LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

ADMINISTRATIVE RECORD

Volume 16

2019

Bate Stamp Numbers

00935046 – 00936355

Prepared for

Department of the Army
Longhorn Army Ammunition Plant

1976–2019

VOLUME 16

2019

A. Title: (cont'd) Report – Quarterly Evaluation Report, 1st Quarter (January–March) 2019, Groundwater Treatment Plant, Longhorn Army Ammunition Plant, Karnack, Texas, July 2019
Author(s): Bhate Environmental Associates, Inc.
Recipient: U.S. Army Corps of Engineers, Tulsa District
Date: July 19, 2019
Bate Stamp: 00935046 – 00936355

ANALYTICAL REPORT

Workorder: 34-1906774
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

Analysis Information

Workorder: 1906774

Limits: Client SOW/Contract Specified
Basis: DoD QSM

Preparation: NA
Batch: NA
Prepared By: NA

Analysis: EPA 6850, DoD QSM
Batch: ELMS/2227 (HBN: 234852)
Analyzed By: Thomas Bosch

Blank

LMB: 644168
Analyzed: 03/19/2019 12:22

Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 644169
Analyzed: 03/19/2019 11:55
Dilution: 1
Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.09	4.00	102	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1906774001
Analyzed: 03/19/2019 12:35
Dilution: 1
Units: ug/L

MS: 644170
Analyzed: 03/19/2019 12:48
Dilution: 1
Units: ug/L

MSD: 644171
Analyzed: 03/19/2019 13:02
Dilution: 1
Units: ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	4.83	4	121	78.8	123.8	4.38	110	9.67	0.0	20.0

Continuing Calibration Verification

CCV: 644165
Analyzed: 03/19/2019 11:35
Units: ug/L
Criteria: ± 15%

CCV: 644172
Analyzed: 03/19/2019 13:18
Units: ug/L
Criteria: ± 15%

Analyte	Result	Target	% Rec.	Result	Target	% Rec.
Perchlorate	25.0	25.0	99.8	25.0	25.0	100

Interference Check Sample

ICSA: 644167
Analyzed: 03/19/2019 12:09
Units: ug/L
Criteria: ± 30%

Analyte	Result	Target	% Rec.
Perchlorate	3.88	4.00	97.1

Quality Control Sample
Batch Report

Analysis Information

Workorder: **1906774**

Limits:	Client SOW/Contract Specified	**Preparation:**	NA	**Analysis:**	EPA 6850, DoD QSM
Basis:	DoD QSM	**Batch:**	NA	**Batch:**	ELMS/2227 (HBN: 234852)
		Prepared By:	NA	**Analyzed By:**	Thomas Bosch

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

Analyst	Peer Review
/S/ Thomas Bosch 03/20/2019 13:14	/S/ Stephen Brose 03/21/2019 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

W 1906774

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

18698/#2

Subcontract Chain of Custody

COC ID: 10880

1906774

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:	HS19030298
TSR:	Danielle Winnings

	LAB SAMPLE ID / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / DUE DATE
1.	**HS19030298-02**	**LH18/24-SP650_030619_BIX**	**Water**	**06 Mar 2019 13:00**
	SUB_Perch-6850			21 Mar 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:	3/7/19 18:00
Received By:	[signature]	Date/Time:	3/8/19 / 935
Cooler ID(s):	9224	Temperature(s):	2.

ALS Environmental
CHAIN-OF-CUSTODY

Project / Job / Task: HS19030298	Split:	Workorder ID: 1906774	Level: ENV_LVL4
Client: ALS Environmental (Houston)		Account: 8101	Type: 125Poly
Comments:			Preservatives: COOL

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	Requested Analysis: EPA 6850, DoD QSM
1	03/06/2019 13:00	LH18/24-SP650_030619_BIX	1906774001		Water	A	1	A
2								
3								
4								
5								
6								
7								
8								
9								
10								

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ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
Warath, Julie	03/08/2019 09:55	ALS Sample Receiving	Sample Login
Julie Warath	3/8/19 1120	13B	Storage
R.33.1	3-18.19/12:50	T.Bond	6850

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

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

Prepared / Analyzed by: ____________ Date / Time: ____________

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

00935050

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Houston

Project/Task/Site: 1906774

Date/Time of Receipt: 3/8/19/1655

Number of Coolers Received: 1

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

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

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 9224	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: [signature] Signature   Meredith Edwards Printed Name   3/8/19 Date

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ 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: ______________ Printed Name   Returned to Sample Receipt by: ______________ Signature   Date: ______________

CRIR.doc   Revised 01/01/2018

Part # 159469-434 RIT2 EXP 11/19

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

SHIP DATE: 07MAR19
ACTWGT: 13.60 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

551C1/46D3/10DC

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

SALT LAKE CITY UT 84123
(801) 266-7700
REF: HS19030298 - RJ

FedEx
Express

E

J181118060501uv

FRI - 08 MAR 3:00P
STANDARD OVERNIGHT

TRK# 0201 **4809 7831 4299**

AX BTFA

84123
UT-US **SLC**

Batch Worklist

Batch: **ELMS/ 2227**
Rule: EPA 6850, DoD QSM Water
Workorder: **1906774 [ENV_LVL4]**

Created: 3/19/2019 11:27
Analyst: T. Bosch

Instrument:
Status: WP

HBN: 234852

Pos	Lab ID	Sample ID	Prep Initial	Prep Final	Dust Weight	Type	Mx	Container	Procedure	Mgr	Expire Date	Due Date	Run Date
1	644165	CCV for HBN 234852 [ELMS/2227]				CCV	3		E685041C3Q	5311		3/21/2019	
2	644166	RLVS for HBN 234852 [ELMS/2227				RLVS	3		E685041C3Q	5311		3/21/2019	
3	644167	ICS for HBN 234852 [ELMS/2227]				ICS	3		E6850..D3Q	5311		3/21/2019	
4	644168	LMB for HBN 234852 [ELMS/2227]				LMB	3		E6850Q413Q	5311		3/21/2019	
5	644169	LCS for HBN 234852 [ELMS/2227]				LCS	3		E6850Q413Q	5311		3/21/2019	
6	1906774001	LH18/24-SP650_030619_BIX				SAMPLE	3	1906774001-A	E6850Q41.3	5480	4/3/2019	3/21/2019	
7	644170	LH18/24-SP650...(1906774001MS)				MS	3		E6850Q413Q	5311		3/21/2019	
8	644171	LH18/24-SP65...(1906774001MSD)				MSD	3		E6850Q413Q	5311		3/21/2019	
9	644172	CCV for HBN 234852 [ELMS/2227]				CCV	3		E685041C3Q	5311		3/21/2019	

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #( )'s: 1906774 (001)
ELMS Batch/HBN ID: 2227 (234852)
Prep Date: 03/19/2019 Analysis Date: 03/19/2019 Analyst: T. Bosch
Analyte: Perchlorate Matrix: **Water** Method: **6850**
Sequence: \\HPCHEM\I\SEQUENCE\CLO4\2019\MAR\19MAR19D.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 644169; Target = 4.0µg/L. ASTM type II water was used for LMB 644168.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1906774001 (Client ID's: LH18/24-SP650_030619_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.
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\MAR\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\234852-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\HBN#
5) The Reporting Limit Verification Standard (RLVS – 644166) is reported from the analysis of the Laboratory Control Sample (LCS – 644169) 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.

Chromatography (GC, HPLC, LC/MS) Technical Review Criteria Batch(es)/SDG: ELMS: 2227 HBN: 234852 Sample Set IDs if Applicable: 1906774	Analyst Initials	Reviewer Initials
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
MFG: ALS/SLC
MFG Lot: TNB: 09/18/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/18/2018 02:09PM

Amount: 10 mL
Expires: 09/18/2019
Usable: Yes
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
MFG: AccuStandard
MFG Lot: 218065075
Part ID: IC-PER-10X-1

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

Amount: 100 mL
Expires: 07/25/2020
Usable: 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)	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
MFG: ALS/SLC
MFG Lot: TNB: 09/18/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/18/2018 02:09PM

Amount: 10 mL
Expires: 09/18/2019
Usable: Yes
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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
Expires: 05/09/2019
Usable: Yes
Lab Lot: CLO4 QC INT 10.ug/mL

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

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
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

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

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

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

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

Solvent: water (low TOC, < 50 ppb)

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

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

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

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

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

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

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

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

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

ISO 9001 Registered Quality System – TUV USA

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ULTRA ISO GUIDE 34 CERTIFIED

ISO Guide 34 Reference Material

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

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

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.

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

D. Lamendola
Daniel J. Lamendola
Director of QA/RA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

ISO 9001 Registered Quality System – TUV USA

125 Market Street
New Haven, CT 06513
USA

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Tel (203)786-5290
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CERTIFICATE OF ANALYSIS

S 43659

AccuTrace™ Reference Standard

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

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

GHS

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

For use in routine laboratory analysis.

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 ($^{18}O_4$, 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-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
*	644165 CCV@25	Vial 71	1	Control	1	1.94296e6	8.846	24.95399
*	644169 QC@4.0	Vial 72	1	Control	2	2.95659e5	8.943	4.09149
*	644167 ICS@4.0	Vial 73	1	Control	3	2.65691e5	8.627	3.88435
*	644168 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1906774001	Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	644170 67741MS	Vial 76	1	Sample	6	3.98555e5	8.368	4.82506
*	644171 67741SD	Vial 77	1	Sample	7	3.62343e5	8.358	4.37993
*	644172 CCV@25	Vial 71	1	Control	8	2.11382e6	8.746	24.99412

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	644165 CCV@25	Vial 71	1	Control	1	5.76297e5	8.860	24.93587
*	644169 QC@4.0	Vial 72	1	Control	2	9.68807e4	8.956	4.36015
*	644167 ICS@4.0	Vial 73	1	Control	3	8.63749e4	8.649	4.09819
*	644168 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1906774001	Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	644170 67741MS	Vial 76	1	Sample	6	1.30024e5	8.381	5.15091
*	644171 67741SD	Vial 77	1	Sample	7	1.14519e5	8.376	4.51535
*	644172 CCV@25	Vial 71	1	Control	8	6.19581e5	8.761	24.69614

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	644165 CCV@25	Vial 71	1	Control	1	2.36912e5	8.874	5.00000
*	644169 QC@4.0	Vial 72	1	Control	2	2.37845e5	8.962	5.00000
*	644167 ICS@4.0	Vial 73	1	Control	3	2.25720e5	8.647	5.00000
*	644168 LMB	Vial 74	1	Control	4	2.83967e5	8.871	5.00000
*	1906774001	Vial 75	1	Sample	5	2.69232e5	8.436	5.00000
*	644170 67741MS	Vial 76	1	Sample	6	2.69789e5	8.388	5.00000
*	644171 67741SD	Vial 77	1	Sample	7	2.71402e5	8.381	5.00000
*	644172 CCV@25	Vial 71	1	Control	8	2.57308e5	8.763	5.00000

*** End of Report ***

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\MAR\19MAR19D.S

Sequence Table:

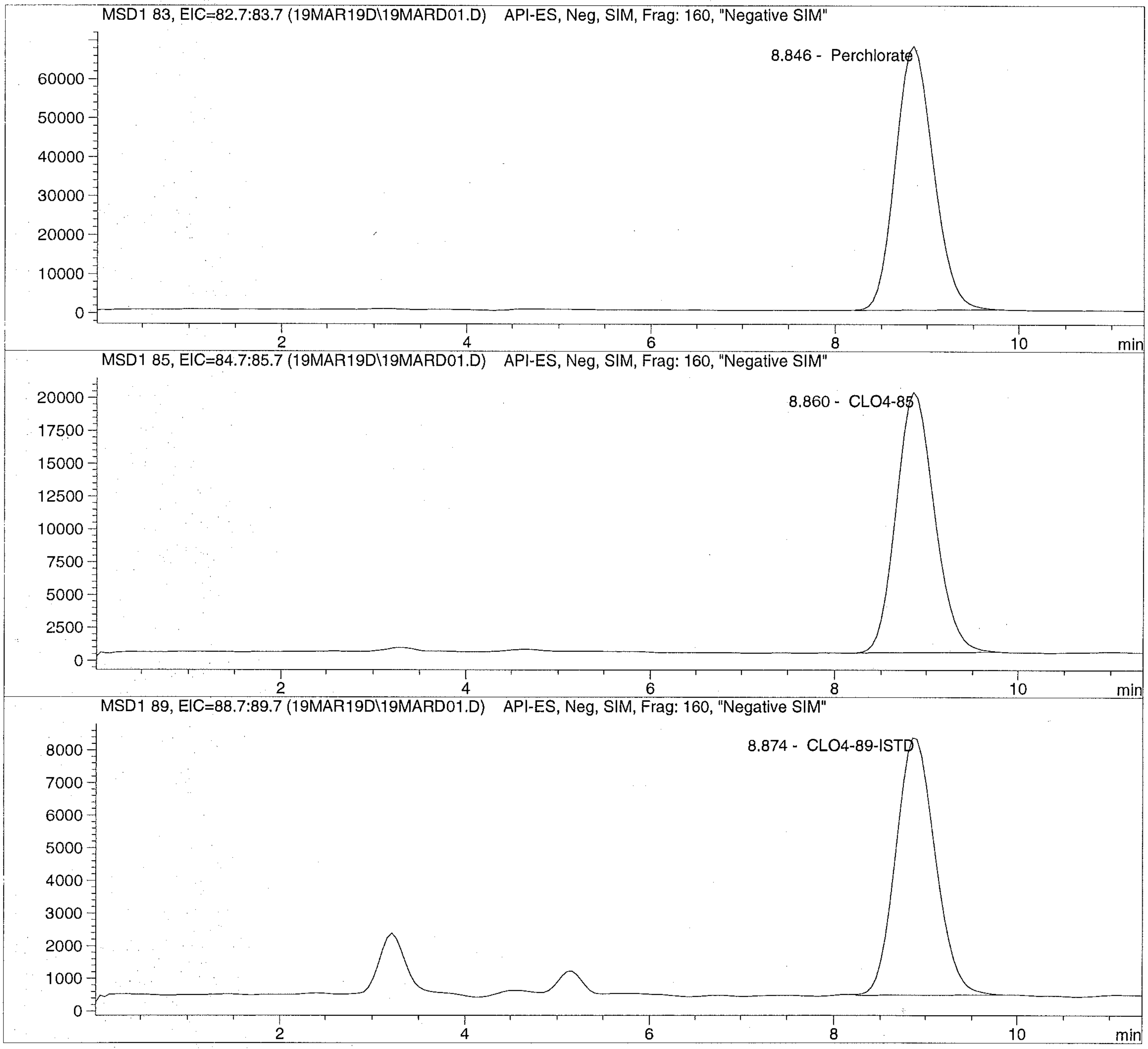
Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	644165 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	644169 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	644167 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	644168 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1906774001	CLO4-AQN	1	Sample		
6	Vial 76	644170 67741MS	CLO4-AQN	1	Sample		
7	Vial 77	644171 67741SD	CLO4-AQN	1	Sample		
8	Vial 71	644172 CCV@25	CLO4-AQN	1	Ctrl Samp		

```
Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD01.D       Sample Name: 644165   CCV@25
=================================================================================
Injection Date:   3/19/2019  11:35:36          Seq Line:          1
Sample Name:      644165   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  14:38:25

Perchlorate analysis
=================================================================================
```



Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD01.D Sample Name: 644165 CCV@25

Injection Date:	3/19/2019 11:35:36	Seq Line:	1
Sample Name:	644165 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 14:38:25

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: 25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.846	PBA	1942956.7	24.9540	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.860	PBA	576297.2	24.9359	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

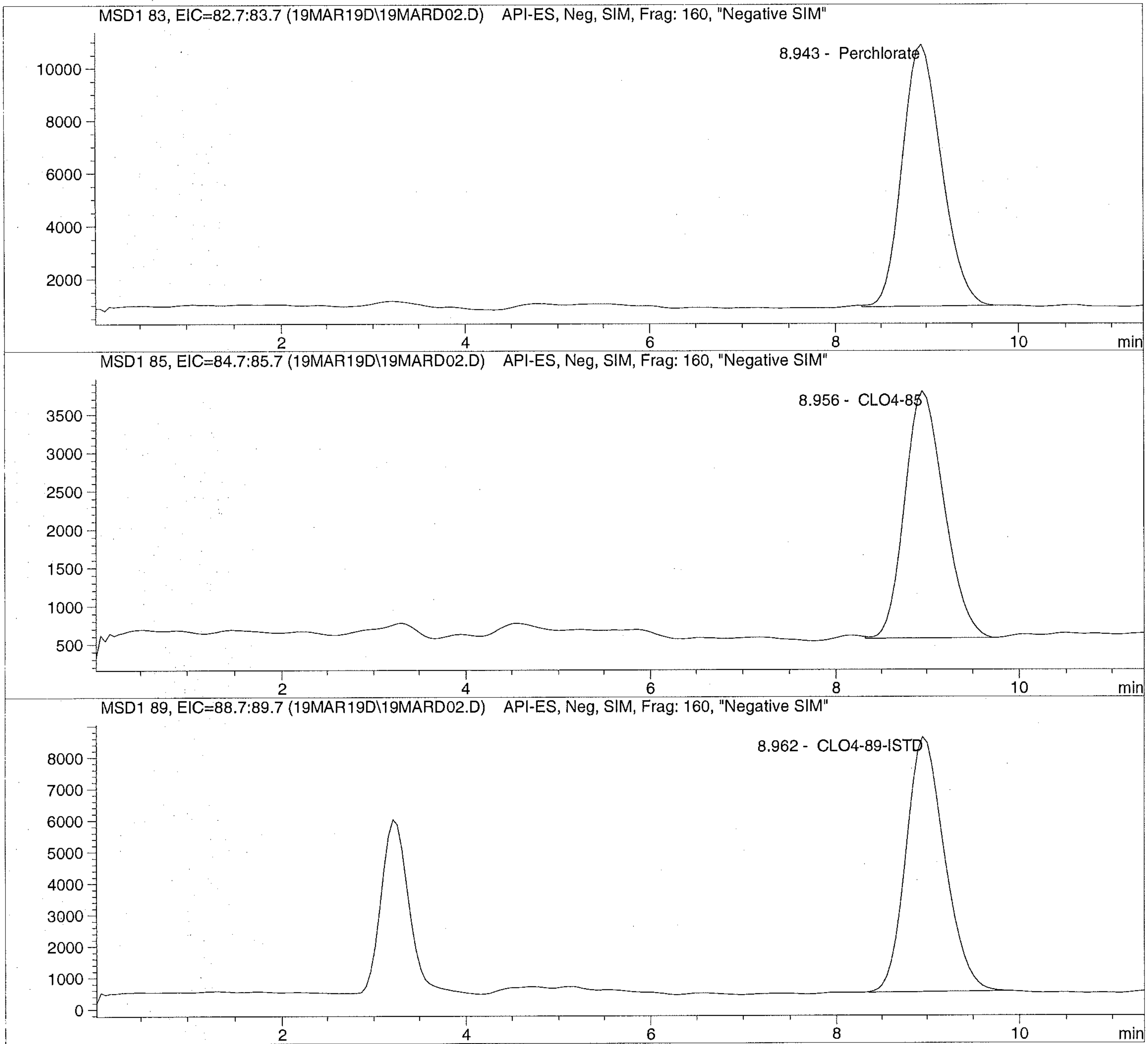
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.874	BBA	236912.0	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD02.D        Sample Name: 644169   QC@4.0
=====================================================================================
Injection Date:    3/19/2019  11:55:42              Seq Line:            2
Sample Name:       644169   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  14:38:25

Perchlorate analysis
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD02.D Sample Name: 644169 QC@4.0

Injection Date:	3/19/2019 11:55:42	Seq Line:	2
Sample Name:	644169 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 14:38:25

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: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.943	BBA	295659.5	4.0915	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.956	BBA	96880.7	4.3601	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.962	BBA	237845.1	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD03.D        Sample Name: 644167   ICS@4.0
=====================================================================================
Injection Date:    3/19/2019  12:09:00          Seq Line:            3
Sample Name:       644167   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  14:38:25

Perchlorate analysis
=====================================================================================
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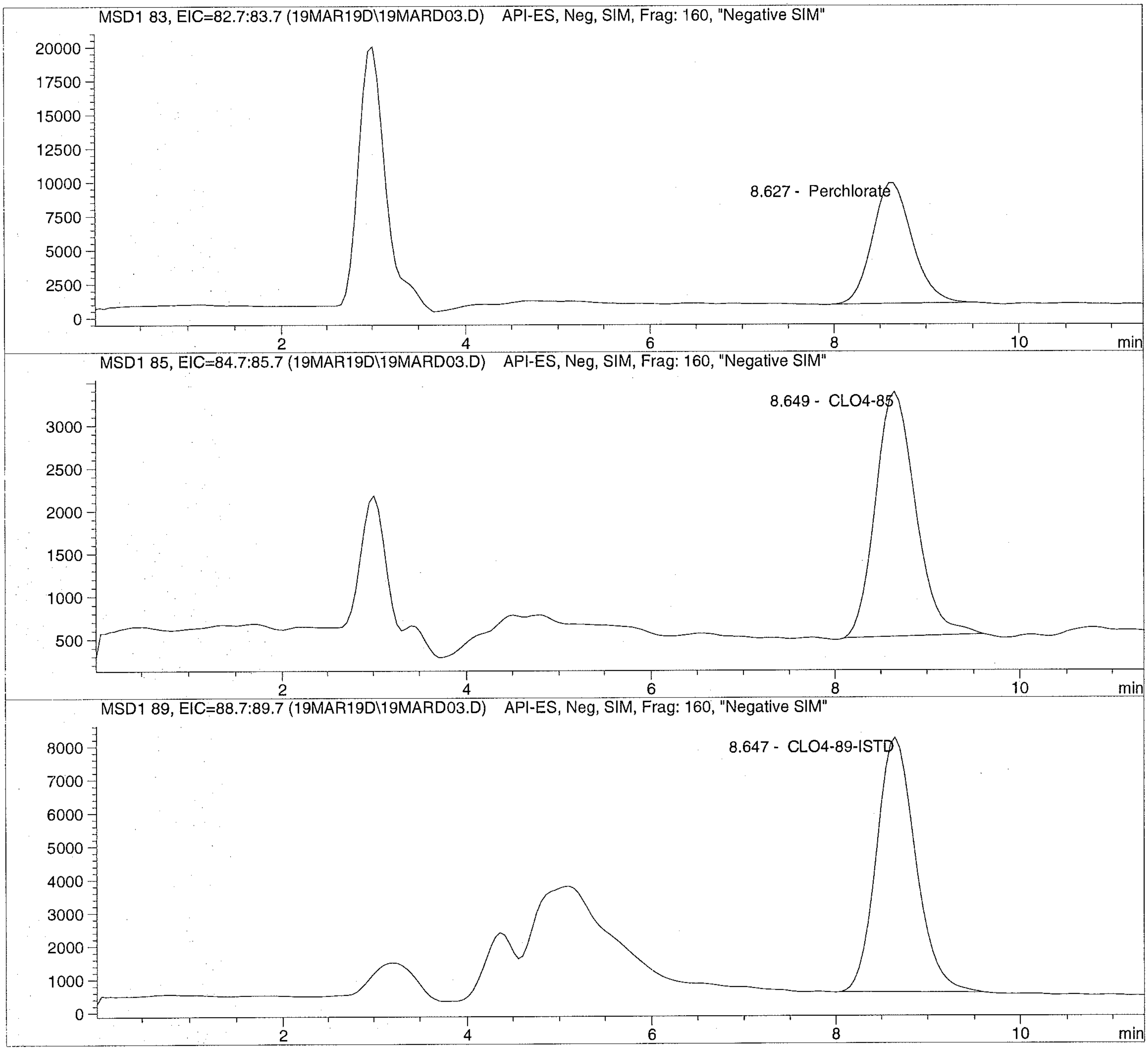


Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD03.D   Sample Name: 644167   ICS@4.0

Injection Date:	3/19/2019 12:09:00	Seq Line:	3
Sample Name:	644167 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 14:38:25

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: 4.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.627	PBA	265691.1	3.8844	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.649	PBA	86374.9	4.0982	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

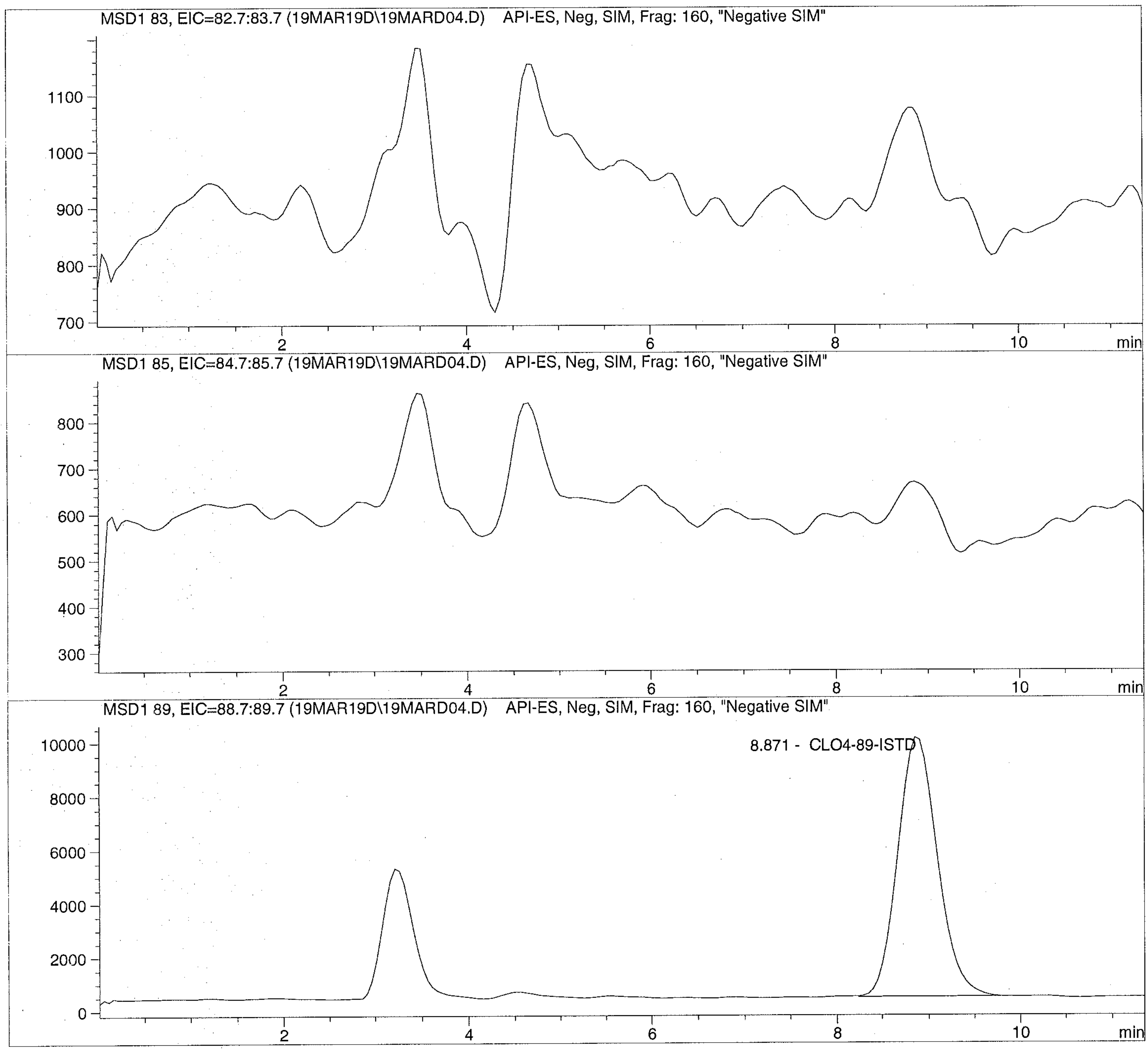
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.647	PBA	225720.1	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD04.D        Sample Name: 644168    LMB
=====================================================================================
Injection Date:    3/19/2019  12:22:20          Seq Line:           4
Sample Name:       644168    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  14:38:25

Perchlorate analysis
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD04.D   Sample Name: 644168   LMB

Injection Date:	3/19/2019 12:22:20	Seq Line:	4
Sample Name:	644168 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 14:38:25

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: 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
8.871	BBA	283966.7	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD05.D Sample Name: 1906774001

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Injection Date:	3/19/2019 12:35:37	Seq Line:	5
Sample Name:	1906774001	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 14:38:25

Perchlorate analysis

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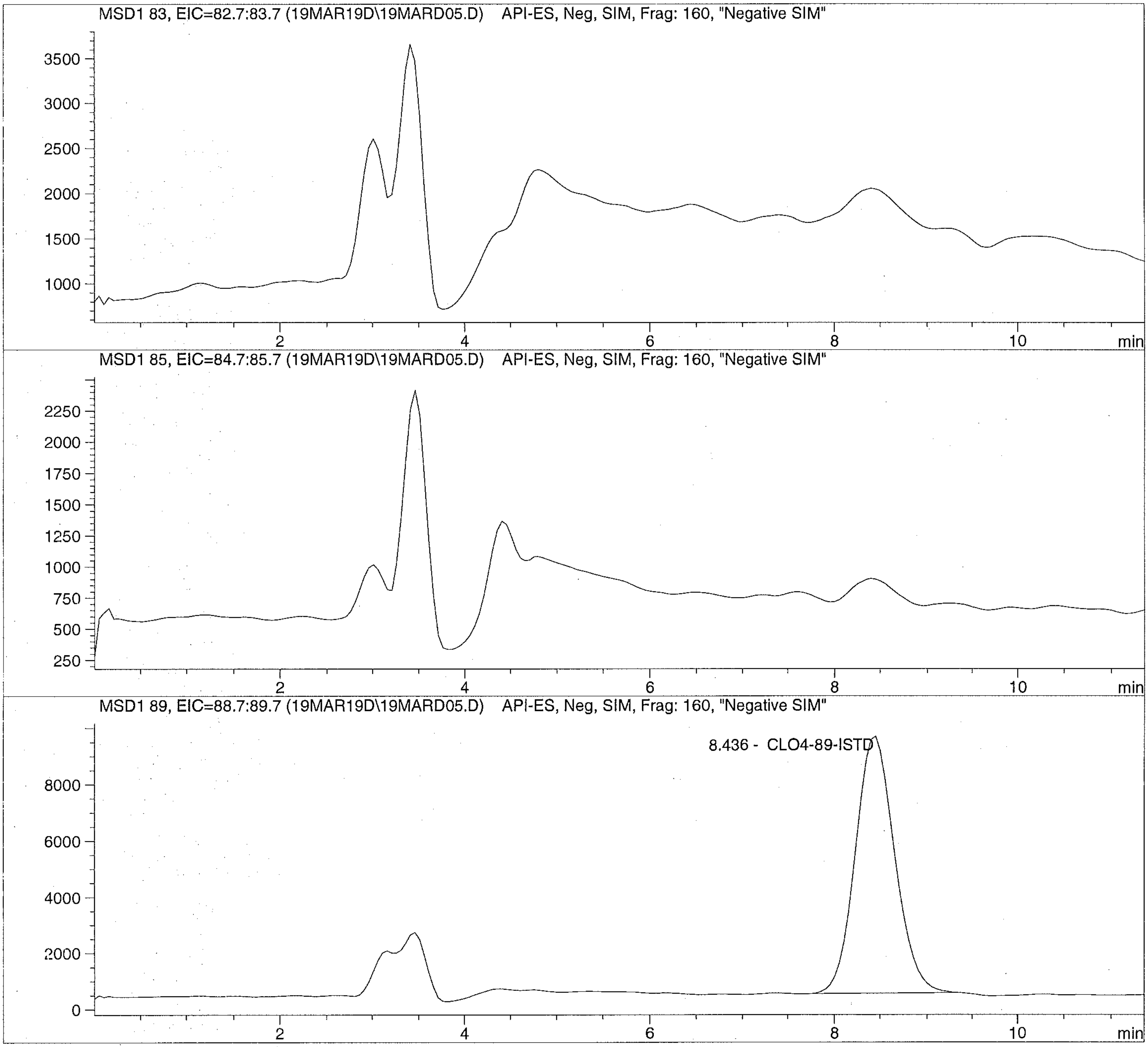


Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD05.D Sample Name: 1906774001

Injection Date:	3/19/2019 12:35:37	Seq Line:	5
Sample Name:	1906774001	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 14:38:25

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: 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
8.436	PBA	269231.6	5.0000	CLO4-89-ISTD

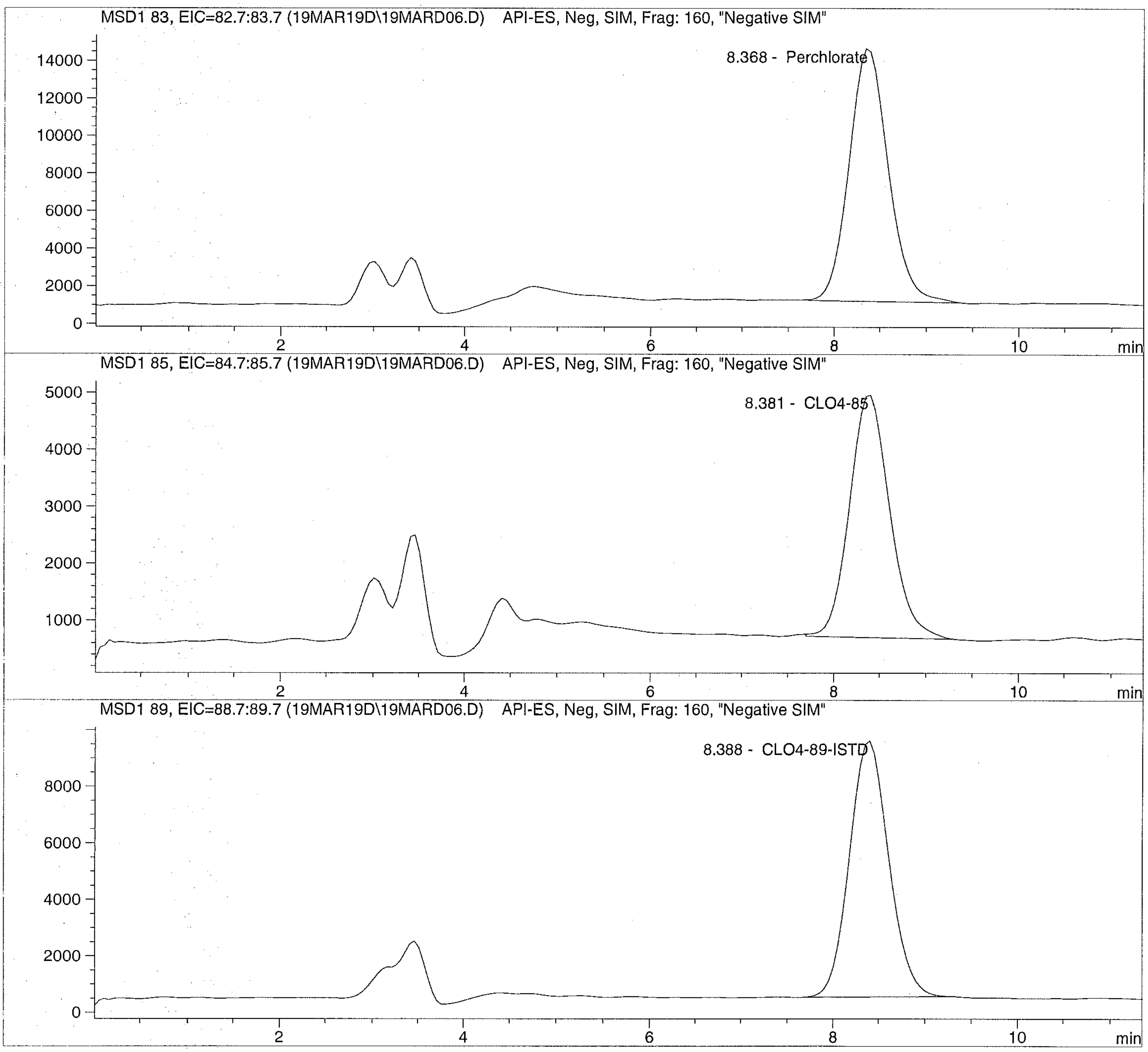
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD06.D   Sample Name: 644170   67741MS

