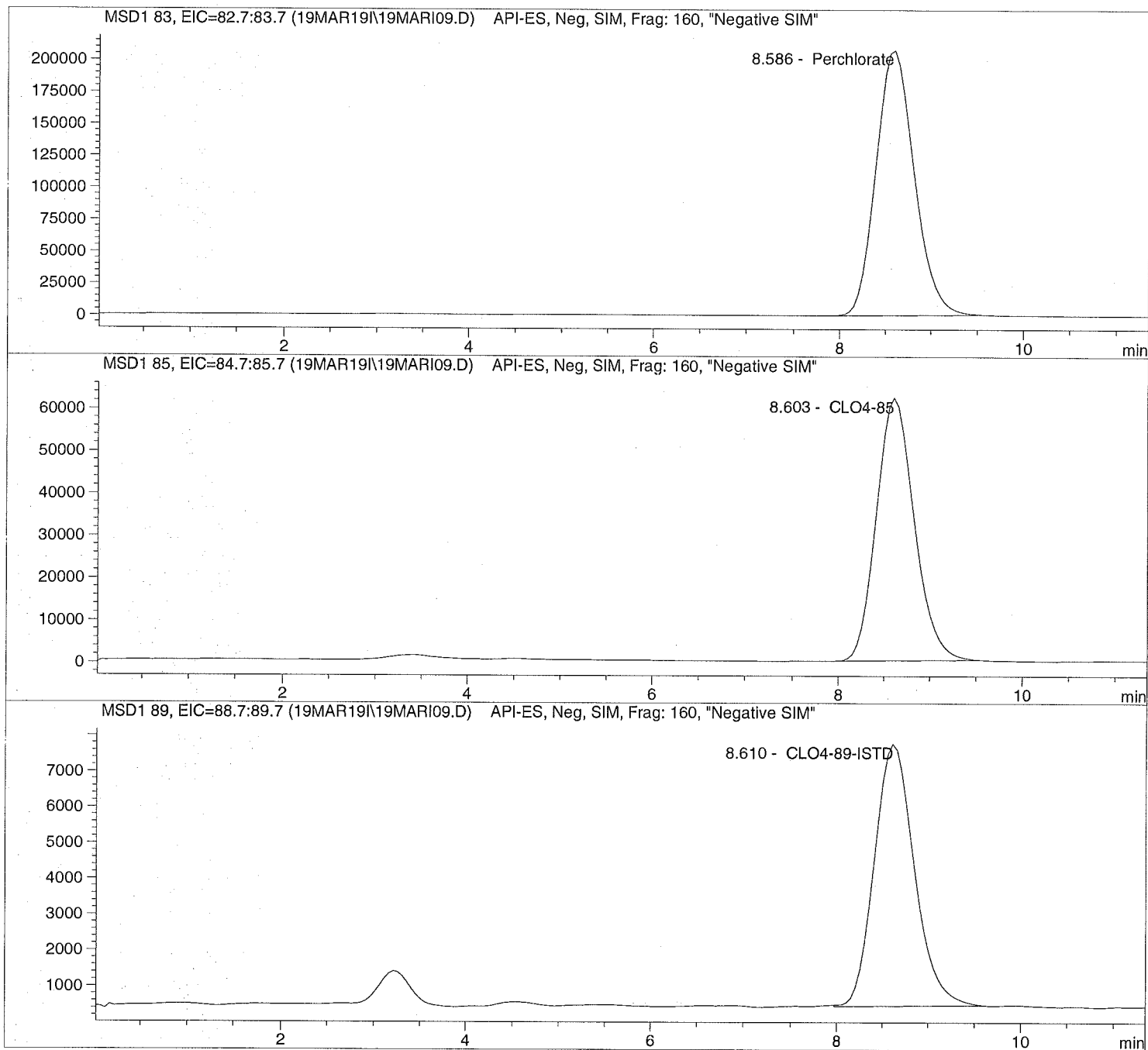
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 10:59:22 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

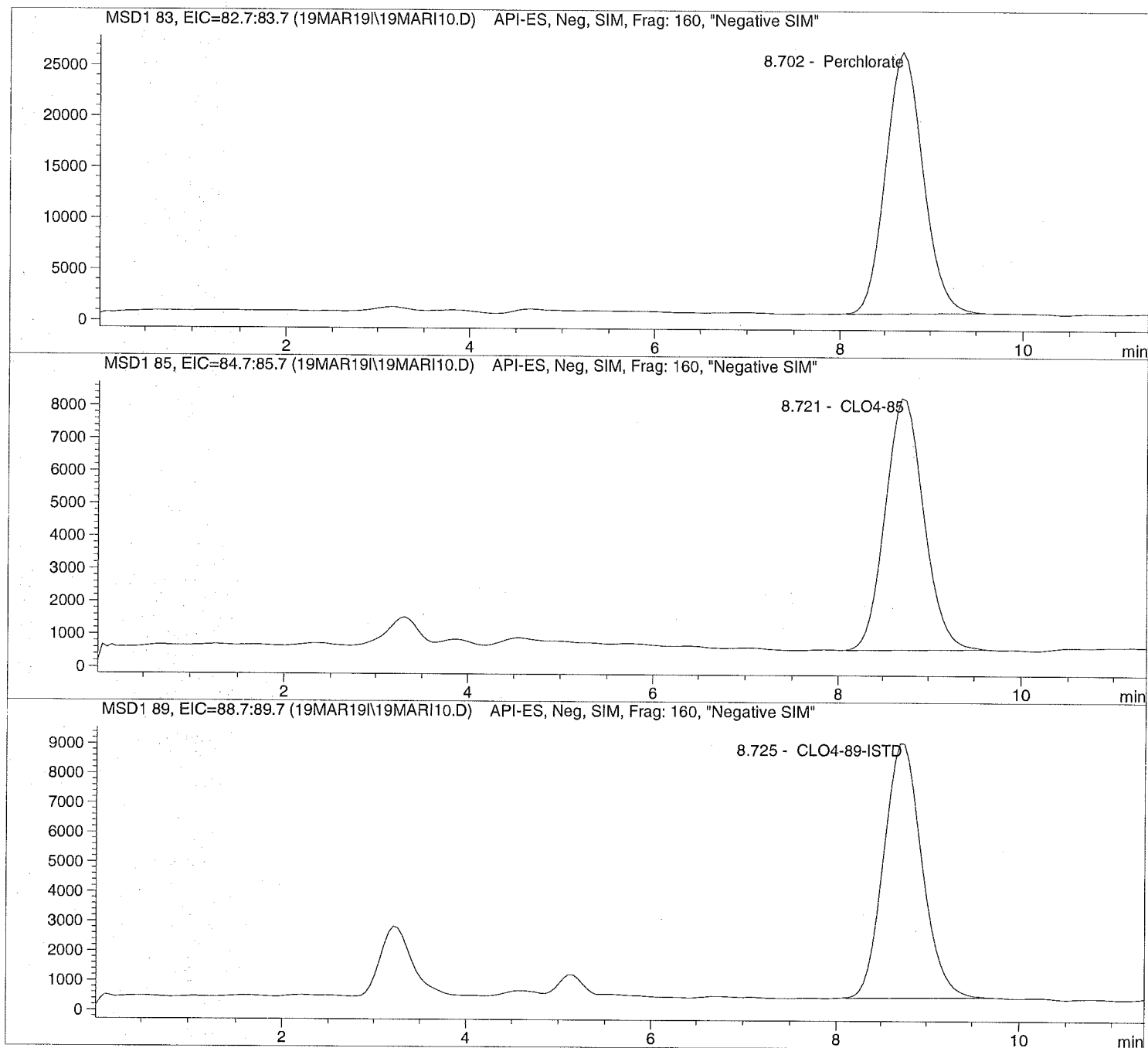
*** End of Report ***

Injection Date: 3/19/2019 11:12:42
Sample Name: ICAL Verf@10ug/L
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 11:12:42 Seq Line: 10
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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

*** End of Report ***



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Unmodified

Injection Date: 3/19/2019 09:39:40

Seq Line: 3

Sample Name: CLO4@ 1.0ug/L

Location: Vial 73

Acq Operator: TNB

Inj. No.: 1

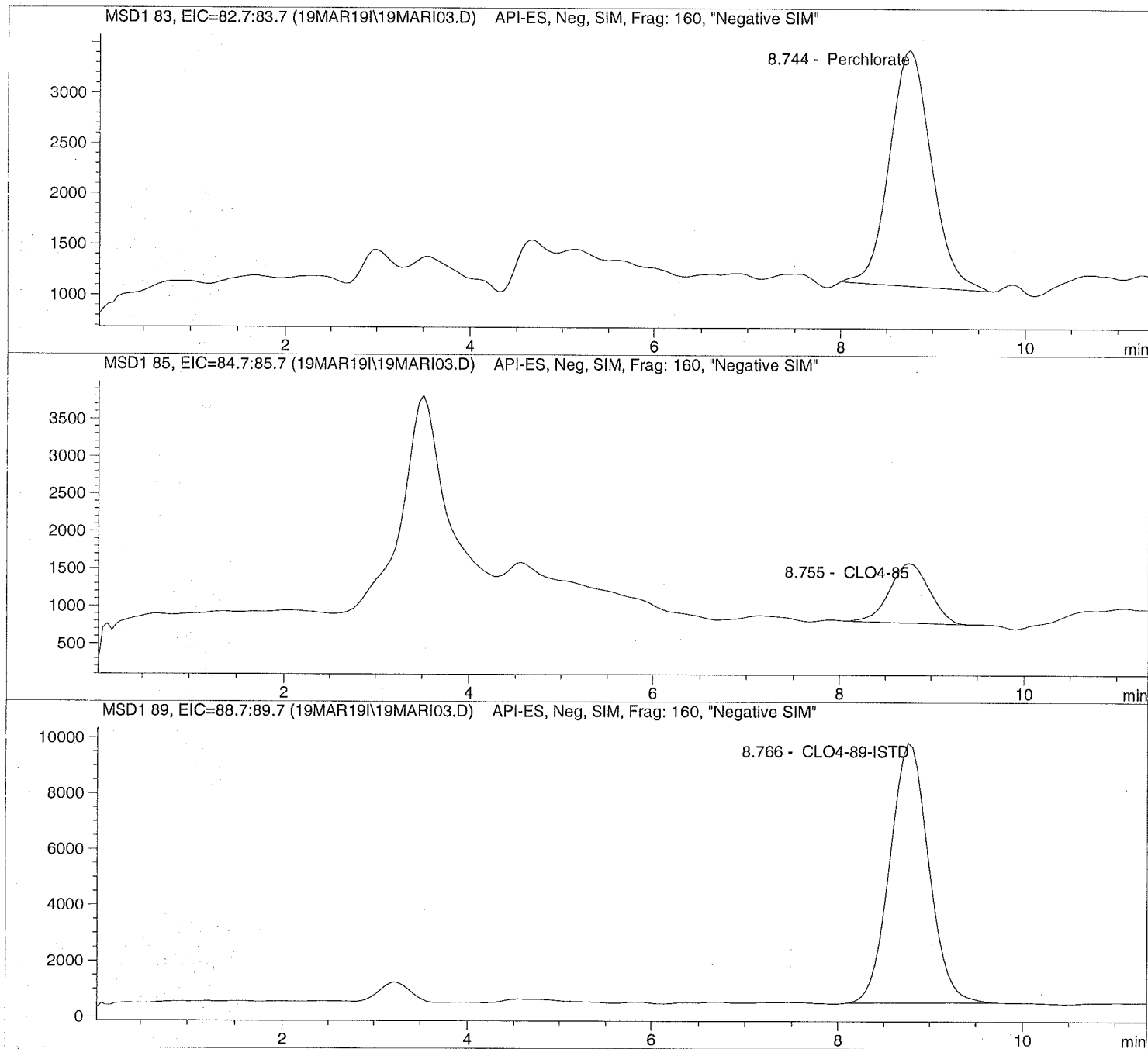
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:38:25

Perchlorate analysis



```
=====
Injection Date:  3/19/2019  09:39:40      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-DP2.M
Last Changed:    3/19/2019  14:38:25
=====
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Tue, 19. Mar. 2019,02:35:19 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
8.744	BBA	74166.3	1.0224	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	BBA	24138.1	0.9487	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```



ALS Environmental
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www.alsglobal.com

May 24, 2019

Analytical Report for Service Request No: K1904503

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

RE: 11324

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory May 17, 2019
For your reference, these analyses have been assigned our service request number **K1904503**.

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
Project Manager



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Table of Contents

Acronyms

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 General Chemistry

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjllabs.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/bsdwlabservice.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/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577- 7222 Fax (360)636- 1068
www.alsglobal.com

Client: ALS Environmental - US**Service Request:** K1904503**Project:****Date Received:** 05/17/2019**Sample Matrix:** Water**CASE NARRATIVE**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

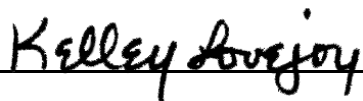
Sample Receipt:

One water sample was received for analysis at ALS Environmental on 05/17/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The sample was stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by



Date

05/24/2019



Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577- 7222 Fax (360)636- 1068
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K1904503

Subcontract Chain of Custody

SAMPLING STATE: Dept of Defense

COC ID: 11324

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 Standcliff 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 Standcliff Rd, Ste 210
Phone: +1 281 530 5656
Reference: HS19050886
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19050886-01	LH18/24-SP650_051419	Water	14 May 2019 14:00
TOC Analysis for DOD Level IV			23 May 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: J. LAWAL

Date/Time: 5/16/19 18:00

Received By: R. Morrow ALS Kelso

Date/Time: 5/17/19 0950

Cooler ID(s): _____

Temperature(s): _____

RIGHT SOLUTIONS | RIGHT PARTNER



PC

Kelly

Cooler Receipt and Preservation Form

Client ALS-Houston Service Request K19 04503
Received: 5/17/19 Opened: 5/17/19 By: km Unloaded: 5/17/19 By: km

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	Tracking Number	NA	Filed
0.4	0.4	3.1	3.1	0	380		480978338653		

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:

RUSH



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
Project: 11324
Sample Matrix: Water
Analysis Method: SM 5310 C
Prep Method: None

Service Request: K1904503
Date Collected: 05/14/19
Date Received: 05/17/19
Units: mg/L
Basis: NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
HS19050886-01	K1904503-001	1.64	0.50	0.20	0.07	1	05/22/19 20:54	
Method Blank	K1904503-MB	ND U	0.50	0.20	0.07	1	05/22/19 20:10	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project 11324
Sample Matrix: Water

Service Request: K1904503
Date Collected: 05/14/19
Date Received: 05/17/19
Date Analyzed: 05/22/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name: HS19050886-01
Lab Code: K1904503-001

Units: mg/L
Basis: NA

						Duplicate Sample K1904503- 001DUP			
Analyte Name	Analysis Method	LOQ	LOD	MDL	Sample Result	Result	Average	RPD	RPD Limit
Carbon, Total Organic	SM 5310 C	0.50	0.20	0.07	1.64	1.69	1.66	3	10

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.

QA/QC Report

Client: ALS Environmental - US
Project: 11324
Sample Matrix: Water

Service Request: K1904503
Date Collected: 05/14/19
Date Received: 05/17/19
Date Analyzed: 05/22/19
Date Extracted: NA

Matrix Spike Summary
Carbon, Total Organic

Sample Name: HS19050886-01
Lab Code: K1904503-001
Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
Basis: NA

Matrix Spike
K1904503-001MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic	1.64	28.0	25.0	105	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.

QA/QC Report

Client: ALS Environmental - US
Project: 11324
Sample Matrix: Water

Service Request: K1904503
Date Analyzed: 05/22/19
Date Extracted: NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 636316

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1904503-LCS	25.7	25.0	103	83-117

Client: ALS Environmental - US
Project:

Service Request: K1904503

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	636316	KQ1906831-05	05/22/19 19:41	25.0	25.4	102	90-110
CCV2	636316	KQ1906831-06	05/22/19 23:44	25.0	25.0	100	90-110
CCV3	636316	KQ1906831-07	05/23/19 04:54	25.0	25.4	102	90-110
CCV4	636316	KQ1906831-08	05/23/19	25.0	24.7	99	90-110

Client: ALS Environmental - US
Project:

Service Request:K1904503

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	636316	KQ1906831-01	05/22/19 19:55	0.50	0.20	0.07	ND	U
CCB2	636316	KQ1906831-02	05/22/19 23:59	0.50	0.20	0.07	ND	U
CCB3	636316	KQ1906831-03	05/23/19 05:09	0.50	0.20	0.07	ND	U
CCB4	636316	KQ1906831-04	05/23/19	0.50	0.20	0.07	ND	U



Raw Data

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www.alsglobal.com



General Chemistry

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www.alsglobal.com

Work Request # ^{Original} K1904503, 4511, 4527, 4531, 4535, 4545, 4546, 4547, 4556, 4595, 4502, 4532, 4531
 Tier: IV II III IV II II II II IV II I III IV
 Date Analyzed: 5/22/19 TOC: 636316, 636320
 Analyst: BCP Run # DOC: 636321
 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: K1904545-5/5d report a high %RSD, but these samples are less than 5x the MRL.
 K1904517-2/2d report a high %RSD due to suspected non-homogeneous sample that is turbid.
 K1904547-1/d is over the calibration range, and has been sent for RA.

Final Approved by: Faucy Date: 05/24/19 DQREPORT

Analytical Results Summary

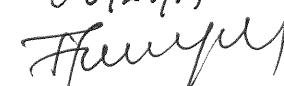
Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 636316 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
K1904503-001	Carbon, Total Organic	N/A		Water	1.64 mg/L	10 mL	1.64 mg/L	1	0.07	0.50			5/22/19 20:54:00	N	IV
K1904518-001	Carbon, Total Organic	N/A		Water	1.34 mg/L	10 mL	1.34 mg/L	1	0.07	0.50			5/22/19 21:52:00	N	II
K1904527-006	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/23/19 05:53:00	N	III
K1904531-001	Carbon, Total Organic	N/A		Surface Water	3.00 mg/L	10 mL	3.00 mg/L	1	0.07	0.50			5/23/19 07:17:00	N	IV
K1904535-001	Carbon, Total Organic	N/A		Water	1.63 mg/L	10 mL	1.63 mg/L	1	0.07	0.50			5/22/19 22:20:00	N	II
K1904535-002	Carbon, Total Organic	N/A		Water	1.88 mg/L	10 mL	1.88 mg/L	1	0.07	0.50			5/22/19 22:48:00	N	II
K1904545-001	Carbon, Total Organic	N/A		Water	0.89 mg/L	10 mL	0.89 mg/L	1	0.07	0.50			5/22/19 23:16:00	N	II
K1904545-002	Carbon, Total Organic	N/A		Water	2.41 mg/L	10 mL	2.41 mg/L	1	0.07	0.50			5/23/19 00:13:00	N	II
K1904545-003	Carbon, Total Organic	N/A		Water	15.03 mg/L	10 mL	15.0 mg/L	1	0.07	0.50			5/23/19 00:41:00	N	II
K1904545-004	Carbon, Total Organic	N/A		Water	16.19 mg/L	10 mL	16.2 mg/L	1	0.07	0.50			5/23/19 01:09:00	N	II
K1904545-005	Carbon, Total Organic	N/A		Water	0.93 mg/L	10 mL	0.93 mg/L	1	0.07	0.50			5/23/19 01:37:00	N	II
K1904545-006	Carbon, Total Organic	N/A		Water	0.60 mg/L	10 mL	0.60 mg/L	1	0.07	0.50			5/23/19 02:06:00	N	II
K1904545-007	Carbon, Total Organic	N/A		Water	0.51 mg/L	10 mL	0.51 mg/L	1	0.07	0.50			5/23/19 02:34:00	N	II
K1904546-001	Carbon, Total Organic	N/A		Water	2.48 mg/L	10 mL	2.48 mg/L	1	0.07	0.50			5/23/19 03:02:00	N	II
K1904546-002	Carbon, Total Organic	N/A		Water	2.53 mg/L	10 mL	2.53 mg/L	1	0.07	0.50			5/23/19 03:30:00	N	II
K1904547-001	Carbon, Total Organic	N/A		Water	99.95 mg/L	10 mL	1000 mg/L	10	0.7	5.0			5/23/19 03:58:00	N	II
K1904547-002	Carbon, Total Organic	N/A		Water	7.10 mg/L	10 mL	710 mg/L	100	7	50			5/23/19 04:26:00	N	II
K1904556-001	Carbon, Total Organic	N/A		Water	1.77 mg/L	10 mL	1.77 mg/L	1	0.07	0.50			5/23/19 06:21:00	N	IV
K1904556-002	Carbon, Total Organic	N/A		Water	1.71 mg/L	10 mL	1.71 mg/L	1	0.07	0.50			5/23/19 06:49:00	N	IV
KQ1906831-01	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/22/19 19:55:00	N	IV
KQ1906831-02	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/22/19 23:59:00	N	IV
KQ1906831-03	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/23/19 05:09:00	N	IV
KQ1906831-04	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/23/19	N	IV
KQ1906831-05	Carbon, Total Organic	CCV		Water	25.41 mg/L	10 mL	25.4 mg/L	1					5/22/19 19:41:00	N	IV
KQ1906831-06	Carbon, Total Organic	CCV		Water	25.05 mg/L	10 mL	25.0 mg/L	1					5/22/19 23:44:00	N	IV
KQ1906831-07	Carbon, Total Organic	CCV		Water	25.45 mg/L	10 mL	25.4 mg/L	1					5/23/19 04:54:00	N	IV
KQ1906831-08	Carbon, Total Organic	CCV		Water	24.67 mg/L	10 mL	24.7 mg/L	1					5/23/19	N	IV
KQ1906831-09	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/22/19 20:10:00	N	IV
KQ1906831-10	Carbon, Total Organic	LCS		Water	25.69 mg/L	10 mL	25.7 mg/L	1	0.07	0.50	103		5/22/19 20:25:00	N	IV
KQ1906831-11	Carbon, Total Organic	DUP	K1904503-001	Water	1.69 mg/L	10 mL	1.69 mg/L	1	0.07	0.50		3	5/22/19 20:54:00	N	IV
KQ1906831-12	Carbon, Total Organic	DUP	K1904518-001	Water	1.34 mg/L	10 mL	1.34 mg/L	1	0.07	0.50		<1	5/22/19 21:52:00	N	II
KQ1906831-13	Carbon, Total Organic	DUP	K1904535-001	Water	1.61 mg/L	10 mL	1.61 mg/L	1	0.07	0.50		1	5/22/19 22:20:00	N	II
KQ1906831-14	Carbon, Total Organic	DUP	K1904535-002	Water	1.83 mg/L	10 mL	1.83 mg/L	1	0.07	0.50		3	5/22/19 22:48:00	N	II
KQ1906831-15	Carbon, Total Organic	DUP	K1904545-001	Water	0.85 mg/L	10 mL	0.85 mg/L	1	0.07	0.50		4	5/22/19 23:16:00	N	II
KQ1906831-16	Carbon, Total Organic	DUP	K1904545-002	Water	2.42 mg/L	10 mL	2.42 mg/L	1	0.07	0.50		<1	5/23/19 00:13:00	N	II

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

05/24/19


Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 636316 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
KQ1906831-17	Carbon, Total Organic	DUP	K1904545-003	Water	15.44 mg/L	10 mL	15.4 mg/L	1	0.07	0.50		3	5/23/19 00:41:00	N	II
KQ1906831-18	Carbon, Total Organic	DUP	K1904545-004	Water	15.81 mg/L	10 mL	15.8 mg/L	1	0.07	0.50		2	5/23/19 01:09:00	N	II
KQ1906831-19	Carbon, Total Organic	DUP	K1904545-005	Water	0.62 mg/L	10 mL	0.62 mg/L	1	0.07	0.50		40*	5/23/19 01:37:00	N	II
KQ1906831-20	Carbon, Total Organic	DUP	K1904545-006	Water	0.60 mg/L	10 mL	0.60 mg/L	1	0.07	0.50		<1	5/23/19 02:06:00	N	II
KQ1906831-21	Carbon, Total Organic	DUP	K1904545-007	Water	0.50 mg/L	10 mL	0.50 mg/L	1	0.07	0.50		2	5/23/19 02:34:00	N	II
KQ1906831-22	Carbon, Total Organic	DUP	K1904546-001	Water	2.49 mg/L	10 mL	2.49 mg/L	1	0.07	0.50		<1	5/23/19 03:02:00	N	II
KQ1906831-23	Carbon, Total Organic	DUP	K1904546-002	Water	2.54 mg/L	10 mL	2.54 mg/L	1	0.07	0.50		<1	5/23/19 03:30:00	N	II
KQ1906831-24	Carbon, Total Organic	DUP	K1904547-001	Water	123.17 mg/L	10 mL	1230 mg/L	10	0.7	5.0		21*	5/23/19 03:58:00	N	II
KQ1906831-25	Carbon, Total Organic	DUP	K1904547-002	Water	5.06 mg/L	10 mL	506 mg/L	100	7	50		34*	5/23/19 04:26:00	N	II
KQ1906831-26	Carbon, Total Organic	DUP	K1904527-006	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	5/23/19 05:53:00	N	III
KQ1906831-27	Carbon, Total Organic	DUP	K1904556-001	Water	1.75 mg/L	10 mL	1.75 mg/L	1	0.07	0.50		<1	5/23/19 06:21:00	N	IV
KQ1906831-28	Carbon, Total Organic	DUP	K1904556-002	Water	1.68 mg/L	10 mL	1.68 mg/L	1	0.07	0.50		2	5/23/19 06:49:00	N	IV
KQ1906831-29	Carbon, Total Organic	DUP	K1904531-001	Surface Water	2.98 mg/L	10 mL	2.98 mg/L	1	0.07	0.50		<1	5/23/19 07:17:00	N	IV
KQ1906831-30	Carbon, Total Organic	MS	K1904503-001	Water	27.96 mg/L	10 mL	28.0 mg/L	1	0.07	0.50	105		5/22/19 21:22:00	N	IV

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indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

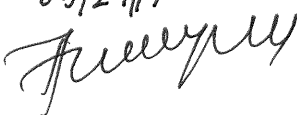
Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 636320 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
K1904295-004	Carbon, Total Organic	N/A		Water	5.68 mg/L	10 mL	568 mg/L	100	7	50			5/23/19 13:25:00	N	II
K1904295-005	Carbon, Total Organic	N/A		Water	6.05 mg/L	10 mL	605 mg/L	100	7	50			5/23/19 13:53:00	N	II
K1904502-001	Carbon, Total Organic	N/A		Water	1.48 mg/L	10 mL	1.48 mg/L	1	0.07	0.50			5/23/19 11:32:00	N	I
K1904502-002	Carbon, Total Organic	N/A		Water	16.84 mg/L	10 mL	16.8 mg/L	1	0.07	0.50			5/23/19 12:00:00	N	I
K1904502-003	Carbon, Total Organic	N/A		Water	2.54 mg/L	10 mL	2.54 mg/L	1	0.07	0.50			5/23/19 12:29:00	N	I
K1904502-004	Carbon, Total Organic	N/A		Water	1.03 mg/L	10 mL	1.03 mg/L	1	0.07	0.50			5/23/19 12:57:00	N	I
K1904532-001	Carbon, Total Organic	N/A		Surface Water	3.06 mg/L	10 mL	3.06 mg/L	1	0.07	0.50			5/23/19 07:45:00	N	III
K1904532-002	Carbon, Total Organic	N/A		Surface Water	10.94 mg/L	10 mL	10.9 mg/L	1	0.07	0.50			5/23/19 08:13:00	Y	III
K1904532-003	Carbon, Total Organic	N/A		Surface Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/23/19 09:40:00	N	III
K1904532-004	Carbon, Total Organic	N/A		Surface Water	2.89 mg/L	10 mL	2.89 mg/L	1	0.07	0.50			5/23/19 10:08:00	N	III
K1904532-005	Carbon, Total Organic	N/A		Surface Water	6.59 mg/L	10 mL	6.59 mg/L	1	0.07	0.50			5/23/19 10:36:00	N	III
K1904532-006	Carbon, Total Organic	N/A		Surface Water	6.69 mg/L	10 mL	6.69 mg/L	1	0.07	0.50			5/23/19 11:04:00	N	III
KQ1906832-01	Carbon, Total Organic	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/23/19 05:09:00	N	III
KQ1906832-02	Carbon, Total Organic	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/23/19 09:25:00	N	III
KQ1906832-03	Carbon, Total Organic	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/23/19 14:36:00	N	III
KQ1906832-04	Carbon, Total Organic	CCV		Surface Water	25.45 mg/L	10 mL	25.4 mg/L	1					5/23/19 04:54:00	N	III
KQ1906832-05	Carbon, Total Organic	CCV		Surface Water	24.67 mg/L	10 mL	24.7 mg/L	1					5/23/19 09:10:00	N	III
KQ1906832-06	Carbon, Total Organic	CCV		Surface Water	24.70 mg/L	10 mL	24.7 mg/L	1					5/23/19 14:21:00	N	III
KQ1906832-07	Carbon, Total Organic	MB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/23/19 05:24:00	N	III
KQ1906832-08	Carbon, Total Organic	LCS		Surface Water	25.10 mg/L	10 mL	25.1 mg/L	1	0.07	0.50	100		5/23/19 05:38:00	N	III
KQ1906832-09	Carbon, Total Organic	MS	K1904532-002	Surface Water	35.57 mg/L	10 mL	35.6 mg/L	1	0.07	0.50	99		5/23/19 08:41:00	N	III
KQ1906832-10	Carbon, Total Organic	DUP	K1904532-001	Surface Water	3.06 mg/L	10 mL	3.06 mg/L	1	0.07	0.50		<1	5/23/19 07:45:00	N	III
KQ1906832-11	Carbon, Total Organic	DUP	K1904532-002	Surface Water	10.84 mg/L	10 mL	10.8 mg/L	1	0.07	0.50		<1	5/23/19 08:13:00	N	III
KQ1906832-12	Carbon, Total Organic	DUP	K1904532-003	Surface Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	5/23/19 09:40:00	N	III
KQ1906832-13	Carbon, Total Organic	DUP	K1904532-004	Surface Water	3.05 mg/L	10 mL	3.05 mg/L	1	0.07	0.50		5	5/23/19 10:08:00	N	III

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

05/24/19


Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 636320 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
KQ1906832-14	Carbon, Total Organic	DUP	K1904532-005	Surface Water	6.50 mg/L	10 mL	6.50 mg/L	1	0.07	0.50		1	5/23/19 10:36:00	N	III
KQ1906832-15	Carbon, Total Organic	DUP	K1904532-006	Surface Water	6.62 mg/L	10 mL	6.62 mg/L	1	0.07	0.50		1	5/23/19 11:04:00	N	III
KQ1906832-16	Carbon, Total Organic	DUP	K1904502-001	Water	1.46 mg/L	10 mL	1.46 mg/L	1	0.07	0.50		2	5/23/19 11:32:00	N	I
KQ1906832-17	Carbon, Total Organic	DUP	K1904502-002	Water	16.64 mg/L	10 mL	16.6 mg/L	1	0.07	0.50		1	5/23/19 12:00:00	N	I
KQ1906832-18	Carbon, Total Organic	DUP	K1904502-003	Water	2.43 mg/L	10 mL	2.43 mg/L	1	0.07	0.50		4	5/23/19 12:29:00	N	I
KQ1906832-19	Carbon, Total Organic	DUP	K1904502-004	Water	1.03 mg/L	10 mL	1.03 mg/L	1	0.07	0.50		<1	5/23/19 12:57:00	N	I
KQ1906832-20	Carbon, Total Organic	DUP	K1904295-004	Water	5.77 mg/L	10 mL	577 mg/L	100	7	50		2	5/23/19 13:25:00	N	II
KQ1906832-21	Carbon, Total Organic	DUP	K1904295-005	Water	6.06 mg/L	10 mL	606 mg/L	100	7	50		<1	5/23/19 13:53:00	N	II

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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: 636321 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
K1904531-001	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	9.08 mg/L	10 mL	9.08 mg/L	1	0.07	0.50			5/23/19 15:20:00	N	IV
K1904532-001	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	7.95 mg/L	10 mL	7.95 mg/L	1	0.07	0.50			5/23/19 15:48:00	N	III
K1904532-002	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	15.48 mg/L	10 mL	15.5 mg/L	1	0.07	0.50			5/23/19 16:16:00	Y	III
K1904532-003	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	4.13 mg/L	10 mL	4.13 mg/L	1	0.07	0.50			5/23/19 17:13:00	N	III
K1904532-004	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	6.96 mg/L	10 mL	6.96 mg/L	1	0.07	0.50			5/23/19 17:41:00	N	III
K1904532-005	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	11.10 mg/L	10 mL	11.1 mg/L	1	0.07	0.50			5/23/19 18:09:00	N	III
K1904532-006	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	8.31 mg/L	10 mL	8.31 mg/L	1	0.07	0.50			5/23/19 19:07:00	N	III
KQ1906833-01	Carbon, Dissolved Organic (DOC)	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/23/19 14:36:00	N	IV
KQ1906833-02	Carbon, Dissolved Organic (DOC)	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/23/19 18:52:00	N	IV
KQ1906833-03	Carbon, Dissolved Organic (DOC)	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/23/19 19:50:00	N	IV
KQ1906833-04	Carbon, Dissolved Organic (DOC)	CCV		Surface Water	24.70 mg/L	10 mL	24.7 mg/L	1					5/23/19 14:21:00	N	IV
KQ1906833-05	Carbon, Dissolved Organic (DOC)	CCV		Surface Water	24.39 mg/L	10 mL	24.4 mg/L	1					5/23/19 18:37:00	N	IV
KQ1906833-06	Carbon, Dissolved Organic (DOC)	CCV		Surface Water	25.08 mg/L	10 mL	25.1 mg/L	1					5/23/19 19:07:00	N	IV
KQ1906833-07	Carbon, Dissolved Organic (DOC)	MB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/23/19 14:50:00	N	IV
KQ1906833-08	Carbon, Dissolved Organic (DOC)	LCS		Surface Water	24.93 mg/L	10 mL	24.9 mg/L	1	0.07	0.50	100		5/23/19 15:05:00	N	IV
KQ1906833-09	Carbon, Dissolved Organic (DOC)	DUP	K1904531-001	Surface Water	9.06 mg/L	10 mL	9.06 mg/L	1	0.07	0.50		<1	5/23/19 15:20:00	N	IV
KQ1906833-10	Carbon, Dissolved Organic (DOC)	DUP	K1904532-001	Surface Water	7.90 mg/L	10 mL	7.90 mg/L	1	0.07	0.50		<1	5/23/19 15:48:00	N	III
KQ1906833-11	Carbon, Dissolved Organic (DOC)	DUP	K1904532-002	Surface Water	15.17 mg/L	10 mL	15.2 mg/L	1	0.07	0.50		2	5/23/19 16:16:00	N	III
KQ1906833-12	Carbon, Dissolved Organic (DOC)	DUP	K1904532-003	Surface Water	4.13 mg/L	10 mL	4.13 mg/L	1	0.07	0.50		<1	5/23/19 17:13:00	N	III
KQ1906833-13	Carbon, Dissolved Organic (DOC)	DUP	K1904532-004	Surface Water	6.98 mg/L	10 mL	6.98 mg/L	1	0.07	0.50		<1	5/23/19 17:41:00	N	III
KQ1906833-14	Carbon, Dissolved Organic (DOC)	DUP	K1904532-005	Surface Water	10.92 mg/L	10 mL	10.9 mg/L	1	0.07	0.50		2	5/23/19 18:09:00	N	III
KQ1906833-15	Carbon, Dissolved Organic (DOC)	DUP	K1904532-006	Surface Water	8.31 mg/L	10 mL	8.31 mg/L	1	0.07	0.50		<1	5/23/19 19:07:00	N	III
KQ1906833-16	Carbon, Dissolved Organic (DOC)	MS	K1904532-002	Surface Water	39.49 mg/L	10 mL	39.5 mg/L	1	0.07	0.50	96		5/23/19 16:44:00	N	III

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

05/24/19
Hewitt

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	C] CCV 25 ppm [25 p	1	25.405	0.0000	25.4053	25.4053	25.4	5/22/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/22/2019
4	MB1	1	0.000	0.0000	0.0000	0	<0.5	5/22/2019
5	[TOC] LCS [24ppm]	1	25.687	0.0000	25.6874	25.6874	25.7	5/22/2019
6	K1904503-001	1	1.639	0.0000	1.6387	1.6387	1.64	5/22/2019
7	K1904503-001d	1	1.687	0.0000	1.6866	1.6866	1.7	5/22/2019
8	K1904503-001ms	1	27.957	0.0000	27.9572	27.9572	28	5/22/2019
9	K1904518-001	1	1.340	0.0000	1.3404	1.3404	1.34	5/22/2019
10	K1904518-001d	1	1.337	0.0000	1.3370	1.337	1.34	5/22/2019
11	K1904535-001	1	1.634	0.0000	1.6342	1.6342	1.6	5/22/2019
12	K1904535-001d	1	1.613	0.0000	1.6128	1.6128	1.61	5/22/2019
13	K1904535-002	1	1.881	0.0000	1.8814	1.8814	1.88	5/22/2019
14	K1904535-002d	1	1.834	0.0000	1.8342	1.8342	1.83	5/22/2019
15	K1904545-001	1	0.885	0.0000	0.8852	0.8852	0.9	5/22/2019
16	K1904545-001d	1	0.849	0.0000	0.8485	0.8485	0.8	5/22/2019
17	C] CCV 25 ppm [25 p	1	25.049	0.0000	25.0489	25.0489	25.05	5/22/2019
18	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/22/2019
19	K1904545-002	1	2.407	0.0000	2.4073	2.4073	2.4	5/23/2019
20	K1904545-002d	1	2.420	0.0000	2.4203	2.4203	2.42	5/23/2019
21	K1904545-003	1	15.025	0.0000	15.0250	15.025	15.03	5/23/2019
22	K1904545-003d	1	15.443	0.0000	15.4434	15.4434	15.4	5/23/2019
23	K1904545-004	1	16.186	0.0000	16.1857	16.1857	16.2	5/23/2019
24	K1904545-004d	1	15.815	0.0000	15.8145	15.8145	15.81	5/23/2019
25	K1904545-005	1	0.933	0.0000	0.9325	0.9325	0.93	5/23/2019

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)

Analyzed By: <i>Bob</i>	Date Analyzed: <i>5/22/19</i>
Reviewed By: <i>John T</i>	Date Reviewed: <i>05/24/19</i>

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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	K1904545-005d	1	0.621	0.0000	0.6206	0.6206	0.62	5/23/2019
27	K1904545-006	1	0.596	0.0000	0.5957	0.5957	0.60	5/23/2019
28	K1904545-006d	1	0.595	0.0000	0.5951	0.5951	0.6	5/23/2019
29	K1904545-007	1	0.512	0.0000	0.5122	0.5122	0.5	5/23/2019
30	K1904545-007d	1	0.500	0.0000	0.5002	0.5002	0.5	5/23/2019
31	K1904546-001	1	2.478	0.0000	2.4782	2.4782	2.5	5/23/2019
32	K1904546-001d	1	2.487	0.0000	2.4873	2.4873	2.5	5/23/2019
33	K1904546-002	1	2.531	0.0000	2.5306	2.5306	2.5	5/23/2019
34	K1904546-002d	1	2.536	0.0000	2.5359	2.5359	2.5	5/23/2019
35	K1904547-001	10	99.953	0.0000	99.9529	999.529	999.5	5/23/2019
36	K1904547-001d	10	123.172	0.0000	123.1718	1231.718	1231.7	5/23/2019
37	K1904547-002	100	7.105	0.0000	7.1048	710.48	710.5	5/23/2019
38	K1904547-002d	100	5.062	0.0000	5.0623	506.23	506.2	5/23/2019
39	C] CCV 25 ppm [25 p	1	25.449	0.0000	25.4492	25.4492	25.4	5/23/2019
40	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
41	K1904527-006	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
42	K1904527-006d	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
43	K1904556-001	1	1.766	0.0000	1.7656	1.7656	1.8	5/23/2019
44	K1904556-001d	1	1.749	0.0000	1.7485	1.7485	1.7	5/23/2019
45	K1904556-002	1	1.711	0.0000	1.7111	1.7111	1.7	5/23/2019
46	K1904556-002d	1	1.679	0.0000	1.6792	1.6792	1.7	5/23/2019
47	K1904531-001	1	2.997	0.0000	2.9966	2.9966	3.0	5/23/2019
48	K1904531-001d	1	2.977	0.0000	2.9770	2.977	3.0	5/23/2019
49	C] CCV 25 ppm [25 p	1	24.666	0.0000	24.6660	24.666	24.7	5/23/2019
50	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019

Analyzed By: <i>BCP</i>	Date Analyzed: <i>5/22/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>05/24/19</i>

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	C] CCV 25 ppm [25 p	1	25.449	0.0000	25.4492	25.4492	25.4	5/23/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
4	MB2	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
5	[TOC] LCS [24ppm]	1	25.102	0.0000	25.1021	25.1021	25.1	5/23/2019
6	K1904532-001	1	3.056	0.0000	3.0557	3.0557	3.06	5/23/2019
7	K1904532-001d	1	3.065	0.0000	3.0645	3.0645	3.1	5/23/2019
8	K1904532-002	1	10.942	0.0000	10.9420	10.942	11	5/23/2019
9	K1904532-002d	1	10.841	0.0000	10.8411	10.8411	10.84	5/23/2019
10	K1904532-002ms	1	35.568	0.0000	35.5676	35.5676	35.57	5/23/2019
11	C] CCV 25 ppm [25 p	1	24.666	0.0000	24.6660	24.666	24.7	5/23/2019
12	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
13	K1904532-003	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
14	K1904532-003d	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
15	K1904532-004	1	2.893	0.0000	2.8926	2.8926	2.9	5/23/2019
16	K1904532-004d	1	3.047	0.0000	3.0468	3.0468	3.0	5/23/2019
17	K1904532-005	1	6.595	0.0000	6.5946	6.5946	6.59	5/23/2019
18	K1904532-005d	1	6.497	0.0000	6.4971	6.4971	6.5	5/23/2019
19	K1904532-006	1	6.691	0.0000	6.6914	6.6914	6.7	5/23/2019
20	K1904532-006d	1	6.618	0.0000	6.6184	6.6184	6.62	5/23/2019
21	K1904502-001	1	1.482	0.0000	1.4815	1.4815	1.48	5/23/2019
22	K1904502-001d	1	1.459	0.0000	1.4594	1.4594	1.5	5/23/2019
23	K1904502-002	1	16.839	0.0000	16.8392	16.8392	16.8	5/23/2019
24	K1904502-002d	1	16.644	0.0000	16.6437	16.6437	16.64	5/23/2019
25	K1904502-003	1	2.543	0.0000	2.5428	2.5428	2.54	5/23/2019

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)

Analyzed By: <i>[Signature]</i>	Date Analyzed: <i>5/22/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>05/24/19</i>

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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	K1904502-003d	1	2.432	0.0000	2.4319	2.4319	2.43	5/23/2019
27	K1904502-004	1	1.029	0.0000	1.0290	1.029	1.03	5/23/2019
28	K1904502-004d	1	1.033	0.0000	1.0330	1.033	1.0	5/23/2019
29	K1904295-004	100	5.682	0.0000	5.6822	568.22	568.2	5/23/2019
30	K1904295-004d	100	5.771	0.0000	5.7712	577.12	577.1	5/23/2019
31	K1904295-005	100	6.048	0.0000	6.0477	604.77	604.8	5/23/2019
32	K1904295-005d	100	6.064	0.0000	6.0635	606.35	606.4	5/23/2019
33	C] CCV 25 ppm [25 p	1	24.696	0.0000	24.6961	24.6961	24.7	5/23/2019
34	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
35		1		0.0000	0.0000	0	<0.5	
36		1		0.0000	0.0000	0	<0.5	
37		1		0.0000	0.0000	0	<0.5	
38		1		0.0000	0.0000	0	<0.5	
39		1		0.0000	0.0000	0	<0.5	
40		1		0.0000	0.0000	0	<0.5	
41		1		0.0000	0.0000	0	<0.5	
42		1		0.0000	0.0000	0	<0.5	
43		1		0.0000	0.0000	0	<0.5	
44		1		0.0000	0.0000	0	<0.5	
45		1		0.0000	0.0000	0	<0.5	
46		1		0.0000	0.0000	0	<0.5	
47		1		0.0000	0.0000	0	<0.5	
48		1		0.0000	0.0000	0	<0.5	
49		1		0.0000	0.0000	0	<0.5	
50		1		0.0000	0.0000	0	<0.5	

Analyzed By: <i>BCP</i>	Date Analyzed: <i>5/22/19</i>
Reviewed By: <i>Thompson</i>	Date Reviewed: <i>05/29/19</i>

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	C] CCV 25 ppm [25 p	1	24.696	0.0000	24.6961	24.6961	24.7	5/23/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
4	MB3	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
5	[TOC] LCS [25ppm]	1	24.928	0.0000	24.9281	24.9281	24.9	5/23/2019
6	K1904531-001	1	9.077	0.0000	9.0769	9.0769	9.08	5/23/2019
7	K1904531-001d	1	9.063	0.0000	9.0631	9.0631	9.1	5/23/2019
8	K1904532-001	1	7.947	0.0000	7.9470	7.947	8	5/23/2019
9	K1904532-001d	1	7.897	0.0000	7.8969	7.8969	7.90	5/23/2019
10	K1904532-002	1	15.482	0.0000	15.4821	15.4821	15.48	5/23/2019
11	K1904532-002d	1	15.170	0.0000	15.1704	15.1704	15.2	5/23/2019
12	K1904532-002ms	1	39.489	0.0000	39.4894	39.4894	39.49	5/23/2019
13	K1904532-003	1	4.135	0.0000	4.1349	4.1349	4.13	5/23/2019
14	K1904532-003d	1	4.130	0.0000	4.1295	4.1295	4.13	5/23/2019
15	K1904532-004	1	6.957	0.0000	6.9573	6.9573	7.0	5/23/2019
16	K1904532-004d	1	6.978	0.0000	6.9782	6.9782	7.0	5/23/2019
17	K1904532-005	1	11.097	0.0000	11.0968	11.0968	11.10	5/23/2019
18	K1904532-005d	1	10.922	0.0000	10.9223	10.9223	10.9	5/23/2019
19	C] CCV 25 ppm [25 p	1	24.389	0.0000	24.3888	24.3888	24.4	5/23/2019
20	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
21	K1904532-006	1	8.308	0.0000	8.3078	8.3078	8.31	5/23/2019
22	K1904532-006d	1	8.308	0.0000	8.3078	8.3078	8.3	5/23/2019
23	C] CCV 25 ppm [25 p	1	25.080	0.0000	25.0803	25.0803	25.1	5/23/2019
24	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/23/2019
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)

Analyzed By: <i>BP</i>	Date Analyzed: <i>5/24/19</i>
Reviewed By: <i>Fruey</i>	Date Reviewed: <i>05/24/19</i>

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TOC: 636316
636320
DOC: 636321

Schedule: 05222019b**Version: 2****Instrument:** Fusion1**Last Saved by:** Fusion1 (Fusion1)**Last Saved on:** 2019/05/22 17:40 - Wednesday

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	K1904503-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
4	Sample	K1904503-001.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
5	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
6	Sample	K1904518-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
7	Sample	K1904535-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
8	Sample	K1904535-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
9	Sample	K1904545-001.01	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
10	Sample	K1904545-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K1904545-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	K1904545-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	K1904545-005.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K1904545-006.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1904545-007.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K1904546-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1904546-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1904547-001.01 10x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	Sample	K1904547-002.01 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	K1904527-006.02	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K1904556-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	K1904556-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K1904531-001.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K1904532-001.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K1904532-002.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
27	Sample	K1904532-002.03 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
28	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
29	Sample	K1904532-003.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1904532-004.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
31	Sample	K1904532-005.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
32	Sample	K1904532-006.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
33	Sample	K1904502-001.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
34	Sample	K1904502-002.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
35	Sample	K1904502-003.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
36	Sample	K1904502-004.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
37	Sample	K1904295-004.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
38	Sample	K1904295-005.01 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

Printed on: May 24, 2019 09:05:43

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05/24/19
Hume

Schedule: 05222019b

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	K1904531-001.04 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
41	Sample	K1904532-001.04 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
42	Sample	K1904532-002.04 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
43	Sample	K1904532-002.04 doc ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
44	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
45	Sample	K1904532-003.04 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
46	Sample	K1904532-004.04 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
47	Sample	K1904532-005.04 doc	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
48	Sample	K1904532-006.04 doc	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 - 05222019b
Wednesday, May 22, 2019 05:40 PM(View - Reps, Unused Reps, Meta-
Data, Signature, History)
Printed on 2019/05/24 09:05 -
Friday**Report Summary Information**

Company Location: Gen Chem Lab
Schedule Name: 05222019b
Instrument Name: Fusion1
Report Version: 1 of 1
Report Creation by Operators (schedule version): Fusion1 (Fusion1) (v2)
Comment:

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

Report Results05/24/19
*Hamper***Sample Type:** Clean

From Schedule Version 2

Pos	Analysis Type	Sample ID	Start Time
◆ (clean)		Clean	2019/05/22 17:40

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	12.53	16.35	3.82	49.70	05:24
2	TC Clean	4.18	7.21	3.03	50.02	04:06
3	TC Clean	2.02	5.20	3.18	50.03	03:55
4	TC Clean	1.84	4.97	3.13	50.02	03:55

Sample Type: Clean

From Schedule Version 2

Pos	Analysis Type	Sample ID	Start Time
◆ (clean)		Clean	2019/05/22 18:02

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.60	3.65	3.04	49.77	05:24
2	TC Clean	3.44	6.54	3.10	50.03	04:01
3	TC Clean	1.68	4.80	3.13	50.05	03:49
4	TC Clean	2.02	5.12	3.10	50.05	03:46

Sample Type: Clean

From Schedule Version 2

Pos	Analysis Type	Sample ID		Start Time		
♦ (clean)		Clean		2019/05/22 18:24		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.82	3.91	3.09	49.64	05:12
2	TC Clean	3.47	6.70	3.23	50.01	04:02
3	TC Clean	2.01	5.19	3.18	50.02	03:45
4	TC Clean	1.98	5.14	3.16	50.05	03:48

Sample Type: Blank (Creating v1259)

From Schedule Version 2

Pos	Analysis Type	Sample ID		Start Time		
♦ (blank)		Reagent/Acid Blank		2019/05/22 18:46		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.58	3.87	3.29	49.62	05:23
2	TC Clean	3.81	7.05	3.24	50.02	04:05
3	TC Clean	2.21	5.29	3.08	50.02	03:49
4	TC Clean	2.16	5.32	3.16	49.76	07:04
5	Reagent Blank	8.27	11.25	2.98	49.73	08:11
6	Acid Blank	2.31	5.24	2.94	49.80	05:32

Sample Type: Sample

From Schedule Version 2

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
◆	D	TOC	RB	0.9130 ppm	0.0000 ppm	0.0000%	2019/05/22 19:26		
Rep #	Base Analysis Type		ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC		0.9130	9.1303	15.26	18.27	3.01	49.88	10:33
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>		<u>Calibration</u>			
1:10		(TC) 9.0674 (IC) (v1259)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)			

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
* B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.4053 ppm (PASS)	0.0000 ppm	0%	2019/05/22 19:41

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.4053	254.0528	181.91	185.03	3.12	49.85	10:32

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos B</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 2

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%	2019/05/22 19:55

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	8.53	11.63	3.10	49.82	10:34

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos D</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample From Schedule Version 2

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
* 1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/22 20:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.45	10.53	3.08	49.82	10:30

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 9.0674 (IC) (v1259)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS From Schedule Version 2

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)	25.6874 ppm (PASS)	0.0000 ppm	0%	2019/05/22 20:25

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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	Type									
C	TOC	25.0 ppm	1	25.6874	256.8739	183.83	186.81	2.98	49.80	10:31

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)**STD Conc - Pos C**

25 ppmC

Sample Type: Sample

From Schedule Version 2

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
2	TOC	ICS	0.1031 ppm	0.0000 ppm	0.0000%	2019/05/22 20:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1031	1.0307	9.77	12.80	3.04	49.80	10:30

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
3	TOC	K1904503-001.01	1.6627 ppm	0.0339 ppm	2.0400%	2019/05/22 20:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.6387	16.3873	20.19	23.17	2.98	49.83	10:30
2	TOC	1.6866	16.8661	20.52	23.54	3.03	49.83	10:28

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
4	TOC	K1904503-001.01 ms	27.9572 ppm	0.0000 ppm	0.0000%	2019/05/22 21:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	27.9572	279.5717	198.84	201.87	3.03	49.80	10:31

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
5	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/22 21:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.43	11.43	3.00	49.84	10:32

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
6	TOC	K1904518-001.01	1.3387 ppm	0.0024 ppm	0.1800%	2019/05/22 21:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.3404	13.4041	18.17	21.36	3.20	49.84	10:26
2	TOC	1.3370	13.3702	18.14	21.30	3.15	49.85	10:27

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
7	TOC	K1904535-001.01	1.6235 ppm	0.0151 ppm	0.9300%	2019/05/22 22:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.6342	16.3417	20.16	23.19	3.03	49.86	10:29
2	TOC	1.6128	16.1281	20.02	23.03	3.01	49.86	10:27

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
8	TOC	K1904535-002.01	1.8578 ppm	0.0333 ppm	1.7900%	2019/05/22 22:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.8814	18.8137	21.84	24.69	2.85	49.88	10:27
2	TOC	1.8342	18.3423	21.52	24.56	3.04	49.88	10:25

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
9	TOC	K1904545-001.01	0.8668 ppm	0.0259 ppm	2.9900%	2019/05/22 23:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8852	8.8519	15.08	18.06	2.99	49.88	10:28
2	TOC	0.8485	8.4851	14.83	17.85	3.02	49.90	10:25

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.0489 ppm	0.0000 ppm	0%	2019/05/22 23:44

(PASS)										
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.0489	250.4891	179.49	182.49	3.00	49.89	10:31
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos B</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		50 ppmC		

<u>Sample Type</u> : Check Standard --> CCB						From Schedule Version 2				
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%	2019/05/22 23:59	
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.71	10.53	2.83	49.92	10:30
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos D</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		0 ppmC		

Sample Type: Sample

From Schedule Version 2

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
◆	10	TOC	K1904545-002.01	2.4138 ppm	0.0092 ppm	0.3800%	2019/05/23 00:13		

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.4073	24.0730	25.41	28.32	2.91	49.91	10:26
2	TOC	2.4203	24.2027	25.50	28.49	2.99	49.92	10:26

Dilution

1:10

Blank Contribution

(TC) 9.0674 (IC)
(v1259)

Method

CAS_salt_010711
(v4)

Calibration

CAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
◆	11	TOC	K1904545-003.01	15.2342 ppm	0.2958 ppm	1.9400%	2019/05/23 00:41		

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	15.0250	150.2497	111.06	114.00	2.94	49.93	10:25
2	TOC	15.4434	154.4336	113.90	117.17	3.27	49.94	10:27

Dilution

1:10

Blank Contribution

(TC) 9.0674 (IC)
(v1259)

Method

CAS_salt_010711
(v4)

Calibration

CAS_salt_010711
(v30)

	Pos	Analysis	Sample ID	Result (ppmC)	Std. Dev.	RSD	Start Time		
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Type	(ppmC)
12 TOC K1904545-004.01	16.0001 ppm 0.2625 ppm 1.6400%

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	16.1857	161.8571	118.94	122.05	3.12	49.93	10:29
2	TOC	15.8145	158.1446	116.42	119.61	3.20	49.93	10:27

Dilution 1:10
Blank Contribution (TC) 9.0674 (IC) (v1259)
Method CAS_salt_010711 (v4)
Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
13	TOC	K1904545-005.01	0.7765 ppm	0.2205 ppm	28.4000%	2019/05/23 01:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9325	9.3248	15.40	18.57	3.17	49.96	10:29
2	TOC	0.6206	6.2060	13.28	16.43	3.15	49.98	10:26

Dilution 1:10
Blank Contribution (TC) 9.0674 (IC) (v1259)
Method CAS_salt_010711 (v4)
Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
14	TOC	K1904545-006.01	0.5954 ppm	0.0004 ppm	0.0700%	2019/05/23 02:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5957	5.9571	13.11	16.06	2.95	49.96	10:31
2	TOC	0.5951	5.9512	13.11	16.17	3.06	49.96	10:29

Dilution 1:10
Blank Contribution (TC) 9.0674 (IC) (v1259)
Method CAS_salt_010711 (v4)
Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
15	TOC	K1904545-007.01	0.5062 ppm	0.0084 ppm	1.6700%	2019/05/23 02:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5122	5.1218	12.54	15.62	3.07	49.97	10:29
2	TOC	0.5002	5.0024	12.46	15.48	3.02	49.97	10:26

Dilution 1:10
Blank Contribution (TC) 9.0674 (IC) (v1259)
Method CAS_salt_010711 (v4)
Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
16	TOC	K1904546-001.01	2.4827 ppm	0.0065 ppm	0.2600%	2019/05/23 03:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.4782	24.7816	25.89	28.77	2.88	49.99	10:28
2	TOC	2.4873	24.8730	25.95	28.95	3.00	49.96	10:28

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	K1904546-002.01	2.5333 ppm	0.0038 ppm	0.1500%	2019/05/23 03:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.5306	25.3061	26.24	29.38	3.14	49.98	10:30
2	TOC	2.5359	25.3591	26.28	29.15	2.87	49.98	10:29

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	K1904547-001.01 10x	111.5624 ppm	16.4182 ppm	14.7200%	2019/05/23 03:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	99.9529	999.5294	687.54	690.54	3.00	50.01	10:27
2	TOC	123.1718	1231.7176	845.15	849.34	4.19	50.01	10:27

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
19	TOC	K1904547-002.01 100x	6.0835 ppm	1.4442 ppm	23.7400%	2019/05/23 04:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.1048	71.0475	57.29	61.22	3.93	50.01	10:28
2	TOC	5.0623	50.6231	43.43	46.70	3.27	50.01	10:27

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.4492 ppm (PASS)	0.0000 ppm	0%	2019/05/23 04:54

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.4492	254.4918	182.21	185.27	3.06	50.01	10:31

Completion State

Success - Criteria

Success Action

Do Nothing

Method

CAS_salt_010711

Calibration

CAS_salt_010711

STD Conc - Pos B

50 ppmC

met.

(v4)

(v30)

Sample Type: Check Standard --> CCB

From Schedule Version 2

	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%	2019/05/23 05:09

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	9.07	12.16	3.08	50.02	10:32

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 2

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/23 05:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.57	10.65	3.08	50.02	10:33

Dilution

1:10

Blank Contribution

(TC) 9.0674 (IC) (v1259)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS

From Schedule Version 2

	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)	25.1021 ppm (PASS)	0.0000 ppm	0%	2019/05/23 05:38

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	25.1021	251.0209	179.85	182.82	2.97	50.03	10:29

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos C

25 ppmC

Sample Type: Sample

From Schedule Version 2

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

♦	21	TOC	K1904527-006.02	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/23 05:53
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Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.67	11.98	3.31	50.02	10:28
2	TOC	0.0000	0.0000	8.52	11.71	3.19	50.06	10:29

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 9.0674 (IC) (v1259)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	22	TOC	K1904556-001.01	1.7570 ppm	0.0121 ppm	0.6900%	2019/05/23 06:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.7656	17.6558	21.05	24.08	3.03	50.03	10:28
2	TOC	1.7485	17.4849	20.94	23.92	2.98	50.03	10:27

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 9.0674 (IC) (v1259)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	23	TOC	K1904556-002.01	1.6952 ppm	0.0225 ppm	1.3300%	2019/05/23 06:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.7111	17.1107	20.68	23.81	3.13	50.04	10:29
2	TOC	1.6792	16.7925	20.47	23.53	3.06	50.04	10:26

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 9.0674 (IC) (v1259)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	24	TOC	K1904531-001.03	2.9868 ppm	0.0139 ppm	0.4600%	2019/05/23 07:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.9966	29.9658	29.41	32.42	3.01	50.06	10:28
2	TOC	2.9770	29.7699	29.28	32.32	3.05	50.01	10:27

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 9.0674 (IC) (v1259)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	25	TOC	K1904532-001.03	3.0601 ppm	0.0063 ppm	0.2000%	2019/05/23 07:45

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.0557	30.5566	29.81	32.83	3.02	50.01	10:26
2	TOC	3.0645	30.6450	29.87	32.88	3.01	50.00	10:27

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
26	TOC	K1904532-002.03	10.8915 ppm	0.0714 ppm	0.6600%	2019/05/23 08:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	10.9420	109.4200	83.34	86.34	3.00	49.97	10:26
2	TOC	10.8411	108.4108	82.66	85.63	2.97	50.00	10:28

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
27	TOC	K1904532-002.03 ms	35.5676 ppm	0.0000 ppm	0.0000%	2019/05/23 08:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	35.5676	355.6758	250.50	253.54	3.05	49.98	10:29

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
28	TOC	RB	0.3261 ppm	0.0000 ppm	0.0000%	2019/05/23 08:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3261	3.2611	11.28	14.34	3.06	49.97	10:32

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 2

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)	24.6660 ppm (PASS)	0.0000 ppm	0%	2019/05/23 09:10

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.6660	246.6602	176.89	180.11	3.21	49.96	10:30

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos B

50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 2

	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%	2019/05/23 09:25

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.32	10.59	3.28	49.95	10:31

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 2

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	29	TOC	K1904532-003.03	0.0000 ppm	0.0000%	2019/05/23 09:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.10	10.01	2.90	49.94	10:24
2	TOC	0.0000	0.0000	7.07	10.05	2.97	49.99	10:26

Dilution

1:10

Blank Contribution

(TC) 9.0674 (IC) (v1259)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	30	TOC	K1904532-004.03	2.9697 ppm	0.1091 ppm	3.6700%	2019/05/23 10:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.8926	28.9257	28.70	31.68	2.98	49.92	10:26
2	TOC	3.0468	30.4682	29.75	32.68	2.93	49.91	10:26

Dilution

1:10

Blank Contribution

(TC) 9.0674 (IC) (v1259)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	31	TOC	K1904532-005.03	6.5458 ppm	0.0690 ppm	1.0500%	2019/05/23 10:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.5946	65.9458	53.83	56.90	3.07	49.89	10:26
2	TOC	6.4971	64.9706	53.17	56.33	3.16	49.90	10:27

Dilution

1:10

Blank Contribution

(TC) 9.0674 (IC) (v1259)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Analysis	Std. Dev.
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Pos	Type	Sample ID	Result (ppmC)	(ppmC)	RSD	Start Time
♦ 32	TOC	K1904532-006.03	6.6549 ppm	0.0516 ppm	0.7700%	2019/05/23 11:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.6914	66.9137	54.49	57.46	2.97	49.88	10:27
2	TOC	6.6184	66.1845	53.99	57.04	3.04	49.87	10:26

Dilution 1:10 Blank Contribution (TC) 9.0674 (IC) (v1259) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 33	TOC	K1904502-001.05	1.4705 ppm	0.0156 ppm	1.0600%	2019/05/23 11:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4815	14.8154	19.12	22.14	3.01	50.00	10:28
2	TOC	1.4594	14.5945	18.97	21.98	3.01	49.93	10:25

Dilution 1:10 Blank Contribution (TC) 9.0674 (IC) (v1259) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 34	TOC	K1904502-002.05	16.7415 ppm	0.1382 ppm	0.8300%	2019/05/23 12:00

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	16.8392	168.3922	123.37	126.36	2.99	50.00	10:31
2	TOC	16.6437	166.4373	122.04	125.11	3.06	49.89	10:28

Dilution 1:10 Blank Contribution (TC) 9.0674 (IC) (v1259) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 35	TOC	K1904502-003.05	2.4874 ppm	0.0784 ppm	3.1500%	2019/05/23 12:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.5428	25.4284	26.33	29.17	2.84	50.00	10:30
2	TOC	2.4319	24.3190	25.58	28.51	2.94	49.88	10:27

Dilution 1:10 Blank Contribution (TC) 9.0674 (IC) (v1259) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 36	TOC	K1904502-004.05	1.0310 ppm	0.0028 ppm	0.2700%	2019/05/23 12:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0290	10.2898	16.05	19.13	3.07	49.96	10:28
2	TOC	1.0330	10.3295	16.08	19.07	2.99	49.99	10:25

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
37	TOC	K1904295-004.01 100x	5.7267 ppm	0.0629 ppm	1.1000%	2019/05/23 13:25

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.6822	56.8223	47.64	50.52	2.88	49.93	10:25
2	TOC	5.7712	57.7121	48.24	51.09	2.84	49.98	10:29

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
38	TOC	K1904295-005.01 100x	6.0556 ppm	0.0111 ppm	0.1800%	2019/05/23 13:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.0477	60.4773	50.12	53.14	3.02	50.03	10:28
2	TOC	6.0635	60.6349	50.23	53.26	3.04	49.94	10:30

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)**Sample Type:** Check Standard --> CCV 25 ppm

From Schedule Version 2

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)	24.6961 ppm (PASS)	0.0000 ppm	0%	2019/05/23 14:21

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.6961	246.9608	177.10	180.04	2.95	49.95	10:35

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos B

50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 2

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%	2019/05/23 14:36

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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Type										
D	TOC	0 ppm	1	0.0000	0.0000	7.09	10.13	3.05	49.99	10:29
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos D</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		0 ppmC		

Sample Type: Sample

From Schedule Version 2

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
39	TOC	MB3	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/23 14:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.15	9.20	3.06	49.96	10:31

Dilution

1:10

Blank Contribution

(TC) 9.0674 (IC)
(v1259)

Method

CAS_salt_010711
(v4)

Calibration

CAS_salt_010711
(v30)

<u>Sample Type</u> : Check Standard --> LCS							From Schedule Version 2			
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)	24.9281 ppm (PASS)	0.0000 ppm	0%	2019/05/23 15:05	
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.9281	249.2811	178.67	181.70	3.02	49.98	10:32
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos C</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		25 ppmC		

Sample Type: Sample

From Schedule Version 2

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
40	TOC	K1904531-001.04 doc	9.0700 ppm	0.0098 ppm	0.1100%	2019/05/23 15:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.0769	90.7692	70.68	73.87	3.19	49.98	10:28
2	TOC	9.0631	90.6308	70.59	73.57	2.98	49.96	10:26

Dilution

Blank Contribution

Method

Calibration

1:10

(TC) 9.0674 (IC) (v1259)

CAS_salt_010711 (v4)

CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
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41	TOC	K1904532-001.04 doc	7.9219 ppm	0.0354 ppm	0.4500%	2019/05/23 15:48
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Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.9470	79.4698	63.01	66.00	2.98	49.99	10:24
2	TOC	7.8969	78.9689	62.67	65.64	2.96	49.98	10:28

Dilution 1:10 Blank Contribution (TC) 9.0674 (IC) (v1259) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
42	TOC	K1904532-002.04 doc	15.3262 ppm	0.2204 ppm	1.4400%	2019/05/23 16:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	15.4821	154.8211	114.16	117.27	3.11	49.95	10:32
2	TOC	15.1704	151.7038	112.04	115.15	3.10	50.02	10:28

Dilution 1:10 Blank Contribution (TC) 9.0674 (IC) (v1259) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
43	TOC	K1904532-002.04 doc ms	39.4894 ppm	0.0000 ppm	0.0000%	2019/05/23 16:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	39.4894	394.8939	277.12	280.20	3.08	49.98	10:32

Dilution 1:10 Blank Contribution (TC) 9.0674 (IC) (v1259) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
44	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/23 16:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.52	11.70	3.18	49.99	10:32

Dilution 1:10 Blank Contribution (TC) 9.0674 (IC) (v1259) Method CAS_salt_010711 (v4) Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
45	TOC	K1904532-003.04 doc	4.1322 ppm	0.0039 ppm	0.0900%	2019/05/23 17:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.1349	41.3493	37.14	40.16	3.03	50.03	10:30
2	TOC	4.1295	41.2947	37.10	40.19	3.09	50.02	10:26

Dilution 1:10 Blank Contribution (TC) 9.0674 (IC) Method CAS_salt_010711 Calibration CAS_salt_010711

(v1259)

(v4)

(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	46	TOC	K1904532-004.04 doc	6.9677 ppm	0.0148 ppm	0.2100%	2019/05/23 17:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.9573	69.5728	56.29	59.33	3.04	50.03	10:31
2	TOC	6.9782	69.7820	56.44	59.41	2.98	50.04	10:26

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦	47	TOC	K1904532-005.04 doc	11.0095 ppm	0.1234 ppm	1.1200%	2019/05/23 18:09

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	11.0968	110.9683	84.39	87.53	3.14	50.01	10:29
2	TOC	10.9223	109.2226	83.21	86.34	3.13	50.02	10:29

Dilution

1:10

Blank Contribution(TC) 9.0674 (IC)
(v1259)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 2

	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)	24.3888 ppm (PASS)	0.0000 ppm	0%	2019/05/23 18:37

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.3888	243.8877	175.01	178.09	3.08	49.99	10:30

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)STD Conc - Pos B

50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 2

	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%	2019/05/23 18:52

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.94	10.11	3.17	49.93	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 2

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
48	TOC	K1904532-006.04 doc	8.3078 ppm	0.0000 ppm	0.0000%	2019/05/23 19:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.3078	83.0777	65.46	68.48	3.02	49.88	10:29
2	TOC	8.3078	83.0777	65.46	68.52	3.06	49.85	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0674 (IC) (v1259)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.0803 ppm (PASS)	0.0000 ppm	0%	2019/05/23 19:35

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.0803	250.8029	179.71	182.76	3.06	49.82	10:31

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 2

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%	2019/05/23 19:50

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.97	9.89	2.93	49.79	10:28

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Meta Data Used in this Report

Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1258	5.1363	1.2620	0.0000	0.0000	0.0000	2019/05/22 12:47	Fusion1 (Fusion1)
v1259	2.7557	2.3080	0.0000	0.0000	0.0000	2019/05/22 19:26	Fusion1 (Fusion1)

Calibrations

Name: CAS_salt_010711 (TOC)

Version: v30 Calibration curve formula: TOC: $y = 6.788x + 9.463$

Ver Creation: 2019/03/05 17:42 r^2 value: TOC: $r^2 = 0.99963$

Comment:

Operator: Fusion1 (Fusion1)

Basic Analysis Type: TOC

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 Operator: Fusion1 (Fusion1)

Ver Creation: 2019/02/21 17:57

Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	ICSpurgeRinseVolume	12.0 ml
UVReactorPreRinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPreRinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPreRinses	1	SyringeSpeedWaste	10
ICSpurgeTime	1.00 mins	SyringeSpeedAcid	7

DetectorSweepFlow	500 ml/min	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
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Report History

Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/05/23 20:06

StarLIMS Run: 636316, 636320, 636321
Analysis: TOC
Method: 415.1, SM 5310 C, 9060, 9060A

CCV: 11-GEN-05-77K 50 ppm LCS: 11-GEN-05-77D 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-74A

ICS TV: 25.0 ppm ICS % R = 2

Spike ID: 11-GEN-05-77J 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-78B

21 % H₃PO₄: 11-GEN-05-78C

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: NA

Prepped 05/21/2019

Analyzed By: <i>BCD</i>	Date Analyzed: 5/22/2019
Reviewed By: <i>Huey</i>	Date Reviewed: 05/24/19

ALS Houston, US

Date: 23-may-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
Work Order: HS19050401

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19050401-01	LH18/24-SP140_050719	Water		07-May-2019 14:00	08-May-2019 09:30	<input type="checkbox"/>

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
Work Order:

CASE NARRATIVE

Work Order Comments

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

Metals by Method SW6020**Batch ID: 140779****Sample ID: HS19050692-02MS**

- MS/MSD and DUPS are for an unrelated sample
-

WetChemistry by Method SW7196**Batch ID: R338200**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 GW Treatment Plant Monthly Influent Samples
 Sample ID: LH18/24-SP140_050719
 Collection Date: 07-May-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19050401
 Lab ID:HS19050401-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
METALS BY ICPMS BY SW6020A		Method:SW6020				Prep:SW3010A / 13-May-2019		Analyst: JHD
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	13-May-2019 23:54
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	13-May-2019 23:54
HEXAVALENT CHROMIUM BY SW7196A		Method:SW7196						Analyst: MZD
Chromium, Hexavalent	0.0100	U	0.00600	0.0100	0.0100	mg/L	1	08-May-2019 13:18
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	23-May-2019 14:50

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

WEIGHT LOG

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19050401

Batch ID: 140779 **Method:** METALS BY ICPMS BY SW6020A **Prep:** 3010A

SamplID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19050401-01	1	10	10 (mL)	1

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19050401

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID 140779	Test Name : METALS BY ICPMS BY SW6020A		Matrix: Water			
HS19050401-01	LH18/24-SP140_050719	07 May 2019 14:00		13 May 2019 12:00	13 May 2019 23:54	1
Batch ID R338200	Test Name : HEXAVALENT CHROMIUM BY SW7196A		Matrix: Water			
HS19050401-01	LH18/24-SP140_050719	07 May 2019 14:00			08 May 2019 13:18	1
Batch ID R339032	Test Name : SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Matrix: Water			
HS19050401-01	LH18/24-SP140_050719	07 May 2019 14:00			23 May 2019 14:50	1

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19050401

QC BATCH REPORT

Batch ID: 140779 (0)		Instrument: ICPMS06		Method: ICP-MS METALS BY SW6020A						
MBLK	Sample ID: MBLK-140779	Units: mg/L		Analysis Date: 14-May-2019 15:15						
Client ID:	Run ID: ICPMS06_338370	SeqNo: 5074406		PrepDate: 13-May-2019		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.00250	0.00200								U
Silver	0.000500	0.00200								U
LCS	Sample ID: LCS-140779	Units: mg/L		Analysis Date: 13-May-2019 23:51						
Client ID:	Run ID: ICPMS06_338296	SeqNo: 5073389		PrepDate: 13-May-2019		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.05418	0.00200	0.05	0	108	80 - 120				
Silver	0.05124	0.00200	0.05	0	102	80 - 120				
MS	Sample ID: HS19050692-02MS	Units: mg/L		Analysis Date: 14-May-2019 15:20						
Client ID:	Run ID: ICPMS06_338370	SeqNo: 5074409		PrepDate: 13-May-2019		DF: 5				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	2.219	0.0100	0.05	2.123	192	80 - 120				SO
Silver	0.05437	0.0100	0.05	-0.000021	109	80 - 120				
MSD	Sample ID: HS19050692-02MSD	Units: mg/L		Analysis Date: 14-May-2019 15:21						
Client ID:	Run ID: ICPMS06_338370	SeqNo: 5074410		PrepDate: 13-May-2019		DF: 5				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	2.198	0.0100	0.05	2.123	150	80 - 120	2.186	0.575	20	SO
Silver	0.05424	0.0100	0.05	-0.000021	109	80 - 120	0.04161	26.3	20	R
PDS	Sample ID: HS19050692-02PDS	Units: mg/L		Analysis Date: 14-May-2019 15:23						
Client ID:	Run ID: ICPMS06_338370	SeqNo: 5074411		PrepDate: 13-May-2019		DF: 5				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	2.683	0.0100	0.5	2.123	112	75 - 125				O
Silver	0.5511	0.0100	0.5	0	110	75 - 125				

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19050401

QC BATCH REPORT

Batch ID: 140779 (0)		Instrument: ICPMS06		Method: ICP-MS METALS BY SW6020A						
SD	Sample ID: HS19050692-02SD	Units: mg/L		Analysis Date: 14-May-2019 15:18						
Client ID:	Run ID: ICPMS06_338370		SeqNo: 5074408		PrepDate: 13-May-2019		DF: 25			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	Limit	Qual
Selenium	2.145	0.0500					2.123	1.02	10	
Silver	0.0125	0.0500					-0.000021	0	10	U

The following samples were analyzed in this batch: HS19050401-01

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19050401

QC BATCH REPORT

Batch ID: R338200 (0)		Instrument: UV-2450		Method: HEXAVALENT CHROMIUM BY SW7196A						
MBLK	Sample ID: MBLK-338200	Units: mg/L		Analysis Date: 08-May-2019 13:18						
Client ID:	Run ID: UV-2450_338200		SeqNo: 5070046		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.0100	0.0100								U
LCS	Sample ID: LCS-338200	Units: mg/L		Analysis Date: 08-May-2019 13:18						
Client ID:	Run ID: UV-2450_338200		SeqNo: 5070047		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.247	0.0100	0.25	0	98.8	90 - 111				
MS	Sample ID: HS19050410-01MS	Units: mg/L		Analysis Date: 08-May-2019 13:18						
Client ID:	Run ID: UV-2450_338200		SeqNo: 5070049		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.249	0.0100	0.25	0.001	99.2	90 - 111				
MSD	Sample ID: HS19050410-01MSD	Units: mg/L		Analysis Date: 08-May-2019 13:18						
Client ID:	Run ID: UV-2450_338200		SeqNo: 5070050		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.235	0.0100	0.25	0.001	93.6	90 - 111	0.249	5.79	20	
The following samples were analyzed in this batch: HS19050401-01										

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19050401

**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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020
Texas	TX104704231-19-23	30-Apr-2020

Client:	Bhate Environmental Associates, Inc.	SAMPLE TRACKING
Project:	LH18/24 GW Treatment Plant Monthly Influent Samples	
Work Order:	HS19050401	

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19050401-01	LH18/24-SP140_050719	Login	08/05/2019 11:51:51	NDR	WET270
HS19050401-01	LH18/24-SP140_050719	Login	08/05/2019 11:51:51	NDR	WET270
HS19050401-01	LH18/24-SP140_050719	Login	08/05/2019 11:51:51	NDR	MET071

ALS Houston, US

Date: 23-May-19

Sample Receipt Checklist

Client Name: Bhate Environmental
Work Order: HS19050401

Date/Time Received: **08-May-2019 09:30**
Received by: **JRM**

Checklist completed by: Nilesh D. Ranchod 8-May-2019
eSignature Date

Reviewed by: RJ Modashia 8-May-2019
eSignature Date

Matrices: **water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	1.6c uc/c IR 11		
Cooler(s)/Kit(s):	44882		
Date/Time sample(s) sent to storage:	05/08/2019 12:15pm		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted by:			

Login Notes: Sample times donot match , SX LH18/27-SP140_050719
COC= Date : 04/07/19 /1400
Label = Date : 05/07/19 / 1400

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:


Corrective Action:

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd., Suite 210 Houston, TX. 77099 (281) 530-5656 ATIN: RJ Modshia

Page 1 of 1[illegible]

For Lab Use Only									
Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition
J. M. M. M.	5/8/19	09:30							
Remarks: Cooler - 44882 11211 Temp 1.6 OFC 0									

FedEx TRK# 0221 4380 9532 7390	WED - 08 MAY 10:30A PRIORITY OVERNIGHT	ALS 10480 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887
AB SGRA	77099 TX-US IAH	
		
170 5121960 07MAY19 00GA 653C1/D66C/8C8A		
BY SEAL		
Type: 1430		Seal Broken By:
1441		Date:



Case Narrative

Method: 6850
Analysis: Perchlorate
Analysis SOP: LC-MS-CLO4
ALS WO ID(s): 1913332, 1913338, 1913342, 1913345

Client: ALS Laboratories (Houston, TX)
Matrix: Water
ELMS Batch (HBN): 2253(239553)

General Set Information: There were ten 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. 50 μL 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 0.45 μm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1913338001 was analyzed and reported from a 1:100 dilution. Field sample 1913342004 was analyzed and reported from a 1:10 dilution. The reporting limits have been adjusted accordingly.

Method QC data: The method blank (LMB 653683) was less than 1/2 the CRDL. The recovery for the LCS (653684) was within acceptable parameters.



MS/MSD Analysis: MS/MSD was performed on samples 1913342006/007. 4.0µl of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4.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 – 653681) is reported from the analysis of the Laboratory Control Sample (LCS – 653684) at a level of 4.0µg/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: 19MARI03).

<u>Stephen Brose</u>	<u>May 22, 2019</u>
Analyst	Date



00938681

ANALYTICAL REPORT

Report Date: May 22, 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: **34-1913338**

Project ID: HS19050401

Purchase Order: HS19050401

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP140_050719	1913338001	05/07/19	05/09/19	

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992

ALS GROUP USA, CORP. An ALS Limited Company

Environmental www.alsglobal.com

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ANALYTICAL REPORT

Workorder: **34-1913338**Client: ALS Environmental
(Houston)

Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: LH18/24-SP140_050719		Sampling Site: NA		Collected: 05/07/2019	
Lab ID: 1913338001		Media: 125 mL Nalgene		Received: 05/09/2019	
Matrix: Water		Sampling Parameter: NA			
Analysis Method - EPA 6850, DoD QSM					
Preparation: Not Applicable			Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2253 (HBN: 239553) Analyzed: 05/21/2019 08:56		Instrument ID: LCMS04 Percent Solid: NA Report Basis: Wet
Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution Qual
Perchlorate	4200	100	200	400	100

Comments

Quality Control: EPA 6850, DoD QSM - (HBN: 239553)

Field sample 1913338001 was analyzed and reported from a 1:100 dilution. Field sample 1913342004 was analyzed and reported from a 1:10 dilution. 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/ Stephen Brose 05/22/2019 06:38	/S/ Thomas Bosch 05/22/2019 11:11

Laboratory Contact Information

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

Phone: (801) 266-7700
Email: als@altlab.com
Web: www.alsslc.com



ANALYTICAL REPORT

Workorder: 34-1913338

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
	Nevada (TNI)	UT00953201-1	https://ndep.nv.gov/water/lab-certification
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
	Oklahoma (TNI)	IJ# 9980	http://www.deq.state.ok.us/CSDnew/labcert.htm
	Texas (TNI)	T104704456-18-9	https://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_list.pdf
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

00938684

Analysis Information

Workorder: 1913338**Limits:** Client SOW/Contract Specified**Preparation:** NA**Analysis:** EPA 6850, DoD QSM**Basis:** DoD QSM**Batch:** NA**Batch:** ELMS/2253 (HBN: 239553)**Prepared By:** NA**Analyzed By:** Stephen Brose

Blank

LMB: 653683**Analyzed:** 05/21/2019 08:29**Units:** ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 653684**Analyzed:** 05/21/2019 08:02**Dilution:** 1**Units:** ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.08	4.00	102	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1913342005**Analyzed:** 05/21/2019 10:03**Dilution:** 1**Units:** ug/L**MS:** 1913342006**Analyzed:** 05/21/2019 10:17**Dilution:** 1**Units:** ug/L**MSD:** 1913342007**Analyzed:** 05/21/2019 10:30**Dilution:** 1**Units:** ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	3.78	4	94.4	78.8	123.8	3.72	93.0	1.51	0.0	20.0

Comments

Field sample 1913338001 was analyzed and reported from a 1:100 dilution. Field sample 1913342004 was analyzed and reported from a 1:10 dilution. 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/ Stephen Brose 05/22/2019 06:38	/S/ Thomas Bosch 05/22/2019 11:11

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



1913338



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: Dept of Defense

COC ID: 11271

SUBCONTRACT TO:

1913338

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: HS19050401
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19050401-01	LH18/24-SP140_050719	Water	07 May 2019 14:00
SUB_Perch-6850			22 May 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:

[Signature]

Date/Time:

5/8/19 18:00

Received By:

[Signature]

Date/Time:

5/9/19 10:18

Cooler ID(s):

Temperature(s):

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08 May 2019

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of 106[illegible]

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: <u>ALS Austin</u>		Project/Task/Site: <u>1913338</u>				
Date/Time of Receipt: <u>5/19/19 10:18</u>		Number of Coolers Received: <u>1</u>				
Condition of Coolers: <u>Acceptable/Unacceptable</u> Cooler Custody Seals: <u>Present/Absent/NA</u> Container Custody Seals: <u>Present/Absent/NA</u> Ice Present: <u>Yes/No/NA</u> <u>Frozen/Melted/NA</u>		Temperature Control: <u>Present/Not Included</u> Location Temp Taken: <u>Control/Between Samples</u> Are all temperatures within project specific guidelines? <u>Yes/No/NA</u> VOA Headspace Present? <u>Yes/No/NA</u>				
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	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19-9390	2 °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By: Lea W. [Signature] Julie W. [Signature] 5/19/19
Signature Printed Name Date

CLIENT-RELATED INFORMATION

- | | | | |
|---|--|---|--|
| <input type="checkbox"/> Missing Cooler
<input type="checkbox"/> Cooler Conditions
<input type="checkbox"/> Missing Paperwork
<input type="checkbox"/> Missing/Incorrect Bottle Labels | <input type="checkbox"/> Missing Samples/Bottles
<input type="checkbox"/> Broken/Leaking Samples
<input type="checkbox"/> Incorrect Bottle Type
<input type="checkbox"/> Cooler Temperatures Out of Range | <input type="checkbox"/> Incorrect Preservation
<input type="checkbox"/> pH Criteria Not Met
<input type="checkbox"/> Residual Chlorine Present
<input type="checkbox"/> Head Space in Bottles | <input type="checkbox"/> Insufficient Sample Volume
<input type="checkbox"/> Chain of Custody Problems
<input type="checkbox"/> Other: |
|---|--|---|--|

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: _____ Returned to Sample Receipt by: _____ Date: _____
Printed Name Signature



**Must Deliver Next Business Day
Time and Temperature Sensitive!**

Part # 159469-404 RITZ EXP 01/20

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

SHIP DATE: 08MAY19
ACTWGT: 21.30 LB
CAD: 300130/CAFE3211
DIMS: 19x16x13 IN

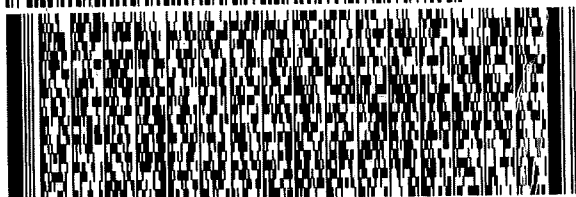
BILL THIRD PARTY

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

SALT LAKE CITY UT 84123

(801) 266-7700

REF: HS19050397/398/401/403 RJ



FedEx
EXPRESS

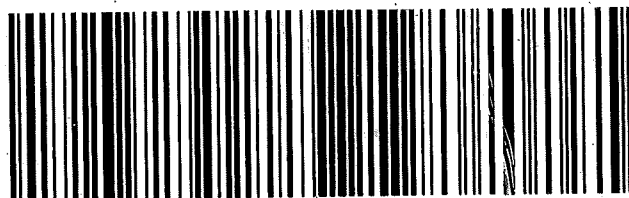


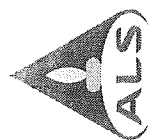
TRK# 4809 7833 6238
0201

**THU - 09 MAY 3:00P
STANDARD OVERNIGHT**

AX BTFA

**84123
UT-US SLC**





Batch Worklist

Batch: ELMS/ 2253

Rule: EPA 6850, DoD QSM Water

Workorder: 1913332 [ENV_LVL4]

Workorder: 1913338 [ENV_LVL4]

Workorder: 1913342 [ENV_LVL4]

Workorder: 1913345 [ENV_LVL4]

Created: 5/20/2019 06:13

Analyst: S. Brose

Instrument:

Status: WP

HBN: 239553



Pos	Lab ID	Sample ID	Prep Initial	Prep Final	Dust Weight	Type	Mx	Container	Procedure	Mgr	Expire Date	Due Date	Run Date
1	653680	CCV for HBN 239553 [ELMS/2253]				CCV	3		E685041C3Q	6214		5/22/2019	
2	653681	RLVS for HBN 239553 [ELMS/2253]				RLVS	3		E685041C3Q	6214		5/22/2019	
3	653682	ICS for HBN 239553 [ELMS/2253]				ICS	3		E6850.D3Q	6214		5/22/2019	
4	653683	LMB for HBN 239553 [ELMS/2253]				LMB	3		E6850Q413Q	6214		5/22/2019	
5	653684	LCS for HBN 239553 [ELMS/2253]				LCS	3		E6850Q413Q	6214		5/22/2019	
6	1913332001	LH18/24-SP650_050719_BIX				SAMPLE	3	1913332001-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
7	1913338001	LH18/24-SP140_050719				SAMPLE	3	1913338001-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
8	1913342001	50WW10-190507				SAMPLE	3	1913342001-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
9	1913342002	50WW09-190507				SAMPLE	3	1913342002-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
10	1913342003	50WW09-190507-FD				FLDDUP	3	1913342003-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
11	1913342004	50WW08-190507				SAMPLE	3	1913342004-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
12	1913342005	50WW23-190507				SAMPLE	3	1913342005-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
13	1913342006	50WW23-190507MS				MS	3	1913342006-A	E6850Q413Q	5480		5/22/2019	
14	1913342007	50WW23-190507MSD				MSD	3	1913342007-A	E6850Q413Q	5480		5/22/2019	
15	1913342008	50WW24-190507				SAMPLE	3	1913342008-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
16	1913342009	50WW05-190507				SAMPLE	3	1913342009-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
17	1913345001	LH18-24-SP650_050719_BIX				SAMPLE	3	1913345001-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
18	653685	CCV for HBN 239553 [ELMS/2253]				CCV	3		E685041C3Q	6214		5/22/2019	



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #()'s: 1913332(001), 1913338(001), 1913342(001-009), 1913345(001)
 ELMS Batch/HBN ID: 2253 (239553)
 Prep Date: 05/21/2019 Analysis Date: 05/21/2019 Analyst: S. Brose
 Analyte: **Perchlorate** Matrix: **Water** Method: 6850
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\MAY\21MAY19D.s
 Reported DL: 1.0µg/L Reported LOD: 2.0µg/L Reported LOQ: 4.0µg/L

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by SAB. 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 AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

STANDARDS: Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

CALIBRATION CURVE: Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.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: 35µL
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

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: 4.0µL of QC Solution Horizon ID 47516 was used for LCS 653684; Target = 4.0µg/L. ASTM type II water was used for LMB 653683.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1913342006/007 (Client ID: 50WW23-190507). 4.0µL of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. Spike target = 4.0µg/L.

COMMENTS:

- 1) Results reported in µg/L. Field samples 1913338001 and 1913342004 required 1:100 and 1:10 dilutions respectively. 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\MAY\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\239553-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATA\VIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 653681) is reported from the analysis of the Laboratory Control Sample (LCS – 653684) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, many of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03).

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.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDG: <u>ELMS/2253</u> <u>IT3N: 238553</u>		
Sample Set IDs if Applicable: <u>1913332/ 38/42/45</u>		
Calibration standards analyzed and meets criteria	SRB	TB
Standards traceability checked and meets criteria	SRB	TB
Standard curve coefficients evaluated and meet criteria	SRB	TB
ICVs analyzed and meet acceptance criteria	SRB	TB
CCVs analyzed and meet acceptance criteria	SRB	TB
Retention Time Windows checked	SRB	TB
For method 8081A, Endrin/DDT Breakdown is checked for compliance	—	—
Surrogate recoveries checked and appropriately addressed	SRB	TB
Method Preparation Blanks analyzed and meet acceptance criteria	SRB	TB
MSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed	SRB	TB
RLVS analyzed	SRB	TB
Preparation and analysis hold times met	SRB	TB
Preparation deviations and re-preparations noted when performed	SRB	TB
Analysis deviations and re-analyses noted when performed	SRB	TB
Sample dilution factors noted on reports	SRB	TB
Electronic records in HBN transcription accuracy and completeness checked	SRB	TB
Preparation and analysis calculations checked	SRB	TB
NCRs are completed as necessary <u>NC/CAR#</u>	—	—
Report forms are complete and accurate	SRB	TB
Manual integrations checked	SRB	TB



STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850 WKG Std 100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	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
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

ASTM H2O		Description - ASTM Type II Water	
Standard: 109		Created By: ALS Support (Lims)	
MFG: DCL In House		Create Date: 10/06/2005 09:10AM	
MFG Lot: Not Provided		Amount: 1000 L	
Part ID: Not Provided		Expires: 11/07/2025	
		Usable: Yes	
		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: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
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
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



STANDARD REPORT

Working Standard - CLO4 QC WRK

Working Standard 47516 QC WRK

CLO4 QC WRK		Description - 6850 QC WKG STD 100ug/L	
Standard: 47516		Created By: Thomas Bosch	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM	
MFG Lot: TNB: 05/06/2019		Amount: 10 mL	
Pipette ID: Not Provided		Expires: 03/31/2020	
		Usable: Yes	
		Lab Lot: CLO4 QC WRK 100.ug/L	

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

Composition

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



STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

ASTM H2O			Description - ASTM Type II Water
Standard: 109			Amount: 1000 L
MFG: DCL In House			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



STANDARD REPORT

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK			Description - Perchlorate ISTD Wrk 1,000ug/L		
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		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
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



STANDARD REPORT

Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729		Created By: Thomas Bosch	Amount: 1 mL
MFG: Cambridge Isotope		Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026
MFG Lot: SDFE-012A		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



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

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.





Certificate of Analysis



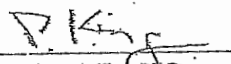
ISO Guide 34 Reference Material

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

125 Market Street
New Haven, CT 06513
USA



AccuStandard®

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

CERTIFICATE OF ANALYSIS



43659

AccuTrace™ Reference Standard

Catalog No: IC-PER-10X-1
Description: Perchlorate Standard
Element: Perchlorate (ClO₄)
SRM: Ind. Std.
Lot: 218065075
Matrix: Water
Hazards: Refer to SDS for complete safety information

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



Signal Word: None

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

Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

Quality Standards:

ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification: $\geq 98\%$
 Labeled CAS Number: NA
 Unlabeled CAS Number: 7601-89-0
 MW*: 130.4
 Chemical Formula: NaCl^*O_4
 Storage: Store at room temperature away from light and moisture.
 Stability: See storage and expiration date.

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.

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/NCSL 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.

* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 $\mu\text{g/mL}$
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	109.4 \pm 2.8 $\mu\text{g/mL}$ (k=2)



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Report: C:\HPCHEM\1\DATA\21MAY19D\21MAY19D.B

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	
*	653680	CCV@25	Vial 71	1	Control	1	2.40704e6	8.594	23.99302
*	653684	QC@4.0	Vial 72	1	Control	2	3.96639e5	8.823	4.08274
*	653682	ICS@4.0	Vial 73	1	Control	3	3.14960e5	8.612	3.74421
*	653683	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1913332001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1913338001	100	Vial 76	1	Sample	6	3.99368e6	8.959	4178.24239
*	1913342001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1913342002		Vial 78	1	Sample	8	6.18077e5	8.360	7.21259
*	1913342003		Vial 79	1	Sample	9	6.79913e5	8.381	7.76574
*	1913342004	10X	Vial 80	1	Sample	10	2.09294e6	8.642	226.56793
*	1913342005		Vial 81	1	Sample	11	0.00000	0.000	0.00000
*	1913342006	MS	Vial 82	1	Sample	12	2.30072e5	8.281	3.77790
*	1913342007	SD	Vial 83	1	Sample	13	2.23456e5	8.296	3.72139
*	1913342008		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	1913342009		Vial 85	1	Sample	15	0.00000	0.000	0.00000
*	1913345001		Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	653685	CCV@25	Vial 71	1	Control	17	1.93838e6	8.628	23.36594

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	653680	CCV@25	Vial 71	1	Control	1	7.14295e5	8.612	23.97986
*	653684	QC@4.0	Vial 72	1	Control	2	1.27284e5	8.838	4.26129
*	653682	ICS@4.0	Vial 73	1	Control	3	1.12778e5	8.627	4.34080
*	653683	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1913332001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1913338001	100	Vial 76	1	Sample	6	1.20507e6	8.974	4254.41607
*	1913342001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1913342002		Vial 78	1	Sample	8	2.00267e5	8.373	7.73270
*	1913342003		Vial 79	1	Sample	9	2.18020e5	8.395	8.25365
*	1913342004	10X	Vial 80	1	Sample	10	6.29788e5	8.660	229.37195
*	1913342005		Vial 81	1	Sample	11	0.00000	0.000	0.00000
*	1913342006	MS	Vial 82	1	Sample	12	8.05070e4	8.292	4.28262
*	1913342007	SD	Vial 83	1	Sample	13	7.84560e4	8.311	4.22992
*	1913342008		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	1913342009		Vial 85	1	Sample	15	0.00000	0.000	0.00000
*	1913345001		Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	653685	CCV@25	Vial 71	1	Control	17	5.93941e5	8.647	24.07193

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	653680	CCV@25	Vial 71	1	Control	1	3.05962e5	8.618	5.00000
*	653684	QC@4.0	Vial 72	1	Control	2	3.19796e5	8.842	5.00000
*	653682	ICS@4.0	Vial 73	1	Control	3	2.78118e5	8.629	5.00000
*	653683	LMB	Vial 74	1	Control	4	3.07550e5	8.973	5.00000
*	1913332001		Vial 75	1	Sample	5	2.84011e5	8.455	5.00000
*	1913338001	100	Vial 76	1	Sample	6	2.80006e5	8.979	500.00000
*	1913342001		Vial 77	1	Sample	7	2.92233e5	8.419	5.00000
*	1913342002		Vial 78	1	Sample	8	2.75334e5	8.385	5.00000
*	1913342003		Vial 79	1	Sample	9	2.80514e5	8.402	5.00000
*	1913342004	10X	Vial 80	1	Sample	10	2.82646e5	8.663	50.00000
*	1913342005		Vial 81	1	Sample	11	2.06104e5	8.293	5.00000
*	1913342006	MS	Vial 82	1	Sample	12	2.01255e5	8.301	5.00000
*	1913342007	SD	Vial 83	1	Sample	13	1.98591e5	8.312	5.00000
*	1913342008		Vial 84	1	Sample	14	2.10825e5	8.375	5.00000

Batch Report: C:\HPCHEM\1\DATA\21MAY19D\21MAY19D.B

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	1913342009	Vial 85	1	Sample	15	2.18072e5	8.384	5.00000
*	1913345001	Vial 86	1	Sample	16	2.17961e5	8.508	5.00000
*	653685	CCV@25	Vial 71	Control	17	2.53387e5	8.650	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	653680	CCV@25	CLO4-AQN 1	Ctrl Samp		
2	Vial 72	653684	QC@4.0	CLO4-AQN 1	Ctrl Samp		
3	Vial 73	653682	ICS@4.0	CLO4-AQN 1	Ctrl Samp		
4	Vial 74	653683	LMB	CLO4-AQN 1	Ctrl Samp		
5	Vial 75	1913332001		CLO4-AQN 1	Sample		
6	Vial 76	1913338001	100	CLO4-AQN 1	Sample		
7	Vial 77	1913342001		CLO4-AQN 1	Sample		
8	Vial 78	1913342002		CLO4-AQN 1	Sample		
9	Vial 79	1913342003		CLO4-AQN 1	Sample		
10	Vial 80	1913342004	10X	CLO4-AQN 1	Sample		
11	Vial 81	1913342005		CLO4-AQN 1	Sample		
12	Vial 82	1913342006	MS	CLO4-AQN 1	Sample		
13	Vial 83	1913342007	SD	CLO4-AQN 1	Sample		
14	Vial 84	1913342008		CLO4-AQN 1	Sample		
15	Vial 85	1913342009		CLO4-AQN 1	Sample		
16	Vial 86	1913345001		CLO4-AQN 1	Sample		
17	Vial 71	653685	CCV@25	CLO4-AQN 1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD01.D

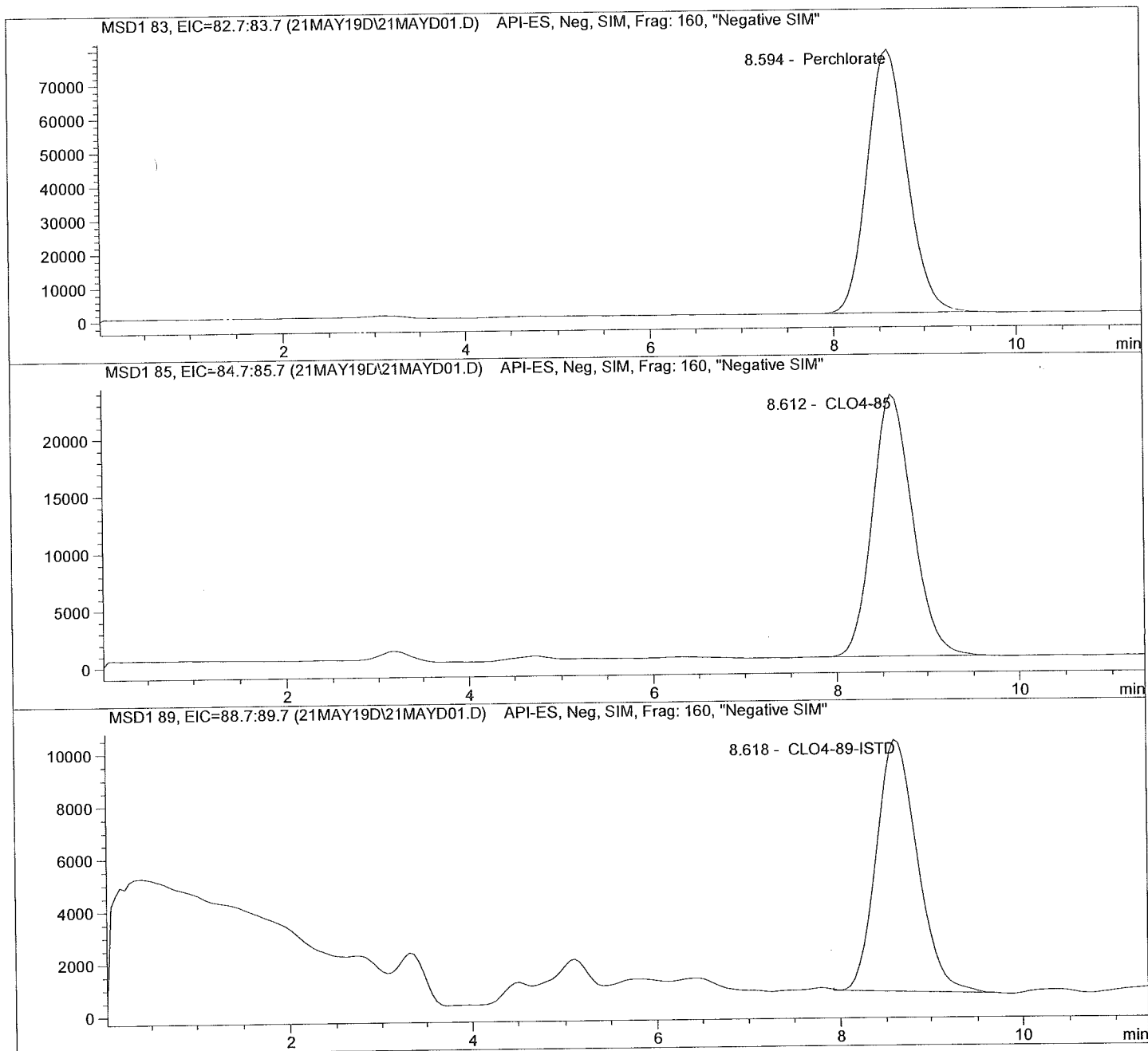
Sample Name: 653680 CCV@25

Injection Date: 5/21/2019 07:49:32
Sample Name: 653680 CCV@25
Acq Operator: 6214

Seq Line: 1
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD01.D

Sample Name: 653680 CCV@25

```

=====
Injection Date:  5/21/2019  07:49:32      Seq Line:           1
Sample Name:    653680    CCV@25          Location:           Vial 71
Acq Operator:   6214              Inj. No.:           1
                                      Inj. Vol.:          35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.594	PBA	2407042.7	23.9930	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.612	BBA	714295.0	23.9799	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.618	BBA	305961.9	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD02.D

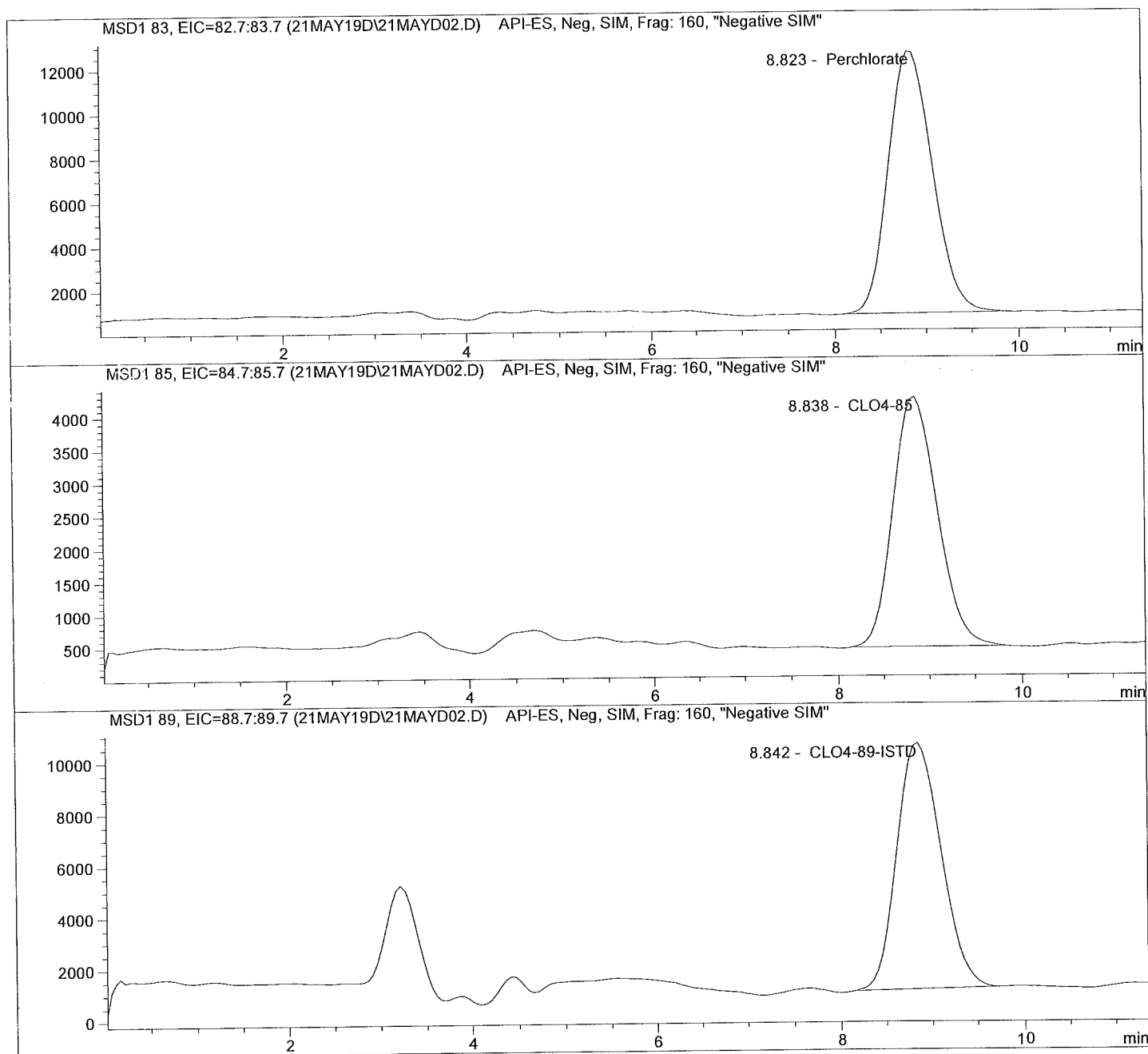
Sample Name: 653684 QC@4.0

Injection Date: 5/21/2019 08:02:56
Sample Name: 653684 QC@4.0
Acq Operator: 6214

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD02.D

Sample Name: 653684 QC@4.0

```
=====
Injection Date:  5/21/2019  08:02:56      Seq Line:           2
Sample Name:    653684    QC@4.0          Location:           Vial 72
Acq Operator:   6214              Inj. No.:           1
                                      Inj. Vol.:          35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:   4.000
=====
```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.823	PBA	396638.7	4.0827	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.838	BBA	127284.0	4.2613	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.842	PBA	319795.5	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD03.D

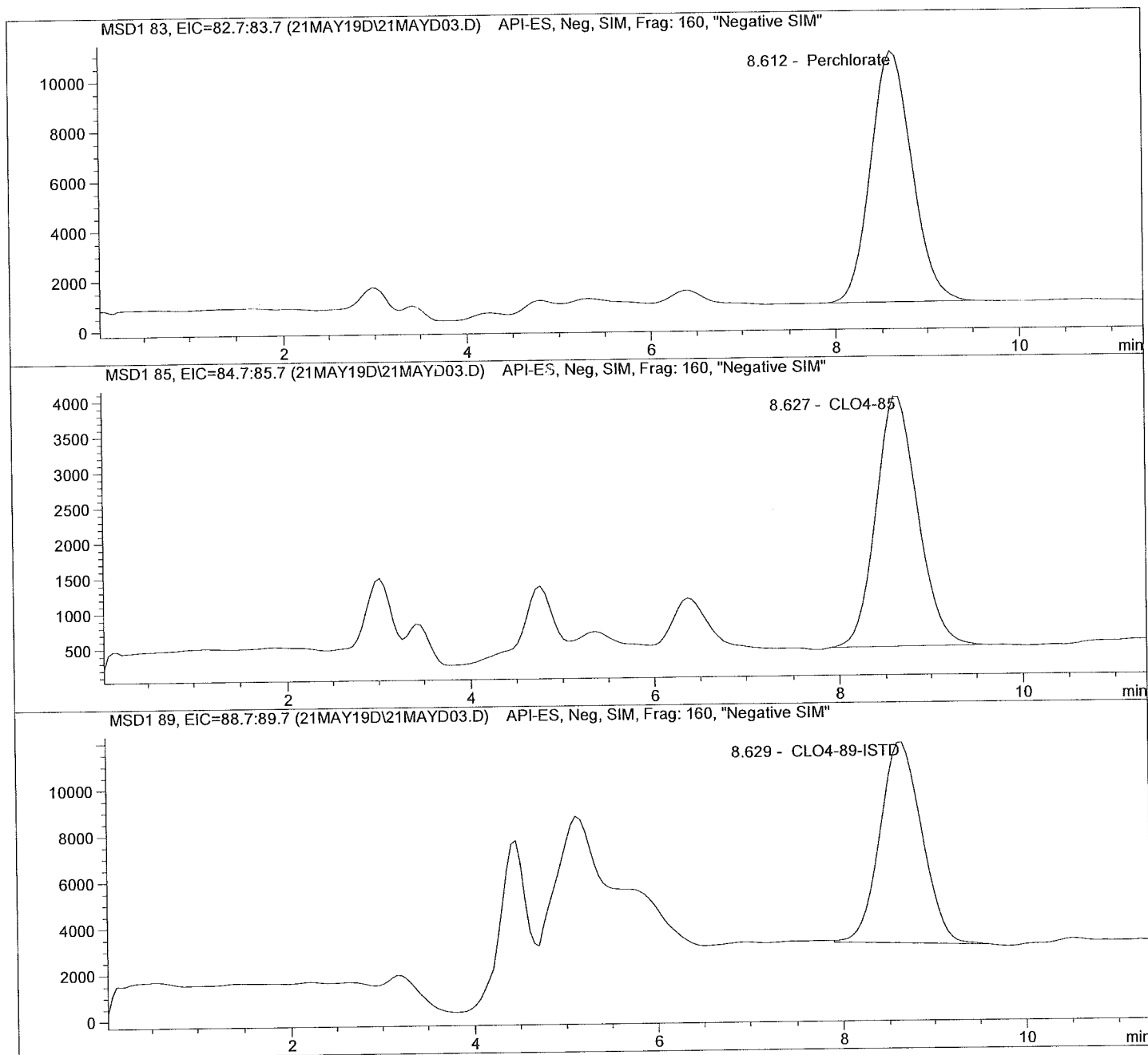
Sample Name: 653682 ICS@4.0

Injection Date: 5/21/2019 08:16:19
Sample Name: 653682 ICS@4.0
Acq Operator: 6214

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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD03.D Sample Name: 653682 ICS@4.0

=====

Injection Date:	5/21/2019 08:16:19	Seq Line:	3
Sample Name:	653682 ICS@4.0	Location:	Vial 73
Acq Operator:	6214	Inj. No.:	1
		Inj. Vol.:	35 µl

=====

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

=====

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

=====

LCMS Results

=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.612	PBA	314959.5	3.7442	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.627	PBA	112778.0	4.3408	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.629	BBA	278118.1	5.0000	CLO4-89-ISTD

=====

*** End of Report ***

=====

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD04.D

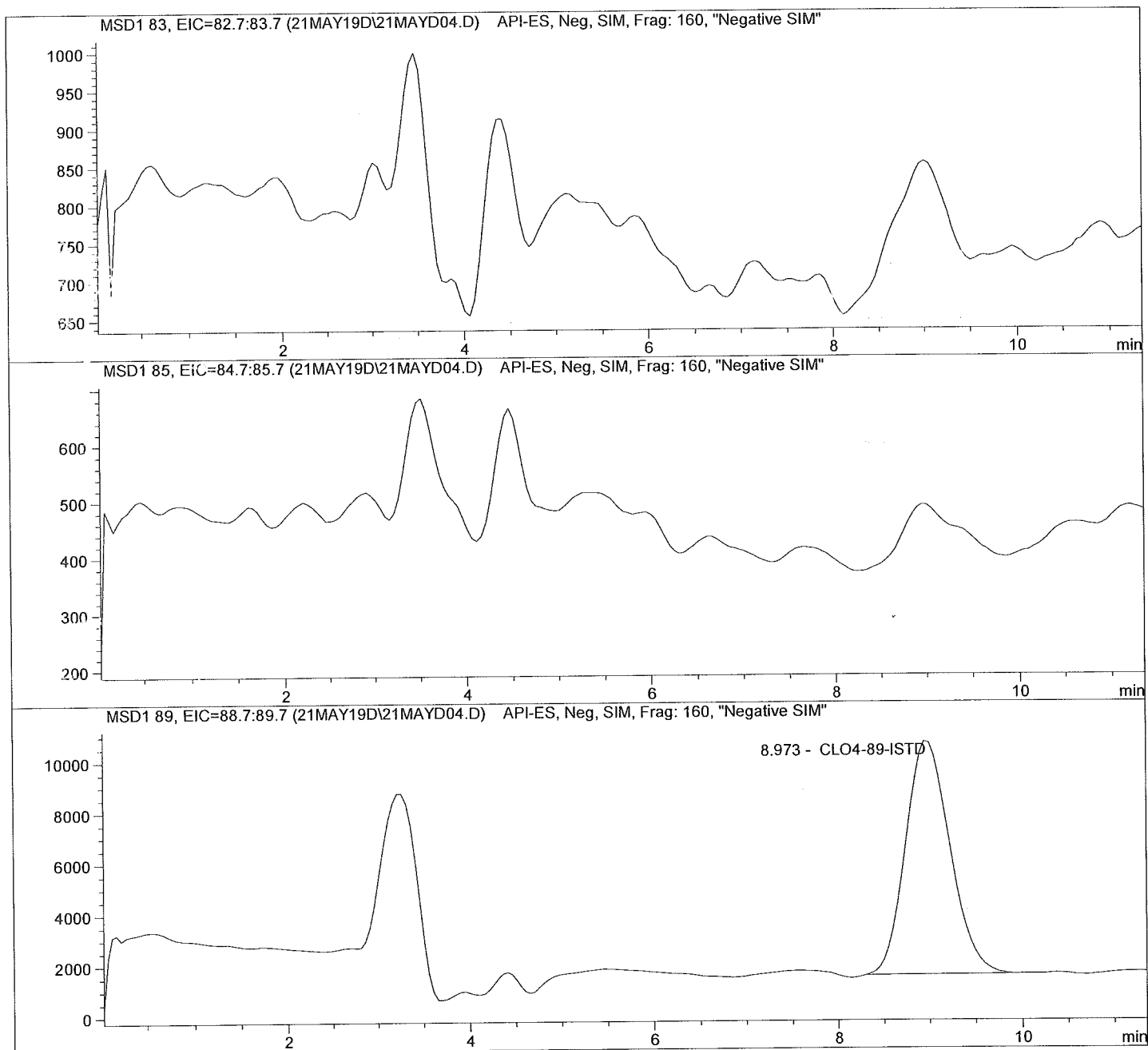
Sample Name: 653683 LMB

Injection Date: 5/21/2019 08:29:45
Sample Name: 653683 LMB
Acq Operator: 6214

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD04.D

Sample Name: 653683 LMB

```
=====
Injection Date:  5/21/2019  08:29:45      Seq Line:           4
Sample Name:     653683    LMB             Location:          Vial 74
Acq Operator:    6214                Inj. No.:           1
                                           Inj. Vol.:          35 µl
=====
```

```
Acq. Method:      CLO4-AQN.M
Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:      4/12/2019  07:54:13
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:          Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.973	PBA	307549.9	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD05.D

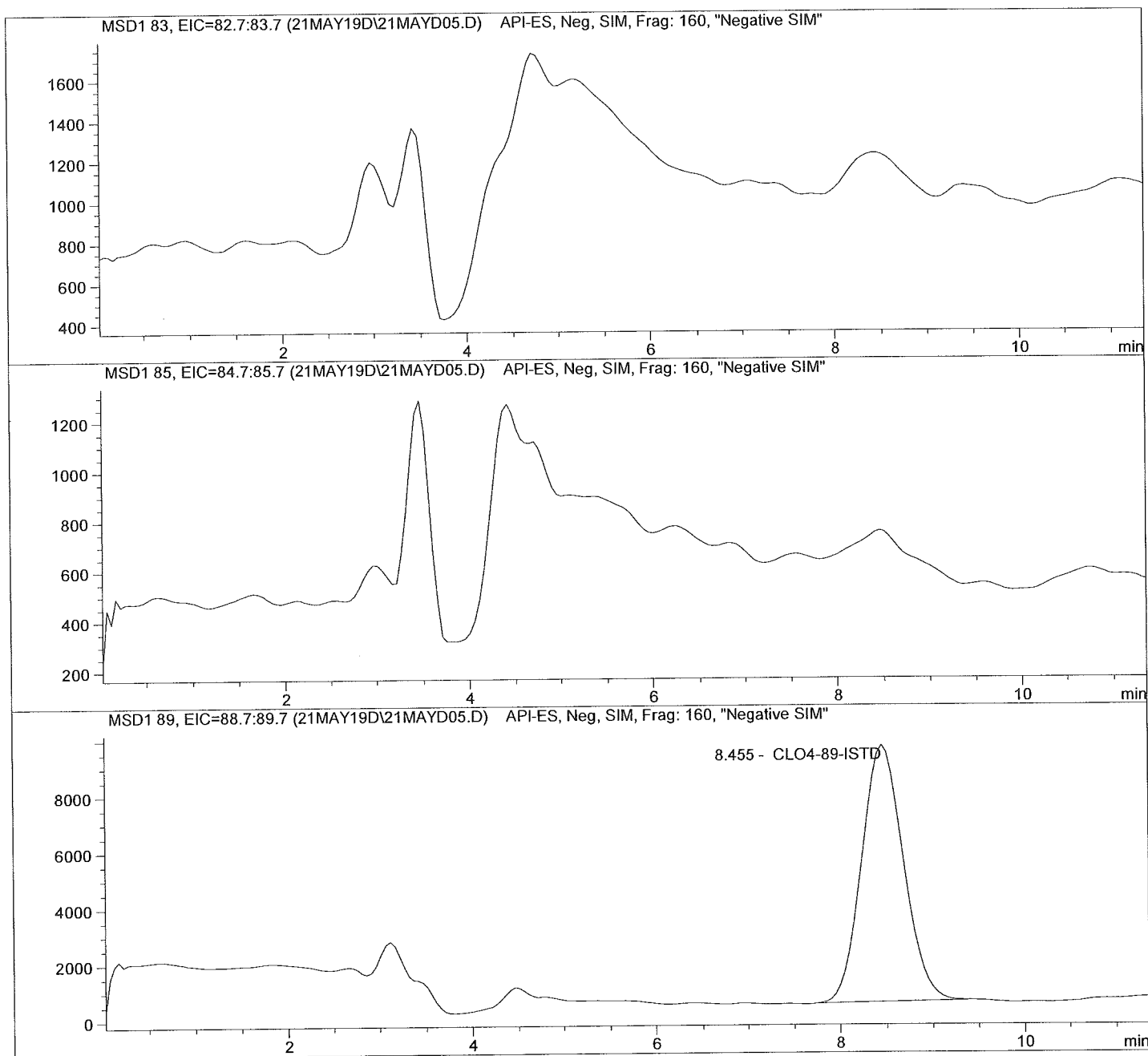
Sample Name: 1913332001

Injection Date: 5/21/2019 08:43:07
Sample Name: 1913332001
Acq Operator: 6214

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD05.D

Sample Name: 1913332001

```
=====
Injection Date:  5/21/2019  08:43:07      Seq Line:           5
Sample Name:    1913332001      Location:          Vial 75
Acq Operator:   6214           Inj. No.:           1
                               Inj. Vol.:          35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.455	PBA	284011.2	5.0000	CLO4-89-ISTD

=====
*** End of Report ***
=====

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD06.D

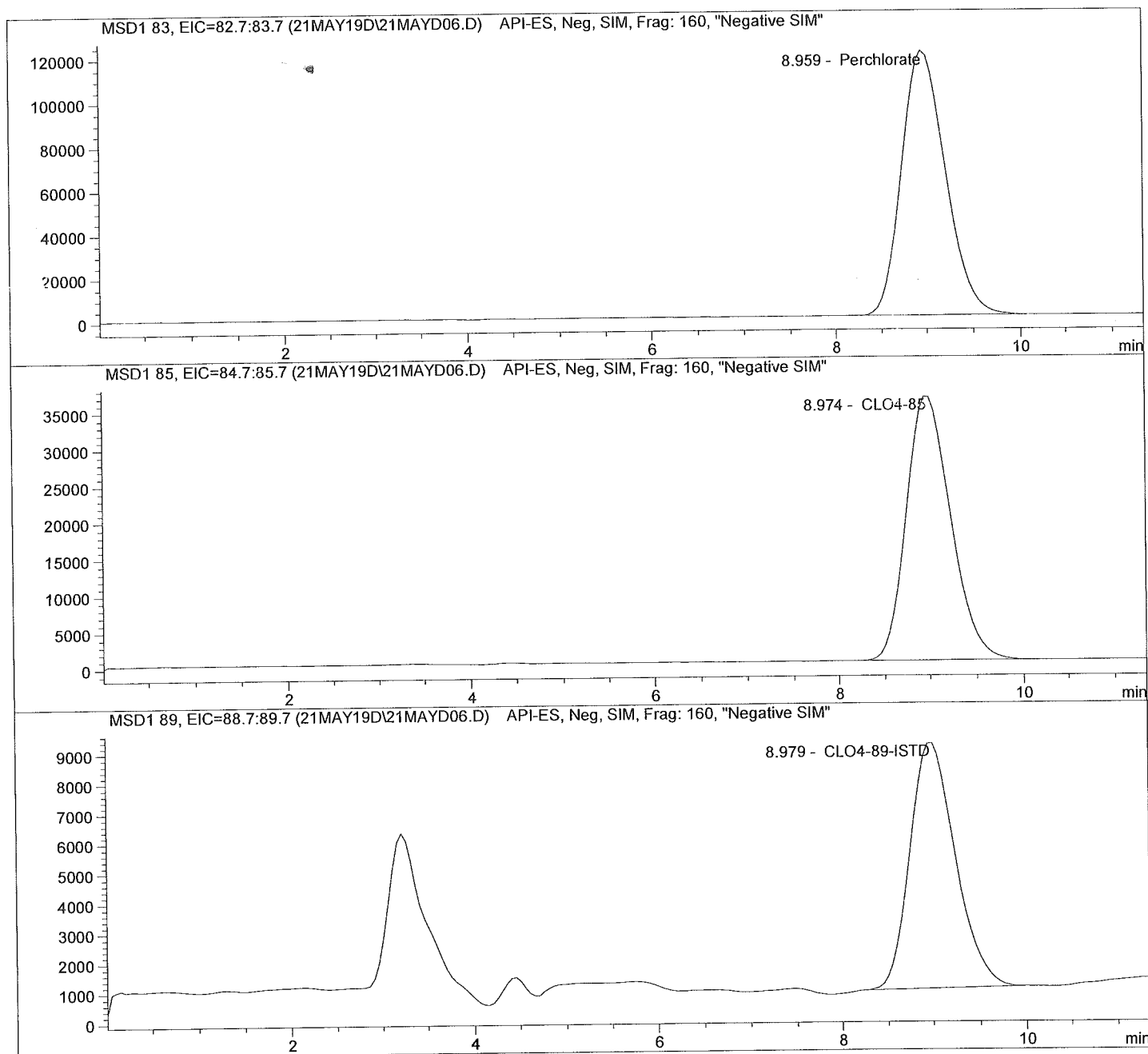
Sample Name: 1913338001 100

Injection Date: 5/21/2019 08:56:30
Sample Name: 1913338001 100
Acq Operator: 6214

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD06.D Sample Name: 1913338001 100

=====
Injection Date: 5/21/2019 08:56:30 Seq Line: 6
Sample Name: 1913338001 100 Location: Vial 76
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====
Sample Information
=====

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.959	PBA	3993682.8	4178.2424	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.974	PBA	1205073.2	4254.4161	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.979	BBA	280005.7	500.0000	CLO4-89-ISTD

=====
*** End of Report ***
=====

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD07.D

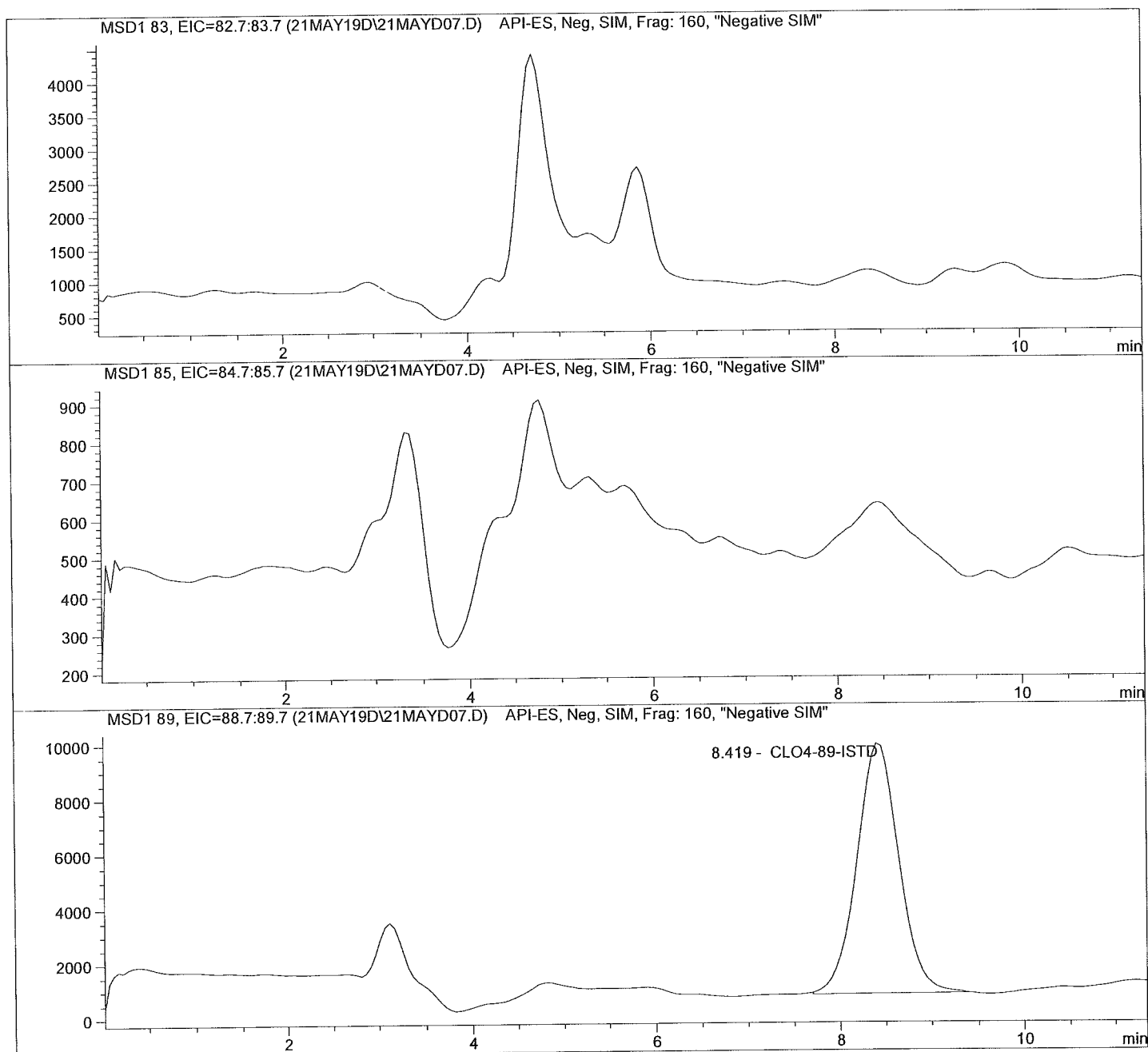
Sample Name: 1913342001

Injection Date: 5/21/2019 09:10:03
Sample Name: 1913342001
Acq Operator: 6214

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD07.D

Sample Name: 1913342001

```
=====
Injection Date:  5/21/2019  09:10:03      Seq Line:           7
Sample Name:    1913342001      Location:          Vial 77
Acq Operator:   6214           Inj. No.:           1
                                   Inj. Vol.:          35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.419	BBA	292233.0	5.0000	CLO4-89-ISTD

=====
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD08.D

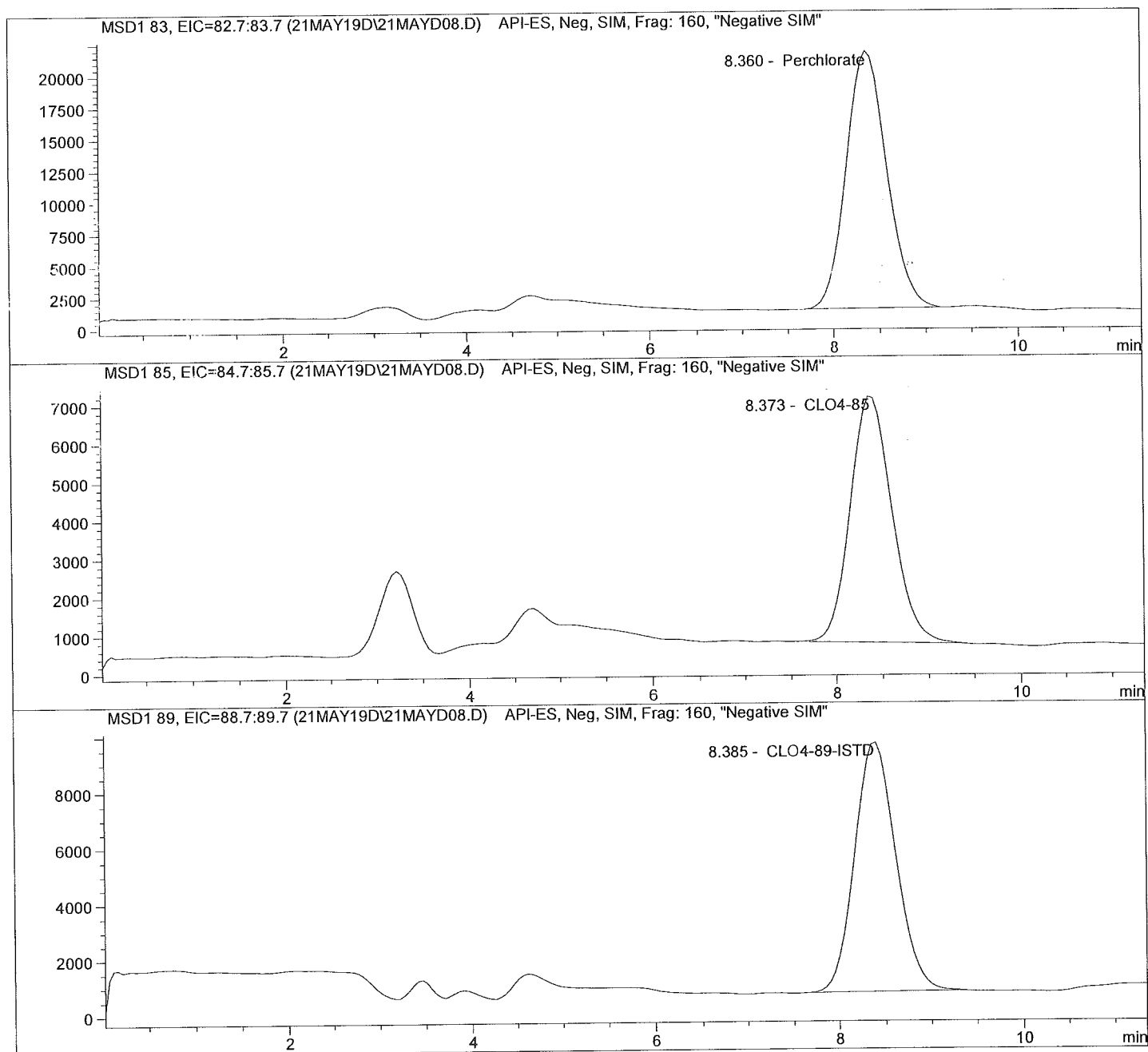
Sample Name: 1913342002

Injection Date: 5/21/2019 09:23:25
Sample Name: 1913342002
Acq Operator: 6214

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD08.D

Sample Name: 1913342002

```
=====
Injection Date:  5/21/2019  09:23:25      Seq Line:           8
Sample Name:    1913342002      Location:          Vial 78
Acq Operator:   6214           Inj. No.:           1
                                   Inj. Vol.:          35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.360	PBA	618077.5	7.2126	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.373	BBA	200267.3	7.7327	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.385	PBA	275333.5	5.0000	CLO4-89-ISTD