Injection Date:	3/19/2019 12:48:55	Seq Line:	6
Sample Name:	644170 67741MS	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 14:38:25

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD06.D Sample Name: 644170 67741MS

Injection Date:	3/19/2019 12:48:55	Seq Line:	6
Sample Name:	644170 67741MS	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 14:38:25

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: 0.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.368	BBA	398555.1	4.8251	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.381	BBA	130023.9	5.1509	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.388	BBA	269788.8	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD07.D       Sample Name: 644171   67741SD
=====================================================================================
Injection Date:   3/19/2019  13:02:13              Seq Line:            7
Sample Name:      644171   67741SD                 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  14:38:25

Perchlorate analysis
=====================================================================================
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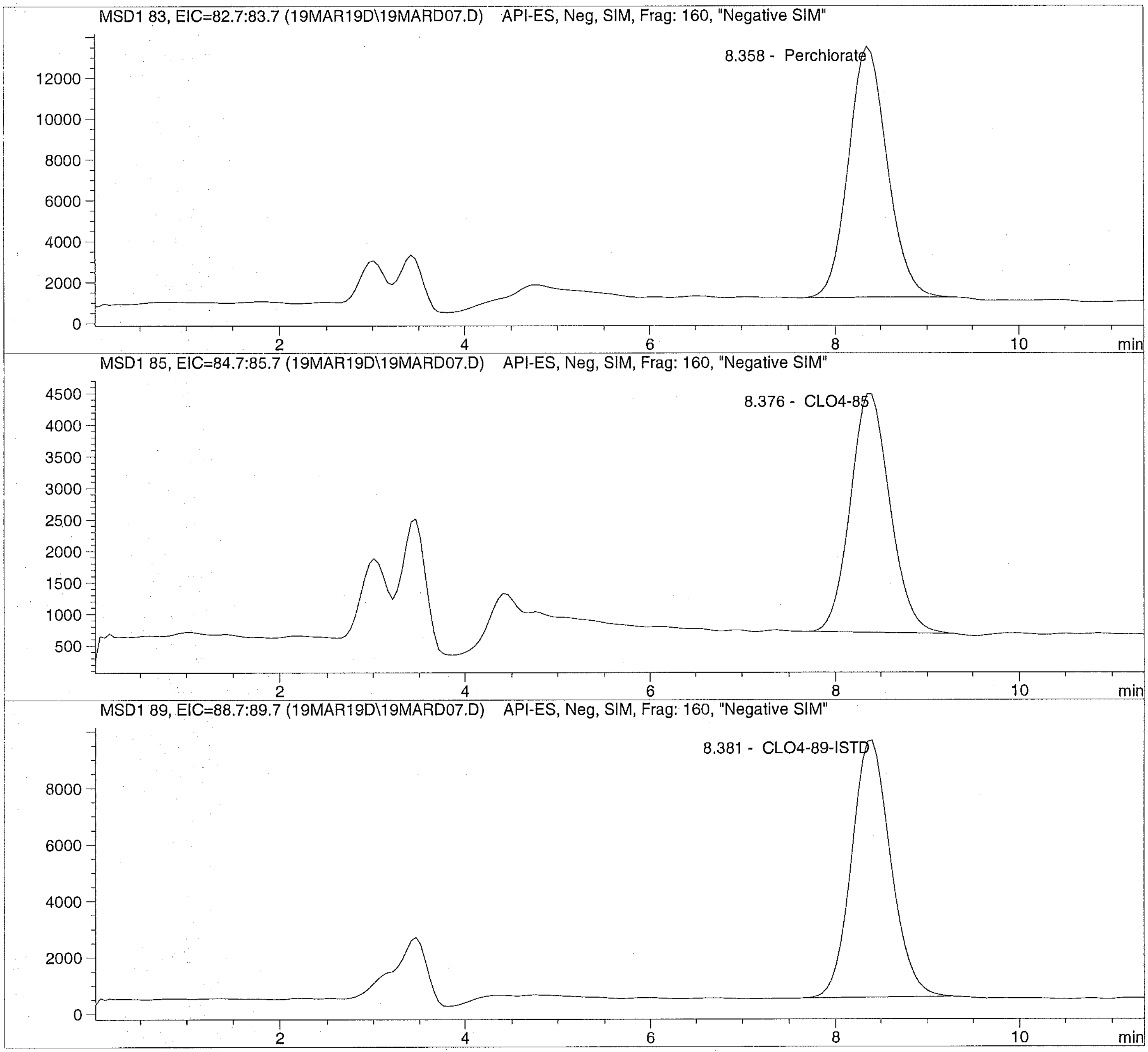

Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD07.D   Sample Name: 644171   67741SD

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Injection Date: 3/19/2019 13:02:13   Seq Line: 7
Sample Name: 644171 67741SD   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 14:38:25

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: 0.000

===

LCMS Results

===

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.358	PBA	362342.5	4.3799	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.376	PBA	114518.6	4.5153	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.381	BBA	271402.1	5.0000	CLO4-89-ISTD

===

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD08.D   Sample Name: 644172 CCV@25

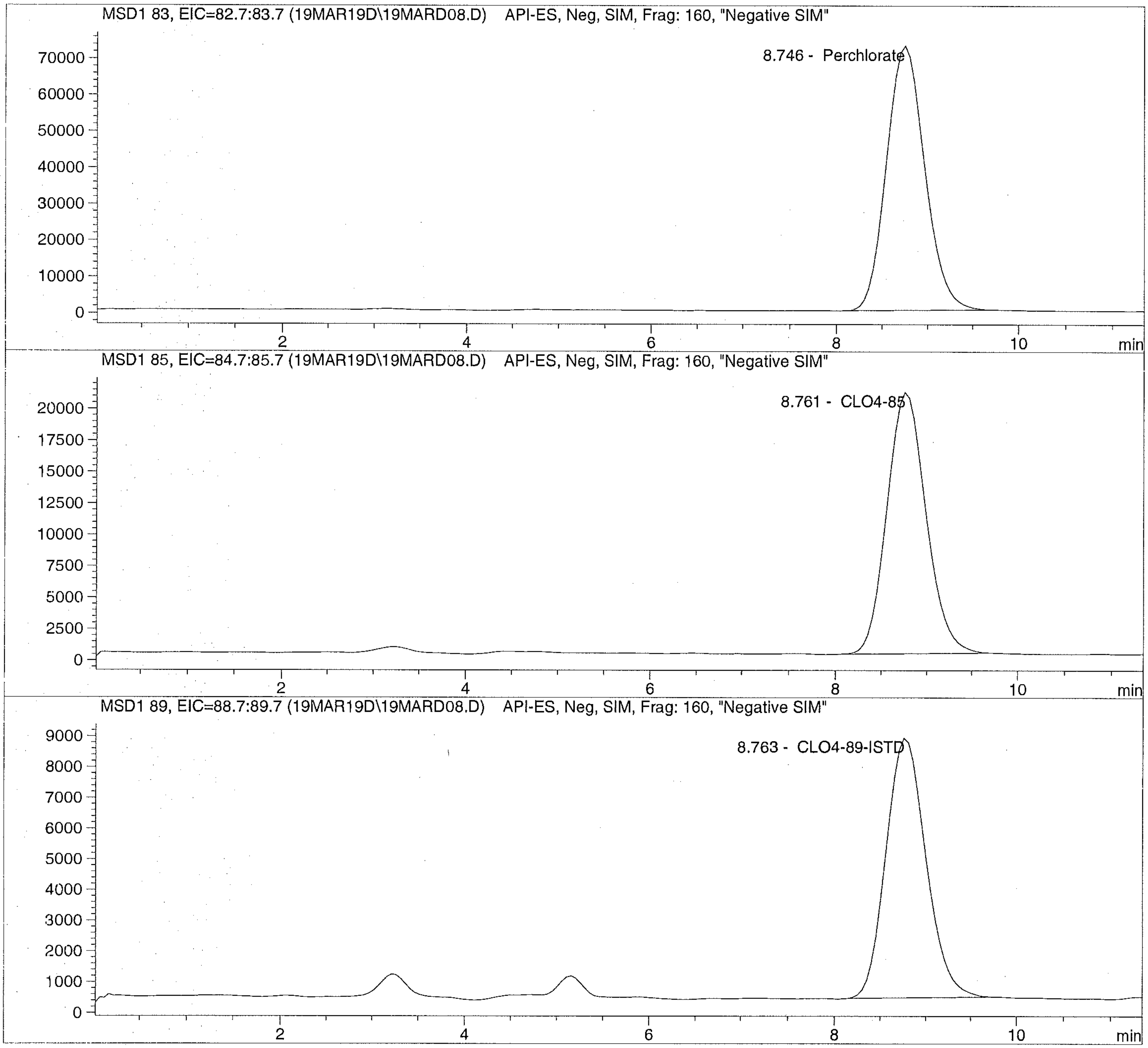
===

Injection Date:	3/19/2019 13:18:38	Seq Line:	8
Sample Name:	644172 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 14:38:25

Perchlorate analysis

===



Data file: C:\HPCHEM\1\DATA\19MAR19D\19MARD08.D Sample Name: 644172 CCV@25

Injection Date:	3/19/2019 13:18:38	Seq Line:	8
Sample Name:	644172 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 14:38:25

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: 25.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.746	PBA	2113821.3	24.9941	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.761	PBA	619581.3	24.6961	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.763	PBA	257307.6	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]	Sig	Lvl	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
```

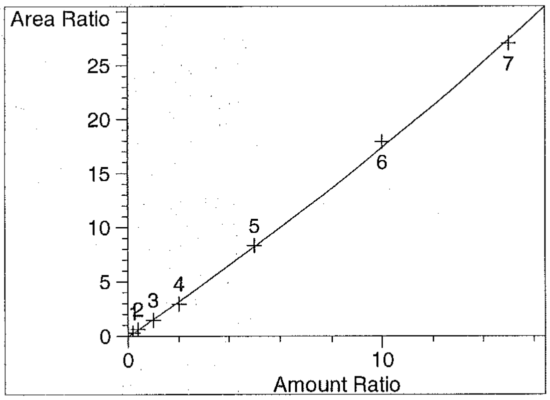
More compound-specific settings:

```
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***
======================================================================
```

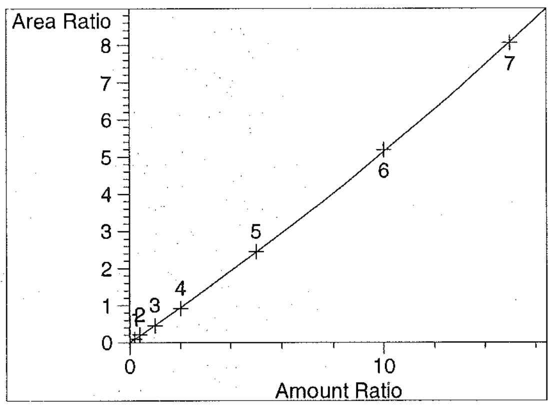
===

Calibration Curves

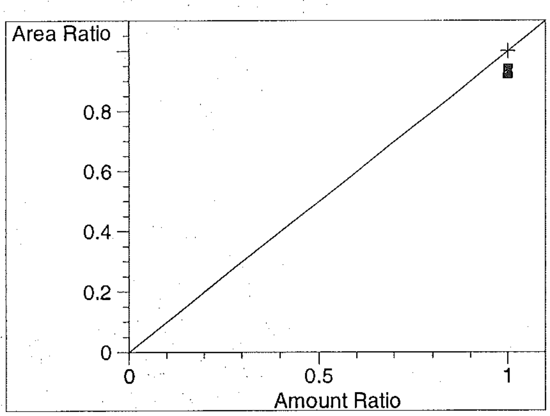
===




```
Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation:              0.99957
Residual Std. Dev.:       0.30744
Formula: y = ax² + 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 = ax² + 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

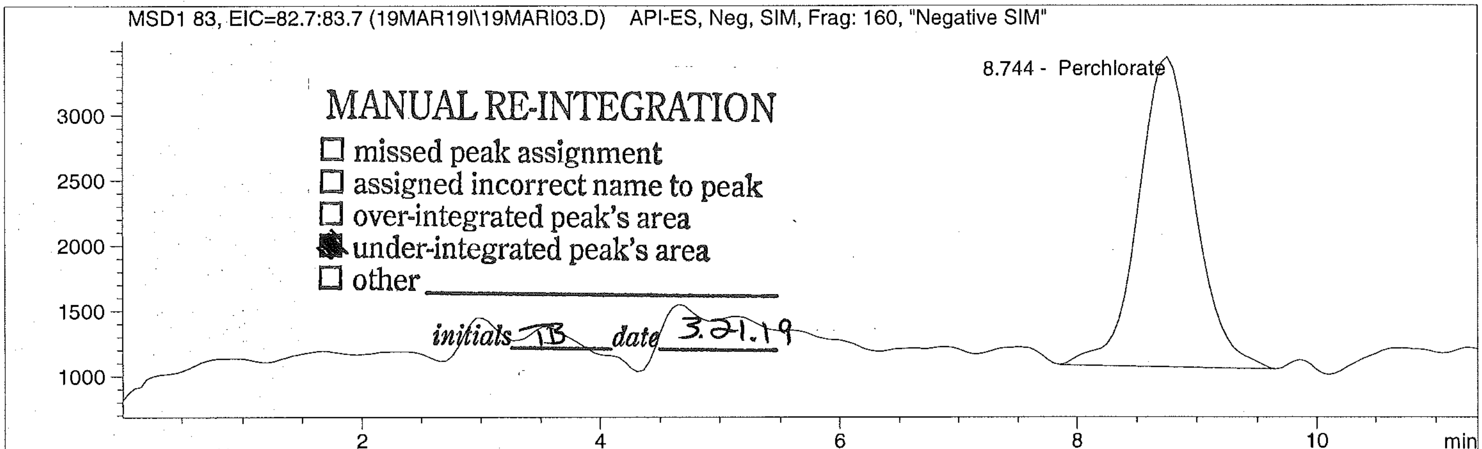
*** End of Report ***

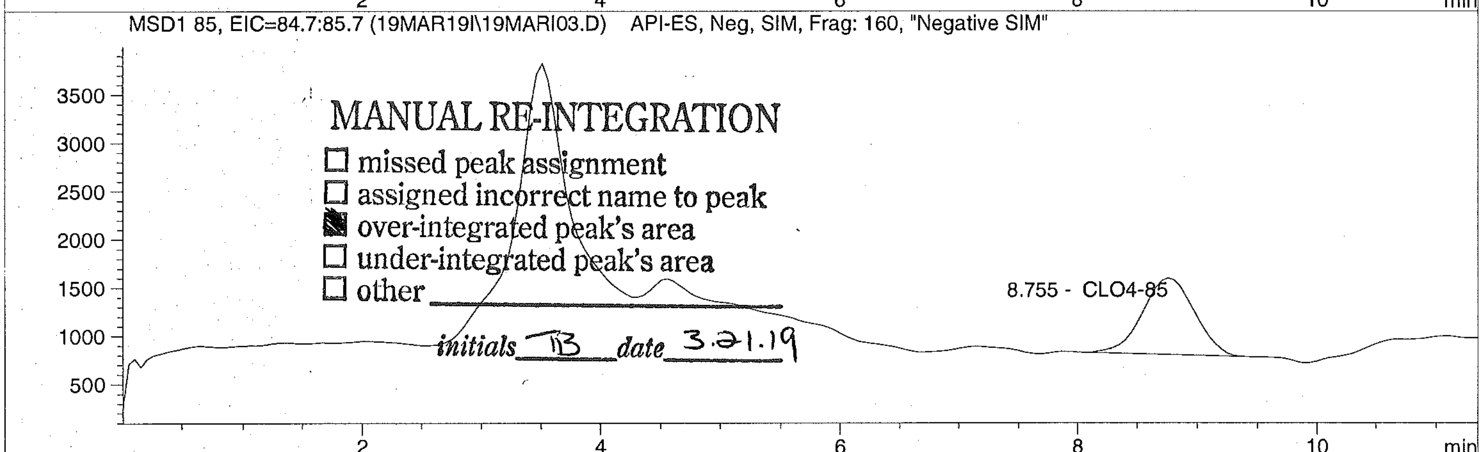
Sequence Table:

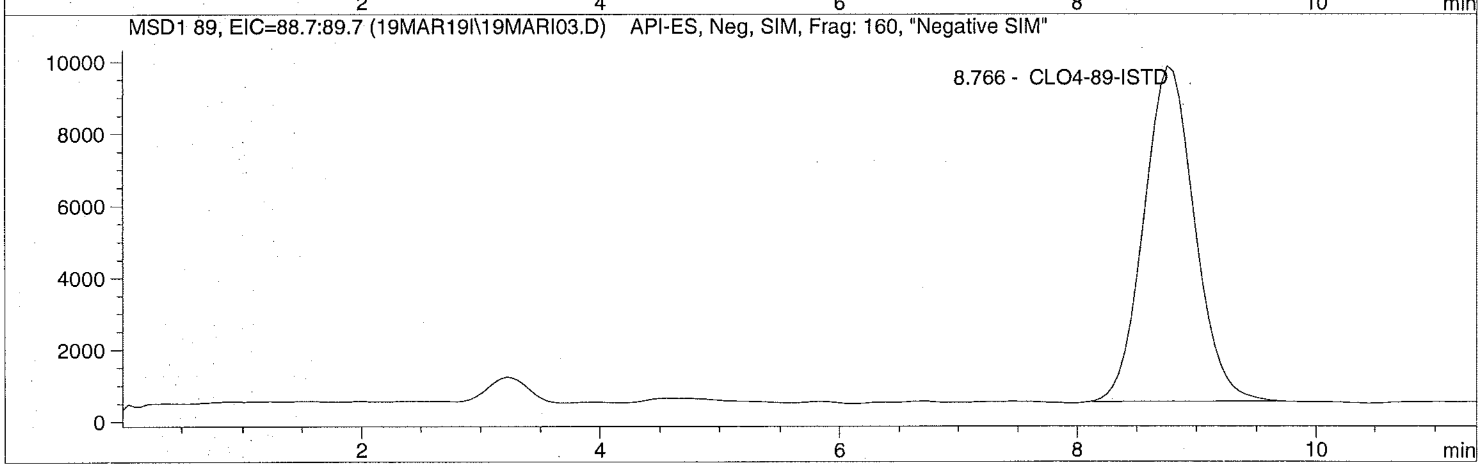
Method and Injection Info Part:

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		

```
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
=====================================================================================
```







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 ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D   Sample Name: CLO4@ 2.0ug/L

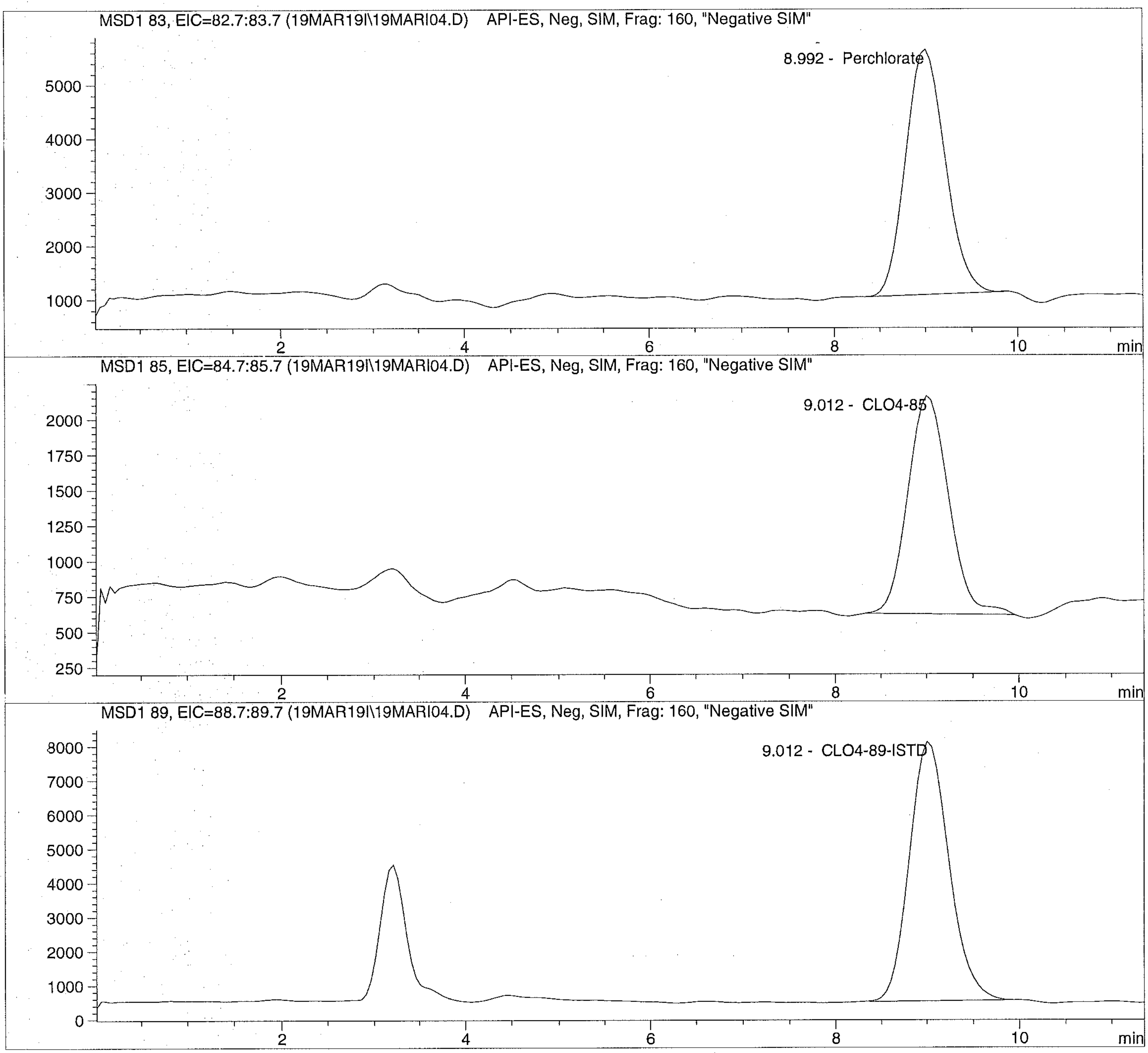
==

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

==



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D Sample Name: CLO4@ 2.0ug/L

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

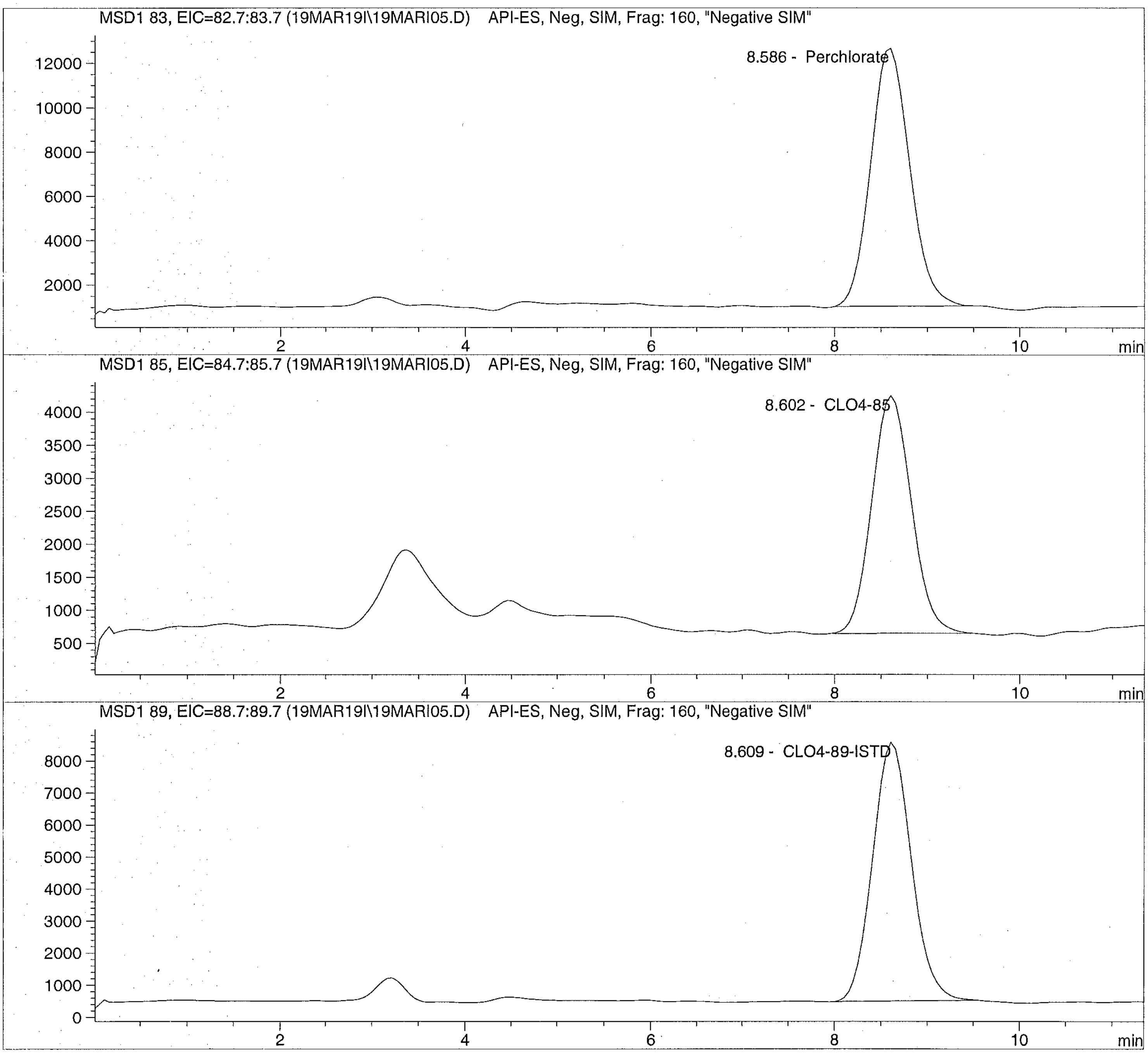
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

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 ***

```
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
=====================================================================================
```



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

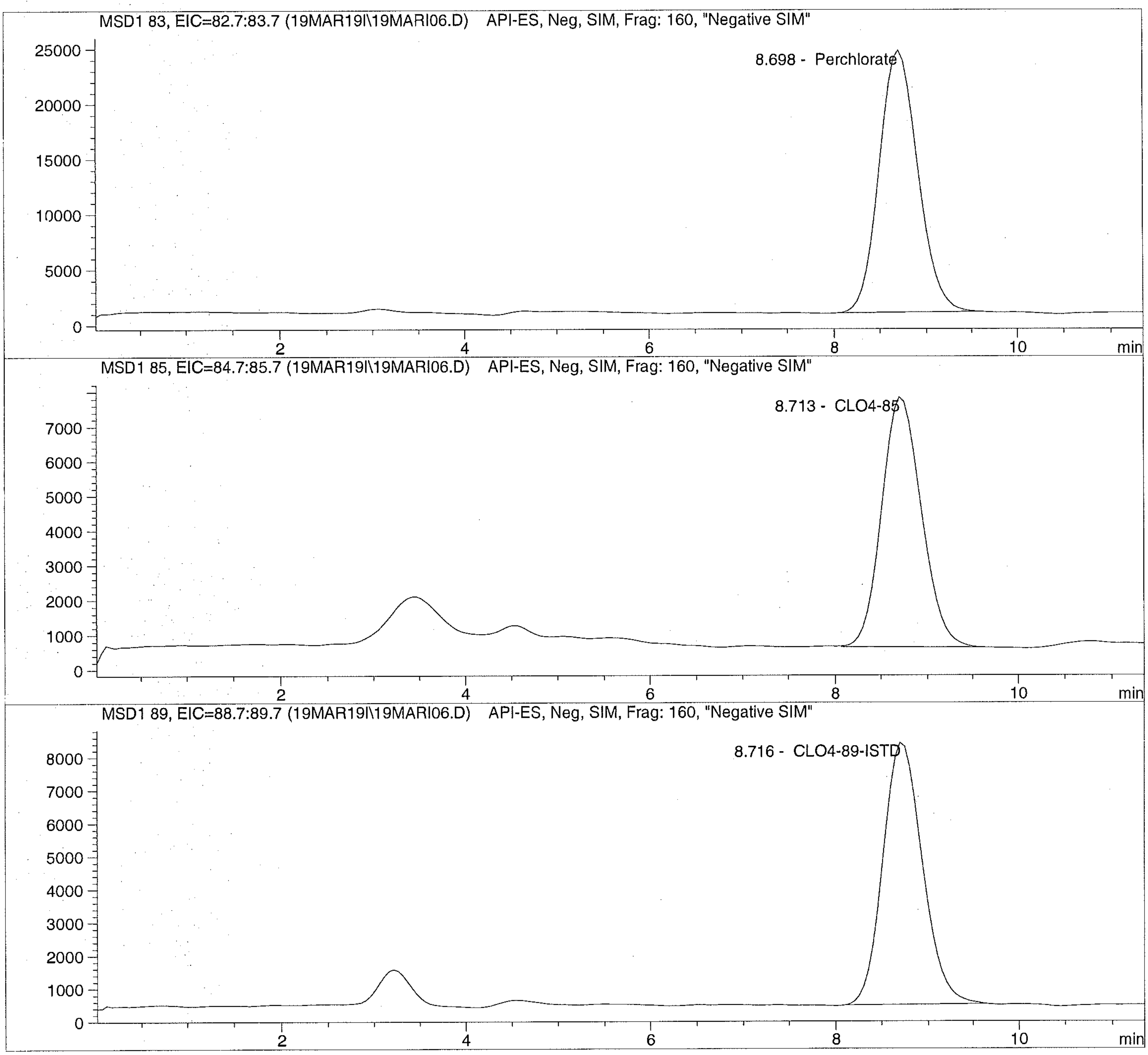
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

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 ***

```
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
=====================================================================================
```



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

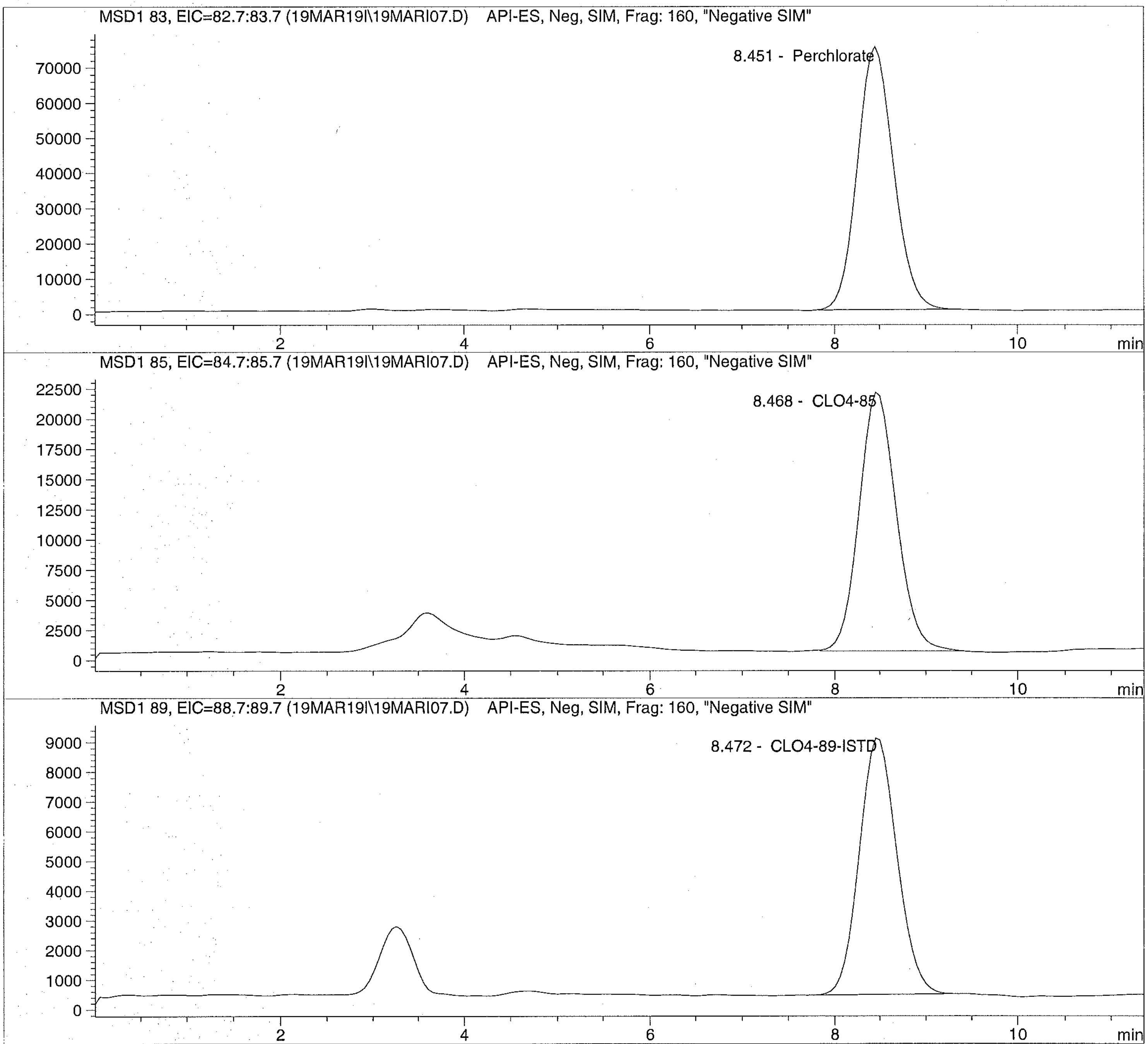
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D Sample Name: CLO4@ 25.ug/L

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



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D Sample Name: CLO4@ 25.ug/L