=====
*** End of Report ***
=====

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD09.D

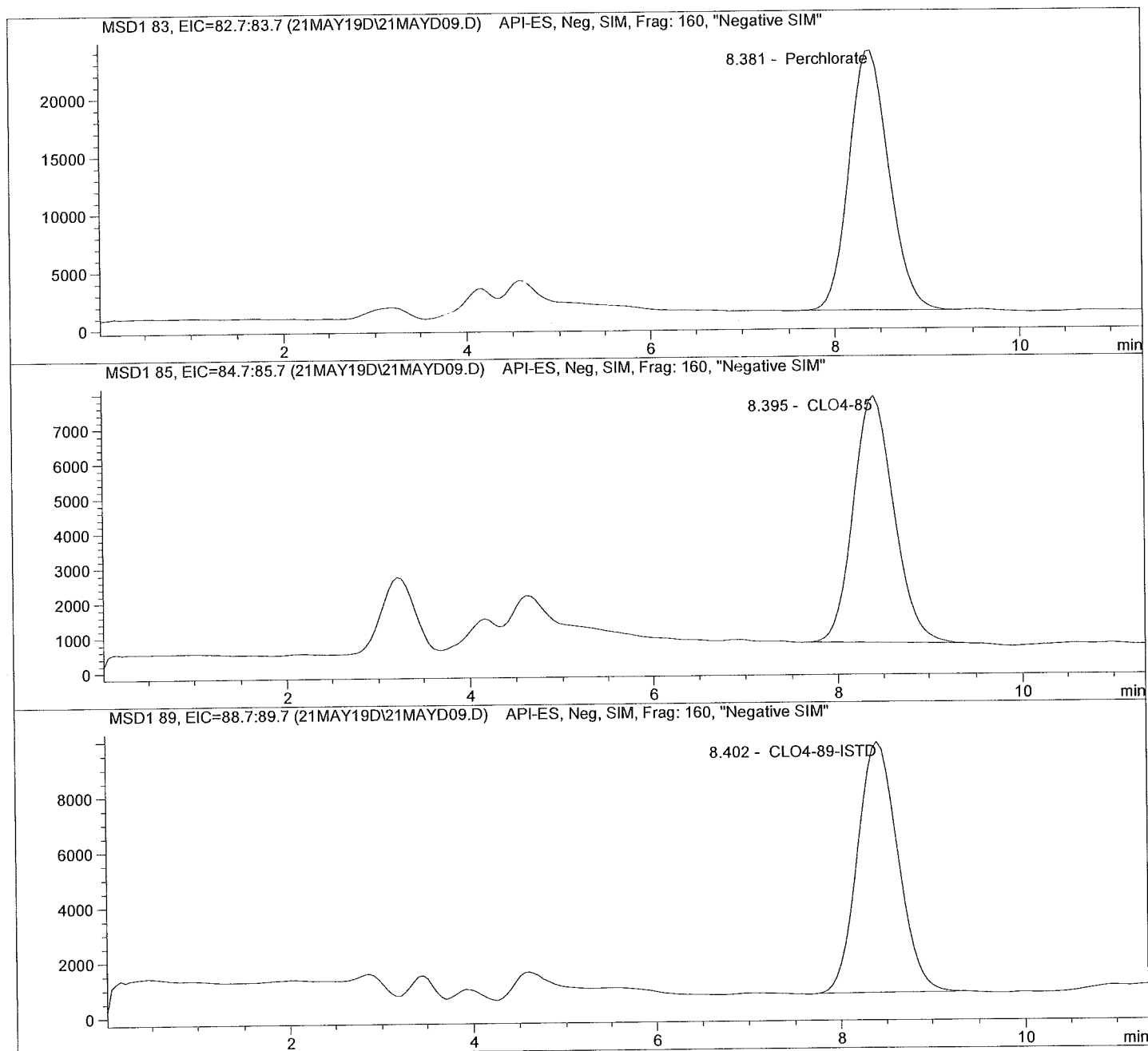
Sample Name: 1913342003

Injection Date: 5/21/2019 09:36:53
Sample Name: 1913342003
Acq Operator: 6214

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD09.D

Sample Name: 1913342003

```

=====
Injection Date:  5/21/2019  09:36:53      Seq Line:          9
Sample Name:    1913342003      Location:         Vial 79
Acq Operator:   6214            Inj. No.:         1
                                           Inj. Vol.:       35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.381	PBA	679913.4	7.7657	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.395	PBA	218019.8	8.2536	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.402	PBA	280514.3	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD10.D

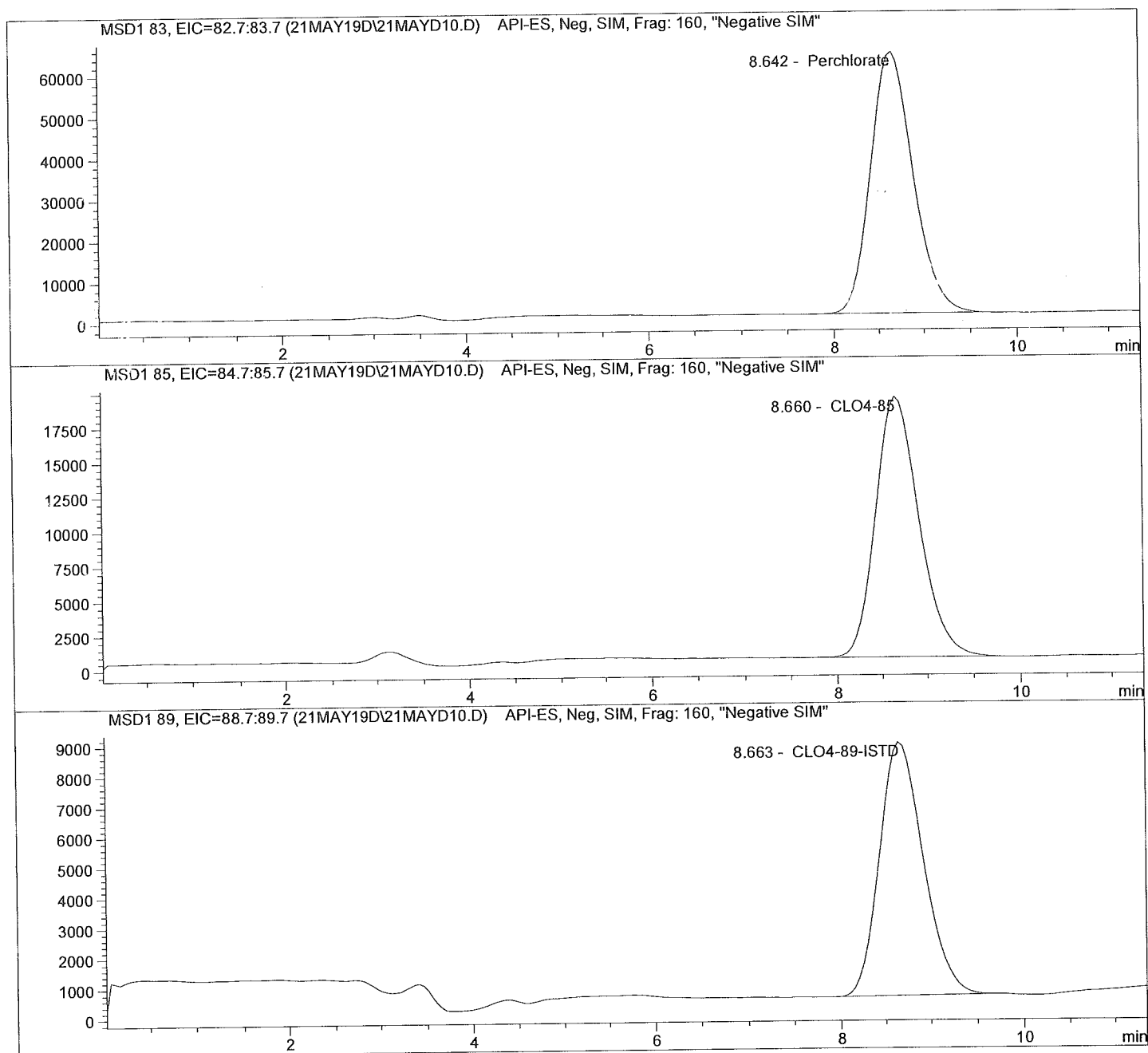
Sample Name: 1913342004 10X

Injection Date: 5/21/2019 09:50:15
Sample Name: 1913342004 10X
Acq Operator: 6214

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD10.D Sample Name: 1913342004 10X

=====
Injection Date: 5/21/2019 09:50:15 Seq Line: 10
Sample Name: 1913342004 10X Location: Vial 80
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====
Sample Information
=====

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.642	BBA	2092939.0	226.5679	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.660	BBA	629787.7	229.3720	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.663	PBA	282645.6	50.0000	CLO4-89-ISTD

=====
*** End of Report ***
=====

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD11.D

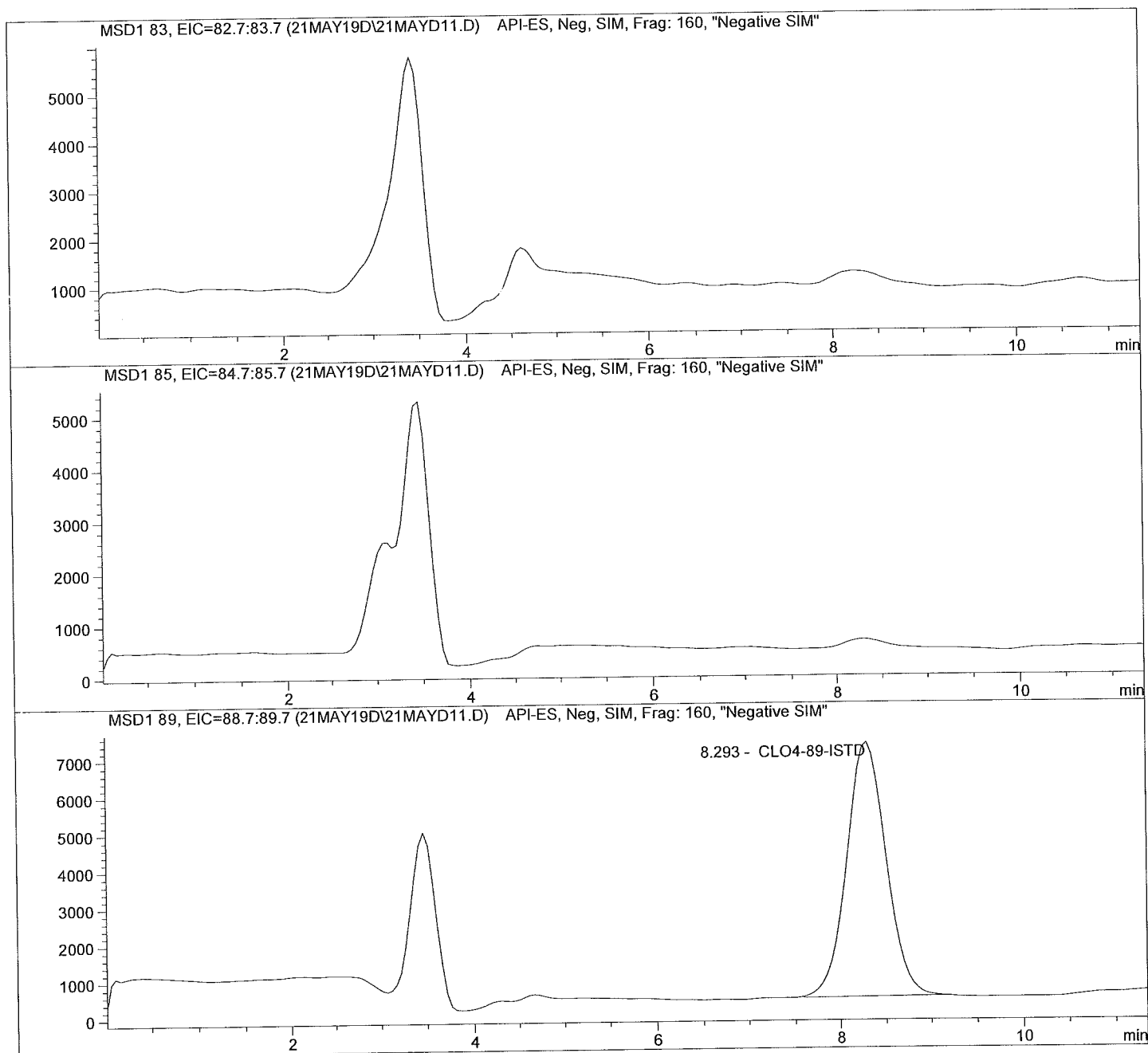
Sample Name: 1913342005

Injection Date: 5/21/2019 10:03:44
Sample Name: 1913342005
Acq Operator: 6214

Seq Line: 11
Location: Vial 81
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD11.D

Sample Name: 1913342005

```

=====
Injection Date:  5/21/2019  10:03:44      Seq Line:           11
Sample Name:    1913342005                Location:           Vial 81
Acq Operator:   6214                      Inj. No.:           1
                                           Inj. Vol.:          35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.293	BBA	206103.9	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD12.D

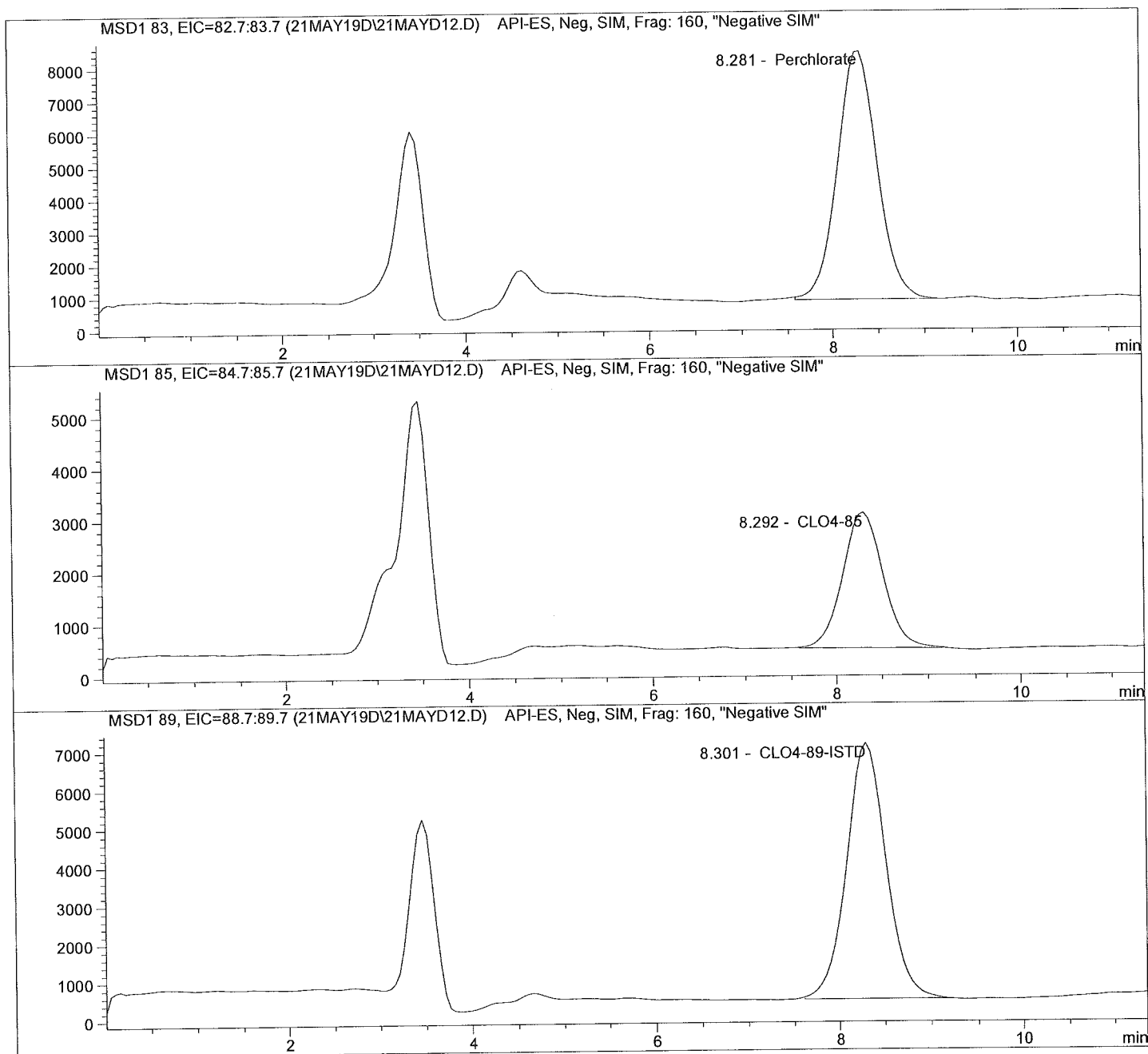
Sample Name: 1913342006 MS

Injection Date: 5/21/2019 10:17:04
Sample Name: 1913342006 MS
Acq Operator: 6214

Seq Line: 12
Location: Vial 82
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD12.D

Sample Name: 1913342006 MS

```

=====
Injection Date:  5/21/2019  10:17:04      Seq Line:           12
Sample Name:    1913342006   MS           Location:          Vial 82
Acq Operator:   6214         Inj. No.:            1
                                           Inj. Vol.:          35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.281	BBA	230072.2	3.7779	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.292	BBA	80507.0	4.2826	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.301	BBA	201254.7	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD13.D

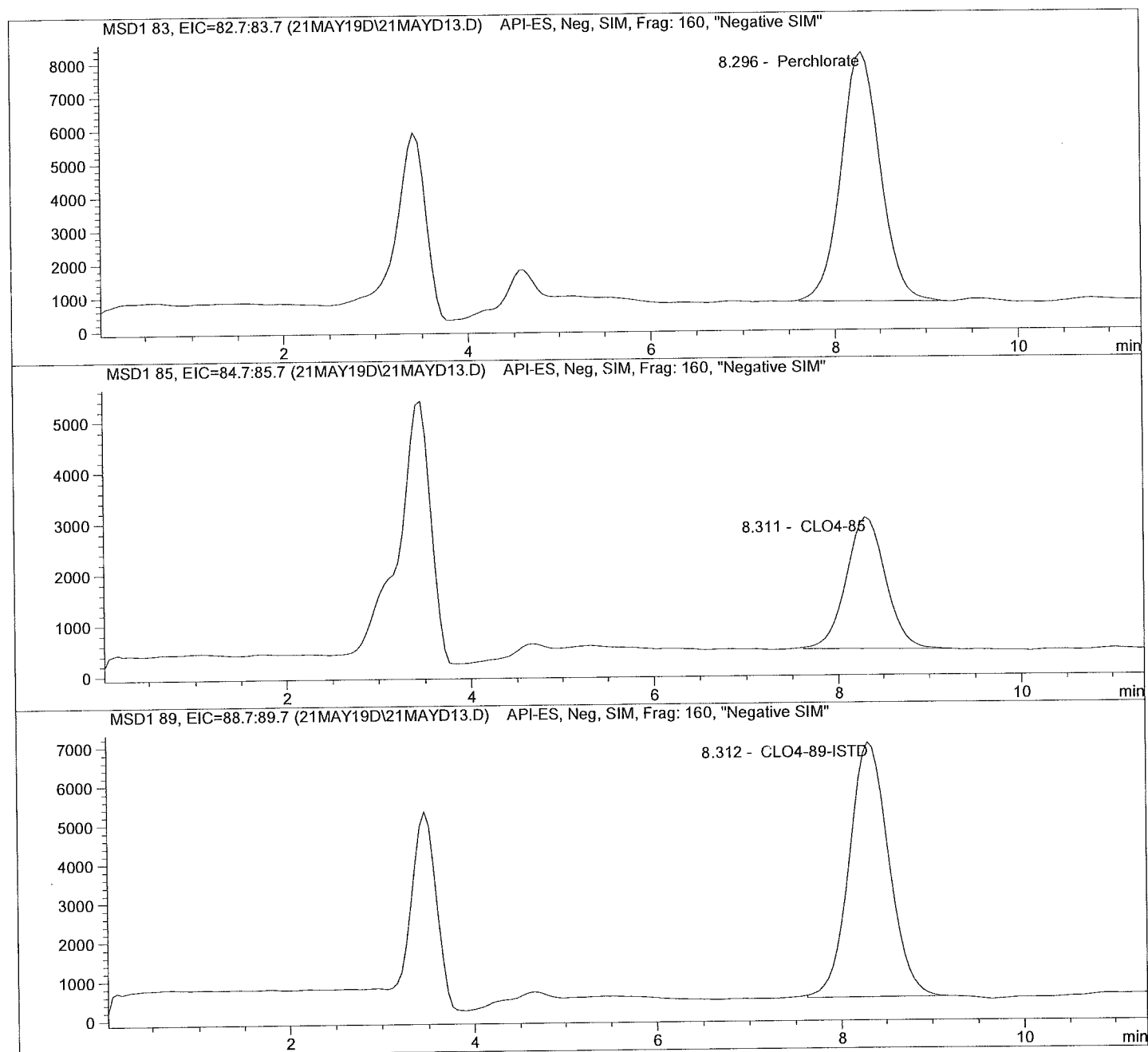
Sample Name: 1913342007 SD

Injection Date: 5/21/2019 10:30:27
Sample Name: 1913342007 SD
Acq Operator: 6214

Seq Line: 13
Location: Vial 83
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD13.D Sample Name: 1913342007 SD

Injection Date: 5/21/2019 10:30:27 Seq Line: 13
Sample Name: 1913342007 SD Location: Vial 83
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.296	BBA	223455.8	3.7214	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.311	BBA	78456.0	4.2299	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.312	BBA	198591.3	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD14.D

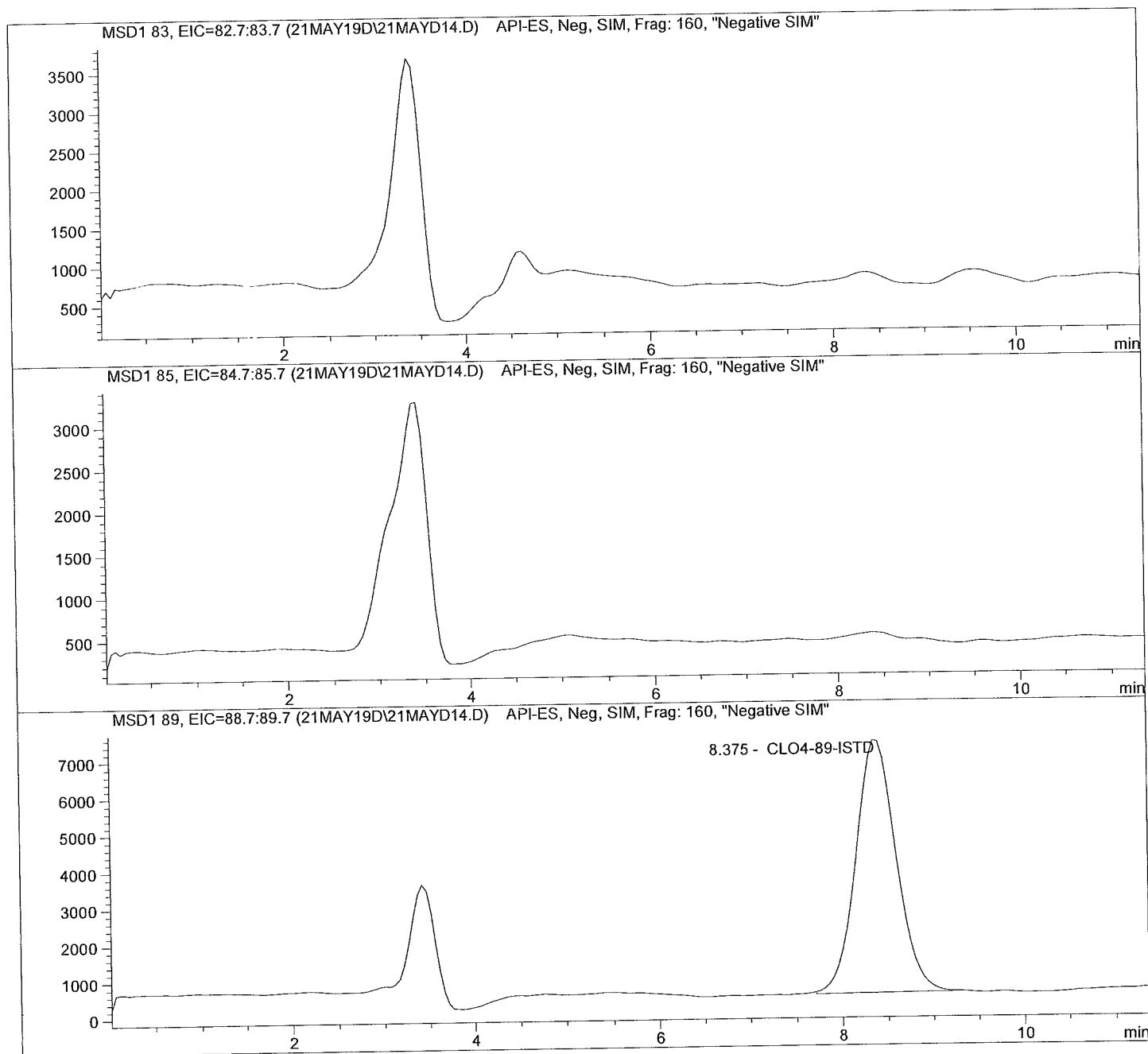
Sample Name: 1913342008

Injection Date: 5/21/2019 10:43:48
Sample Name: 1913342008
Acq Operator: 6214

Seq Line: 14
Location: Vial 84
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD14.D

Sample Name: 1913342008

```

=====
Injection Date:  5/21/2019  10:43:48      Seq Line:           14
Sample Name:    1913342008      Location:           Vial 84
Acq Operator:   6214           Inj. No.:            1
                                           Inj. Vol.:         35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.375	BBA	210825.1	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD15.D

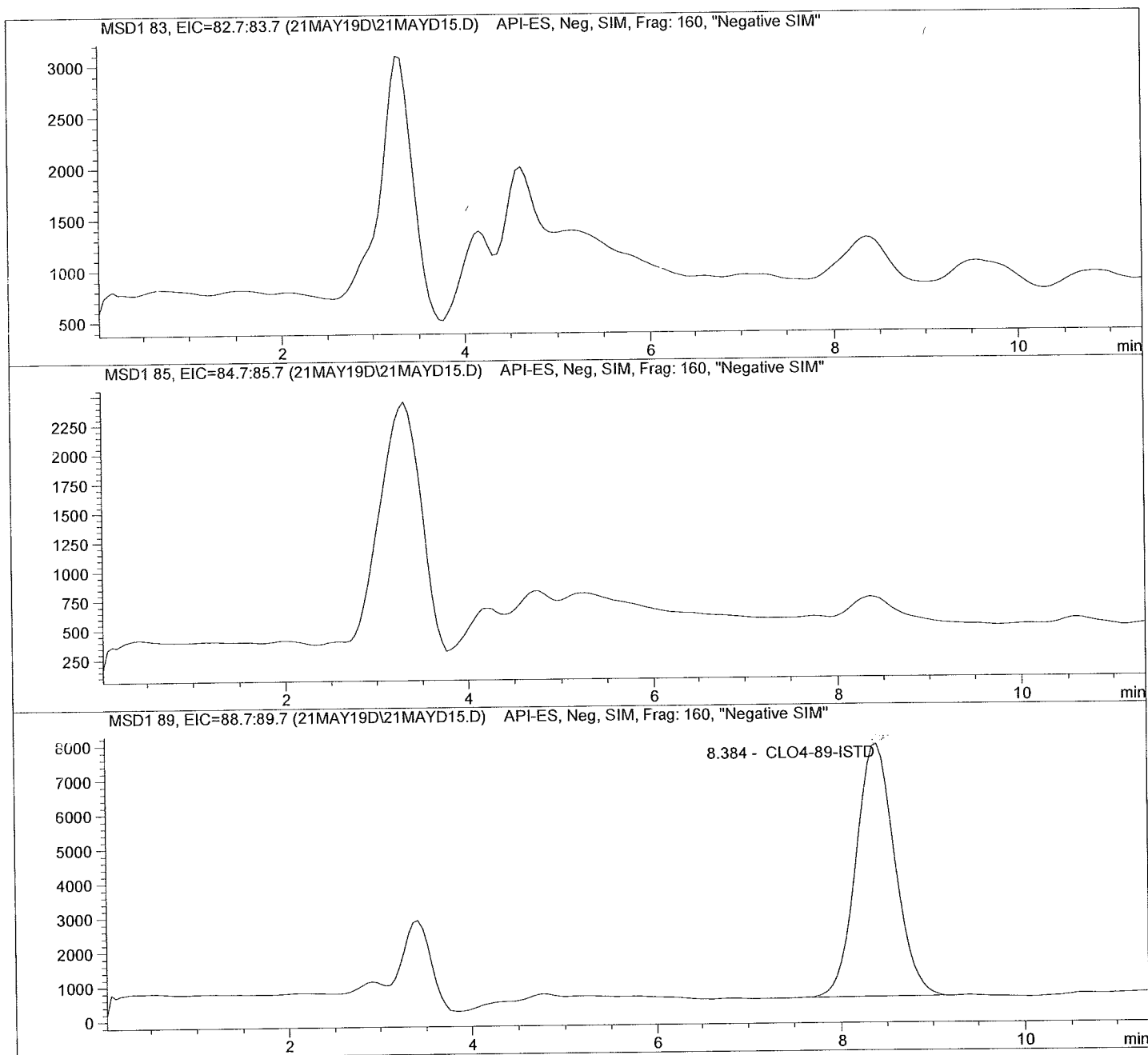
Sample Name: 1913342009

Injection Date: 5/21/2019 10:57:10
Sample Name: 1913342009
Acq Operator: 6214

Seq Line: 15
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD15.D

Sample Name: 1913342009

```

=====
Injection Date:  5/21/2019  10:57:10      Seq Line:          15
Sample Name:    1913342009      Location:         Vial 85
Acq Operator:   6214           Inj. No.:           1
                                           Inj. Vol.:        35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.384	BBA	218072.4	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD16.D

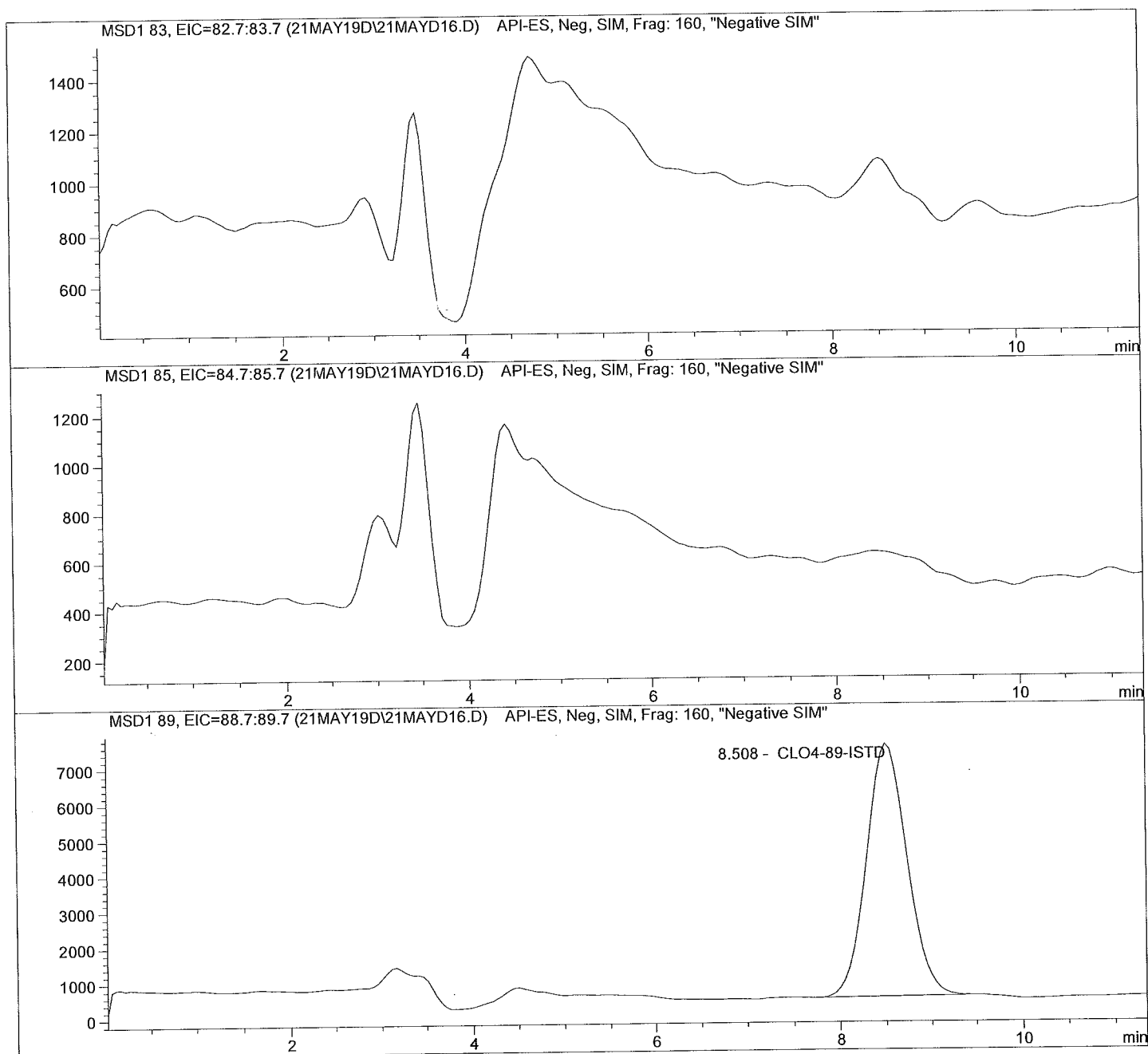
Sample Name: 1913345001

Injection Date: 5/21/2019 11:10:33
Sample Name: 1913345001
Acq Operator: 6214

Seq Line: 16
Location: Vial 86
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD16.D Sample Name: 1913345001

Injection Date: 5/21/2019 11:10:33 Seq Line: 16
Sample Name: 1913345001 Location: Vial 86
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.508	PBA	217961.0	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD17.D

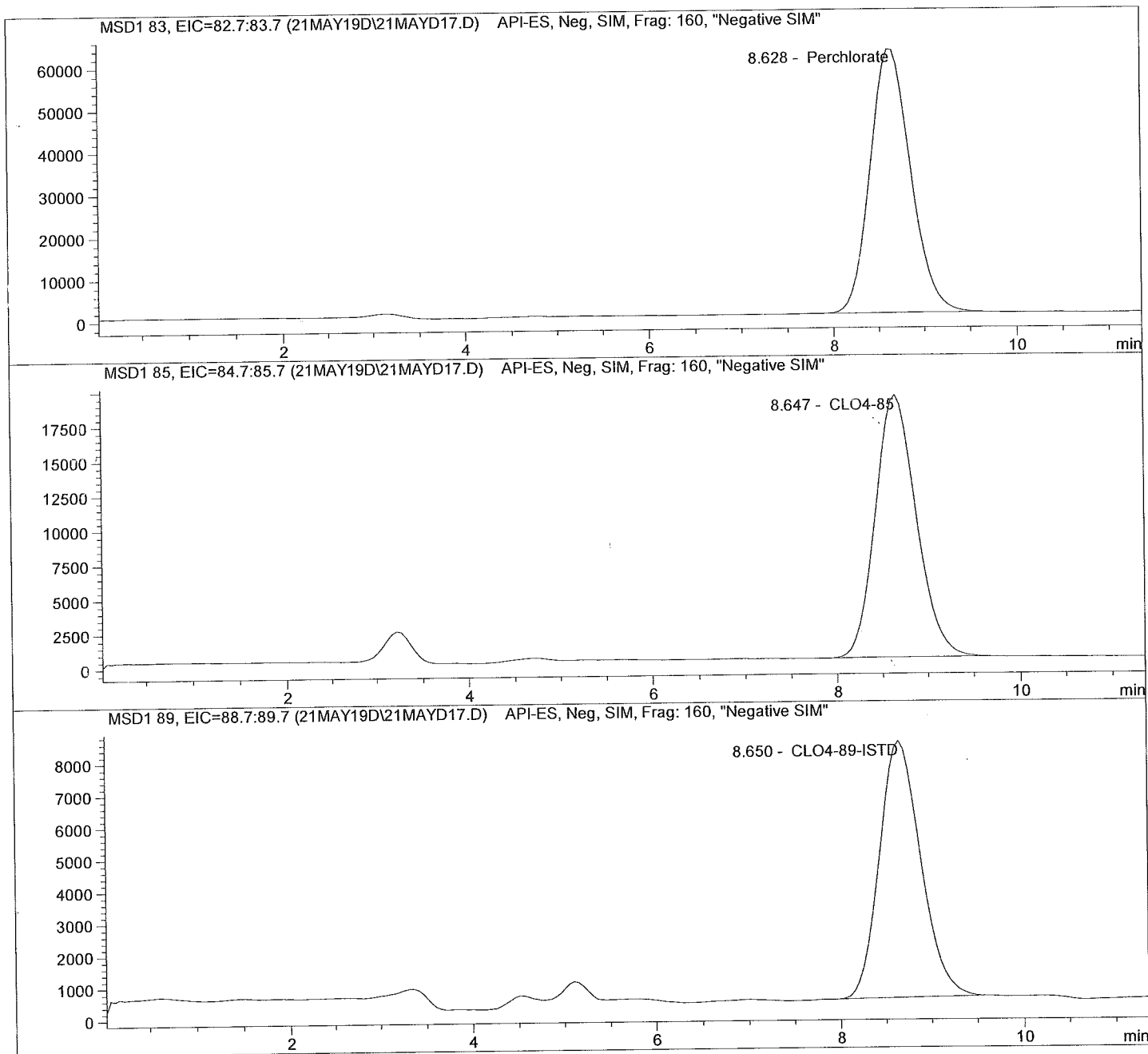
Sample Name: 653685 CCV@25

Injection Date: 5/21/2019 11:23:56
Sample Name: 653685 CCV@25
Acq Operator: 6214

Seq Line: 17
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD17.D

Sample Name: 653685 CCV@25

```
=====
Injection Date:  5/21/2019  11:23:56      Seq Line:          17
Sample Name:    653685    CCV@25          Location:          Vial 71
Acq Operator:   6214              Inj. No.:          1
                                      Inj. Vol.:         35 µl
=====
```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.628	PBA	1938377.4	23.3659	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.647	PBA	593941.4	24.0719	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.650	PBA	253387.5	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 : 3/19/2019 2:35:19 PM

Calculate : Internal Standard
Based on : Peak AreaRel. 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 missingCurve 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

#	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
8.744	1 1	1.00000	7.76074e4	1.28854e-5	1 Perchlorate
	2	2.00000	1.35273e5	1.47849e-5	
	3	5.00000	3.37764e5	1.48033e-5	
	4	10.00000	6.83454e5	1.46316e-5	
	5	25.00000	2.08433e6	1.19943e-5	
	6	50.00000	4.13334e6	1.20968e-5	
	7	75.00000	5.99313e6	1.25143e-5	
8.755	2 1	1.00000	2.36780e4	4.22333e-5	1 CLO4-85
	2	2.00000	4.69486e4	4.25998e-5	
	3	5.00000	1.06124e5	4.71147e-5	
	4	10.00000	2.13523e5	4.68335e-5	
	5	25.00000	6.14295e5	4.06971e-5	
	6	50.00000	1.19814e6	4.17315e-5	
	7	75.00000	1.78355e6	4.20509e-5	
8.766	3 1	5.00000	2.73208e5	1.83011e-5	+I1 CLO4-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5	
	3	5.00000	2.33196e5	2.14412e-5	
	4	5.00000	2.34454e5	2.13262e-5	
	5	5.00000	2.50568e5	1.99547e-5	
	6	5.00000	2.30977e5	2.16472e-5	

RetTime	Lvl	Amount	Area	Amt/Area	Ref Grp Name
[min]	Sig				

7		5.00000	2.21504e5	2.25729e-5	
---	--	---------	-----------	------------	--

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min
Curve Type : Quadratic
Origin : Ignored
Calibration Level Weights:/
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min
Curve Type : Quadratic
Origin : Ignored
Calibration Level Weights:/
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333

Compound: CLO4-89-ISTD

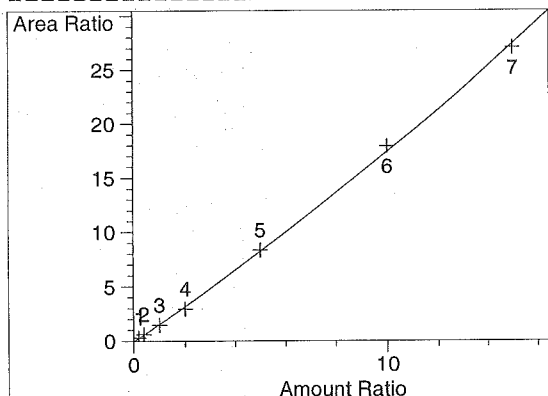
Time Window : From 6.659 min To 12.466 min
Curve Type : Linear
Origin : Included
Calibration Level Weights:/
Level 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

=====

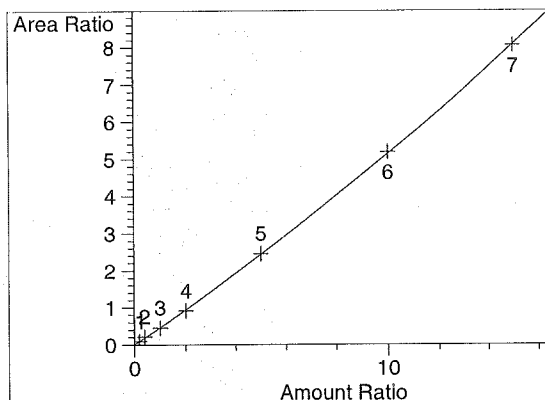
Peak Sum Table

=====

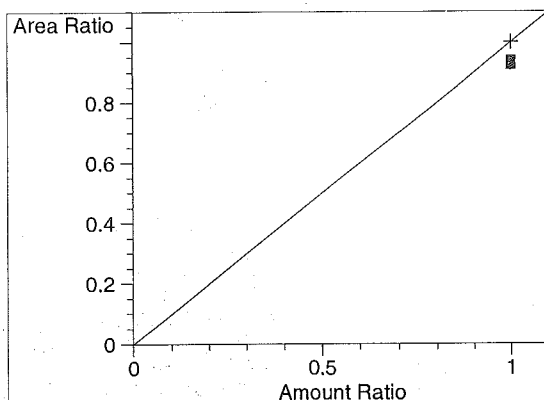
No Entries in table

=====
Calibration Curves
=====

Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation: 0.99957
Residual Std. Dev.: 0.30744
Formula: $y = ax^2 + bx + c$
a: 1.76988e-2
b: 1.56480
c: -4.92430e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755
MSD1 85, EIC=84.7:85.7
Correlation: 0.99983
Residual Std. Dev.: 0.03473
Formula: $y = ax^2 + bx + c$
a: 5.13396e-3
b: 4.62055e-1
c: 4.97209e-4
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766
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 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	7.76074e4	1.06245
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	2.06969
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	4.73474
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	9.27727
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	25.29036
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	51.36844
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	74.16754
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	9.25940

Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
##							
##	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	9.30535e-1
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	2.24255
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	4.86656
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	9.64312
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	25.12159
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	50.46721
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	74.72019
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	9.54024

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	2.73208e5	5.00000
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	5.00000
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	5.00000
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	5.00000
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	5.00000
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	5.00000
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	5.00000
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

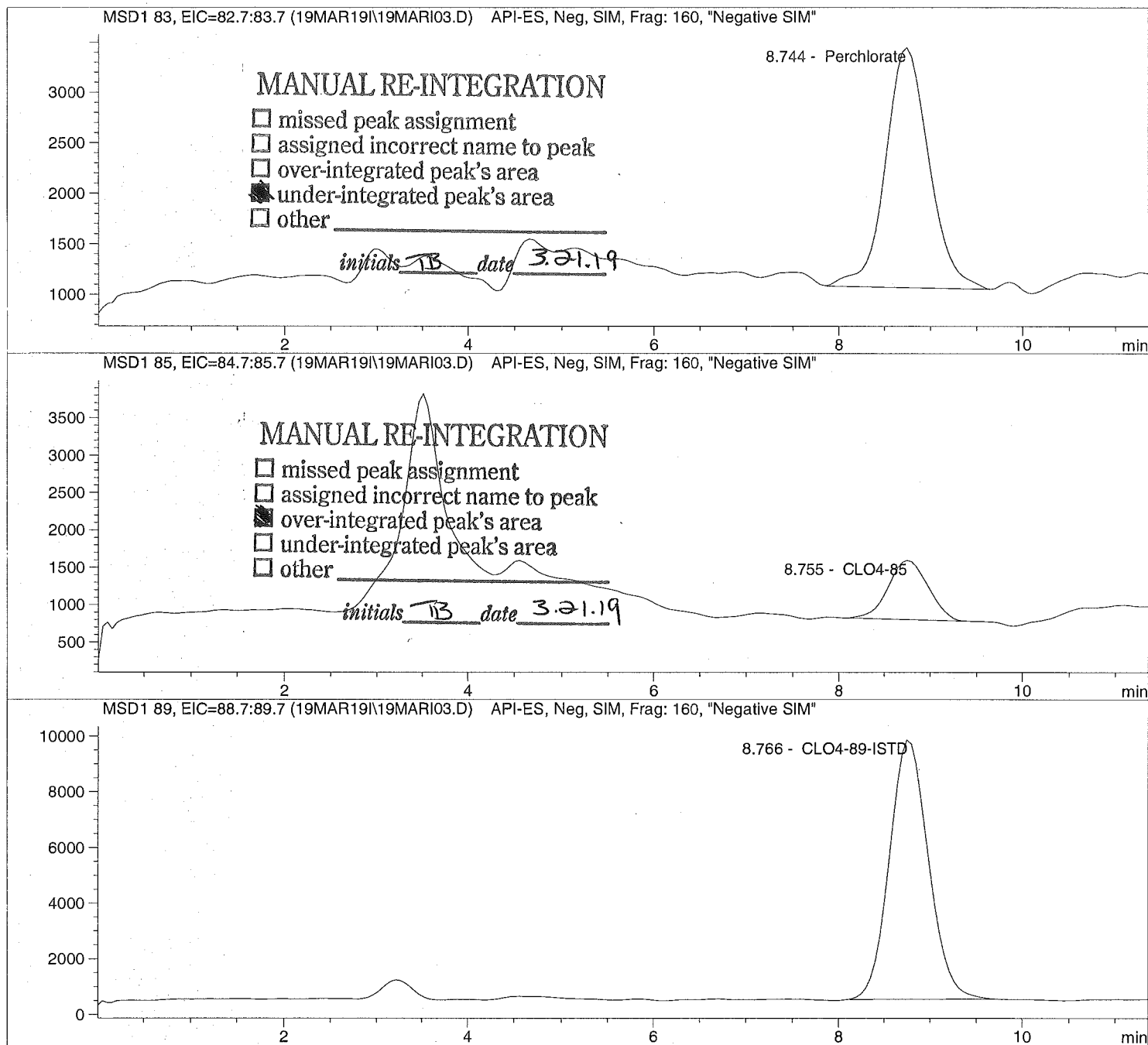
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	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 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI03.D Sample Name: CLO4@ 1.0ug/L

```
=====
Injection Date:  3/19/2019  09:39:40      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-DP2.M
Last Changed:    3/19/2019  14:35:22
```

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Tue, 19. Mar. 2019,02:35:19 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
8.744	MM	77607.4	1.0625	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	MM	23678.0	0.9305	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

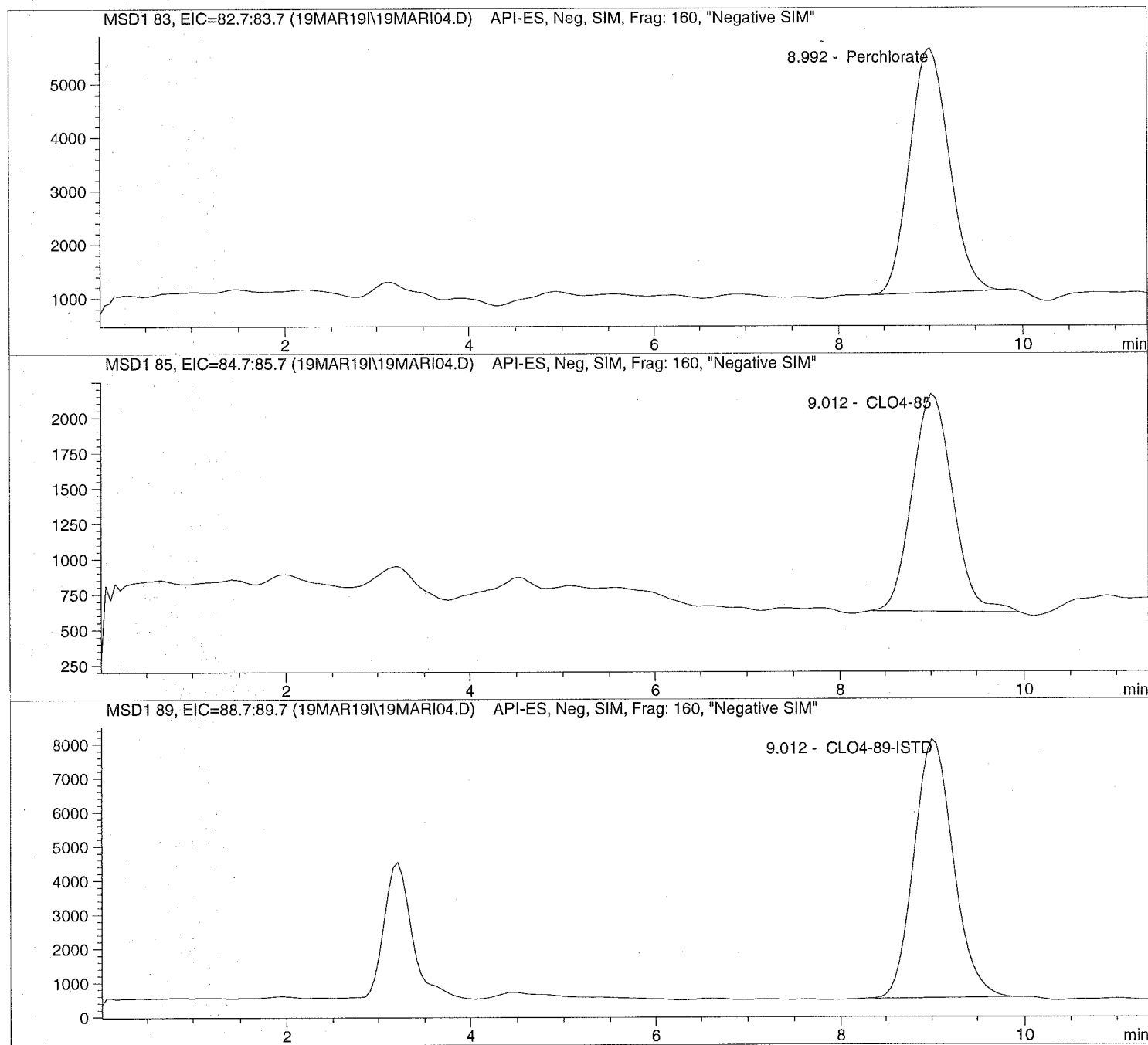
*** End of Report ***

Injection Date: 3/19/2019 09:53:00
Sample Name: CLO4@ 2.0ug/L
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D

Sample Name: CLO4@ 2.0ug/L

Injection Date: 3/19/2019 09:53:00
Sample Name: CLO4@ 2.0ug/L
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.992	BBA	135272.8	2.0697	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

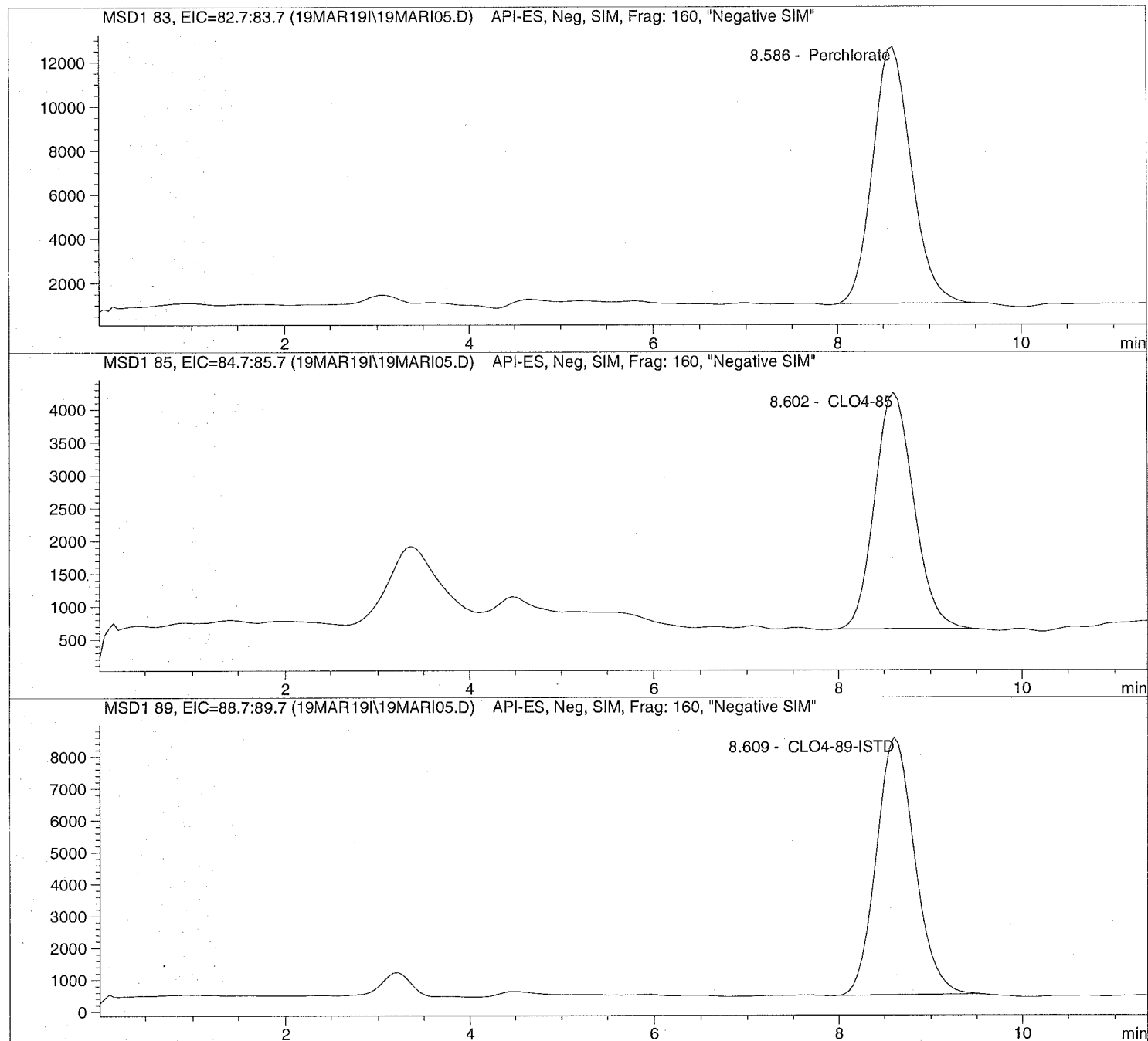
*** End of Report ***

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI05.D

Sample Name: CLO4@ 5.0ug/L

Injection Date: 3/19/2019 10:06:16

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

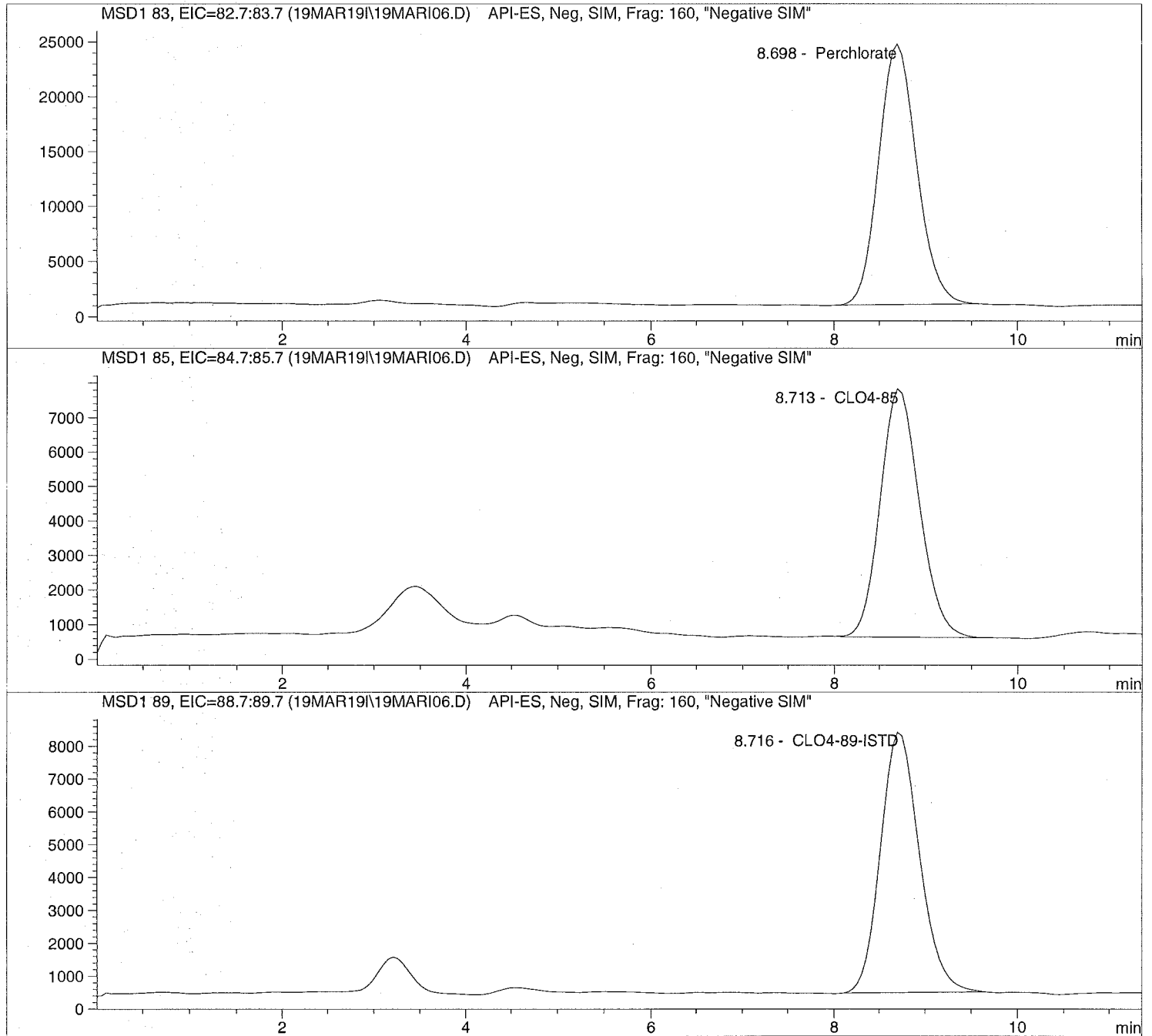
*** End of Report ***

Injection Date: 3/19/2019 10:19:32
Sample Name: CLO4@ 10.ug/L
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI06.D Sample Name: CLO4@ 10.ug/L

```
=====
Injection Date:  3/19/2019  10:19:32      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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.698	PBA	683454.4	9.2773	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

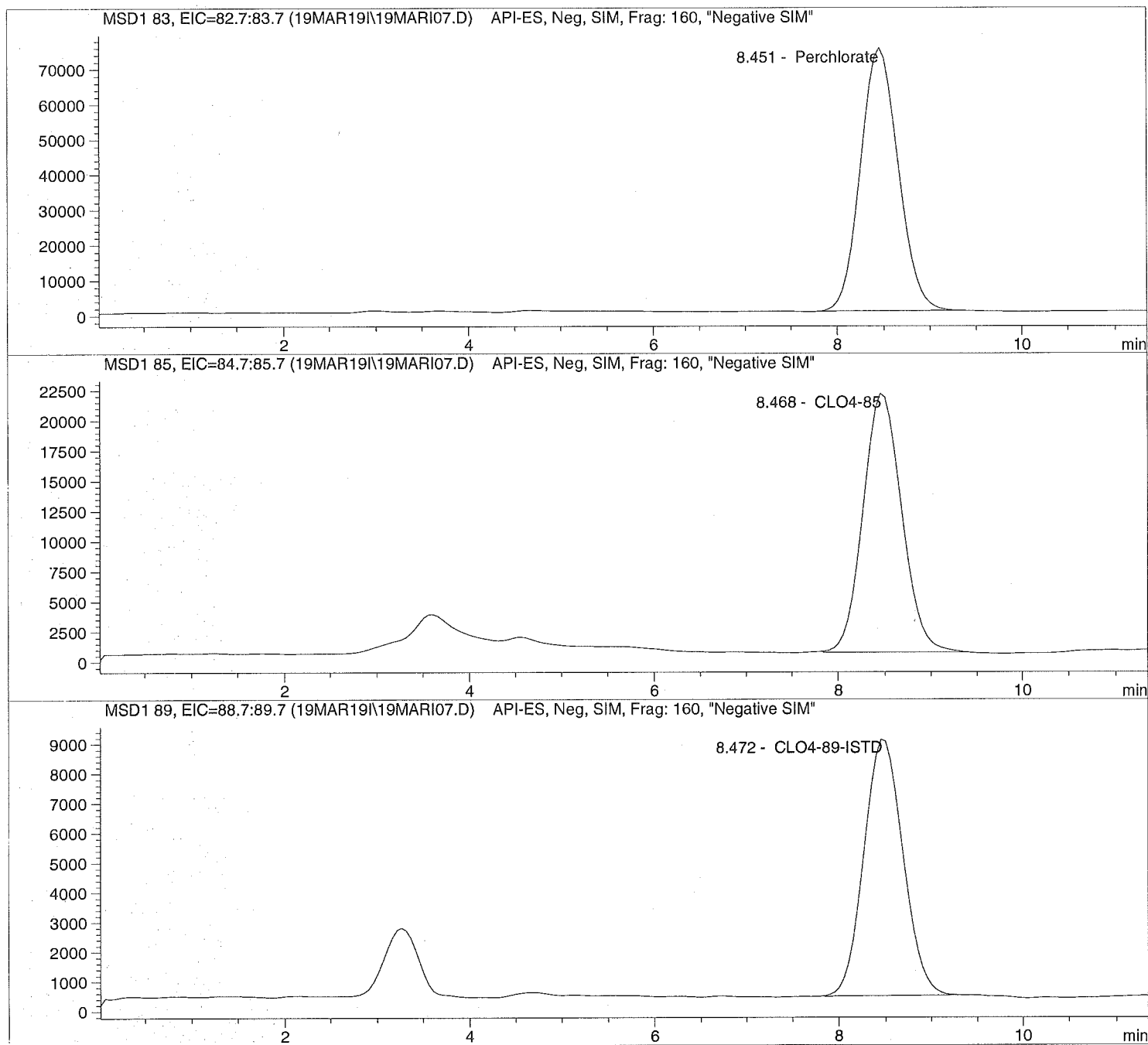
```
=====
*** End of Report ***
=====
```

Injection Date: 3/19/2019 10:32:49
Sample Name: CLO4@ 25.ug/L
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis




```
=====
Injection Date:   3/19/2019  10:32:49      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-DP2.M
Last Changed:      3/19/2019  14:35:22
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:          Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.451	PBA	2084327.4	25.2904	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.468	BBA	614294.8	25.1216	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D

Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05

Seq Line: 8

Sample Name: CLO4@ 50.ug/L

Location: Vial 78

Acq Operator: TNB

Inj. No.: 1

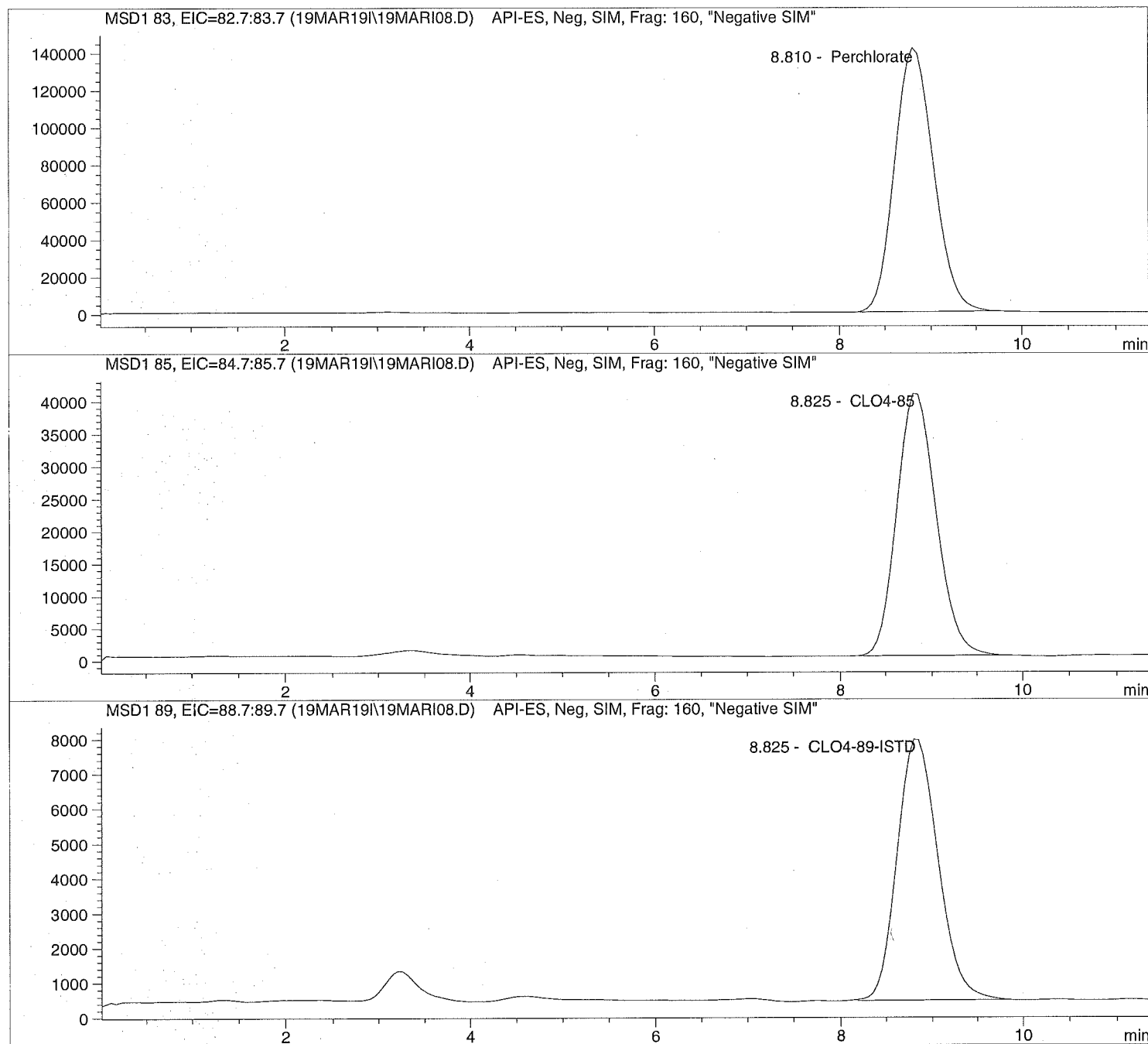
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D

Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.810	PBA	4133340.5	51.3684	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.4672	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

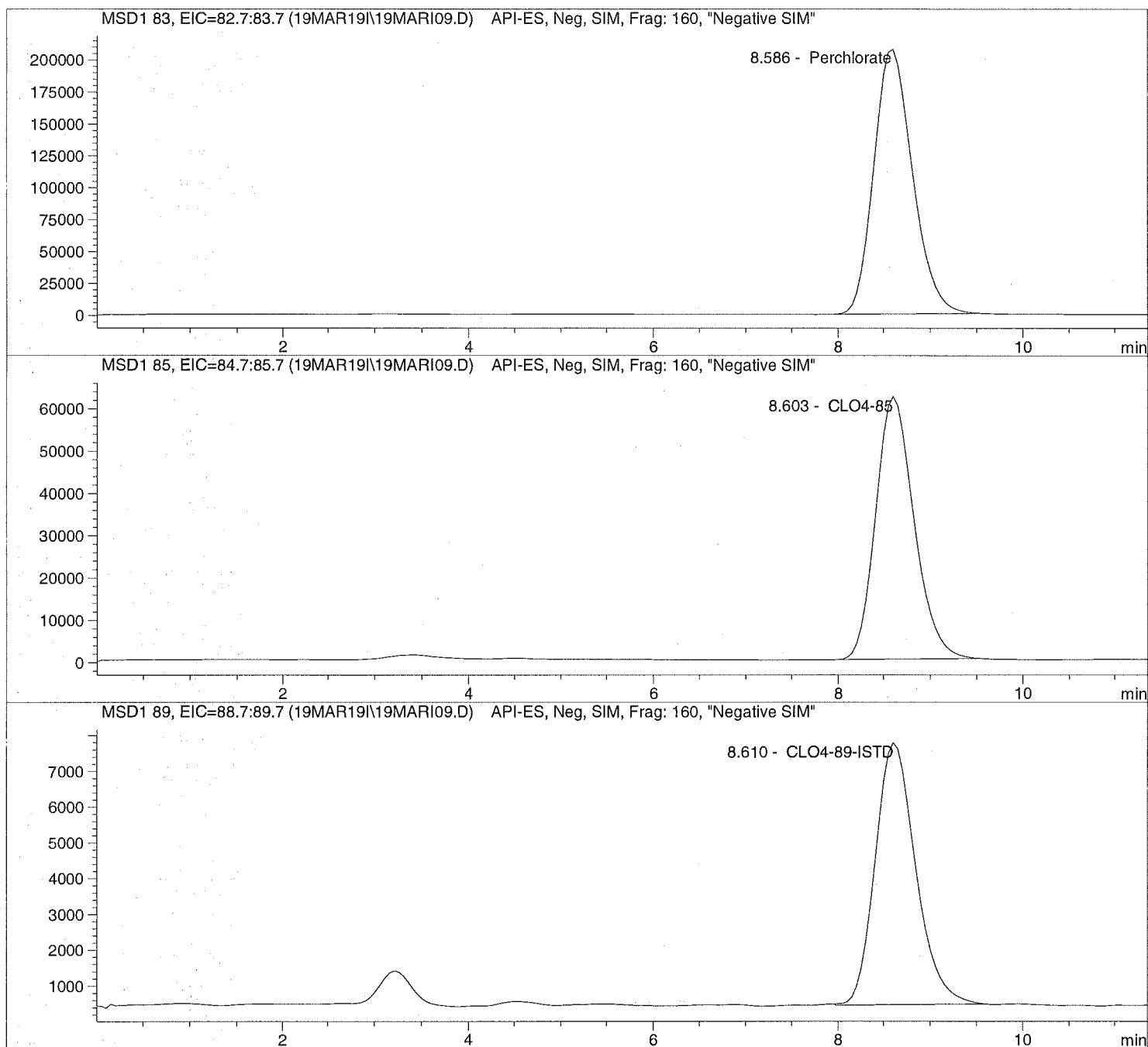
*** End of Report ***

Injection Date: 3/19/2019 10:59:22
Sample Name: CLO4@ 75.ug/L
Acq Operator: TNB

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI09.D

Sample Name: CLO4@ 75.ug/L

Injection Date: 3/19/2019 10:59:22

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

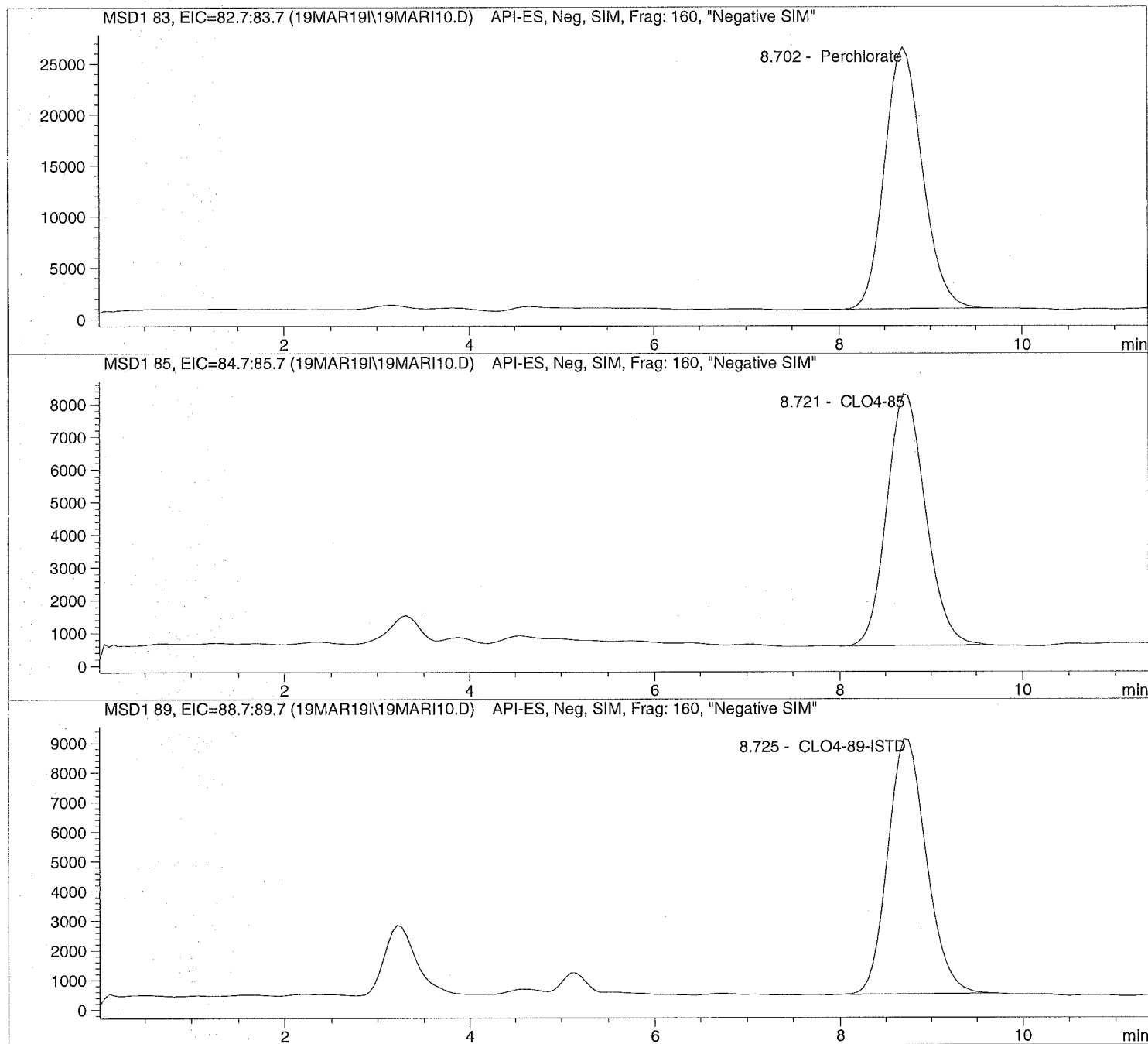
*** End of Report ***

Injection Date: 3/19/2019 11:12:42
Sample Name: ICAL Verf@10ug/L
Acq Operator: TNB

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D

Sample Name: ICAL Verf@10ug/L

Injection Date: 3/19/2019 11:12:42

Seq Line: 10

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal

Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	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\19MAR19\19MARI03.D

Sample Name: CLO4@ 1.0ug/L

Injection Date: 3/19/2019 09:39:40

Seq Line: 3

Sample Name: CLO4@ 1.0ug/L

Location: Vial 73

Acq Operator: TNB

Inj. No.: 1

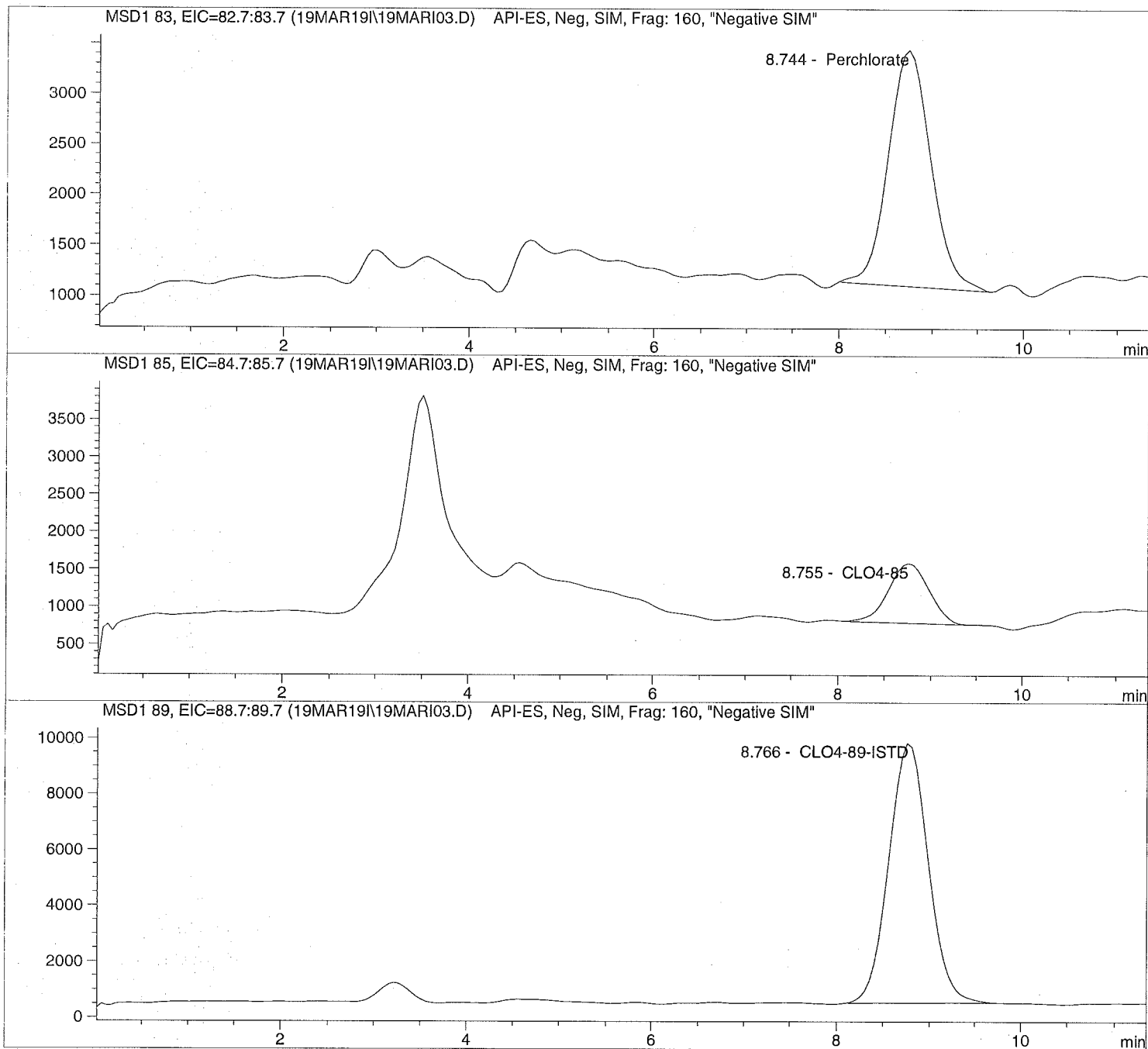
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:38:25

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI03.D

Sample Name: CLO4@ 1.0ug/L

Injection Date: 3/19/2019 09:39:40

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-DP2.M

Last Changed: 3/19/2019 14:38:25

Perchlorate analysis

Sample Information

Sorted By: Signal

Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.744	BBA	74166.3	1.0224	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	BBA	24138.1	0.9487	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

*** End of Report ***

ALS Houston, US

Date: 23-may-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
Work Order: HS19050398

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19050398-01	LH18/24-SP650_050719	Water		07-May-2019 14:00	08-May-2019 09:30	<input type="checkbox"/>
HS19050398-02	LH18/24-SP650_050719_BIX	Water		07-May-2019 14:00	08-May-2019 09:30	<input type="checkbox"/>
HS19050398-03	Trip Blank	Water		07-May-2019 00:00	08-May-2019 09:30	<input type="checkbox"/>

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
Work Order:

CASE NARRATIVE

Work Order Comments

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

GCMS Semivolatiles by Method SW8270SIM**Batch ID: 140715**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

GCMS Volatiles by Method SW8260**Batch ID: R338430**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

Metals by Method SW6020**Batch ID: 140779****Sample ID: HS19050692-02MS**

- MS and MSD are for an unrelated sample

Sample ID: HS19050692-02PDS

- PDS is for an unrelated sample

WetChemistry by Method SW7196**Batch ID: R338198**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
 Sample ID: LH18/24-SP650_050719
 Collection Date: 07-May-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19050398

Lab ID:HS19050398-01

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	14-May-2019 16:26
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	14-May-2019 16:26
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:26
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	14-May-2019 16:26
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	14-May-2019 16:26
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	14-May-2019 16:26
1,2-Dichloroethane	0.51	J	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	14-May-2019 16:26
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:26
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:26
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	14-May-2019 16:26
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	14-May-2019 16:26
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:26
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	14-May-2019 16:26
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	14-May-2019 16:26
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:26
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:26
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:26
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	14-May-2019 16:26
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	14-May-2019 16:26
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26

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

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
 Sample ID: LH18/24-SP650_050719
 Collection Date: 07-May-2019 14:00

ANALYTICAL REPORT
 WorkOrder: HS19050398
 Lab ID: HS19050398-01
 Matrix: Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C			Method: SW8260				Analyst: PC	
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
cis-1,2-Dichloroethene	1.9		0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	14-May-2019 16:26
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	14-May-2019 16:26
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	14-May-2019 16:26
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	14-May-2019 16:26
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:26
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
Trichloroethene	0.65	J	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:26
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:26
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>86.1</i>			0	<i>81-118</i>	%REC	<i>1</i>	<i>14-May-2019 16:26</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>100.0</i>			0	<i>85-114</i>	%REC	<i>1</i>	<i>14-May-2019 16:26</i>
<i>Surr: Dibromofluoromethane</i>	<i>87.5</i>			0	<i>80-119</i>	%REC	<i>1</i>	<i>14-May-2019 16:26</i>
<i>Surr: Toluene-d8</i>	<i>104</i>			0	<i>89-112</i>	%REC	<i>1</i>	<i>14-May-2019 16:26</i>
SEMIVOLATILES SIM			Method: SW8270SIM				Prep: SW3510 / 10-May-2019 Analyst: LG	
1,4-Dioxane	21		1.0	1.0	1.0	ug/L	100	14-May-2019 11:16
<i>Surr: 2-Fluorobiphenyl</i>	<i>136</i>			0	<i>40-140</i>	%REC	<i>100</i>	<i>14-May-2019 11:16</i>
<i>Surr: 4-Terphenyl-d14</i>	<i>112</i>			0	<i>40-140</i>	%REC	<i>100</i>	<i>14-May-2019 11:16</i>
<i>Surr: Nitrobenzene-d5</i>	<i>127</i>			0	<i>40-140</i>	%REC	<i>100</i>	<i>14-May-2019 11:16</i>
METALS BY ICPMS BY SW6020A			Method: SW6020				Prep: SW3010A / 13-May-2019 Analyst: JHD	
Barium	0.136		0.00190	0.00250	0.00500	mg/L	1	13-May-2019 23:53
Lead	0.00100	U	0.000600	0.00100	0.00500	mg/L	1	13-May-2019 23:53
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	13-May-2019 23:53
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	13-May-2019 23:53

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

ALS Houston, US

Date: 23-May-19

Client:	Bhate Environmental Associates, Inc.	ANALYTICAL REPORT
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples	WorkOrder:HS19050398
Sample ID:	LH18/24-SP650_050719	Lab ID:HS19050398-01
Collection Date:	07-May-2019 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
HEXAVALENT CHROMIUM BY SW7196A		Method:SW7196						Analyst: MZD
Chromium, Hexavalent	0.0100	U	0.00600	0.0100	0.0100	mg/L	1	08-May-2019 13:17

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

ALS Houston, US

Date: 23-May-19

Client:	Bhate Environmental Associates, Inc.	ANALYTICAL REPORT
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples	WorkOrder:HS19050398
Sample ID:	LH18/24-SP650_050719_BIX	Lab ID:HS19050398-02
Collection Date:	07-May-2019 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	23-May-2019 14:50

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

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
 Sample ID: Trip Blank
 Collection Date: 07-May-2019 00:00

ANALYTICAL REPORT

WorkOrder:HS19050398

Lab ID:HS19050398-03

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	14-May-2019 16:02
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	14-May-2019 16:02
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:02
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	14-May-2019 16:02
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	14-May-2019 16:02
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	14-May-2019 16:02
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	14-May-2019 16:02
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:02
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:02
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	14-May-2019 16:02
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	14-May-2019 16:02
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:02
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	14-May-2019 16:02
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	14-May-2019 16:02
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:02
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:02
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:02
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	14-May-2019 16:02
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	14-May-2019 16:02
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02

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

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
 Sample ID: Trip Blank
 Collection Date: 07-May-2019 00:00

ANALYTICAL REPORT

WorkOrder:HS19050398

Lab ID:HS19050398-03

Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		Method:SW8260						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	14-May-2019 16:02
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	14-May-2019 16:02
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	14-May-2019 16:02
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	14-May-2019 16:02
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	14-May-2019 16:02
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	14-May-2019 16:02
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	14-May-2019 16:02
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>88.9</i>			0	<i>81-118</i>	%REC	<i>1</i>	<i>14-May-2019 16:02</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>98.1</i>			0	<i>85-114</i>	%REC	<i>1</i>	<i>14-May-2019 16:02</i>
<i>Surr: Dibromofluoromethane</i>	<i>89.0</i>			0	<i>80-119</i>	%REC	<i>1</i>	<i>14-May-2019 16:02</i>
<i>Surr: Toluene-d8</i>	<i>105</i>			0	<i>89-112</i>	%REC	<i>1</i>	<i>14-May-2019 16:02</i>

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

WEIGHT LOG

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

Batch ID: 140715 **Method:** SEMIVOLATILES SIM **Prep:** 3510_B_SIM

SamplID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19050398-01	1	1000	1 (mL)	0.001

Batch ID: 140779 **Method:** METALS BY ICPMS BY SW6020A **Prep:** 3010A

SamplID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19050398-01	1	10	10 (mL)	1

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID 140715	Test Name : SEMIVOLATILES SIM		Matrix: Water			
HS19050398-01	LH18/24-SP650_050719	07 May 2019 14:00		10 May 2019 12:14	14 May 2019 11:16	100
Batch ID 140779	Test Name : METALS BY ICPMS BY SW6020A		Matrix: Water			
HS19050398-01	LH18/24-SP650_050719	07 May 2019 14:00		13 May 2019 12:00	13 May 2019 23:53	1
Batch ID R338198	Test Name : HEXAVALENT CHROMIUM BY SW7196A		Matrix: Water			
HS19050398-01	LH18/24-SP650_050719	07 May 2019 14:00			08 May 2019 13:17	1
Batch ID R338430	Test Name : VOLATILES ORGANICS BY METHOD 8260C		Matrix: Water			
HS19050398-01	LH18/24-SP650_050719	07 May 2019 14:00			14 May 2019 16:26	1
HS19050398-03	Trip Blank	07 May 2019 00:00			14 May 2019 16:02	1
Batch ID R339032	Test Name : SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Matrix: Water			
HS19050398-02	LH18/24-SP650_050719_BIX	07 May 2019 14:00			23 May 2019 14:50	1

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: 140779 (0)		Instrument: ICPMS06		Method: ICP-MS METALS BY SW6020A					
MBLK	Sample ID: MBLK-140779	Units: mg/L		Analysis Date: 14-May-2019 15:15					
Client ID:	Run ID: ICPMS06_338370	SeqNo: 5074406		PrepDate: 13-May-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.00250	0.00400							U
Lead	0.00100	0.00200							U
Selenium	0.00250	0.00200							U
Silver	0.000500	0.00200							U

LCS	Sample ID: LCS-140779	Units: mg/L		Analysis Date: 13-May-2019 23:51					
Client ID:	Run ID: ICPMS06_338296	SeqNo: 5073389		PrepDate: 13-May-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.05371	0.00400	0.05	0	107	80 - 120			
Lead	0.05094	0.00200	0.05	0	102	80 - 120			
Selenium	0.05418	0.00200	0.05	0	108	80 - 120			
Silver	0.05124	0.00200	0.05	0	102	80 - 120			

MS	Sample ID: HS19050692-02MS	Units: mg/L		Analysis Date: 14-May-2019 15:20					
Client ID:	Run ID: ICPMS06_338370	SeqNo: 5074409		PrepDate: 13-May-2019		DF: 5			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.0506	0.0200	0.05	0.002878	95.4	80 - 120			
Lead	2.378	0.0100	0.05	2.208	340	80 - 120			SO
Selenium	2.219	0.0100	0.05	2.123	192	80 - 120			SO
Silver	0.05437	0.0100	0.05	-0.000021	109	80 - 120			

MSD	Sample ID: HS19050692-02MSD	Units: mg/L		Analysis Date: 14-May-2019 15:21					
Client ID:	Run ID: ICPMS06_338370	SeqNo: 5074410		PrepDate: 13-May-2019		DF: 5			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Barium	0.05205	0.0200	0.05	0.002878	98.3	80 - 120	0.04962	4.77	20
Lead	2.489	0.0100	0.05	2.208	562	80 - 120	2.328	6.7	20 SO
Selenium	2.198	0.0100	0.05	2.123	150	80 - 120	2.186	0.575	20 SO
Silver	0.05424	0.0100	0.05	-0.000021	109	80 - 120	0.04161	26.3	20 R

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: 140779 (0)		Instrument: ICPMS06		Method: ICP-MS METALS BY SW6020A						
PDS		Sample ID: HS19050692-02PDS		Units: mg/L		Analysis Date: 14-May-2019 15:23				
Client ID:		Run ID: ICPMS06_338370		SeqNo: 5074411		PrepDate: 13-May-2019		DF: 5		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.4787	0.0200	0.5	0	95.7	75 - 125				
Lead	3.063	0.0100	0.5	2.208	171	75 - 125				SO
Selenium	2.683	0.0100	0.5	2.123	112	75 - 125				O
Silver	0.5511	0.0100	0.5	0	110	75 - 125				

SD		Sample ID: HS19050692-02SD		Units: mg/L		Analysis Date: 14-May-2019 15:18				
Client ID:		Run ID: ICPMS06_338370		SeqNo: 5074408		PrepDate: 13-May-2019		DF: 25		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Barium	0.0625	0.100					0.002878	0	10	U
Lead	2.24	0.0500					2.208	1.46	10	
Selenium	2.145	0.0500					2.123	1.02	10	
Silver	0.0125	0.0500					-0.000021	0	10	U

The following samples were analyzed in this batch: HS19050398-01

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: 140715 (0)		Instrument: SV-5		Method: SEMIVOLATILES SIM					
MBLK	Sample ID: MBLK-140715	Units: ug/L		Analysis Date: 13-May-2019 16:06					
Client ID:	Run ID: SV-5_338421	SeqNo: 5074908		PrepDate: 10-May-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0.010	0.010							U
Surr: 2-Fluorobiphenyl	0.07833	0	0.08	0	97.9	40 - 140			
Surr: 4-Terphenyl-d14	0.05817	0	0.08	0	72.7	40 - 140			
Surr: Nitrobenzene-d5	0.08156	0	0.08	0	102	40 - 140			

LCS	Sample ID: LCS-140715	Units: ug/L		Analysis Date: 13-May-2019 16:27					
Client ID:	Run ID: SV-5_338421	SeqNo: 5074909		PrepDate: 10-May-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0.08934	0.010	0.08	0	112	40 - 140			
Surr: 2-Fluorobiphenyl	0.07161	0	0.08	0	89.5	40 - 140			
Surr: 4-Terphenyl-d14	0.06391	0	0.08	0	79.9	40 - 140			
Surr: Nitrobenzene-d5	0.07487	0	0.08	0	93.6	40 - 140			

LCSD	Sample ID: LCSD-140715	Units: ug/L		Analysis Date: 13-May-2019 16:48					
Client ID:	Run ID: SV-5_338421	SeqNo: 5074910		PrepDate: 10-May-2019		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,4-Dioxane	0.08741	0.010	0.08	0	109	40 - 140	0.08934	2.18	20
Surr: 2-Fluorobiphenyl	0.07183	0	0.08	0	89.8	40 - 140	0.07161	0.308	20
Surr: 4-Terphenyl-d14	0.06602	0	0.08	0	82.5	40 - 140	0.06391	3.24	20
Surr: Nitrobenzene-d5	0.08096	0	0.08	0	101	40 - 140	0.07487	7.83	20

The following samples were analyzed in this batch: HS19050398-01

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: R338430 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MBLK	Sample ID: VBLKW-190514	Units: UG/L		Analysis Date: 14-May-2019 11:37					
Client ID:	Run ID: VOA6_338430	SeqNo: 5075195		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
1,1,1,2-Tetrachloroethane	0.50	1.0							U
1,1,1-Trichloroethane	0.50	1.0							U
1,1,2,2-Tetrachloroethane	0.50	1.0							U
1,1,2-Trichloroethane	0.50	1.0							U
1,1-Dichloroethane	0.50	1.0							U
1,1-Dichloroethene	0.50	1.0							U
1,1-Dichloropropene	0.50	1.0							U
1,2,3-Trichlorobenzene	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
Bromomethane	0.50	1.0							U

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: R338430 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MBLK	Sample ID: VBLKW-190514	Units: UG/L		Analysis Date: 14-May-2019 11:37					
Client ID:	Run ID: VOA6_338430	SeqNo: 5075195		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	1.0	2.0							U
Carbon tetrachloride	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	42.59	1.0	50	0	85.2	81 - 118			
Surr: 4-Bromofluorobenzene	48.97	1.0	50	0	97.9	85 - 114			
Surr: Dibromofluoromethane	43.89	1.0	50	0	87.8	80 - 119			
Surr: Toluene-d8	52.89	1.0	50	0	106	89 - 112			

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: R338430 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-190514		Units: UG/L		Analysis Date: 14-May-2019 10:49			
Client ID:		Run ID: VOA6_338430		SeqNo: 5075194		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	19.65	1.0	20	0	98.3	78 - 124			
1,1,1-Trichloroethane	19.21	1.0	20	0	96.0	74 - 131			
1,1,2,2-Tetrachloroethane	19.94	1.0	20	0	99.7	71 - 121			
1,1,2-Trichloroethane	19.79	1.0	20	0	98.9	80 - 119			
1,1-Dichloroethane	19.1	1.0	20	0	95.5	77 - 125			
1,1-Dichloroethene	19.64	1.0	20	0	98.2	71 - 131			
1,1-Dichloropropene	19.1	1.0	20	0	95.5	78 - 125			
1,2,3-Trichlorobenzene	22.8	1.0	20	0	114	69 - 129			
1,2,3-Trichloropropane	19.99	1.0	20	0	99.9	73 - 122			
1,2,4-Trichlorobenzene	20.95	1.0	20	0	105	69 - 130			
1,2,4-Trimethylbenzene	19.27	1.0	20	0	96.3	76 - 124			
1,2-Dibromo-3-chloropropane	20.82	1.0	20	0	104	62 - 128			
1,2-Dibromoethane	19.76	1.0	20	0	98.8	77 - 121			
1,2-Dichlorobenzene	19.39	1.0	20	0	96.9	80 - 119			
1,2-Dichloroethane	19.2	1.0	20	0	96.0	73 - 128			
1,2-Dichloropropane	20.1	1.0	20	0	100	78 - 122			
1,3,5-Trimethylbenzene	19.23	1.0	20	0	96.2	75 - 124			
1,3-Dichlorobenzene	19.33	1.0	20	0	96.7	80 - 119			
1,3-Dichloropropane	19.66	1.0	20	0	98.3	80 - 119			
1,4-Dichlorobenzene	19.64	1.0	20	0	98.2	79 - 118			
2,2-Dichloropropane	19.71	1.0	20	0	98.6	60 - 139			
2-Butanone	41.52	2.0	40	0	104	56 - 143			
2-Chlorotoluene	18.51	1.0	20	0	92.5	79 - 122			
2-Hexanone	40.58	2.0	40	0	101	57 - 139			
4-Chlorotoluene	18.69	1.0	20	0	93.4	78 - 122			
4-Isopropyltoluene	18.93	1.0	20	0	94.6	77 - 127			
4-Methyl-2-pentanone	39.72	2.0	40	0	99.3	67 - 130			
Acetone	44.55	2.0	40	0	111	39 - 160			
Benzene	19.69	1.0	20	0	98.4	79 - 120			
Bromobenzene	19.68	1.0	20	0	98.4	80 - 120			
Bromochloromethane	19.96	1.0	20	0	99.8	78 - 123			
Bromodichloromethane	20.01	1.0	20	0	100	79 - 125			
Bromoform	21	1.0	20	0	105	66 - 130			
Bromomethane	22.76	1.0	20	0	114	53 - 141			

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: R338430 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS		Sample ID: VLCSW-190514		Units: UG/L		Analysis Date: 14-May-2019 10:49			
Client ID:		Run ID: VOA6_338430		SeqNo: 5075194		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	39.51	2.0	40	0	98.8	64 - 133			
Carbon tetrachloride	18.82	1.0	20	0	94.1	72 - 136			
Chlorobenzene	19.91	1.0	20	0	99.5	82 - 118			
Chloroethane	18.27	1.0	20	0	91.3	60 - 138			
Chloroform	19.45	1.0	20	0	97.2	79 - 124			
Chloromethane	18.59	1.0	20	0	93.0	50 - 139			
cis-1,2-Dichloroethene	19.06	1.0	20	0	95.3	78 - 123			
cis-1,3-Dichloropropene	20.18	1.0	20	0	101	75 - 124			
Dibromochloromethane	19.83	1.0	20	0	99.2	74 - 126			
Dibromomethane	20.15	1.0	20	0	101	79 - 123			
Dichlorodifluoromethane	21.17	1.0	20	0	106	32 - 152			
Ethylbenzene	19.47	1.0	20	0	97.3	79 - 121			
Hexachlorobutadiene	20.77	1.0	20	0	104	66 - 134			
Isopropylbenzene	19.15	1.0	20	0	95.7	72 - 131			
m,p-Xylene	38.81	2.0	40	0	97.0	80 - 121			
Methylene chloride	20.12	2.0	20	0	101	74 - 124			
Naphthalene	20.78	1.0	20	0	104	61 - 128			
n-Butylbenzene	19.23	1.0	20	0	96.1	75 - 128			
n-Propylbenzene	18.85	1.0	20	0	94.2	76 - 126			
o-Xylene	19.46	1.0	20	0	97.3	78 - 122			
sec-Butylbenzene	18.62	1.0	20	0	93.1	77 - 126			
Styrene	20.18	1.0	20	0	101	78 - 123			
tert-Butylbenzene	18.7	1.0	20	0	93.5	78 - 124			
Tetrachloroethene	19.22	1.0	20	0	96.1	74 - 129			
Toluene	19.42	1.0	20	0	97.1	80 - 121			
trans-1,2-Dichloroethene	19.89	1.0	20	0	99.5	75 - 124			
trans-1,3-Dichloropropene	20.67	1.0	20	0	103	73 - 127			
Trichloroethene	19.92	1.0	20	0	99.6	79 - 123			
Trichlorofluoromethane	19.39	1.0	20	0	96.9	65 - 141			
Vinyl chloride	19.64	1.0	20	0	98.2	58 - 137			
Surr: 1,2-Dichloroethane-d4	49.83	1.0	50	0	99.7	81 - 118			
Surr: 4-Bromofluorobenzene	50.82	1.0	50	0	102	85 - 114			
Surr: Dibromofluoromethane	48.75	1.0	50	0	97.5	80 - 119			
Surr: Toluene-d8	48.69	1.0	50	0	97.4	89 - 112			

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: R338430 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS19050304-05MS		Units: UG/L		Analysis Date: 14-May-2019 14:26			
Client ID:		Run ID: VOA6_338430		SeqNo: 5075202		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	17.96	1.0	20	0	89.8	78 - 124			
1,1,1-Trichloroethane	17.27	1.0	20	0	86.4	74 - 131			
1,1,2,2-Tetrachloroethane	19.07	1.0	20	0	95.4	71 - 121			
1,1,2-Trichloroethane	18.35	1.0	20	0	91.8	80 - 119			
1,1-Dichloroethane	16.46	1.0	20	0	82.3	77 - 125			
1,1-Dichloroethene	17.19	1.0	20	0	86.0	71 - 131			
1,1-Dichloropropene	18.19	1.0	20	0	91.0	78 - 125			
1,2,3-Trichlorobenzene	21.91	1.0	20	0	110	69 - 129			
1,2,3-Trichloropropane	18.51	1.0	20	0	92.6	73 - 122			
1,2,4-Trichlorobenzene	20.05	1.0	20	0	100	69 - 130			
1,2,4-Trimethylbenzene	17.85	1.0	20	0	89.3	76 - 124			
1,2-Dibromo-3-chloropropane	20.62	1.0	20	0	103	62 - 128			
1,2-Dibromoethane	18.37	1.0	20	0	91.9	77 - 121			
1,2-Dichlorobenzene	18.43	1.0	20	0	92.2	80 - 119			
1,2-Dichloroethane	16.81	1.0	20	0	84.1	73 - 128			
1,2-Dichloropropane	17.63	1.0	20	0	88.2	78 - 122			
1,3,5-Trimethylbenzene	18.57	1.0	20	0	92.8	75 - 124			
1,3-Dichlorobenzene	18.44	1.0	20	0	92.2	80 - 119			
1,3-Dichloropropane	18.25	1.0	20	0	91.3	80 - 119			
1,4-Dichlorobenzene	18.41	1.0	20	0	92.1	79 - 118			
2,2-Dichloropropane	17.18	1.0	20	0	85.9	60 - 139			
2-Butanone	36.74	2.0	40	0	91.9	56 - 143			
2-Chlorotoluene	18.14	1.0	20	0	90.7	79 - 122			
2-Hexanone	36.41	2.0	40	0	91.0	57 - 139			
4-Chlorotoluene	18.02	1.0	20	0	90.1	78 - 122			
4-Isopropyltoluene	19.4	1.0	20	0	97.0	77 - 127			
4-Methyl-2-pentanone	37.53	2.0	40	0	93.8	67 - 130			
Acetone	41.3	2.0	40	5.033	90.7	39 - 160			
Benzene	17.22	1.0	20	0	86.1	79 - 120			
Bromobenzene	17.54	1.0	20	0	87.7	80 - 120			
Bromochloromethane	16.53	1.0	20	0	82.6	78 - 123			
Bromodichloromethane	17.16	1.0	20	0	85.8	79 - 125			
Bromoform	18.69	1.0	20	0	93.5	66 - 130			
Bromomethane	14.83	1.0	20	0	74.1	53 - 141			

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: R338430 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MS		Sample ID: HS19050304-05MS		Units: UG/L		Analysis Date: 14-May-2019 14:26			
Client ID:		Run ID: VOA6_338430		SeqNo: 5075202		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Carbon disulfide	34.64	2.0	40	0	86.6	64 - 133			
Carbon tetrachloride	17.45	1.0	20	0	87.2	72 - 136			
Chlorobenzene	18.68	1.0	20	0	93.4	82 - 118			
Chloroethane	16.04	1.0	20	0	80.2	60 - 138			
Chloroform	16.36	1.0	20	0	81.8	79 - 124			
Chloromethane	14.06	1.0	20	0	70.3	50 - 139			
cis-1,2-Dichloroethene	16.27	1.0	20	0	81.4	78 - 123			
cis-1,3-Dichloropropene	18.73	1.0	20	0	93.7	75 - 124			
Dibromochloromethane	18.41	1.0	20	0	92.0	74 - 126			
Dibromomethane	17.7	1.0	20	0	88.5	79 - 123			
Dichlorodifluoromethane	15.98	1.0	20	0	79.9	32 - 152			
Ethylbenzene	18.41	1.0	20	0	92.1	79 - 121			
Hexachlorobutadiene	21.25	1.0	20	0	106	66 - 134			
Isopropylbenzene	18.73	1.0	20	0	93.7	72 - 131			
m,p-Xylene	37.34	2.0	40	0	93.4	80 - 121			
Methylene chloride	16.74	2.0	20	0	83.7	74 - 124			
Naphthalene	20.25	1.0	20	0	101	61 - 128			
n-Butylbenzene	19.47	1.0	20	0	97.4	75 - 128			
n-Propylbenzene	19.15	1.0	20	0	95.8	76 - 126			
o-Xylene	19.15	1.0	20	0	95.7	78 - 122			
sec-Butylbenzene	19.76	1.0	20	0	98.8	77 - 126			
Styrene	18.13	1.0	20	0	90.7	78 - 123			
tert-Butylbenzene	19.35	1.0	20	0	96.8	78 - 124			
Tetrachloroethene	18.9	1.0	20	0	94.5	74 - 129			
Toluene	18.38	1.0	20	0	91.9	80 - 121			
trans-1,2-Dichloroethene	17.28	1.0	20	0	86.4	75 - 124			
trans-1,3-Dichloropropene	17.81	1.0	20	0	89.1	73 - 127			
Trichloroethene	18.37	1.0	20	0	91.9	79 - 123			
Trichlorofluoromethane	16.85	1.0	20	0	84.3	65 - 141			
Vinyl chloride	17.11	1.0	20	0	85.5	58 - 137			
Surr: 1,2-Dichloroethane-d4	43.63	1.0	50	0	87.3	81 - 118			
Surr: 4-Bromofluorobenzene	50.27	1.0	50	0	101	85 - 114			
Surr: Dibromofluoromethane	45.19	1.0	50	0	90.4	80 - 119			
Surr: Toluene-d8	52	1.0	50	0	104	89 - 112			

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: R338430 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD		Sample ID: HS19050304-05MSD		Units: UG/L		Analysis Date: 14-May-2019 14:50				
Client ID:		Run ID: VOA6_338430		SeqNo: 5075203		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	18.05	1.0	20	0	90.3	78 - 124	17.96	0.499	20	
1,1,1-Trichloroethane	16.75	1.0	20	0	83.7	74 - 131	17.27	3.11	20	
1,1,2,2-Tetrachloroethane	20.62	1.0	20	0	103	71 - 121	19.07	7.82	20	
1,1,2-Trichloroethane	18.77	1.0	20	0	93.9	80 - 119	18.35	2.27	20	
1,1-Dichloroethane	15.96	1.0	20	0	79.8	77 - 125	16.46	3.1	20	
1,1-Dichloroethene	16.38	1.0	20	0	81.9	71 - 131	17.19	4.84	20	
1,1-Dichloropropene	17.86	1.0	20	0	89.3	78 - 125	18.19	1.86	20	
1,2,3-Trichlorobenzene	24.61	1.0	20	0	123	69 - 129	21.91	11.6	20	
1,2,3-Trichloropropane	20.12	1.0	20	0	101	73 - 122	18.51	8.29	20	
1,2,4-Trichlorobenzene	21.58	1.0	20	0	108	69 - 130	20.05	7.37	20	
1,2,4-Trimethylbenzene	19.04	1.0	20	0	95.2	76 - 124	17.85	6.43	20	
1,2-Dibromo-3-chloropropane	23.37	1.0	20	0	117	62 - 128	20.62	12.5	20	
1,2-Dibromoethane	18.7	1.0	20	0	93.5	77 - 121	18.37	1.8	20	
1,2-Dichlorobenzene	20.02	1.0	20	0	100	80 - 119	18.43	8.27	20	
1,2-Dichloroethane	16.81	1.0	20	0	84.1	73 - 128	16.81	0.00614	20	
1,2-Dichloropropane	17.42	1.0	20	0	87.1	78 - 122	17.63	1.19	20	
1,3,5-Trimethylbenzene	19.67	1.0	20	0	98.3	75 - 124	18.57	5.76	20	
1,3-Dichlorobenzene	19.64	1.0	20	0	98.2	80 - 119	18.44	6.33	20	
1,3-Dichloropropane	18.61	1.0	20	0	93.0	80 - 119	18.25	1.94	20	
1,4-Dichlorobenzene	19.37	1.0	20	0	96.8	79 - 118	18.41	5.05	20	
2,2-Dichloropropane	16.54	1.0	20	0	82.7	60 - 139	17.18	3.8	20	
2-Butanone	36.99	2.0	40	0	92.5	56 - 143	36.74	0.672	20	
2-Chlorotoluene	19.27	1.0	20	0	96.3	79 - 122	18.14	6	20	
2-Hexanone	38.67	2.0	40	0	96.7	57 - 139	36.41	6.02	20	
4-Chlorotoluene	19.19	1.0	20	0	96.0	78 - 122	18.02	6.3	20	
4-Isopropyltoluene	20.54	1.0	20	0	103	77 - 127	19.4	5.71	20	
4-Methyl-2-pentanone	38.72	2.0	40	0	96.8	67 - 130	37.53	3.12	20	
Acetone	42.23	2.0	40	5.033	93.0	39 - 160	41.3	2.22	20	
Benzene	17.15	1.0	20	0	85.7	79 - 120	17.22	0.446	20	
Bromobenzene	18.86	1.0	20	0	94.3	80 - 120	17.54	7.22	20	
Bromochloromethane	15.89	1.0	20	0	79.5	78 - 123	16.53	3.91	20	
Bromodichloromethane	16.76	1.0	20	0	83.8	79 - 125	17.16	2.31	20	
Bromoform	19.5	1.0	20	0	97.5	66 - 130	18.69	4.22	20	
Bromomethane	14.44	1.0	20	0	72.2	53 - 141	14.83	2.67	20	

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: R338430 (0)		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C					
MSD		Sample ID: HS19050304-05MSD		Units: UG/L		Analysis Date: 14-May-2019 14:50			
Client ID:		Run ID: VOA6_338430		SeqNo: 5075203		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Carbon disulfide	33.71	2.0	40	0	84.3	64 - 133	34.64	2.72	20
Carbon tetrachloride	17.32	1.0	20	0	86.6	72 - 136	17.45	0.729	20
Chlorobenzene	18.86	1.0	20	0	94.3	82 - 118	18.68	0.95	20
Chloroethane	15.18	1.0	20	0	75.9	60 - 138	16.04	5.54	20
Chloroform	15.86	1.0	20	0	79.3	79 - 124	16.36	3.15	20
Chloromethane	13.31	1.0	20	0	66.6	50 - 139	14.06	5.44	20
cis-1,2-Dichloroethene	15.91	1.0	20	0	79.6	78 - 123	16.27	2.26	20
cis-1,3-Dichloropropene	18.59	1.0	20	0	92.9	75 - 124	18.73	0.759	20
Dibromochloromethane	18.51	1.0	20	0	92.5	74 - 126	18.41	0.558	20
Dibromomethane	17.47	1.0	20	0	87.4	79 - 123	17.7	1.28	20
Dichlorodifluoromethane	15.52	1.0	20	0	77.6	32 - 152	15.98	2.93	20
Ethylbenzene	18.16	1.0	20	0	90.8	79 - 121	18.41	1.34	20
Hexachlorobutadiene	21.15	1.0	20	0	106	66 - 134	21.25	0.477	20
Isopropylbenzene	19.08	1.0	20	0	95.4	72 - 131	18.73	1.81	20
m,p-Xylene	37.75	2.0	40	0	94.4	80 - 121	37.34	1.1	20
Methylene chloride	16.03	2.0	20	0	80.1	74 - 124	16.74	4.31	20
Naphthalene	22.61	1.0	20	0	113	61 - 128	20.25	11	20
n-Butylbenzene	20.47	1.0	20	0	102	75 - 128	19.47	5.02	20
n-Propylbenzene	20.31	1.0	20	0	102	76 - 126	19.15	5.87	20
o-Xylene	19.03	1.0	20	0	95.1	78 - 122	19.15	0.637	20
sec-Butylbenzene	20.71	1.0	20	0	104	77 - 126	19.76	4.7	20
Styrene	17.96	1.0	20	0	89.8	78 - 123	18.13	0.935	20
tert-Butylbenzene	20.46	1.0	20	0	102	78 - 124	19.35	5.56	20
Tetrachloroethene	19.07	1.0	20	0	95.4	74 - 129	18.9	0.914	20
Toluene	18.07	1.0	20	0	90.4	80 - 121	18.38	1.68	20
trans-1,2-Dichloroethene	17.11	1.0	20	0	85.5	75 - 124	17.28	0.993	20
trans-1,3-Dichloropropene	17.87	1.0	20	0	89.3	73 - 127	17.81	0.302	20
Trichloroethene	17.81	1.0	20	0	89.1	79 - 123	18.37	3.1	20
Trichlorofluoromethane	16.6	1.0	20	0	83.0	65 - 141	16.85	1.52	20
Vinyl chloride	16.44	1.0	20	0	82.2	58 - 137	17.11	3.99	20
Surr: 1,2-Dichloroethane-d4	43.69	1.0	50	0	87.4	81 - 118	43.63	0.13	20
Surr: 4-Bromofluorobenzene	49.42	1.0	50	0	98.8	85 - 114	50.27	1.71	20
Surr: Dibromofluoromethane	44.57	1.0	50	0	89.1	80 - 119	45.19	1.39	20
Surr: Toluene-d8	52.58	1.0	50	0	105	89 - 112	52	1.12	20

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: R338430 (0)	Instrument: VOA6	Method: VOLATILES ORGANICS BY METHOD 8260C
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The following samples were analyzed in this batch:

HS19050398-01	HS19050398-03
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ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19050398

QC BATCH REPORT

Batch ID: R338198 (0)		Instrument: UV-2450		Method: HEXAVALENT CHROMIUM BY SW7196A						
MBLK	Sample ID: MBLK-338198	Units: mg/L		Analysis Date: 08-May-2019 13:17						
Client ID:	Run ID: UV-2450_338198		SeqNo: 5070024		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.0100	0.0100								U
LCS	Sample ID: LCS-338198	Units: mg/L		Analysis Date: 08-May-2019 13:17						
Client ID:	Run ID: UV-2450_338198		SeqNo: 5070025		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.247	0.0100	0.25	0	98.8	80 - 120				
MS	Sample ID: HS19050410-01MS	Units: mg/L		Analysis Date: 08-May-2019 13:17						
Client ID:	Run ID: UV-2450_338198		SeqNo: 5070026		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.249	0.0100	0.25	0.001	99.2	75 - 125				
MSD	Sample ID: HS19050410-01MSD	Units: mg/L		Analysis Date: 08-May-2019 13:17						
Client ID:	Run ID: UV-2450_338198		SeqNo: 5070027		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.235	0.0100	0.25	0.001	93.6	75 - 125	0.249	5.79	20	

The following samples were analyzed in this batch: HS19050398-01

ALS Houston, US

Date: 23-May-19

Client:	Bhate Environmental Associates, Inc.	QUALIFIERS, ACRONYMS, UNITS
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples	
WorkOrder:	HS19050398	

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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020
Texas	TX104704231-19-23	30-Apr-2020

ALS Houston, US

Date: 23-may-19

Client: Bhate Environmental Associates, Inc.**Project:** LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples**Work Order:** HS19050398**SAMPLE TRACKING**

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19050398-01	LH18/24-SP650_050719	Login	08/05/2019 11:38:04	NDR	EXT024
HS19050398-01	LH18/24-SP650_050719	Login	08/05/2019 11:38:04	NDR	WET270
HS19050398-01	LH18/24-SP650_050719	Login	08/05/2019 11:38:04	NDR	MET071
HS19050398-01	LH18/24-SP650_050719	Login	08/05/2019 11:38:04	NDR	VOA137
HS19050398-02	LH18/24-SP650_050719_BIX	Login	08/05/2019 11:38:04	NDR	Sub
HS19050398-03	Trip Blank	Login	08/05/2019 11:38:04	NDR	VOA137

ALS Houston, US

Date: 23-May-19

Sample Receipt Checklist

Client Name: Bhate Environmental
 Work Order: HS19050398

Date/Time Received: **08-May-2019 09:30**
 Received by: **JRM**

Checklist completed by: Nilesh D. Ranchod 8-May-2019
 eSignature Date

Reviewed by: RJ Modashia 8-May-2019
 eSignature Date

Matrices: **water**

Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	1.6c uc/c IR 11		
Cooler(s)/Kit(s):	44882		
Date/Time sample(s) sent to storage:	05/08/2019 11:55am		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:


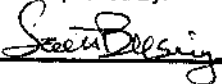
Person Contacted:


Contacted By:

Regarding:

Comments:

Corrective Action:

Project: BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			Project No. NWO1312.0150.0 16.0001			Analyses <div style="text-align: right; font-size: 1.2em; font-weight: bold;">HS19050398</div> <div style="text-align: right;"> Bhate Environmental Associates, Inc. 18/24 Longhorn GW Treatment Plant Monthly Effluent </div> 																					
Job: GROUNDWATER TREATMENT PLANT MONTHLY EFFLUENT SAMPLES						<div style="display: flex; justify-content: space-around; font-weight: bold;"> VOLATILES SILVER, SELENIUM, LEAD, BARIUM HEXAVALENT CHROMIUM 1, 4 - DIOXANE PERCHLORATE </div>																					
Prepared By: Scott Beesinger			P.O. Number																								
Field Sample I.D.			Sample Matrix			Date / Time			MS / MSD	No. OF CONTAINERS																	
LH18/24-SP650_050719			Water			05/07/19 / 14:00																					
LH18/24-SP650_050719			Water			05/07/19 / 14:00																					
LH18/24-SP650_050719_BIX			Water			05/07/19 / 14:00																					
LH18/24-SP650_050719			Water			05/07/19 / 14:00																					
Trip Blank			Water			05/07/19																					
Additional Remarks: STANDARD TURN AROUND TIME																											
Relinquished By: 			Date 05/07/19		Time 14:30		Received By:			Date		Time		Relinquished By:			Date		Time		Received By:			Date		Time	
Received At Lab By: J. M. M. M.			Date 5/8/19		Time 09:30		Airbill No.			Opened By:			Date		Time		Temp of Container			Seal No.		Condition					
Remarks: Cooler - 44862 1211 Temp 1.6 CF00																											

FedEx TRK# 4380 9532 7390 AB SGRA  WED - 08 MAY 10:30A PRIORITY OVERNIGHT 77099 TX-US IAH		ALS 10450 Standliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	CUSTO Date: 5/7/19 Name: Scott B. B. Company: B.H.H.
--	--	--	--

FED 5121960 07MAY19 SGGA 563C1/DESC/RCOA

BY SEAL		Seal Broken By:	
Type: 1432		Date: 5/8/19	
1432			



Case Narrative

Method: 6850
Analysis: Perchlorate
Analysis SOP: LC-MS-CLO4
ALS WO ID(s): 1913332, 1913338, 1913342, 1913345

Client: ALS Laboratories (Houston, TX)
Matrix: Water
ELMS Batch (HBN): 2253(239553)

General Set Information: There were ten 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. 50 μL 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 0.45 μm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1913338001 was analyzed and reported from a 1:100 dilution. Field sample 1913342004 was analyzed and reported from a 1:10 dilution. The reporting limits have been adjusted accordingly.

Method QC data: The method blank (LMB 653683) was less than 1/2 the CRDL. The recovery for the LCS (653684) was within acceptable parameters.



MS/MSD Analysis: MS/MSD was performed on samples 1913342006/007. 4.0µl of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4.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 – 653681) is reported from the analysis of the Laboratory Control Sample (LCS – 653684) at a level of 4.0µg/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: 19MARI03).

<u>Stephen Brose</u>	<u>May 22, 2019</u>
Analyst	Date



00938801

ANALYTICAL REPORT

Report Date: May 22, 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: **34-1913332**

Project ID: HS19050398

Purchase Order: HS19050398

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_050719_BIX	1913332001	05/07/19	05/09/19	

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992

ALS GROUP USA, CORP. An ALS Limited Company

Environmental www.alsglobal.com

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33 of 121



ANALYTICAL REPORT

Workorder: **34-1913332**Client: ALS Environmental
(Houston)

Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: LH18/24-SP650_050719_BIX		Sampling Site: NA		Collected: 05/07/2019	
Lab ID: 1913332001		Media: 125 mL Nalgene		Received: 05/09/2019	
Matrix: Water		Sampling Parameter: NA			
Analysis Method - EPA 6850, DoD QSM					
Preparation: Not Applicable			Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2253 (HBN: 239553) Analyzed: 05/21/2019 08:43		Instrument ID: LCMS04 Percent Solid: NA 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

Comments

Quality Control: EPA 6850, DoD QSM - (HBN: 239553)

Field sample 1913338001 was analyzed and reported from a 1:100 dilution. Field sample 1913342004 was analyzed and reported from a 1:10 dilution. 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/ Stephen Brose 05/22/2019 06:38	/S/ Thomas Bosch 05/22/2019 11:11

Laboratory Contact Information

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

Phone: (801) 266-7700
Email: als@altlab.com
Web: www.alsslc.com



ANALYTICAL REPORT

Workorder: 34-1913332

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.pjllabs.com
	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.com
	Utah (TNI)	UT00953	http://lams.nelac-institute.org/search
	Nevada (TNI)	UT00953201-1	https://ndep.nv.gov/water/lab-certification
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
	Oklahoma (TNI)	IJ# 9980	http://www.deq.state.ok.us/CSDnew/labcert.htm
	Texas (TNI)	T104704456-18-9	https://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_list.pdf
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	http://www.aihaaccreditedlabs.org
	DOECAP-AP	L18-606	http://www.pjllabs.com
	Washington	C596	https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.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

00938804

Analysis Information

Workorder: 1913332**Limits:** Client SOW/Contract Specified**Preparation:** NA**Analysis:** EPA 6850, DoD QSM**Basis:** DoD QSM**Batch:** NA**Batch:** ELMS/2253 (HBN: 239553)**Prepared By:** NA**Analyzed By:** Stephen Brose

Blank

LMB: 653683**Analyzed:** 05/21/2019 08:29**Units:** ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 653684**Analyzed:** 05/21/2019 08:02**Dilution:** 1**Units:** ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.08	4.00	102	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1913342005**Analyzed:** 05/21/2019 10:03**Dilution:** 1**Units:** ug/L**MS:** 1913342006**Analyzed:** 05/21/2019 10:17**Dilution:** 1**Units:** ug/L**MSD:** 1913342007**Analyzed:** 05/21/2019 10:30**Dilution:** 1**Units:** ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	3.78	4	94.4	78.8	123.8	3.72	93.0	1.51	0.0	20.0

Comments

Field sample 1913338001 was analyzed and reported from a 1:100 dilution. Field sample 1913342004 was analyzed and reported from a 1:10 dilution. 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/ Stephen Brose 05/22/2019 06:38	/S/ Thomas Bosch 05/22/2019 11:11

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



1913332

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: Dept of Defense

COC ID: 11269

SUBCONTRACT TO:

1913332

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: HS19050398
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19050398-02	LH18/24-SP650_050719_BIX	Water	07 May 2019 14:00
SUB_Perch-6850			22 May 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:

[Signature]

Date/Time:

5/8/19 18:00

Received By:

[Signature]

Date/Time:

5/8/19 10:08

Cooler ID(s):

Temperature(s):

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08 May 2019

Page 1 of 1

[illegible]

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: <u>ALS Austin</u>		Project/Task/Site: <u>1913332</u>				
Date/Time of Receipt: <u>5/11/19 10:18</u>		Number of Coolers Received: <u>1</u>				
Condition of Coolers: <u>Acceptable/Unacceptable</u> Cooler Custody Seals: <u>Present/Absent/NA</u> Container Custody Seals: <u>Present/Absent/NA</u> Ice Present: <u>Yes/No/NA</u> <u>Frozen/Melted/NA</u>		Temperature Control: <u>Present/Not Included</u> Location Temp Taken: <u>Control/Between Samples</u> Are all temperatures within project specific guidelines? <u>Yes/No/NA</u> VOA Headspace Present? <u>Yes/No/NA</u>				
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	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 - 9390	2 °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By: Lea W. Warrick Julie Warrick 5/11/19
Signature Printed Name Date

CLIENT-RELATED INFORMATION

- | | | | |
|---|--|---|--|
| <input type="checkbox"/> Missing Cooler
<input type="checkbox"/> Cooler Conditions
<input type="checkbox"/> Missing Paperwork
<input type="checkbox"/> Missing/Incorrect Bottle Labels | <input type="checkbox"/> Missing Samples/Bottles
<input type="checkbox"/> Broken/Leaking Samples
<input type="checkbox"/> Incorrect Bottle Type
<input type="checkbox"/> Cooler Temperatures Out of Range | <input type="checkbox"/> Incorrect Preservation
<input type="checkbox"/> pH Criteria Not Met
<input type="checkbox"/> Residual Chlorine Present
<input type="checkbox"/> Head Space in Bottles | <input type="checkbox"/> Insufficient Sample Volume
<input type="checkbox"/> Chain of Custody Problems
<input type="checkbox"/> Other: |
|---|--|---|--|

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: _____ Returned to Sample Receipt by: _____ Date: _____
Printed Name Signature



**Must Deliver Next Business Day
Time and Temperature Sensitive!**

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

SHIP DATE: 08MAY19
ACTWGT: 21.30 LB
CAD: 300130/CAFE3211
DIMS: 19x16x13 IN

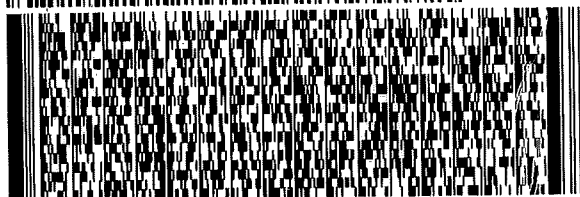
BILL THIRD PARTY

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

SALT LAKE CITY UT 84123

(801) 266-7700

REF: HS19050397/398/401/403 RJ



FedEx
Express

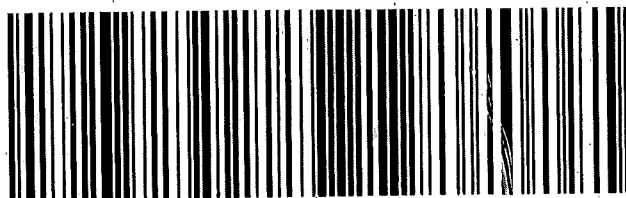


TRK# 4809 7833 6238
0201

**THU - 09 MAY 3:00P
STANDARD OVERNIGHT**

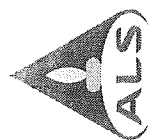
AX BTFA

**84123
UT-US SLC**



Part # 150469-434 RIT2 EXP 01/20

301/2950/1555



Batch Worklist

Batch: ELMS/ 2253

Rule: EPA 6850, DoD QSM Water

Workorder: 1913332 [ENV_LVL4]

Workorder: 1913338 [ENV_LVL4]

Workorder: 1913342 [ENV_LVL4]

Workorder: 1913345 [ENV_LVL4]

Created: 5/20/2019 06:13

Analyst: S. Brose

Instrument:

Status: WP

HBN: 239553



Pos	Lab ID	Sample ID	Prep Initial	Prep Final	Dust Weight	Type	Mx	Container	Procedure	Mgr	Expire Date	Due Date	Run Date
1	653680	CCV for HBN 239553 [ELMS/2253]				CCV	3		E685041C3Q	6214		5/22/2019	
2	653681	RLVS for HBN 239553 [ELMS/2253]				RLVS	3		E685041C3Q	6214		5/22/2019	
3	653682	ICS for HBN 239553 [ELMS/2253]				ICS	3		E6850.D3Q	6214		5/22/2019	
4	653683	LMB for HBN 239553 [ELMS/2253]				LMB	3		E6850Q413Q	6214		5/22/2019	
5	653684	LCS for HBN 239553 [ELMS/2253]				LCS	3		E6850Q413Q	6214		5/22/2019	
6	1913332001	LH18/24-SP650_050719_BIX				SAMPLE	3	1913332001-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
7	1913338001	LH18/24-SP140_050719				SAMPLE	3	1913338001-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
8	1913342001	50WW10-190507				SAMPLE	3	1913342001-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
9	1913342002	50WW09-190507				SAMPLE	3	1913342002-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
10	1913342003	50WW09-190507-FD				FLDDUP	3	1913342003-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
11	1913342004	50WW08-190507				SAMPLE	3	1913342004-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
12	1913342005	50WW23-190507				SAMPLE	3	1913342005-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
13	1913342006	50WW23-190507MS				MS	3	1913342006-A	E6850Q413Q	5480		5/22/2019	
14	1913342007	50WW23-190507MSD				MSD	3	1913342007-A	E6850Q413Q	5480		5/22/2019	
15	1913342008	50WW24-190507				SAMPLE	3	1913342008-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
16	1913342009	50WW05-190507				SAMPLE	3	1913342009-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
17	1913345001	LH18-24-SP650_050719_BIX				SAMPLE	3	1913345001-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
18	653685	CCV for HBN 239553 [ELMS/2253]				CCV	3		E685041C3Q	6214		5/22/2019	



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #()'s: 1913332(001), 1913338(001), 1913342(001-009), 1913345(001)
 ELMS Batch/HBN ID: 2253 (239553)
 Prep Date: 05/21/2019 Analysis Date: 05/21/2019 Analyst: S. Brose
 Analyte: **Perchlorate** Matrix: **Water** Method: 6850
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\MAY\21MAY19D.s
 Reported DL: 1.0µg/L Reported LOD: 2.0µg/L Reported LOQ: 4.0µg/L

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by SAB. 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 AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

STANDARDS: Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

CALIBRATION CURVE: Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.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: 35µL
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

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: 4.0µL of QC Solution Horizon ID 47516 was used for LCS 653684; Target = 4.0µg/L. ASTM type II water was used for LMB 653683.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1913342006/007 (Client ID: 50WW23-190507). 4.0µL of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. Spike target = 4.0µg/L.

COMMENTS:

- 1) Results reported in µg/L. Field samples 1913338001 and 1913342004 required 1:100 and 1:10 dilutions respectively. 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\MAY\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\239553-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATA\VIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 653681) is reported from the analysis of the Laboratory Control Sample (LCS – 653684) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, many of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03).

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.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDG: <u>ELMS/2253</u> <u>IT3N: 238553</u>		
Sample Set IDs if Applicable: <u>1913332/ 38/42/45</u>		
Calibration standards analyzed and meets criteria	SRB	TB
Standards traceability checked and meets criteria	SRB	TB
Standard curve coefficients evaluated and meet criteria	SRB	TB
ICVs analyzed and meet acceptance criteria	SRB	TB
CCVs analyzed and meet acceptance criteria	SRB	TB
Retention Time Windows checked	SRB	TB
For method 8081A, Endrin/DDT Breakdown is checked for compliance	—	—
Surrogate recoveries checked and appropriately addressed	SRB	TB
Method Preparation Blanks analyzed and meet acceptance criteria	SRB	TB
MSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed	SRB	TB
RLVS analyzed	SRB	TB
Preparation and analysis hold times met	SRB	TB
Preparation deviations and re-preparations noted when performed	SRB	TB
Analysis deviations and re-analyses noted when performed	SRB	TB
Sample dilution factors noted on reports	SRB	TB
Electronic records in HBN transcription accuracy and completeness checked	SRB	TB
Preparation and analysis calculations checked	SRB	TB
NCRs are completed as necessary NC/CAR#	—	—
Report forms are complete and accurate	SRB	TB
Manual integrations checked	SRB	TB



STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK		Description - 6850 WKG Std 100.ug/L			
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name			Concentration
1	14797-73-0	Perchlorate			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
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	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: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
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
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			Amount: 1000 L
MFG: DCL In House			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 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		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



STANDARD REPORT

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		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
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



STANDARD REPORT

Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729			Amount: 1 mL
MFG: Cambridge Isotope			Expires: 04/28/2026
MFG Lot: SDFF-012A			Usable: Yes
Part ID: OLM-7310-S			Lab Lot: CLO4ISTDSTK
Created By: Thomas Bösch			
Create Date: 09/20/2018 09:09AM			
Verified By: Thomas Bosch			
Verify Date:			
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



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

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:

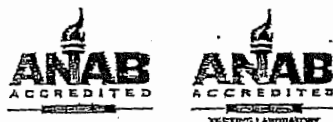
Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the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





Certificate of Analysis



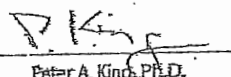
ISO Guide 34 Reference Material

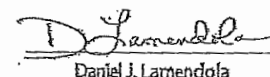
Product Number: ICC-013
Lot Number: CP-0860

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

125 Market Street
New Haven, CT 06513
USA



AccuStandard®

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

CERTIFICATE OF ANALYSIS



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

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



Signal Word: None

Component	SRM #	Prepared Concentration ($\mu\text{g/mL}$)
ClO_4 Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is $\pm 0.24\%$.

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 $0.2\ \mu\text{m}$ 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 $\pm 0.5\%$ 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

Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

Quality Standards:

ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification: $\geq 98\%$
 Labeled CAS Number: NA
 Unlabeled CAS Number: 7601-89-0
 MW*: 130.4
 Chemical Formula: NaClO_4
 Storage: Store at room temperature away from light and moisture.
 Stability: See storage and expiration data.

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.

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.

* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 $\mu\text{g/mL}$
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	109.4 \pm 2.8 $\mu\text{g/mL}$ (k=2)



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Report: C:\HPCHEM\1\DATA\21MAY19D\21MAY19D.B

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	
*	653680	CCV@25	Vial 71	1	Control	1	2.40704e6	8.594	23.99302
*	653684	QC@4.0	Vial 72	1	Control	2	3.96639e5	8.823	4.08274
*	653682	ICS@4.0	Vial 73	1	Control	3	3.14960e5	8.612	3.74421
*	653683	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1913332001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1913338001	100	Vial 76	1	Sample	6	3.99368e6	8.959	4178.24239
*	1913342001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1913342002		Vial 78	1	Sample	8	6.18077e5	8.360	7.21259
*	1913342003		Vial 79	1	Sample	9	6.79913e5	8.381	7.76574
*	1913342004	10X	Vial 80	1	Sample	10	2.09294e6	8.642	226.56793
*	1913342005		Vial 81	1	Sample	11	0.00000	0.000	0.00000
*	1913342006	MS	Vial 82	1	Sample	12	2.30072e5	8.281	3.77790
*	1913342007	SD	Vial 83	1	Sample	13	2.23456e5	8.296	3.72139
*	1913342008		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	1913342009		Vial 85	1	Sample	15	0.00000	0.000	0.00000
*	1913345001		Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	653685	CCV@25	Vial 71	1	Control	17	1.93838e6	8.628	23.36594

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	653680	CCV@25	Vial 71	1	Control	1	7.14295e5	8.612	23.97986
*	653684	QC@4.0	Vial 72	1	Control	2	1.27284e5	8.838	4.26129
*	653682	ICS@4.0	Vial 73	1	Control	3	1.12778e5	8.627	4.34080
*	653683	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1913332001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1913338001	100	Vial 76	1	Sample	6	1.20507e6	8.974	4254.41607
*	1913342001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1913342002		Vial 78	1	Sample	8	2.00267e5	8.373	7.73270
*	1913342003		Vial 79	1	Sample	9	2.18020e5	8.395	8.25365
*	1913342004	10X	Vial 80	1	Sample	10	6.29788e5	8.660	229.37195
*	1913342005		Vial 81	1	Sample	11	0.00000	0.000	0.00000
*	1913342006	MS	Vial 82	1	Sample	12	8.05070e4	8.292	4.28262
*	1913342007	SD	Vial 83	1	Sample	13	7.84560e4	8.311	4.22992
*	1913342008		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	1913342009		Vial 85	1	Sample	15	0.00000	0.000	0.00000
*	1913345001		Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	653685	CCV@25	Vial 71	1	Control	17	5.93941e5	8.647	24.07193

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	653680	CCV@25	Vial 71	1	Control	1	3.05962e5	8.618	5.00000
*	653684	QC@4.0	Vial 72	1	Control	2	3.19796e5	8.842	5.00000
*	653682	ICS@4.0	Vial 73	1	Control	3	2.78118e5	8.629	5.00000
*	653683	LMB	Vial 74	1	Control	4	3.07550e5	8.973	5.00000
*	1913332001		Vial 75	1	Sample	5	2.84011e5	8.455	5.00000
*	1913338001	100	Vial 76	1	Sample	6	2.80006e5	8.979	500.00000
*	1913342001		Vial 77	1	Sample	7	2.92233e5	8.419	5.00000
*	1913342002		Vial 78	1	Sample	8	2.75334e5	8.385	5.00000
*	1913342003		Vial 79	1	Sample	9	2.80514e5	8.402	5.00000
*	1913342004	10X	Vial 80	1	Sample	10	2.82646e5	8.663	50.00000
*	1913342005		Vial 81	1	Sample	11	2.06104e5	8.293	5.00000
*	1913342006	MS	Vial 82	1	Sample	12	2.01255e5	8.301	5.00000
*	1913342007	SD	Vial 83	1	Sample	13	1.98591e5	8.312	5.00000
*	1913342008		Vial 84	1	Sample	14	2.10825e5	8.375	5.00000

Batch Report: C:\HPCHEM\1\DATA\21MAY19D\21MAY19D.B

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	1913342009	Vial 85	1	Sample	15	2.18072e5	8.384	5.00000
*	1913345001	Vial 86	1	Sample	16	2.17961e5	8.508	5.00000
*	653685	CCV@25	Vial 71	Control	17	2.53387e5	8.650	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	653680	CCV@25	CLO4-AQN 1	Ctrl Samp		
2	Vial 72	653684	QC@4.0	CLO4-AQN 1	Ctrl Samp		
3	Vial 73	653682	ICS@4.0	CLO4-AQN 1	Ctrl Samp		
4	Vial 74	653683	LMB	CLO4-AQN 1	Ctrl Samp		
5	Vial 75	1913332001		CLO4-AQN 1	Sample		
6	Vial 76	1913338001	100	CLO4-AQN 1	Sample		
7	Vial 77	1913342001		CLO4-AQN 1	Sample		
8	Vial 78	1913342002		CLO4-AQN 1	Sample		
9	Vial 79	1913342003		CLO4-AQN 1	Sample		
10	Vial 80	1913342004	10X	CLO4-AQN 1	Sample		
11	Vial 81	1913342005		CLO4-AQN 1	Sample		
12	Vial 82	1913342006	MS	CLO4-AQN 1	Sample		
13	Vial 83	1913342007	SD	CLO4-AQN 1	Sample		
14	Vial 84	1913342008		CLO4-AQN 1	Sample		
15	Vial 85	1913342009		CLO4-AQN 1	Sample		
16	Vial 86	1913345001		CLO4-AQN 1	Sample		
17	Vial 71	653685	CCV@25	CLO4-AQN 1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD01.D

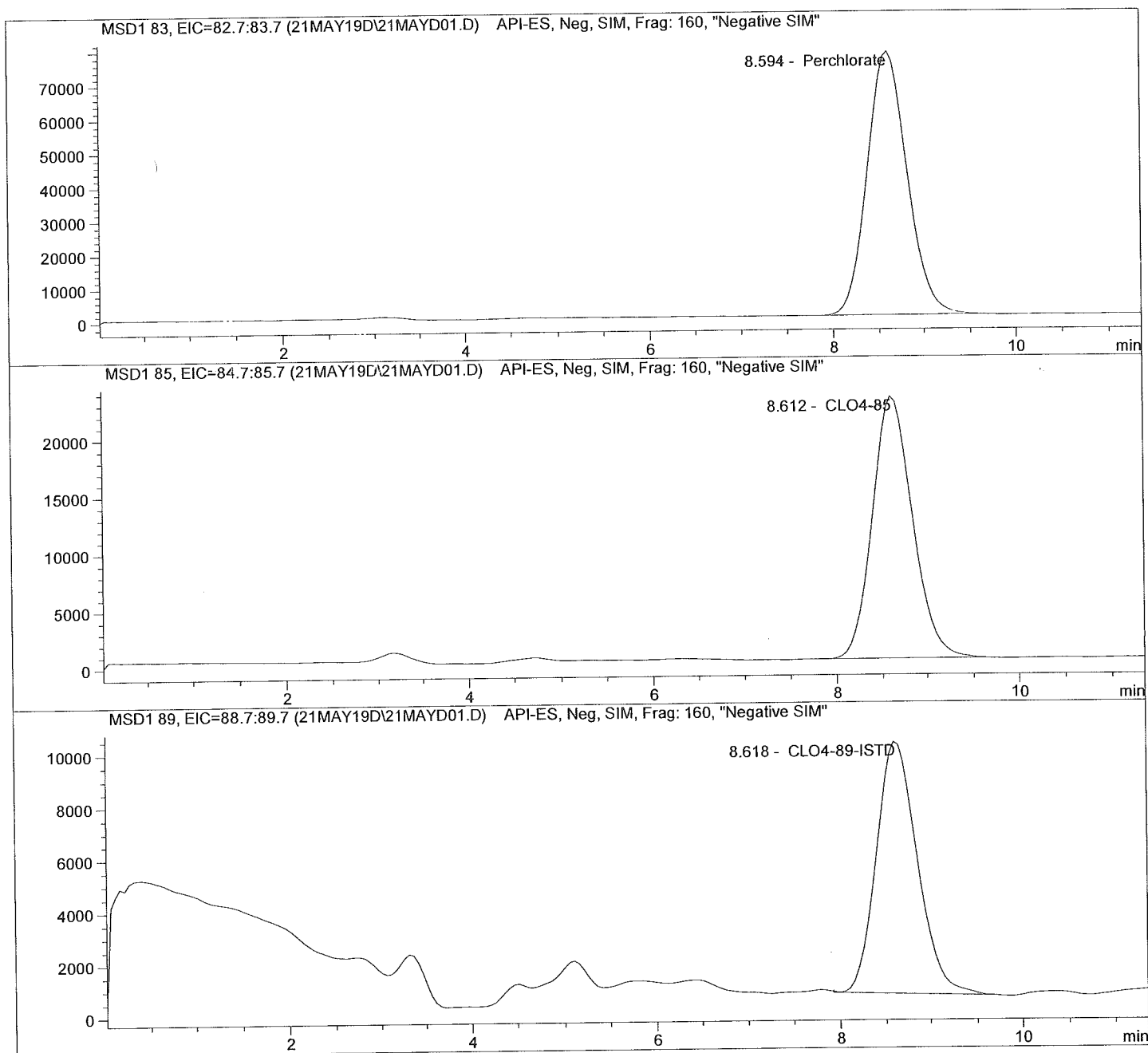
Sample Name: 653680 CCV@25

Injection Date: 5/21/2019 07:49:32
Sample Name: 653680 CCV@25
Acq Operator: 6214

Seq Line: 1
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD01.D

Sample Name: 653680 CCV@25