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

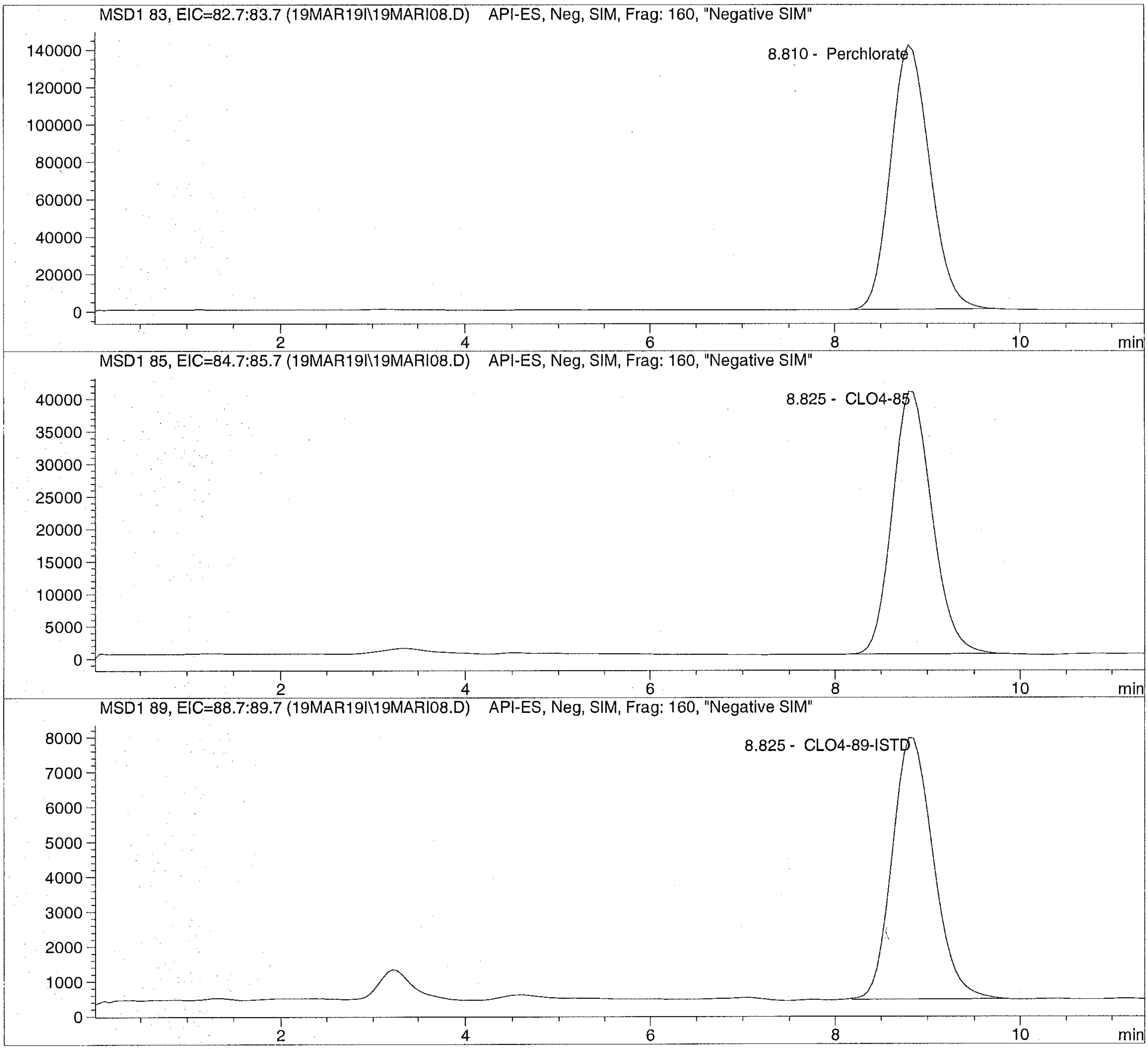
*** End of Report ***

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

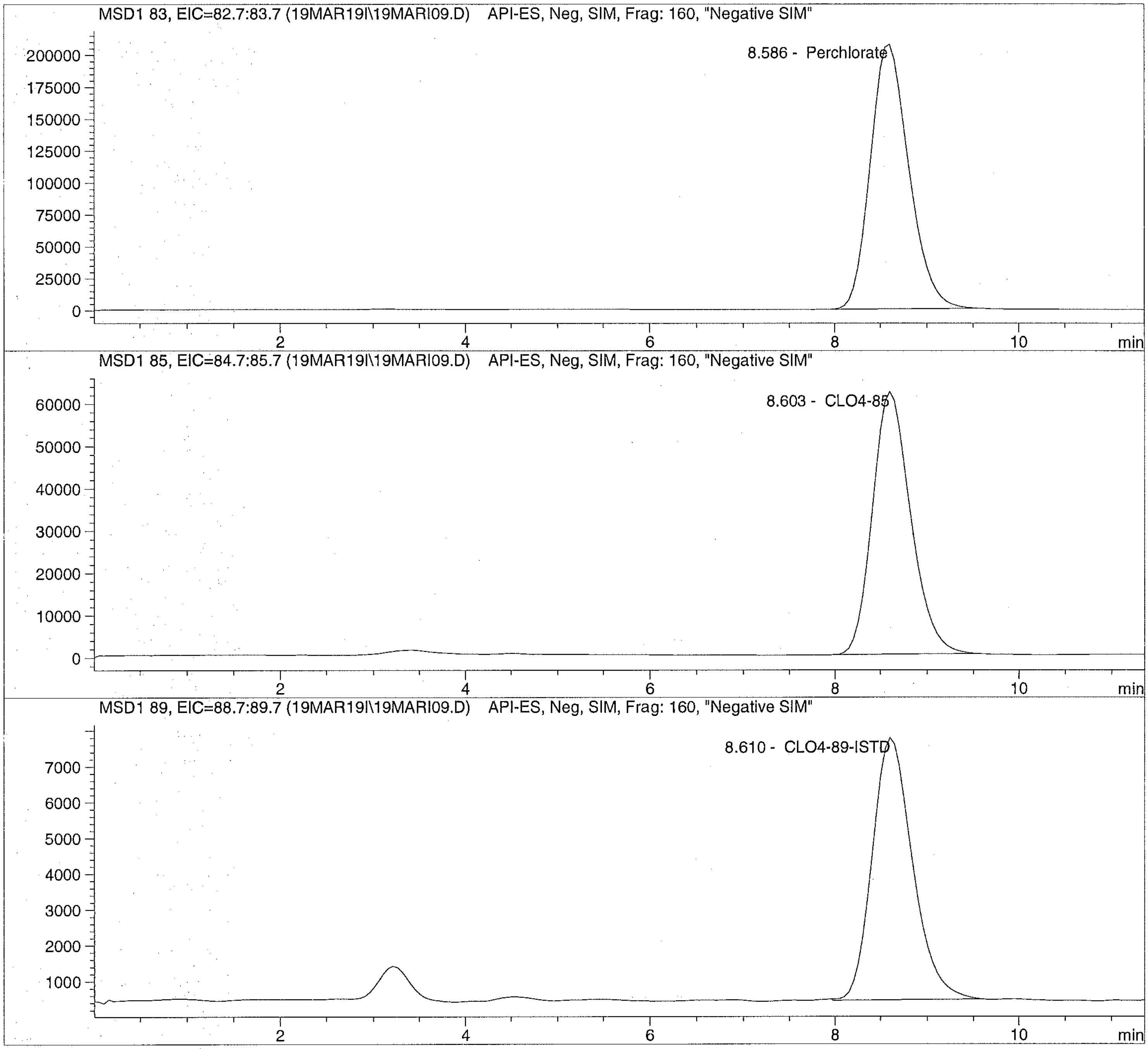
*** End of Report ***

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



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

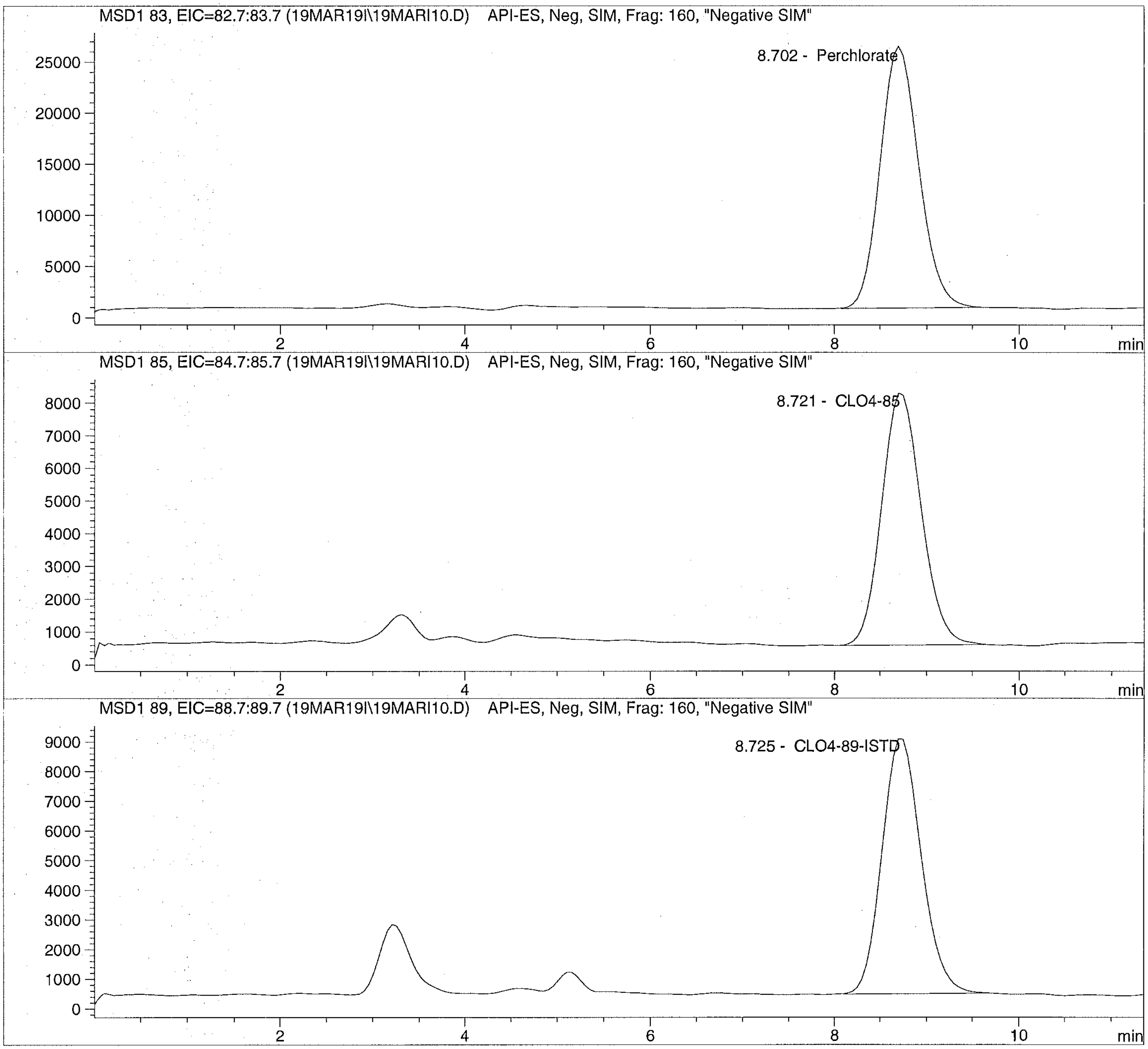
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

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 ***

```
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
=====================================================================================
```



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

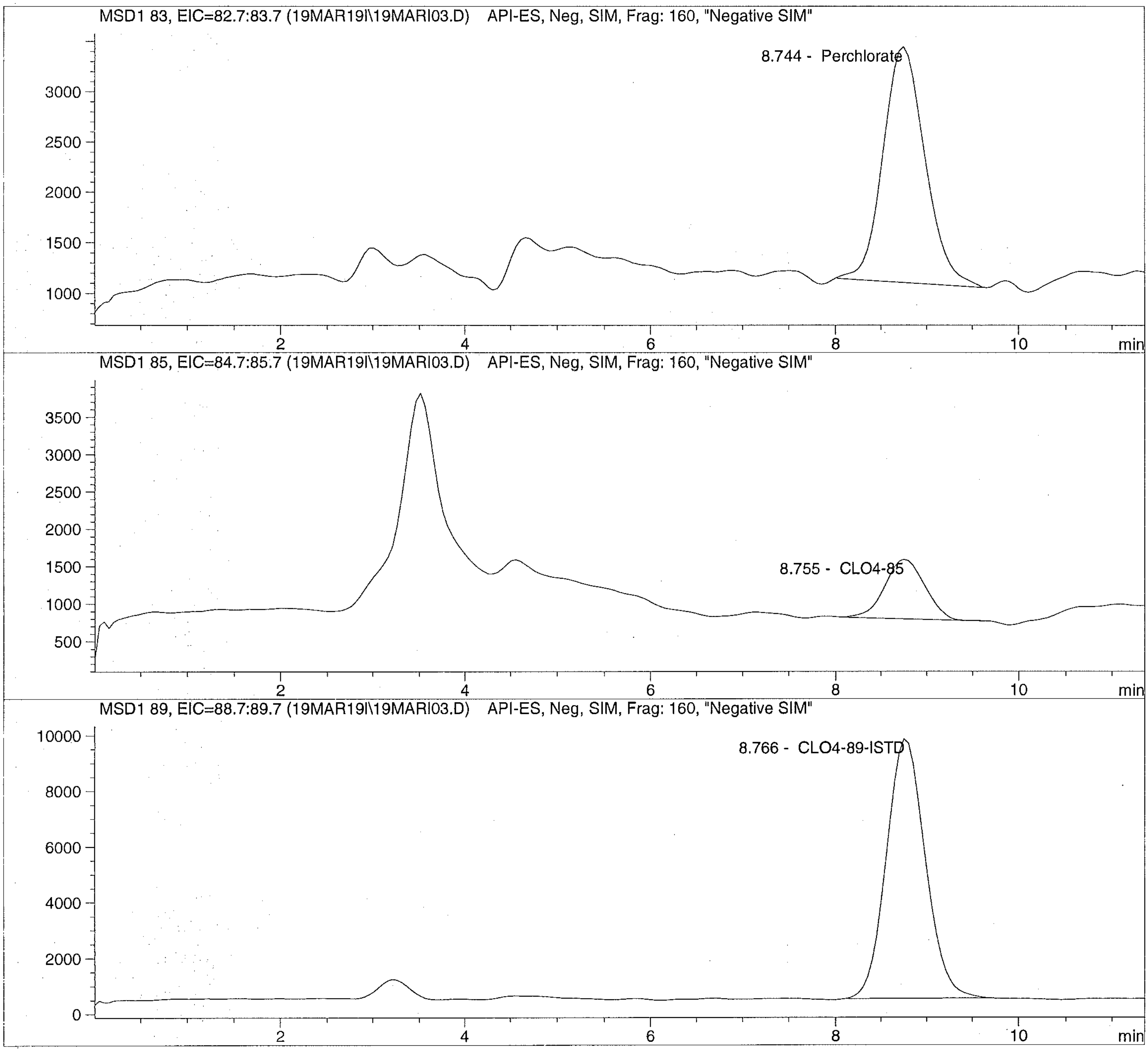
Unmodified

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



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 ***

10450 Stancliff Rd. Suite 210
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T: +1 281 530 5656
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March 11, 2019

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

Work Order: **HS19030301**

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

Dear Marcia,

ALS Environmental received 2 sample(s) on Mar 07, 2019 for the analysis presented in the following report.

This is a REVISED REPORT. Please see the Case Narrative for discussion concerning this revision.

Regards,

Generated By: RJ.MODASHIA

RJ Modashia
Project Manager

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19030301

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19030301-01	LH18/24-SP650_030619	Water		06-Mar-2019 13:00	07-Mar-2019 08:51	☐
HS19030301-02	TRIP BLANK	Water	ALS-020119-60	06-Mar-2019 00:00	07-Mar-2019 08:51	☐

Revision: 1

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.

- Updated the Sample ID to the correct name: LH18/24-SP650_030619

GCMS Volatiles by Method SW8260

Batch ID: R334270

Sample ID: HS19030163-01MS

- MS and MSD are for an unrelated sample

Sample ID: VLCSW-190308

- 1,2,3-Trichlorobenzene exceeded QC limits for LCS. CCV is OK. Samples are ND for this compound.

WetChemistry by Method SW9056

Batch ID: R334216

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

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.

ANALYTICAL REPORT

Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples WorkOrder:HS19030301

Sample ID: LH18/24-SP650_030619 Lab ID:HS19030301-01

Collection Date: 06-Mar-2019 13:00 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:53
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	08-Mar-2019 12:53
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	08-Mar-2019 12:53
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:53
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	08-Mar-2019 12:53
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	08-Mar-2019 12:53
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	08-Mar-2019 12:53
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53

Note: See Qualifiers Page for a list of qualifiers and their explanation. **Revision:** 1

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Sample ID: LH18/24-SP650_030619
Collection Date: 06-Mar-2019 13:00

ANALYTICAL REPORT
WorkOrder:HS19030301
Lab ID:HS19030301-01
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	08-Mar-2019 12:53
cis-1,2-Dichloroethene	**1.6**		**0.20**	**0.50**	**1.0**	**UG/L**	1	08-Mar-2019 12:53
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	08-Mar-2019 12:53
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	08-Mar-2019 12:53
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	08-Mar-2019 12:53
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:53
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Trichloroethene	**0.74**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	08-Mar-2019 12:53
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:53
Surr: 1,2-Dichloroethane-d4	*83.4*			**0**	*81-118*	*%REC*	*1*	*08-Mar-2019 12:53*
Surr: 4-Bromofluorobenzene	*101*			**0**	*85-114*	*%REC*	*1*	*08-Mar-2019 12:53*
Surr: Dibromofluoromethane	*84.5*			**0**	*80-119*	*%REC*	*1*	*08-Mar-2019 12:53*
Surr: Toluene-d8	*108*			**0**	*89-112*	*%REC*	*1*	*08-Mar-2019 12:53*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**312**		**2.00**	**5.00**	**5.00**	**mg/L**	10	08-Mar-2019 00:17
Sulfate	**13.9**		**2.00**	**5.00**	**5.00**	**mg/L**	10	08-Mar-2019 00:17

Note: See Qualifiers Page for a list of qualifiers and their explanation. **Revision:** 1

ALS Houston, US Date: 11-Mar-19

Client:	Bhate Environmental Associates, Inc.	**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS19030301
Sample ID:	TRIP BLANK	Lab ID:HS19030301-02
Collection Date:	06-Mar-2019 00:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:29
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	08-Mar-2019 12:29
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	08-Mar-2019 12:29
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:29
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	08-Mar-2019 12:29
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	08-Mar-2019 12:29
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	08-Mar-2019 12:29
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29

Note: See Qualifiers Page for a list of qualifiers and their explanation. **Revision:** 1

ALS Houston, US Date: 11-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:	HS19030301
Sample ID:	TRIP BLANK	Lab ID:	HS19030301-02
Collection Date:	06-Mar-2019 00:00	Matrix:	Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	08-Mar-2019 12:29
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	08-Mar-2019 12:29
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	08-Mar-2019 12:29
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	08-Mar-2019 12:29
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	08-Mar-2019 12:29
Surr: 1,2-Dichloroethane-d4	*82.5*			**0**	*81-118*	*%REC*	*1*	*08-Mar-2019 12:29*
Surr: 4-Bromofluorobenzene	*101*			**0**	*85-114*	*%REC*	*1*	*08-Mar-2019 12:29*
Surr: Dibromofluoromethane	*83.8*			**0**	*80-119*	*%REC*	*1*	*08-Mar-2019 12:29*
Surr: Toluene-d8	*108*			**0**	*89-112*	*%REC*	*1*	*08-Mar-2019 12:29*

Note: See Qualifiers Page for a list of qualifiers and their explanation. **Revision:** 1

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030301

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R334216	**Test Name :** ANIONS BY SW9056A			**Matrix:** Water		
HS19030301-01	LH18/24-SP650_030619	06 Mar 2019 13:00			08 Mar 2019 00:17	10
Batch ID R334270	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C			**Matrix:** Water		
HS19030301-01	LH18/24-SP650_030619	06 Mar 2019 13:00			08 Mar 2019 12:53	1
HS19030301-02	TRIP BLANK	06 Mar 2019 00:00			08 Mar 2019 12:29	1

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030301

QC BATCH REPORT

Batch ID: R334270 **Instrument:** VOA6 **Method:** SW8260

MBLK Sample ID: **VBLKW-190308** Units: **UG/L** Analysis Date: **08-Mar-2019 12:05**
Client ID: Run ID: **VOA6_334270** SeqNo: **4984642** 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	2.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U
Bromomethane	0.50	1.0								U

Revision: 1

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030301

QC BATCH REPORT

Batch ID: R334270 **Instrument:** VOA6 **Method:** SW8260

MBLK Sample ID: **VBLKW-190308** Units: **UG/L** Analysis Date: **08-Mar-2019 12:05**
Client ID: Run ID: **VOA6_334270** SeqNo: **4984642** 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	0.50	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	*41.37*	*1.0*	*50*	*0*	*82.7*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*50.23*	*1.0*	*50*	*0*	*100*	*85 - 114*				
Surr: Dibromofluoromethane	*40.97*	*1.0*	*50*	*0*	*81.9*	*80 - 119*				
Surr: Toluene-d8	*53.9*	*1.0*	*50*	*0*	*108*	*89 - 112*				

Revision: 1

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030301

QC BATCH REPORT

Batch ID: R334270 **Instrument:** VOA6 **Method:** SW8260

LCS Sample ID: **VLCSW-190308** Units: **UG/L** Analysis Date: **08-Mar-2019 11:17**
Client ID: Run ID: **VOA6_334270** SeqNo: **4984641** 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	21.24	1.0	20	0	106	78 - 124				
1,1,1-Trichloroethane	20.25	1.0	20	0	101	74 - 131				
1,1,2,2-Tetrachloroethane	21.25	1.0	20	0	106	71 - 121				
1,1,2-Trichloroethane	21.41	1.0	20	0	107	80 - 119				
1,1-Dichloroethane	19.78	1.0	20	0	98.9	77 - 125				
1,1-Dichloroethene	19.2	1.0	20	0	96.0	71 - 131				
1,1-Dichloropropene	19.85	1.0	20	0	99.2	78 - 125				
1,2,3-Trichlorobenzene	26.35	1.0	20	0	132	69 - 129				S
1,2,3-Trichloropropane	20.6	1.0	20	0	103	73 - 122				
1,2,4-Trichlorobenzene	23.18	1.0	20	0	116	69 - 130				
1,2,4-Trimethylbenzene	19.42	1.0	20	0	97.1	76 - 124				
1,2-Dibromo-3-chloropropane	23.86	1.0	20	0	119	62 - 128				
1,2-Dibromoethane	22.06	1.0	20	0	110	77 - 121				
1,2-Dichlorobenzene	20.01	1.0	20	0	100	80 - 119				
1,2-Dichloroethane	21.49	1.0	20	0	107	73 - 128				
1,2-Dichloropropane	21.18	1.0	20	0	106	78 - 122				
1,3,5-Trimethylbenzene	19.3	1.0	20	0	96.5	75 - 124				
1,3-Dichlorobenzene	19.63	1.0	20	0	98.2	80 - 119				
1,3-Dichloropropane	21.34	1.0	20	0	107	80 - 119				
1,4-Dichlorobenzene	19.59	1.0	20	0	97.9	79 - 118				
2,2-Dichloropropane	20.16	1.0	20	0	101	60 - 139				
2-Butanone	47.93	2.0	40	0	120	56 - 143				
2-Chlorotoluene	19.09	1.0	20	0	95.4	79 - 122				
2-Hexanone	46.31	2.0	40	0	116	57 - 139				
4-Chlorotoluene	19.42	1.0	20	0	97.1	78 - 122				
4-Isopropyltoluene	19.19	1.0	20	0	95.9	77 - 127				
4-Methyl-2-pentanone	44.94	2.0	40	0	112	67 - 130				
Acetone	48.14	2.0	40	0	120	39 - 160				
Benzene	20.74	1.0	20	0	104	79 - 120				
Bromobenzene	19.89	1.0	20	0	99.5	80 - 120				
Bromochloromethane	20.61	1.0	20	0	103	78 - 123				
Bromodichloromethane	21.23	1.0	20	0	106	79 - 125				
Bromoform	22.88	1.0	20	0	114	66 - 130				
Bromomethane	24.1	1.0	20	0	120	53 - 141				

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030301

QC BATCH REPORT

Batch ID: R334270 **Instrument:** VOA6 **Method:** SW8260

LCS Sample ID: **VLCSW-190308** Units: **UG/L** Analysis Date: **08-Mar-2019 11:17**
Client ID: Run ID: **VOA6_334270** SeqNo: **4984641** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	40.69	2.0	40	0	102	64 - 133				
Carbon tetrachloride	21.12	1.0	20	0	106	72 - 136				
Chlorobenzene	20.68	1.0	20	0	103	82 - 118				
Chloroethane	19.46	1.0	20	0	97.3	60 - 138				
Chloroform	20.35	1.0	20	0	102	79 - 124				
Chloromethane	20.05	1.0	20	0	100	50 - 139				
cis-1,2-Dichloroethene	20.09	1.0	20	0	100	78 - 123				
cis-1,3-Dichloropropene	21.64	1.0	20	0	108	75 - 124				
Dibromochloromethane	22.28	1.0	20	0	111	74 - 126				
Dibromomethane	21.51	1.0	20	0	108	79 - 123				
Dichlorodifluoromethane	19.85	1.0	20	0	99.3	32 - 152				
Ethylbenzene	20.06	1.0	20	0	100	79 - 121				
Hexachlorobutadiene	22.92	1.0	20	0	115	66 - 134				
Isopropylbenzene	19.83	1.0	20	0	99.1	72 - 131				
m,p-Xylene	40.07	2.0	40	0	100	80 - 121				
Methylene chloride	20.39	2.0	20	0	102	74 - 124				
Naphthalene	24.65	1.0	20	0	123	61 - 128				
n-Butylbenzene	19.03	1.0	20	0	95.1	75 - 128				
n-Propylbenzene	19.08	1.0	20	0	95.4	76 - 126				
o-Xylene	20.48	1.0	20	0	102	78 - 122				
sec-Butylbenzene	18.75	1.0	20	0	93.8	77 - 126				
Styrene	21.13	1.0	20	0	106	78 - 123				
tert-Butylbenzene	18.73	1.0	20	0	93.7	78 - 124				
Tetrachloroethene	20.12	1.0	20	0	101	74 - 129				
Toluene	20.87	1.0	20	0	104	80 - 121				
trans-1,2-Dichloroethene	20.1	1.0	20	0	101	75 - 124				
trans-1,3-Dichloropropene	21.95	1.0	20	0	110	73 - 127				
Trichloroethene	21.02	1.0	20	0	105	79 - 123				
Trichlorofluoromethane	19.19	1.0	20	0	95.9	65 - 141				
Vinyl chloride	18.48	1.0	20	0	92.4	58 - 137				
Surr: 1,2-Dichloroethane-d4	*51.89*	*1.0*	*50*	*0*	*104*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*53.23*	*1.0*	*50*	*0*	*106*	*85 - 114*				
Surr: Dibromofluoromethane	*51.27*	*1.0*	*50*	*0*	*103*	*80 - 119*				
Surr: Toluene-d8	*47.66*	*1.0*	*50*	*0*	*95.3*	*89 - 112*				

Revision: 1

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030301

QC BATCH REPORT

Batch ID: R334270 **Instrument:** VOA6 **Method:** SW8260

MS Sample ID: **HS19030163-01MS** Units: **UG/L** Analysis Date: **08-Mar-2019 16:29**
Client ID: Run ID: **VOA6_334270** SeqNo: **4984650** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	20.64	1.0	20	0	103	78 - 124				
1,1,1-Trichloroethane	17.28	1.0	20	0	86.4	74 - 131				
1,1,2,2-Tetrachloroethane	23.34	1.0	20	0	117	71 - 121				
1,1,2-Trichloroethane	21.51	1.0	20	0	108	80 - 119				
1,1-Dichloroethane	15.49	1.0	20	0	77.5	77 - 125				
1,1-Dichloroethene	16.33	1.0	20	0	81.6	71 - 131				
1,1-Dichloropropene	18.4	1.0	20	0	92.0	78 - 125				
1,2,3-Trichlorobenzene	31.17	1.0	20	0	156	69 - 129				S
1,2,3-Trichloropropane	32.3	1.0	20	0	161	73 - 122				S
1,2,4-Trichlorobenzene	27.02	1.0	20	0	135	69 - 130				S
1,2,4-Trimethylbenzene	21.71	1.0	20	0	109	76 - 124				
1,2-Dibromo-3-chloropropane	27.4	1.0	20	0	137	62 - 128				S
1,2-Dibromoethane	22.13	1.0	20	0	111	77 - 121				
1,2-Dichlorobenzene	21.24	1.0	20	0	106	80 - 119				
1,2-Dichloroethane	18.17	1.0	20	0	90.9	73 - 128				
1,2-Dichloropropane	18.26	1.0	20	0	91.3	78 - 122				
1,3,5-Trimethylbenzene	22.06	1.0	20	0	110	75 - 124				
1,3-Dichlorobenzene	21.05	1.0	20	0	105	80 - 119				
1,3-Dichloropropane	21.22	1.0	20	0	106	80 - 119				
1,4-Dichlorobenzene	20.65	1.0	20	0	103	79 - 118				
2,2-Dichloropropane	16.44	1.0	20	0	82.2	60 - 139				
2-Butanone	41.77	2.0	40	0	104	56 - 143				
2-Chlorotoluene	20.76	1.0	20	0	104	79 - 122				
2-Hexanone	50.33	2.0	40	0	126	57 - 139				
4-Chlorotoluene	21.05	1.0	20	0	105	78 - 122				
4-Isopropyltoluene	22.51	1.0	20	0	113	77 - 127				
4-Methyl-2-pentanone	48.85	2.0	40	0	122	67 - 130				
Acetone	40.25	2.0	40	0	101	39 - 160				
Benzene	18.1	1.0	20	0	90.5	79 - 120				
Bromobenzene	20.7	1.0	20	0	103	80 - 120				
Bromochloromethane	15.3	1.0	20	0	76.5	78 - 123				S
Bromodichloromethane	18.48	1.0	20	0	92.4	79 - 125				
Bromoform	22.63	1.0	20	0	113	66 - 130				
Bromomethane	20.71	1.0	20	0	104	53 - 141				

Revision: 1

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030301

QC BATCH REPORT

Batch ID: R334270 **Instrument:** VOA6 **Method:** SW8260

MS Sample ID: **HS19030163-01MS** Units: **UG/L** Analysis Date: **08-Mar-2019 16:29**
Client ID: Run ID: **VOA6_334270** SeqNo: **4984650** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	30.91	2.0	40	0	77.3	64 - 133				
Carbon tetrachloride	21.19	1.0	20	0	106	72 - 136				
Chlorobenzene	20.56	1.0	20	0	103	82 - 118				
Chloroethane	15.55	1.0	20	0	77.7	60 - 138				
Chloroform	15.88	1.0	20	0	79.4	79 - 124				
Chloromethane	11.94	1.0	20	0	59.7	50 - 139				
cis-1,2-Dichloroethene	16	1.0	20	0	80.0	78 - 123				
cis-1,3-Dichloropropene	18.11	1.0	20	0	90.6	75 - 124				
Dibromochloromethane	21.65	1.0	20	0	108	74 - 126				
Dibromomethane	18.93	1.0	20	0	94.6	79 - 123				
Dichlorodifluoromethane	9.761	1.0	20	0	48.8	32 - 152				
Ethylbenzene	21.29	1.0	20	0	106	79 - 121				
Hexachlorobutadiene	25.33	1.0	20	0	127	66 - 134				
Isopropylbenzene	23.53	1.0	20	1.608	110	72 - 131				
m,p-Xylene	42.68	2.0	40	0	107	80 - 121				
Methylene chloride	16.05	2.0	20	0	80.3	74 - 124				
Naphthalene	29.28	1.0	20	0	146	61 - 128				S
n-Butylbenzene	22.33	1.0	20	0	112	75 - 128				
n-Propylbenzene	22	1.0	20	0	110	76 - 126				
o-Xylene	21.3	1.0	20	0	106	78 - 122				
sec-Butylbenzene	22.53	1.0	20	0	113	77 - 126				
Styrene	20.92	1.0	20	0	105	78 - 123				
tert-Butylbenzene	22.24	1.0	20	0	111	78 - 124				
Tetrachloroethene	22.8	1.0	20	0	114	74 - 129				
Toluene	21.05	1.0	20	0	105	80 - 121				
trans-1,2-Dichloroethene	16.49	1.0	20	0	82.5	75 - 124				
trans-1,3-Dichloropropene	18.72	1.0	20	0	93.6	73 - 127				
Trichloroethene	19.06	1.0	20	0	95.3	79 - 123				
Trichlorofluoromethane	15.35	1.0	20	0	76.7	65 - 141				
Vinyl chloride	13.26	1.0	20	0	66.3	58 - 137				
Surr: 1,2-Dichloroethane-d4	*42.6*	*1.0*	*50*	*0*	*85.2*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*50.07*	*1.0*	*50*	*0*	*100*	*85 - 114*				
Surr: Dibromofluoromethane	*42.23*	*1.0*	*50*	*0*	*84.5*	*80 - 119*				
Surr: Toluene-d8	*54.26*	*1.0*	*50*	*0*	*109*	*89 - 112*				

Revision: 1

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030301

QC BATCH REPORT

Batch ID: R334270 **Instrument:** VOA6 **Method:** SW8260

MSD Sample ID: **HS19030163-01MSD** Units: **UG/L** Analysis Date: **08-Mar-2019 16:53**
Client ID: Run ID: **VOA6_334270** SeqNo: **4984651** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	20.78	1.0	20	0	104	78 - 124	20.64	0.661	20	
1,1,1-Trichloroethane	18.25	1.0	20	0	91.2	74 - 131	17.28	5.44	20	
1,1,2,2-Tetrachloroethane	20.8	1.0	20	0	104	71 - 121	23.34	11.5	20	
1,1,2-Trichloroethane	20.81	1.0	20	0	104	80 - 119	21.51	3.32	20	
1,1-Dichloroethane	16.04	1.0	20	0	80.2	77 - 125	15.49	3.46	20	
1,1-Dichloroethene	17.15	1.0	20	0	85.7	71 - 131	16.33	4.89	20	
1,1-Dichloropropene	20.56	1.0	20	0	103	78 - 125	18.4	11.1	20	
1,2,3-Trichlorobenzene	31	1.0	20	0	155	69 - 129	31.17	0.541	20	S
1,2,3-Trichloropropane	28.78	1.0	20	0	144	73 - 122	32.3	11.5	20	S
1,2,4-Trichlorobenzene	26.83	1.0	20	0	134	69 - 130	27.02	0.679	20	S
1,2,4-Trimethylbenzene	21.09	1.0	20	0	105	76 - 124	21.71	2.9	20	
1,2-Dibromo-3-chloropropane	24.34	1.0	20	0	122	62 - 128	27.4	11.9	20	
1,2-Dibromoethane	21.34	1.0	20	0	107	77 - 121	22.13	3.67	20	
1,2-Dichlorobenzene	19.82	1.0	20	0	99.1	80 - 119	21.24	6.9	20	
1,2-Dichloroethane	19.09	1.0	20	0	95.4	73 - 128	18.17	4.9	20	
1,2-Dichloropropane	18.64	1.0	20	0	93.2	78 - 122	18.26	2.07	20	
1,3,5-Trimethylbenzene	21.5	1.0	20	0	108	75 - 124	22.06	2.55	20	
1,3-Dichlorobenzene	20.17	1.0	20	0	101	80 - 119	21.05	4.24	20	
1,3-Dichloropropane	20.54	1.0	20	0	103	80 - 119	21.22	3.28	20	
1,4-Dichlorobenzene	19.56	1.0	20	0	97.8	79 - 118	20.65	5.41	20	
2,2-Dichloropropane	17.08	1.0	20	0	85.4	60 - 139	16.44	3.82	20	
2-Butanone	40.18	2.0	40	0	100	56 - 143	41.77	3.89	20	
2-Chlorotoluene	20.11	1.0	20	0	101	79 - 122	20.76	3.17	20	
2-Hexanone	46.6	2.0	40	0	117	57 - 139	50.33	7.68	20	
4-Chlorotoluene	20.2	1.0	20	0	101	78 - 122	21.05	4.14	20	
4-Isopropyltoluene	22.99	1.0	20	0	115	77 - 127	22.51	2.1	20	
4-Methyl-2-pentanone	45.37	2.0	40	0	113	67 - 130	48.85	7.39	20	
Acetone	37.06	2.0	40	0	92.7	39 - 160	40.25	8.26	20	
Benzene	19.25	1.0	20	0	96.2	79 - 120	18.1	6.17	20	
Bromobenzene	19.33	1.0	20	0	96.7	80 - 120	20.7	6.82	20	
Bromochloromethane	15.9	1.0	20	0	79.5	78 - 123	15.3	3.8	20	
Bromodichloromethane	19.03	1.0	20	0	95.2	79 - 125	18.48	2.92	20	
Bromoform	21.66	1.0	20	0	108	66 - 130	22.63	4.36	20	
Bromomethane	19.94	1.0	20	0	99.7	53 - 141	20.71	3.76	20	