```

=====
Injection Date:  5/21/2019  07:49:32      Seq Line:           1
Sample Name:    653680    CCV@25          Location:           Vial 71
Acq Operator:   6214              Inj. No.:           1
                                      Inj. Vol.:          35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.594	PBA	2407042.7	23.9930	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.612	BBA	714295.0	23.9799	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.618	BBA	305961.9	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD02.D

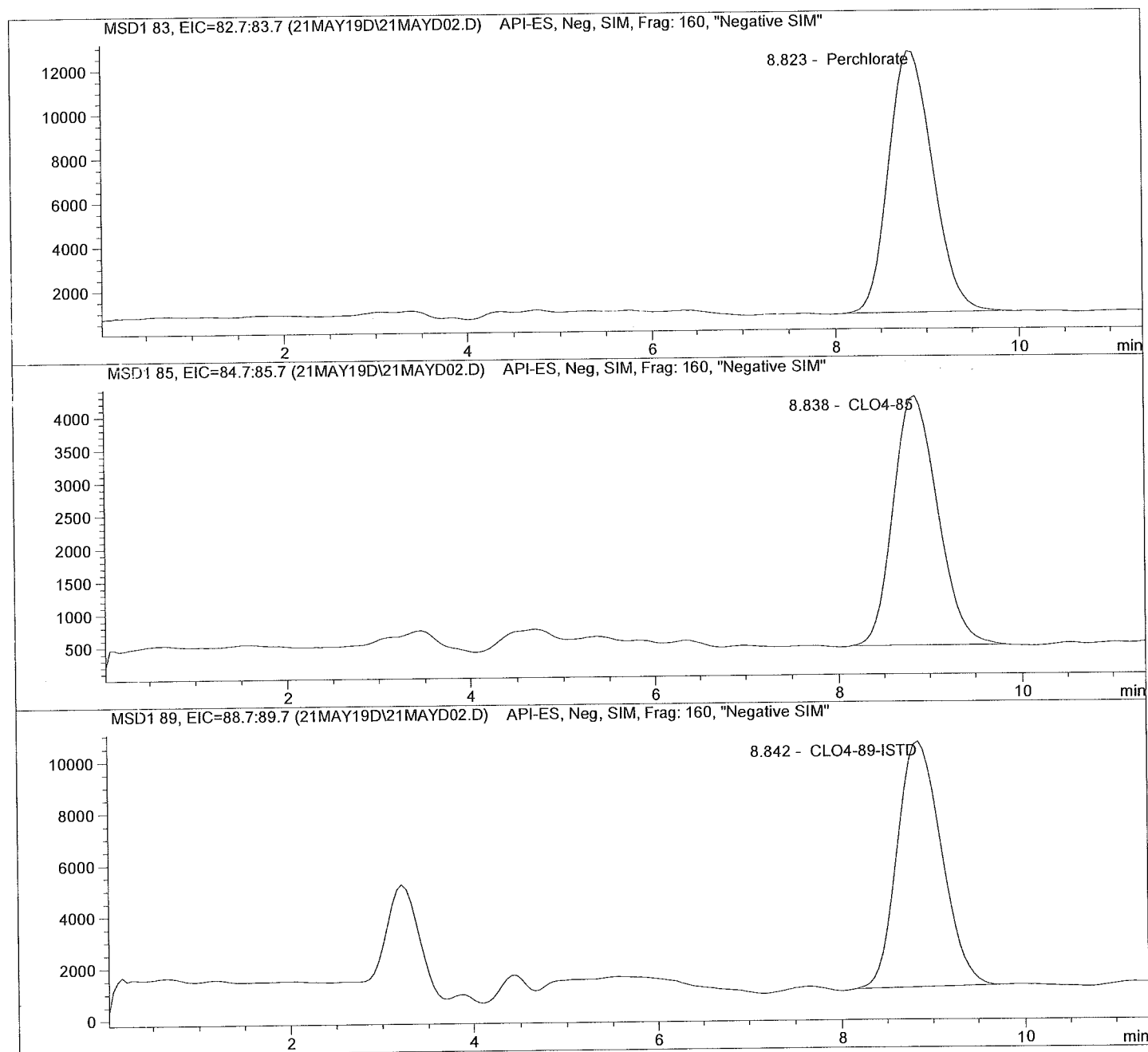
Sample Name: 653684 QC@4.0

Injection Date: 5/21/2019 08:02:56
Sample Name: 653684 QC@4.0
Acq Operator: 6214

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD02.D Sample Name: 653684 QC@4.0

Injection Date: 5/21/2019 08:02:56 Seq Line: 2
 Sample Name: 653684 QC@4.0 Location: Vial 72
 Acq Operator: 6214 Inj. No.: 1
 Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
 Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
 Multiplier: 1.000000
 Dilution: 1.000000
 Sample Amount: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.823	PBA	396638.7	4.0827	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.838	BBA	127284.0	4.2613	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.842	PBA	319795.5	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD03.D

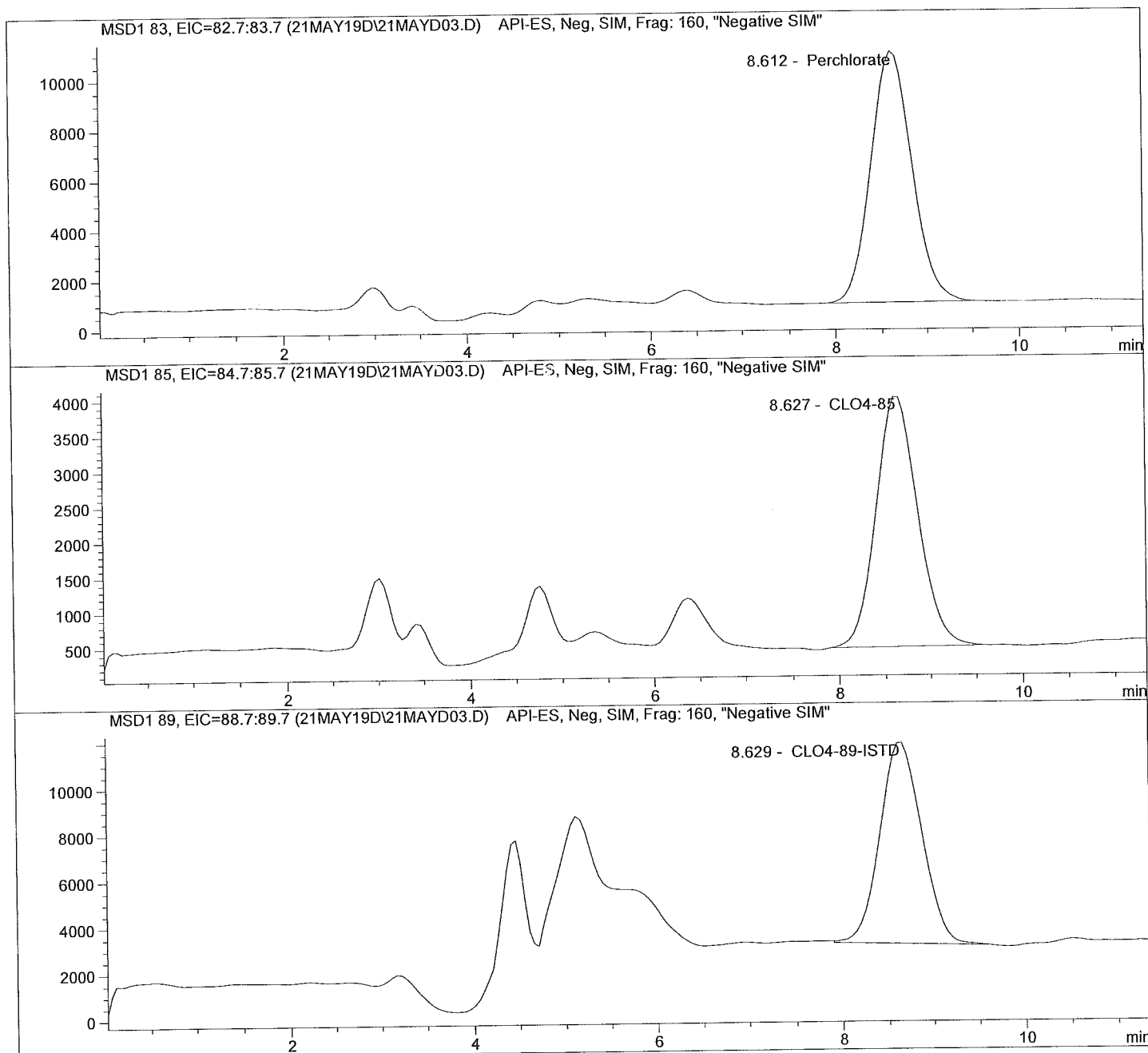
Sample Name: 653682 ICS@4.0

Injection Date: 5/21/2019 08:16:19
Sample Name: 653682 ICS@4.0
Acq Operator: 6214

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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD03.D Sample Name: 653682 ICS@4.0

```
=====
Injection Date: 5/21/2019 08:16:19 Seq Line: 3
Sample Name: 653682 ICS@4.0 Location: Vial 73
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl
=====
```

Acq. Method: CLO4-AQN.M
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000
=====
```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.612	PBA	314959.5	3.7442	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.627	PBA	112778.0	4.3408	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.629	BBA	278118.1	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD04.D

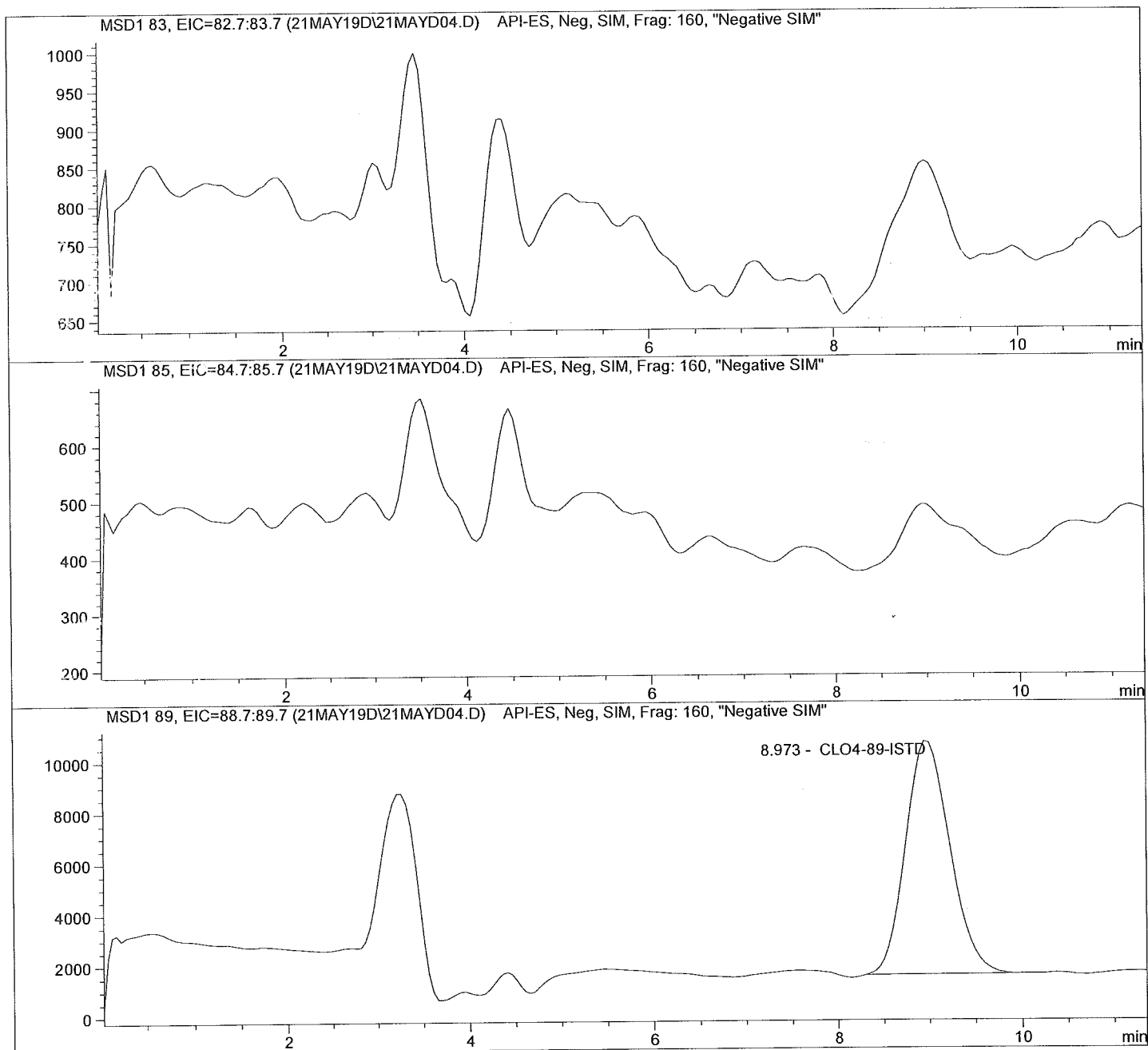
Sample Name: 653683 LMB

Injection Date: 5/21/2019 08:29:45
Sample Name: 653683 LMB
Acq Operator: 6214

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD04.D

Sample Name: 653683 LMB

```
=====
Injection Date:  5/21/2019  08:29:45      Seq Line:           4
Sample Name:     653683    LMB             Location:          Vial 74
Acq Operator:    6214              Inj. No.:           1
                                           Inj. Vol.:          35 µl
=====
```

```
Acq. Method:      CLO4-AQN.M
Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:      4/12/2019  07:54:13
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:          Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.973	PBA	307549.9	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD05.D

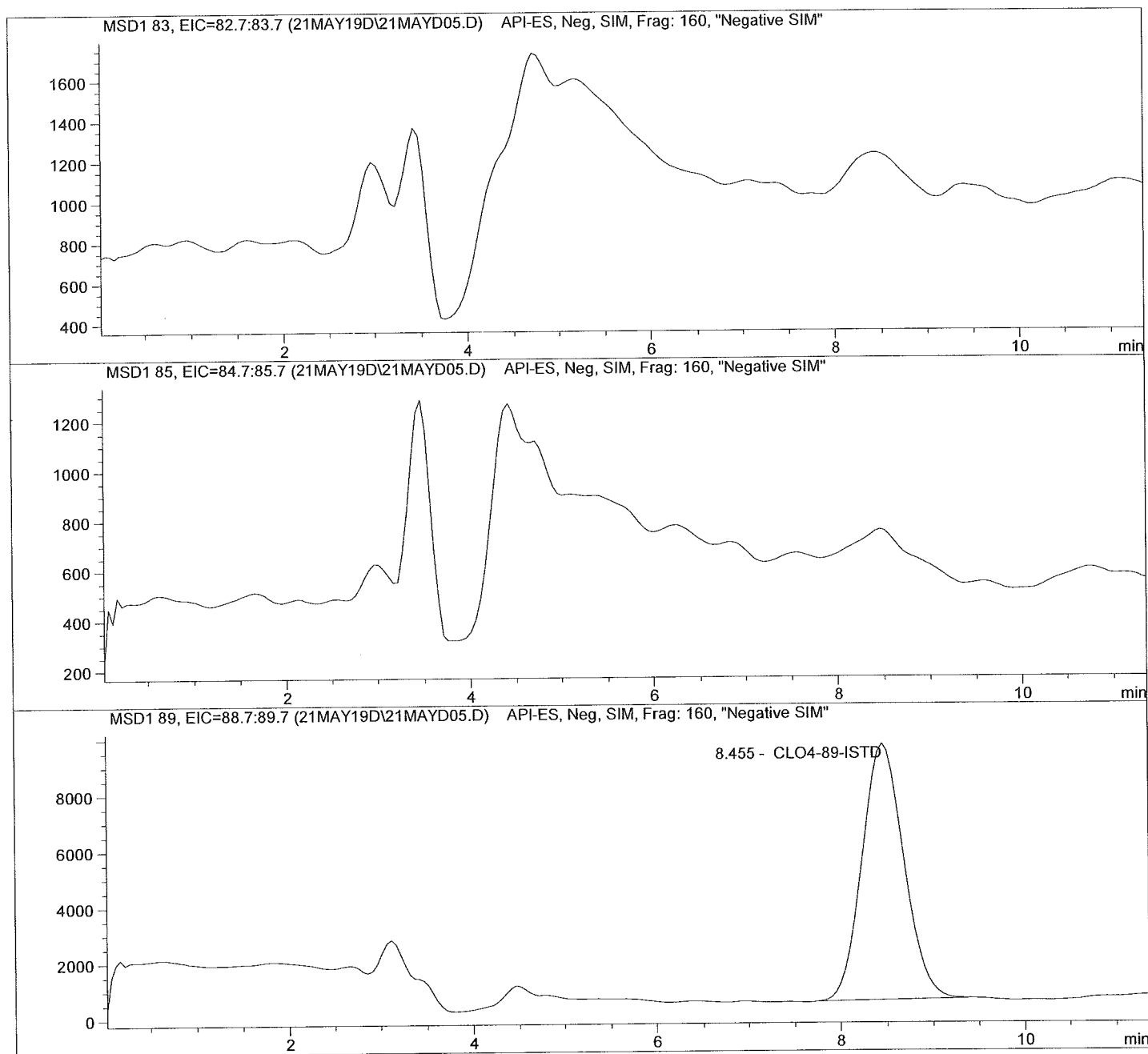
Sample Name: 1913332001

Injection Date: 5/21/2019 08:43:07
Sample Name: 1913332001
Acq Operator: 6214

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD05.D

Sample Name: 1913332001

```
=====
Injection Date:  5/21/2019  08:43:07      Seq Line:          5
Sample Name:    1913332001      Location:         Vial 75
Acq Operator:   6214           Inj. No.:          1
                               Inj. Vol.:         35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019, 07:52:58 am
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
8.455	PBA	284011.2	5.0000	CLO4-89-ISTD

=====
*** End of Report ***
=====

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD06.D

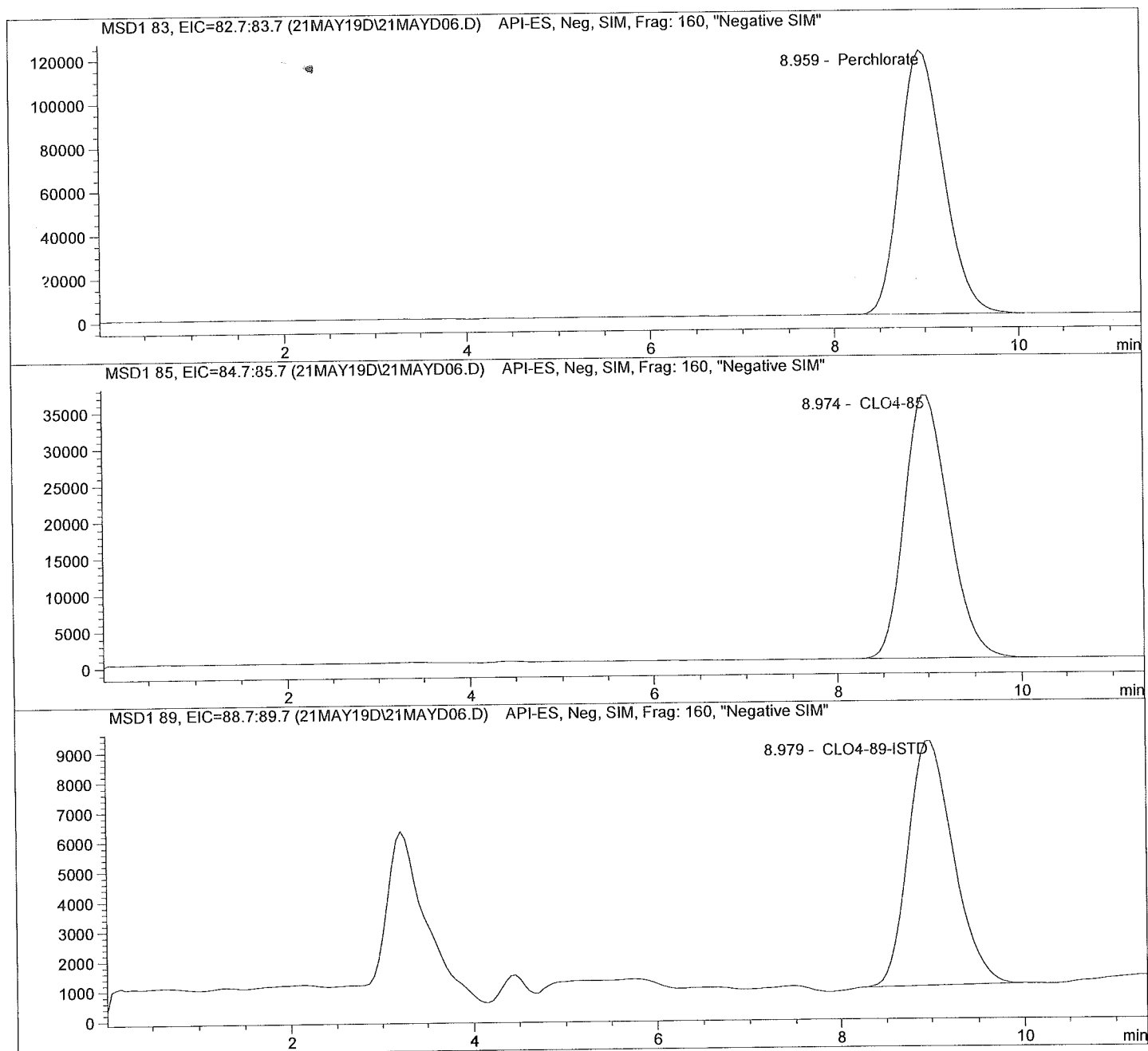
Sample Name: 1913338001 100

Injection Date: 5/21/2019 08:56:30
Sample Name: 1913338001 100
Acq Operator: 6214

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD06.D Sample Name: 1913338001 100

=====
Injection Date: 5/21/2019 08:56:30 Seq Line: 6
Sample Name: 1913338001 100 Location: Vial 76
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====
Sample Information
=====

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.959	PBA	3993682.8	4178.2424	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.974	PBA	1205073.2	4254.4161	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.979	BBA	280005.7	500.0000	CLO4-89-ISTD

=====
*** End of Report ***
=====

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD07.D

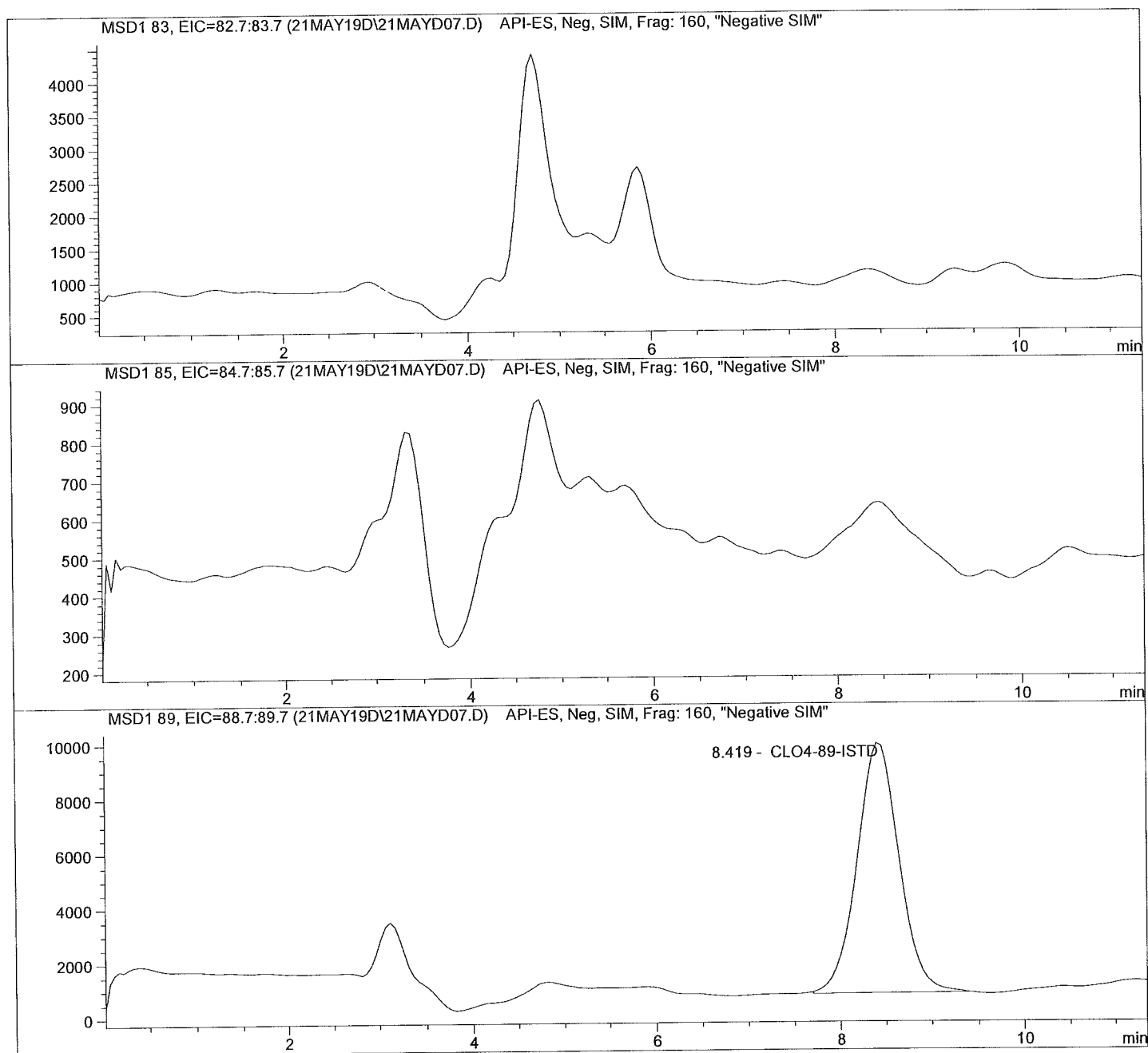
Sample Name: 1913342001

Injection Date: 5/21/2019 09:10:03
Sample Name: 1913342001
Acq Operator: 6214

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD07.D

Sample Name: 1913342001

```
=====
Injection Date:  5/21/2019  09:10:03      Seq Line:           7
Sample Name:    1913342001      Location:          Vial 77
Acq Operator:   6214           Inj. No.:           1
                                   Inj. Vol.:          35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.419	BBA	292233.0	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD08.D

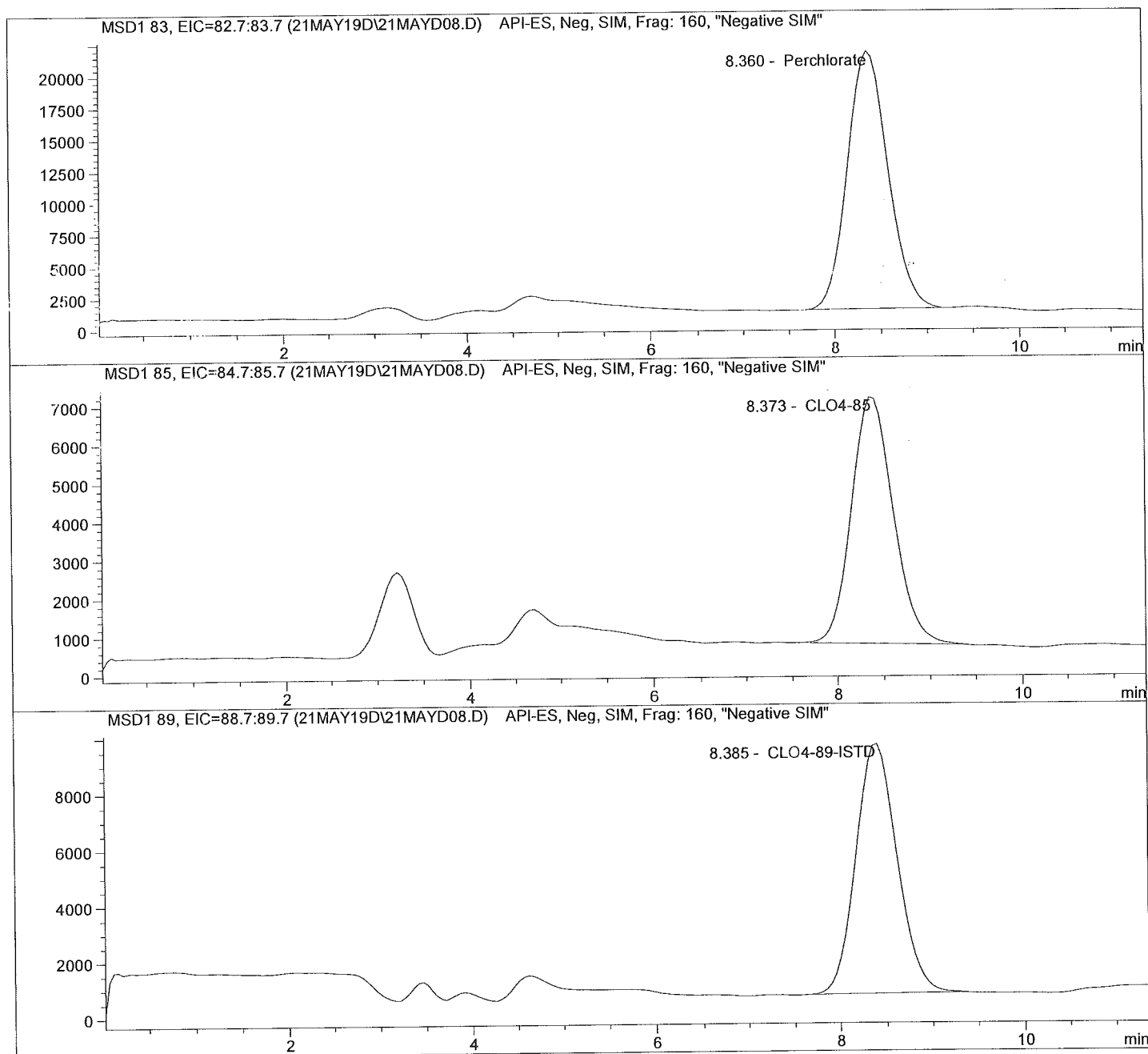
Sample Name: 1913342002

Injection Date: 5/21/2019 09:23:25
Sample Name: 1913342002
Acq Operator: 6214

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD08.D Sample Name: 1913342002

```
=====
Injection Date:  5/21/2019  09:23:25      Seq Line:           8
Sample Name:    1913342002      Location:          Vial 78
Acq Operator:   6214           Inj. No.:            1
                               Inj. Vol.:          35 µl
=====
```

Acq. Method: CLO4-AQN.M
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.360	PBA	618077.5	7.2126	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.373	BBA	200267.3	7.7327	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.385	PBA	275333.5	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD09.D

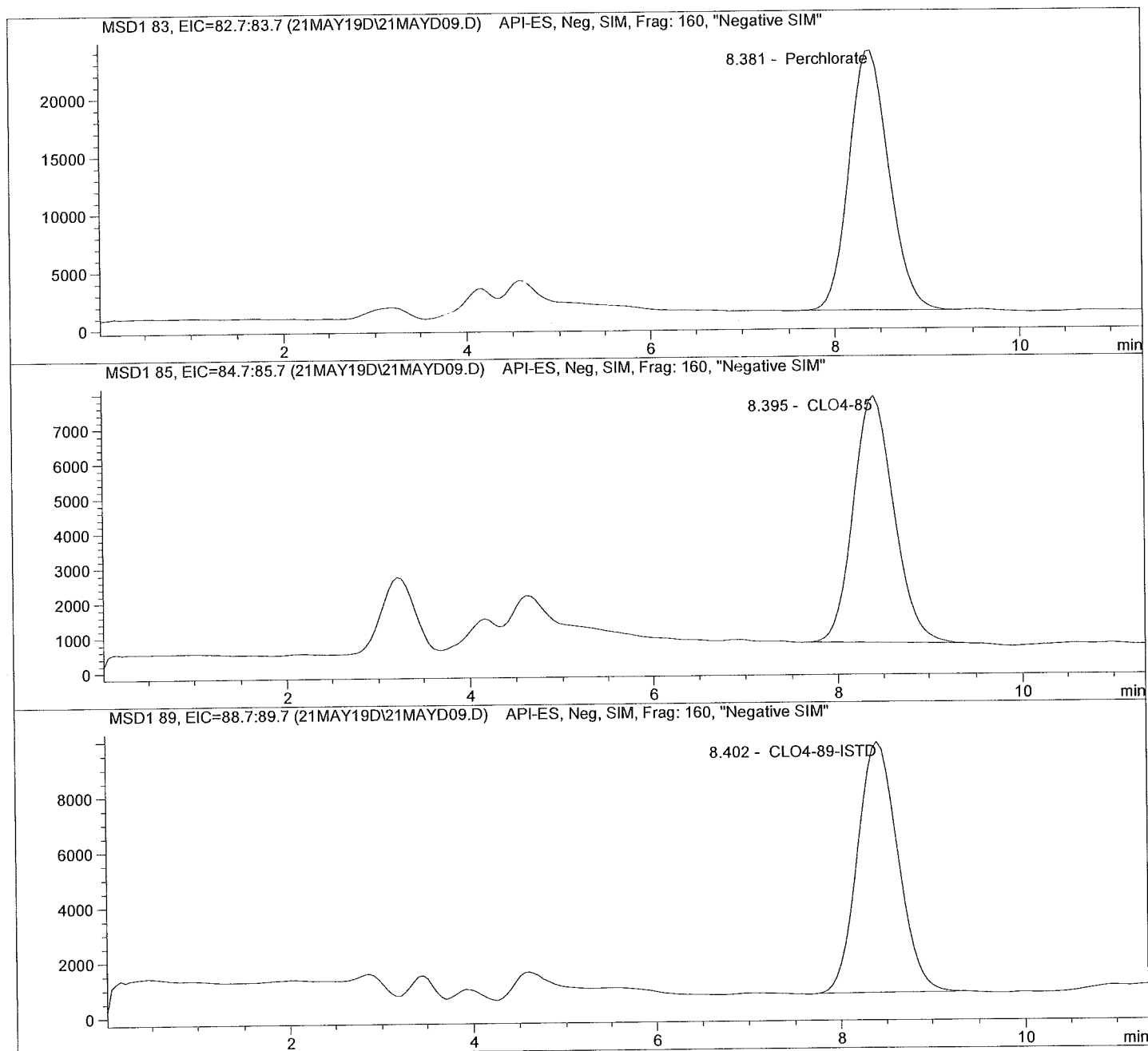
Sample Name: 1913342003

Injection Date: 5/21/2019 09:36:53
Sample Name: 1913342003
Acq Operator: 6214

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD09.D

Sample Name: 1913342003

```

=====
Injection Date:  5/21/2019  09:36:53      Seq Line:          9
Sample Name:    1913342003      Location:        Vial 79
Acq Operator:   6214           Inj. No.:         1
                                   Inj. Vol.:        35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.381	PBA	679913.4	7.7657	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.395	PBA	218019.8	8.2536	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.402	PBA	280514.3	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD10.D

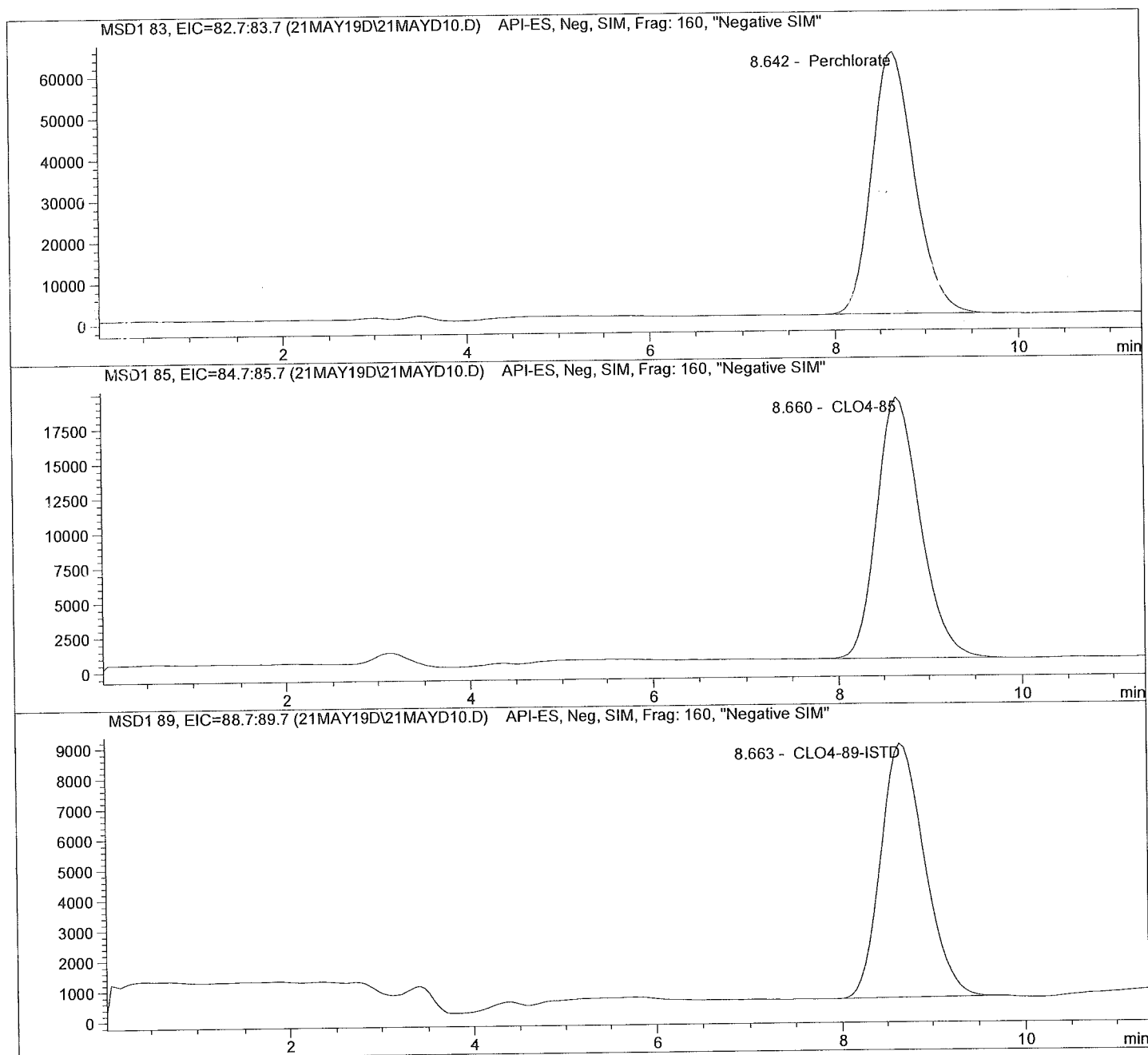
Sample Name: 1913342004 10X

Injection Date: 5/21/2019 09:50:15
Sample Name: 1913342004 10X
Acq Operator: 6214

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD10.D

Sample Name: 1913342004 10X

```
=====
Injection Date: 5/21/2019 09:50:15 Seq Line: 10
Sample Name: 1913342004 10X Location: Vial 80
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl
=====
```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

```
=====
Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.642	BBA	2092939.0	226.5679	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.660	BBA	629787.7	229.3720	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.663	PBA	282645.6	50.0000	CLO4-89-ISTD

=====

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD11.D

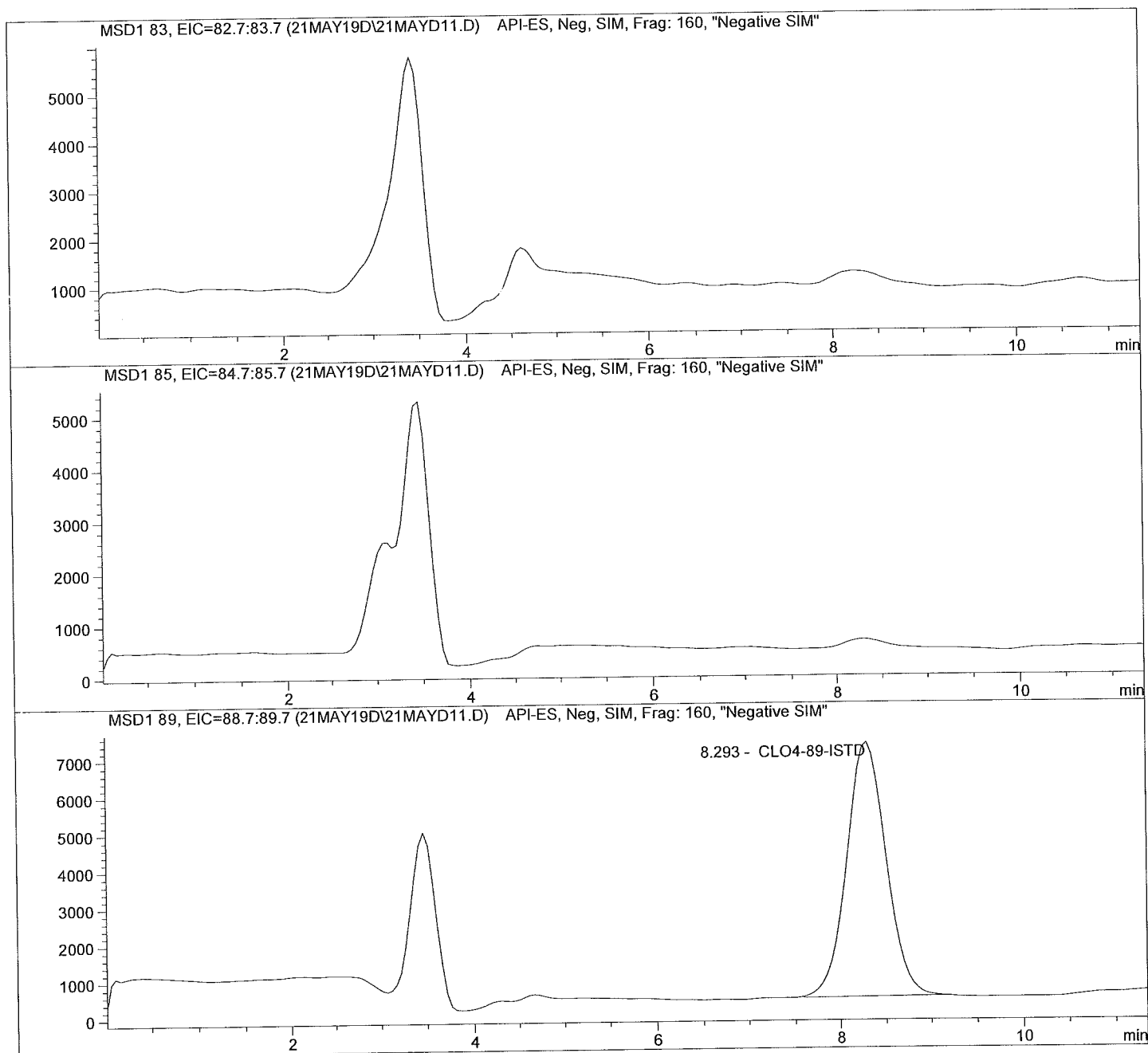
Sample Name: 1913342005

Injection Date: 5/21/2019 10:03:44
Sample Name: 1913342005
Acq Operator: 6214

Seq Line: 11
Location: Vial 81
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD11.D Sample Name: 1913342005

Injection Date: 5/21/2019 10:03:44 Seq Line: 11
Sample Name: 1913342005 Location: Vial 81
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.293	BBA	206103.9	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD12.D

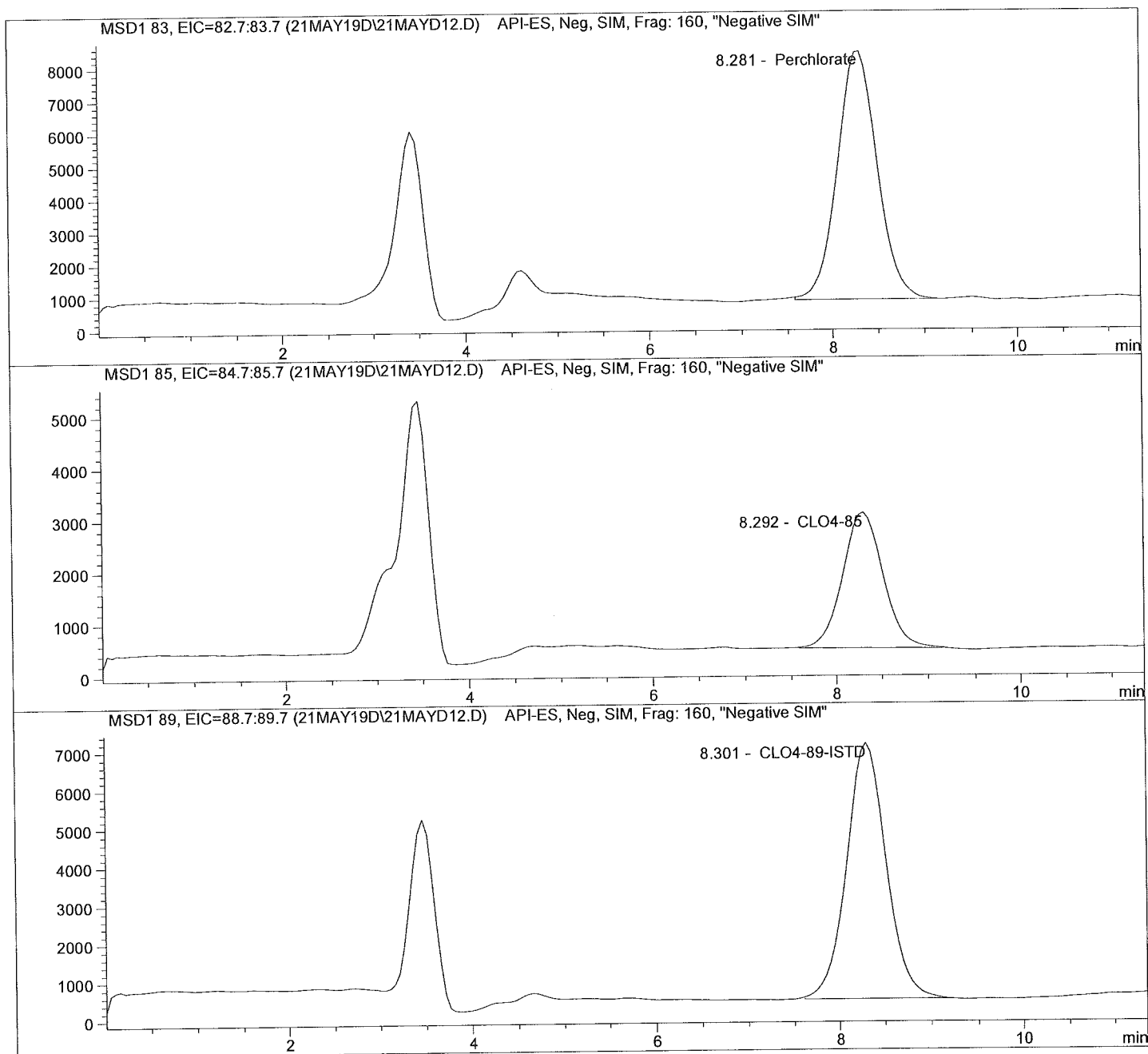
Sample Name: 1913342006 MS

Injection Date: 5/21/2019 10:17:04
Sample Name: 1913342006 MS
Acq Operator: 6214

Seq Line: 12
Location: Vial 82
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD12.D Sample Name: 1913342006 MS

Injection Date: 5/21/2019 10:17:04 Seq Line: 12
 Sample Name: 1913342006 MS Location: Vial 82
 Acq Operator: 6214 Inj. No.: 1
 Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
 Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
 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
8.281	BBA	230072.2	3.7779	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.292	BBA	80507.0	4.2826	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.301	BBA	201254.7	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD13.D

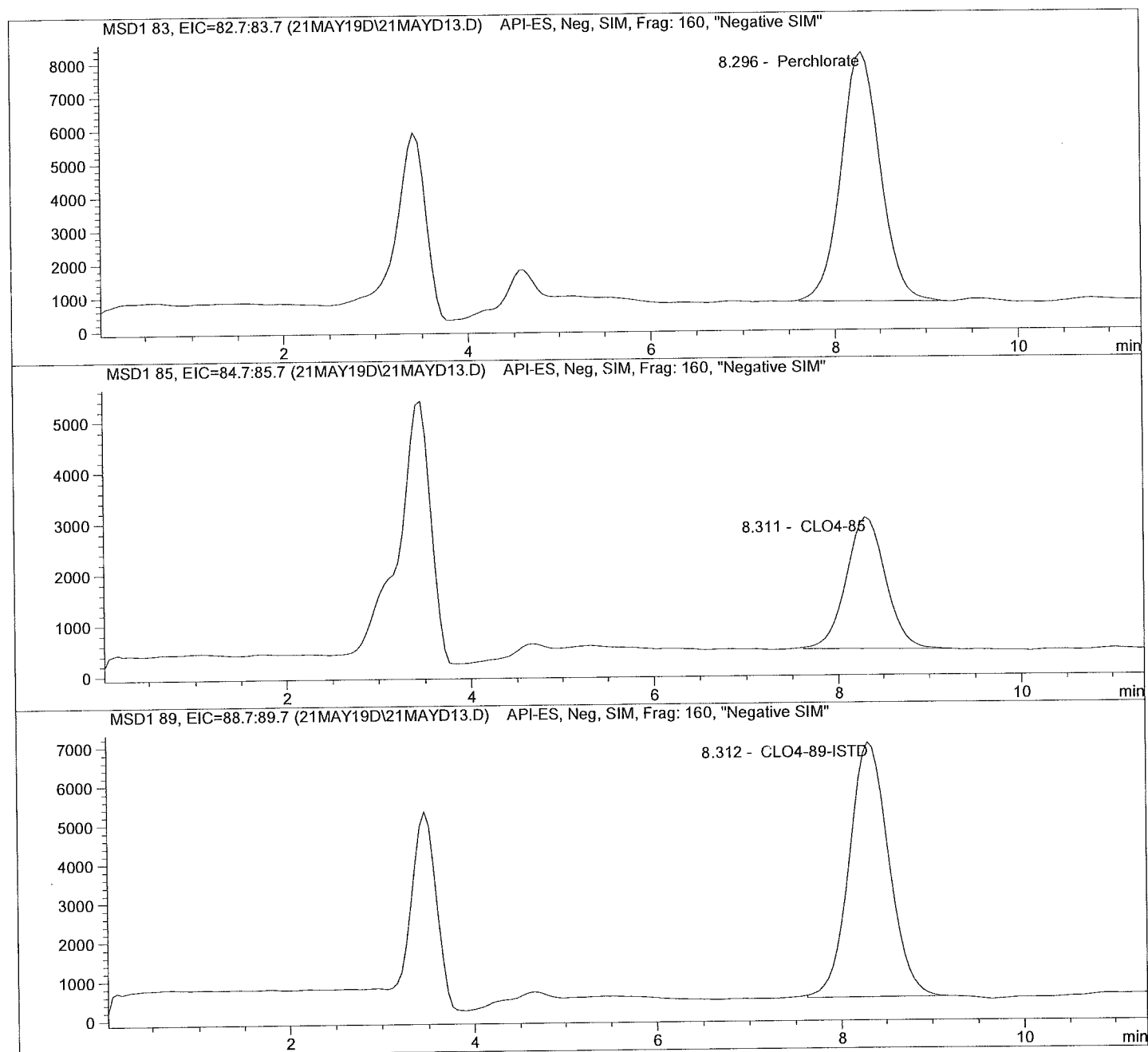
Sample Name: 1913342007 SD

Injection Date: 5/21/2019 10:30:27
Sample Name: 1913342007 SD
Acq Operator: 6214

Seq Line: 13
Location: Vial 83
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD13.D Sample Name: 1913342007 SD

Injection Date: 5/21/2019 10:30:27 Seq Line: 13
Sample Name: 1913342007 SD Location: Vial 83
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.296	BBA	223455.8	3.7214	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.311	BBA	78456.0	4.2299	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.312	BBA	198591.3	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD14.D

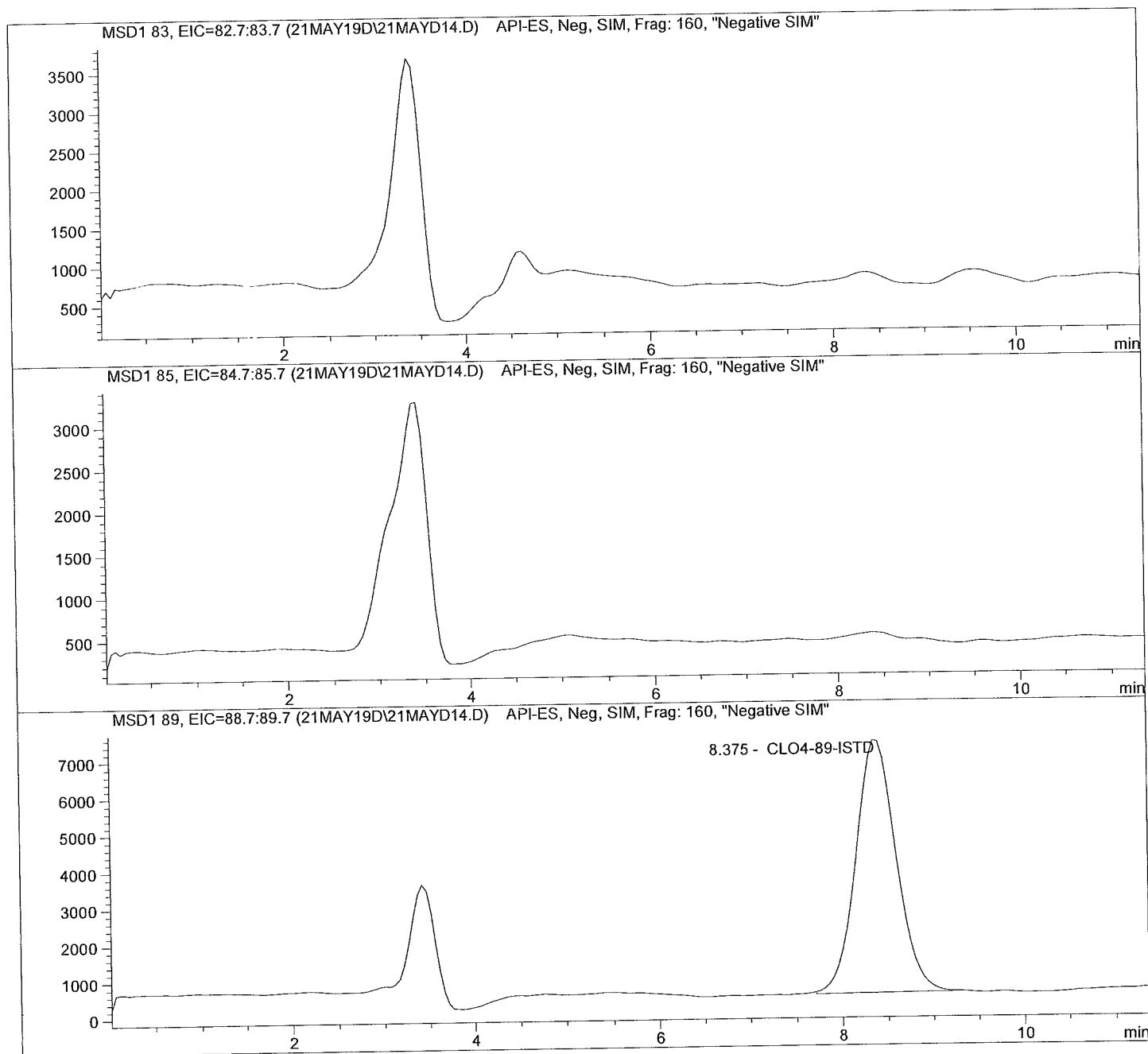
Sample Name: 1913342008

Injection Date: 5/21/2019 10:43:48
Sample Name: 1913342008
Acq Operator: 6214

Seq Line: 14
Location: Vial 84
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD14.D

Sample Name: 1913342008

```
=====
Injection Date:  5/21/2019  10:43:48      Seq Line:          14
Sample Name:    1913342008      Location:         Vial 84
Acq Operator:   6214           Inj. No.:          1
                                   Inj. Vol.:         35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.375	BBA	210825.1	5.0000	CLO4-89-ISTD

=====
*** End of Report ***
=====

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD15.D

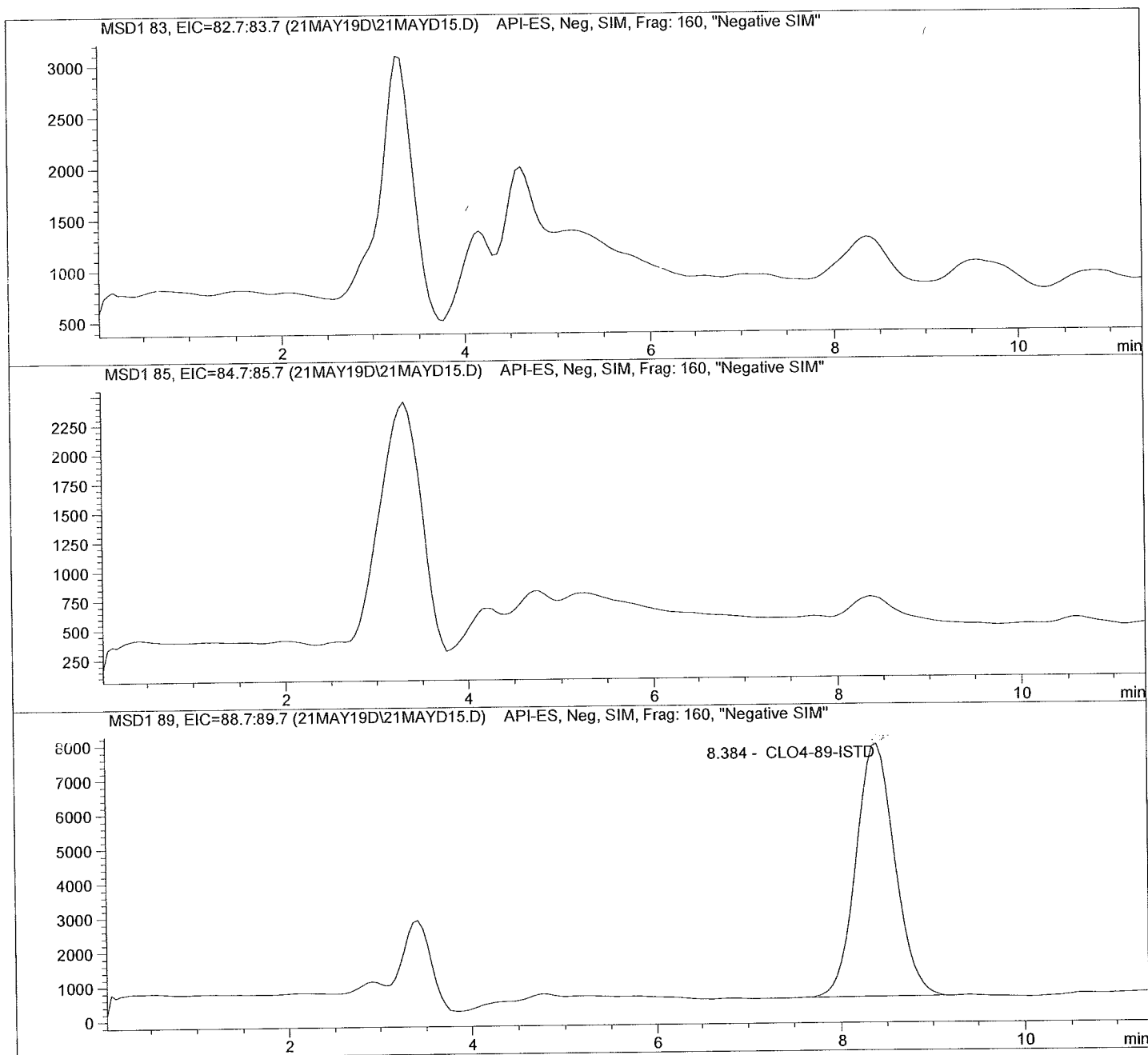
Sample Name: 1913342009

Injection Date: 5/21/2019 10:57:10
Sample Name: 1913342009
Acq Operator: 6214

Seq Line: 15
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD15.D Sample Name: 1913342009

Injection Date: 5/21/2019 10:57:10 Seq Line: 15
Sample Name: 1913342009 Location: Vial 85
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.384	BBA	218072.4	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD16.D

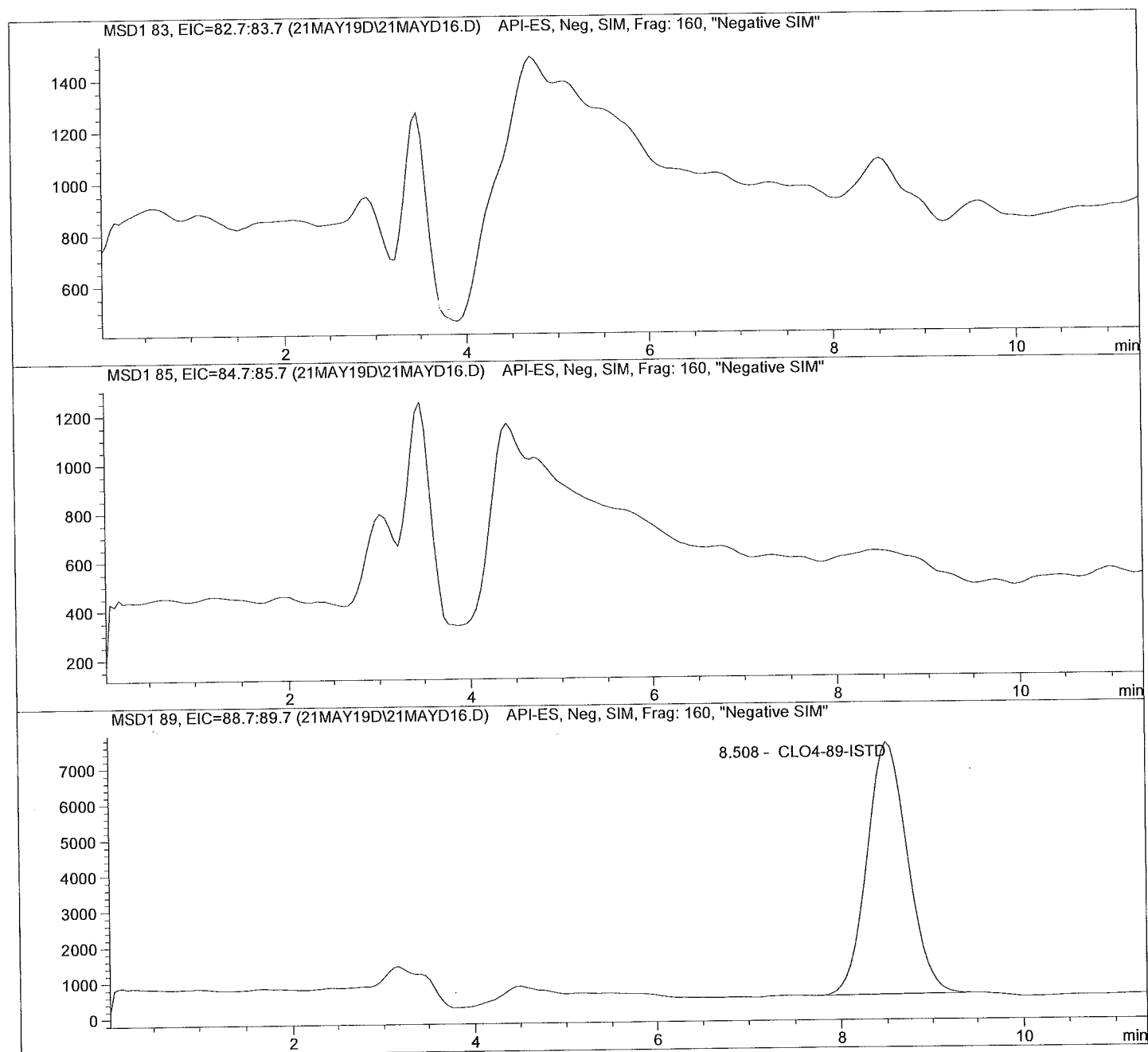
Sample Name: 1913345001

Injection Date: 5/21/2019 11:10:33
Sample Name: 1913345001
Acq Operator: 6214

Seq Line: 16
Location: Vial 86
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD16.D Sample Name: 1913345001

Injection Date: 5/21/2019 11:10:33 Seq Line: 16
Sample Name: 1913345001 Location: Vial 86
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
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
8.508	PBA	217961.0	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD17.D

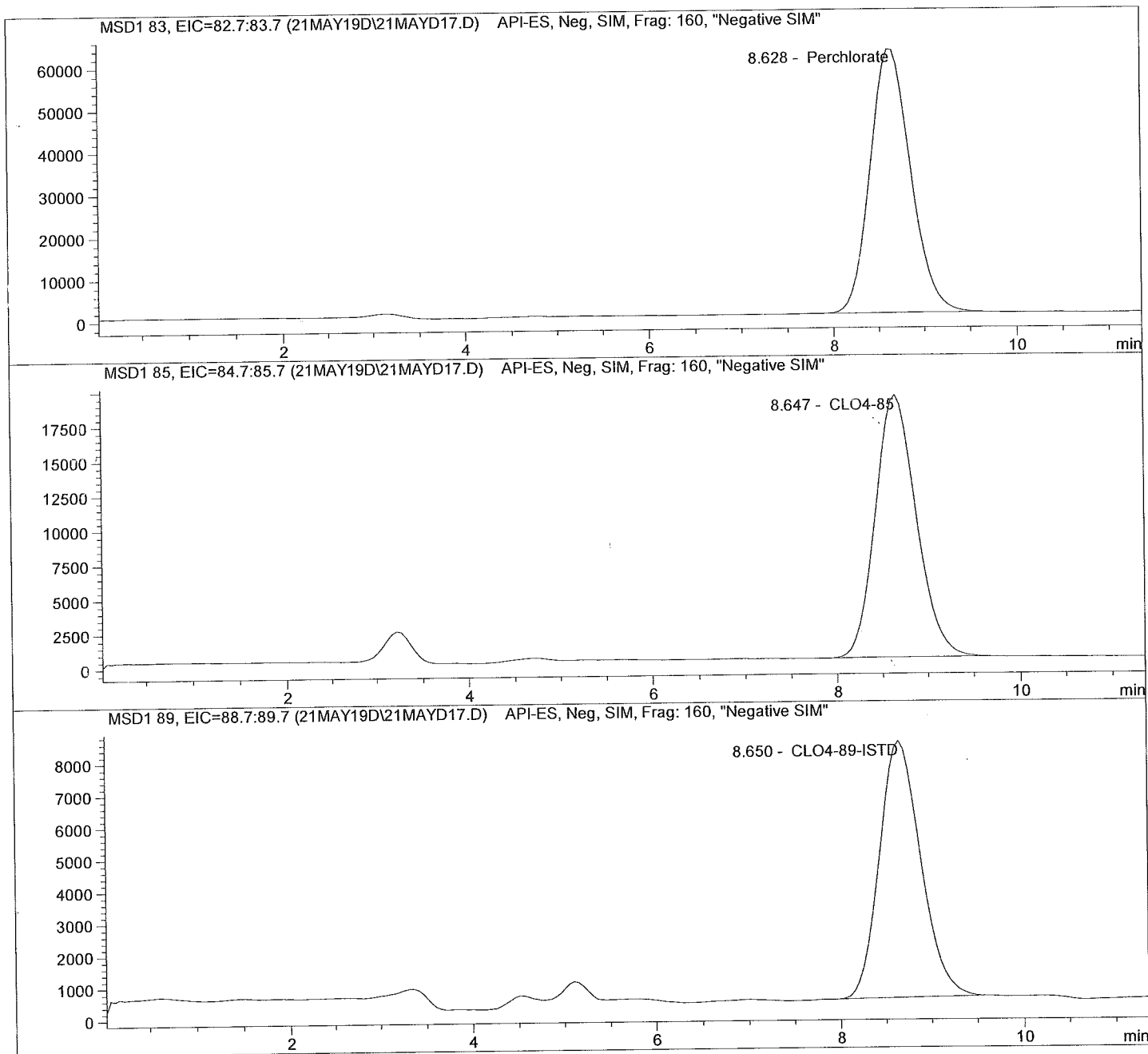
Sample Name: 653685 CCV@25

Injection Date: 5/21/2019 11:23:56
Sample Name: 653685 CCV@25
Acq Operator: 6214

Seq Line: 17
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD17.D

Sample Name: 653685 CCV@25

```
=====
Injection Date:  5/21/2019  11:23:56      Seq Line:          17
Sample Name:    653685    CCV@25          Location:          Vial 71
Acq Operator:   6214              Inj. No.:           1
                                      Inj. Vol.:          35 µl
=====
```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.628	PBA	1938377.4	23.3659	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.647	PBA	593941.4	24.0719	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.650	PBA	253387.5	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 : 3/19/2019 2:35:19 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	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
[min]	Sig						
8.744	1	1	1.00000	7.76074e4	1.28854e-5	1	Perchlorate
		2	2.00000	1.35273e5	1.47849e-5		
		3	5.00000	3.37764e5	1.48033e-5		
		4	10.00000	6.83454e5	1.46316e-5		
		5	25.00000	2.08433e6	1.19943e-5		
		6	50.00000	4.13334e6	1.20968e-5		
		7	75.00000	5.99313e6	1.25143e-5		
8.755	2	1	1.00000	2.36780e4	4.22333e-5	1	CLO4-85
		2	2.00000	4.69486e4	4.25998e-5		
		3	5.00000	1.06124e5	4.71147e-5		
		4	10.00000	2.13523e5	4.68335e-5		
		5	25.00000	6.14295e5	4.06971e-5		
		6	50.00000	1.19814e6	4.17315e-5		
		7	75.00000	1.78355e6	4.20509e-5		
8.766	3	1	5.00000	2.73208e5	1.83011e-5	+I1	CLO4-89-ISTD
		2	5.00000	2.24886e5	2.22335e-5		
		3	5.00000	2.33196e5	2.14412e-5		
		4	5.00000	2.34454e5	2.13262e-5		
		5	5.00000	2.50568e5	1.99547e-5		
		6	5.00000	2.30977e5	2.16472e-5		

RetTime	Lvl	Amount	Area	Amt/Area	Ref Grp Name
[min]	Sig				

7		5.00000	2.21504e5	2.25729e-5	
---	--	---------	-----------	------------	--

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min
Curve Type : Quadratic
Origin : Ignored
Calibration Level Weights:/
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min
Curve Type : Quadratic
Origin : Ignored
Calibration Level Weights:/
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333

Compound: CLO4-89-ISTD

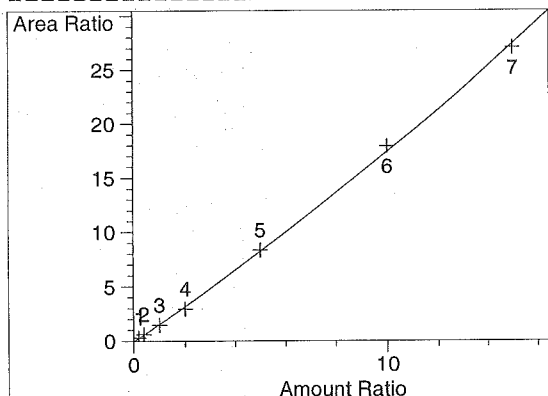
Time Window : From 6.659 min To 12.466 min
Curve Type : Linear
Origin : Included
Calibration Level Weights:/
Level 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

=====

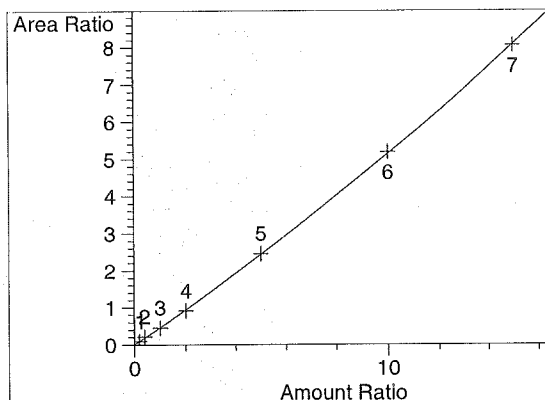
Peak Sum Table

=====

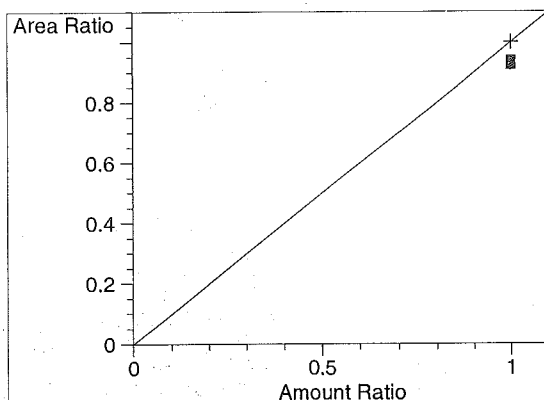
No Entries in table

=====
Calibration Curves
=====

Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation: 0.99957
Residual Std. Dev.: 0.30744
Formula: $y = ax^2 + bx + c$
a: 1.76988e-2
b: 1.56480
c: -4.92430e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755
MSD1 85, EIC=84.7:85.7
Correlation: 0.99983
Residual Std. Dev.: 0.03473
Formula: $y = ax^2 + bx + c$
a: 5.13396e-3
b: 4.62055e-1
c: 4.97209e-4
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:
Level 1 : 1
Level 2 : 0.5
Level 3 : 0.2
Level 4 : 0.1
Level 5 : 0.04
Level 6 : 0.02
Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766
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 1 : 1
Level 2 : 1
Level 3 : 1
Level 4 : 1
Level 5 : 1
Level 6 : 1
Level 7 : 1

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	7.76074e4	1.06245
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	2.06969
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	4.73474
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	9.27727
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	25.29036
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	51.36844
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	74.16754
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	9.25940

Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
##							
##	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	9.30535e-1
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	2.24255
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	4.86656
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	9.64312
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	25.12159
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	50.46721
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	74.72019
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	9.54024

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	2.73208e5	5.00000
##	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	5.00000
##	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	5.00000
##	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	5.00000
##	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	5.00000
##	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	5.00000
##	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	5.00000
##	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

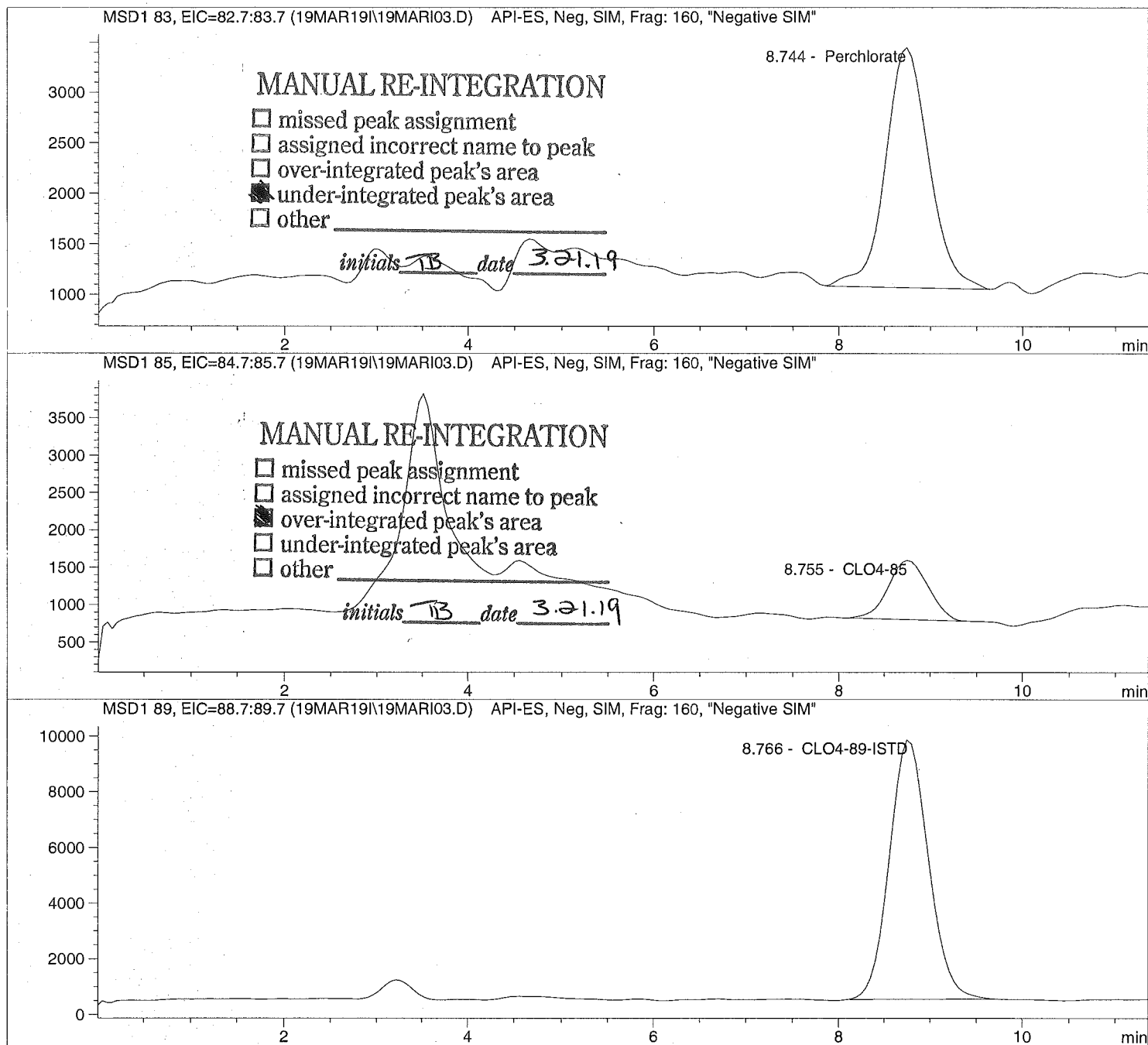
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	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 80	ICAL Verf@10ug/L	CLO4-AQN	1	Ctrl Samp		

Injection Date: 3/19/2019 09:39:40
Sample Name: CLO4@ 1.0ug/L
Acq Operator: TNB

Seq Line: 3
Location: Vial 73
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI03.D Sample Name: CLO4@ 1.0ug/L

```
=====
Injection Date:  3/19/2019  09:39:40      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-DP2.M
Last Changed:    3/19/2019  14:35:22
```

Perchlorate analysis

Sample Information

```
=====
Sorted By:       Signal
Calib. Data Modified:  Tue, 19. Mar. 2019,02:35:19 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
8.744	MM	77607.4	1.0625	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	MM	23678.0	0.9305	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

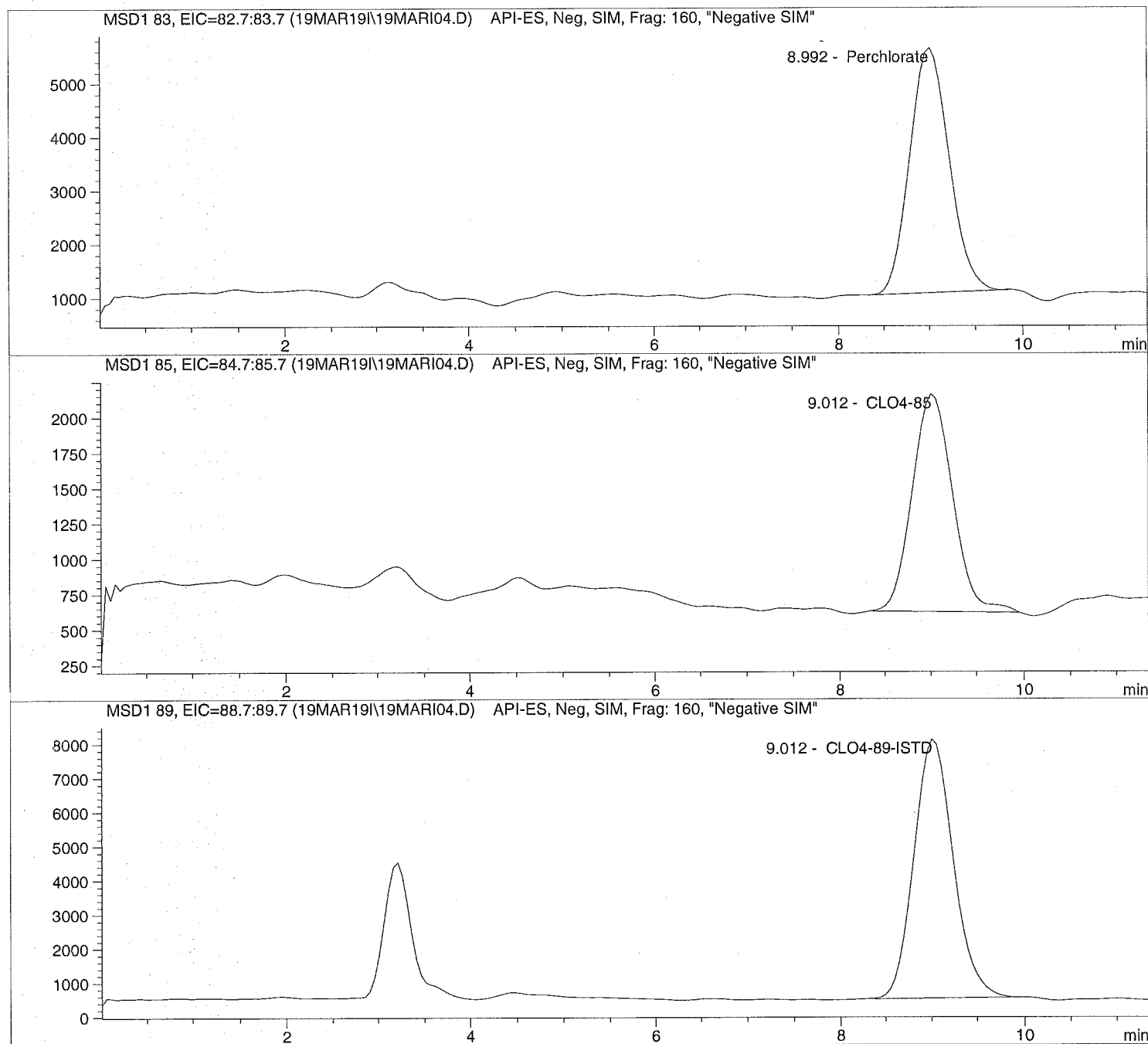
*** End of Report ***

Injection Date: 3/19/2019 09:53:00
Sample Name: CLO4@ 2.0ug/L
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D

Sample Name: CLO4@ 2.0ug/L

Injection Date: 3/19/2019 09:53:00
Sample Name: CLO4@ 2.0ug/L
Acq Operator: TNB

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.992	BBA	135272.8	2.0697	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

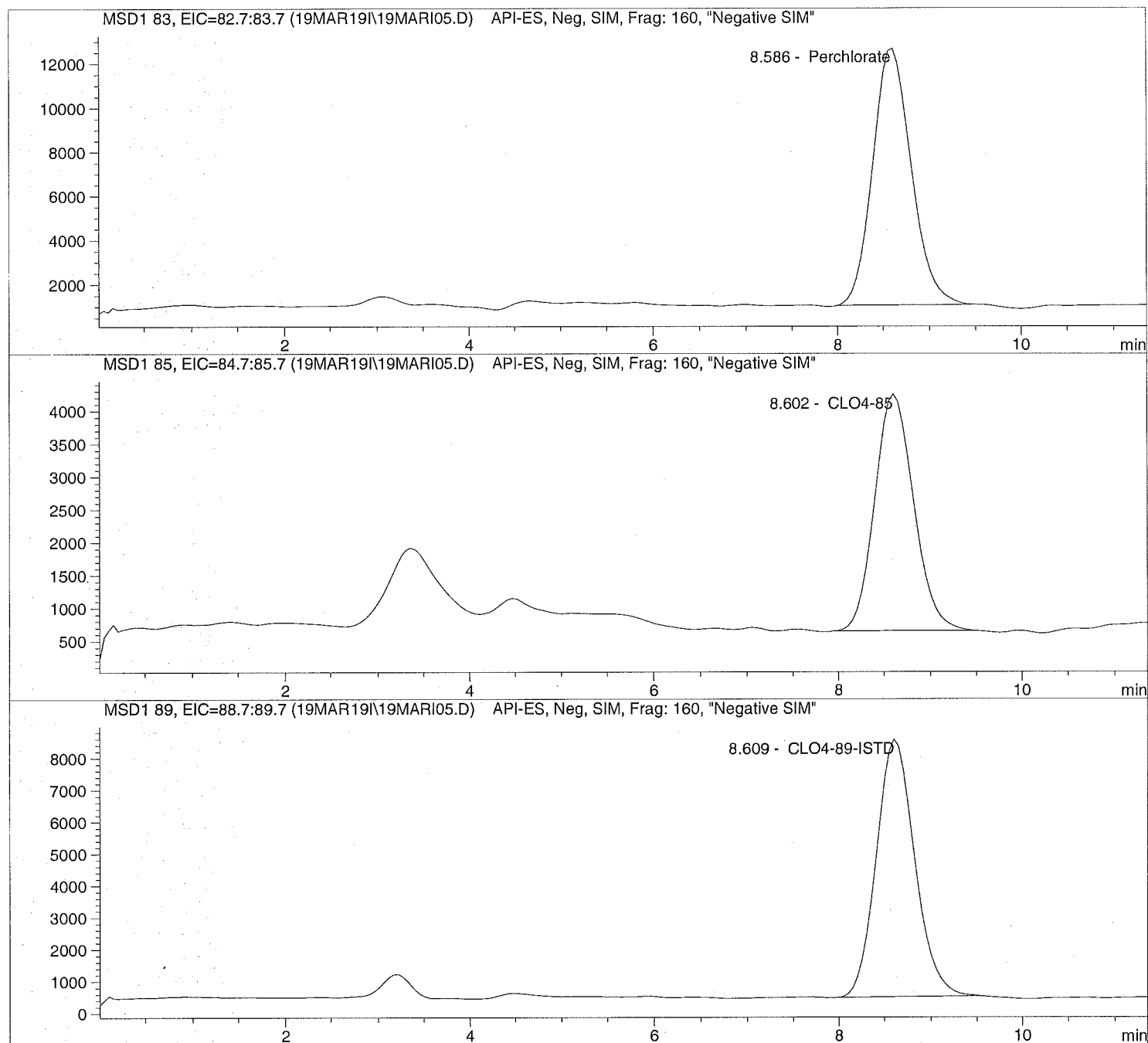
*** End of Report ***

Injection Date: 3/19/2019 10:06:16
Sample Name: CLO4@ 5.0ug/L
Acq Operator: TNB

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI05.D

Sample Name: CLO4@ 5.0ug/L

Injection Date: 3/19/2019 10:06:16

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

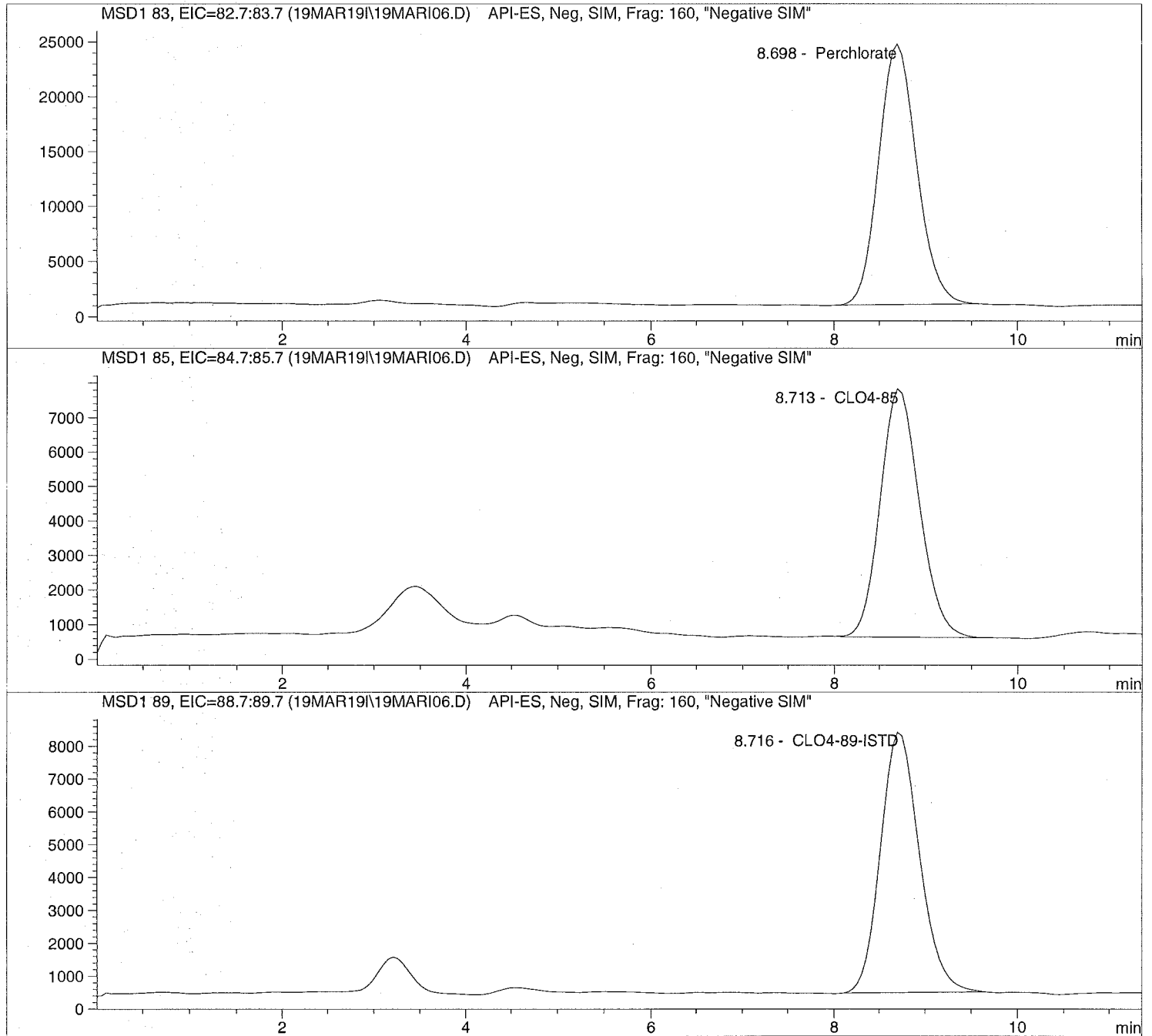
*** End of Report ***

Injection Date: 3/19/2019 10:19:32
Sample Name: CLO4@ 10.ug/L
Acq Operator: TNB

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI06.D Sample Name: CLO4@ 10.ug/L

Injection Date: 3/19/2019 10:19:32 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.698	PBA	683454.4	9.2773	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

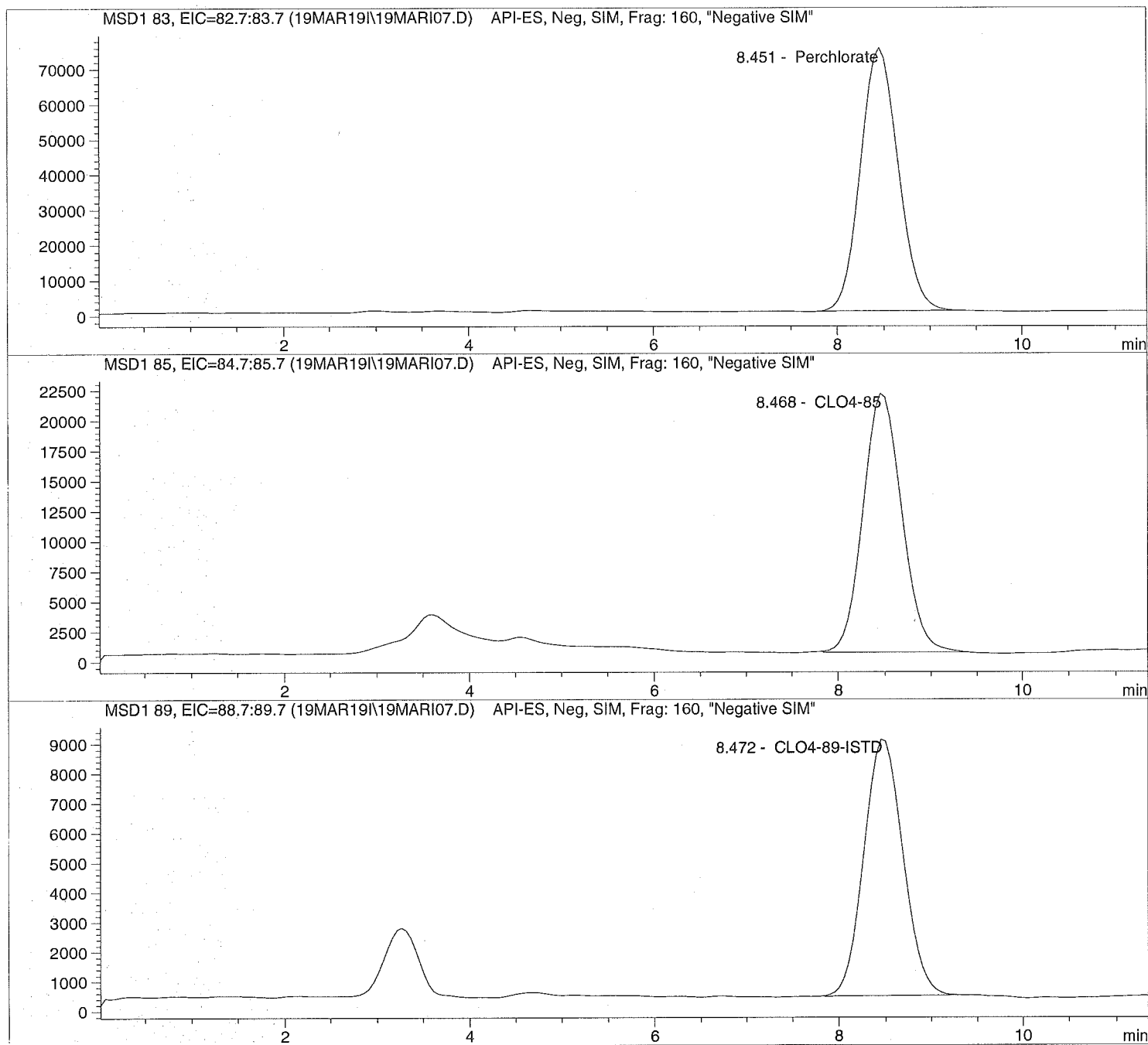
*** End of Report ***

Injection Date: 3/19/2019 10:32:49
Sample Name: CLO4@ 25.ug/L
Acq Operator: TNB

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Injection Date: 3/19/2019 10:32:49 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-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.451	PBA	2084327.4	25.2904	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.468	BBA	614294.8	25.1216	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D

Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05

Seq Line: 8

Sample Name: CLO4@ 50.ug/L

Location: Vial 78

Acq Operator: TNB

Inj. No.: 1

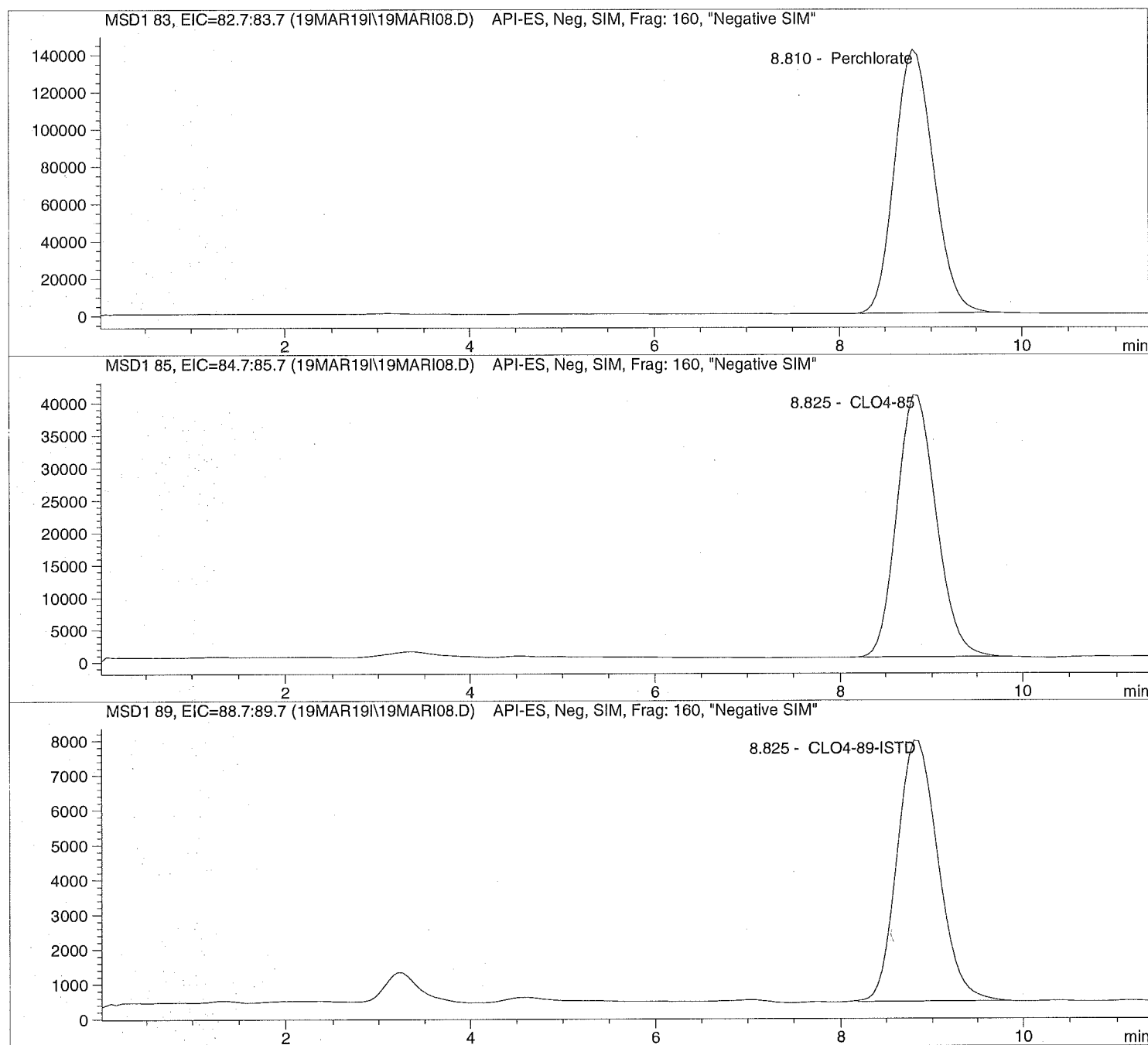
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D

Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.810	PBA	4133340.5	51.3684	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.4672	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

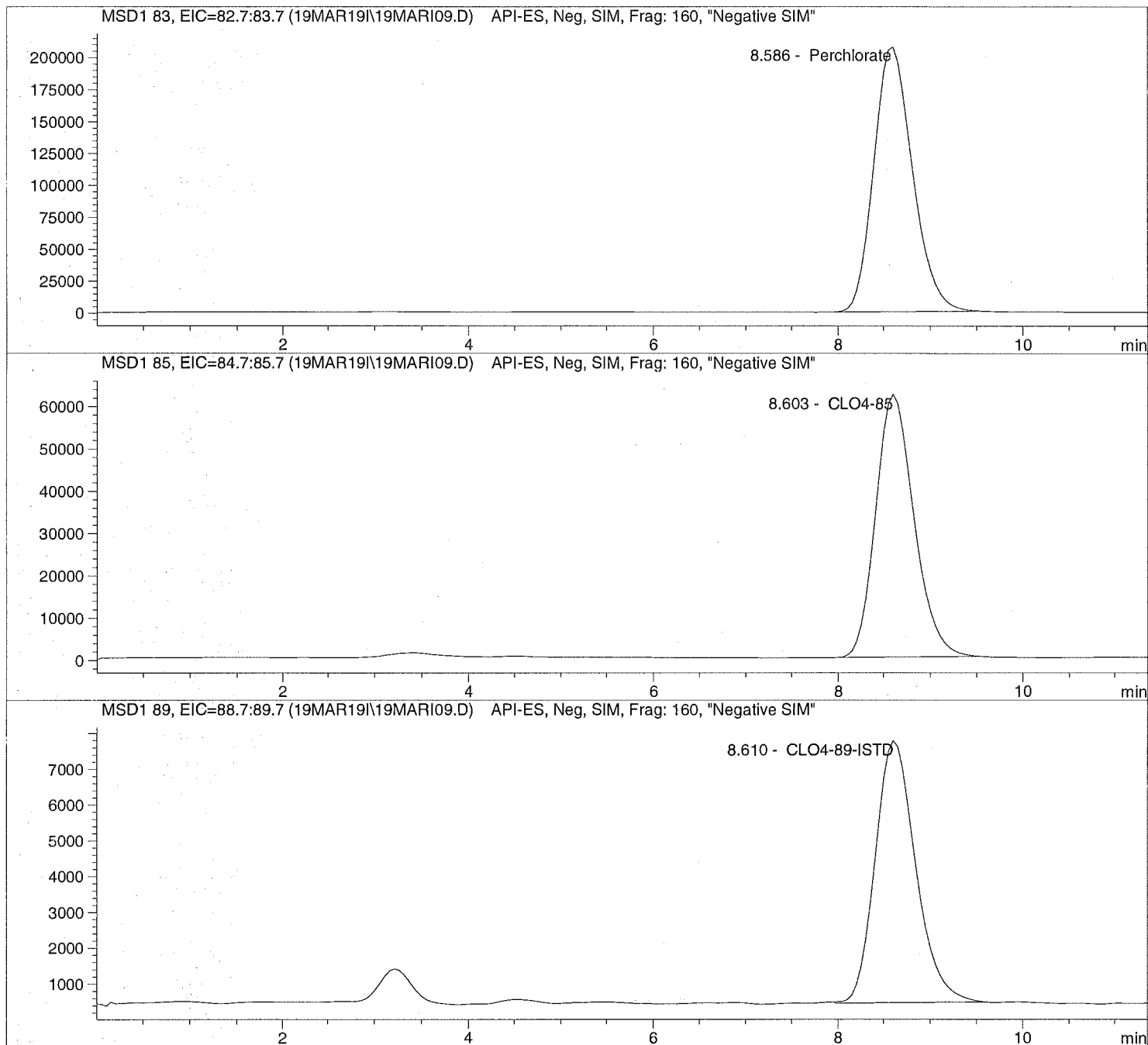
*** End of Report ***

Injection Date: 3/19/2019 10:59:22
Sample Name: CLO4@ 75.ug/L
Acq Operator: TNB

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI09.D

Sample Name: CLO4@ 75.ug/L

Injection Date: 3/19/2019 10:59:22

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

*** End of Report ***

Injection Date: 3/19/2019 11:12:42

Seq Line: 10

Sample Name: ICAL Verf@10ug/L

Location: Vial 80

Acq Operator: TNB

Inj. No.: 1

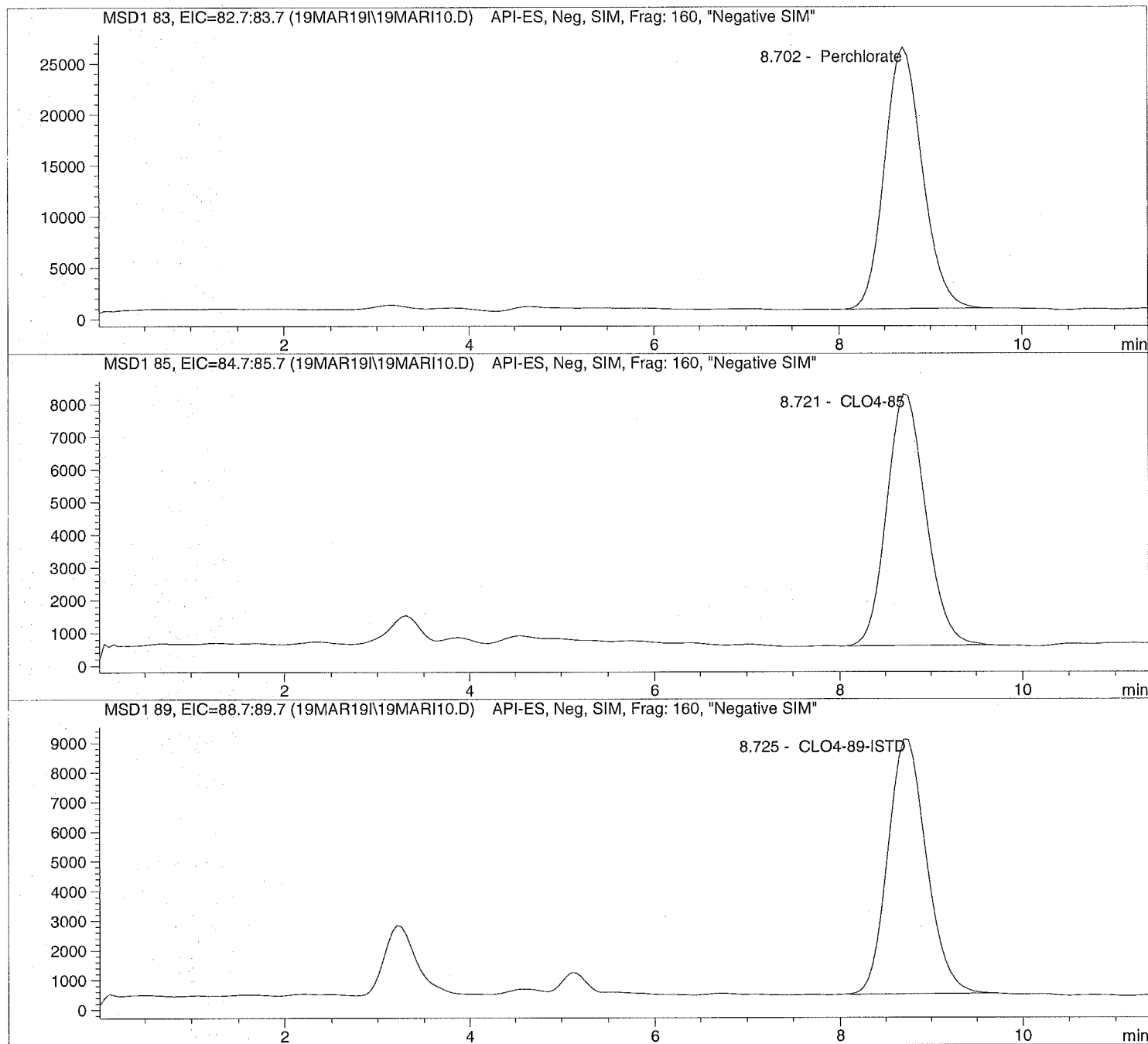
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D

Sample Name: ICAL Verf@10ug/L

Injection Date: 3/19/2019 11:12:42

Seq Line: 10

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-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

Sample Information

Sorted By: Signal

Calib. Data Modified: Tue, 19. Mar. 2019, 02:35:19 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
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	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\19MAR19\19MARI03.D

Sample Name: CLO4@ 1.0ug/L

Injection Date: 3/19/2019 09:39:40

Seq Line: 3

Sample Name: CLO4@ 1.0ug/L

Location: Vial 73

Acq Operator: TNB

Inj. No.: 1

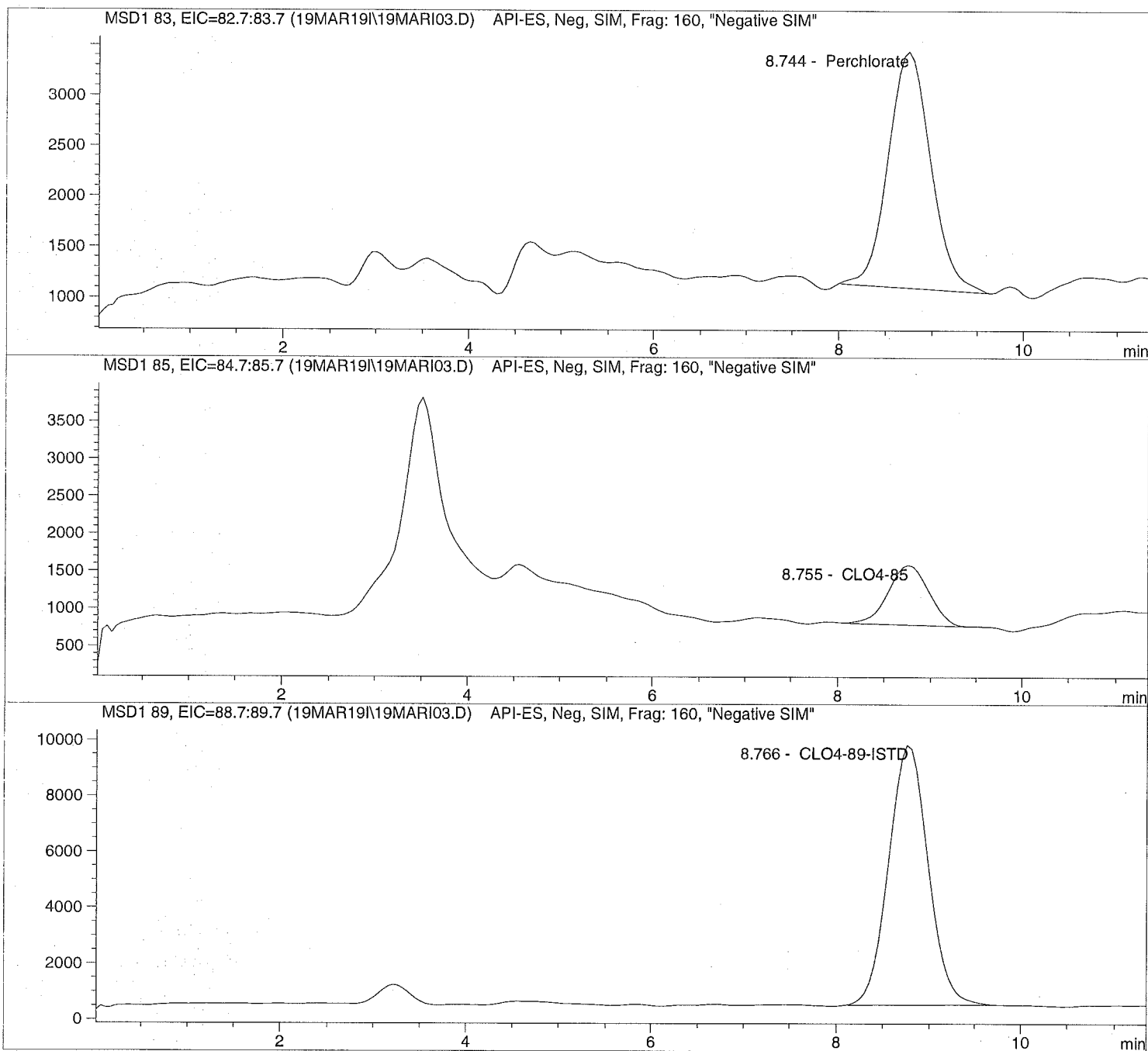
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:38:25

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI03.D

Sample Name: CLO4@ 1.0ug/L

Injection Date: 3/19/2019 09:39:40

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-DP2.M

Last Changed: 3/19/2019 14:38:25

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 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
8.744	BBA	74166.3	1.0224	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	BBA	24138.1	0.9487	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

*** End of Report ***

ALS Houston, US

Date: 23-may-19

Client:	Bhate Environmental Associates, Inc.	SAMPLE SUMMARY
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
Work Order:	HS19050397	

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19050397-01	LH18/24-SP650_050719	Water		07-May-2019 14:00	08-May-2019 09:30	<input type="checkbox"/>
HS19050397-02	LH18/24-SP650_050719_BIX	Water		07-May-2019 14:00	08-May-2019 09:30	<input type="checkbox"/>

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order:

CASE NARRATIVE

Work Order Comments

- 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 Fort Collins, CO. Final report attached.
-

WetChemistry by Method E350.3**Batch ID: R338485**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

WetChemistry by Method E365.3**Batch ID: R338359**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
 Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
 Sample ID: LH18/24-SP650_050719
 Collection Date: 07-May-2019 14:00

ANALYTICAL REPORT

WorkOrder:HS19050397
 Lab ID:HS19050397-01
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
AMMONIA AS N BY E350.3(ISE)		Method:E350.3					Analyst: RG	
Nitrogen, Ammonia (As N)	21		0.20	0.10	0.20	mg/L	1	14-May-2019 11:30
ORTHO PHOSPHATE (PO4) AS P BY E365.3		Method:E365.3					Analyst: KVL	
Phosphorus, Total Orthophosphate (As P)	4.95		0.100	0.200	0.250	mg/L	10	08-May-2019 18:15
SUBCONTRACT ANALYSIS - TOC ANALYSIS		Method:NA					Analyst: SUBK	
Subcontract Analysis	See Attached		0	0		NA	1	16-May-2019 09:25

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

ALS Houston, US

Date: 23-May-19

Client:	Bhate Environmental Associates, Inc.	ANALYTICAL REPORT
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS19050397
Sample ID:	LH18/24-SP650_050719_BIX	Lab ID:HS19050397-02
Collection Date:	07-May-2019 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		Method:NA						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	23-May-2019 14:50

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

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19050397

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R338359	Test Name : ORTHO PHOSPHATE (PO4) AS P BY E365.3			Matrix: Water		
HS19050397-01	LH18/24-SP650_050719	07 May 2019 14:00			08 May 2019 18:15	10
Batch ID R338485	Test Name : AMMONIA AS N BY E350.3(ISE)			Matrix: Water		
HS19050397-01	LH18/24-SP650_050719	07 May 2019 14:00			14 May 2019 11:30	1
Batch ID R338511	Test Name : SUBCONTRACT ANALYSIS - TOC ANALYSIS			Matrix: Water		
HS19050397-01	LH18/24-SP650_050719	07 May 2019 14:00			16 May 2019 09:25	1
Batch ID R339032	Test Name : SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			Matrix: Water		
HS19050397-02	LH18/24-SP650_050719_BIX	07 May 2019 14:00			23 May 2019 14:50	1

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19050397

QC BATCH REPORT

Batch ID: R338359 (0)		Instrument: UV-2450		Method: ORTHO PHOSPHATE (PO4) AS P BY E365.3					
MBLK	Sample ID: MBLK-R338359	Units: mg/L		Analysis Date: 08-May-2019 18:15					
Client ID:	Run ID: UV-2450_338359	SeqNo: 5073819		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.0200	0.0250							U
LCS	Sample ID: LCS-R338359	Units: mg/L		Analysis Date: 08-May-2019 18:15					
Client ID:	Run ID: UV-2450_338359	SeqNo: 5073801		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	0.232	0.0250	0.25	0	92.8	85 - 115			
MS	Sample ID: HS19050397-01MS	Units: mg/L		Analysis Date: 08-May-2019 18:15					
Client ID: LH18/24-SP650_050719	Run ID: UV-2450_338359	SeqNo: 5073803		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	7.52	0.250	2.5	4.95	103	80 - 120			
MSD	Sample ID: HS19050397-01MSD	Units: mg/L		Analysis Date: 08-May-2019 18:15					
Client ID: LH18/24-SP650_050719	Run ID: UV-2450_338359	SeqNo: 5073802		PrepDate:		DF: 10			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Phosphorus, Total Orthophosphate (As P)	7.42	0.250	2.5	4.95	98.8	80 - 120	7.52	1.34	20
The following samples were analyzed in this batch: HS19050397-01									

ALS Houston, US

Date: 23-May-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19050397

QC BATCH REPORT

Batch ID: R338485 (0)		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
MBLK	Sample ID: MBLK-R338485	Units: mg/L		Analysis Date: 14-May-2019 11:30						
Client ID:	Run ID: WetChem_HS_338485		SeqNo: 5076342		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.10	0.20								U
LCS	Sample ID: LCS-R338485	Units: mg/L		Analysis Date: 14-May-2019 11:30						
Client ID:	Run ID: WetChem_HS_338485		SeqNo: 5076341		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.79	0.20	10	0	108	80 - 120				
MS	Sample ID: HS19050506-06MS	Units: mg/L		Analysis Date: 14-May-2019 11:30						
Client ID:	Run ID: WetChem_HS_338485		SeqNo: 5076344		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.12	0.20	10	1.346	87.7	80 - 120				
MSD	Sample ID: HS19050506-06MSD	Units: mg/L		Analysis Date: 14-May-2019 11:30						
Client ID:	Run ID: WetChem_HS_338485		SeqNo: 5076343		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10	0.20	10	1.346	86.5	80 - 120	10.12	1.19	20	
The following samples were analyzed in this batch: HS19050397-01										

ALS Houston, US

Date: 23-May-19

Client:	Bhate Environmental Associates, Inc.	QUALIFIERS, ACRONYMS, UNITS
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19050397	

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 Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019
North Carolina	624-2019	31-Dec-2019
Maryland	343, 2018-2019	30-Jun-2019
Arkansas	19-028-0	27-Mar-2020
Texas	TX104704231-19-23	30-Apr-2020

Client:	Bhate Environmental Associates, Inc.	SAMPLE TRACKING
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
Work Order:	HS19050397	

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19050397-01	LH18/24-SP650_050719	Login	08/05/2019 11:28:28	NDR	WET069
HS19050397-01	LH18/24-SP650_050719	Login	08/05/2019 11:28:28	NDR	WET069
HS19050397-01	LH18/24-SP650_050719	Login	08/05/2019 11:28:28	NDR	Sub
HS19050397-02	LH18/24-SP650_050719_BIX	Login	08/05/2019 11:28:28	NDR	Sub

ALS Houston, US

Date: 23-May-19

Sample Receipt Checklist

Client Name: Bhate Environmental
Work Order: HS19050397

Date/Time Received: **08-May-2019 09:30**
Received by: **JRM**

Checklist completed by: Nilesh D. Ranchod 8-May-2019
eSignature Date

Reviewed by: RJ Modashia 8-May-2019
eSignature Date

Matrices: **Water**Carrier name: **FedEx Priority Overnight**

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:N/A
Samplers name present on COC?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	1.6C / 1.6c UC/C IR11		
Cooler(s)/Kit(s):	44882		
Date/Time sample(s) sent to storage:	05/08/2019 11:45		
Water - VOA vials have zero headspace?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:			

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:


CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: R.J Modshia

Page 1 of 1

Project: BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS						Project No. NWO1312.0150.0 16.0001																
Job: GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES																						
Prepared By: Scott Beesinger											P.O. Number											
Field Sample I.D.			Sample Matrix		Date / Time		MS / MSD	No. OF CONTAINERS	AMMONIA-N	TOTAL ORGANIC CARBON	ORTHO-PHOSPHATE	PERCHLORATE	Analyses								Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650_050719			Water		05/07/19 / 14:00			2	X	X									H2SO4			
LH18/24-SP650_050719			Water		05/07/19 / 14:00			1			X							NONE				
LH18/24-SP650_050719_BIX			Water		05/07/19 / 14:00			1				X						NONE				
Additional Remarks: Standard TAT on all parameters																						
Relinquished By: 			Date 05/07/19		Time 14:30		Received By:			Date		Time		Relinquished By:			Date		Time			

Received At Lab By:				For Lab Use Only					
Date	Time	Albidi No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition	
5/18/19	09:30								
Remarks: <i>Coder - 44882</i> <i>1M11</i> <i>Temp 1.6</i> <i>OF00</i>									

FedEx TAK# 4380 9532 7390 AB SGRA  FID 5121568 07MAY19 62GA 55311/066C/0C0A		WED - 08 MAY 10:30A PRIORITY OVERNIGHT 77099 TX-US IAH		ALS 10450 Standliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887		CUSTO Date: 5/7/19 Name: Scott B. B. B. Company: B. B. B.	
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BY SEAL Time: 1430 1430 PM		Seal Broken By: Date: 5/8/19	
---	--	---------------------------------	--



ALS Environmental
ALS Group USA, Corp
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Kelso, WA 98626
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www.alsglobal.com

May 15, 2019

Analytical Report for Service Request No: K1904158

RJ Modashia
ALS Laboratory Group
10450 Stancliff Road
Suite 210
Houston, TX 77099-4338

RE: HS19050397

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory May 09, 2019
For your reference, these analyses have been assigned our service request number **K1904158**.

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

For Kelley Lovejoy
Project Manager



ALS Environmental
ALS Group USA, Corp
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Table of Contents

Acronyms

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 General Chemistry

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjllabs.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/bsdwlabservice.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/analyte is offered by that state.



Case Narrative

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577- 7222 Fax (360)636- 1068
www.alsglobal.com



Client: ALS Environmental - US
Project: HS19050397
Sample Matrix: Water

Service Request: K1904158
Date Received: 05/09/2019

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:

One water sample was received for analysis at ALS Environmental on 05/09/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The sample was stored at minimum in accordance with the analytical method requirements.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by

A handwritten signature in black ink, appearing to read "Ely Dini", written over a horizontal line.

Date

05/15/2019



Chain of Custody

ALS Environmental—Kelso Laboratory
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Phone (360)577- 7222 Fax (360)636- 1068
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10450 Standcliff Rd, Ste 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887
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Subcontract Chain of Custody

SAMPLING STATE: Dept of Defense

COC ID: 11268

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 Standcliff 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 Standcliff Rd, Ste 210
Phone: +1 281 530 5656
Reference: HS19050397
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19050397-01	LH18/24-SP650_050719	Water	07 May 2019 14:00
TOC Analysis for DOD Level IV			16 May 2019

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

QC Level: DOD IV (DoD Data Package)

MAY 08 2019

Relinquished By:

Date/Time:

Received By:

Date/Time:

Cooler ID(s):

Temperature(s):

RIGHT SOLUTIONS | RIGHT PARTNER



Cooler Receipt and Preservation Form

Client ALS Houston Service Request K19 04158
Received: 5-9-19 Opened: 5-9-19 By: NP Unloaded: 5-9-19 By: NP

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	Tracking Number	NA	Filed
-0.1	0.0	2.2	2.1	-0.1	317	11266	480978336227		
						11268			
						11277			

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:

RUSH



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
Project: HS19050397
Sample Matrix: Water
Analysis Method: SM 5310 C
Prep Method: None

Service Request: K1904158
Date Collected: 05/7/19
Date Received: 05/9/19
Units: mg/L
Basis: NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_050719	K1904158-001	1.46	0.50	0.20	0.07	1	05/10/19 03:25	
Method Blank	K1904158-MB	ND U	0.50	0.20	0.07	1	05/10/19 06:42	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project HS19050397
Sample Matrix: Water

Service Request: K1904158
Date Collected: 05/07/19
Date Received: 05/09/19
Date Analyzed: 05/10/19

Replicate Sample Summary
General Chemistry Parameters

Sample Name: LH18/24-SP650_050719
Lab Code: K1904158-001

Units: mg/L
Basis: NA

Analyte Name	Analysis Method	LOQ	LOD	MDL	Sample Result	Duplicate Sample K1904158-001DUP	Average	RPD	RPD Limit
						Result			
Carbon, Total Organic	SM 5310 C	0.50	0.20	0.07	1.46	1.42	1.44	3	10

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.

QA/QC Report

Client: ALS Environmental - US
Project: HS19050397
Sample Matrix: Water

Service Request: K1904158
Date Analyzed: 05/10/19
Date Extracted: NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method: SM 5310 C
Prep Method: None

Units: mg/L
Basis: NA
Analysis Lot: 635076

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1904158-LCS	25.3	25.0	101	83-117

Client: ALS Environmental - US
Project: HS19050397

Service Request: K1904158

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	635076	KQ1906237-05	05/09/19 19:10	25.0	24.9	100	90-110
CCV2	635076	KQ1906237-06	05/10/19 01:03	25.0	25.0	100	90-110
CCV3	635076	KQ1906237-07	05/10/19 06:13	25.0	24.7	99	90-110
CCV4	635076	KQ1906237-08	05/10/19 10:29	25.0	24.9	99	90-110

Client: ALS Environmental - US
Project: HS19050397

Service Request: K1904158

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	635076	KQ1906237-01	05/09/19 19:25	0.50	0.20	0.07	ND	U
CCB2	635076	KQ1906237-02	05/10/19 01:17	0.50	0.20	0.07	ND	U
CCB3	635076	KQ1906237-03	05/10/19 06:28	0.50	0.20	0.07	ND	U
CCB4	635076	KQ1906237-04	05/10/19 10:44	0.50	0.20	0.07	ND	U



Raw Data

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com



General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577- 7222 Fax (360)636- 1068
www.alsglobal.com

Work Request #

Original

K1903942, 4032, 4074, 4115, 4158, 4189, 4161, 4181, 4182, 4195, 4065, 4571, 4094, 420

4133, 416
I II

Tier:

Date Analyzed:

5/9/19

TOC: 635076

635077

4058

II

Analyst:

BCD

Run #

635075

Analysis:

TOC/DOC

DOC: 635078

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: ^{BCD 5/11/19} K1904032-2/2d, and K190 reports a high %LSD. However, this sample is less than 5x the MRL.
K1904094 reports a high %RSD due to dirty/turbid non-homogenous sample.
K1904071-1 TOC sent for RA. Sample requires a dup.

Final Approved by:

Hawley

Date:

05/13/19

DQREPORT


Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 635075 Method/Testcode: 9060A/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
K1903942-004	Carbon, Total Organic (TOC)	N/A		Water	7.20 mg/L	10 mL	28.8 mg/L	4		2.0			5/9/19 21:46:00	N	1
KQ1906235-01	Carbon, Total Organic (TOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1		0.50			5/9/19 19:25:00	N	1
KQ1906235-02	Carbon, Total Organic (TOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1		0.50			5/9/19 01:17:00	N	1
KQ1906235-03	Carbon, Total Organic (TOC)	CCV		Water	24.93 mg/L	10 mL	24.9 mg/L	1					5/9/19 19:10:00	N	1
KQ1906235-04	Carbon, Total Organic (TOC)	CCV		Water	25.03 mg/L	10 mL	25.0 mg/L	1					5/9/19 01:03:00	N	1
KQ1906235-05	Carbon, Total Organic (TOC)	MB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1		0.50			5/9/19 19:40:00	N	1
KQ1906235-06	Carbon, Total Organic (TOC)	MB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1		0.50			5/9/19 19:40:00	N	1
KQ1906235-07	Carbon, Total Organic (TOC)	MB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1		0.50			5/9/19 19:40:00	N	1
KQ1906235-08	Carbon, Total Organic (TOC)	MB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1		0.50			5/9/19 19:40:00	N	1
KQ1906235-09	Carbon, Total Organic (TOC)	LCS		Water	25.26 mg/L	10 mL	25.3 mg/L	1		0.50	101		5/9/19 20:35:00	N	1
KQ1906235-10	Carbon, Total Organic (TOC)	LCS		Water	25.26 mg/L	10 mL	25.3 mg/L	1		0.50	101		5/9/19 20:35:00	N	1
KQ1906235-11	Carbon, Total Organic (TOC)	LCS		Water	25.26 mg/L	10 mL	25.3 mg/L	1		0.50	101		5/9/19 20:35:00	N	1
KQ1906235-12	Carbon, Total Organic (TOC)	LCS		Water	25.26 mg/L	10 mL	25.3 mg/L	1		0.50	101		5/9/19 20:35:00	N	1
KQ1906235-13	Carbon, Total Organic (TOC)	DUP	K1903942-004	Water	7.22 mg/L	10 mL	28.9 mg/L	4		2.0		<1	5/9/19 21:46:00	N	1
KQ1906235-14	Carbon, Total Organic (TOC)	TRP	K1903942-004	Water	7.26 mg/L	10 mL	29.0 mg/L	4		2.0		<1	5/9/19 21:46:00	N	1
KQ1906235-15	Carbon, Total Organic (TOC)	QUAD	K1903942-004	Water	7.24 mg/L	10 mL	29.0 mg/L	4		2.0		<1	5/9/19 21:46:00	N	1

05/13/19


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: 635076 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
K1904032-001	Carbon, Total Organic	N/A		Water	16.99 mg/L	10 mL	17.0 mg/L	1	0.07	0.50			5/10/19 09:04:00	N	II
K1904032-002	Carbon, Total Organic	N/A		Water	0.85 mg/L	10 mL	0.85 mg/L	1	0.07	0.50			5/10/19 09:32:00	N	II
K1904074-001	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 03:53:00	N	III
K1904115-001	Carbon, Total Organic	N/A		Drinking Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 04:21:00	N	I
K1904158-001	Carbon, Total Organic	N/A		Water	1.46 mg/L	10 mL	1.46 mg/L	1	0.07	0.50			5/10/19 03:25:00	N	IV
K1904159-001	Carbon, Total Organic	N/A		Ground Water	1.74 mg/L	10 mL	1.74 mg/L	1	0.07	0.50			5/10/19 00:07:00	N	IV
K1904159-002	Carbon, Total Organic	N/A		Ground Water	1.80 mg/L	10 mL	1.80 mg/L	1	0.07	0.50			5/10/19 00:35:00	N	IV
K1904159-003	Carbon, Total Organic	N/A		Ground Water	1.13 mg/L	10 mL	1.13 mg/L	1	0.07	0.50			5/10/19 01:32:00	N	IV
K1904159-004	Carbon, Total Organic	N/A		Ground Water	1.93 mg/L	10 mL	1.93 mg/L	1	0.07	0.50			5/10/19 02:00:00	N	IV
K1904159-005	Carbon, Total Organic	N/A		Ground Water	1.10 mg/L	10 mL	1.10 mg/L	1	0.07	0.50			5/10/19 02:28:00	N	IV
K1904159-006	Carbon, Total Organic	N/A		Ground Water	1.98 mg/L	10 mL	1.98 mg/L	1	0.07	0.50			5/10/19 02:56:00	N	IV
K1904161-001	Carbon, Total Organic	N/A		Ground Water	2.10 mg/L	10 mL	2.10 mg/L	1	0.07	0.50			5/9/19 22:41:00	N	IV
K1904161-002	Carbon, Total Organic	N/A		Ground Water	0.98 mg/L	10 mL	0.98 mg/L	1	0.07	0.50			5/9/19 23:09:00	Y	IV
K1904181-001	Carbon, Total Organic	N/A		Water	0.97 mg/L	10 mL	0.97 mg/L	1	0.07	0.50			5/10/19 04:49:00	N	II
K1904182-001	Carbon, Total Organic	N/A		Water	0.31 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 05:17:00	N	II
K1904195-001	Carbon, Total Organic	N/A		Water	2.14 mg/L	10 mL	2.14 mg/L	1	0.07	0.50			5/10/19 05:45:00	N	II
K1904195-002	Carbon, Total Organic	N/A		Water	3.34 mg/L	10 mL	3.34 mg/L	1	0.07	0.50			5/10/19 07:12:00	N	II
K1904195-003	Carbon, Total Organic	N/A		Water	1.36 mg/L	10 mL	1.36 mg/L	1	0.07	0.50			5/10/19 07:40:00	N	II
K1904195-004	Carbon, Total Organic	N/A		Water	1.56 mg/L	10 mL	1.56 mg/L	1	0.07	0.50			5/10/19 08:08:00	N	II
K1904195-005	Carbon, Total Organic	N/A		Water	1.57 mg/L	10 mL	1.57 mg/L	1	0.07	0.50			5/10/19 08:36:00	N	II
KQ1906237-01	Carbon, Total Organic	CCB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/9/19 19:25:00	N	IV
KQ1906237-02	Carbon, Total Organic	CCB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 01:17:00	N	IV
KQ1906237-03	Carbon, Total Organic	CCB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 06:28:00	N	IV
KQ1906237-04	Carbon, Total Organic	CCB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 10:44:00	N	IV
KQ1906237-05	Carbon, Total Organic	CCV		Ground Water	24.93 mg/L	10 mL	24.9 mg/L	1					5/9/19 19:10:00	N	IV
KQ1906237-06	Carbon, Total Organic	CCV		Ground Water	25.03 mg/L	10 mL	25.0 mg/L	1					5/10/19 01:03:00	N	IV
KQ1906237-07	Carbon, Total Organic	CCV		Ground Water	24.68 mg/L	10 mL	24.7 mg/L	1					5/10/19 06:13:00	N	IV

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

05/10 05/13/19
Hewitt

Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 635076 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
KQ1906237-08	Carbon, Total Organic	CCV		Ground Water	24.85 mg/L	10 mL	24.9 mg/L	1					5/10/19 10:29:00	N	IV
KQ1906237-09	Carbon, Total Organic	MB		Ground Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 06:42:00	N	IV
KQ1906237-10	Carbon, Total Organic	LCS		Ground Water	25.28 mg/L	10 mL	25.3 mg/L	1	0.07	0.50	101		5/10/19 06:57:00	N	IV
KQ1906237-11	Carbon, Total Organic	MS	K1904161-002	Ground Water	24.54 mg/L	10 mL	24.5 mg/L	1	0.07	0.50	94		5/9/19 23:38:00	N	IV
KQ1906237-12	Carbon, Total Organic	DUP	K1904161-001	Ground Water	2.00 mg/L	10 mL	2.00 mg/L	1	0.07	0.50		5	5/9/19 22:41:00	N	IV
KQ1906237-13	Carbon, Total Organic	DUP	K1904161-002	Ground Water	1.05 mg/L	10 mL	1.05 mg/L	1	0.07	0.50		7	5/9/19 23:09:00	N	IV
KQ1906237-14	Carbon, Total Organic	DUP	K1904159-001	Ground Water	1.69 mg/L	10 mL	1.69 mg/L	1	0.07	0.50		3	5/10/19 00:07:00	N	IV
KQ1906237-15	Carbon, Total Organic	DUP	K1904159-002	Ground Water	1.87 mg/L	10 mL	1.87 mg/L	1	0.07	0.50		4	5/10/19 00:35:00	N	IV
KQ1906237-16	Carbon, Total Organic	DUP	K1904159-003	Ground Water	1.08 mg/L	10 mL	1.08 mg/L	1	0.07	0.50		5	5/10/19 01:32:00	N	IV
KQ1906237-17	Carbon, Total Organic	DUP	K1904159-004	Ground Water	1.78 mg/L	10 mL	1.78 mg/L	1	0.07	0.50		8	5/10/19 02:00:00	N	IV
KQ1906237-18	Carbon, Total Organic	DUP	K1904159-005	Ground Water	1.06 mg/L	10 mL	1.06 mg/L	1	0.07	0.50		4	5/10/19 02:28:00	N	IV
KQ1906237-19	Carbon, Total Organic	DUP	K1904159-006	Ground Water	2.05 mg/L	10 mL	2.05 mg/L	1	0.07	0.50		3	5/10/19 02:56:00	N	IV
KQ1906237-20	Carbon, Total Organic	DUP	K1904158-001	Water	1.42 mg/L	10 mL	1.42 mg/L	1	0.07	0.50		3	5/10/19 03:25:00	N	IV
KQ1906237-21	Carbon, Total Organic	DUP	K1904074-001	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	5/10/19 03:53:00	N	III
KQ1906237-22	Carbon, Total Organic	DUP	K1904115-001	Drinking Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	5/10/19 04:21:00	N	I
KQ1906237-23	Carbon, Total Organic	DUP	K1904181-001	Water	0.99 mg/L	10 mL	0.99 mg/L	1	0.07	0.50		2	5/10/19 04:49:00	N	II
KQ1906237-24	Carbon, Total Organic	DUP	K1904182-001	Water	0.35 mg/L	10 mL	0.35 mg/L J	1	0.07	0.50		NC	5/10/19 05:17:00	N	II
KQ1906237-25	Carbon, Total Organic	DUP	K1904195-001	Water	2.13 mg/L	10 mL	2.13 mg/L	1	0.07	0.50		<1	5/10/19 05:45:00	N	II
KQ1906237-26	Carbon, Total Organic	DUP	K1904195-002	Water	3.25 mg/L	10 mL	3.25 mg/L	1	0.07	0.50		3	5/10/19 07:12:00	N	II
KQ1906237-27	Carbon, Total Organic	DUP	K1904195-003	Water	1.30 mg/L	10 mL	1.30 mg/L	1	0.07	0.50		4	5/10/19 07:40:00	N	II
KQ1906237-28	Carbon, Total Organic	DUP	K1904195-004	Water	1.53 mg/L	10 mL	1.53 mg/L	1	0.07	0.50		2	5/10/19 08:08:00	N	II
KQ1906237-29	Carbon, Total Organic	DUP	K1904195-005	Water	1.58 mg/L	10 mL	1.58 mg/L	1	0.07	0.50		<1	5/10/19 08:36:00	N	II
KQ1906237-30	Carbon, Total Organic	DUP	K1904032-001	Water	17.34 mg/L	10 mL	17.3 mg/L	1	0.07	0.50		2	5/10/19 09:04:00	N	II
KQ1906237-31	Carbon, Total Organic	DUP	K1904032-002	Water	0.61 mg/L	10 mL	0.61 mg/L	1	0.07	0.50		34*	5/10/19 09:32:00	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: 635077 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
K1904065-001	Carbon, Total Organic	N/A		Water	7.02 mg/L	10 mL	702 mg/L	100	7	50			5/10/19 10:59:00	N	II
K1904071-001	Carbon, Total Organic	N/A		Surface Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 10:00:00	N	III
K1904094-001	Carbon, Total Organic	N/A		Ground Water	10.84 mg/L	10 mL	10.8 mg/L	1	0.07	0.50			5/10/19 11:27:00	N	II
K1904094-002	Carbon, Total Organic	N/A		Ground Water	7.99 mg/L	10 mL	7.99 mg/L	1	0.07	0.50			5/10/19 11:55:00	N	II
K1904094-003	Carbon, Total Organic	N/A		Ground Water	2.62 mg/L	10 mL	2.62 mg/L	1	0.07	0.50			5/10/19 12:23:00	N	II
K1904094-004	Carbon, Total Organic	N/A		Ground Water	1.57 mg/L	10 mL	1.57 mg/L	1	0.07	0.50			5/10/19 12:51:00	N	II
K1904094-005	Carbon, Total Organic	N/A		Ground Water	0.89 mg/L	10 mL	0.89 mg/L	1	0.07	0.50			5/10/19 13:19:00	N	II
K1904094-006	Carbon, Total Organic	N/A		Ground Water	0.55 mg/L	10 mL	0.55 mg/L	1	0.07	0.50			5/10/19 13:47:00	N	II
K1904094-007	Carbon, Total Organic	N/A		Ground Water	2.60 mg/L	10 mL	2.60 mg/L	1	0.07	0.50			5/10/19 14:15:00	N	II
K1904133-001	Carbon, Total Organic	N/A		Drinking Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 14:44:00	N	I
K1904163-001	Carbon, Total Organic	N/A		Ground Water	1.35 mg/L	10 mL	1.35 mg/L	1	0.07	0.50			5/10/19 17:06:00	N	II
K1904163-002	Carbon, Total Organic	N/A		Ground Water	0.47 mg/L	10 mL	0.47 mg/L J	1	0.07	0.50			5/10/19 17:34:00	N	II
K1904163-003	Carbon, Total Organic	N/A		Ground Water	1.45 mg/L	10 mL	1.45 mg/L	1	0.07	0.50			5/10/19 18:02:00	N	II
K1904163-004	Carbon, Total Organic	N/A		Ground Water	0.74 mg/L	10 mL	0.74 mg/L	1	0.07	0.50			5/10/19 18:30:00	N	II
K1904163-005	Carbon, Total Organic	N/A		Ground Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 18:58:00	N	II
K1904205-001	Carbon, Total Organic	N/A		Water	35.34 mg/L	10 mL	35.3 mg/L	1	0.07	0.50			5/10/19 19:26:00	N	IV
K1904205-002	Carbon, Total Organic	N/A		Water	11.17 mg/L	10 mL	11.2 mg/L	1	0.07	0.50			5/10/19 19:55:00	N	IV
KQ1906238-01	Carbon, Total Organic	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 06:28:00	N	III
KQ1906238-02	Carbon, Total Organic	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 10:44:00	N	III
KQ1906238-03	Carbon, Total Organic	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 16:22:00	N	III
KQ1906238-04	Carbon, Total Organic	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 21:05:00	N	III
KQ1906238-05	Carbon, Total Organic	CCV		Surface Water	24.68 mg/L	10 mL	24.7 mg/L	1					5/10/19 06:13:00	N	III
KQ1906238-06	Carbon, Total Organic	CCV		Surface Water	24.85 mg/L	10 mL	24.9 mg/L	1					5/10/19 10:29:00	N	III
KQ1906238-07	Carbon, Total Organic	CCV		Surface Water	24.02 mg/L	10 mL	24.0 mg/L	1					5/10/19 16:07:00	N	III