Revision: 1

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030301

QC BATCH REPORT

Batch ID: R334270 **Instrument:** VOA6 **Method:** SW8260

MSD Sample ID: **HS19030163-01MSD** Units: **UG/L** Analysis Date: **08-Mar-2019 16:53**
Client ID: Run ID: **VOA6_334270** SeqNo: **4984651** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	33.15	2.0	40	0	82.9	64 - 133	30.91	7	20	
Carbon tetrachloride	22.13	1.0	20	0	111	72 - 136	21.19	4.31	20	
Chlorobenzene	20.65	1.0	20	0	103	82 - 118	20.56	0.397	20	
Chloroethane	17.3	1.0	20	0	86.5	60 - 138	15.55	10.7	20	
Chloroform	16.33	1.0	20	0	81.7	79 - 124	15.88	2.83	20	
Chloromethane	12.62	1.0	20	0	63.1	50 - 139	11.94	5.51	20	
cis-1,2-Dichloroethene	16.36	1.0	20	0	81.8	78 - 123	16	2.18	20	
cis-1,3-Dichloropropene	18.69	1.0	20	0	93.5	75 - 124	18.11	3.17	20	
Dibromochloromethane	21.6	1.0	20	0	108	74 - 126	21.65	0.221	20	
Dibromomethane	19.3	1.0	20	0	96.5	79 - 123	18.93	1.97	20	
Dichlorodifluoromethane	10.51	1.0	20	0	52.6	32 - 152	9.761	7.43	20	
Ethylbenzene	21.74	1.0	20	0	109	79 - 121	21.29	2.07	20	
Hexachlorobutadiene	27.51	1.0	20	0	138	66 - 134	25.33	8.26	20	S
Isopropylbenzene	24.58	1.0	20	1.608	115	72 - 131	23.53	4.35	20	
m,p-Xylene	43.51	2.0	40	0	109	80 - 121	42.68	1.94	20	
Methylene chloride	16.16	2.0	20	0	80.8	74 - 124	16.05	0.673	20	
Naphthalene	27.74	1.0	20	0	139	61 - 128	29.28	5.41	20	S
n-Butylbenzene	23.43	1.0	20	0	117	75 - 128	22.33	4.82	20	
n-Propylbenzene	21.88	1.0	20	0	109	76 - 126	22	0.545	20	
o-Xylene	21.5	1.0	20	0	108	78 - 122	21.3	0.948	20	
sec-Butylbenzene	23.02	1.0	20	0	115	77 - 126	22.53	2.13	20	
Styrene	21.25	1.0	20	0	106	78 - 123	20.92	1.56	20	
tert-Butylbenzene	22.27	1.0	20	0	111	78 - 124	22.24	0.114	20	
Tetrachloroethene	24.06	1.0	20	0	120	74 - 129	22.8	5.36	20	
Toluene	21.57	1.0	20	0	108	80 - 121	21.05	2.46	20	
trans-1,2-Dichloroethene	17.04	1.0	20	0	85.2	75 - 124	16.49	3.29	20	
trans-1,3-Dichloropropene	19.24	1.0	20	0	96.2	73 - 127	18.72	2.72	20	
Trichloroethene	20.31	1.0	20	0	102	79 - 123	19.06	6.33	20	
Trichlorofluoromethane	16.52	1.0	20	0	82.6	65 - 141	15.35	7.37	20	
Vinyl chloride	13.85	1.0	20	0	69.3	58 - 137	13.26	4.37	20	
Surr: 1,2-Dichloroethane-d4	*41.92*	*1.0*	*50*	*0*	*83.8*	*81 - 118*	*42.6*	*1.62*	*20*	
Surr: 4-Bromofluorobenzene	*50.79*	*1.0*	*50*	*0*	*102*	*85 - 114*	*50.07*	*1.42*	*20*	
Surr: Dibromofluoromethane	*41.48*	*1.0*	*50*	*0*	*83.0*	*80 - 119*	*42.23*	*1.8*	*20*	
Surr: Toluene-d8	*52.71*	*1.0*	*50*	*0*	*105*	*89 - 112*	*54.26*	*2.9*	*20*	

Revision: 1

ALS Houston, US Date: 11-Mar-19

Client:	Bhate Environmental Associates, Inc.	**QC BATCH REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19030301	

Batch ID: R334270 **Instrument:** VOA6 **Method:** SW8260

The following samples were analyzed in this batch: HS19030301-01 HS19030301-02

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030301

QC BATCH REPORT

Batch ID: R334216 **Instrument:** ICS2100 **Method:** SW9056

MBLK Sample ID: **WBLKW1-030719** Units: **mg/L** Analysis Date: **07-Mar-2019 16:22**
Client ID: Run ID: **ICS2100_334216** SeqNo: **4979622** 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: **WLCSW1-030719** Units: **mg/L** Analysis Date: **07-Mar-2019 16:37**
Client ID: Run ID: **ICS2100_334216** SeqNo: **4979623** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	21.43	0.500	20	0	107	80 - 120				
Sulfate	20.79	0.500	20	0	104	80 - 120				

LCSD Sample ID: **WLCSDW1-030719** Units: **mg/L** Analysis Date: **07-Mar-2019 16:51**
Client ID: Run ID: **ICS2100_334216** SeqNo: **4979624** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	20.62	0.500	20	0	103	80 - 120	21.43	3.84	20	
Sulfate	20	0.500	20	0	100.0	80 - 120	20.79	3.91	20	

MS Sample ID: **HS19030301-01MS** Units: **mg/L** Analysis Date: **08-Mar-2019 00:31**
Client ID: **LH18/24-SP650_030619** Run ID: **ICS2100_334216** SeqNo: **4979646** PrepDate: DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	412.7	5.00	100	312	101	80 - 120				
Sulfate	107.6	5.00	100	13.91	93.7	80 - 120				

MS Sample ID: **HS19030293-01MS** Units: **mg/L** Analysis Date: **07-Mar-2019 19:04**
Client ID: Run ID: **ICS2100_334216** SeqNo: **4979627** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	23.07	0.500	10	13.61	94.6	80 - 120				
Sulfate	33.83	0.500	10	24.5	93.3	80 - 120				

ALS Houston, US Date: 11-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030301

QC BATCH REPORT

Batch ID: R334216 **Instrument:** ICS2100 **Method:** SW9056

MSD Sample ID: **HS19030301-01MSD** Units: **mg/L** Analysis Date: **08-Mar-2019 00:46**
Client ID: **LH18/24-SP650_030619** Run ID: **ICS2100_334216** SeqNo: **4979647** PrepDate: DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	396.8	5.00	100	312	84.8	80 - 120	412.7	3.93	20	
Sulfate	103	5.00	100	13.91	89.1	80 - 120	107.6	4.34	20	

MSD Sample ID: **HS19030293-01MSD** Units: **mg/L** Analysis Date: **07-Mar-2019 19:19**
Client ID: Run ID: **ICS2100_334216** SeqNo: **4979628** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	23.2	0.500	10	13.61	95.9	80 - 120	23.07	0.553	20	
Sulfate	33.85	0.500	10	24.5	93.5	80 - 120	33.83	0.0621	20	

The following samples were analyzed in this batch: HS19030301-01

ALS Houston, US Date: 11-Mar-19

Client:	Bhate Environmental Associates, Inc.	**QUALIFIERS, ACRONYMS, UNITS**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	**HS19030301**	

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

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

Unit Reported	Description
mg/L	Milligrams per Liter

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	88-0356	27-Mar-2019
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

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19030301

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19030301-01	LH18/24-SP650_030619	Login	3/7/2019 11:41:15 AM	NDR	WET311
HS19030301-01	LH18/24-SP650_030619	Login	3/7/2019 11:41:15 AM	NDR	WET311
HS19030301-01	LH18/24-SP650_030619	Login	3/7/2019 11:41:15 AM	NDR	Sub

ALS Houston, US Date: 11-Mar-19

Sample Receipt Checklist

Client Name:	Bhate Environmental	Date/Time Received:	**07-Mar-2019 08:51**
Work Order:	HS19030301	Received by:	**NDR**

Checklist completed by: *Nilesh D. Ranchod* (eSignature) 7-Mar-2019 (Date)

Reviewed by: *RJ Modashia* (eSignature) 7-Mar-2019 (Date)

Matrices: **Water**

Carrier name: **FedEx Priority Overnight**

	Yes	No	
Shipping container/cooler in good condition?	☑	☐	Not Present ☐
Custody seals intact on shipping container/cooler?	☑	☐	Not Present ☐
Custody seals intact on sample bottles?	☐	☐	Not Present ☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	☐	☐	Not Present ☑
Chain of custody present?	☑	☐	1 Page(s)
Chain of custody signed when relinquished and received?	☑	☐	COC IDs:N/A
Samplers name present on COC?	☐	☑	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature in compliance?	☑	☐	

Temperature(s)/Thermometer(s):	0.2C/0.2C UC/C	IR11
Cooler(s)/Kit(s):	43601	
Date/Time sample(s) sent to storage:	03/07/2019 13:00	

	Yes	No	
Water - VOA vials have zero headspace?	☑	☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	☐	☐	N/A ☑
pH adjusted?	☐	☐	N/A ☑

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210, Houston, Tx. 77099 ATTN: R.J. Modashia

Page 1 of 1

Project: BHATE
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No. NWO1312.0150.016.0001

Job:
GROUNDWATER TREATMENT PLANT BI-WEEKLY SAMPLES

Prepared By: Scott Beesinger

P.O Number

HS19030301
Bhate Environmental Associates, Inc.
l18/24 Longhorn GW Treatment Plant Weekly Sampl

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	VOC	CHLORIDE, SULFATE									Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650_030619	Water	03/06/19 / 13:00		3	3										HCL	
LH18/24-SP650_030619	Water	03/06/19 / 13:00		1		1									NONE	
Trip Blank	Water	03/06/19		2	2										HCL	

Additional Remarks: **STANDARD TAT ON ALL PARAMETERS.**

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	03/06/19	13:30	NA	3/7/19	0851						

9For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks
43601 IR #11
Temp u/c 0.2

(Word) S:\I-ces\Forms\Chain of Custody - BiWeekly

ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

CUST[illegible]ODY SEAL

Date: 3/6/19
Time: 1330
Name: Scott Bessinger
Company: BHA[illegible]

Seal Broken By: [illegible]
Date: [illegible]

FedEx.
TRK# 0221 4380 9530 9478
THU - 07 MAR 10:30A
PRIORITY OVERNIGHT

AB SGRA
77099
TX-US
IAH

FID 5121968 06MAR19 GGGA 553CI/46D3/8CBA

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

March 31, 2019

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

Work Order: **HS19030749**

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

Dear Marcia,

ALS Environmental received 2 sample(s) on Mar 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

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19030749

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19030749-01	LH18/24-SP650_031419	Water		14-Mar-2019 14:00	15-Mar-2019 08:38	☐
HS19030749-02	LH18/24-SP650_031419_BIX	Water		14-Mar-2019 14:00	15-Mar-2019 08:38	☐

ALS Houston, US Date: 31-Mar-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 Kelso, WA. Final report attached.

WetChemistry by Method E350.3

Batch ID: R334781

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

WetChemistry by Method E365.3

Batch ID: R334753

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

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.	**ANALYTICAL REPORT**	
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:	HS19030749
Sample ID:	LH18/24-SP650_031419	Lab ID:	HS19030749-01
Collection Date:	14-Mar-2019 14:00	Matrix:	Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
AMMONIA AS N BY E350.3(ISE)		**Method:E350.3**						Analyst: KVL
Nitrogen, Ammonia (As N)	**18**		**0.20**	**0.20**	**0.20**	**mg/L**	1	18-Mar-2019 12:30
ORTHO PHOSPHATE (PO4) AS P BY E365.3		**Method:E365.3**						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	**4.65**		**0.100**	**0.250**	**0.250**	**mg/L**	10	15-Mar-2019 14:30
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	29-Mar-2019 15:52

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

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples		WorkOrder:HS19030749
Sample ID:	LH18/24-SP650_031419_BIX		Lab ID:HS19030749-02
Collection Date:	14-Mar-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	31-Mar-2019 12:13

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

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030749

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R334753	**Test Name :** ORTHO PHOSPHATE (PO4) AS P BY E365.3			**Matrix:** Water		
HS19030749-01	LH18/24-SP650_031419	14 Mar 2019 14:00			15 Mar 2019 14:30	10
Batch ID R334781	**Test Name :** AMMONIA AS N BY E350.3(ISE)			**Matrix:** Water		
HS19030749-01	LH18/24-SP650_031419	14 Mar 2019 14:00			18 Mar 2019 12:30	1
Batch ID R335613	**Test Name :** SUBCONTRACT ANALYSIS - TOC ANALYSIS			**Matrix:** Water		
HS19030749-01	LH18/24-SP650_031419	14 Mar 2019 14:00			29 Mar 2019 15:52	1
Batch ID R335660	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			**Matrix:** Water		
HS19030749-02	LH18/24-SP650_031419_BIX	14 Mar 2019 14:00			31 Mar 2019 12:13	1

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030749

QC BATCH REPORT NEW

Batch ID: R334753 (0) **Instrument:** UV-2450 **Method:** ORTHO PHOSPHATE (PO4) AS P BY E365.3

MBLK Sample ID: **MBLK-334753** Units: **mg/L** Analysis Date: **15-Mar-2019 14:30**
Client ID: Run ID: **UV-2450_334753** SeqNo: **4995078** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.0250	0.0250								U

LCS Sample ID: **LCS-334753** Units: **mg/L** Analysis Date: **15-Mar-2019 14:30**
Client ID: Run ID: **UV-2450_334753** SeqNo: **4995079** 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)	0.253	0.0250	0.25	0	101	85 - 115				

MS Sample ID: **HS19030749-01MS** Units: **mg/L** Analysis Date: **15-Mar-2019 14:30**
Client ID: **LH18/24-SP650_031419** Run ID: **UV-2450_334753** SeqNo: **4995081** PrepDate: DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	7.48	0.250	2.5	4.65	113	80 - 120				

MSD Sample ID: **HS19030749-01MSD** Units: **mg/L** Analysis Date: **15-Mar-2019 14:30**
Client ID: **LH18/24-SP650_031419** Run ID: **UV-2450_334753** SeqNo: **4995082** PrepDate: DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	7.46	0.250	2.5	4.65	112	80 - 120	7.48	0.268	20	

The following samples were analyzed in this batch: HS19030749-01

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19030749

QC BATCH REPORT NEW

Batch ID: R334781 (0) **Instrument:** WetChem_HS **Method:** AMMONIA AS N BY E350.3(ISE)

MBLK Sample ID: **MBLK-R334781** Units: **mg/L** Analysis Date: **18-Mar-2019 12:30**
Client ID: Run ID: **WetChem_HS_334781** SeqNo: **4995674** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.20	0.20								U

LCS Sample ID: **LCS-R334781** Units: **mg/L** Analysis Date: **18-Mar-2019 12:30**
Client ID: Run ID: **WetChem_HS_334781** SeqNo: **5007379** 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)	9.398	0.20	10	0	94.0	80 - 120				

MS Sample ID: **HS19030689-05MS** Units: **mg/L** Analysis Date: **18-Mar-2019 12:30**
Client ID: Run ID: **WetChem_HS_334781** SeqNo: **4995676** 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)	10.4	0.20	10	0.1809	102	80 - 120				

MSD Sample ID: **HS19030689-05MSD** Units: **mg/L** Analysis Date: **18-Mar-2019 12:30**
Client ID: Run ID: **WetChem_HS_334781** SeqNo: **4995675** 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)	10.38	0.20	10	0.1809	102	80 - 120	10.4	0.192	20	

The following samples were analyzed in this batch: HS19030749-01

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.	**QUALIFIERS, ACRONYMS, UNITS**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	**HS19030749**	

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

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

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
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: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19030749

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19030749-01	LH18/24-SP650_031419	Login	3/15/2019 9:47:50 AM	JRM	WET311
HS19030749-01	LH18/24-SP650_031419	Login	3/15/2019 9:47:50 AM	JRM	WET311
HS19030749-01	LH18/24-SP650_031419	Login	3/15/2019 9:47:50 AM	JRM	Sub
HS19030749-02	LH18/24-SP650_031419_BIX	Login	3/15/2019 9:47:50 AM	JRM	Sub

ALS Houston, US Date: 31-Mar-19

Sample Receipt Checklist

Client Name:	Bhate Environmental	Date/Time Received:	**15-Mar-2019 08:38**
Work Order:	HS19030749	Received by:	**JRM**

Checklist completed by: *Jared R. Makan* (eSignature) 15-Mar-2019 (Date)

Reviewed by: *RJ Modashia* (eSignature) 15-Mar-2019 (Date)

Matrices: **Water**

Carrier name: **ALS Courier**

	Yes	No	Not Present
Shipping container/cooler in good condition?	☑	☐	☐
Custody seals intact on shipping container/cooler?	☑	☐	☐
Custody seals intact on sample bottles?	☐	☐	☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	☐	☐	☑
Chain of custody present?	☑	☐	1 Page(s)
Chain of custody signed when relinquished and received?	☑	☐	COC IDs:N/A
Samplers name present on COC?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature in compliance?	☑	☐	

Temperature(s)/Thermometer(s):	1.3c/1.3c UC/C	IR25
Cooler(s)/Kit(s):	25780	
Date/Time sample(s) sent to storage:	03/15/2019 10:55	

	Yes	No	
Water - VOA vials have zero headspace?	☐	☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	☑	☐	N/A ☐
pH adjusted?	☐	☑	N/A ☐

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: R.J 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							Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650_031419	Water	03/14/19 / 14:00		2	X	X									H2SO4	
LH18/24-SP650_031419	Water	03/14/19 / 14:00		1			X								NONE	
LH18/24-SP650_031419_BIX	Water	03/14/19 / 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
Scott Beesinger	03/14/19	14:30									

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition
J. [illegible]	3/15/19	08:38							

Remarks:
Cooler 25780 11225
Temp 1.3 CF 0.0

HS19030749
Bhate Environmental Associates, Inc.
18/24 Longhorn GW Treatment Plant Weekly Sampl

(Word) S:\I-ces\Forms\Chain of Custody - BiWeekly

ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

CUSTODY SEAL

Date: 3/14/19 Time: 1430
Name: Scott Bessinger
Company: BHT

Seal Broken By: JM
Date: 3/15/19

FedEx
TRK# 0221 4380 9530 9490
FRI - 15 MAR 10:30A
PRIORITY OVERNIGHT

AB SGRA
77099
TX-US
IAH

FID 3586291 14MAR19 GGGA 563CI/4603/4CBA

Case Narrative

Method: 6850
Analysis: Perchlorate
Analysis SOP: LC-MS-CLO4
ALS WO ID(s): 1907867; 1907869; 1907871; 1908794

Client: ALS Laboratories (Houston, TX)
Matrix: Water
ELMS Batch (HBN): 2230 (235529)

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. 50µL of an ^{18}O labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45µm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1907867001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

Method QC data: The method blank (LMB 645533) was less than 1/2 the CRDL. The recovery for the LCS (645534) was within acceptable parameters.

MS/MSD Analysis: MS/MSD was performed on sample 1907869001 (Client ID's: LH18/24-SP650_031419_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 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 – 645531) is reported from the analysis of the Laboratory Control Sample (LCS – 645534) 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	March 29, 2019
Analyst	Date

ANALYTICAL REPORT

Report Date: March 29, 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: **34-1907871**
Project ID: HS19030749
Purchase Order: HS19030749
Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_031419_BIX	1907871001	03/14/19	03/19/19	

ANALYTICAL REPORT

Workorder: 34-1907871
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **LH18/24-SP650_031419_BIX**	Sampling Site: NA	Collected: 03/14/2019
Lab ID: 1907871001	Media: 125 mL Nalgene	Received: 03/19/2019
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/2230 (HBN: 235529)	Percent Solid: NA
	Analyzed: 03/28/2019 10:21	Report Basis: Wet

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

Comments

Quality Control: EPA 6850, DoD QSM - (HBN: 235529)

Field sample 1907867001 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 03/28/2019 14:08	/S/ Stephen Brose 03/29/2019 12:58

Laboratory Contact Information

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

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

ANALYTICAL REPORT

Workorder: 34-1907871
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

Analysis Information

Workorder: 1907871

Limits: Client SOW/Contract Specified
Basis: DoD QSM
Preparation: NA
Batch: NA
Prepared By: NA
Analysis: EPA 6850, DoD QSM
Batch: ELMS/2230 (HBN: 235529)
Analyzed By: Thomas Bosch

Blank

LMB: 645533
Analyzed: 03/28/2019 09:14
Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 645534
Analyzed: 03/28/2019 08:47
Dilution: 1
Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.00	4.00	99.9	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1907869001
Analyzed: 03/28/2019 09:41
Dilution: 1
Units: ug/L

MS: 645535
Analyzed: 03/28/2019 09:54
Dilution: 1
Units: ug/L

MSD: 645536
Analyzed: 03/28/2019 10:08
Dilution: 1
Units: ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	4.66	4	117	78.8	123.8	4.05	101	14	0.0	20.0

Comments

Field sample 1907867001 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 03/28/2019 14:23	/S/ Stephen Brose 03/29/2019 12:58

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 1907871

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

18698/#2

Subcontract Chain of Custody

COC ID: 10915

1907871

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:	HS19030749
TSR:	Danielle Winnings

	LAB SAMPLE ID / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / DUE DATE
1.	**HS19030749-02**	**LH18/24-SP650_031419_BIX**	**Water**	**14 Mar 2019 14:00**
	SUB_Perch-6850			29 Mar 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. Winnings	Date/Time:	3/18/19 18:00
Received By:	Jaun a Jassell	Date/Time:	031919 9:50
Cooler ID(s):		Temperature(s):	

ALS Environmental
CHAIN-OF-CUSTODY

Project / Job / Task: HS19030749	Split:	Workorder ID: 1907871	Level: ENV_LVL4
Client: ALS Environmental (Houston)		Account: 8101	Type: 125Poly
Comments:			Preservatives: COOL

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	Requested Analysis: EPA 6850, DoD QSM
1	03/14/2019 14:00	LH18/24-SP650_031419_BIX	1907871001		Water	A	1	A
2								
3								
4								
5								
6								
7								
8								
9								
10								

22 of 145

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
Warath, Julie	03/19/2019 09:50	ALS Sample Receiving	Sample Login
Julie Warath	3/20/19 1200	ISC	Storage
R.33.1	3.27.19/11:45	T.Bond	6850

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

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

Prepared / Analyzed by: ____ Date / Time: ____

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

 Tue, 03/19/19 12:35 PM ALSCOCV3.1

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Houston | Project/Task/Site: 1907871
Date/Time of Receipt: 031919 930 | Number of Coolers Received: 1

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

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

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 9350	1 °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: Tami VanTassel (Signature) Tami VanTassel (Printed Name) 03-19-19 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ 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: ______ (Printed Name) Returned to Sample Receipt by: ______ (Signature) Date: ______

CRIR.doc Revised 01/01/2018

Part # 159469-434 RIT2 EXP 11/19

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

SHIP DATE: 18MAR19
ACTWGT: 9.35 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE

SALT LAKE CITY UT 84123
(01) 266-7700
REF: HS19030749/761/763 RJ

551C1/46D3/104C

FedEx
Express
E

J181118090501uv

TUE - 19 MAR 3:00P
STANDARD OVERNIGHT

TRK# 0201 4809 7831 7725

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

Dat
Nan
Con

Batch Worklist

Batch: ELMS/ 2230
Rule: EPA 6850, DoD QSM Water

Created: 3/28/2019 07:45
Analyst: T. Bosch

Instrument:
Status: WP

HBN: 235529

Workorder: 1907867 [ENV_LVL4]
Workorder: 1907869 [ENV_LVL4]
Workorder: 1907871 [ENV_LVL4]
Workorder: 1908794 [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	645530	CCV for HBN 235529 [ELMS/2230]				CCV	3		E685041C3Q	5311		4/1/2019	
2	645531	RLVS for HBN 235529 [ELMS/2230				RLVS	3		E685041C3Q	5311		4/1/2019	
3	645532	ICS for HBN 235529 [ELMS/2230]				ICS	3		E6850..D3Q	5311		4/1/2019	
4	645533	LMB for HBN 235529 [ELMS/2230]				LMB	3		E6850Q413Q	5311		4/1/2019	
5	645534	LCS for HBN 235529 [ELMS/2230]				LCS	3		E6850Q413Q	5311		4/1/2019	
6	1907867001	LH18/24-SP140_031419				SAMPLE	3	1907867001-A	E6850Q41.3	5480	4/11/2019	4/1/2019	
7	1907869001	LH18/24-SP650_031419_BIX				SAMPLE	3	1907869001-A	E6850Q41.3	5480	4/11/2019	4/1/2019	
8	645535	LH18/24-SP650...(1907869001MS)				MS	3		E6850Q413Q	5311		4/1/2019	
9	645536	LH18/24-SP65...(1907869001MSD)				MSD	3		E6850Q413Q	5311		4/1/2019	
10	1907871001	LH18/24-SP650_031419_BIX				SAMPLE	3	1907871001-A	E6850Q41.3	5480	4/11/2019	4/1/2019	
11	1908794001	LH18/24-SP650_032119_BIX				SAMPLE	3	1908794001-A	E6850Q41.3	5480	4/18/2019	4/8/2019	
12	645537	CCV for HBN 235529 [ELMS/2230]				CCV	3		E685041C3Q	5311		4/1/2019	

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #( )'s: 1907867 (001); 1907869 (001); 1907871 (001); 1908794 (001)
ELMS Batch/HBN ID: 2230 (235529)
Prep Date: 03/27/2019 Analysis Date: 03/28/2019 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: 25µL
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 645534; Target = 4.0µg/L. ASTM type II water was used for LMB 645533.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1907869001 (Client ID's: LH18/24-SP650_031419_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 1907867001 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\MAR\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\235529-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\HBN#
5) The Reporting Limit Verification Standard (RLVS – 645531) is reported from the analysis of the Laboratory Control Sample (LCS – 645534) 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.

Chromatography (GC, HPLC, LC/MS) Technical Review Criteria Batch(es)/SDG: ELMS: 2230 HBN: 235529 Sample Set IDs if Applicable: 1907867/1907869/1907871/1908794	Analyst Initials	Reviewer Initials
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
MFG: ALS/SLC
MFG Lot: TNB: 09/18/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/18/2018 02:09PM

Amount: 10 mL
Expires: 09/18/2019
Usable: Yes
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
MFG: AccuStandard
MFG Lot: 218065075
Part ID: IC-PER-10X-1

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

Amount: 100 mL
Expires: 07/25/2020
Usable: 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)	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
MFG: ALS/SLC
MFG Lot: TNB: 09/18/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/18/2018 02:09PM

Amount: 10 mL
Expires: 09/18/2019
Usable: Yes
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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
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
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

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
MFG: Cambridge Isotope
MFG Lot: SDFF-012A
Part ID: OLM-7310-S

Created By: Thomas Bosch
Create Date: 09/20/2018 09:09AM
Verified By: Thomas Bosch
Verify Date:

Amount: 1 mL
Expires: 04/28/2026
Usable: Yes
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

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

Product Number:	ICC-013	Lot Issue Date:	29-Feb 2016
Lot Number:	CP-0860	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.

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

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.

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

D. Lamendola
Daniel J. Lamendola
Director of QA/RA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

ISO 9001 Registered Quality System – TUV USA

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 °C)
Included on ISO/IEC 17025 Scope of Accreditation: Yes
Included on ISO 17034 Scope of Accreditation: Yes

GHS

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

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-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
*	645530 CCV@25	Vial 71	1	Control	1	1.81499e6	8.385	24.13647
*	645534 QC@4.0	Vial 72	1	Control	2	2.89937e5	8.542	3.99582
*	645532 ICS@4.0	Vial 73	1	Control	3	2.38655e5	8.226	3.65624
*	645533 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1907867001 1K	Vial 75	1	Sample	5	7.55115e5	8.548	8344.77963
*	1907869001	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	645535 78691MS	Vial 77	1	Sample	7	2.77046e5	8.030	4.66163
*	645536 78691SD	Vial 78	1	Sample	8	2.89384e5	8.027	4.05130
*	1907871001	Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1908794001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	645537 CCV@25	Vial 71	1	Control	11	1.79709e6	8.389	24.49119

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	645530 CCV@25	Vial 71	1	Control	1	5.33395e5	8.403	23.90219
*	645534 QC@4.0	Vial 72	1	Control	2	9.52963e4	8.559	4.26699
*	645532 ICS@4.0	Vial 73	1	Control	3	7.88339e4	8.237	3.90865
*	645533 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1907867001 1K	Vial 75	1	Sample	5	2.38827e5	8.562	8762.35701
*	1907869001	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	645535 78691MS	Vial 77	1	Sample	7	8.93399e4	8.046	4.91371
*	645536 78691SD	Vial 78	1	Sample	8	9.85690e4	8.049	4.48457
*	1907871001	Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1908794001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	645537 CCV@25	Vial 71	1	Control	11	5.35802e5	8.404	24.59111

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	645530 CCV@25	Vial 71	1	Control	1	2.29255e5	8.411	5.00000
*	645534 QC@4.0	Vial 72	1	Control	2	2.39106e5	8.571	5.00000
*	645532 ICS@4.0	Vial 73	1	Control	3	2.16080e5	8.242	5.00000
*	645533 LMB	Vial 74	1	Control	4	2.42742e5	8.463	5.00000
*	1907867001 1K	Vial 75	1	Sample	5	2.89136e5	8.567	5000.00000
*	1907869001	Vial 76	1	Sample	6	1.89925e5	8.088	5.00000
*	645535 78691MS	Vial 77	1	Sample	7	1.94413e5	8.053	5.00000
*	645536 78691SD	Vial 78	1	Sample	8	2.35220e5	8.053	5.00000
*	1907871001	Vial 79	1	Sample	9	1.89609e5	8.089	5.00000
*	1908794001	Vial 80	1	Sample	10	1.92453e5	8.070	5.00000
*	645537 CCV@25	Vial 71	1	Control	11	2.23514e5	8.412	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

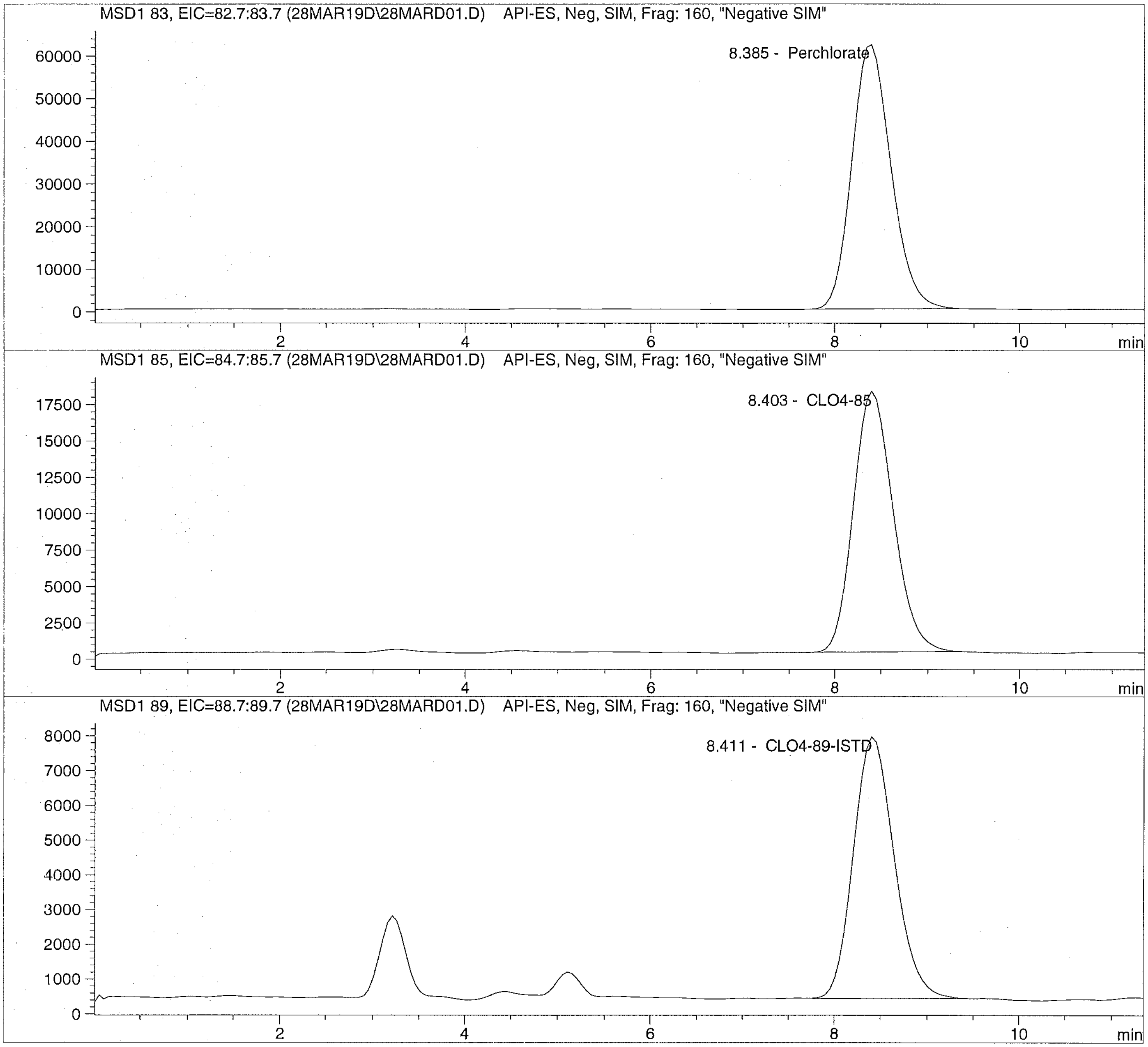
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	645530 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	645534 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	645532 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	645533 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1907867001 1K	CLO4-AQN	1	Sample		
6	Vial 76	1907869001	CLO4-AQN	1	Sample		
7	Vial 77	645535 78691MS	CLO4-AQN	1	Sample		
8	Vial 78	645536 78691SD	CLO4-AQN	1	Sample		
9	Vial 79	1907871001	CLO4-AQN	1	Sample		
10	Vial 80	1908794001	CLO4-AQN	1	Sample		
11	Vial 71	645537 CCV@25	CLO4-AQN	1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD01.D Sample Name: 645530 CCV@25

Injection Date:	3/28/2019 08:30:53	Seq Line:	1
Sample Name:	645530 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD01.D Sample Name: 645530 CCV@25

Injection Date:	3/28/2019 08:30:53	Seq Line:	1
Sample Name:	645530 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.385	PBA	1814992.7	24.1365	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.403	PBA	533395.5	23.9022	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.411	BBA	229255.1	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD02.D   Sample Name: 645534 QC@4.0

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Injection Date:	3/28/2019 08:47:42	Seq Line:	2
Sample Name:	645534 QC@4.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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

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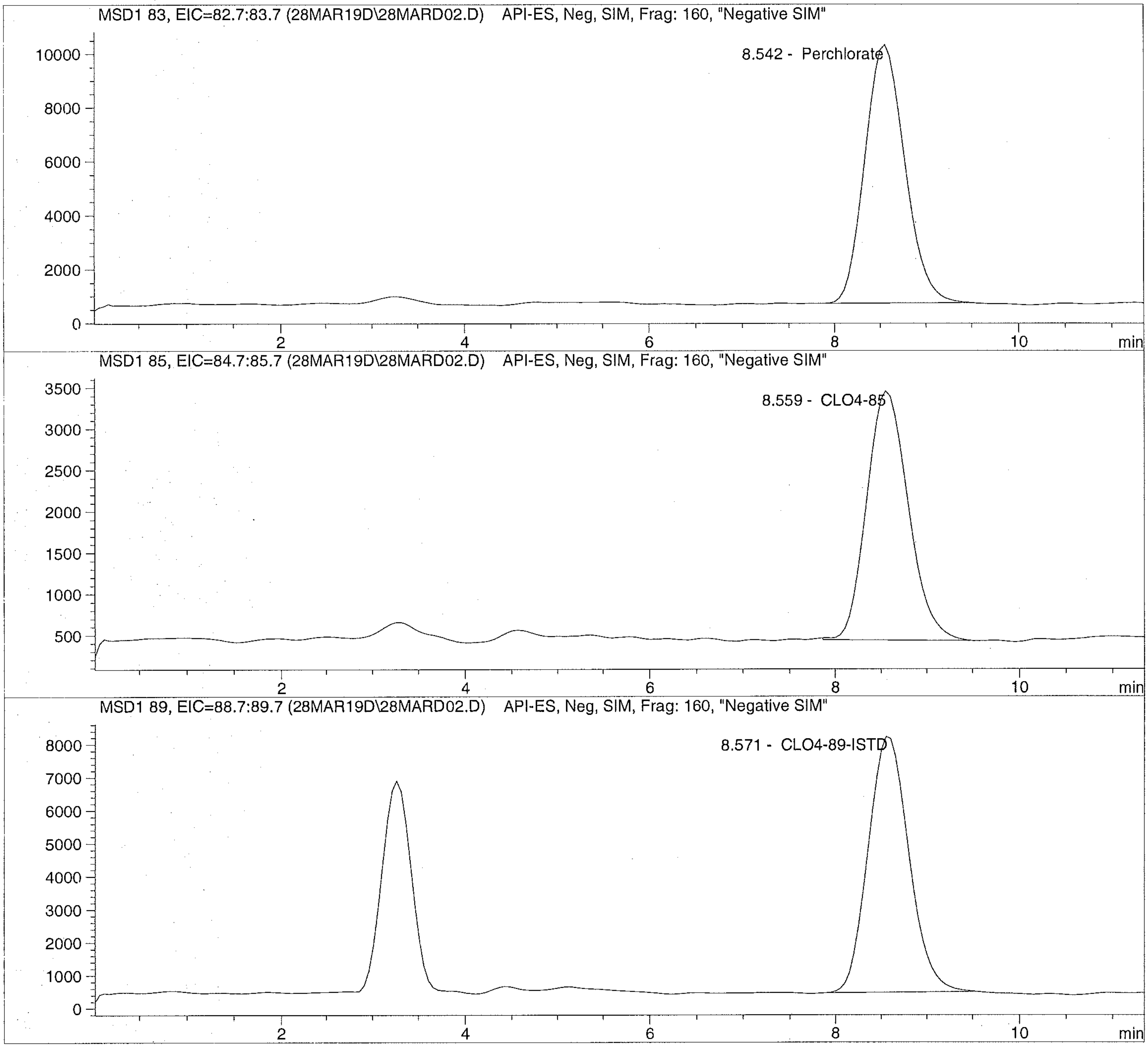

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD02.D   Sample Name: 645534 QC@4.0

Injection Date: 3/28/2019 08:47:42   Seq Line: 2
Sample Name: 645534 QC@4.0   Location: Vial 72
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 25 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
8.542	PBA	289937.1	3.9958	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.559	BBA	95296.3	4.2670	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.571	PBA	239105.9	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD03.D        Sample Name: 645532   ICS@4.0
=====================================================================================
Injection Date:    3/28/2019  09:00:54             Seq Line:           3
Sample Name:       645532    ICS@4.0               Location:       Vial 73
Acq Operator:      TNB                             Inj. No.:           1
                                                   Inj. Vol.:         25 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
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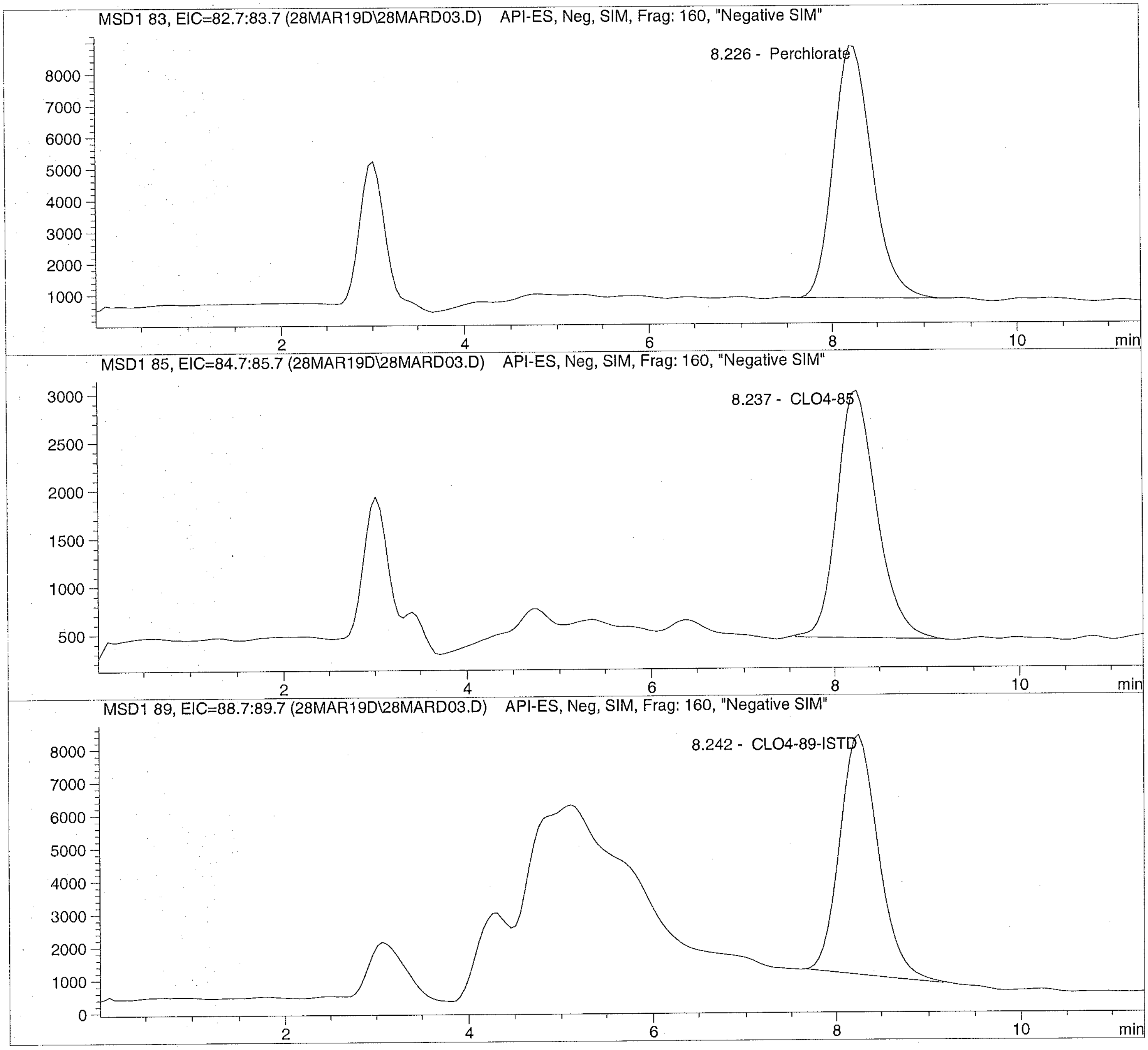


Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD03.D Sample Name: 645532 ICS@4.0

Injection Date:	3/28/2019 09:00:54	Seq Line:	3
Sample Name:	645532 ICS@4.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.226	BBA	238654.8	3.6562	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.237	BBA	78833.9	3.9087	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.242	PBA	216079.7	5.0000	CLO4-89-ISTD

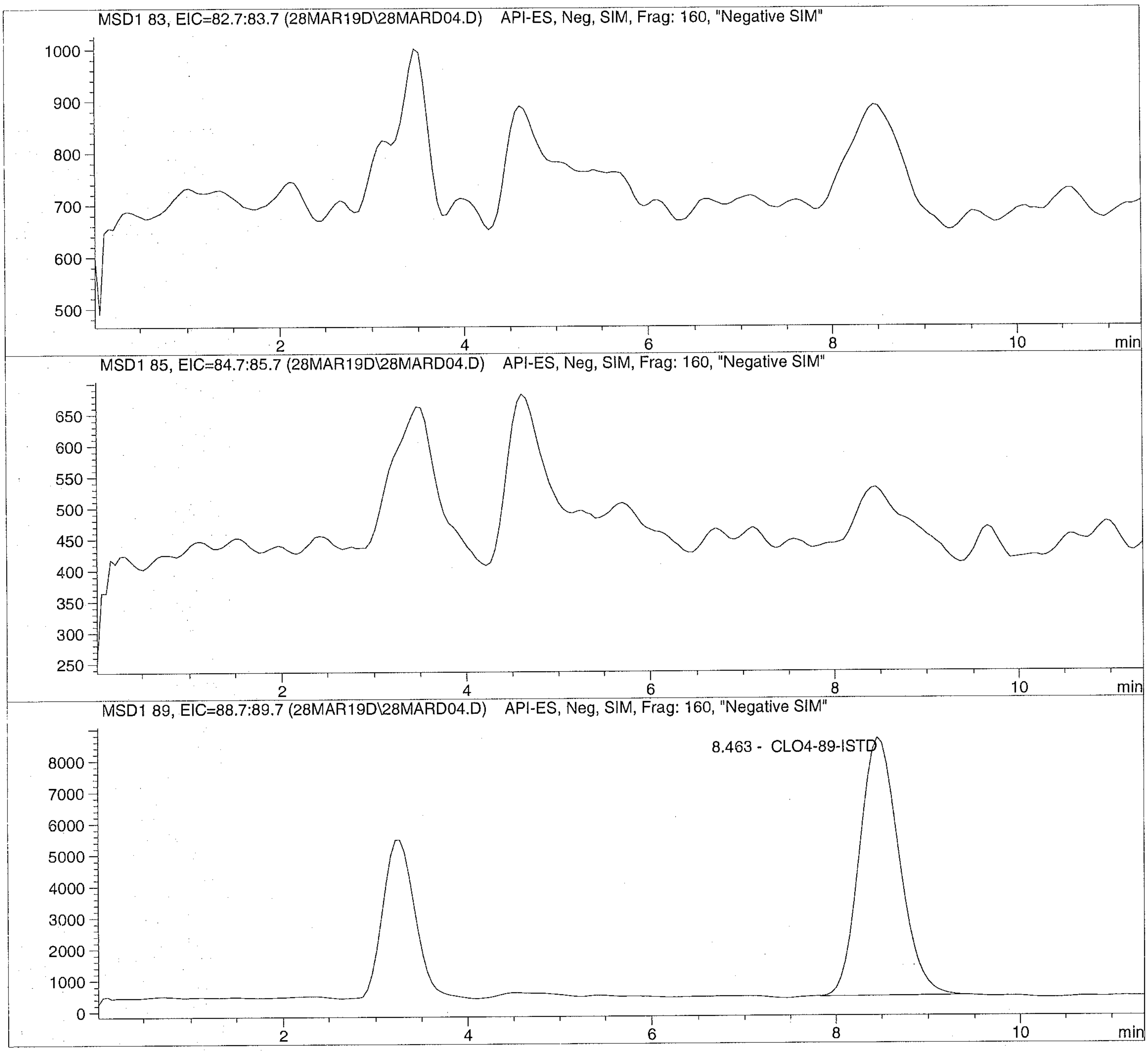
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD04.D   Sample Name: 645533   LMB

Injection Date:	3/28/2019 09:14:08	Seq Line:	4
Sample Name:	645533 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD04.D Sample Name: 645533 LMB

Injection Date:	3/28/2019 09:14:08	Seq Line:	4
Sample Name:	645533 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.463	BBA	242742.3	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD05.D       Sample Name: 1907867001   1K
==================================================================================
Injection Date:     3/28/2019  09:28:25            Seq Line:             5
Sample Name:        1907867001    1K               Location:         Vial 75
Acq Operator:       TNB                            Inj. No.:             1
                                                   Inj. Vol.:         25 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
==================================================================================
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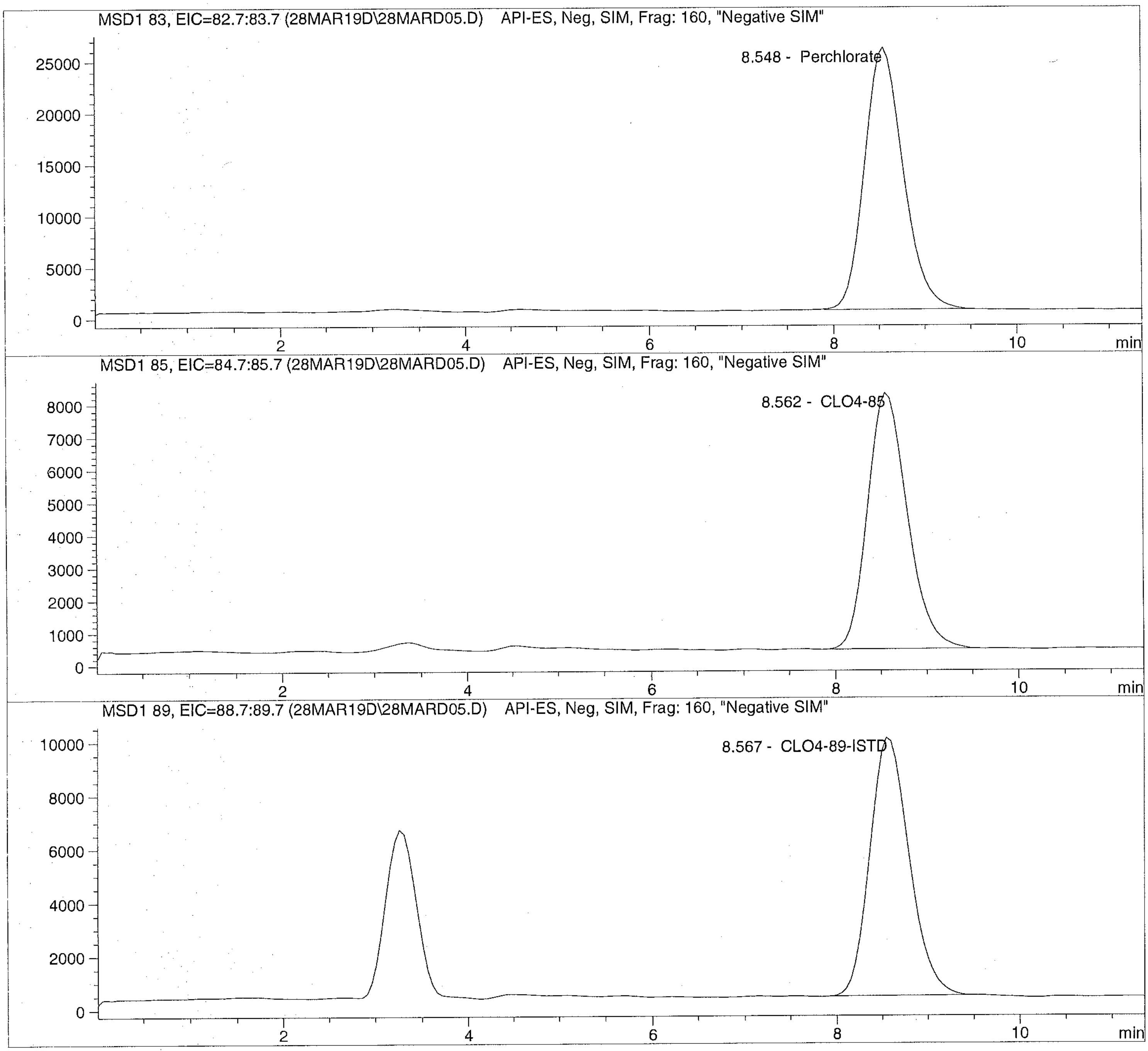

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Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD05.D       Sample Name: 1907867001   1K
=====================================================================================
Injection Date:   3/28/2019  09:28:25              Seq Line:           5
Sample Name:      1907867001   1K                  Location:       Vial 75
Acq Operator:     TNB                              Inj. No.:           1
                                                   Inj. Vol.:       25 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
8.548	BBA	755115.1	8344.7796	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.562	PBA	238826.8	8762.3570	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.567	PBA	289135.6	5000.0000	CLO4-89-ISTD

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=====================================================================================
                              *** End of Report ***
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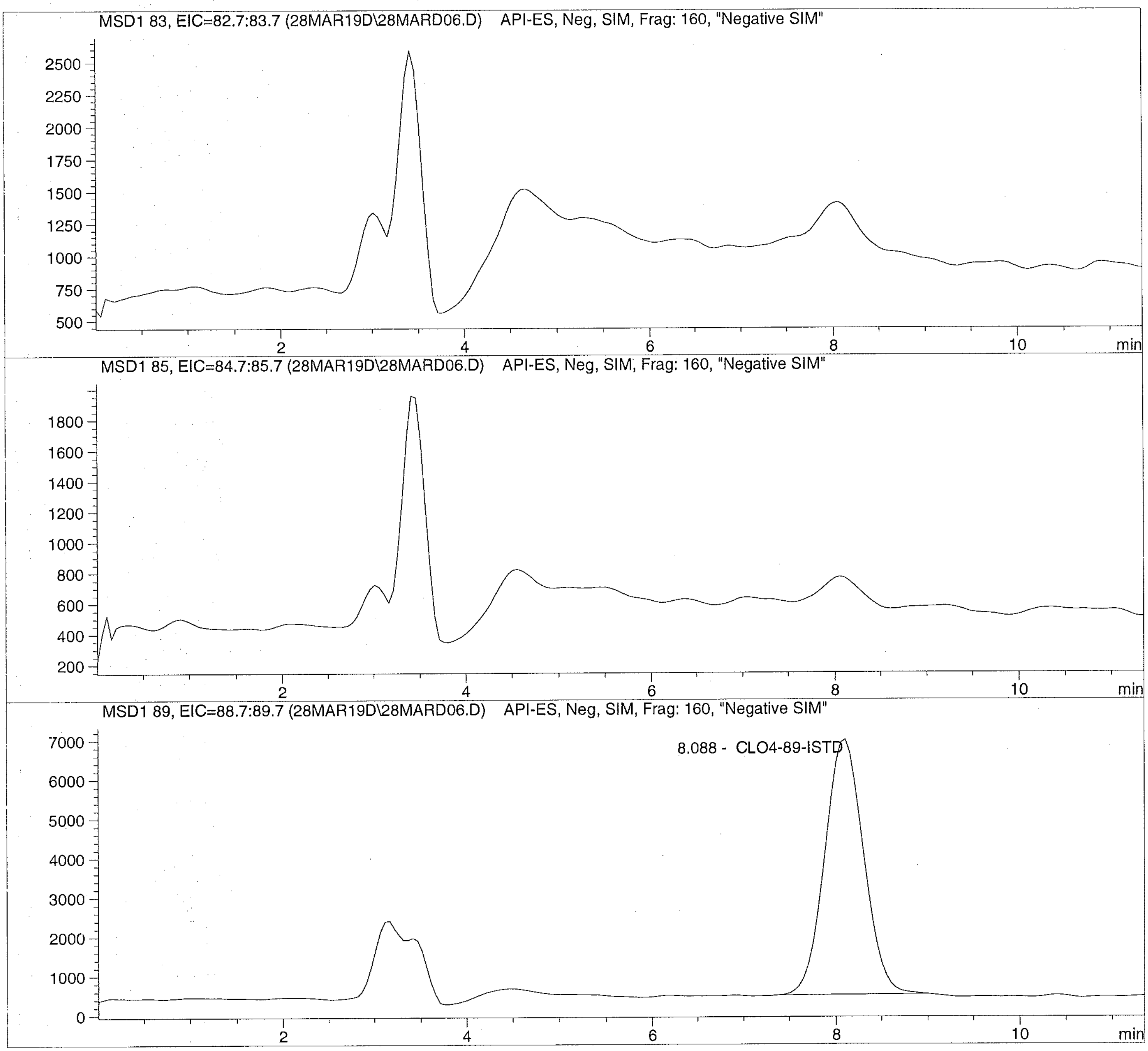
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD06.D Sample Name: 1907869001

Injection Date:	3/28/2019 09:41:37	Seq Line:	6
Sample Name:	1907869001	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD06.D   Sample Name: 1907869001

Injection Date: 3/28/2019 09:41:37   Seq Line: 6
Sample Name: 1907869001   Location: Vial 76
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 25 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
8.088	BBA	189925.3	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD07.D        Sample Name: 645535   78691MS
=====================================================================================
Injection Date:    3/28/2019  09:54:47              Seq Line:            7
Sample Name:       645535   78691MS                 Location:      Vial 77
Acq Operator:      TNB                              Inj. No.:            1
                                                    Inj. Vol.:       25 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
=====================================================================================
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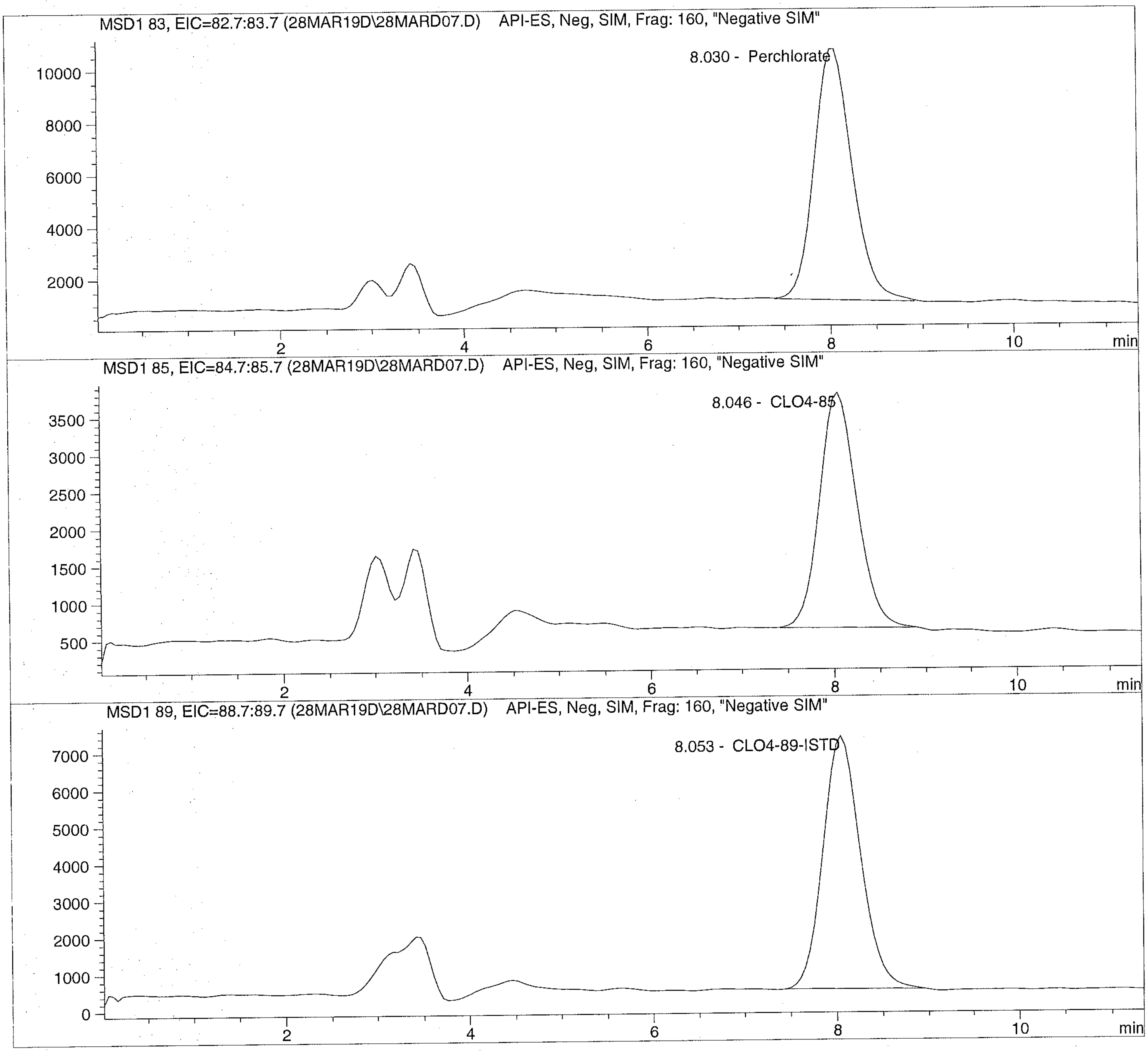


Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD07.D Sample Name: 645535 78691MS

Injection Date:	3/28/2019 09:54:47	Seq Line:	7
Sample Name:	645535 78691MS	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.030	BBA	277046.3	4.6616	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.046	BBA	89339.9	4.9137	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.053	BBA	194412.9	5.0000	CLO4-89-ISTD

*** End of Report ***

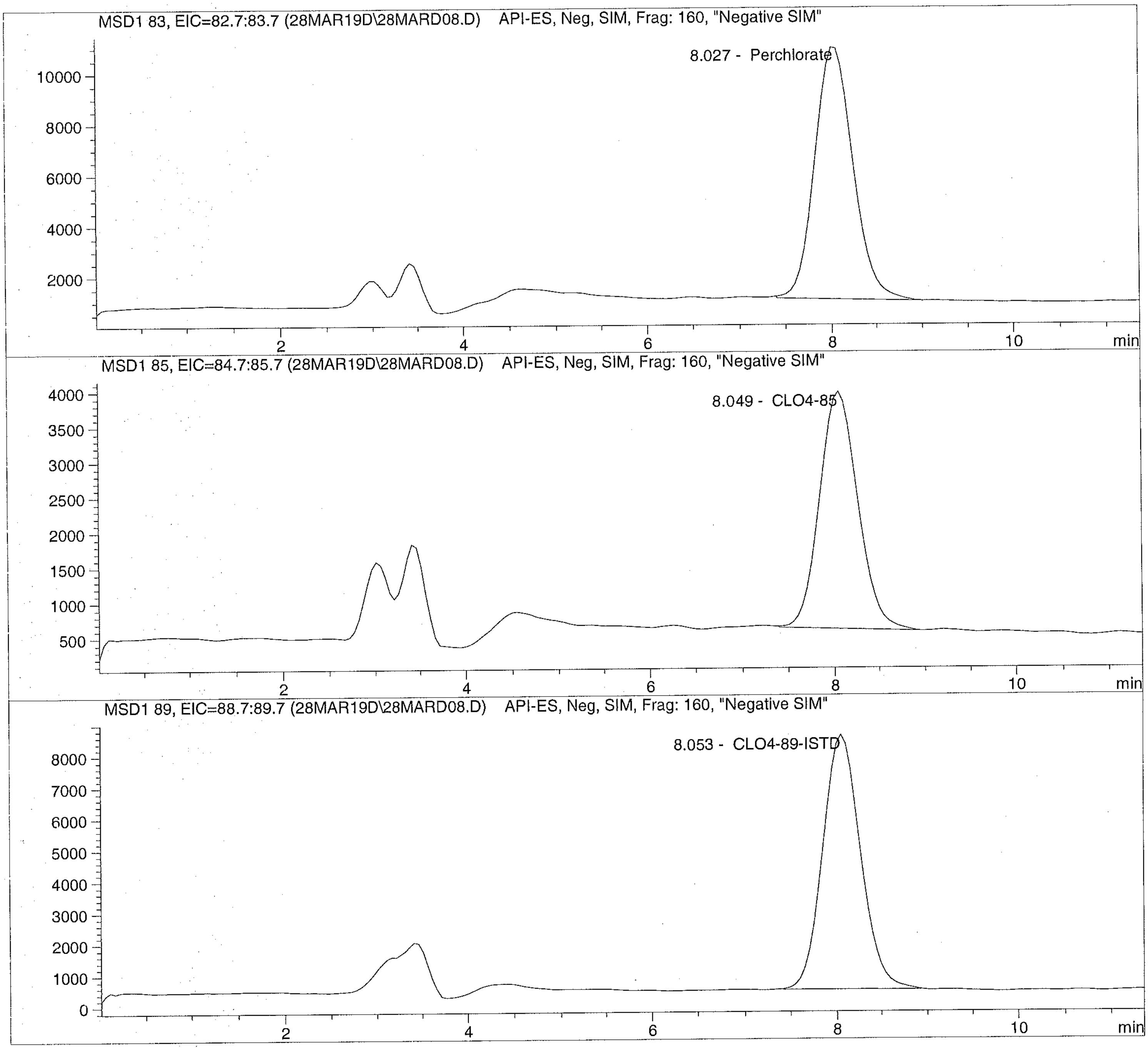
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD08.D   Sample Name: 645536   78691SD

Injection Date: 3/28/2019 10:08:05
Sample Name: 645536 78691SD
Acq Operator: TNB

Seq Line: 8
Location: Vial 78
Inj. No.: 1
Inj. Vol.: 25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD08.D   Sample Name: 645536   78691SD

Injection Date: 3/28/2019 10:08:05   Seq Line: 8
Sample Name: 645536 78691SD   Location: Vial 78
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 25 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
8.027	BBA	289383.7	4.0513	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.049	BBA	98569.0	4.4846	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.053	BBA	235219.8	5.0000	CLO4-89-ISTD

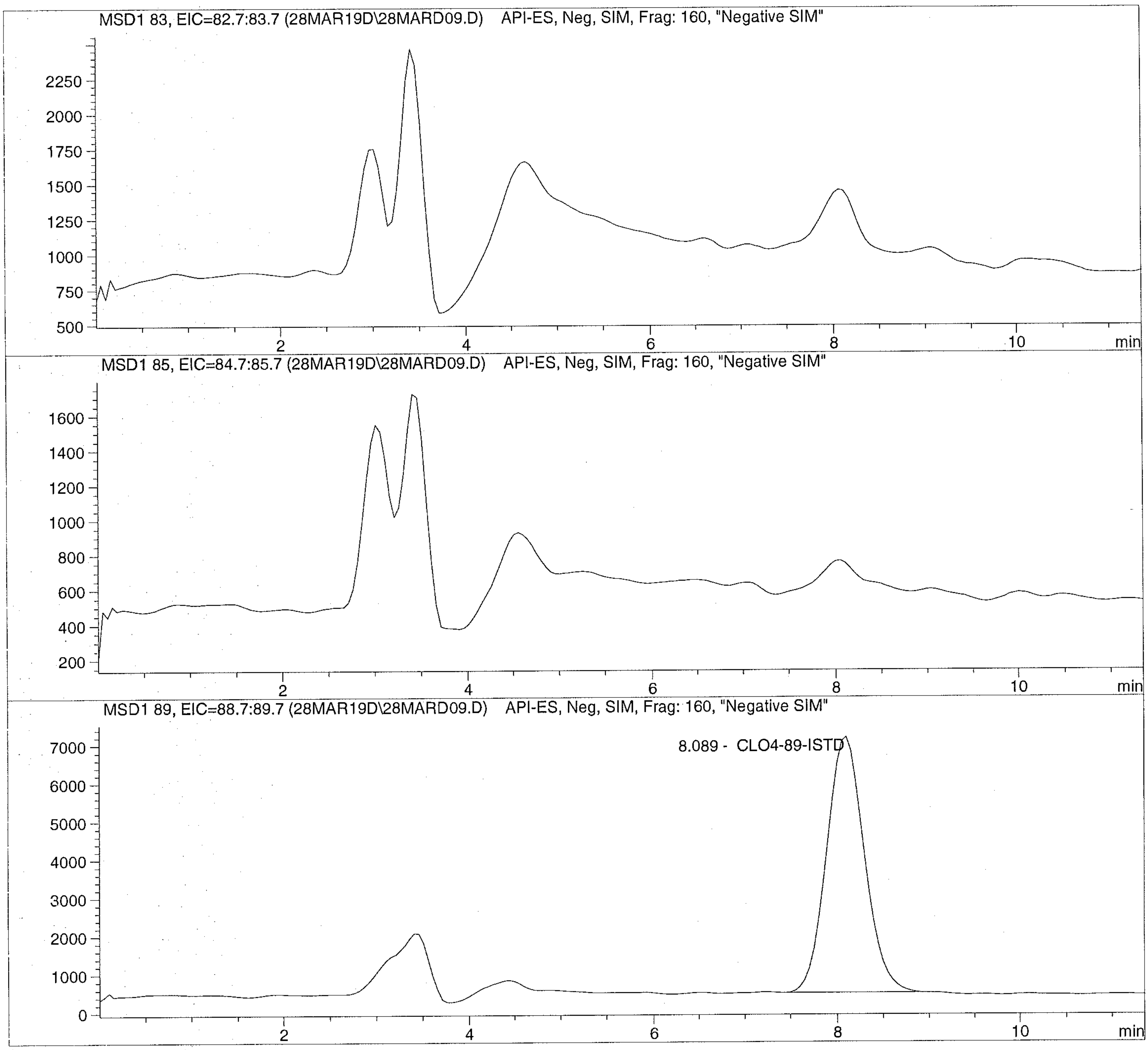
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD09.D Sample Name: 1907871001

Injection Date:	3/28/2019 10:21:14	Seq Line:	9
Sample Name:	1907871001	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD09.D Sample Name: 1907871001

Injection Date:	3/28/2019 10:21:14	Seq Line:	9
Sample Name:	1907871001	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.089	PBA	189608.5	5.0000	CLO4-89-ISTD

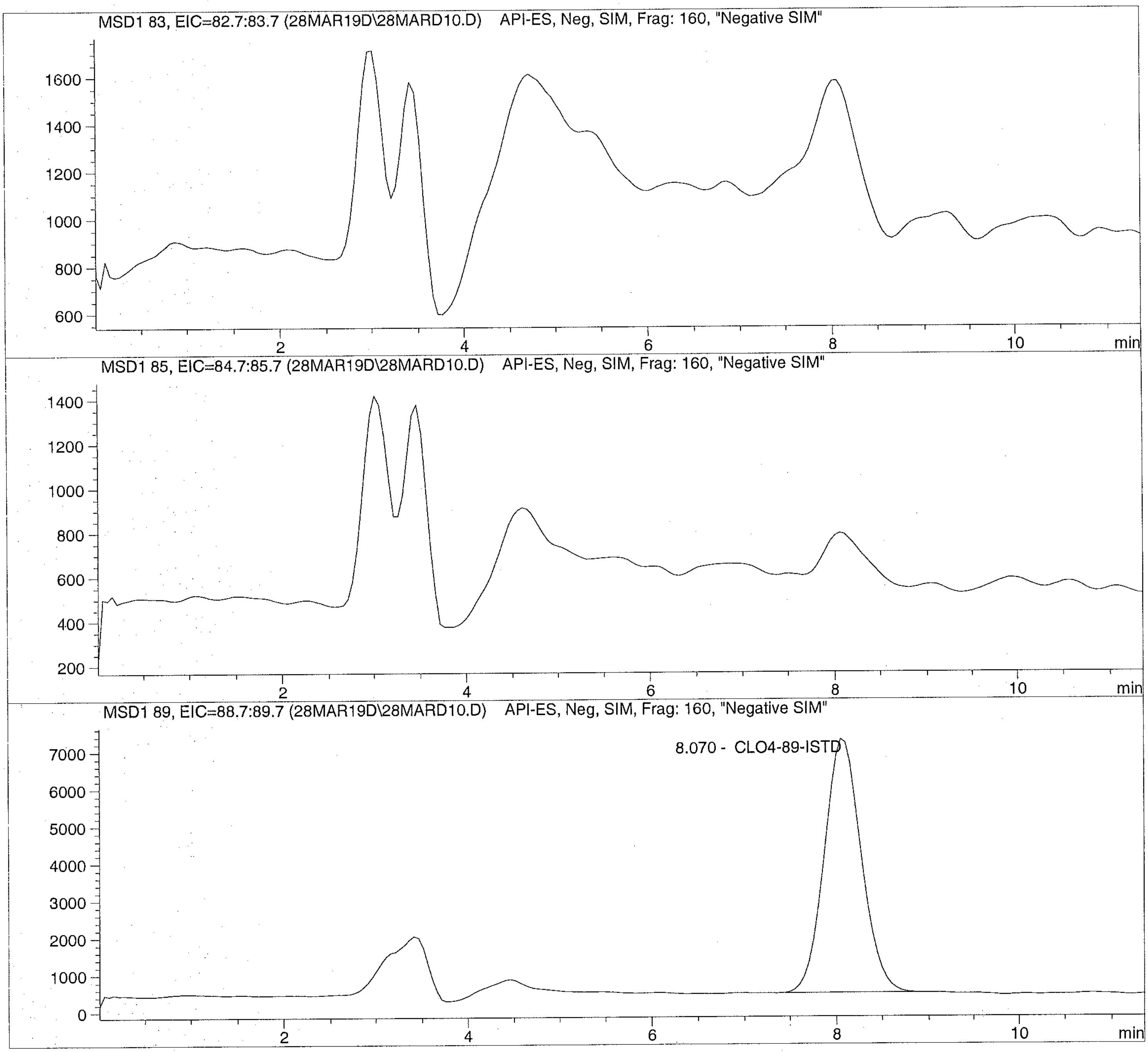
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD10.D Sample Name: 1908794001