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

05/13/19
Hawkins

Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 635077 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
KQ1906238-08	Carbon, Total Organic	CCV		Surface Water	24.34 mg/L	10 mL	24.3 mg/L	1					5/10/19 20:51:00	N	III
KQ1906238-09	Carbon, Total Organic	MB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			5/10/19 16:37:00	N	III
KQ1906238-10	Carbon, Total Organic	LCS		Surface Water	24.84 mg/L	10 mL	24.8 mg/L	1	0.07	0.50	99		5/10/19 16:51:00	N	III
KQ1906238-11	Carbon, Total Organic	MS	K1904071-001	Surface Water	25.61 mg/L	10 mL	25.6 mg/L	1	0.07	0.50	102		5/10/19 10:15:00	N	III
KQ1906238-13	Carbon, Total Organic	DUP	K1904065-001	Water	7.10 mg/L	10 mL	710 mg/L	100	7	50		1	5/10/19 10:59:00	N	II
KQ1906238-14	Carbon, Total Organic	DUP	K1904094-001	Ground Water	10.73 mg/L	10 mL	10.7 mg/L	1	0.07	0.50		1	5/10/19 11:27:00	N	II
KQ1906238-15	Carbon, Total Organic	DUP	K1904094-002	Ground Water	7.72 mg/L	10 mL	7.72 mg/L	1	0.07	0.50		3	5/10/19 11:55:00	N	II
KQ1906238-16	Carbon, Total Organic	DUP	K1904094-003	Ground Water	2.19 mg/L	10 mL	2.19 mg/L	1	0.07	0.50		18*	5/10/19 12:23:00	N	II
KQ1906238-17	Carbon, Total Organic	DUP	K1904094-004	Ground Water	1.56 mg/L	10 mL	1.56 mg/L	1	0.07	0.50		<1	5/10/19 12:51:00	N	II
KQ1906238-18	Carbon, Total Organic	DUP	K1904094-005	Ground Water	0.83 mg/L	10 mL	0.83 mg/L	1	0.07	0.50		7	5/10/19 13:19:00	N	II
KQ1906238-19	Carbon, Total Organic	DUP	K1904094-006	Ground Water	0.55 mg/L	10 mL	0.55 mg/L	1	0.07	0.50		1	5/10/19 13:47:00	N	II
KQ1906238-20	Carbon, Total Organic	DUP	K1904094-007	Ground Water	2.38 mg/L	10 mL	2.38 mg/L	1	0.07	0.50		9	5/10/19 14:15:00	N	II
KQ1906238-21	Carbon, Total Organic	DUP	K1904133-001	Drinking Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	5/10/19 14:44:00	N	I
KQ1906238-22	Carbon, Total Organic	DUP	K1904163-001	Ground Water	1.27 mg/L	10 mL	1.27 mg/L	1	0.07	0.50		6	5/10/19 17:06:00	N	II
KQ1906238-23	Carbon, Total Organic	DUP	K1904163-002	Ground Water	0.44 mg/L	10 mL	0.44 mg/L J	1	0.07	0.50		8	5/10/19 17:34:00	N	II
KQ1906238-24	Carbon, Total Organic	DUP	K1904163-003	Ground Water	1.33 mg/L	10 mL	1.33 mg/L	1	0.07	0.50		9	5/10/19 18:02:00	N	II
KQ1906238-25	Carbon, Total Organic	DUP	K1904163-004	Ground Water	0.77 mg/L	10 mL	0.77 mg/L	1	0.07	0.50		4	5/10/19 18:30:00	N	II
KQ1906238-26	Carbon, Total Organic	DUP	K1904163-005	Ground Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	5/10/19 18:58:00	N	II
KQ1906238-27	Carbon, Total Organic	DUP	K1904205-001	Water	35.34 mg/L	10 mL	35.3 mg/L	1	0.07	0.50		<1	5/10/19 19:26:00	N	IV
KQ1906238-28	Carbon, Total Organic	DUP	K1904205-002	Water	10.89 mg/L	10 mL	10.9 mg/L	1	0.07	0.50		3	5/10/19 19:55:00	N	IV

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 635078 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
K1904058-001	Carbon, Dissolved Organic (DOC)	N/A		Water	5.20 mg/L	10 mL	5.20 mg/L	1	0.07	0.50			5/10/19 22:18:00	N	II
K1904058-002	Carbon, Dissolved Organic (DOC)	N/A		Water	2.04 mg/L	10 mL	2.04 mg/L	1	0.07	0.50			5/10/19 22:46:00	N	II
K1904071-001	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/10/19 21:20:00	N	III
KQ1906239-01	Carbon, Dissolved Organic (DOC)	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/10/19 21:05:00	N	III
KQ1906239-02	Carbon, Dissolved Organic (DOC)	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/10/19 23:57:00	N	III
KQ1906239-03	Carbon, Dissolved Organic (DOC)	CCV		Surface Water	24.18 mg/L	10 mL	24.2 mg/L	1					5/10/19 23:42:00	N	III
KQ1906239-04	Carbon, Dissolved Organic (DOC)	CCV		Surface Water	24.47 mg/L	10 mL	24.5 mg/L	1					5/11/19 00:41:00	N	III
KQ1906239-05	Carbon, Dissolved Organic (DOC)	MB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/11/19 00:12:00	N	III
KQ1906239-06	Carbon, Dissolved Organic (DOC)	LCS		Surface Water	25.12 mg/L	10 mL	25.1 mg/L	1	0.07	0.50	100		5/11/19 00:26:00	N	III
KQ1906239-07	Carbon, Dissolved Organic (DOC)	MS	K1904071-001	Surface Water	24.79 mg/L	10 mL	24.8 mg/L	1	0.07	0.50	99		5/10/19 21:49:00	N	III
KQ1906239-08	Carbon, Dissolved Organic (DOC)	DUP	K1904071-001	Surface Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50		NC	5/10/19 21:20:00	N	III
KQ1906239-09	Carbon, Dissolved Organic (DOC)	DUP	K1904058-001	Water	5.13 mg/L	10 mL	5.13 mg/L	1	0.07	0.50		1	5/10/19 22:18:00	N	II
KQ1906239-10	Carbon, Dissolved Organic (DOC)	DUP	K1904058-002	Water	2.09 mg/L	10 mL	2.09 mg/L	1	0.07	0.50		2	5/10/19 22:46:00	N	II
KQ1906239-11	Carbon, Dissolved Organic (DOC)	CCB		Surface Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			5/11/19 00:56:00	N	III
KQ1906239-12	Carbon, Dissolved Organic (DOC)	CCV		Surface Water	24.34 mg/L	10 mL	24.3 mg/L	1					5/10/19 20:51:00	N	III

05/13/19
Haley

indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

TOC: 635075,
635076,
635077
DOC: 635078

Schedule: 05092019

Version: 5

Instrument: Fusion1

Last Saved by: Fusion1 (Fusion1)

Last Saved on: 2019/05/09 18:20 - Thursday

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)	4	True	Ready
C	Check Standard	[TOC] LCS [24.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
2	Sample	ICS	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
3	Sample	K1903942-004.01 4x	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
4	Sample	K1904161-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
5	Sample	K1904161-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
6	Sample	K1904161-002.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
7	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
8	Sample	K1904159-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
9	Sample	K1904159-002.01	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
10	Sample	K1904159-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K1904159-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	K1904159-005.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	K1904159-006.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K1904158-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1904074-001.02	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K1904115-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1904181-001.02	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1904182-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	Sample	K1904195-001.01	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
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	K1904195-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K1904195-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	K1904195-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K1904195-005.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K1904032-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K1904032-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
27	Sample	K1904071-001.04	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
28	Sample	K1904071-001.04 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
29	Sample	K1904065-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1904094-001.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
31	Sample	K1904094-002.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
32	Sample	K1904094-003.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
33	Sample	K1904094-004.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
34	Sample	K1904094-005.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
35	Sample	K1904094-006.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
36	Sample	K1904094-007.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
37	Sample	K1904133-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
38	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready

Printed on: May 11, 2019 10:32:21

05/13/19
Free sample

Schedule: 05092019

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	K1904163-001.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
41	Sample	K1904163-002.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
42	Sample	K1904163-003.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
43	Sample	K1904163-004.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
44	Sample	K1904163-005.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
45	Sample	K1904205-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
46	Sample	K1904205-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
47	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
48	Sample	K1904071-001.03 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
49	Sample	K1904071-001.03 ms doc	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
50	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
51	Sample	K1904058-001.02 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
52	Sample	K1904058-002.02 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
53	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
54	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
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	

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	C] CCV 25 ppm [25 p	1	24.926	0.0000	24.9255	24.9255	24.9	5/9/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/9/2019
4	MB1	1	0.000	0.0000	0.0000	0	<0.5	5/9/2019
5	MB1d	1	0.000	0.0000	0.0000	0	<0.5	5/9/2019
6	MB1t	1	0.000	0.0000	0.0000	0	<0.5	5/9/2019
7	MB1q	1	0.000	0.0000	0.0000	0	<0.5	5/9/2019
8	[TOC] LCS [24ppm]	1	25.023	0.0000	25.0234	25.0234	25	5/9/2019
9	[TOC] LCS [24ppm]c	1	25.037	0.0000	25.0368	25.0368	25.04	5/9/2019
10	[TOC] LCS [24ppm]t	1	25.510	0.0000	25.5102	25.5102	25.51	5/9/2019
11	[TOC] LCS [24ppm]d	1	25.466	0.0000	25.4658	25.4658	25.5	5/9/2019
12	K1903942-004	1	7.196	0.0000	7.1956	7.1956	7.20	5/9/2019
13	K1903942-004d	1	7.224	0.0000	7.2244	7.2244	7.22	5/9/2019
14	K1903942-004t	1	7.260	0.0000	7.2600	7.26	7.26	5/9/2019
15	K1903942-004q	1	7.240	0.0000	7.2403	7.2403	7.2	5/9/2019
16	C] CCV 25 ppm [25 p	1	25.032	0.0000	25.0320	25.032	25.0	5/10/2019
17	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
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)

Analyzed By: <i>BGD</i>	Date Analyzed: <i>5/9/19</i>
Reviewed By: <i>Shawna</i>	Date Reviewed: <i>05/13/19</i>

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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	C] CCV 25 ppm [25 p	1	24.926	0.0000	24.9255	24.9255	24.9	5/9/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/9/2019
4	K1904161-001	1	2.097	0.0000	2.0968	2.0968	2.1	5/9/2019
5	K1904161-001d	1	1.998	0.0000	1.9982	1.9982	2.0	5/9/2019
6	K1904161-002	1	0.981	0.0000	0.9807	0.9807	0.98	5/9/2019
7	K1904161-002d	1	1.055	0.0000	1.0549	1.0549	1.1	5/9/2019
8	K1904161-002ms	1	24.540	0.0000	24.5398	24.5398	25	5/9/2019
9	K1904159-001	1	1.741	0.0000	1.7408	1.7408	1.74	5/10/2019
10	K1904159-001d	1	1.691	0.0000	1.6907	1.6907	1.69	5/10/2019
11	K1904159-002	1	1.801	0.0000	1.8009	1.8009	1.8	5/10/2019
12	K1904159-002d	1	1.867	0.0000	1.8665	1.8665	1.87	5/10/2019
13	C] CCV 25 ppm [25 p	1	25.032	0.0000	25.0320	25.032	25.03	5/10/2019
14	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
15	K1904159-003	1	1.134	0.0000	1.1342	1.1342	1.1	5/10/2019
16	K1904159-003d	1	1.081	0.0000	1.0813	1.0813	1.1	5/10/2019
17	K1904159-004	1	1.932	0.0000	1.9323	1.9323	1.93	5/10/2019
18	K1904159-004d	1	1.783	0.0000	1.7833	1.7833	1.8	5/10/2019
19	K1904159-005	1	1.103	0.0000	1.1028	1.1028	1.1	5/10/2019
20	K1904159-005d	1	1.055	0.0000	1.0552	1.0552	1.06	5/10/2019
21	K1904159-006	1	1.984	0.0000	1.9835	1.9835	1.98	5/10/2019
22	K1904159-006d	1	2.051	0.0000	2.0509	2.0509	2.1	5/10/2019
23	K1904158-001	1	1.456	0.0000	1.4556	1.4556	1.5	5/10/2019
24	K1904158-001d	1	1.420	0.0000	1.4195	1.4195	1.42	5/10/2019
25	K1904074-001	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019

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)

Analyzed By: <i>BP</i>	Date Analyzed: <i>5/9/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>05/13/19</i>

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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	K1904074-001d	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
27	K1904115-001	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
28	K1904115-001d	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
29	K1904181-001	1	0.967	0.0000	0.9668	0.9668	1.0	5/10/2019
30	K1904181-001d	1	0.988	0.0000	0.9879	0.9879	1.0	5/10/2019
31	K1904182-001	1	0.307	0.0000	0.3070	0.307	<0.5	5/10/2019
32	K1904182-001d	1	0.349	0.0000	0.3492	0.3492	<0.5	5/10/2019
33	K1904195-001	1	2.139	0.0000	2.1392	2.1392	2.1	5/10/2019
34	K1904195-001d	1	2.130	0.0000	2.1302	2.1302	2.1	5/10/2019
35	C] CCV 25 ppm [25 p	1	24.678	0.0000	24.6781	24.6781	24.7	5/10/2019
36	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
37	MB2	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
38	[TOC] LCS [24ppm]	1	25.280	0.0000	25.2799	25.2799	25.3	5/10/2019
39	K1904195-002	1	3.342	0.0000	3.3419	3.3419	3.3	5/10/2019
40	K1904195-002d	1	3.252	0.0000	3.2522	3.2522	3.3	5/10/2019
41	K1904195-003	1	1.359	0.0000	1.3590	1.359	1.4	5/10/2019
42	K1904195-003d	1	1.303	0.0000	1.3034	1.3034	1.3	5/10/2019
43	K1904195-004	1	1.560	0.0000	1.5595	1.5595	1.6	5/10/2019
44	K1904195-004d	1	1.529	0.0000	1.5285	1.5285	1.5	5/10/2019
45	K1904195-005	1	1.572	0.0000	1.5717	1.5717	1.6	5/10/2019
46	K1904195-005d	1	1.576	0.0000	1.5758	1.5758	1.6	5/10/2019
47	K1904032-001	1	16.993	0.0000	16.9929	16.9929	17.0	5/10/2019
48	K1904032-001d	1	17.339	0.0000	17.3388	17.3388	17.3	5/10/2019
49	K1904032-002	1	0.853	0.0000	0.8526	0.8526	0.9	5/10/2019
50	K1904032-002d	1	0.607	0.0000	0.6072	0.6072	0.6	5/10/2019

Analyzed By: <i>BCP</i>	Date Analyzed: <i>5/9/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>05/13/19</i>

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	C] CCV 25 ppm [25 p	1	24.678	0.0000	24.6781	24.6781	24.7	5/10/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
4	K1904071-001	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
5	K1904071-001ms	1	25.607	0.0000	25.6068	25.6068	25.6	5/10/2019
6	C] CCV 25 ppm [25 p	1	24.850	0.0000	24.8503	24.8503	24.85	5/10/2019
7	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
8	K1904065-001	100	7.024	0.0000	7.0242	702.42	702	5/10/2019
9	K1904065-001d	100	7.101	0.0000	7.1012	710.12	710.12	5/10/2019
10	K1904094-001	1	10.841	0.0000	10.8408	10.8408	10.84	5/10/2019
11	K1904094-001d	1	10.730	0.0000	10.7297	10.7297	10.7	5/10/2019
12	K1904094-002	1	7.994	0.0000	7.9937	7.9937	7.99	5/10/2019
13	K1904094-002d	1	7.722	0.0000	7.7217	7.7217	7.72	5/10/2019
14	K1904094-003	1	2.623	0.0000	2.6225	2.6225	2.62	5/10/2019
15	K1904094-003d	1	2.194	0.0000	2.1943	2.1943	2.2	5/10/2019
16	K1904094-004	1	1.569	0.0000	1.5686	1.5686	1.6	5/10/2019
17	K1904094-004d	1	1.562	0.0000	1.5615	1.5615	1.56	5/10/2019
18	K1904094-005	1	0.893	0.0000	0.8930	0.893	0.9	5/10/2019
19	K1904094-005d	1	0.833	0.0000	0.8325	0.8325	0.8	5/10/2019
20	K1904094-006	1	0.547	0.0000	0.5466	0.5466	0.55	5/10/2019
21	K1904094-006d	1	0.555	0.0000	0.5545	0.5545	0.55	5/10/2019
22	K1904094-007	1	2.595	0.0000	2.5951	2.5951	2.6	5/10/2019
23	K1904094-007d	1	2.383	0.0000	2.3830	2.383	2.4	5/10/2019
24	K1904133-001	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
25	K1904133-001d	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019

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)

Analyzed By: <i>kip</i>	Date Analyzed: <i>5/9/19</i>
Reviewed By: <i>Thompson</i>	Date Reviewed: <i>05/13/19</i>

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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	C] CCV 25 ppm [25 p	1	24.021	0.0000	24.0206	24.0206	24.02	5/10/2019
27	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
28	MB3	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
29	[TOC] LCS [25ppm]	1	24.837	0.0000	24.8366	24.8366	24.8	5/10/2019
30	K1904163-001	1	1.347	0.0000	1.3470	1.347	1.3	5/10/2019
31	K1904163-001d	1	1.270	0.0000	1.2703	1.2703	1.3	5/10/2019
32	K1904163-002	1	0.473	0.0000	0.4733	0.4733	<0.5	5/10/2019
33	K1904163-002d	1	0.435	0.0000	0.4353	0.4353	<0.5	5/10/2019
34	K1904163-003	1	1.451	0.0000	1.4509	1.4509	1.5	5/10/2019
35	K1904163-003d	1	1.326	0.0000	1.3264	1.3264	1.3	5/10/2019
36	K1904163-004	1	0.743	0.0000	0.7433	0.7433	0.7	5/10/2019
37	K1904163-004d	1	0.771	0.0000	0.7707	0.7707	0.8	5/10/2019
38	K1904163-005	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
39	K1904163-005d	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
40	K1904205-001	1	35.335	0.0000	35.3351	35.3351	35.3	5/10/2019
41	K1904205-001d	1	35.343	0.0000	35.3429	35.3429	35.3	5/10/2019
42	K1904205-002	1	11.166	0.0000	11.1655	11.1655	11.2	5/10/2019
43	K1904205-002d	1	10.888	0.0000	10.8882	10.8882	10.9	5/10/2019
44	C] CCV 25 ppm [25 p	1	24.341	0.0000	24.3410	24.341	24.3	5/10/2019
45	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
46		1		0.0000	0.0000	0	<0.5	
47		1		0.0000	0.0000	0	<0.5	
48		1		0.0000	0.0000	0	<0.5	
49		1		0.0000	0.0000	0	<0.5	
50		1		0.0000	0.0000	0	<0.5	

Analyzed By: <i>BCP</i>	Date Analyzed: <i>5/9/19</i>
Reviewed By: <i>Harvey</i>	Date Reviewed: <i>05/13/19</i>

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	C] CCV 25 ppm [25 p	1	24.341	0.0000	24.3410	24.341	24.3	5/10/2019
3	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
4	K1904071-001	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
5	K1904071-001d	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
6	K1904071-001ms	1	24.793	0.0000	24.7933	24.7933	24.79	5/10/2019
7	K1904058-001	1	5.199	0.0000	5.1992	5.1992	5.2	5/10/2019
8	K1904058-001d	1	5.131	0.0000	5.1305	5.1305	5	5/10/2019
9	K1904058-002	1	2.041	0.0000	2.0408	2.0408	2.04	5/10/2019
10	K1904058-002d	1	2.087	0.0000	2.0873	2.0873	2.09	5/10/2019
11	C] CCV 25 ppm [25 p	1	24.183	0.0000	24.1833	24.1833	24.2	5/10/2019
12	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
13	MB4	1	0.000	0.0000	0.0000	0	<0.5	5/11/2019
14	[TOC] LCS [25ppm]	1	25.116	0.0000	25.1159	25.1159	25.12	5/11/2019
15	C] CCV 25 ppm [25 p	1	24.467	0.0000	24.4668	24.4668	24.5	5/11/2019
16	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/11/2019
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)

Analyzed By: BCD	Date Analyzed: 5/9/19
Reviewed By: [Signature]	Date Reviewed: 05/13/19

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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	C] CCV 25 ppm [25 p	1	24.850	0.0000	24.8503	24.8503	24.85	5/10/2019
52	[TOC] CCB [0 ppm]	1	0.000	0.0000	0.0000	0	<0.5	5/10/2019
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: <i>BCP</i>	Date Analyzed: <i>5/9/19</i>
Reviewed By: <i>Theresa</i>	Date Reviewed: <i>05/13/19</i>

Fusion Report - 05092019
Thursday, May 09, 2019 05:16 PM(View - Reps, Unused Reps, Meta-
Data, Signature, History)
Printed on 2019/05/11 10:32 -
Saturday**Report Summary Information**

Company Location: Gen Chem Lab

Schedule Name: 05092019

Engine 1.1.5.1

Version:

Instrument Name: Fusion1

Firmware 1.2.0696

Version:

Report Version: 1 of 1

Connection: RS232 COM1

Report Creation by Fusion1 (Fusion1) (v2)
Operators (schedule Fusion1 (Fusion1) (v3)
version): Fusion1 (Fusion1) (v4)
Fusion1 (Fusion1) (v5)

Comment:

Report Results*05/13/19
Honeywell***Sample Type:** Clean

From Schedule Version 2

Pos	Analysis Type	Sample ID	Start Time
♦ (clean)		Clean	2019/05/09 17:16

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	13.44	18.05	4.61	49.62	05:23
2	TC Clean	12.76	15.75	2.98	50.07	04:06
3	TC Clean	3.34	6.39	3.05	50.05	03:47
4	TC Clean	2.50	5.39	2.89	50.09	03:49

Sample Type: Clean

From Schedule Version 3

Pos	Analysis Type	Sample ID	Start Time
♦ (clean)		Clean	2019/05/09 17:38

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	12.82	15.92	3.10	49.61	05:12
2	TC Clean	6.95	9.93	2.98	50.09	04:04
3	TC Clean	2.20	5.33	3.13	50.11	03:48

4	TC Clean	1.56	4.76	3.20	50.10	03:47
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Sample Type: Clean

From Schedule Version 4

Pos	Analysis Type	Sample ID			Start Time	
♦ (clean)		Clean			2019/05/09 18:00	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	12.57	15.67	3.10	49.61	05:13
2	TC Clean	4.30	7.43	3.13	50.09	04:07
3	TC Clean	1.51	4.69	3.18	50.10	03:48
4	TC Clean	1.08	4.23	3.15	50.09	03:47

Sample Type: Blank (Creating v1254)

From Schedule Version 5

Pos	Analysis Type	Sample ID			Start Time	
♦ (blank)		Reagent/Acid Blank			2019/05/09 18:22	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.85	3.84	2.99	49.57	05:13
2	TC Clean	3.42	6.48	3.06	50.09	04:05
3	TC Clean	1.50	4.35	2.85	50.10	03:48
4	TC Clean	1.24	4.27	3.02	50.06	03:47
5	Reagent Blank	2.93	5.90	2.97	50.07	05:06
6	Acid Blank	1.16	4.17	3.01	49.68	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	0.0113 ppm	0.0000 ppm	0.0000%	2019/05/09 18:55		
Rep #	Base Analysis Type		ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC		0.0113	0.1129	8.79	11.90	3.12	50.02	10:33
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>				
1:10		(TC) 8.7114 (IC) (v1254)		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)				

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.9255 ppm (PASS)	0.0000 ppm	0%	2019/05/09 19:10

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.9255	249.2546	178.66	181.55	2.89	49.97	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 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/05/09 19:25

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.20	9.26	3.06	49.99	10:31

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 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%	2019/05/09 19:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.18	9.22	3.04	49.93	10:28
2	TOC	0.0000	0.0000	6.23	9.32	3.10	50.00	10:30
3	TOC	0.0000	0.0000	6.19	9.09	2.90	49.98	10:27
4	TOC	0.0000	0.0000	6.08	8.93	2.85	49.95	10:27

Dilution

1:10

Blank Contribution

(TC) 8.7114 (IC) (v1254)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS

From Schedule Version 5

		Concentration		Min / Max			
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	Pos	BAT	(ppm)	Dil	Sample ID	(% dev)	Result	Std. Dev.	RSD	Start Time	
	♦	C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	25.2591 ppm (PASS)	0.2650 ppm	1.05%	2019/05/09 20:35

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	25.0234	250.2342	179.32	182.28	2.96	49.97	10:28
C	TOC	25.0 ppm	2	25.0368	250.3683	179.41	182.30	2.89	50.03	10:29
C	TOC	25.0 ppm	3	25.5102	255.1017	182.62	185.61	2.99	49.95	10:27
C	TOC	25.0 ppm	4	25.4658	254.6583	182.32	185.36	3.04	49.95	10:26

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos C</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	25 ppmC

Sample Type: Sample

From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	2	TOC	ICS	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/09 21:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.68	10.55	2.87	49.97	10:32

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	3	TOC	K1903942-004.01	7.2301 ppm	0.0272 ppm	0.3800%	2019/05/09 21:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.1956	71.9565	57.56	60.57	3.02	49.90	10:25
2	TOC	7.2244	72.2437	57.75	60.87	3.12	49.86	10:27
3	TOC	7.2600	72.6003	57.99	61.03	3.03	49.83	10:26
4	TOC	7.2403	72.4029	57.86	60.80	2.94	49.83	10:28

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	4	TOC	K1904161-001.01	2.0475 ppm	0.0697 ppm	3.4000%	2019/05/09 22:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.0968	20.9675	22.94	25.83	2.89	49.81	10:32
2	TOC	1.9982	19.9819	22.28	25.18	2.90	49.79	10:28

Dilution

1:10

Blank Contribution

(TC) 8.7114 (IC)

Method

CAS_salt_010711

Calibration

CAS_salt_010711

(v1254)

(v4)

(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
5	TOC	K1904161-002.01	1.0178 ppm	0.0525 ppm	5.1600%	2019/05/09 23:09

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9807	9.8065	15.37	18.28	2.91	49.78	10:29
2	TOC	1.0549	10.5490	15.87	18.77	2.90	49.78	10:30

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
6	TOC	K1904161-002.01 ms	24.5398 ppm	0.0000 ppm	0.0000%	2019/05/09 23:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	24.5398	245.3979	175.29	178.28	2.99	49.97	10:29

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
7	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/09 23:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.00	9.93	2.93	49.84	10:34

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
8	TOC	K1904159-001.01	1.7158 ppm	0.0354 ppm	2.0600%	2019/05/10 00:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.7408	17.4083	20.53	23.49	2.96	49.82	10:27
2	TOC	1.6907	16.9074	20.19	23.18	2.99	49.81	10:25

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
9	TOC	K1904159-002.01	1.8337 ppm	0.0464 ppm	2.5300%	2019/05/10 00:35

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.8009	18.0093	20.94	23.83	2.89	49.85	10:25
2	TOC	1.8665	18.6649	21.38	24.33	2.95	49.81	10:28

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.0320 ppm (PASS)	0.0000 ppm	0%	2019/05/10 01:03

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.0320	250.3197	179.38	182.41	3.03	49.81	10:32

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 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/05/10 01:17

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.33	8.36	3.03	49.81	10:34

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 5

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 10	TOC	K1904159-003.01	1.1077 ppm	0.0374 ppm	3.3800%	2019/05/10 01:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.1342	11.3416	16.41	19.31	2.90	49.84	10:27
2	TOC	1.0813	10.8127	16.05	18.92	2.87	49.84	10:26

Dilution

1:10

Blank Contribution

(TC) 8.7114 (IC) (v1254)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

11	TOC	K1904159-004.01	1.8578 ppm	0.1054 ppm	5.6700%	2019/05/10 02:00
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Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.9323	19.3234	21.83	24.60	2.77	49.87	10:28
2	TOC	1.7833	17.8325	20.82	23.69	2.88	49.88	10:25

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
12	TOC	K1904159-005.01	1.0790 ppm	0.0336 ppm	3.1200%	2019/05/10 02:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.1028	11.0278	16.20	19.19	2.99	49.91	10:26
2	TOC	1.0552	10.5520	15.87	18.88	3.01	49.90	10:26

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
13	TOC	K1904159-006.01	2.0172 ppm	0.0477 ppm	2.3700%	2019/05/10 02:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.9835	19.8346	22.18	25.24	3.07	49.94	10:28
2	TOC	2.0509	20.5094	22.63	25.44	2.81	49.94	10:32

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
14	TOC	K1904158-001.01	1.4376 ppm	0.0255 ppm	1.7800%	2019/05/10 03:25

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4556	14.5561	18.59	21.55	2.96	49.95	10:25
2	TOC	1.4195	14.1952	18.35	21.36	3.01	49.96	10:29

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
15	TOC	K1904074-001.02	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/10 03:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.25	8.10	2.85	49.99	10:26
2	TOC	0.0000	0.0000	5.00	7.99	2.99	50.00	10:26

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
16	TOC	K1904115-001.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/10 04:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.08	10.91	2.83	50.02	10:29
2	TOC	0.0000	0.0000	7.91	10.91	3.00	50.02	10:30

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	K1904181-001.02	0.9773 ppm	0.0149 ppm	1.5200%	2019/05/10 04:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9668	9.6681	15.27	18.24	2.96	50.04	10:27
2	TOC	0.9879	9.8787	15.42	18.17	2.75	50.07	10:26

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	K1904182-001.01	0.3281 ppm	0.0299 ppm	9.1100%	2019/05/10 05:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3070	3.0696	10.80	13.58	2.78	50.07	10:27
2	TOC	0.3492	3.4924	11.08	13.90	2.82	50.08	10:31

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
19	TOC	K1904195-001.01	2.1347 ppm	0.0064 ppm	0.3000%	2019/05/10 05:45

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.1392	21.3918	23.23	26.05	2.81	50.12	10:28
2	TOC	2.1302	21.3019	23.17	26.10	2.93	50.16	10:25

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.6781 ppm (PASS)	0.0000 ppm	0%	2019/05/10 06:13

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.6781	246.7810	176.98	179.94	2.96	50.08	10:29

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos B</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/05/10 06:28

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.32	8.14	2.81	50.00	10:34

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos D</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample From Schedule Version 5

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/10 06:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.45	7.30	2.85	49.96	10:33

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.7114 (IC) (v1254)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	25.2799 ppm (PASS)	0.0000 ppm	0%	2019/05/10 06:57

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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	Type									
C	TOC	25.0 ppm	1	25.2799	252.7991	181.06	184.05	2.99	49.92	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 5

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
21	TOC	K1904195-002.01	3.2970 ppm	0.0634 ppm	1.9200%	2019/05/10 07:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.3419	33.4190	31.40	34.35	2.96	49.87	10:30
2	TOC	3.2522	32.5218	30.79	33.64	2.85	49.85	10:31

Dilution **Blank Contribution** **Method** **Calibration**
 1:10 (TC) 8.7114 (IC) (v1254) CAS_salt_010711 (v4) CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
22	TOC	K1904195-003.01	1.3312 ppm	0.0393 ppm	2.9500%	2019/05/10 07:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.3590	13.5897	17.94	20.69	2.76	49.83	10:30
2	TOC	1.3034	13.0343	17.56	20.31	2.75	49.79	10:26

Dilution **Blank Contribution** **Method** **Calibration**
 1:10 (TC) 8.7114 (IC) (v1254) CAS_salt_010711 (v4) CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
23	TOC	K1904195-004.01	1.5440 ppm	0.0219 ppm	1.4200%	2019/05/10 08:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5595	15.5948	19.30	22.12	2.82	49.78	10:31
2	TOC	1.5285	15.2854	19.09	21.94	2.86	49.83	10:28

Dilution **Blank Contribution** **Method** **Calibration**
 1:10 (TC) 8.7114 (IC) (v1254) CAS_salt_010711 (v4) CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
24	TOC	K1904195-005.01	1.5738 ppm	0.0029 ppm	0.1900%	2019/05/10 08:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5717	15.7170	19.38	22.17	2.79	49.81	10:26
2	TOC	1.5758	15.7583	19.41	22.15	2.75	49.82	10:26

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
25	TOC	K1904032-001.01	17.1658 ppm	0.2446 ppm	1.4200%	2019/05/10 09:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	16.9929	169.9287	124.06	126.97	2.91	49.81	10:25
2	TOC	17.3388	173.3878	126.41	129.43	3.03	49.80	10:28

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
26	TOC	K1904032-002.01	0.7299 ppm	0.1735 ppm	23.7800%	2019/05/10 09:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8526	8.5263	14.50	17.57	3.08	49.83	10:29
2	TOC	0.6072	6.0720	12.83	15.74	2.91	49.81	10:25

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
27	TOC	K1904071-001.04	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/10 10:00

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.03	8.16	3.13	49.84	10:27

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
28	TOC	K1904071-001.04 ms	25.6068 ppm	0.0000 ppm	0.0000%	2019/05/10 10:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	25.6068	256.0683	182.53	185.41	2.88	49.75	10:33

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time

♦	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.8503 ppm (PASS)	0.0000 ppm	0%	2019/05/10 10:29
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.8503	248.5032	178.14	181.05	2.91	49.75	10:33
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos B</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		50 ppmC		

Sample Type: Check Standard --> CCB

From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/05/10 10:44

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.62	8.36	2.75	50.00	10:30

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos D

0 ppmC

Sample Type: Sample

From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	29	TOC	K1904065-001.01 100x	7.0627 ppm	0.0545 ppm	0.7700%	2019/05/10 10:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.0242	70.2417	56.39	59.23	2.84	49.99	10:29
2	TOC	7.1012	71.0121	56.91	59.88	2.97	49.96	10:27

Dilution

1:10

Blank Contribution

(TC) 8.7114 (IC)
(v1254)

Method

CAS_salt_010711
(v4)

Calibration

CAS_salt_010711
(v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	30	TOC	K1904094-001.03	10.7852 ppm	0.0785 ppm	0.7300%	2019/05/10 11:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	10.8408	108.4079	82.30	85.29	2.99	50.10	10:27
2	TOC	10.7297	107.2971	81.54	84.48	2.93	49.97	10:25

Dilution

1:10

Blank Contribution

(TC) 8.7114 (IC)
(v1254)

Method

CAS_salt_010711
(v4)

Calibration

CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
31	TOC	K1904094-002.03	7.8577 ppm	0.1923 ppm	2.4500%	2019/05/10 11:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.9937	79.9368	62.97	65.86	2.89	50.12	10:29
2	TOC	7.7217	77.2173	61.13	64.13	3.01	50.14	10:25

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
32	TOC	K1904094-003.03	2.4084 ppm	0.3028 ppm	12.5700%	2019/05/10 12:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.6225	26.2254	26.51	29.25	2.74	50.15	10:30
2	TOC	2.1943	21.9428	23.61	26.59	2.99	50.18	10:29

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
33	TOC	K1904094-004.03	1.5651 ppm	0.0050 ppm	0.3200%	2019/05/10 12:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5686	15.6861	19.36	22.35	2.99	50.15	10:27
2	TOC	1.5615	15.6154	19.31	22.14	2.83	50.19	10:25

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
34	TOC	K1904094-005.03	0.8627 ppm	0.0428 ppm	4.9600%	2019/05/10 13:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8930	8.9300	14.77	17.56	2.79	50.19	10:26
2	TOC	0.8325	8.3245	14.36	17.24	2.88	50.24	10:24

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
35	TOC	K1904094-006.03	0.5506 ppm	0.0055 ppm	1.0000%	2019/05/10 13:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5466	5.4665	12.42	15.15	2.72	50.17	10:29

2	TOC	0.5545	5.5446	12.48	15.29	2.82	50.27	10:32
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Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
36	TOC	K1904094-007.03	2.4891 ppm	0.1500 ppm	6.0300%	2019/05/10 14:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.5951	25.9514	26.33	29.18	2.86	50.24	10:32
2	TOC	2.3830	23.8299	24.89	27.81	2.93	50.17	10:28

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
37	TOC	K1904133-001.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/10 14:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.06	9.93	2.87	50.18	10:30
2	TOC	0.0000	0.0000	6.79	9.66	2.87	50.27	10:26

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
38	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/10 15:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.10	6.93	2.84	50.17	10:26
2	TOC	0.0000	0.0000	4.38	7.17	2.79	50.20	10:26
3	TOC	0.0000	0.0000	3.94	6.84	2.90	50.29	10:27
4	TOC	0.0000	0.0000	4.00	6.84	2.84	50.18	10:25

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.0206 ppm (PASS)	0.0000 ppm	0%	2019/05/10 16:07

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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B	TOC	25 ppm	1	24.0206	240.2062	172.51	175.43	2.91	50.21	10:31
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 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/05/10 16:22

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	4.58	7.57	2.99	50.28	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 5

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 39	TOC	MB3	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/10 16:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	3.74	6.63	2.89	50.29	10:31

Dilution		Blank Contribution		Method		Calibration	
1:10		(TC) 8.7114 (IC) (v1254)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)	

Sample Type: Check Standard --> LCS From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ C	TOC	25.0000	1:1	[TOC] LCS [25.0 ppm]	0 / infinity (NA / NA)	24.8366 ppm (PASS)	0.0000 ppm	0%	2019/05/10 16:51

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.8366	248.3662	178.05	181.00	2.95	50.22	10:31

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 5

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
40	TOC	K1904163-001.03	1.3087 ppm	0.0543 ppm	4.1500%	2019/05/10 17:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.3470	13.4704	17.85	20.81	2.96	50.24	10:27
2	TOC	1.2703	12.7029	17.33	20.14	2.80	50.32	10:27

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
41	TOC	K1904163-002.03	0.4543 ppm	0.0269 ppm	5.9200%	2019/05/10 17:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4733	4.7328	11.92	14.78	2.86	50.30	10:27
2	TOC	0.4353	4.3528	11.67	14.56	2.89	50.26	10:28

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
42	TOC	K1904163-003.03	1.3887 ppm	0.0880 ppm	6.3400%	2019/05/10 18:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4509	14.5090	18.56	21.11	2.55	50.25	10:25
2	TOC	1.3264	13.2641	17.72	20.82	3.11	50.38	10:28

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
43	TOC	K1904163-004.03	0.7570 ppm	0.0194 ppm	2.5600%	2019/05/10 18:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.7433	7.4332	13.76	16.65	2.89	50.30	10:31
2	TOC	0.7707	7.7072	13.94	16.96	3.02	50.15	10:29

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
44	TOC	K1904163-005.03	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/10 18:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time

1	TOC	0.0000	0.0000	6.58	9.46	2.88	50.19	10:31
2	TOC	0.0000	0.0000	6.58	9.46	2.88	50.17	10:27

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
45	TOC	K1904205-001.01	35.3390 ppm	0.0055 ppm	0.0200%	2019/05/10 19:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	35.3351	353.3511	248.56	251.48	2.91	50.19	10:29
2	TOC	35.3429	353.4292	248.62	251.54	2.92	50.19	10:27

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
46	TOC	K1904205-002.01	11.0269 ppm	0.1960 ppm	1.7800%	2019/05/10 19:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	11.1655	111.6548	84.50	87.46	2.96	50.23	10:29
2	TOC	10.8882	108.8823	82.62	85.63	3.01	50.24	10:27

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
47	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/10 20:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.84	9.73	2.89	50.28	10:25
2	TOC	0.0000	0.0000	5.94	8.90	2.96	50.30	10:27

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)MethodCAS_salt_010711
(v4)CalibrationCAS_salt_010711
(v30)Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.3410 ppm (PASS)	0.0000 ppm	0%	2019/05/10 20:51

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.3410	243.4104	174.69	177.57	2.88	50.20	10:32

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)**STD Conc - Pos B**

50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/05/10 21:05

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.28	8.13	2.85	50.21	10:31

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)**STD Conc - Pos D**

0 ppmC

Sample Type: Sample

From Schedule Version 5

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 48	TOC	K1904071-001.03 doc	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/10 21:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.64	7.58	2.95	50.27	10:27
2	TOC	0.0000	0.0000	4.26	7.41	3.14	50.11	10:24

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 49	TOC	K1904071-001.03 ms doc	24.7933 ppm	0.0000 ppm	0.0000%	2019/05/10 21:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	24.7933	247.9333	177.01	180.01	3.00	50.13	10:35

Dilution

1:10

Blank Contribution(TC) 8.7114 (IC)
(v1254)**Method**CAS_salt_010711
(v4)**Calibration**CAS_salt_010711
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 50	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/10 22:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.08	8.09	3.01	50.14	10:30

Dilution 1:10
Blank Contribution (TC) 8.7114 (IC) (v1254)
Method CAS_salt_010711 (v4)
Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
51	TOC	K1904058-001.02 doc	5.1648 ppm	0.0485 ppm	0.9400%	2019/05/10 22:18

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.1992	51.9917	44.00	46.91	2.91	50.03	10:29
2	TOC	5.1305	51.3051	43.54	46.51	2.97	50.13	10:25

Dilution 1:10
Blank Contribution (TC) 8.7114 (IC) (v1254)
Method CAS_salt_010711 (v4)
Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
52	TOC	K1904058-002.02 doc	2.0640 ppm	0.0329 ppm	1.5900%	2019/05/10 22:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.0408	20.4077	22.56	25.53	2.97	49.97	10:28
2	TOC	2.0873	20.8732	22.88	25.74	2.86	49.92	10:29

Dilution 1:10
Blank Contribution (TC) 8.7114 (IC) (v1254)
Method CAS_salt_010711 (v4)
Calibration CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
53	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/10 23:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.02	7.87	2.85	49.96	10:28
2	TOC	0.0000	0.0000	5.13	8.18	3.05	49.91	10:26

Dilution 1:10
Blank Contribution (TC) 8.7114 (IC) (v1254)
Method CAS_salt_010711 (v4)
Calibration CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.1833 ppm (PASS)	0.0000 ppm	0%	2019/05/10 23:42

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.1833	241.8326	173.62	176.53	2.91	50.03	10:28

Completion State Success - Criteria
Success Action Do Nothing
Method CAS_salt_010711
Calibration CAS_salt_010711
STD Conc - Pos B 50 ppmC

met.

(v4)

(v30)

Sample Type: Check Standard --> CCB

From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/05/10 23:57

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.18	7.99	2.81	49.93	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

Sample Type: Sample

From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆	54	TOC	MB4	0.0000 ppm	0.0000 ppm	0.0000%	2019/05/11 00:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.23	7.15	2.92	49.89	10:29

Dilution

1:10

Blank Contribution

(TC) 8.7114 (IC) (v1254)

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

Sample Type: Check Standard --> LCS

From Schedule Version 5

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦	C	TOC	25.0000	1:1	[TOC] LCS [25.0 ppm]	0 / infinity (NA / NA)	25.1159 ppm (PASS)	0.0000 ppm	0%	2019/05/11 00:26

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	25.1159	251.1594	179.95	182.90	2.96	49.87	10:33

Completion State

Success - Criteria met.

Success Action

Do Nothing

Method

CAS_salt_010711 (v4)

Calibration

CAS_salt_010711 (v30)

STD Conc - Pos C

25 ppmC

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 5

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
-----	-----	---------------------	-----	-----------	-------------------	--------	-----------	-----	------------

♦	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.4668 ppm (PASS)	0.0000 ppm	0%	2019/05/11 00:41
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.4668	244.6685	175.54	178.68	3.14	49.84	10:33
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos B</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		50 ppmC		

<u>Sample Type</u> : Check Standard --> CCB							From Schedule Version 5			
Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time	
♦	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/05/11 00:56
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	4.96	7.91	2.94	49.84	10:33
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>		<u>Calibration</u>		<u>STD Conc - Pos D</u>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		0 ppmC		

Meta Data Used in this Report

Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1253	1.3423	1.1900	0.0000	0.0000	0.0000	2019/05/07 15:06	Fusion1 (Fusion1)
v1254	0.9757	1.1630	0.0000	0.0000	0.0000	2019/05/09 18:55	Fusion1 (Fusion1)

Calibrations

Name: CAS_salt_010711 (TOC)

Version:	v30	Calibration curve formula:	TOC: $y = 6.788x + 9.463$
Ver Creation:	2019/03/05 17:42	r ² value:	TOC: $r^2 = 0.99963$
Comment:			
Operator:	Fusion1 (Fusion1)		
Basic Analysis Type	TOC		

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

Operator: Fusion1 (Fusion1)

Ver Creation: 2019/02/21 17:57

Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	ICSpurgeRinseVolume	12.0 ml
UVReactorPrerinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPrerinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPrerinses	1	SyringeSpeedWaste	10
ICSpurgeTime	1.00 mins	SyringeSpeedAcid	7
DetectorSweepFlow	500 ml/min	SyringeSpeedReagent	7
PreSpurgeTime	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	2019/05/11 01:13

StarLIMS Run: 635075, 635076, 635077, 635078
Analysis: TOC
Method: 415.1, SM 5310 C, 9060, 9060A

CCV: 11-GEN-05-77K 50 ppm LCS: 11-GEN-05-77D 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-74A

ICS TV: 25.0 ppm ICS % R = 2

Spike ID: 11-GEN-05-77J 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-77M

21 % H₃PO₄: 11-GEN-05-77O

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: NA

Analyzed By: <i>BCD</i>	Date Analyzed: <i>5/11/19-5/19/19-5/21/19</i>
Reviewed By: <i>Theresa</i>	Date Reviewed: <i>05/13/19</i>



Case Narrative

Method: 6850
Analysis: Perchlorate
Analysis SOP: LC-MS-CLO4
ALS WO ID(s): 1913332, 1913338, 1913342, 1913345

Client: ALS Laboratories (Houston, TX)
Matrix: Water
ELMS Batch (HBN): 2253(239553)

General Set Information: There were ten 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. 50 μL 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 0.45 μm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1913338001 was analyzed and reported from a 1:100 dilution. Field sample 1913342004 was analyzed and reported from a 1:10 dilution. The reporting limits have been adjusted accordingly.

Method QC data: The method blank (LMB 653683) was less than 1/2 the CRDL. The recovery for the LCS (653684) was within acceptable parameters.



MS/MSD Analysis: MS/MSD was performed on samples 1913342006/007. 4.0µl of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4.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 – 653681) is reported from the analysis of the Laboratory Control Sample (LCS – 653684) at a level of 4.0µg/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: 19MARI03).

<u>Stephen Brose</u>	<u>May 22, 2019</u>
Analyst	Date



00938963

ANALYTICAL REPORT

Report Date: May 22, 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: **34-1913345**

Project ID: HS19050397

Purchase Order: HS19050397

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18-24-SP650_050719_BIX	1913345001	05/07/19	05/09/19	

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992

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ANALYTICAL REPORT

Workorder: 34-1913345

Client: ALS Environmental
(Houston)

Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: LH18-24-SP650_050719_BIX		Sampling Site: NA		Collected: 05/07/2019		
Lab ID: 1913345001		Media: 125 mL Nalgene		Received: 05/09/2019		
Matrix: Water		Sampling Parameter: NA				
Analysis Method - EPA 6850, DoD QSM						
Preparation: Not Applicable			Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2253 (HBN: 239553) Analyzed: 05/21/2019 11:10		Instrument ID: LCMS04 Percent Solid: NA 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

Comments

Quality Control: EPA 6850, DoD QSM - (HBN: 239553)

Field sample 1913338001 was analyzed and reported from a 1:100 dilution. Field sample 1913342004 was analyzed and reported from a 1:10 dilution. 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/ Stephen Brose 05/22/2019 06:38	/S/ Thomas Bosch 05/22/2019 11:11

Laboratory Contact Information

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

Phone: (801) 266-7700
Email: als@alstglobal.com
Web: www.alstslc.com



ANALYTICAL REPORT

Workorder: 34-1913345

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.pjllabs.com
	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.com
	Utah (TNI)	UT00953	http://lams.nelac-institute.org/search
	Nevada (TNI)	UT00953201-1	https://ndep.nv.gov/water/lab-certification
	Iowa (TNI)	IA# 376	http://www.shl.uiowa.edu/labcert/idnr/
	Kansas	E-10416	http://www.kdheks.gov/envlab/disclaimer.html
	Oklahoma (TNI)	IJ# 9980	http://www.deq.state.ok.us/CSDnew/labcert.htm
	Texas (TNI)	T104704456-18-9	https://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_list.pdf
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	http://www.aihaaccreditedlabs.org
	DOECAP-AP	L18-606	http://www.pjllabs.com
	Washington	C596	https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	http://www.pjllabs.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

00938966

Analysis Information

Workorder: 1913345

Limits: Client SOW/Contract Specified

Preparation: NA

Analysis: EPA 6850, DoD QSM

Basis: DoD QSM

Batch: NA

Batch: ELMS/2253 (HBN: 239553)

Prepared By: NA

Analyzed By: Stephen Brose

Blank

LMB: 653683

Analyzed: 05/21/2019 08:29

Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 653684

Analyzed: 05/21/2019 08:02

Dilution: 1

Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.08	4.00	102	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1913342005

Analyzed: 05/21/2019 10:03

Dilution: 1

Units: ug/L

MS: 1913342006

Analyzed: 05/21/2019 10:17

Dilution: 1

Units: ug/L

MSD: 1913342007

Analyzed: 05/21/2019 10:30

Dilution: 1

Units: ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	3.78	4	94.4	78.8	123.8	3.72	93.0	1.51	0.0	20.0

Comments

Field sample 1913338001 was analyzed and reported from a 1:100 dilution. Field sample 1913342004 was analyzed and reported from a 1:10 dilution. 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/ Stephen Brose 05/22/2019 06:38	/S/ Thomas Bosch 05/22/2019 11:11

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
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Subcontract Chain of Custody

18698/#2

SAMPLING STATE: Dept of Defense

COC ID: 11270

SUBCONTRACT TO:

1913345

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: HS19050397
TSR: Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19050397-02	LH18/24-SP650_050719_BIX	Water	07 May 2019 14:00
SUB_Perch-6850			16 May 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:

Received By:

Date/Time:

Cooler ID(s):

Temperature(s):

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Page 1 of 1

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SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Page 1 of 1

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: <u>ALS Houston</u>		Project/Task/Site: <u>1913345</u>				
Date/Time of Receipt: <u>5/11/19 10:18</u>		Number of Coolers Received: <u>1</u>				
Condition of Coolers: <u>Acceptable/Unacceptable</u>		Temperature Control: <u>Present/Not Included</u>				
Cooler Custody Seals: <u>Present/Absent/NA</u>		Location Temp Taken: <u>Control/Between Samples</u>				
Container Custody Seals: <u>Present/Absent/NA</u>		Are all temperatures within project specific guidelines? <u>Yes/No/NA</u>				
Ice Present: <u>Yes/No/NA</u>		VOA Headspace Present? <u>Yes/No/NA</u>				
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	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 - 9390	2 °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By: Julie Warrick Julie Warrick 5/11/19
Signature Printed Name Date

CLIENT-RELATED INFORMATION

- | | | | |
|--|---|--|---|
| <input type="checkbox"/> Missing Cooler | <input type="checkbox"/> Missing Samples/Bottles | <input type="checkbox"/> Incorrect Preservation | <input type="checkbox"/> Insufficient Sample Volume |
| <input type="checkbox"/> Cooler Conditions | <input type="checkbox"/> Broken/Leaking Samples | <input type="checkbox"/> pH Criteria Not Met | <input type="checkbox"/> Chain of Custody Problems |
| <input type="checkbox"/> Missing Paperwork | <input type="checkbox"/> Incorrect Bottle Type | <input type="checkbox"/> Residual Chlorine Present | <input type="checkbox"/> Other: |
| <input type="checkbox"/> Missing/Incorrect Bottle Labels | <input type="checkbox"/> Cooler Temperatures Out of Range | <input type="checkbox"/> 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: _____ Returned to Sample Receipt by: _____ Date: _____
Printed Name Signature



**Must Deliver Next Business Day
Time and Temperature Sensitive!**

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

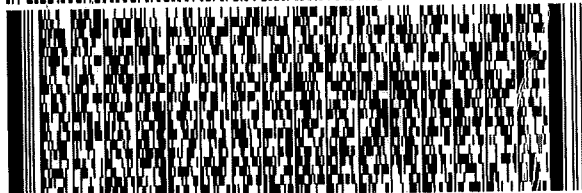
SHIP DATE: 08MAY19
ACTWGT: 21.30 LB
CAD: 300130/CAFE3211
DIMS: 19x16x13 IN
BILL THIRD PARTY

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

SALT LAKE CITY UT 84123

(801) 288-7700

REF: HS19050397/398/401/403 RJ



FedEx
EXP 7888

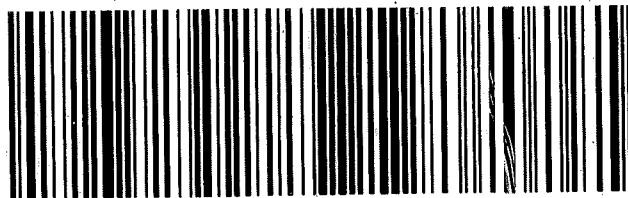


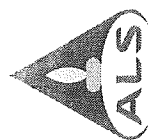
TRK# 4809 7833 6238
0201

**THU - 09 MAY 3:00P
STANDARD OVERNIGHT**

AX BTFA

**84123
UT-US SLC**





Batch Worklist

Batch: ELMS/ 2253

Rule: EPA 6850, DoD QSM Water

Workorder: 1913332 [ENV_LVL4]

Workorder: 1913338 [ENV_LVL4]

Workorder: 1913342 [ENV_LVL4]

Workorder: 1913345 [ENV_LVL4]

Created: 5/20/2019 06:13

Analyst: S. Brose

Instrument:

Status: WP

HBN: 239553



Pos	Lab ID	Sample ID	Prep Initial	Prep Final	Dust Weight	Type	Mx	Container	Procedure	Mgr	Expire Date	Due Date	Run Date
1	653680	CCV for HBN 239553 [ELMS/2253]				CCV	3		E685041C3Q	6214		5/22/2019	
2	653681	RLVS for HBN 239553 [ELMS/2253]				RLVS	3		E685041C3Q	6214		5/22/2019	
3	653682	ICS for HBN 239553 [ELMS/2253]				ICS	3		E6850.D3Q	6214		5/22/2019	
4	653683	LMB for HBN 239553 [ELMS/2253]				LMB	3		E6850Q413Q	6214		5/22/2019	
5	653684	LCS for HBN 239553 [ELMS/2253]				LCS	3		E6850Q413Q	6214		5/22/2019	
6	1913332001	LH18/24-SP650_050719_BIX				SAMPLE	3	1913332001-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
7	1913338001	LH18/24-SP140_050719				SAMPLE	3	1913338001-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
8	1913342001	50WW10-190507				SAMPLE	3	1913342001-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
9	1913342002	50WW09-190507				SAMPLE	3	1913342002-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
10	1913342003	50WW09-190507-FD				FLDDUP	3	1913342003-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
11	1913342004	50WW08-190507				SAMPLE	3	1913342004-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
12	1913342005	50WW23-190507				SAMPLE	3	1913342005-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
13	1913342006	50WW23-190507MS				MS	3	1913342006-A	E6850Q413Q	5480		5/22/2019	
14	1913342007	50WW23-190507MSD				MSD	3	1913342007-A	E6850Q413Q	5480		5/22/2019	
15	1913342008	50WW24-190507				SAMPLE	3	1913342008-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
16	1913342009	50WW05-190507				SAMPLE	3	1913342009-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
17	1913345001	LH18-24-SP650_050719_BIX				SAMPLE	3	1913345001-A	E6850Q41.3	5480	6/4/2019	5/22/2019	
18	653685	CCV for HBN 239553 [ELMS/2253]				CCV	3		E685041C3Q	6214		5/22/2019	



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #()'s: 1913332(001), 1913338(001), 1913342(001-009), 1913345(001)
 ELMS Batch/HBN ID: 2253 (239553)
 Prep Date: 05/21/2019 Analysis Date: 05/21/2019 Analyst: S. Brose
 Analyte: **Perchlorate** Matrix: **Water** Method: 6850
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\MAY\21MAY19D.s
 Reported DL: 1.0µg/L Reported LOD: 2.0µg/L Reported LOQ: 4.0µg/L

SAMPLE PREPARATION/ANALYSIS:

Water: Samples were prepared by SAB. 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 AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

STANDARDS: Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

CALIBRATION CURVE: Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.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: 35µL
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

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: 4.0µL of QC Solution Horizon ID 47516 was used for LCS 653684; Target = 4.0µg/L. ASTM type II water was used for LMB 653683.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1913342006/007 (Client ID: 50WW23-190507). 4.0µL of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. Spike target = 4.0µg/L.

COMMENTS:

- 1) Results reported in µg/L. Field samples 1913338001 and 1913342004 required 1:100 and 1:10 dilutions respectively. 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\MAY\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\239553-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATA\VIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 653681) is reported from the analysis of the Laboratory Control Sample (LCS – 653684) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, many of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03).

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.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDG: <u>ELMS/2253</u> <u>IT3N: 238553</u>		
Sample Set IDs if Applicable: <u>1913332/ 38/42/45</u>		
Calibration standards analyzed and meets criteria	SRB	TB
Standards traceability checked and meets criteria	SRB	TB
Standard curve coefficients evaluated and meet criteria	SRB	TB
ICVs analyzed and meet acceptance criteria	SRB	TB
CCVs analyzed and meet acceptance criteria	SRB	TB
Retention Time Windows checked	SRB	TB
For method 8081A, Endrin/DDT Breakdown is checked for compliance	—	—
Surrogate recoveries checked and appropriately addressed	SRB	TB
Method Preparation Blanks analyzed and meet acceptance criteria	SRB	TB
MSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed	SRB	TB
RLVS analyzed	SRB	TB
Preparation and analysis hold times met	SRB	TB
Preparation deviations and re-preparations noted when performed	SRB	TB
Analysis deviations and re-analyses noted when performed	SRB	TB
Sample dilution factors noted on reports	SRB	TB
Electronic records in HBN transcription accuracy and completeness checked	SRB	TB
Preparation and analysis calculations checked	SRB	TB
NCRs are completed as necessary <u>NC/CAR#</u>	—	—
Report forms are complete and accurate	SRB	TB
Manual integrations checked	SRB	TB



STANDARD REPORT

Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850 WKG Std 100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	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
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

ASTM H2O		Description - ASTM Type II Water	
Standard: 109		Created By: ALS Support (Lims)	
MFG: DCL In House		Create Date: 10/06/2005 09:10AM	
MFG Lot: Not Provided		Amount: 1000 L	
Part ID: Not Provided		Expires: 11/07/2025	
		Usable: Yes	
		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: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
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
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



STANDARD REPORT

Working Standard - CLO4 QC WRK

Working Standard

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			Amount: 1000 L
MFG: DCL In House			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



STANDARD REPORT

Working Standard - CLO4ISTDWRK

Working Standard - CLO4ISTDWRK

CLO4ISTDWRK			Description - Perchlorate ISTD Wrk 1,000ug/L		
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		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
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



STANDARD REPORT

Constituent

Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729		Created By: Thomas Bosch	Amount: 1 mL
MFG: Cambridge Isotope		Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026
MFG Lot: SDFF-012A		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



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

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:

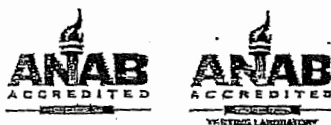
Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the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





Certificate of Analysis



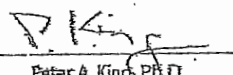
ISO Guide 34 Reference Material

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/QA



125 Market Street
New Haven, CT 06513
USA



AccuStandard®

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

CERTIFICATE OF ANALYSIS



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

Date Certified: Jun 25, 2018

Expiration: Jul 25, 2020

Sample Size: 100 mL

Components: 1

Storage Condition: Ambient ($>5^\circ\text{C}$)

Included on ISO/IEC 17025 Scope of Accreditation: Yes

Included on ISO 17034 Scope of Accreditation: Yes



Signal Word: None

Component	SRM #	Prepared Concentration ($\mu\text{g/mL}$)
ClO_4 Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is $\pm 0.24\%$.

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 $0.2 \mu\text{m}$ 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 $\pm 0.5\%$ 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



Cambridge Isotope Laboratories, Inc.

Certificate of Analysis

Quality Standards:

ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

Product Information

Chemical Purity Specification: $\geq 98\%$
 Labeled CAS Number: NA
 Unlabeled CAS Number: 7601-89-0
 MW*: 130.4
 Chemical Formula: NaClO_4
 Storage: Store at room temperature away from light and moisture.
 Stability: See storage and expiration date.

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.

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.

* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 $\mu\text{g/mL}$
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	109.4 \pm 2.8 $\mu\text{g/mL}$ (k=2)



ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Batch Report: C:\HPCHEM\1\DATA\21MAY19D\21MAY19D.B

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.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	
*	653680	CCV@25	Vial 71	1	Control	1	2.40704e6	8.594	23.99302
*	653684	QC@4.0	Vial 72	1	Control	2	3.96639e5	8.823	4.08274
*	653682	ICS@4.0	Vial 73	1	Control	3	3.14960e5	8.612	3.74421
*	653683	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1913332001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1913338001	100	Vial 76	1	Sample	6	3.99368e6	8.959	4178.24239
*	1913342001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1913342002		Vial 78	1	Sample	8	6.18077e5	8.360	7.21259
*	1913342003		Vial 79	1	Sample	9	6.79913e5	8.381	7.76574
*	1913342004	10X	Vial 80	1	Sample	10	2.09294e6	8.642	226.56793
*	1913342005		Vial 81	1	Sample	11	0.00000	0.000	0.00000
*	1913342006	MS	Vial 82	1	Sample	12	2.30072e5	8.281	3.77790
*	1913342007	SD	Vial 83	1	Sample	13	2.23456e5	8.296	3.72139
*	1913342008		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	1913342009		Vial 85	1	Sample	15	0.00000	0.000	0.00000
*	1913345001		Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	653685	CCV@25	Vial 71	1	Control	17	1.93838e6	8.628	23.36594

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	653680	CCV@25	Vial 71	1	Control	1	7.14295e5	8.612	23.97986
*	653684	QC@4.0	Vial 72	1	Control	2	1.27284e5	8.838	4.26129
*	653682	ICS@4.0	Vial 73	1	Control	3	1.12778e5	8.627	4.34080
*	653683	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1913332001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1913338001	100	Vial 76	1	Sample	6	1.20507e6	8.974	4254.41607
*	1913342001		Vial 77	1	Sample	7	0.00000	0.000	0.00000
*	1913342002		Vial 78	1	Sample	8	2.00267e5	8.373	7.73270
*	1913342003		Vial 79	1	Sample	9	2.18020e5	8.395	8.25365
*	1913342004	10X	Vial 80	1	Sample	10	6.29788e5	8.660	229.37195
*	1913342005		Vial 81	1	Sample	11	0.00000	0.000	0.00000
*	1913342006	MS	Vial 82	1	Sample	12	8.05070e4	8.292	4.28262
*	1913342007	SD	Vial 83	1	Sample	13	7.84560e4	8.311	4.22992
*	1913342008		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	1913342009		Vial 85	1	Sample	15	0.00000	0.000	0.00000
*	1913345001		Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	653685	CCV@25	Vial 71	1	Control	17	5.93941e5	8.647	24.07193

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	653680	CCV@25	Vial 71	1	Control	1	3.05962e5	8.618	5.00000
*	653684	QC@4.0	Vial 72	1	Control	2	3.19796e5	8.842	5.00000
*	653682	ICS@4.0	Vial 73	1	Control	3	2.78118e5	8.629	5.00000
*	653683	LMB	Vial 74	1	Control	4	3.07550e5	8.973	5.00000
*	1913332001		Vial 75	1	Sample	5	2.84011e5	8.455	5.00000
*	1913338001	100	Vial 76	1	Sample	6	2.80006e5	8.979	500.00000
*	1913342001		Vial 77	1	Sample	7	2.92233e5	8.419	5.00000
*	1913342002		Vial 78	1	Sample	8	2.75334e5	8.385	5.00000
*	1913342003		Vial 79	1	Sample	9	2.80514e5	8.402	5.00000
*	1913342004	10X	Vial 80	1	Sample	10	2.82646e5	8.663	50.00000
*	1913342005		Vial 81	1	Sample	11	2.06104e5	8.293	5.00000
*	1913342006	MS	Vial 82	1	Sample	12	2.01255e5	8.301	5.00000
*	1913342007	SD	Vial 83	1	Sample	13	1.98591e5	8.312	5.00000
*	1913342008		Vial 84	1	Sample	14	2.10825e5	8.375	5.00000

Batch Report: C:\HPCHEM\1\DATA\21MAY19D\21MAY19D.B

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	1913342009	Vial 85	1	Sample	15	2.18072e5	8.384	5.00000
*	1913345001	Vial 86	1	Sample	16	2.17961e5	8.508	5.00000
*	653685	CCV@25	Vial 71	Control	17	2.53387e5	8.650	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	653680	CCV@25	CLO4-AQN 1	Ctrl Samp		
2	Vial 72	653684	QC@4.0	CLO4-AQN 1	Ctrl Samp		
3	Vial 73	653682	ICS@4.0	CLO4-AQN 1	Ctrl Samp		
4	Vial 74	653683	LMB	CLO4-AQN 1	Ctrl Samp		
5	Vial 75	1913332001		CLO4-AQN 1	Sample		
6	Vial 76	1913338001	100	CLO4-AQN 1	Sample		
7	Vial 77	1913342001		CLO4-AQN 1	Sample		
8	Vial 78	1913342002		CLO4-AQN 1	Sample		
9	Vial 79	1913342003		CLO4-AQN 1	Sample		
10	Vial 80	1913342004	10X	CLO4-AQN 1	Sample		
11	Vial 81	1913342005		CLO4-AQN 1	Sample		
12	Vial 82	1913342006	MS	CLO4-AQN 1	Sample		
13	Vial 83	1913342007	SD	CLO4-AQN 1	Sample		
14	Vial 84	1913342008		CLO4-AQN 1	Sample		
15	Vial 85	1913342009		CLO4-AQN 1	Sample		
16	Vial 86	1913345001		CLO4-AQN 1	Sample		
17	Vial 71	653685	CCV@25	CLO4-AQN 1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD01.D

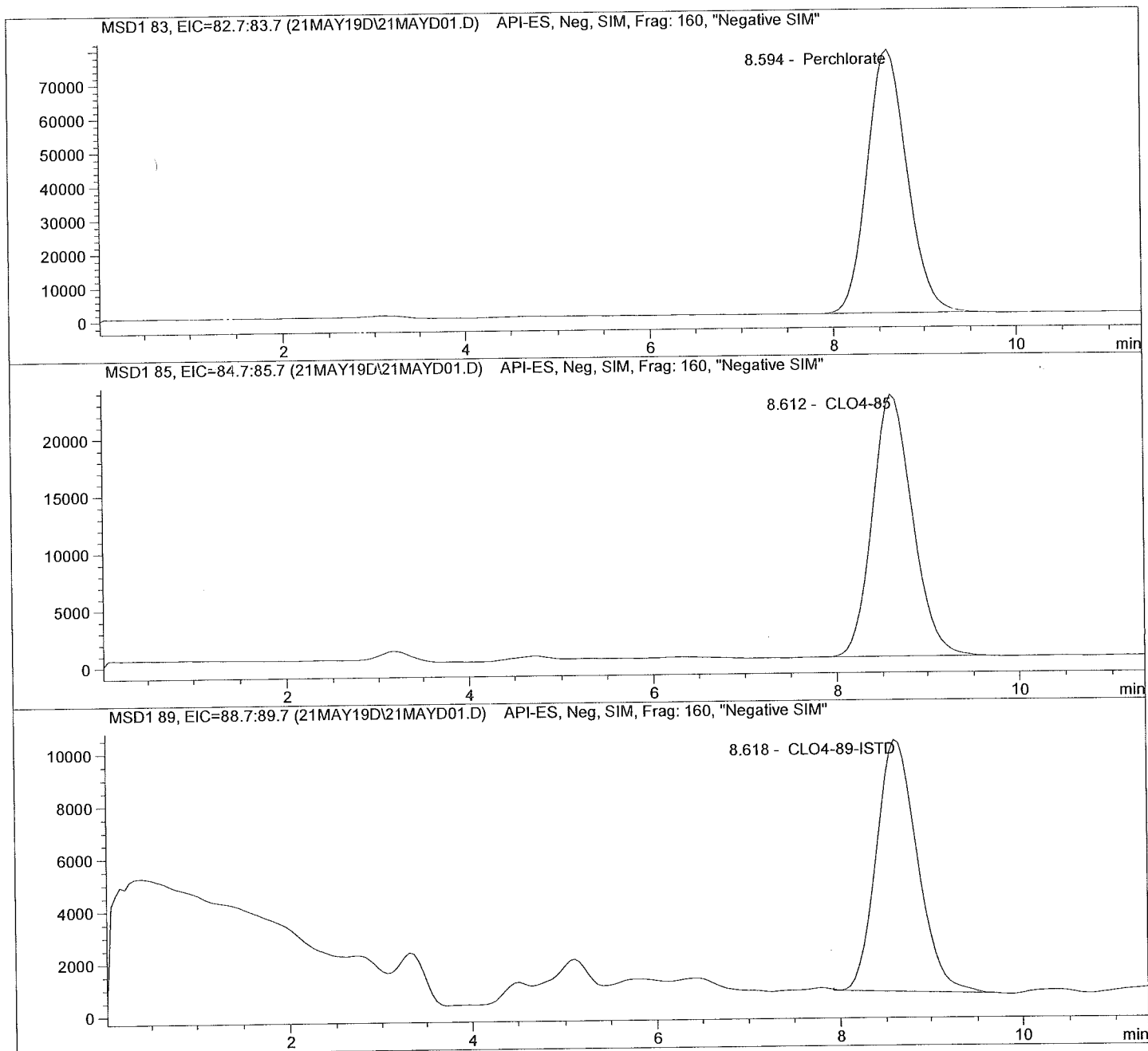
Sample Name: 653680 CCV@25

Injection Date: 5/21/2019 07:49:32
Sample Name: 653680 CCV@25
Acq Operator: 6214

Seq Line: 1
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD01.D

Sample Name: 653680 CCV@25

```

=====
Injection Date:  5/21/2019  07:49:32      Seq Line:           1
Sample Name:    653680    CCV@25          Location:           Vial 71
Acq Operator:   6214              Inj. No.:           1
                                      Inj. Vol.:          35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.594	PBA	2407042.7	23.9930	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.612	BBA	714295.0	23.9799	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.618	BBA	305961.9	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD02.D

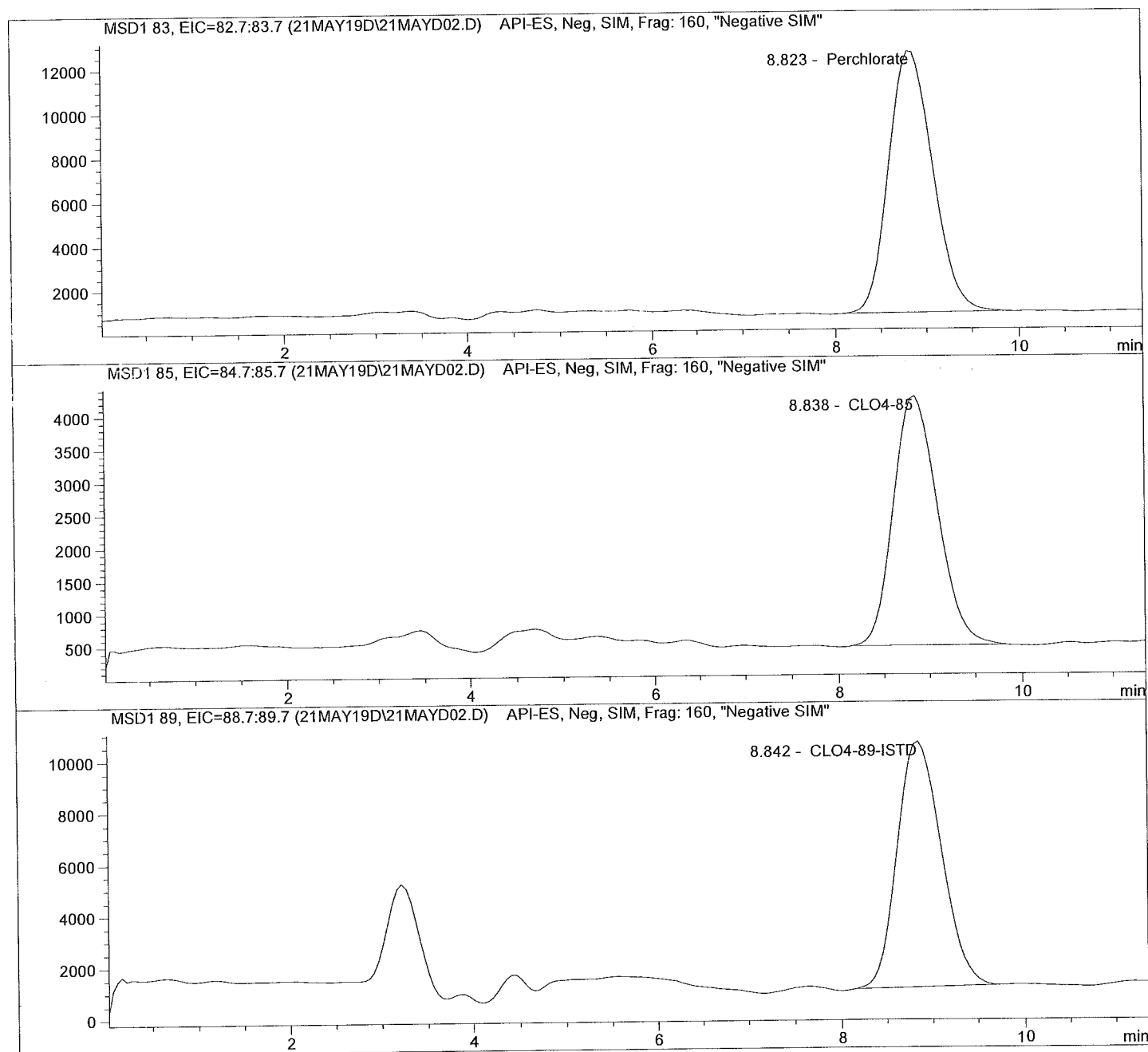
Sample Name: 653684 QC@4.0

Injection Date: 5/21/2019 08:02:56
Sample Name: 653684 QC@4.0
Acq Operator: 6214

Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD02.D

Sample Name: 653684 QC@4.0

```
=====
Injection Date:  5/21/2019  08:02:56      Seq Line:           2
Sample Name:    653684    QC@4.0          Location:           Vial 72
Acq Operator:   6214              Inj. No.:           1
                                      Inj. Vol.:          35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  4.000
=====
```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.823	PBA	396638.7	4.0827	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.838	BBA	127284.0	4.2613	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.842	PBA	319795.5	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD03.D

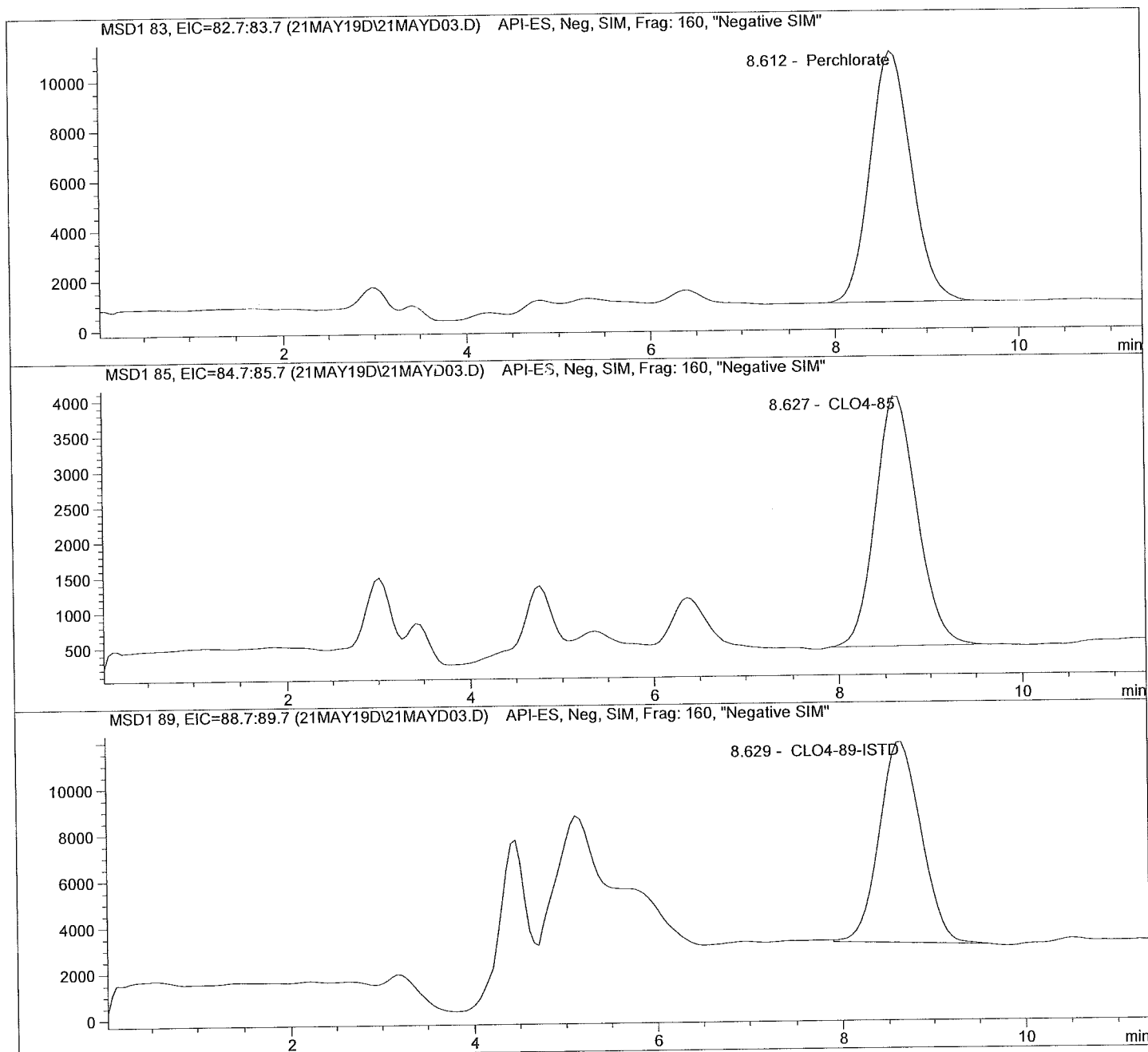
Sample Name: 653682 ICS@4.0

Injection Date: 5/21/2019 08:16:19
Sample Name: 653682 ICS@4.0
Acq Operator: 6214

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-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD03.D

Sample Name: 653682 ICS@4.0

```
=====
Injection Date:  5/21/2019  08:16:19      Seq Line:          3
Sample Name:    653682    ICS@4.0        Location:          Vial 73
Acq Operator:   6214                      Inj. No.:          1
                                           Inj. Vol.:        35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

Sample Information

```
=====
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  4.000
=====
```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.612	PBA	314959.5	3.7442	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.627	PBA	112778.0	4.3408	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.629	BBA	278118.1	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD04.D

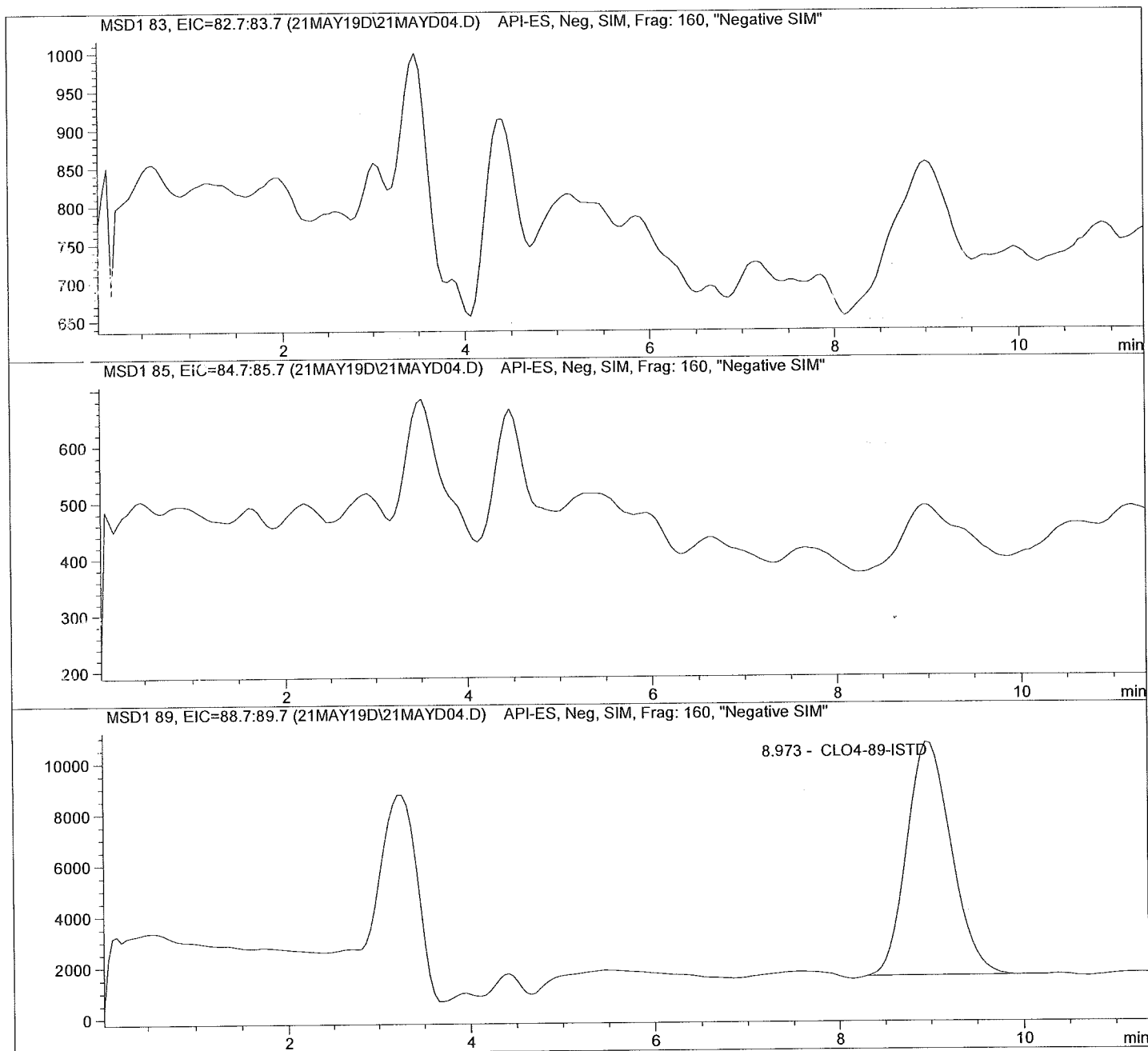
Sample Name: 653683 LMB

Injection Date: 5/21/2019 08:29:45
Sample Name: 653683 LMB
Acq Operator: 6214

Seq Line: 4
Location: Vial 74
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD04.D

Sample Name: 653683 LMB

```
=====
Injection Date:  5/21/2019  08:29:45      Seq Line:           4
Sample Name:     653683    LMB             Location:          Vial 74
Acq Operator:    6214              Inj. No.:           1
                                      Inj. Vol.:          35 µl
=====
```

```
Acq. Method:      CLO4-AQN.M
Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:      4/12/2019  07:54:13
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:          Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.973	PBA	307549.9	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD05.D

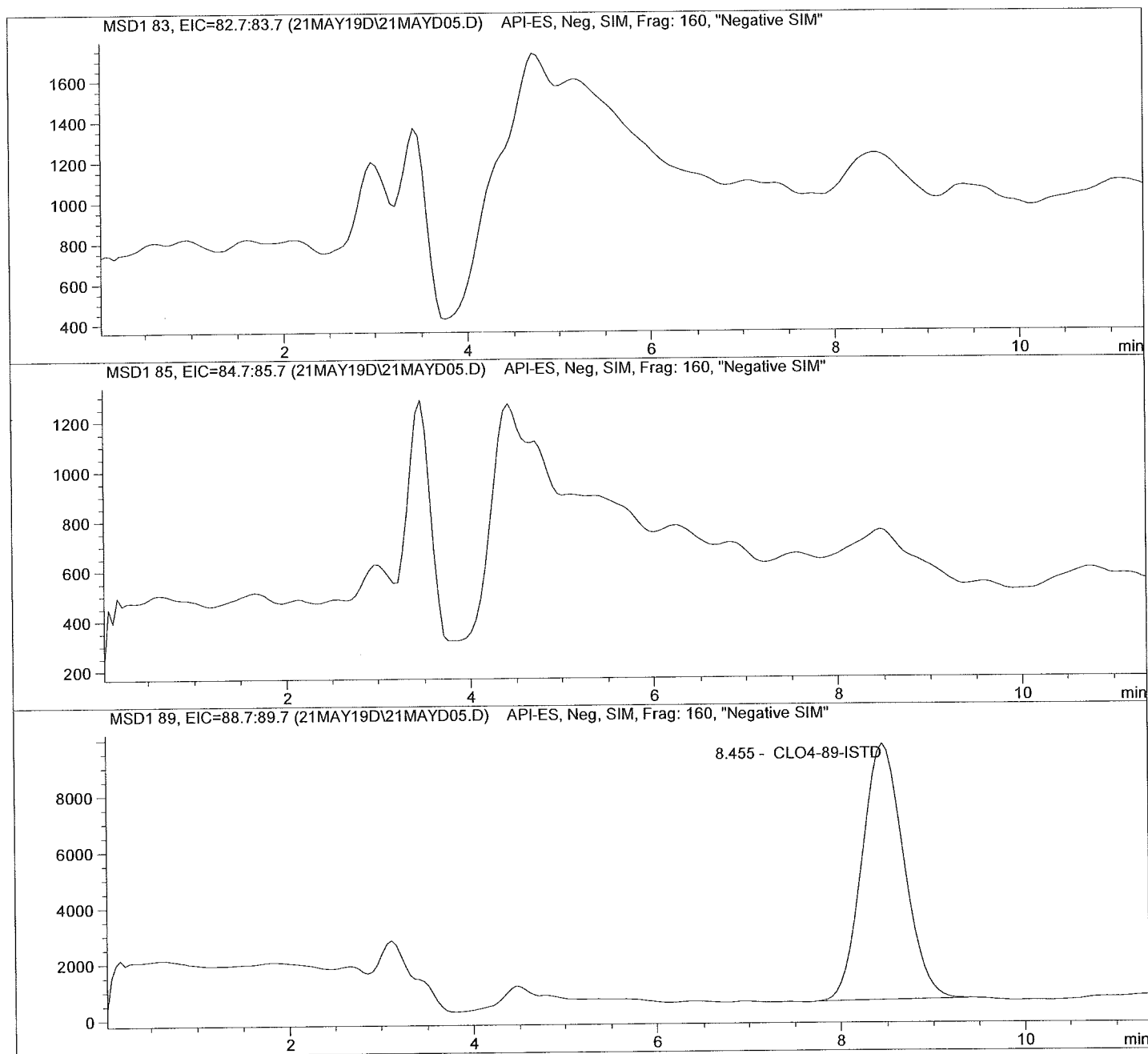
Sample Name: 1913332001

Injection Date: 5/21/2019 08:43:07
Sample Name: 1913332001
Acq Operator: 6214

Seq Line: 5
Location: Vial 75
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD05.D

Sample Name: 1913332001

```
=====
Injection Date:  5/21/2019  08:43:07      Seq Line:          5
Sample Name:    1913332001      Location:        Vial 75
Acq Operator:   6214           Inj. No.:         1
                               Inj. Vol.:        35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.455	PBA	284011.2	5.0000	CLO4-89-ISTD

=====
*** End of Report ***
=====

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD06.D

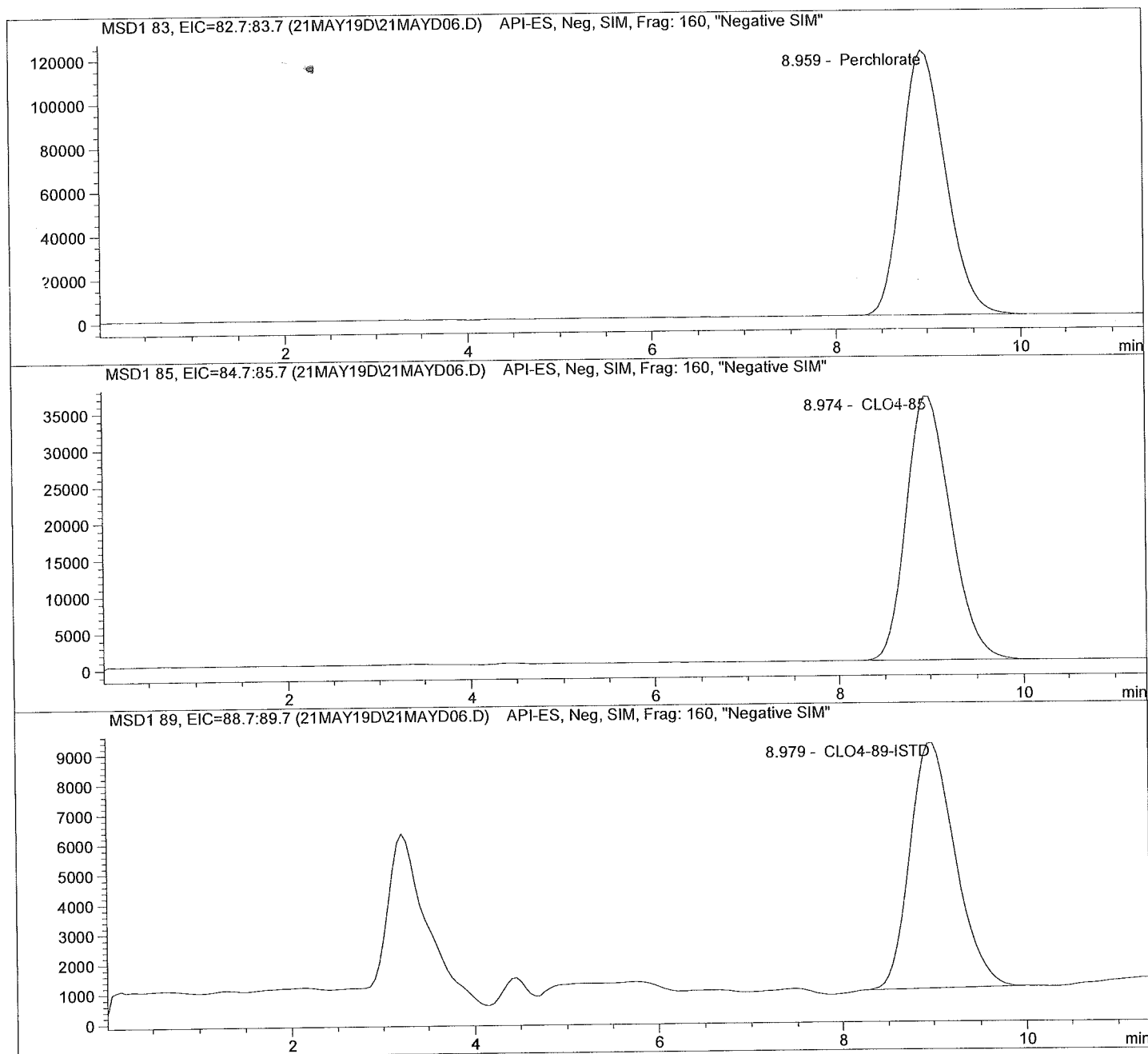
Sample Name: 1913338001 100

Injection Date: 5/21/2019 08:56:30
Sample Name: 1913338001 100
Acq Operator: 6214

Seq Line: 6
Location: Vial 76
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD06.D Sample Name: 1913338001 100

=====
Injection Date: 5/21/2019 08:56:30 Seq Line: 6
Sample Name: 1913338001 100 Location: Vial 76
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====
Sample Information
=====

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.959	PBA	3993682.8	4178.2424	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.974	PBA	1205073.2	4254.4161	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.979	BBA	280005.7	500.0000	CLO4-89-ISTD

=====
*** End of Report ***
=====

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD07.D

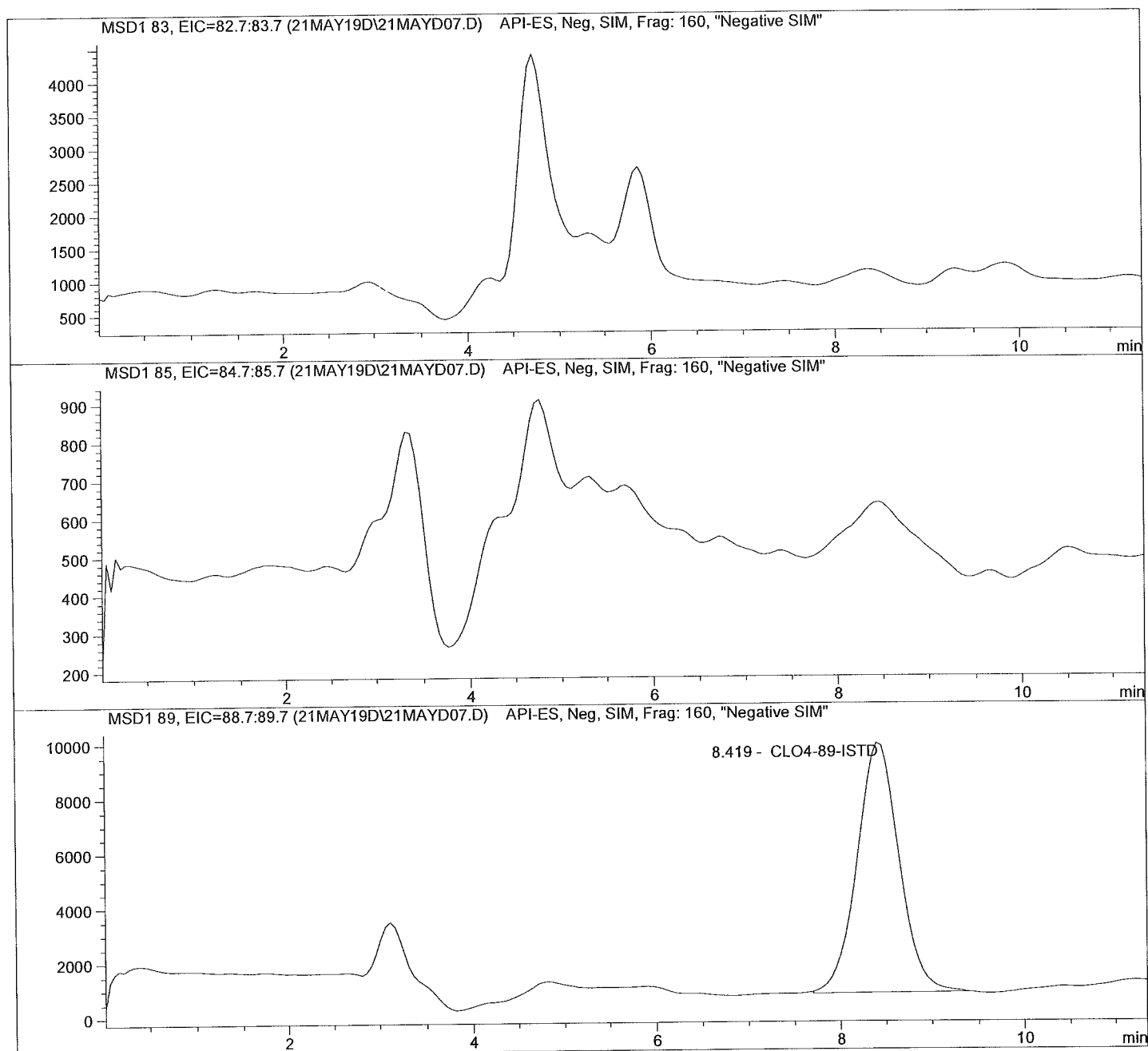
Sample Name: 1913342001

Injection Date: 5/21/2019 09:10:03
Sample Name: 1913342001
Acq Operator: 6214

Seq Line: 7
Location: Vial 77
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD07.D

Sample Name: 1913342001

```
=====
Injection Date:  5/21/2019  09:10:03      Seq Line:           7
Sample Name:    1913342001      Location:          Vial 77
Acq Operator:   6214           Inj. No.:           1
                                   Inj. Vol.:          35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.419	BBA	292233.0	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD08.D

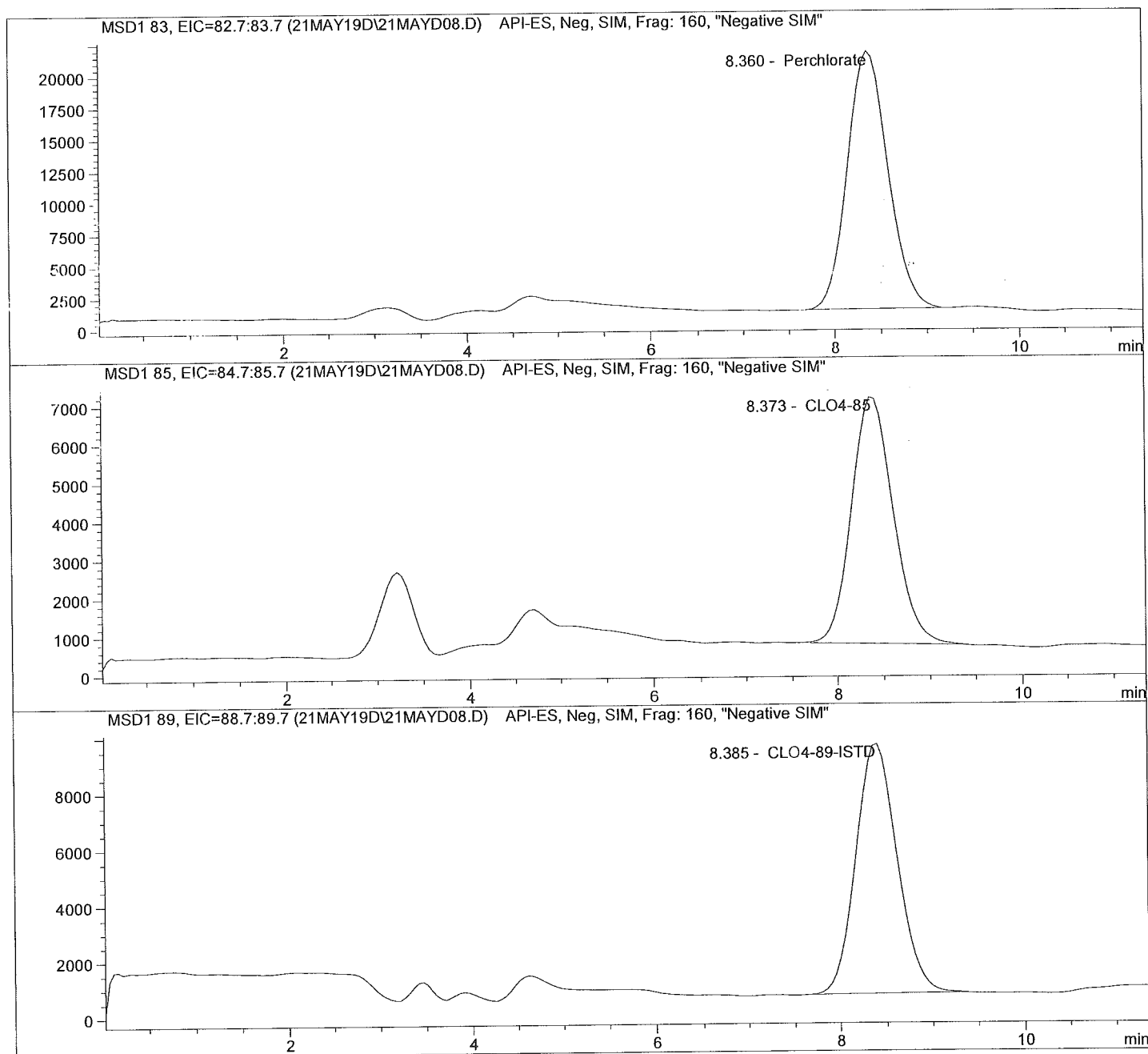
Sample Name: 1913342002

Injection Date: 5/21/2019 09:23:25
Sample Name: 1913342002
Acq Operator: 6214

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD08.D

Sample Name: 1913342002

```

=====
Injection Date:  5/21/2019  09:23:25      Seq Line:           8
Sample Name:    1913342002      Location:          Vial 78
Acq Operator:   6214           Inj. No.:            1
                                           Inj. Vol.:         35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.360	PBA	618077.5	7.2126	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.373	BBA	200267.3	7.7327	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.385	PBA	275333.5	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD09.D

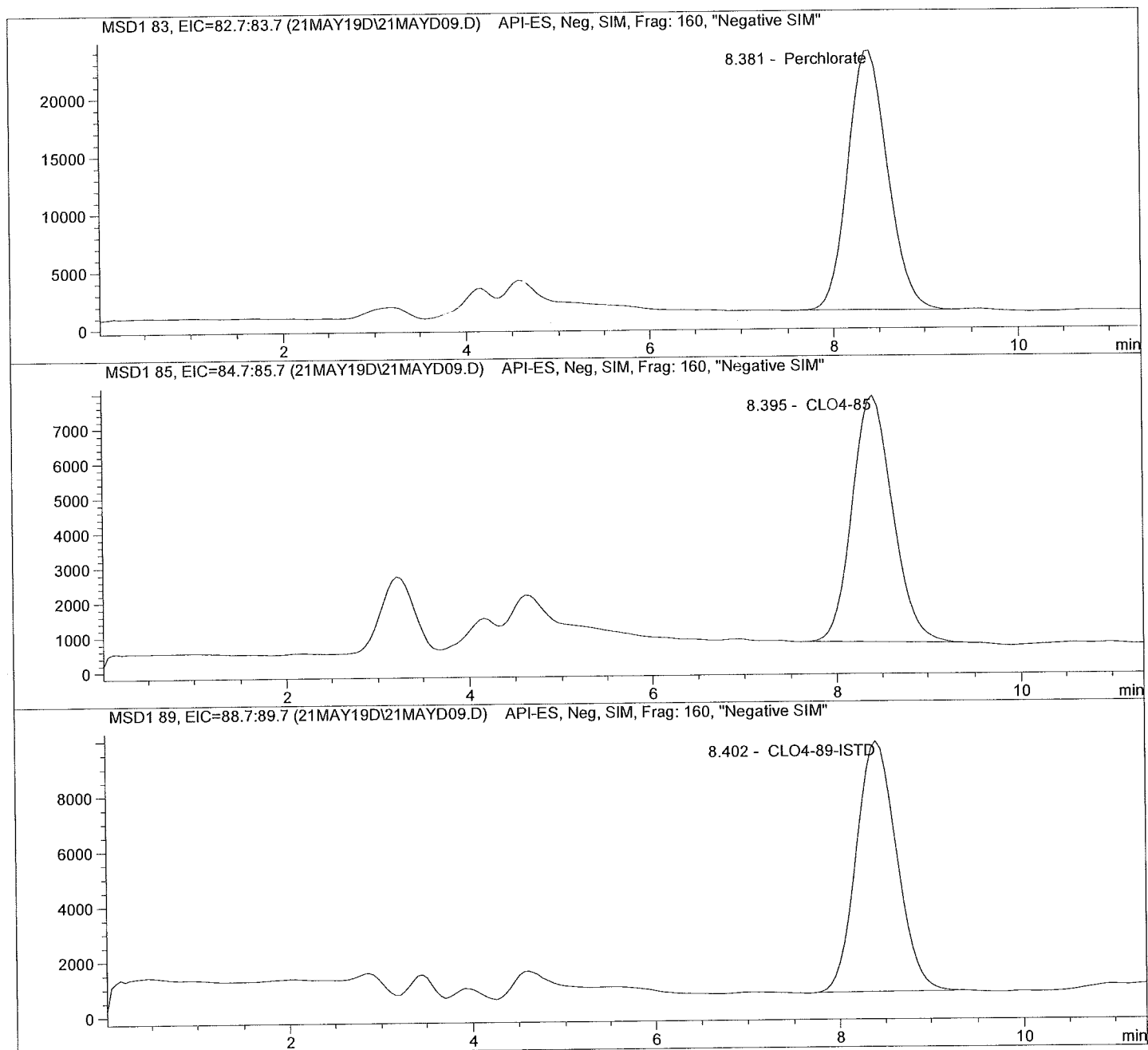
Sample Name: 1913342003

Injection Date: 5/21/2019 09:36:53
Sample Name: 1913342003
Acq Operator: 6214

Seq Line: 9
Location: Vial 79
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD09.D

Sample Name: 1913342003

```

=====
Injection Date:  5/21/2019  09:36:53      Seq Line:          9
Sample Name:    1913342003      Location:        Vial 79
Acq Operator:   6214            Inj. No.:        1
                                           Inj. Vol.:      35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.381	PBA	679913.4	7.7657	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.395	PBA	218019.8	8.2536	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.402	PBA	280514.3	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD10.D

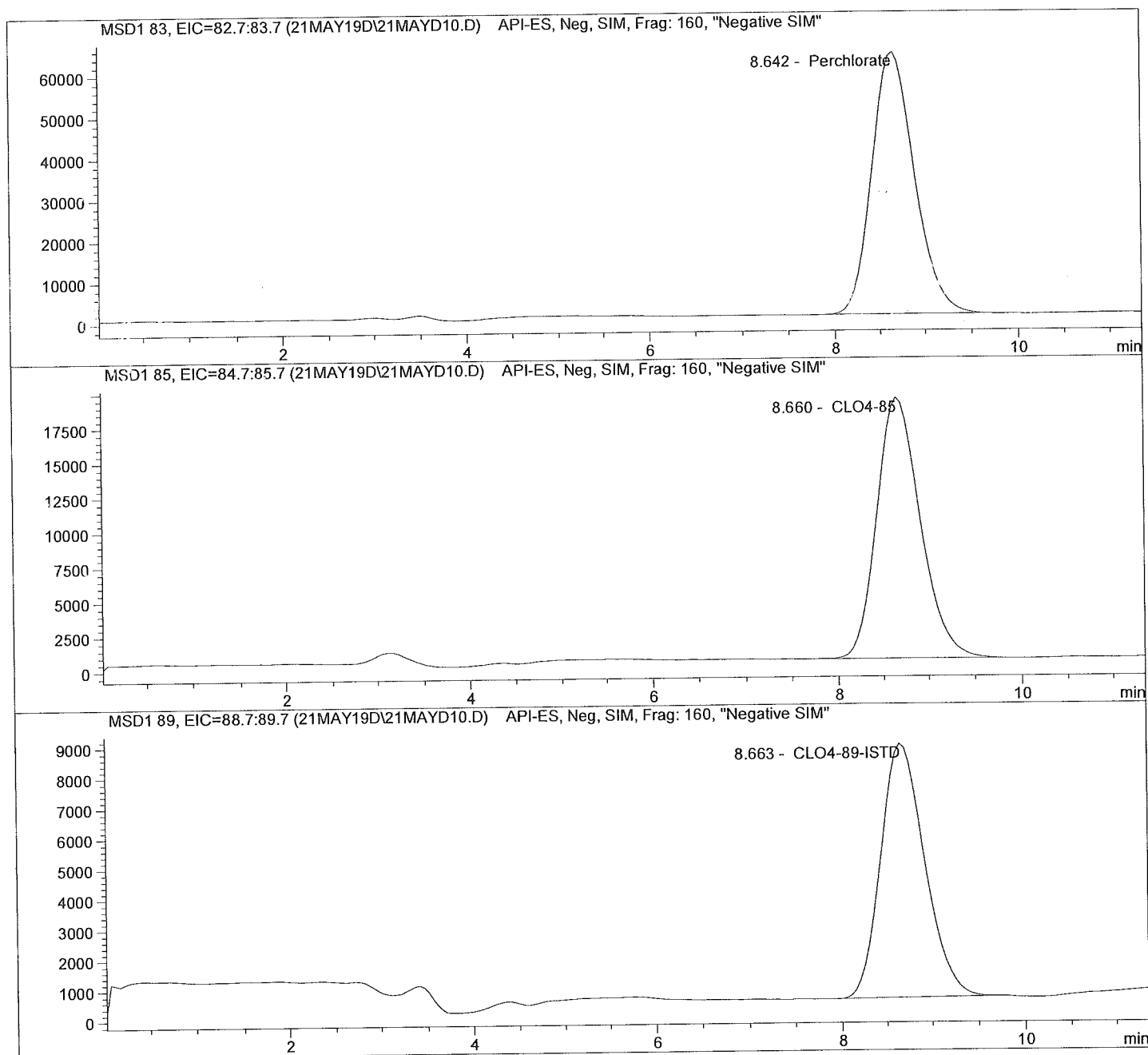
Sample Name: 1913342004 10X

Injection Date: 5/21/2019 09:50:15
Sample Name: 1913342004 10X
Acq Operator: 6214

Seq Line: 10
Location: Vial 80
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD10.D

Sample Name: 1913342004 10X

=====

Injection Date:	5/21/2019 09:50:15	Seq Line:	10
Sample Name:	1913342004 10X	Location:	Vial 80
Acq Operator:	6214	Inj. No.:	1
		Inj. Vol.:	35 µl

=====

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.642	BBA	2092939.0	226.5679	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.660	BBA	629787.7	229.3720	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.663	PBA	282645.6	50.0000	CLO4-89-ISTD

=====

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD11.D

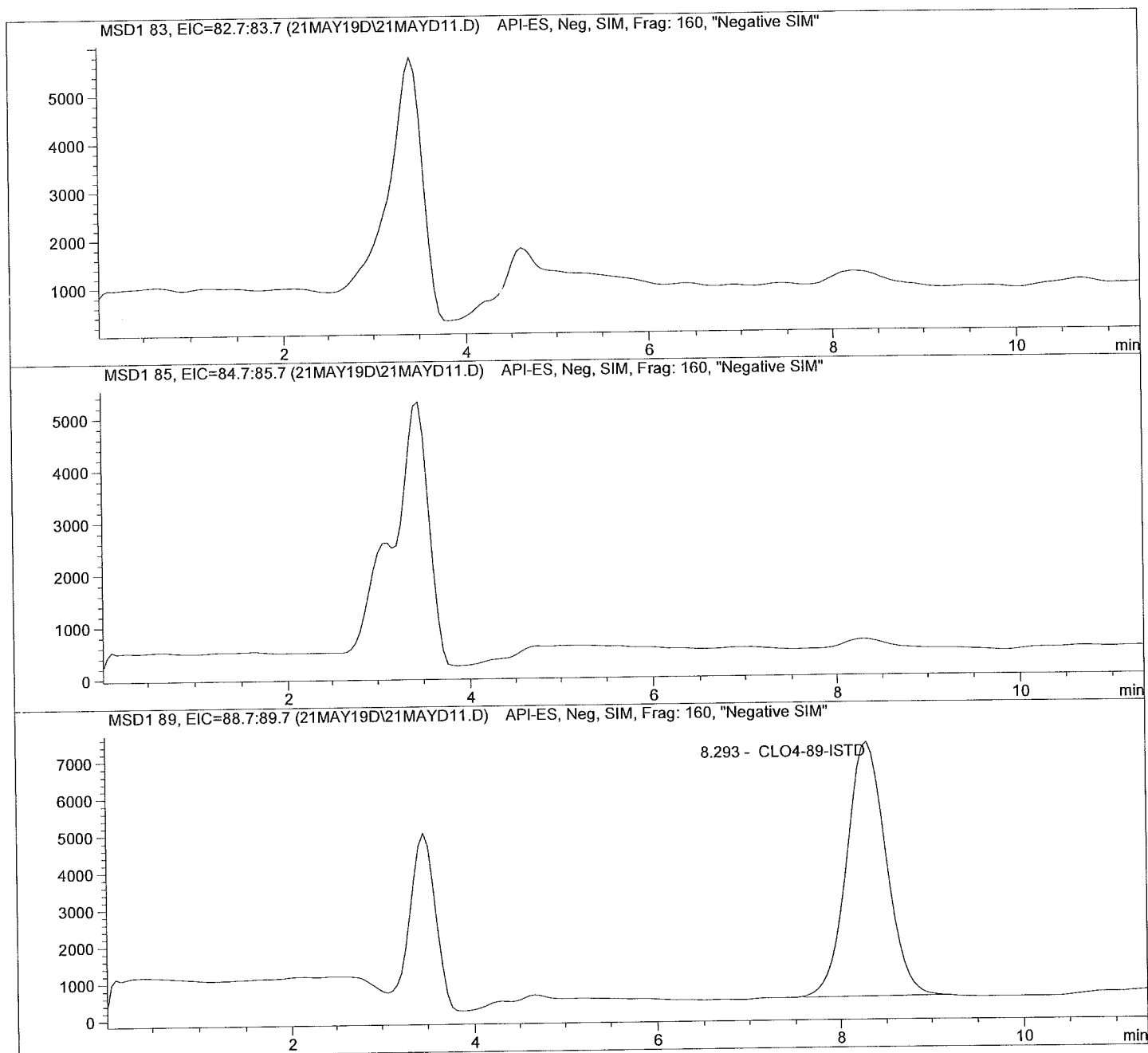
Sample Name: 1913342005

Injection Date: 5/21/2019 10:03:44
Sample Name: 1913342005
Acq Operator: 6214

Seq Line: 11
Location: Vial 81
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD11.D

Sample Name: 1913342005

```

=====
Injection Date:  5/21/2019  10:03:44      Seq Line:           11
Sample Name:    1913342005                Location:           Vial 81
Acq Operator:   6214                      Inj. No.:           1
                                           Inj. Vol.:          35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.293	BBA	206103.9	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD12.D

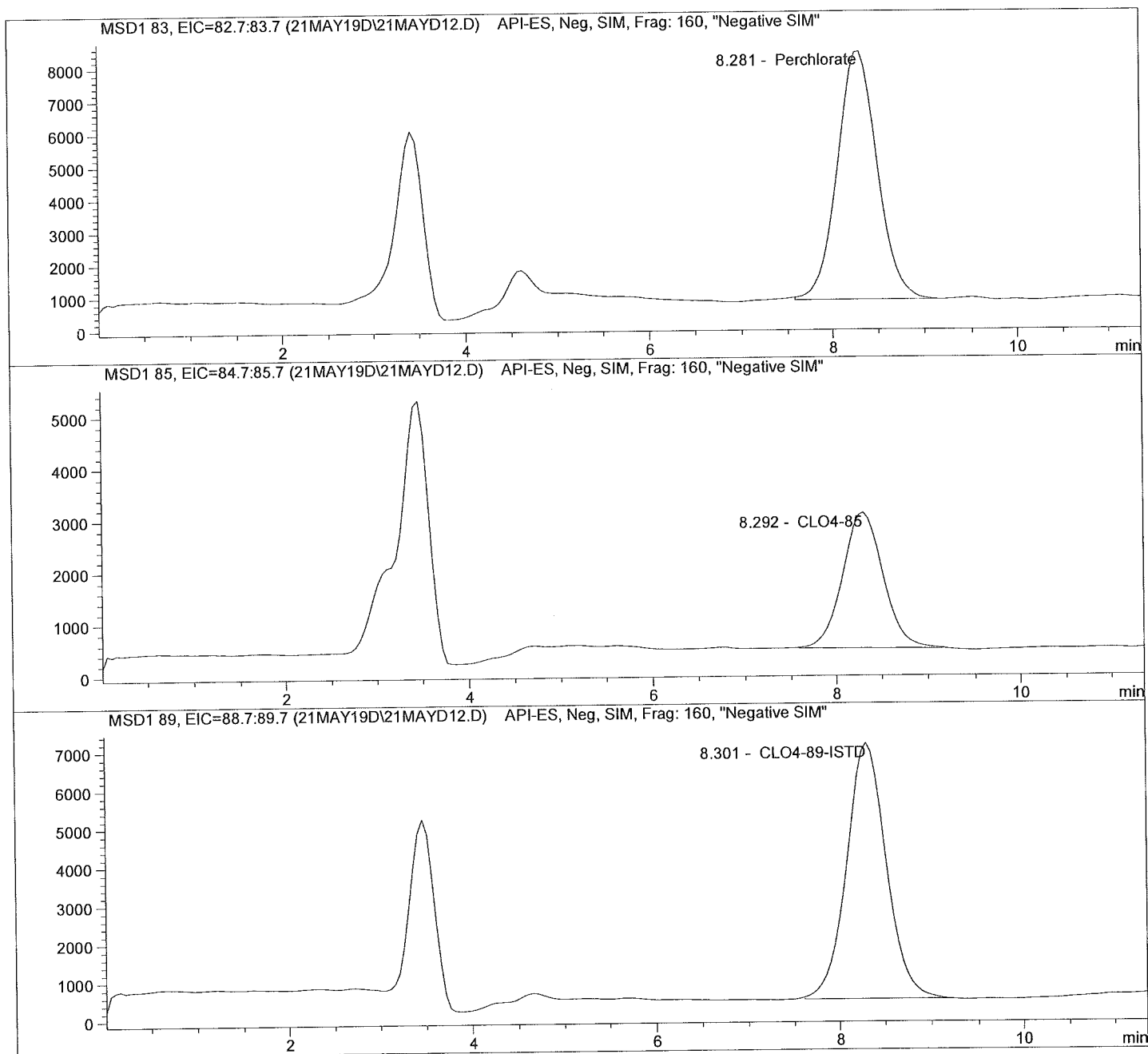
Sample Name: 1913342006 MS

Injection Date: 5/21/2019 10:17:04
Sample Name: 1913342006 MS
Acq Operator: 6214

Seq Line: 12
Location: Vial 82
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD12.D

Sample Name: 1913342006 MS

```

=====
Injection Date:  5/21/2019  10:17:04      Seq Line:           12
Sample Name:    1913342006   MS           Location:          Vial 82
Acq Operator:   6214         Inj. No.:            1
                                           Inj. Vol.:          35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.281	BBA	230072.2	3.7779	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.292	BBA	80507.0	4.2826	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.301	BBA	201254.7	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD13.D

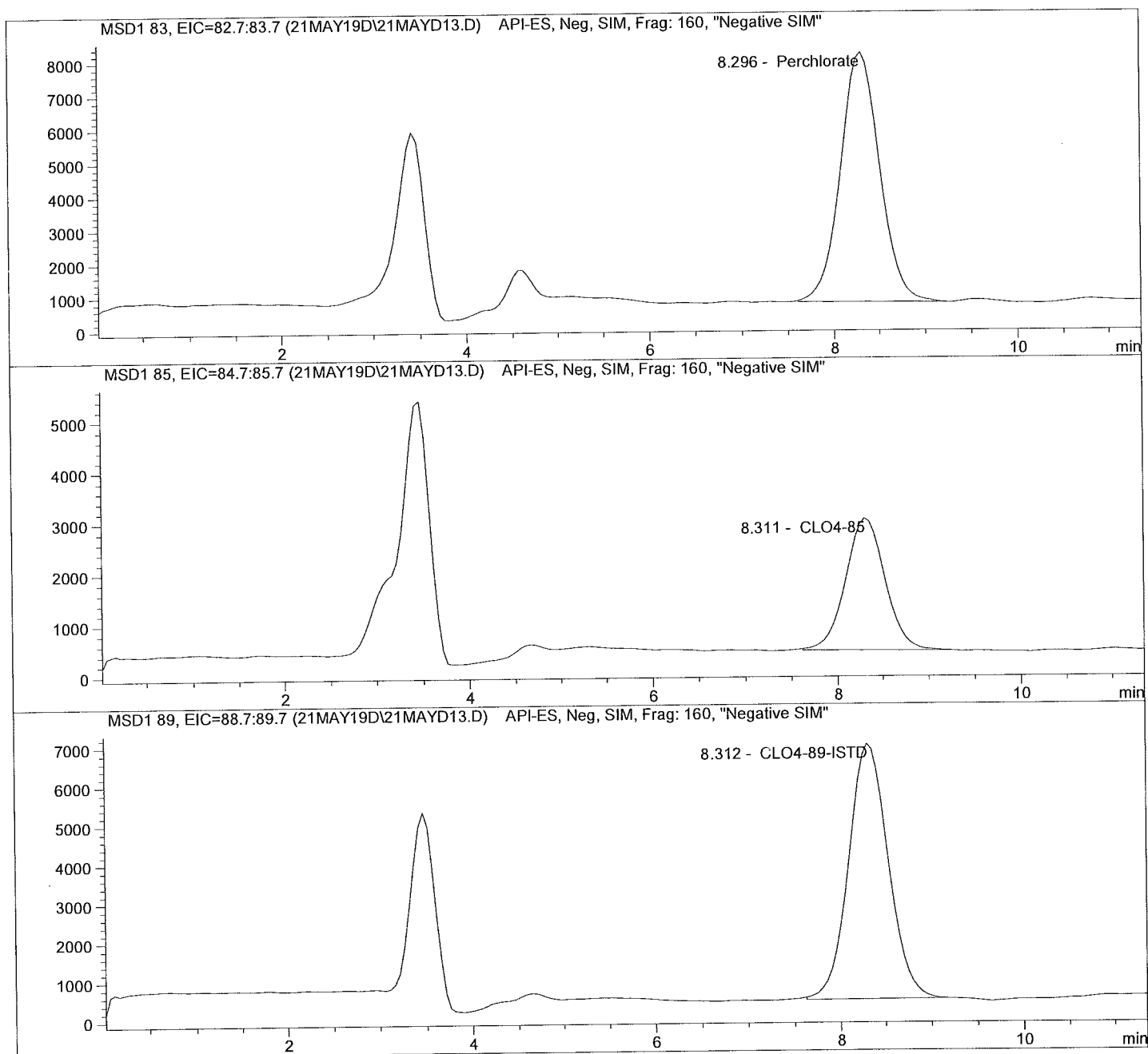
Sample Name: 1913342007 SD

Injection Date: 5/21/2019 10:30:27
Sample Name: 1913342007 SD
Acq Operator: 6214

Seq Line: 13
Location: Vial 83
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD13.D Sample Name: 1913342007 SD

Injection Date: 5/21/2019 10:30:27 Seq Line: 13
Sample Name: 1913342007 SD Location: Vial 83
Acq Operator: 6214 Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
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
8.296	BBA	223455.8	3.7214	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.311	BBA	78456.0	4.2299	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.312	BBA	198591.3	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD14.D

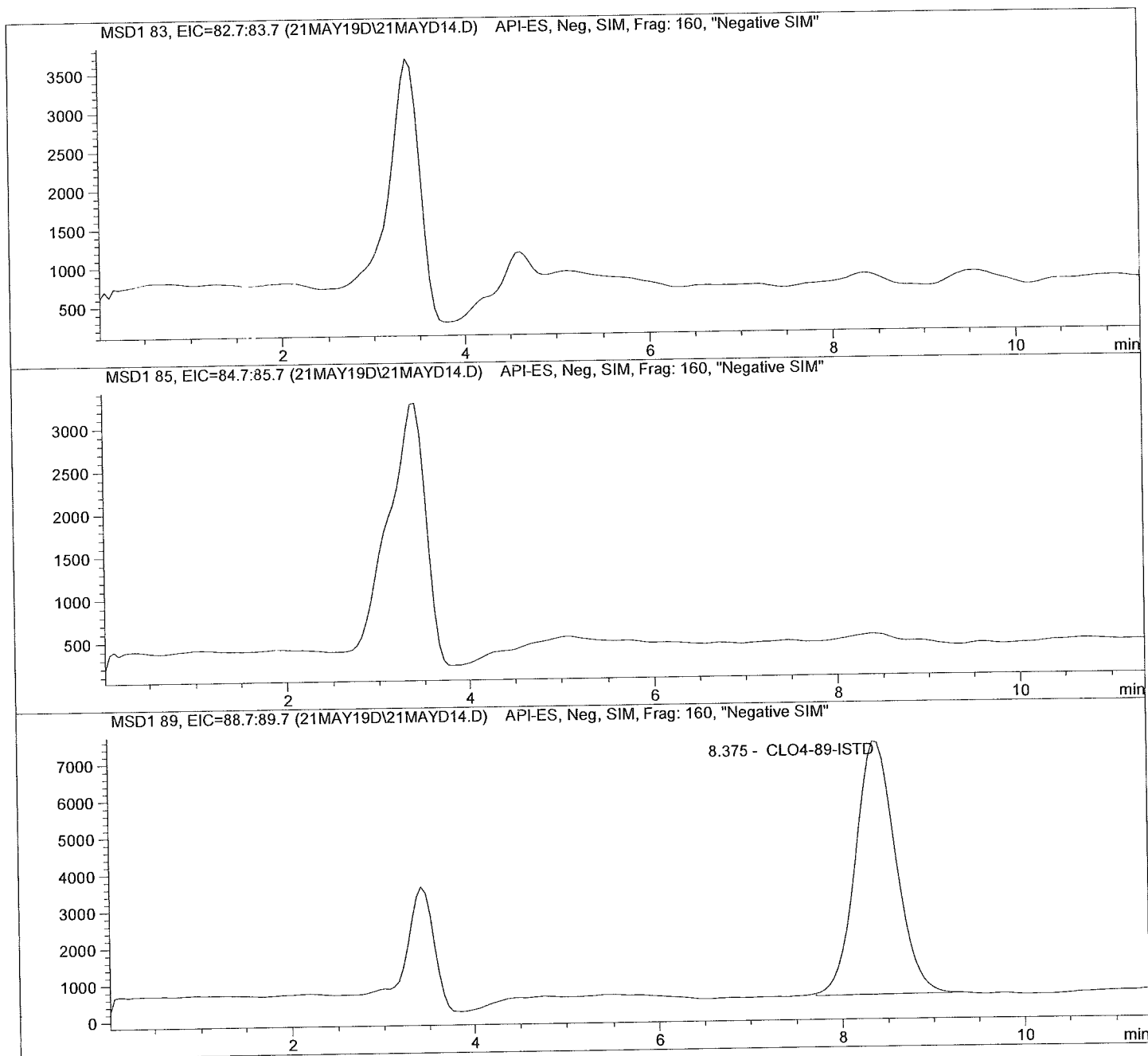
Sample Name: 1913342008

Injection Date: 5/21/2019 10:43:48
Sample Name: 1913342008
Acq Operator: 6214

Seq Line: 14
Location: Vial 84
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD14.D

Sample Name: 1913342008

```
=====
Injection Date:  5/21/2019  10:43:48      Seq Line:          14
Sample Name:    1913342008      Location:         Vial 84
Acq Operator:   6214           Inj. No.:          1
                                           Inj. Vol.:       35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.375	BBA	210825.1	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD15.D

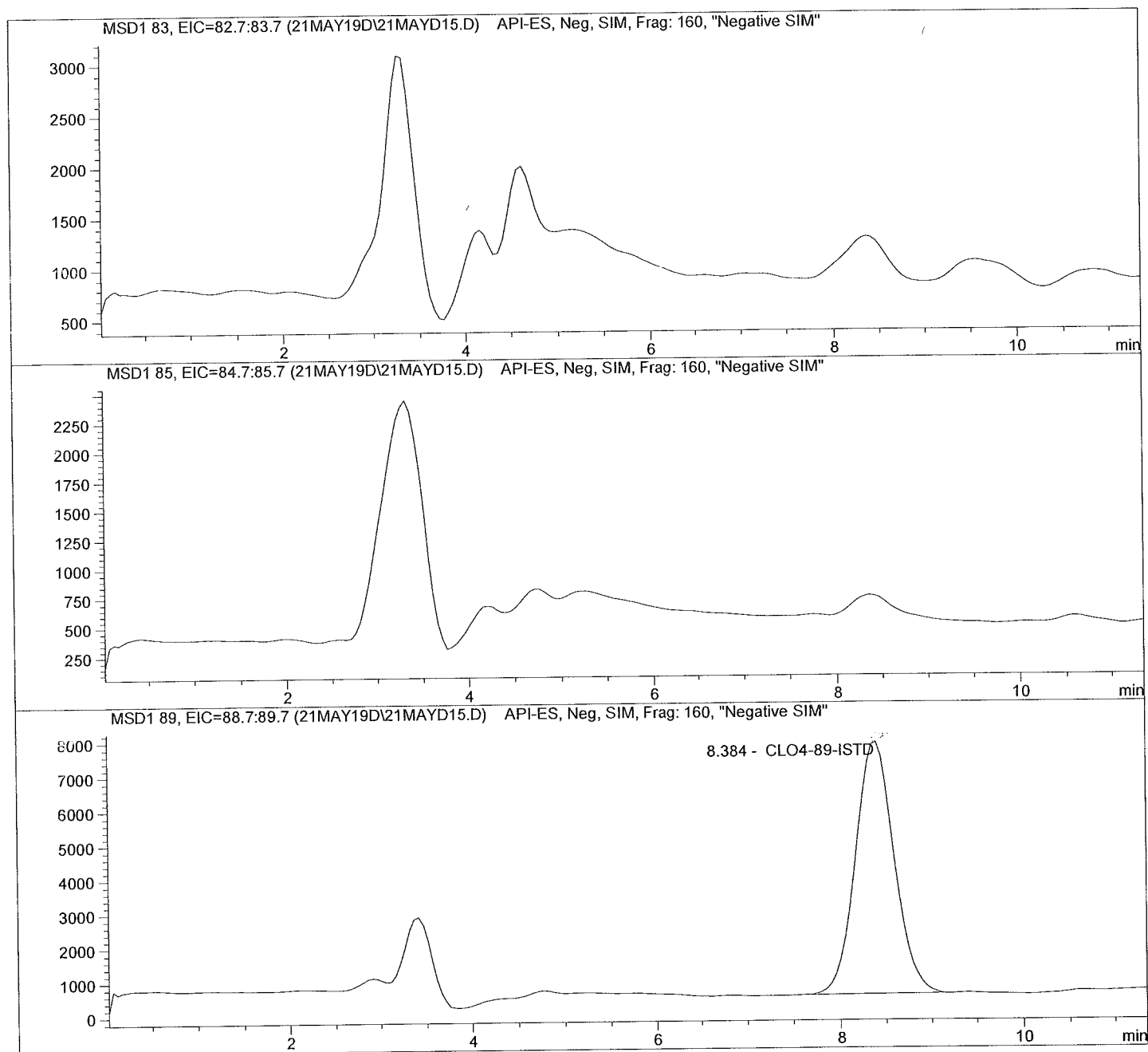
Sample Name: 1913342009

Injection Date: 5/21/2019 10:57:10
Sample Name: 1913342009
Acq Operator: 6214

Seq Line: 15
Location: Vial 85
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD15.D

Sample Name: 1913342009

```

=====
Injection Date:  5/21/2019  10:57:10      Seq Line:          15
Sample Name:    1913342009      Location:         Vial 85
Acq Operator:   6214           Inj. No.:           1
                                           Inj. Vol.:        35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.384	BBA	218072.4	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD16.D

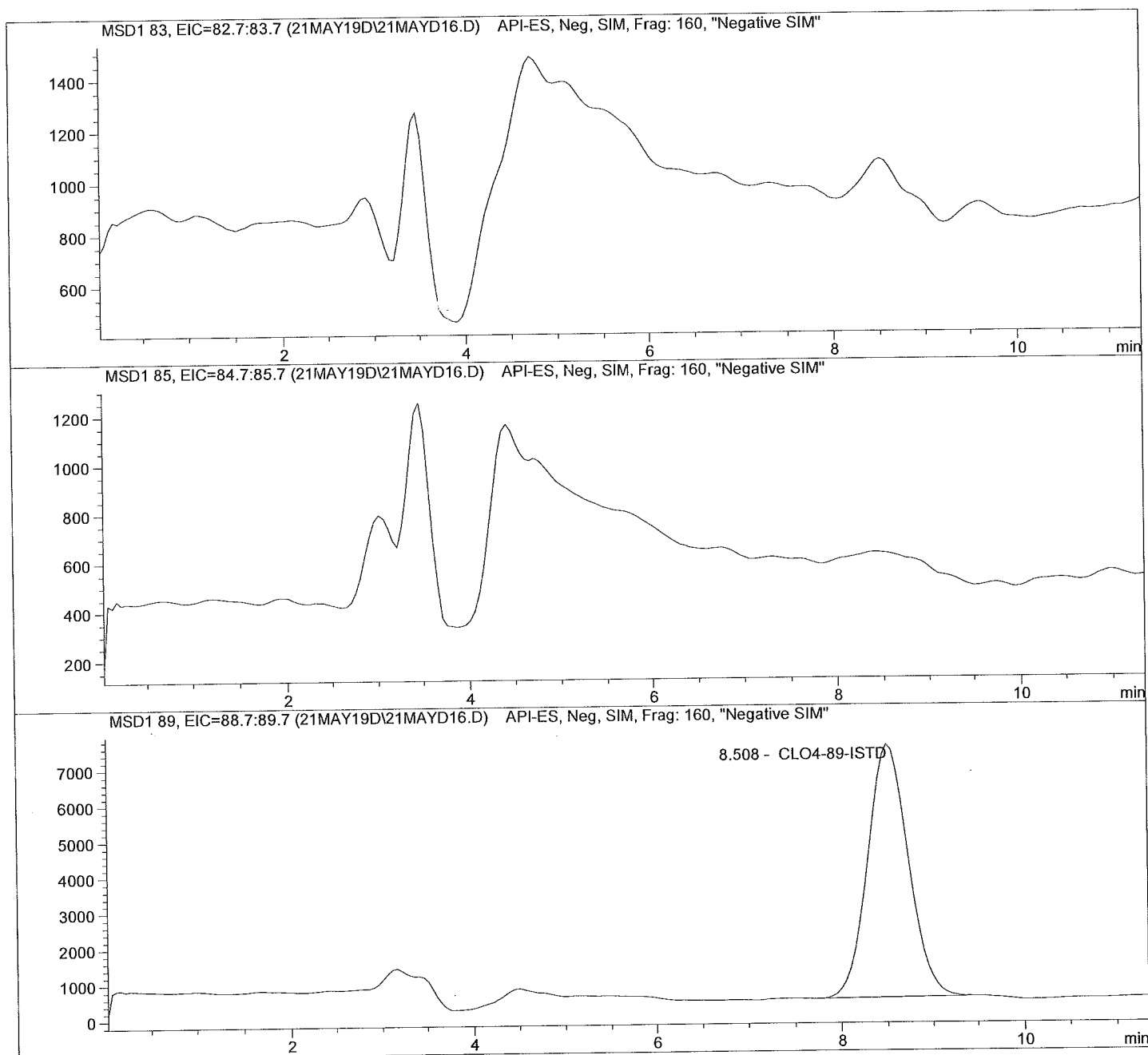
Sample Name: 1913345001

Injection Date: 5/21/2019 11:10:33
Sample Name: 1913345001
Acq Operator: 6214

Seq Line: 16
Location: Vial 86
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD16.D

Sample Name: 1913345001

```
=====
Injection Date:  5/21/2019  11:10:33      Seq Line:           16
Sample Name:    1913345001                Location:           Vial 86
Acq Operator:   6214                      Inj. No.:           1
                                           Inj. Vol.:          35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
```

Perchlorate analysis

```
=====
                          Sample Information
=====
```

```
Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
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
8.508	PBA	217961.0	5.0000	CLO4-89-ISTD

```
=====
*** End of Report ***
=====
```

Data file: C:\HPCHEM\1\DATA\21MAY19D\21MAYD17.D

Sample Name: 653685 CCV@25

Injection Date: 5/21/2019 11:23:56
Sample Name: 653685 CCV@25
Acq Operator: 6214

Seq Line: 17
Location: Vial 71
Inj. No.: 1
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