Injection Date:	3/28/2019 10:34:27	Seq Line:	10
Sample Name:	1908794001	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD10.D   Sample Name: 1908794001

Injection Date:	3/28/2019 10:34:27	Seq Line:	10
Sample Name:	1908794001	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.070	PBA	192453.4	5.0000	CLO4-89-ISTD

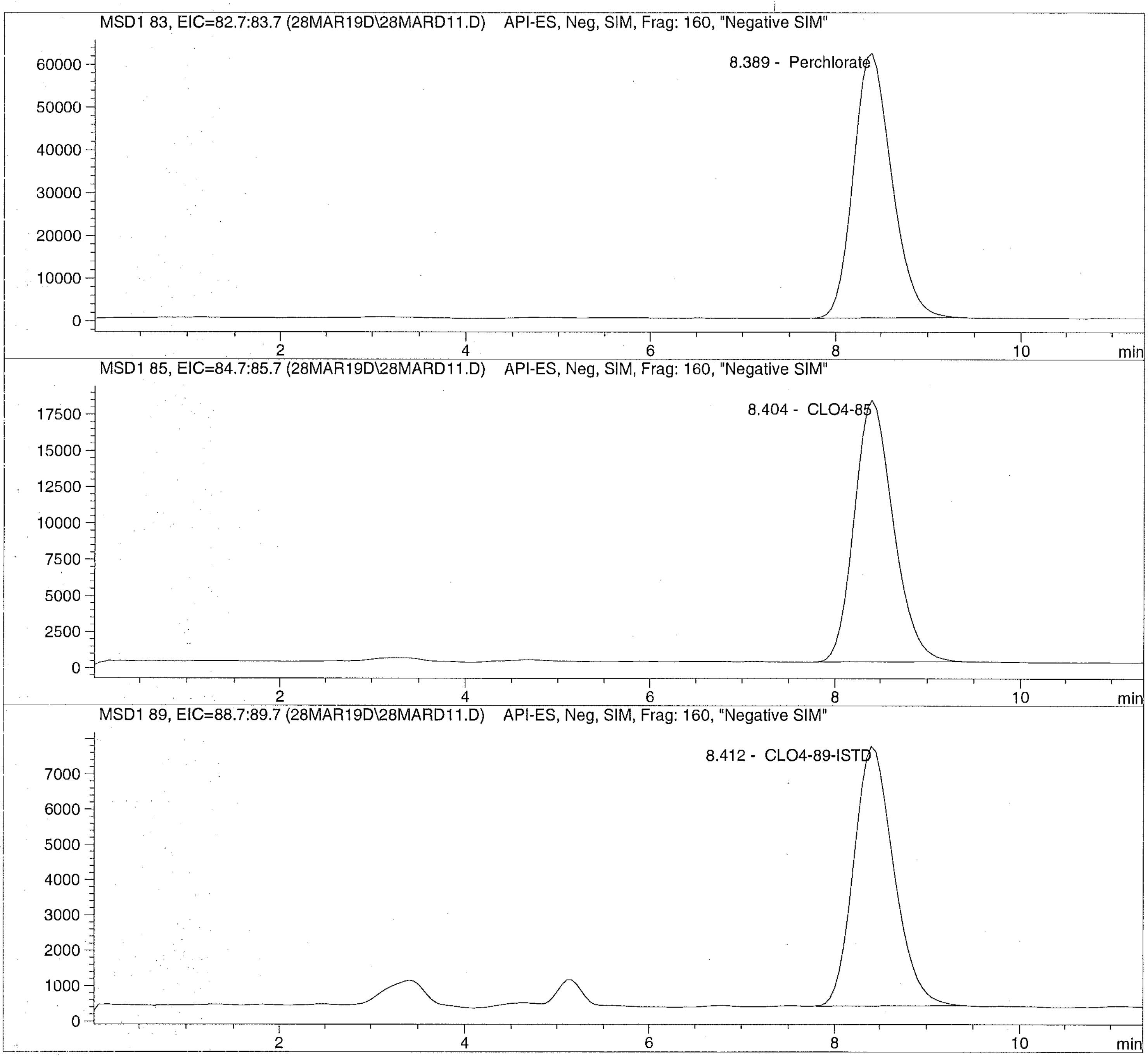
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD11.D Sample Name: 645537 CCV@25

Injection Date:	3/28/2019 10:49:41	Seq Line:	11
Sample Name:	645537 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD11.D   Sample Name: 645537   CCV@25

===

Injection Date: 3/28/2019 10:49:41   Seq Line: 11
Sample Name: 645537 CCV@25   Location: Vial 71
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 25 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
8.389	PBA	1797085.1	24.4912	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.404	PBA	535801.9	24.5911	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.412	BBA	223514.2	5.0000	CLO4-89-ISTD

===

*** End of Report ***

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Initial Calibration

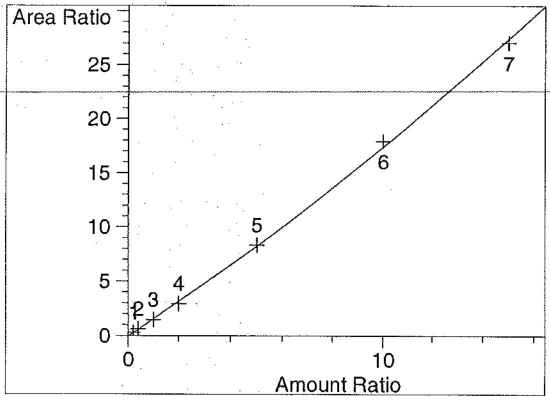
```
=====================================================================
                         Calibration Table
=====================================================================

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
```

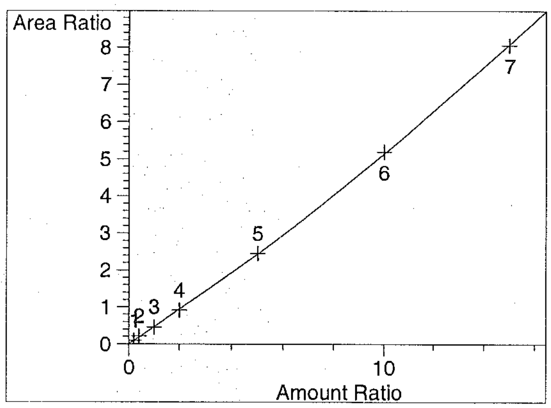
RetTime [min]	Lvl Sig		Amount	Area	Amt/Area	Ref	Grp	Name
8.744	1	1	1.00000	7.76074e4	1.28854e-5	1		Perchlorate
		2	2.00000	1.35273e5	1.47849e-5			
		3	5.00000	3.37764e5	1.48033e-5			
		4	10.00000	6.83454e5	1.46316e-5			
		5	25.00000	2.08433e6	1.19943e-5			
		6	50.00000	4.13334e6	1.20968e-5			
		7	75.00000	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  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***
=====================================================================
```

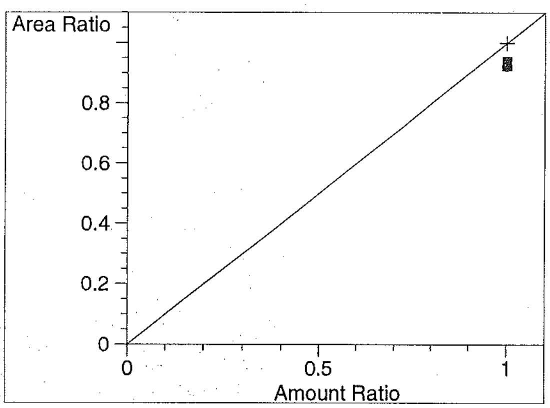
===
Calibration Curves
===



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:

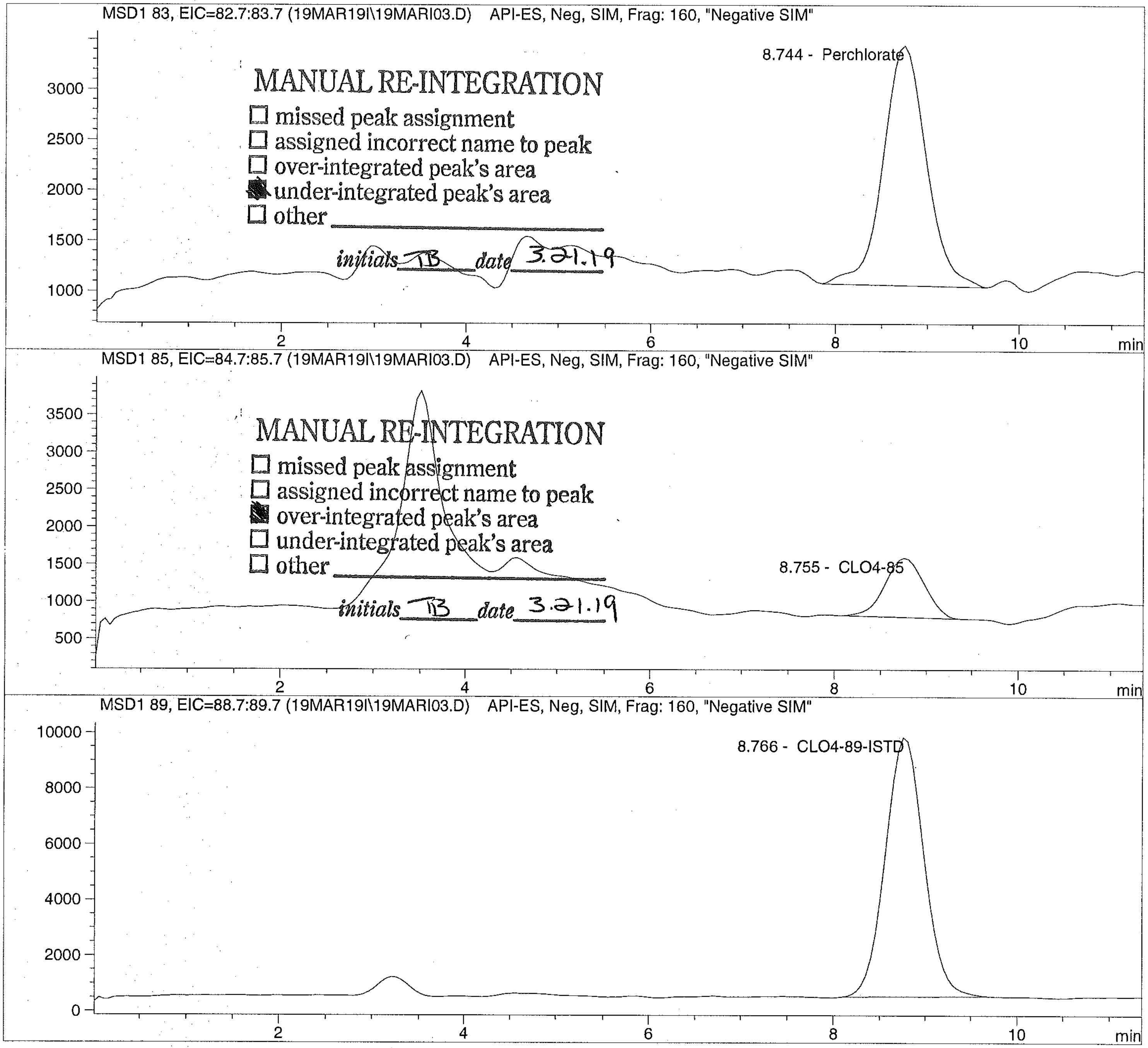
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	CLO4@ 5.0ug/L	CLO4-AQN	1	Ctrl Samp		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

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



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

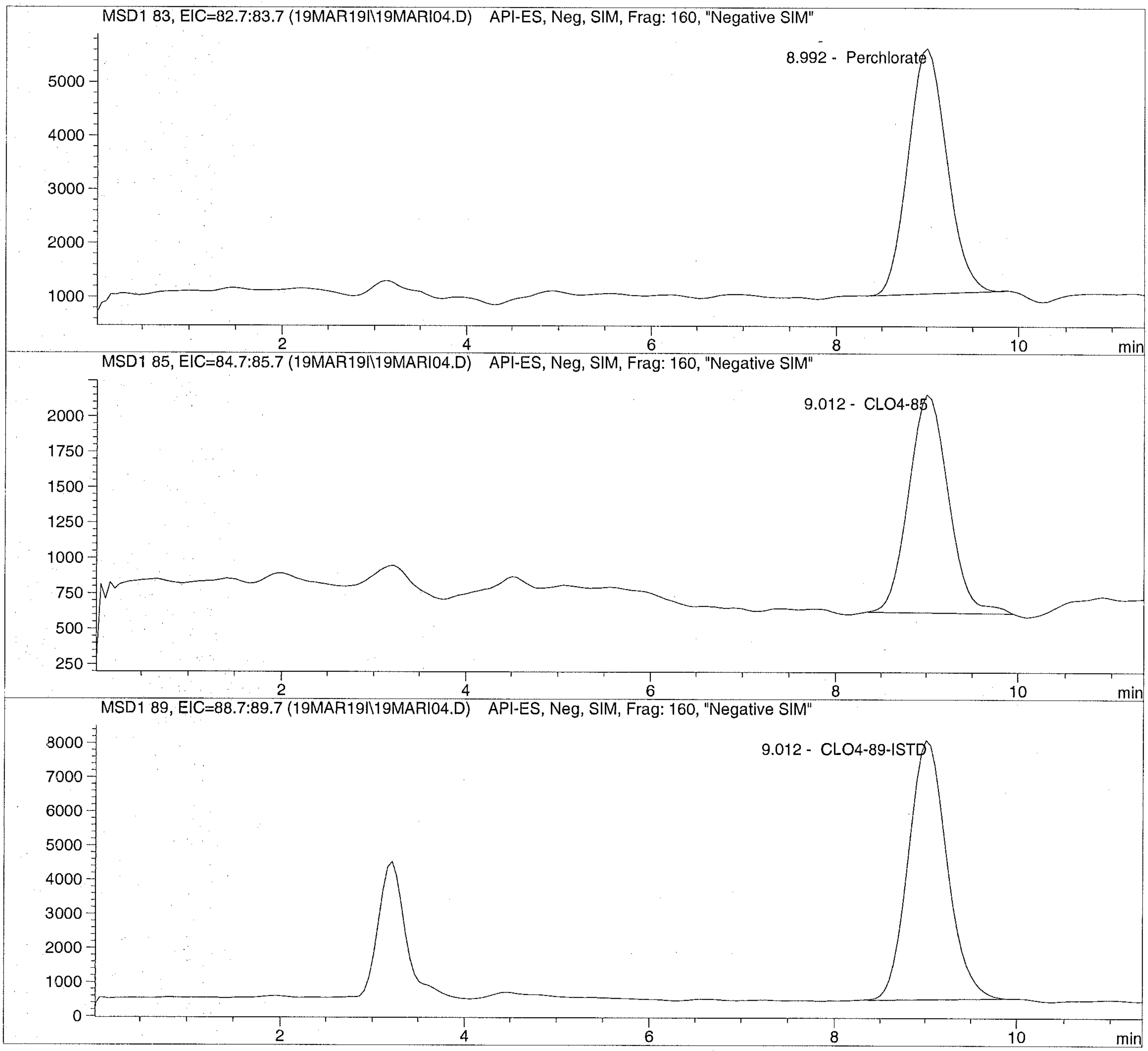
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D   Sample Name: CLO4@ 2.0ug/L

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



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D Sample Name: CLO4@ 2.0ug/L

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

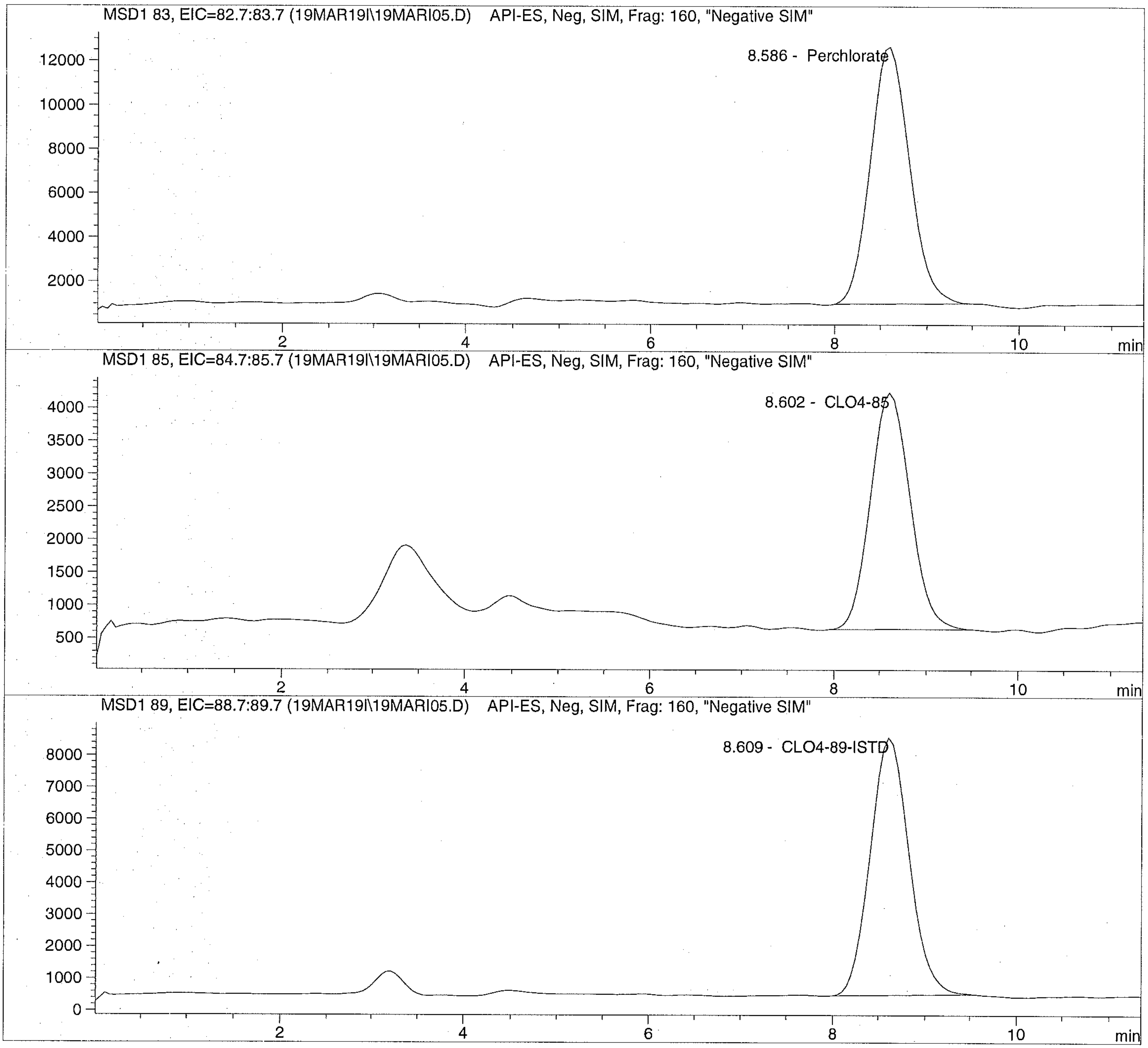
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

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 ***

```
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
=================================================================================
```



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

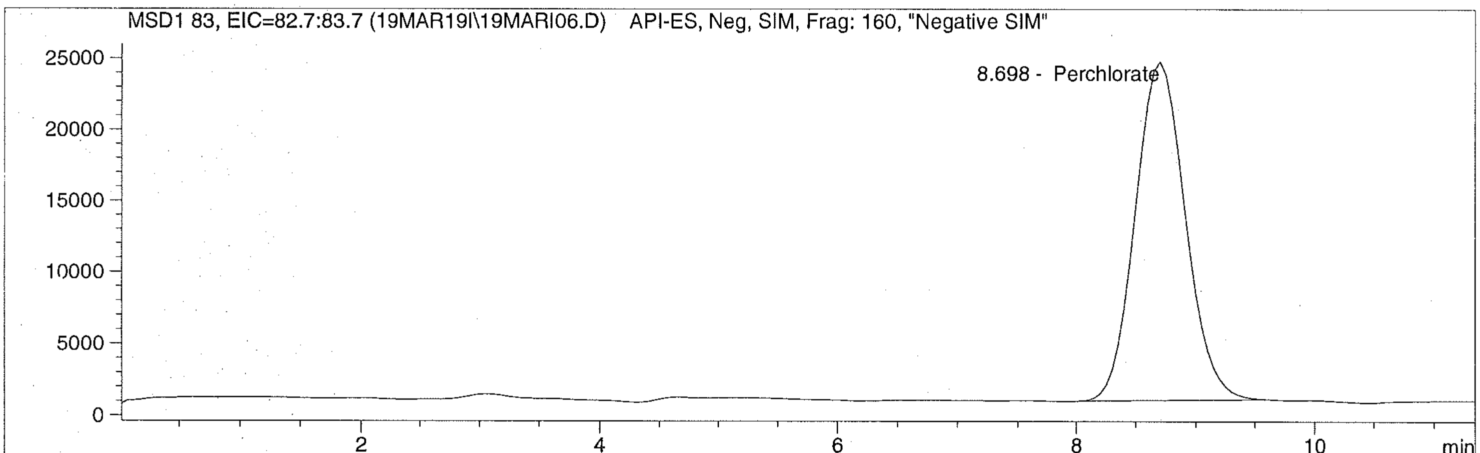
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

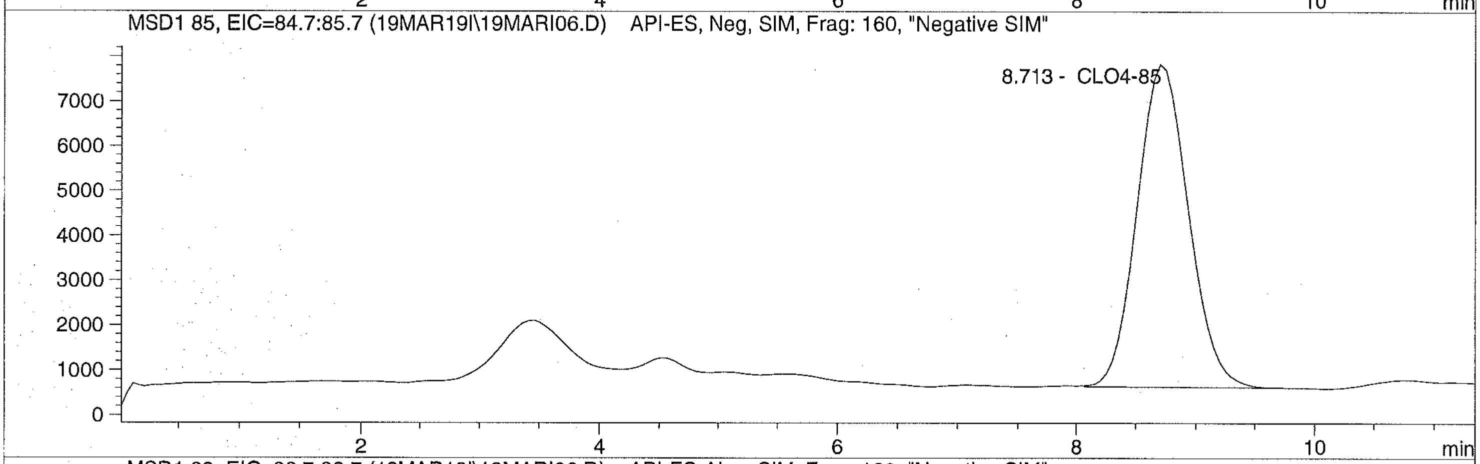
Signal3: MSD1 89, EIC=88.7:89.7

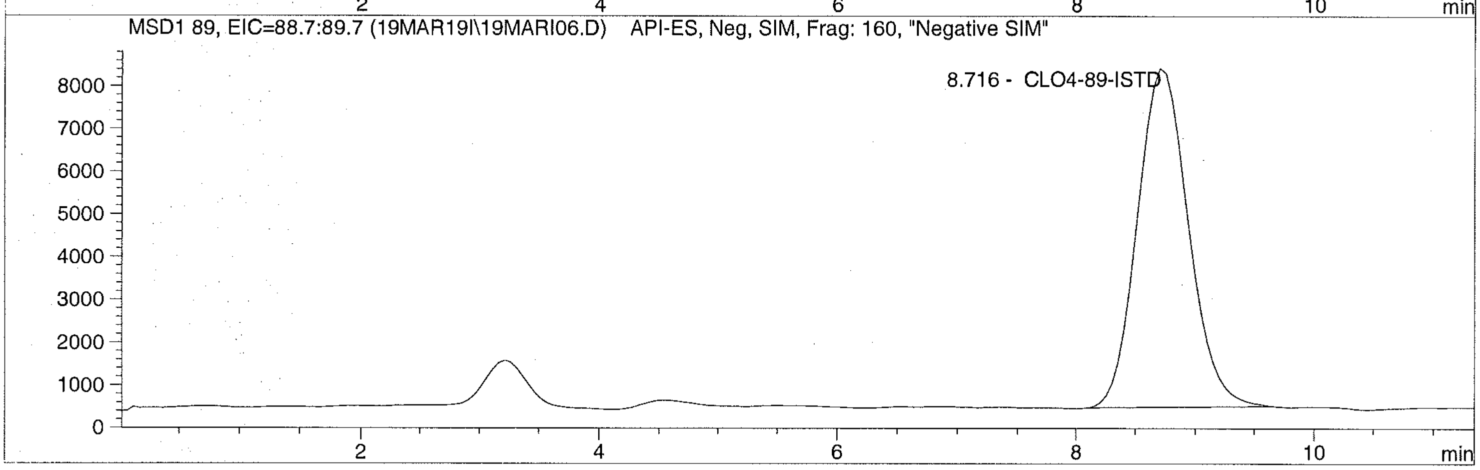
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

*** End of Report ***

```
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
=================================================================================
```







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

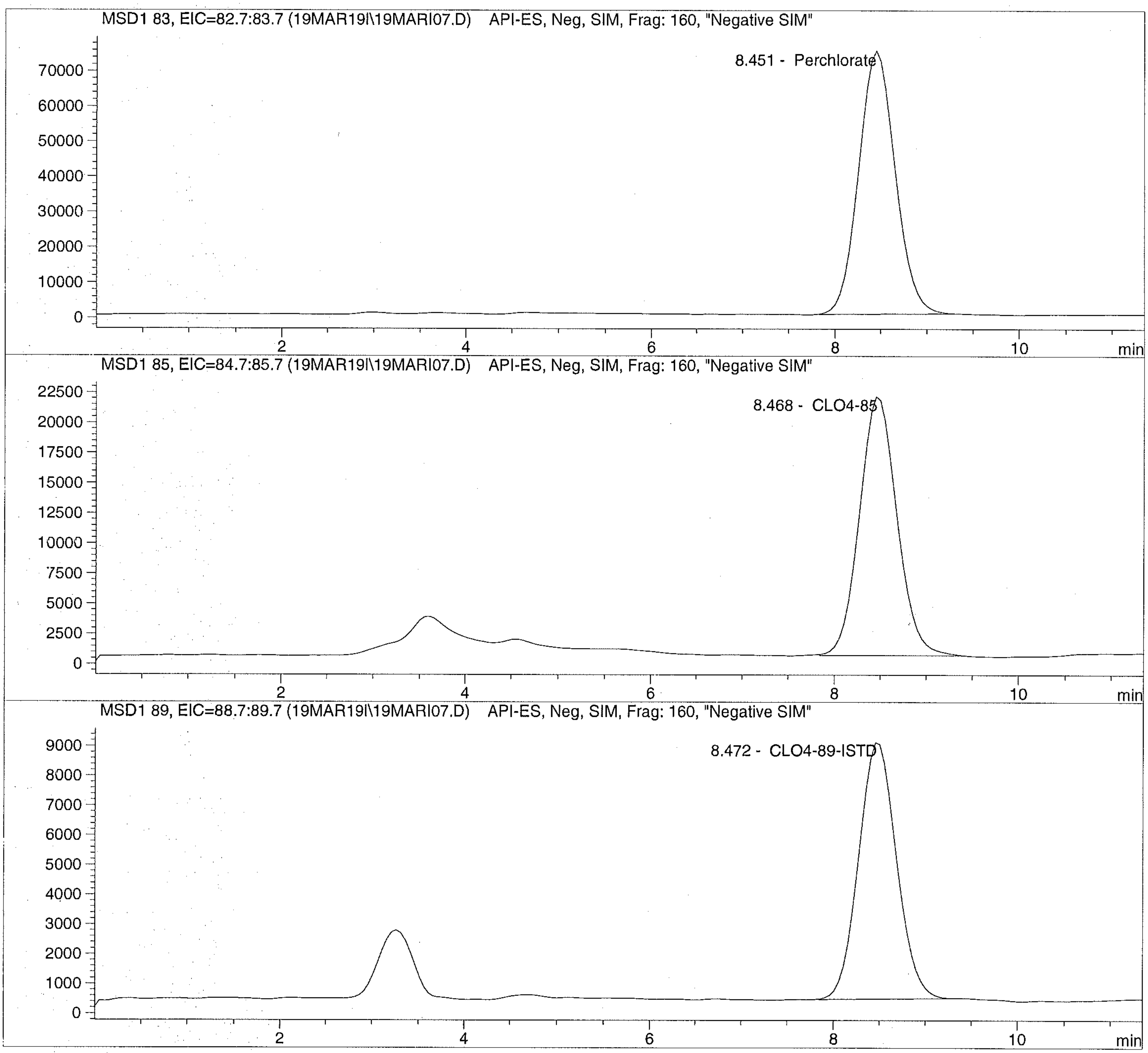
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

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 ***

```
Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D       Sample Name: CLO4@ 25.ug/L
==================================================================================
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
==================================================================================
```



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D Sample Name: CLO4@ 25.ug/L

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

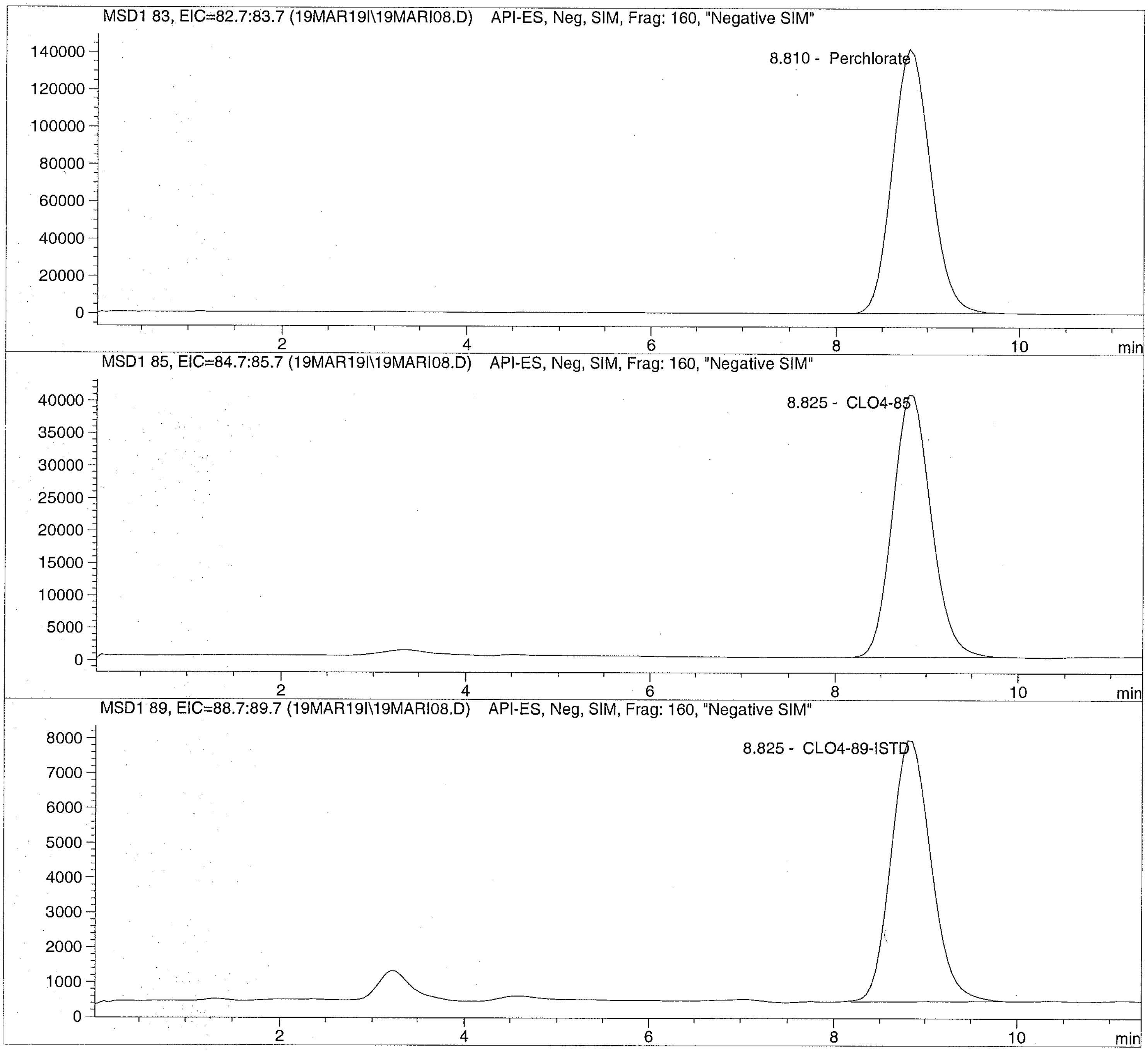
==

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

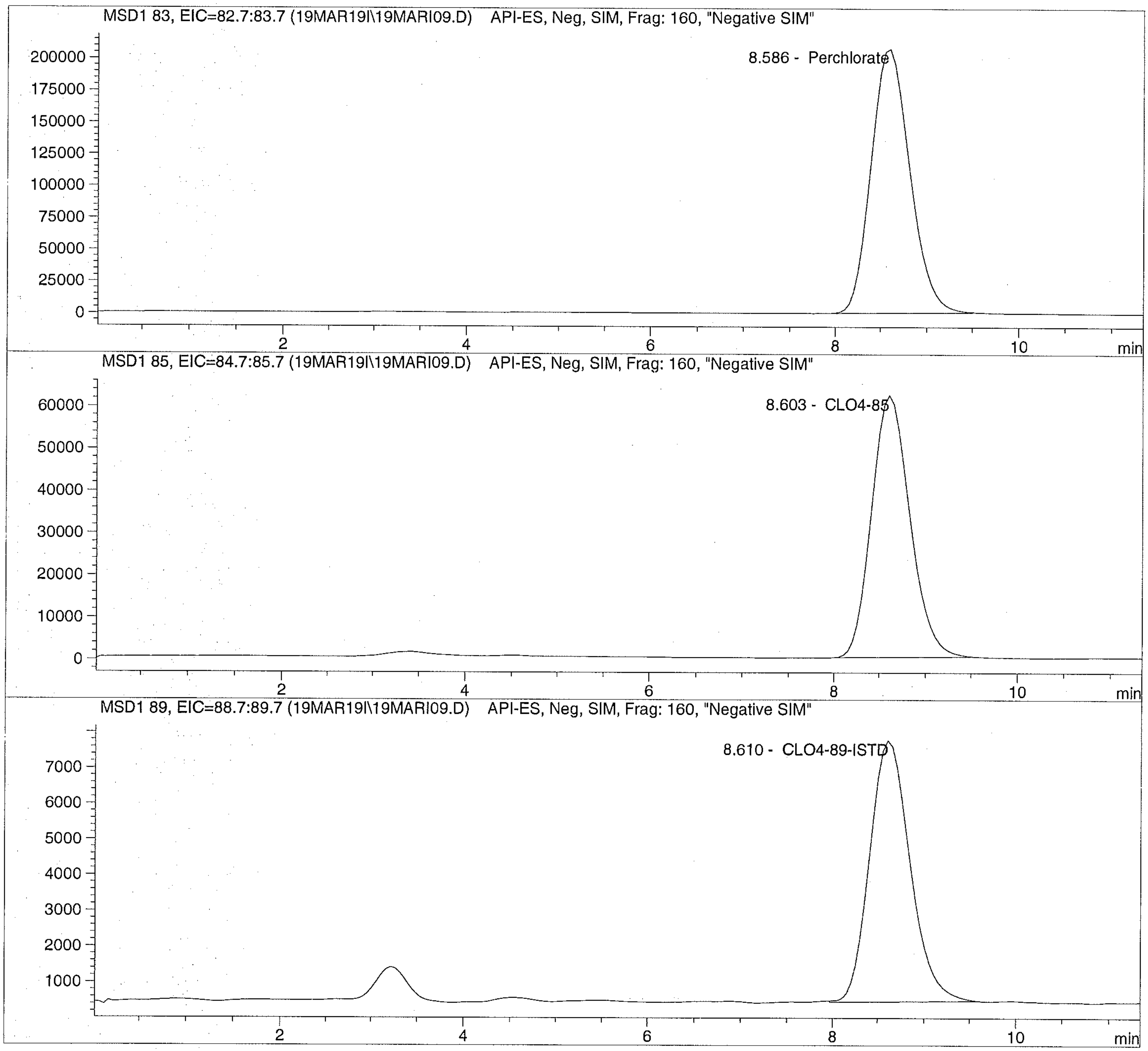
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.4672	CLO4-85

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 ***

```
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
=====================================================================================
```



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

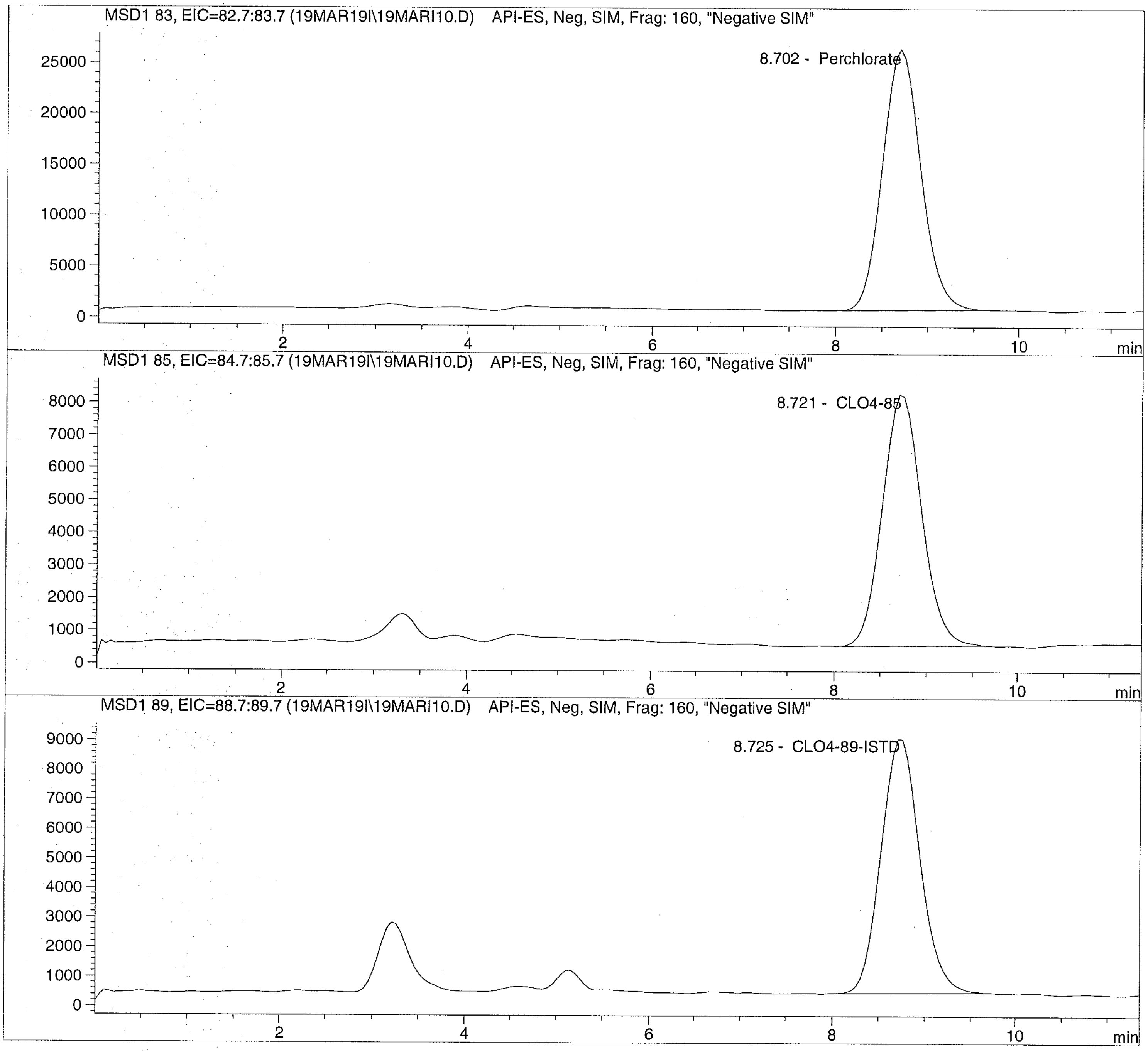
*** End of Report ***

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



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 ***

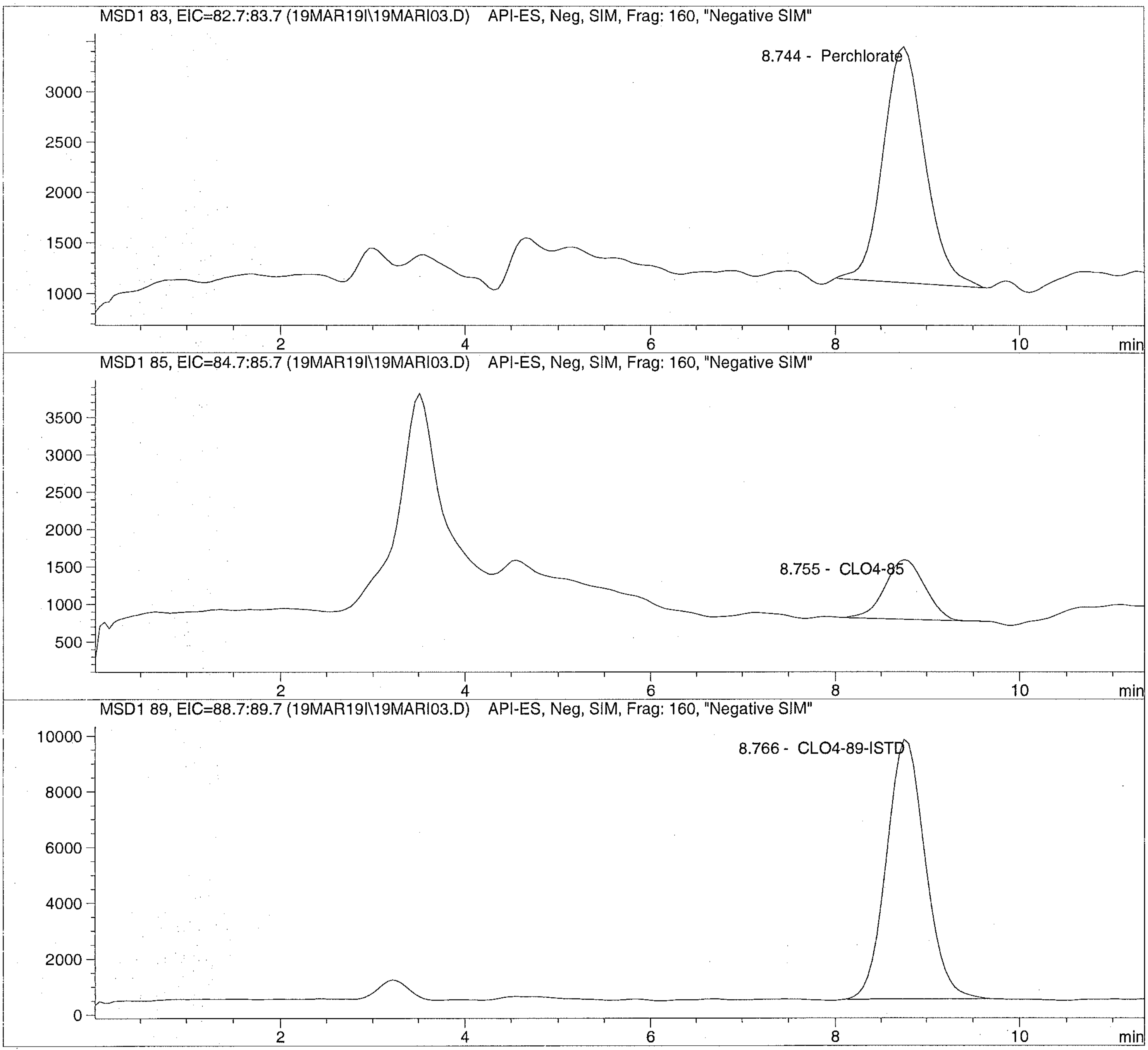
ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Unmodified

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



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 Environmental
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www.alsglobal.com

March 29, 2019

Analytical Report for Service Request No: K1902346

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

RE: HS19030749

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory March 19, 2019
For your reference, these analyses have been assigned our service request number **K1902346.**

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

Noel D. Oar

for Kelley Lovejoy
Project Manager

ALS Environmental
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Table of Contents

Acronyms

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

Inorganic Data Qualifiers

* The result is an outlier. See case narrative.

\# The control limit criteria is not applicable. See case narrative.

B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.

E The result is an estimate amount because the value exceeded the instrument calibration range.

J The result is an estimated value.

U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.

i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.

X See case narrative.

Q See case narrative. One or more quality control criteria was outside the limits.

H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

\# The control limit criteria is not applicable. See case narrative.

J The result is an estimated value.

E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.

M The duplicate injection precision was not met.

N The Matrix Spike sample recovery is not within control limits. See case narrative.

S The reported value was determined by the Method of Standard Additions (MSA).

U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.

W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.

i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.

X See case narrative.

\+ The correlation coefficient for the MSA is less than 0.995.

Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

* The result is an outlier. See case narrative.

\# The control limit criteria is not applicable. See case narrative.

A A tentatively identified compound, a suspected aldol-condensation product.

B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.

C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.

D The reported result is from a dilution.

E The result is an estimated value.

J The result is an estimated value.

N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.

P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.

U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.

i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.

X See case narrative.

Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.

L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.

H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.

O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.

Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.

Z The chromatographic fingerprint does not resemble a petroleum product.

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

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
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www.alsglobal.com

1317 South 13th Ave, Kelso, WA 98626 | 1-360-577-7222 | www.alsglobal.com

ALS Environmental

Client: ALS Environmental - US
Project: HS19030749
Sample Matrix: Water

Service Request: K1902346
Date Received: 03/19/2019

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Group. This report contains analytical results and quality control parameters for samples designated for Tier IV validation deliverables, which includes summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt:

One water sample was received for analysis at ALS Environmental on 03/19/2019. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4ºC upon receipt at the laboratory.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by Noel D. Dair

Date 03/29/2019

Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577- 7222 Fax (360)636-1 068
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K1902346

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: 10916

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:	HS19030749
TSR:	Danielle Winnings

	LAB SAMPLE ID	CLIENT SAMPLE ID / ANALYSIS REQUESTED	MATRIX	COLLECT DATE / DUE DATE
1.	**HS19030749-01**	**LH18/24-SP650_031419**	**Water**	**14 Mar 2019 14:00**
		TOC Analysis for DOD Level IV		29 Mar 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. Mauarv	Date/Time:	3/18/19 18:00
Received By:	[signature]	Date/Time:	3/19/19 0930
Cooler ID(s):		Temperature(s):	

PC KV

Cooler Receipt and Preservation Form

Client ALS Houston Service Request K19 03346

Received: 3/19/19 Opened: 3/19/19 By: CG Unloaded: 3/19/19 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? 1 Left 1 Right

   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	10916	4809 7831 7714	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* ______
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA Y N

   If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: ______

General Chemistry

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577- 7222 Fax (360)636-1 068
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	K1902346
Project:	HS19030749	**Date Collected:**	03/14/19
Sample Matrix:	Water	**Date Received:**	03/19/19
Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_031419	K1902346-001	**2.96**	0.50	0.20	0.07	1	03/22/19 05:14	
Method Blank	K1902346-MB	ND U	0.50	0.20	0.07	1	03/22/19 04:44	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1902346
Project:	HS19030749	**Date Collected:**	N/A
Sample Matrix:	Water	**Date Received:**	N/A
		Date Analyzed:	03/22/19
		Date Extracted:	NA

Matrix Spike Summary
Carbon, Total Organic

Sample Name:	Batch QC	**Units:**	mg/L
Lab Code:	K1902389-001	**Basis:**	NA
Analysis Method:	SM 5310 C		
Prep Method:	None		

Matrix Spike
K1902389-001MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic	3.34	31.0	25.0	111	83-117

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

Results flagged with a pound (#) indicate the control criteria is not applicable.

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

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1902346
Project:	HS19030749	**Date Analyzed:**	03/22/19
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	629144

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1902346-LCS	26.9	25.0	107	83-117

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US **Service Request:** K1902346
Project: HS19030749

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	629144	KQ1903793-06	03/21/19 19:42	25.0	24.5	98	90-110
CCV2	629144	KQ1903793-07	03/21/19 23:31	25.0	24.5	98	90-110
CCV3	629144	KQ1903793-08	03/22/19 04:15	25.0	24.9	100	90-110
CCV4	629144	KQ1903793-09	03/22/19 08:58	25.0	24.4	98	90-110
CCV5	629144	KQ1903793-10	03/22/19 14:09	25.0	24.2	97	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS19030749

Service Request: K1902346

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	629144	KQ1903793-01	03/21/19 19:57	0.50	0.20	0.07	ND	U
CCB2	629144	KQ1903793-02	03/21/19 23:46	0.50	0.20	0.07	ND	U
CCB3	629144	KQ1903793-03	03/22/19 04:30	0.50	0.20	0.07	ND	U
CCB4	629144	KQ1903793-04	03/22/19 09:13	0.50	0.20	0.07	ND	U
CCB5	629144	KQ1903793-05	03/22/19 14:23	0.50	0.20	0.07	ND	U

Raw Data

ALS Environmental—Kelso Laboratory
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General Chemistry

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Work Request # Original (________) K1902074, 2162, 1927, 2047, 2102, 2121, 2127, 2147, 2153, 2168, 2346, 2389, 2121, 2169, 2230, 2232, 2254, 2435

Tier: II, II, I, IV, II, I, II, II, II, II, IV, IV, I, II, II, II, II, IV

Date Analyzed: 3/21/19

Analyst: BCD

Analysis: TOC/DOC

Run # DOC: 629142 TOC: 629144, 629146, 629149

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 BCD 3/25/19
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: K1902232-2/3, K1902121-1/2, K1902435-1/2/3/4/5/6/7, K1902254-1/2/3
Sent for reanalysis due to CCB above the MRL.
K1902102-1, K1902074-2/1 sent for reanalysis due to MS requiring a dilution.
K1902102-1 TOC sent reanalysis due to requiring a dilution.
K1902147-1 sent for reanalysis because it is overdiluted.
K1902155-1/1dup have a high %RSD due to dirty, non-homogenous sample.
K1902168-2/2d report a high %RSD, but these samples are less than 5x the MRL.

Final Approved by: [signature] Date: 03/25/19

DQREPORT

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 629142 **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
K1902074-001	Carbon, Dissolved Organic (DOC)	N/A		Effluent	1.64 mg/L	10 ml	1.64 mg/L	1	0.07	0.50			3/21/19 20:56	N	II
K1902074-002	Carbon, Dissolved Organic (DOC)	N/A		Water	1.65 mg/L	10 ml	1.65 mg/L	1	0.07	0.50			3/21/19 21:24	N	II
K1902102-001	Carbon, Dissolved Organic (DOC)	N/A		Water	76.61 mg/L	10 ml	76.6 mg/L	1	0.07	0.50			3/21/19 21:52	N	II
KQ1903792-01	Carbon, Dissolved Organic (DOC)	CCB		Effluent	0.01 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/21/19 19:57	N	II
KQ1903792-02	Carbon, Dissolved Organic (DOC)	CCB		Effluent	0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/21/19 23:46	N	II
KQ1903792-03	Carbon, Dissolved Organic (DOC)	CCV		Effluent	24.51 mg/L	10 ml	24.5 mg/L	1			98		3/21/19 19:42	N	II
KQ1903792-04	Carbon, Dissolved Organic (DOC)	CCV		Effluent	24.47 mg/L	10 ml	24.5 mg/L	1			98		3/21/19 23:31	N	II
KQ1903792-05	Carbon, Dissolved Organic (DOC)	MB		Effluent	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/21/19 20:12	N	II
KQ1903792-06	Carbon, Dissolved Organic (DOC)	LCS		Effluent	26.54 mg/L	10 ml	26.5 mg/L	1	0.07	0.50	106		3/21/19 20:26	N	II
KQ1903792-07	Carbon, Dissolved Organic (DOC)	MS	K1902102-001	Water	99.38 mg/L	10 ml	99.4 mg/L	1	0.07	0.50	91		3/21/19 22:20	N	II
KQ1903792-08	Carbon, Dissolved Organic (DOC)	DUP	K1902102-001	Water	78.20 mg/L	10 ml	78.2 mg/L	1	0.07	0.50		2	3/21/19 21:52	N	II
KQ1903792-09	Carbon, Dissolved Organic (DOC)	DUP	K1902074-002	Water	1.68 mg/L	10 ml	1.68 mg/L	1	0.07	0.50		2	3/21/19 21:24	N	II
KQ1903792-10	Carbon, Dissolved Organic (DOC)	DUP	K1902074-001	Effluent	1.62 mg/L	10 ml	1.62 mg/L	1	0.07	0.50		1	3/21/19 20:56	N	II

03/25/19

# 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:** 629144 **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
K1901927-005	Carbon, Total Organic	N/A		Ground Water	45.71 mg/L	10 ml	45.7 mg/L	1	0.07	0.50			3/22/19 00:01	N	I
K1902047-001	Carbon, Total Organic	N/A		Water	2.94 mg/L	10 ml	2.94 mg/L	1	0.07	0.50			3/21/19 23:03	N	IV
K1902102-001	Carbon, Total Organic	N/A		Water	83.22 mg/L	10 ml	83.2 mg/L	1	0.07	0.50			3/22/19 05:42	N	II
K1902121-002	Carbon, Total Organic	N/A		Reagent Water	-0.24 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/22/19 20:19	N	I
K1902127-001	Carbon, Total Organic	N/A		Water	15.73 mg/L	10 ml	15.7 mg/L	1	0.07	0.50			3/22/19 06:10	N	II
K1902127-002	Carbon, Total Organic	N/A		Water	7.06 mg/L	10 ml	28.2 mg/L	4	0.3	2.0			3/22/19 06:38	N	II
K1902127-003	Carbon, Total Organic	N/A		Water	7.65 mg/L	10 ml	7.65 mg/L	1	0.07	0.50			3/22/19 07:06	N	II
K1902127-004	Carbon, Total Organic	N/A		Water	4.54 mg/L	10 ml	18.1 mg/L	4	0.3	2.0			3/22/19 07:34	N	II
K1902147-001 RA	Carbon, Total Organic	N/A		Water	0.23 mg/L	10 ml	50 mg/L U	100	7	50			3/22/19 08:02	N	II
K1902147-002	Carbon, Total Organic	N/A		Water	0.95 mg/L	10 ml	0.95 mg/L	1	0.07	0.50			3/22/19 08:30	N	II
K1902153-001	Carbon, Total Organic	N/A		Water	2.23 mg/L	10 ml	223 mg/L	100	7	50			3/22/19 02:50	N	II
K1902153-002	Carbon, Total Organic	N/A		Water	3.16 mg/L	10 ml	316 mg/L	100	7	50			3/22/19 03:19	N	II
K1902153-003	Carbon, Total Organic	N/A		Water	1.20 mg/L	10 ml	120 mg/L	100	7	50			3/22/19 03:47	N	II
K1902168-001	Carbon, Total Organic	N/A		Water	1.86 mg/L	10 ml	1.86 mg/L	1	0.07	0.50			3/22/19 09:28	N	II
K1902168-002	Carbon, Total Organic	N/A		Water	0.87 mg/L	10 ml	0.87 mg/L	1	0.07	0.50			3/22/19 09:56	N	II
K1902346-001	Carbon, Total Organic	N/A		Water	2.96 mg/L	10 ml	2.96 mg/L	1	0.07	0.50			3/22/19 05:14	N	IV
K1902389-001	Carbon, Total Organic	N/A		Water	3.34 mg/L	10 ml	3.34 mg/L	1	0.07	0.50			3/22/19 00:57	Y	IV
K1902389-002	Carbon, Total Organic	N/A		Water	27.06 mg/L	10 ml	27.1 mg/L	1	0.07	0.50			3/22/19 01:54	N	IV
K1902389-003	Carbon, Total Organic	N/A		Water	27.93 mg/L	10 ml	27.9 mg/L	1	0.07	0.50			3/22/19 02:22	N	IV
KQ1903793-01	Carbon, Total Organic	CCB		Water	9.45000000000001E	10 ml	0.50 mg/L U	1	0.07	0.50			3/21/19 19:57	N	IV
KQ1903793-02	Carbon, Total Organic	CCB		Water	0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/21/19 23:46	N	IV
KQ1903793-03	Carbon, Total Organic	CCB		Water	0.05 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/22/19 04:30	N	IV
KQ1903793-04	Carbon, Total Organic	CCB		Water	-0.17 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/22/19 09:13	N	IV
KQ1903793-05	Carbon, Total Organic	CCB		Water	-0.19 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/22/19 14:23	N	IV
KQ1903793-06	Carbon, Total Organic	CCV		Water	24.51 mg/L	10 ml	24.5 mg/L	1			98		3/21/19 19:42	N	IV
KQ1903793-07	Carbon, Total Organic	CCV		Water	24.47 mg/L	10 ml	24.5 mg/L	1			98		3/21/19 23:31	N	IV
KQ1903793-08	Carbon, Total Organic	CCV		Water	24.91 mg/L	10 ml	24.9 mg/L	1			100		3/22/19 04:15	N	IV
KQ1903793-09	Carbon, Total Organic	CCV		Water	24.39 mg/L	10 ml	24.4 mg/L	1			98		3/22/19 08:58	N	IV
KQ1903793-10	Carbon, Total Organic	CCV		Water	24.24 mg/L	10 ml	24.2 mg/L	1			97		3/22/19 14:09	N	IV
KQ1903793-11	Carbon, Total Organic	MB		Water	1.65000000000001E	10 ml	0.50 mg/L U	1	0.07	0.50			3/22/19 04:44	N	IV
KQ1903793-12	Carbon, Total Organic	LCS		Water	26.86 mg/L	10 ml	26.9 mg/L	1	0.07	0.50	107		3/22/19 04:59	N	IV
KQ1903793-13	Carbon, Total Organic	MS	K1902389-001	Water	30.99 mg/L	10 ml	31.0 mg/L	1	0.07	0.50	111		3/22/19 01:25	N	IV
KQ1903793-14	Carbon, Total Organic	DUP	K1902047-001	Water	2.93 mg/L	10 ml	2.93 mg/L	1	0.07	0.50		<1	3/21/19 23:03	N	IV
KQ1903793-15	Carbon, Total Organic	DUP	K1901927-005	Ground Water	46.15 mg/L	10 ml	46.1 mg/L	1	0.07	0.50		<1	3/22/19 00:01	N	I

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

03/25/19

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 629144 **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
KQ1903793-16	Carbon, Total Organic	DUP	K1902389-001	Water	3.34 mg/L	10 ml	3.34 mg/L	1	0.07	0.50		<1	3/22/19 00:57	N	IV
KQ1903793-17	Carbon, Total Organic	DUP	K1902389-002	Water	27.77 mg/L	10 ml	27.8 mg/L	1	0.07	0.50		3	3/22/19 01:54	N	IV
KQ1903793-18	Carbon, Total Organic	DUP	K1902389-003	Water	27.82 mg/L	10 ml	27.8 mg/L	1	0.07	0.50		<1	3/22/19 02:22	N	IV
KQ1903793-19	Carbon, Total Organic	DUP	K1902153-001	Water	1.67 mg/L	10 ml	167 mg/L	100	7	50		29*	3/22/19 02:50	N	II
KQ1903793-20	Carbon, Total Organic	DUP	K1902153-002	Water	3.14 mg/L	10 ml	314 mg/L	100	7	50		<1	3/22/19 03:19	N	II
KQ1903793-21	Carbon, Total Organic	DUP	K1902153-003	Water	1.13 mg/L	10 ml	113 mg/L	100	7	50		6	3/22/19 03:47	N	II
KQ1903793-22	Carbon, Total Organic	DUP	K1902346-001	Water	2.84 mg/L	10 ml	2.84 mg/L	1	0.07	0.50		4	3/22/19 05:14	N	IV
KQ1903793-23	Carbon, Total Organic	DUP	K1902102-001	Water	83.37 mg/L	10 ml	83.4 mg/L	1	0.07	0.50		<1	3/22/19 05:42	N	II
KQ1903793-24	Carbon, Total Organic	DUP	K1902121-002	Reagent Water	-0.24 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50		NC	3/22/19 20:19	N	I
KQ1903793-25	Carbon, Total Organic	DUP	K1902127-001	Water	15.57 mg/L	10 ml	15.6 mg/L	1	0.07	0.50		<1	3/22/19 06:10	N	II
KQ1903793-26	Carbon, Total Organic	DUP	K1902127-002	Water	6.91 mg/L	10 ml	27.6 mg/L	4	0.3	2.0		2	3/22/19 06:38	N	II
KQ1903793-27	Carbon, Total Organic	DUP	K1902127-003	Water	7.52 mg/L	10 ml	7.52 mg/L	1	0.07	0.50		2	3/22/19 07:06	N	II
KQ1903793-28	Carbon, Total Organic	DUP	K1902127-004	Water	4.39 mg/L	10 ml	17.6 mg/L	4	0.3	2.0		3	3/22/19 07:34	N	II
KQ1903793-29	Carbon, Total Organic	DUP	K1902147-001	Water	0.22 mg/L	10 ml	22 mg/L J	100	7	50		NC	3/22/19 08:02	N	II
KQ1903793-30	Carbon, Total Organic	DUP	K1902147-002	Water	0.91 mg/L	10 ml	0.91 mg/L	1	0.07	0.50		4	3/22/19 08:30	N	II
KQ1903793-31	Carbon, Total Organic	DUP	K1902168-001	Water	1.78 mg/L	10 ml	1.78 mg/L	1	0.07	0.50		4	3/22/19 09:28	N	II
KQ1903793-32	Carbon, Total Organic	DUP	K1902168-002	Water	0.76 mg/L	10 ml	0.76 mg/L	1	0.07	0.50		14*	3/22/19 09:56	N	II

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

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 629146 **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
K1902121-001 RA	Carbon, Total Organic	N/A		Reagent Water	-0.24 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/22/19 19:51	N	I
K1902169-001	Carbon, Total Organic	N/A		Water	14.29 mg/L	10 ml	14.3 mg/L	1	0.07	0.50			3/22/19 10:24	N	II
K1902169-002	Carbon, Total Organic	N/A		Water	17.52 mg/L	10 ml	17.5 mg/L	1	0.07	0.50			3/22/19 10:52	N	II
K1902169-003	Carbon, Total Organic	N/A		Water	18.67 mg/L	10 ml	18.7 mg/L	1	0.07	0.50			3/22/19 11:20	N	II
K1902169-004	Carbon, Total Organic	N/A		Water	9.18 mg/L	10 ml	9.18 mg/L	1	0.07	0.50			3/22/19 11:48	N	II
K1902169-005	Carbon, Total Organic	N/A		Water	11.61 mg/L	10 ml	11.6 mg/L	1	0.07	0.50			3/22/19 12:16	N	II
K1902169-006	Carbon, Total Organic	N/A		Water	11.71 mg/L	10 ml	11.7 mg/L	1	0.07	0.50			3/22/19 12:44	N	II
K1902169-007	Carbon, Total Organic	N/A		Water	12.46 mg/L	10 ml	12.5 mg/L	1	0.07	0.50			3/22/19 13:12	N	II
K1902169-008	Carbon, Total Organic	N/A		Water	15.31 mg/L	10 ml	15.3 mg/L	1	0.07	0.50			3/22/19 13:41	N	II
K1902230-001	Carbon, Total Organic	N/A		Water	1.86 mg/L	10 ml	1.86 mg/L	1	0.07	0.50			3/22/19 15:07	N	II
K1902230-002	Carbon, Total Organic	N/A		Water	0.70 mg/L	10 ml	0.70 mg/L	1	0.07	0.50			3/22/19 15:35	N	II
K1902230-003	Carbon, Total Organic	N/A		Water	0.80 mg/L	10 ml	0.80 mg/L	1	0.07	0.50			3/22/19 16:03	N	II
K1902230-004	Carbon, Total Organic	N/A		Water	1.23 mg/L	10 ml	1.23 mg/L	1	0.07	0.50			3/22/19 16:32	N	II
K1902230-005	Carbon, Total Organic	N/A		Water	0.32 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/22/19 17:00	N	II
K1902232-001	Carbon, Total Organic	N/A		Water	5.72 mg/L	10 ml	5.72 mg/L	1	0.07	0.50			3/22/19 17:28	N	II
K1902232-002 RA	Carbon, Total Organic	N/A		Water	9.75 mg/L	10 ml	9.75 mg/L	1	0.07	0.50			3/22/19 18:55	N	II
K1902232-003 RA	Carbon, Total Organic	N/A		Water	13.90 mg/L	10 ml	13.9 mg/L	1	0.07	0.50			3/22/19 19:23	N	II
KQ1903794-01	Carbon, Total Organic	CCB		Water	-0.17 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/22/19 09:13	N	II
KQ1903794-02	Carbon, Total Organic	CCB		Water	-0.19 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/22/19 14:23	N	II
KQ1903794-03	Carbon, Total Organic	CCB		Water	-0.24 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/22/19 18:40	N	II
KQ1903794-04	Carbon, Total Organic	CCB	(High)	Water	0.89 mg/L	10 ml	0.89 mg/L	1	0.07	0.50			3/22/19 23:50	N	II
KQ1903794-05	Carbon, Total Organic	CCV		Water	24.39 mg/L	10 ml	24.4 mg/L	1			98		3/22/19 08:58	N	II
KQ1903794-06	Carbon, Total Organic	CCV		Water	24.24 mg/L	10 ml	24.2 mg/L	1			97		3/22/19 14:09	N	II
KQ1903794-07	Carbon, Total Organic	CCV		Water	23.91 mg/L	10 ml	23.9 mg/L	1			96		3/22/19 18:25	N	II
KQ1903794-08	Carbon, Total Organic	CCV		Water	27.39 mg/L	10 ml	27.4 mg/L	1			110		3/22/19 23:35	N	II
KQ1903794-09	Carbon, Total Organic	MB		Water	-0.24 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/22/19 14:38	N	II
KQ1903794-10	Carbon, Total Organic	LCS		Water	26.10 mg/L	10 ml	26.1 mg/L	1	0.07	0.50	104		3/22/19 14:53	N	II
KQ1903794-11	Carbon, Total Organic	MS	K1902232-001	Water	33.31 mg/L	10 ml	33.3 mg/L	1	0.07	0.50	110		3/22/19 17:56	N	II
KQ1903794-12	Carbon, Total Organic	DUP	K1902169-001	Water	14.17 mg/L	10 ml	14.2 mg/L	1	0.07	0.50		<1	3/22/19 10:24	N	II
KQ1903794-13	Carbon, Total Organic	DUP	K1902169-002	Water	17.70 mg/L	10 ml	17.7 mg/L	1	0.07	0.50		1	3/22/19 10:52	N	II
KQ1903794-14	Carbon, Total Organic	DUP	K1902169-003	Water	18.63 mg/L	10 ml	18.6 mg/L	1	0.07	0.50		<1	3/22/19 11:20	N	II
KQ1903794-15	Carbon, Total Organic	DUP	K1902169-004	Water	9.05 mg/L	10 ml	9.05 mg/L	1	0.07	0.50		1	3/22/19 11:48	N	II
KQ1903794-16	Carbon, Total Organic	DUP	K1902169-005	Water	11.53 mg/L	10 ml	11.5 mg/L	1	0.07	0.50		<1	3/22/19 12:16	N	II
KQ1903794-17	Carbon, Total Organic	DUP	K1902169-006	Water	11.48 mg/L	10 ml	11.5 mg/L	1	0.07	0.50		2	3/22/19 12:44	N	II
KQ1903794-18	Carbon, Total Organic	DUP	K1902169-007	Water	12.85 mg/L	10 ml	12.9 mg/L	1	0.07	0.50		3	3/22/19 13:12	N	II

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

03/25/19

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 629146 **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
KQ1903794-19	Carbon, Total Organic	DUP	K1902169-008	Water	15.02 mg/L	10 ml	15.0 mg/L	1	0.07	0.50		2	3/22/19 13:41	N	II
KQ1903794-20	Carbon, Total Organic	DUP	K1902230-001	Water	1.86 mg/L	10 ml	1.86 mg/L	1	0.07	0.50		<1	3/22/19 15:07	N	II
KQ1903794-21	Carbon, Total Organic	DUP	K1902230-002	Water	0.64 mg/L	10 ml	0.64 mg/L	1	0.07	0.50		8	3/22/19 15:35	N	II
KQ1903794-22	Carbon, Total Organic	DUP	K1902230-003	Water	0.79 mg/L	10 ml	0.79 mg/L	1	0.07	0.50		<1	3/22/19 16:03	N	II
KQ1903794-23	Carbon, Total Organic	DUP	K1902230-004	Water	1.14 mg/L	10 ml	1.14 mg/L	1	0.07	0.50		7	3/22/19 16:32	N	II
KQ1903794-24	Carbon, Total Organic	DUP	K1902230-005	Water	0.30 mg/L	10 ml	0.30 mg/L J	1	0.07	0.50		NC	3/22/19 17:00	N	II
KQ1903794-25	Carbon, Total Organic	DUP	K1902232-001	Water	5.79 mg/L	10 ml	5.79 mg/L	1	0.07	0.50		1	3/22/19 17:28	N	II
KQ1903794-26	Carbon, Total Organic	DUP	K1902232-002	Water	9.86 mg/L	10 ml	9.86 mg/L	1	0.07	0.50		1	3/22/19 18:55	N	II
KQ1903794-27	Carbon, Total Organic	DUP	K1902232-003	Water	13.87 mg/L	10 ml	13.9 mg/L	1	0.07	0.50		<1	3/22/19 19:23	N	II
KQ1903794-28	Carbon, Total Organic	DUP	K1902121-001	Reagent Water	-0.24 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50		NC	3/22/19 19:51	N	I

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

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 629149 **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
K1902254-001	Carbon, Total Organic	N/A		Water	6.54 mg/L	10 ml	6.54 mg/L	1	0.07	0.50			3/23/19 01:02	N	II
K1902254-002	Carbon, Total Organic	N/A		Water	18.37 mg/L	10 ml	18.4 mg/L	1	0.07	0.50			3/23/19 01:30	N	II
K1902254-003	Carbon, Total Organic	N/A		Water	22.01 mg/L	10 ml	22.0 mg/L	1	0.07	0.50			3/23/19 01:58	N	II
K1902435-001	Carbon, Total Organic	N/A		Ground Water	119.91 mg/L	10 ml	120 mg/L	1	0.07	0.50			3/22/19 20:47	N	IV
K1902435-002	Carbon, Total Organic	N/A		Ground Water	5.07 mg/L	10 ml	5.07 mg/L	1	0.07	0.50			3/22/19 21:15	N	IV
K1902435-003	Carbon, Total Organic	N/A		Ground Water	3.20 mg/L	10 ml	3.20 mg/L	1	0.07	0.50			3/22/19 21:43	N	IV
K1902435-004	Carbon, Total Organic	N/A		Ground Water	5.08 mg/L	10 ml	5.08 mg/L	1	0.07	0.50			3/22/19 22:11	N	IV
K1902435-005	Carbon, Total Organic	N/A		Ground Water	137.01 mg/L	10 ml	137 mg/L	1	0.07	0.50			3/22/19 22:39	N	IV
K1902435-006	Carbon, Total Organic	N/A		Ground Water	118.27 mg/L	10 ml	118 mg/L	1	0.07	0.50			3/22/19 23:07	N	IV
K1902435-007	Carbon, Total Organic	N/A		Ground Water	12.50 mg/L	10 ml	12.5 mg/L	1	0.07	0.50			3/23/19 00:05	Y	IV
KQ1903795-01	Carbon, Total Organic	CCB		Ground Water	-0.24 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/22/19 18:40	N	IV
KQ1903795-02	Carbon, Total Organic	CCB		Ground Water	0.89 mg/L	10 ml	0.89 mg/L	1	0.07	0.50			3/22/19 23:50	N	IV
KQ1903795-03	Carbon, Total Organic	CCB		Ground Water	-0.24 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/23/19 03:09	N	IV
KQ1903795-04	Carbon, Total Organic	CCV		Ground Water	23.91 mg/L	10 ml	23.9 mg/L	1			96		3/22/19 18:25	N	IV
KQ1903795-05	Carbon, Total Organic	CCV		Ground Water	27.39 mg/L	10 ml	27.4 mg/L	1			110		3/22/19 23:35	N	IV
KQ1903795-06	Carbon, Total Organic	CCV		Ground Water	23.81 mg/L	10 ml	23.8 mg/L	1			95		3/23/19 02:55	N	IV
KQ1903795-09	Carbon, Total Organic	MS	K1902435-007	Ground Water	33.24 mg/L	10 ml	33.2 mg/L	1	0.07	0.50	83		3/23/19 00:33	N	IV
KQ1903795-10	Carbon, Total Organic	DUP	K1902435-001	Ground Water	112.05 mg/L	10 ml	112 mg/L	1	0.07	0.50		7	3/22/19 20:47	N	IV
KQ1903795-11	Carbon, Total Organic	DUP	K1902435-002	Ground Water	3.05 mg/L	10 ml	3.05 mg/L	1	0.07	0.50		50*	3/22/19 21:15	N	IV
KQ1903795-12	Carbon, Total Organic	DUP	K1902435-003	Ground Water	2.88 mg/L	10 ml	2.88 mg/L	1	0.07	0.50		11*	3/22/19 21:43	N	IV
KQ1903795-13	Carbon, Total Organic	DUP	K1902435-004	Ground Water	4.70 mg/L	10 ml	4.70 mg/L	1	0.07	0.50		8	3/22/19 22:11	N	IV
KQ1903795-14	Carbon, Total Organic	DUP	K1902435-005	Ground Water	127.76 mg/L	10 ml	128 mg/L	1	0.07	0.50		7	3/22/19 22:39	N	IV
KQ1903795-15	Carbon, Total Organic	DUP	K1902435-006	Ground Water	127.20 mg/L	10 ml	127 mg/L	1	0.07	0.50		7	3/22/19 23:07	N	IV
KQ1903795-16	Carbon, Total Organic	DUP	K1902435-007	Ground Water	12.30 mg/L	10 ml	12.3 mg/L	1	0.07	0.50		2	3/23/19 00:05	N	IV
KQ1903795-17	Carbon, Total Organic	DUP	K1902254-001	Water	6.38 mg/L	10 ml	6.38 mg/L	1	0.07	0.50		3	3/23/19 01:02	N	II

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

03/25/19

00935257

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 629149 **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
KQ1903795-18	Carbon, Total Organic	DUP	K1902254-002	Water	18.17 mg/L	10 ml	18.2 mg/L	1	0.07	0.50		1	3/23/19 01:30	N	II
KQ1903795-19	Carbon, Total Organic	DUP	K1902254-003	Water	21.93 mg/L	10 ml	21.9 mg/L	1	0.07	0.50		<1	3/23/19 01:58	N	II

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

DOC: 629142
TOC: 629144,
629146,
629149

Schedule: 03212019

Version: 4
Instrument: Fusion1
Last Saved by: Fusion1 (Fusion1)
Last Saved on: 2019/03/21 18:03 - 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	K1902074-001.03 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
4	Sample	K1902074-002.03 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
5	Sample	K1902102-001.01 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
6	Sample	K1902102-001.01 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	FB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
9	Sample	K1902047-001.01	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	K1901927-005.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	K1902389-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	K1902389-001.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
14	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
15	Sample	K1902389-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K1902389-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1902153-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1902153-002.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	Sample	K1902153-003.01 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	K1902346-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K1902102-001.02	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	K1902127-001.12	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K1902127-002.12 4x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K1902127-003.12	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K1902127-004.12 4x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
27	Sample	K1902147-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
28	Sample	K1902147-002.01	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	K1902168-001.04	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1902168-002.04	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
31	Sample	K1902169-001.24	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
32	Sample	K1902169-002.24	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
33	Sample	K1902169-003.24	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
34	Sample	K1902169-004.24	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
35	Sample	K1902169-005.24	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
36	Sample	K1902169-006.24	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
37	Sample	K1902169-007.24	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
38	Sample	K1902169-008.24	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

03/25/19

Schedule: 03212019

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	K1902230-001.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
41	Sample	K1902230-002.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
42	Sample	K1902230-003.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
43	Sample	K1902230-004.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
44	Sample	K1902230-005.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
45	Sample	K1902232-001.12	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
46	Sample	K1902232-001.12 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
47	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
48	Sample	K1902232-002.12	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
49	Sample	K1902232-003.12	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
50	Sample	K1902121-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
51	Sample	K1902121-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
52	Sample	K1902435-001.02	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
53	Sample	K1902435-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
54	Sample	K1902435-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
55	Sample	K1902435-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
56	Sample	K1902435-005.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
57	Sample	K1902435-006.01	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
58	Sample	MB4	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
C	Check Standard	[TOC] LCS [24.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	False	Ready
59	Sample	K1902435-007.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
60	Sample	K1902435-007.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
61	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
62	Sample	K1902254-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
63	Sample	K1902254-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
64	Sample	K1902254-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
65	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
					False	

Fusion Report - 03212019
Thursday, March 21, 2019 04:58 PM

(View - Reps, Unused Reps, Meta-Data, Signature, History)
Printed on 2019/03/23 11:38 - Saturday

Report Summary Information

Company Location:	Gen Chem Lab		
Schedule Name:	03212019	Engine Version:	1.1.5.1
Instrument Name:	Fusion1	Firmware Version:	1.2.0696
Report Version:	1 of 1	Connection:	RS232 COM1
Report Creation by Operators (schedule version):	Fusion1 (Fusion1) (v2) Fusion1 (Fusion1) (v3) Fusion1 (Fusion1) (v4)		
Comment:			

Report Results

03/25/19

Sample Type: Clean — From Schedule Version 2

	Pos	Analysis Type	Sample ID	Start Time
◈	(clean)		Clean	2019/03/21 16:58

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	13.69	16.58	2.89	49.93	07:59
2	TC Clean	20.38	23.31	2.93	49.73	07:19
3	TC Clean	2.42	5.55	3.13	49.79	07:01
4	TC Clean	1.97	4.69	2.71	49.80	07:01

Sample Type: Clean — From Schedule Version 3

	Pos	Analysis Type	Sample ID	Start Time
◈	(clean)		Clean	2019/03/21 17:32

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	10.80	13.84	3.04	49.90	08:01
2	TC Clean	4.74	7.49	2.75	49.73	07:16
3	TC Clean	1.91	4.68	2.77	49.81	06:59
4	TC Clean	1.32	4.10	2.77	49.81	07:04

Sample Type: Clean From Schedule Version 4

	Pos	Analysis Type	Sample ID	Start Time
◈	(clean)		Clean	2019/03/21 18:06

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	1.03	3.77	2.74	49.95	08:00
2	TC Clean	4.31	6.95	2.64	49.79	07:16
3	TC Clean	1.72	4.56	2.84	49.85	07:02
4	TC Clean	1.74	4.48	2.74	49.84	07:03

Sample Type: Blank (Creating v1238) From Schedule Version 4

	Pos	Analysis Type	Sample ID	Start Time
◈	(blank)		Reagent/Acid Blank	2019/03/21 18:41

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	1.00	3.60	2.60	49.84	05:29
2	TC Clean	4.32	7.12	2.80	49.86	07:17
3	TC Clean	2.15	5.14	2.99	49.89	07:02
4	TC Clean	2.00	4.74	2.74	49.91	07:02
5	Reagent Blank	8.64	11.55	2.91	49.90	08:11
6	Acid Blank	1.76	4.51	2.75	49.59	05:29

Sample Type: Sample From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	D	TOC	RB	0.6753 ppm	0.0000 ppm	0.0000%	2019/03/21 19:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6753	6.7532	13.68	16.57	2.90	50.05	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	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)	24.7429 ppm (PASS)	0.0000 ppm	0%	2019/03/21 19:42

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.7429	247.4293	177.42	180.64	3.22	50.08	10:34

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 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)	0.2462 ppm (PASS)	0.0000 ppm	0%	2019/03/21 19:57

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.2462	2.4625	11.13	14.12	2.99	50.11	10:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample

From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	1	TOC	MB1	0.1945 ppm	0.0000 ppm	0.0000%	2019/03/21 20:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1945	1.9447	10.41	13.45	3.03	50.13	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	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)	26.7752 ppm (PASS)	0.0000 ppm	0%	2019/03/21 20:26

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time

	Type									
C	TOC	25.0 ppm	1	26.7752	267.7521	191.21	194.15	2.94	50.12	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 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	2	TOC	ICS	0.5996 ppm	0.0000 ppm	0.0000%	2019/03/21 20:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5996	5.9960	13.16	16.20	3.04	50.14	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	3	TOC	K1902074-001.03 doc	1.8667 ppm	0.0140 ppm	0.7500%	2019/03/21 20:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.8766	18.7657	21.83	24.73	2.90	50.18	10:27
2	TOC	1.8568	18.5683	21.70	24.80	3.10	50.17	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	4	TOC	K1902074-002.03 doc	1.9020 ppm	0.0253 ppm	1.3300%	2019/03/21 21:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.8841	18.8408	21.88	24.73	2.85	50.15	10:26
2	TOC	1.9199	19.1988	22.12	24.96	2.84	50.11	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	5	TOC	K1902102-001.01 doc	77.6461 ppm	1.1244 ppm	1.4500%	2019/03/21 21:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	76.8510	768.5100	530.75	533.65	2.90	50.09	10:28
2	TOC	78.4412	784.4117	541.55	544.57	3.03	50.08	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC)	CAS_salt_010711	CAS_salt_010711

(v1238) (v4) (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	6	TOC	K1902102-001.01 ms doc	99.6155 ppm	0.0000 ppm	0.0000%	2019/03/21 22:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	99.6155	996.1549	685.28	688.33	3.06	50.06	10:33

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	7	TOC	RB	0.8853 ppm	0.0000 ppm	0.0000%	2019/03/21 22:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8853	8.8525	15.10	18.27	3.17	50.02	10:33

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	8	TOC	FB	0.3991 ppm	0.0000 ppm	0.0000%	2019/03/21 22:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3991	3.9909	11.80	14.63	2.83	50.08	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	9	TOC	K1902047-001.01	3.1747 ppm	0.0064 ppm	0.2000%	2019/03/21 23:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.1792	31.7917	30.67	33.69	3.02	50.09	10:26
2	TOC	3.1702	31.7018	30.61	33.43	2.82	50.08	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	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)	24.7049 ppm (PASS)	0.0000 ppm	0%	2019/03/21 23:31

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.7049	247.0492	177.16	180.15	2.99	50.08	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 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)	0.2679 ppm (PASS)	0.0000 ppm	0%	2019/03/21 23:46

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.2679	2.6790	11.28	14.33	3.04	50.09	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample

From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	10	TOC	K1901927-005.03	46.1675 ppm	0.3093 ppm	0.6700%	2019/03/22 00:01

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	45.9488	459.4884	320.99	323.90	2.91	50.06	10:30
2	TOC	46.3862	463.8624	323.96	326.76	2.80	50.07	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	11	TOC	RB	0.6373 ppm	0.1548 ppm	24.2900%	2019/03/22 00:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.7468	7.4677	14.16	17.16	3.00	50.07	10:28
2	TOC	0.5279	5.2785	12.68	15.49	2.81	50.05	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	12	TOC	K1902389-001.01	3.5762 ppm	0.0031 ppm	0.0900%	2019/03/22 00:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.5740	35.7399	33.35	36.29	2.94	50.02	10:24
2	TOC	3.5784	35.7841	33.38	36.25	2.87	50.02	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	13	TOC	K1902389-001.01 ms	31.2217 ppm	0.0000 ppm	0.0000%	2019/03/22 01:25

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	31.2217	312.2170	221.02	223.80	2.78	50.00	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	14	TOC	RB	0.3757 ppm	0.0000 ppm	0.0000%	2019/03/22 01:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3757	3.7567	11.64	14.47	2.82	50.01	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	15	TOC	K1902389-002.01	27.6512 ppm	0.5067 ppm	1.8300%	2019/03/22 01:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	27.2930	272.9296	194.36	197.15	2.80	50.00	10:27
2	TOC	28.0095	280.0953	199.22	201.90	2.69	49.98	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	16	TOC	K1902389-003.01	28.1127 ppm	0.0750 ppm	0.2700%	2019/03/22 02:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	28.1657	281.6569	200.28	203.19	2.91	49.97	10:27
2	TOC	28.0596	280.5962	199.56	202.41	2.85	49.98	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

		Analysis			Std. Dev.		

	Pos	Type	Sample ID	Result (ppmC)	(ppmC)	RSD	Start Time
◈	17	TOC	K1902153-001.01 100x	2.1834 ppm	0.3944 ppm	18.0600%	2019/03/22 02:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.4623	24.6231	25.81	28.60	2.80	49.95	10:30
2	TOC	1.9046	19.0456	22.02	24.86	2.84	49.96	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	18	TOC	K1902153-002.01 100x	3.3888 ppm	0.0121 ppm	0.3600%	2019/03/22 03:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.3974	33.9735	32.15	35.09	2.93	50.01	10:28
2	TOC	3.3803	33.8026	32.04	34.91	2.87	49.96	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	19	TOC	K1902153-003.01 100x	1.4009 ppm	0.0500 ppm	3.5700%	2019/03/22 03:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4362	14.3623	18.84	21.63	2.79	49.95	10:28
2	TOC	1.3655	13.6551	18.36	21.10	2.74	49.93	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	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)	25.1491 ppm (PASS)	0.0000 ppm	0%	2019/03/22 04:15

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.1491	251.4909	180.17	182.80	2.63	49.90	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 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)	0.2848 ppm (PASS)	0.0000 ppm	0%	2019/03/22 04:30

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.2848	2.8484	11.40	14.09	2.70	49.89	10:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	20	TOC	MB2	0.2384 ppm	0.0000 ppm	0.0000%	2019/03/22 04:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2384	2.3837	10.71	13.39	2.68	49.91	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	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)	27.0967 ppm (PASS)	0.0000 ppm	0%	2019/03/22 04:59

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	27.0967	270.9666	193.39	196.26	2.87	49.90	10:29

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 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	21	TOC	K1902346-001.01	3.1362 ppm	0.0803 ppm	2.5600%	2019/03/22 05:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.1930	31.9302	30.77	33.56	2.79	49.89	10:30

2	TOC	3.0794	30.7944	30.00	32.92	2.92	49.86	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	22	TOC	K1902102-001.02	83.5303 ppm	0.1033 ppm	0.1200%	2019/03/22 05:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	83.4573	834.5727	575.59	578.46	2.87	49.88	10:28
2	TOC	83.6034	836.0342	576.59	579.49	2.90	49.93	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	23	TOC	K1902127-001.12	15.8880 ppm	0.1089 ppm	0.6900%	2019/03/22 06:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	15.9649	159.6493	117.46	120.43	2.96	49.89	10:27
2	TOC	15.8110	158.1098	116.42	119.03	2.61	49.79	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	24	TOC	K1902127-002.12 4x	7.2203 ppm	0.1077 ppm	1.4900%	2019/03/22 06:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.2965	72.9647	58.62	61.29	2.67	49.75	10:31
2	TOC	7.1441	71.4414	57.59	60.28	2.69	49.70	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	25	TOC	K1902127-003.12	7.8209 ppm	0.0934 ppm	1.1900%	2019/03/22 07:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.8869	78.8693	62.63	65.27	2.64	49.66	10:27
2	TOC	7.7548	77.5479	61.73	64.50	2.77	49.65	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	26	TOC	K1902127-004.12 4x	4.6989 ppm	0.1032 ppm	2.2000%	2019/03/22 07:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.7718	47.7185	41.48	44.27	2.79	49.59	10:29
2	TOC	4.6259	46.2585	40.49	43.16	2.66	49.58	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	27	TOC	K1902147-001.01 100x	0.4629 ppm	0.0021 ppm	0.4500%	2019/03/22 08:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4644	4.6436	12.24	14.96	2.71	49.56	10:28
2	TOC	0.4614	4.6141	12.22	14.96	2.74	49.50	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	28	TOC	K1902147-002.01	1.1631 ppm	0.0267 ppm	2.2900%	2019/03/22 08:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.1820	11.8195	17.11	19.97	2.86	49.64	10:31
2	TOC	1.1442	11.4424	16.86	19.60	2.74	49.76	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	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)	24.6255 ppm (PASS)	0.0000 ppm	0%	2019/03/22 08:58

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.6255	246.2551	176.62	179.28	2.66	49.91	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 4

			Concentration			Min / Max				

	Pos	BAT	(ppm)	Dil	Sample ID	(% dev)	Result	Std. Dev.	RSD	Start Time
◈	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0686 ppm (PASS)	0.0000 ppm	0%	2019/03/22 09:13

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0686	0.6858	9.93	12.79	2.86	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 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	29	TOC	K1902168-001.04	2.0571 ppm	0.0518 ppm	2.5200%	2019/03/22 09:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.0937	20.9372	23.30	25.96	2.66	49.96	10:30
2	TOC	2.0205	20.2050	22.81	25.66	2.86	50.00	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	30	TOC	K1902168-002.04	1.0525 ppm	0.0826 ppm	7.8500%	2019/03/22 09:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.1109	11.1094	16.63	19.46	2.83	50.01	10:25
2	TOC	0.9941	9.9412	15.84	18.81	2.97	50.01	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	31	TOC	K1902169-001.24	14.4701 ppm	0.0860 ppm	0.5900%	2019/03/22 10:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	14.5309	145.3092	107.73	110.45	2.72	49.97	10:29
2	TOC	14.4092	144.0923	106.90	109.89	2.99	49.97	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	32	TOC	K1902169-002.24	17.8450 ppm	0.1318 ppm	0.7400%	2019/03/22 10:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	17.7518	177.5178	129.59	132.45	2.86	49.97	10:26
2	TOC	17.9381	179.3814	130.85	133.67	2.81	49.97	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	33	TOC	K1902169-003.24	18.8828 ppm	0.0274 ppm	0.1500%	2019/03/22 11:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	18.9022	189.0220	137.40	140.21	2.81	49.95	10:32
2	TOC	18.8635	188.6346	137.14	140.09	2.96	49.96	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	34	TOC	K1902169-004.24	9.3550 ppm	0.0898 ppm	0.9600%	2019/03/22 11:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.4185	94.1847	73.02	75.99	2.97	49.97	10:27
2	TOC	9.2915	92.9148	72.16	75.02	2.86	49.97	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	35	TOC	K1902169-005.24	11.8106 ppm	0.0557 ppm	0.4700%	2019/03/22 12:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	11.8500	118.4999	89.53	92.49	2.96	49.98	10:28
2	TOC	11.7712	117.7117	88.99	92.00	3.01	49.97	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	36	TOC	K1902169-006.24	11.8325 ppm	0.1654 ppm	1.4000%	2019/03/22 12:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	11.9494	119.4943	90.20	93.00	2.79	49.99	10:29
2	TOC	11.7155	117.1549	88.62	91.50	2.88	49.96	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC)	CAS_salt_010711	CAS_salt_010711

(v1238) (v4) (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	37	TOC	K1902169-007.24	12.8921 ppm	0.2771 ppm	2.1500%	2019/03/22 13:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	12.6962	126.9620	95.27	98.09	2.82	50.01	10:30
2	TOC	13.0881	130.8807	97.93	100.84	2.91	50.03	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	38	TOC	K1902169-008.24	15.4016 ppm	0.2088 ppm	1.3600%	2019/03/22 13:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	15.5492	155.4920	114.64	117.52	2.88	50.05	10:30
2	TOC	15.2540	152.5397	112.64	115.67	3.04	50.06	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	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)	24.4810 ppm (PASS)	0.0000 ppm	0%	2019/03/22 14:09

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.4810	244.8099	175.64	178.60	2.96	50.07	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 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)	0.0485 ppm (PASS)	0.0000 ppm	0%	2019/03/22 14:23

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0485	0.4854	9.79	12.80	3.01	50.09	10:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample

From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	39	TOC	MB3	0.0000 ppm	0.0000 ppm	0.0000%	2019/03/22 14:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.49	11.48	2.99	50.09	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	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)	26.3372 ppm (PASS)	0.0000 ppm	0%	2019/03/22 14:53

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	26.3372	263.3722	188.24	191.16	2.92	50.10	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 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	40	TOC	K1902230-001.05	2.0965 ppm	0.0063 ppm	0.3000%	2019/03/22 15:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.1009	21.0094	23.35	26.30	2.94	50.08	10:27
2	TOC	2.0921	20.9210	23.29	26.37	3.08	50.08	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	41	TOC	K1902230-002.05	0.9090 ppm	0.0394 ppm	4.3300%	2019/03/22 15:35

Rep	Base	ppm	µg	Adjusted	NDIR (Abs)	Baseline	Pressure	Run

#	Analysis Type			(Abs)		(Abs)	(psig)	Time
1	TOC	0.9368	9.3681	15.45	18.19	2.74	50.11	10:24
2	TOC	0.8811	8.8113	15.07	17.96	2.89	50.10	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	42	TOC	K1902230-003.05	1.0304 ppm	0.0033 ppm	0.3200%	2019/03/22 16:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0327	10.3272	16.10	18.96	2.86	50.11	10:29
2	TOC	1.0280	10.2800	16.07	18.99	2.92	50.10	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	43	TOC	K1902230-004.05	1.4208 ppm	0.0626 ppm	4.4100%	2019/03/22 16:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4651	14.6510	19.04	22.03	2.99	50.09	10:29
2	TOC	1.3766	13.7656	18.44	21.48	3.04	50.06	10:23

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	44	TOC	K1902230-005.05	0.5452 ppm	0.0150 ppm	2.7500%	2019/03/22 17:00

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5558	5.5584	12.86	15.72	2.85	50.11	10:28
2	TOC	0.5346	5.3463	12.72	15.64	2.92	50.10	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	45	TOC	K1902232-001.12	5.9922 ppm	0.0482 ppm	0.8000%	2019/03/22 17:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.9581	59.5807	49.54	52.48	2.94	50.09	10:26
2	TOC	6.0263	60.2628	50.00	53.07	3.07	50.11	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	33.5471	335.4714	236.81	239.79	2.98	50.10	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	47	TOC	RB	0.0443 ppm	0.0000 ppm	0.0000%	2019/03/22 18:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0443	0.4435	9.39	12.26	2.87	50.11	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	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)	24.1426 ppm (PASS)	0.0000 ppm	0%	2019/03/22 18:25

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.1426	241.4260	173.34	176.18	2.84	50.17	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/03/22 18:40

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	8.99	12.03	3.03	50.10	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample

From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	48	TOC	K1902232-002.12	10.0441 ppm	0.0777 ppm	0.7700%	2019/03/22 18:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.9892	99.8919	76.90	79.97	3.07	50.16	10:29
2	TOC	10.0991	100.9909	77.64	80.42	2.78	50.05	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	49	TOC	K1902232-003.12	14.1220 ppm	0.0201 ppm	0.1400%	2019/03/22 19:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	14.1362	141.3625	105.05	108.04	3.00	50.06	10:26
2	TOC	14.1078	141.0782	104.86	107.79	2.93	50.04	10:23

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	50	TOC	K1902121-001.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/03/22 19:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.86	11.75	2.89	50.04	10:25
2	TOC	0.0000	0.0000	9.03	12.04	3.01	50.03	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	51	TOC	K1902121-002.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/03/22 20:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.20	11.22	3.02	50.00	10:31
2	TOC	0.0000	0.0000	8.53	11.57	3.04	50.01	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	52	TOC	K1902435-001.02	116.2162 ppm	5.5539 ppm	4.7800%	2019/03/22 20:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	120.1434	1201.4336	824.62	827.61	2.99	49.98	10:28
2	TOC	112.2890	1122.8899	771.30	774.91	3.61	49.98	10:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	53	TOC	K1902435-002.01	4.2973 ppm	1.4335 ppm	33.3600%	2019/03/22 21:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.3109	53.1089	45.14	48.45	3.31	49.96	10:25
2	TOC	3.2836	32.8362	31.38	34.42	3.04	49.97	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	54	TOC	K1902435-003.01	3.2785 ppm	0.2293 ppm	6.9900%	2019/03/22 21:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.4407	34.4066	32.45	35.43	2.98	49.95	10:30
2	TOC	3.1164	31.1641	30.25	33.19	2.94	49.96	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	55	TOC	K1902435-004.01	5.1276 ppm	0.2636 ppm	5.1400%	2019/03/22 22:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.3140	53.1399	45.16	48.09	2.93	49.95	10:26
2	TOC	4.9413	49.4127	42.63	45.55	2.91	49.94	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	56	TOC	K1902435-005.01	132.6232 ppm	6.5383 ppm	4.9300%	2019/03/22 22:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	137.2465	1372.4649	940.71	943.70	2.99	49.92	10:25
2	TOC	127.9999	1279.9994	877.95	881.72	3.77	49.99	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC)	CAS_salt_010711	CAS_salt_010711

(v1238) (v4) (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	57	TOC	K1902435-006.01	122.9733 ppm	6.3170 ppm	5.1400%	2019/03/22 23:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	118.5065	1185.0649	813.51	817.08	3.57	50.07	10:26
2	TOC	127.4401	1274.4013	874.15	878.10	3.95	50.09	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	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)	27.6282 ppm (PASS)	0.0000 ppm	0%	2019/03/22 23:35

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	27.6282	276.2819	197.00	200.68	3.68	50.18	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 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)	1.1283 ppm (PASS)	0.0000 ppm	0%	2019/03/22 23:50

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	1.1283	11.2825	17.12	20.21	3.09	50.20	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample

From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	59	TOC	K1902435-007.01	12.6387 ppm	0.1397 ppm	1.1100%	2019/03/23 00:05

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	12.7374	127.3745	95.55	98.46	2.91	50.20	10:30
2	TOC	12.5399	125.3989	94.21	97.27	3.06	50.20	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	60	TOC	K1902435-007.01 ms	33.4785 ppm	0.0000 ppm	0.0000%	2019/03/23 00:33

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	33.4785	334.7849	236.34	239.34	3.00	50.22	10:33

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	61	TOC	RB	0.6159 ppm	0.0000 ppm	0.0000%	2019/03/23 00:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6159	6.1595	13.27	16.42	3.14	50.22	10:33

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	62	TOC	K1902254-001.01	6.6998 ppm	0.1143 ppm	1.7100%	2019/03/23 01:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.7806	67.8056	55.12	58.04	2.92	50.23	10:28
2	TOC	6.6189	66.1895	54.02	57.06	3.04	50.22	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	63	TOC	K1902254-002.01	18.5047 ppm	0.1440 ppm	0.7800%	2019/03/23 01:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	18.6065	186.0653	135.39	138.31	2.92	50.23	10:30
2	TOC	18.4029	184.0293	134.01	137.12	3.11	50.22	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

		Analysis			Std. Dev.		

	Pos	Type	Sample ID	Result (ppmC)	(ppmC)	RSD	Start Time
◈	64	TOC	K1902254-003.01	22.2028 ppm	0.0577 ppm	0.2600%	2019/03/23 01:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	22.2436	222.4357	160.08	163.10	3.02	50.23	10:28
2	TOC	22.1620	221.6195	159.53	162.65	3.12	50.23	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	65	TOC	RB	0.0278 ppm	0.0393 ppm	141.4200%	2019/03/23 02:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0555	0.5554	9.47	12.55	3.08	50.21	10:29
2	TOC	0.0000	0.0000	8.79	11.75	2.96	50.21	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 9.0920 (IC) (v1238)	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)	24.0426 ppm (PASS)	0.0000 ppm	0%	2019/03/23 02:55

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.0426	240.4257	172.66	175.53	2.87	50.20	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/03/23 03:09

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	9.20	12.29	3.09	50.20	10:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria	Do Nothing	CAS_salt_010711	CAS_salt_010711	0 ppmC

met.	(v4)	(v30)

Meta Data Used in this Report

Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1237	1.0520	0.7490	0.0000	0.0000	0.0000	2019/03/19 18:04	Fusion1 (Fusion1)
v1238	2.8787	1.7600	0.0000	0.0000	0.0000	2019/03/21 19:27	Fusion1 (Fusion1)

Calibrations

Name: CAS_salt_010711 (TOC)

Version: v30

Ver Creation: 2019/03/05 17:42

Comment:

Operator: Fusion1 (Fusion1)

Basic Analysis Type: TOC

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

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

Basic Analysis Type: TOC

Sample ID	Y Raw Value	X Expected	Message	End Time
DI Water	7.8970	0.0000		2019/03/05 16:15
0.500 ppm	11.5280	0.5000		2019/03/05 16:29
1.0 ppm	14.9760	1.0000		2019/03/05 16:44
5.0 ppm	43.6500	5.0000		2019/03/05 16:58
10 ppm	79.6020	10.0000		2019/03/05 17:12
25 ppm	183.3580	25.0000		2019/03/05 17:26
50 ppm	346.3230	50.0000		2019/03/05 17:40

Methods

Name: CAS_salt_010711 (TOC)

Version: v4

Ver Creation: 2019/02/21 17:57

Comment:

Operator: Fusion1 (Fusion1)

Parameter	Value
SampleVolume	10.0 mL
Dilution	1:10
AcidVolume	0.5 ml

Advanced Parameter	Value
NeedleRinseVolume	5.0 ml
VialPrimeVolume	2.0 ml
ICSamplePrimeVolume	2.0 ml

ReagentVolume	2.0 ml	ICSpargeRinseVolume	12.0 ml
UVReactorPrerinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPrerinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPrerinses	1	SyringeSpeedWaste	10
ICSpargeTime	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

Report History

Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/03/23 03:26

StarLIMS Run: 629142, 629144, 629629146, 629149

Analysis: TOC/DOC

Method: 9060, 415.1, SM 5310 C, 9060A

CCV: 11-GEN-05-76B 50 ppm LCS: 11-GEN-05-74L 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-05-70O 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-77B

21 % H3PO4: 11-GEN-05-77A

Equipment ID: K-TOC-03

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

FILTER ID: NA

Analyzed By:	BCD	Date Analyzed:	~~3/23/19~~ 21 ①
Reviewed By:	Fang	Date Reviewed:	03/25/19

①BCD 3/23/19

10450 Stancliff Rd. Suite 210
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March 31, 2019

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

Work Order: **HS19030761**

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

Dear Marcia,

ALS Environmental received 3 sample(s) on Mar 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

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
Work Order: HS19030761

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19030761-01	LH18/24-SP650_031419	Water		14-Mar-2019 14:00	15-Mar-2019 08:38	☐
HS19030761-02	LH18/24-SP650_031419_BIX	Water		14-Mar-2019 14:00	15-Mar-2019 08:38	☐
HS19030761-03	Trip Blank	Water	ALS 022719-66	14-Mar-2019 14:00	15-Mar-2019 08:38	☐

ALS Houston, US Date: 31-Mar-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: 138779

Sample ID: LCSD-138779

- The RPD between the LCS and LCSD was outside of the control limit. Surrogate Nitrobenzene-d5

Sample ID: LH18/24-SP650_031419 (HS19030761-01)

- One or more of the method 8270 surrogates were recovered outside of the control limits. This was due to a dilution required for sample analysis.

GCMS Volatiles by Method SW8260

Batch ID: R334643

Sample ID: HS19030640-01MS

- MS and MSD are for an unrelated sample

Metals by Method SW6020

Batch ID: 138939

Sample ID: HS19030918-01MS

- MS and MSD are for an unrelated sample

WetChemistry by Method SW7196

Batch ID: R334752

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

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples		WorkOrder:HS19030761
Sample ID:	LH18/24-SP650_031419		Lab ID:HS19030761-01
Collection Date:	14-Mar-2019 14:00		Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,2-Dichloroethane	**0.53**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Mar-2019 13:16
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 13:16
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
2-Butanone	**3.5**		**0.50**	**1.0**	**2.0**	**UG/L**	1	15-Mar-2019 13:16
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Mar-2019 13:16
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 13:16
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Mar-2019 13:16
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	15-Mar-2019 13:16
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Mar-2019 13:16
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16

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

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples		WorkOrder:HS19030761
Sample ID:	LH18/24-SP650_031419		Lab ID:HS19030761-01
Collection Date:	14-Mar-2019 14:00		Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
cis-1,2-Dichloroethene	**2.1**		**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Mar-2019 13:16
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Mar-2019 13:16
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Mar-2019 13:16
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	15-Mar-2019 13:16
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 13:16
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Trichloroethene	**0.74**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	15-Mar-2019 13:16
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 13:16
Surr: 1,2-Dichloroethane-d4	*88.8*			**0**	*81-118*	*%REC*	*1*	*15-Mar-2019 13:16*
Surr: 4-Bromofluorobenzene	*97.3*			**0**	*85-114*	*%REC*	*1*	*15-Mar-2019 13:16*
Surr: Dibromofluoromethane	*90.5*			**0**	*80-119*	*%REC*	*1*	*15-Mar-2019 13:16*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*1*	*15-Mar-2019 13:16*
SEMIVOLATILES SIM		**Method:SW8270SIM**				Prep:SW3510 / 18-Mar-2019		Analyst: QX
1,4-Dioxane	**3.1**		**0.10**	**0.10**	**0.10**	**ug/L**	10	18-Mar-2019 16:42
Surr: 2-Fluorobiphenyl	*193*	*S*		**0**	*40-140*	*%REC*	*10*	*18-Mar-2019 16:42*
Surr: 4-Terphenyl-d14	*62.7*			**0**	*40-140*	*%REC*	*10*	*18-Mar-2019 16:42*
Surr: Nitrobenzene-d5	*103*			**0**	*40-140*	*%REC*	*10*	*18-Mar-2019 16:42*
ICP-MS METALS BY SW6020A		**Method:SW6020**				Prep:SW3010A / 21-Mar-2019		Analyst: JCJ
Barium	**0.139**		**0.00190**	**0.00250**	**0.00400**	**mg/L**	1	23-Mar-2019 01:05
Lead	0.00100	U	0.000600	0.00100	0.00200	mg/L	1	23-Mar-2019 01:05
Selenium	0.00250	U	0.00110	0.00250	0.00200	mg/L	1	23-Mar-2019 01:05
Silver	0.000500	U	0.000200	0.000500	0.00200	mg/L	1	23-Mar-2019 01:05

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

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples		WorkOrder:HS19030761
Sample ID:	LH18/24-SP650_031419		Lab ID:HS19030761-01
Collection Date:	14-Mar-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	15-Mar-2019 12:14

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

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples		WorkOrder:HS19030761
Sample ID:	LH18/24-SP650_031419_BIX		Lab ID:HS19030761-02
Collection Date:	14-Mar-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	31-Mar-2019 12:13

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

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.	**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples	WorkOrder:HS19030761
Sample ID:	Trip Blank	Lab ID:HS19030761-03
Collection Date:	14-Mar-2019 14:00	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 12:52
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	15-Mar-2019 12:52
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	15-Mar-2019 12:52
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 12:52
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	15-Mar-2019 12:52
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	15-Mar-2019 12:52
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	15-Mar-2019 12:52
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52

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

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples		WorkOrder:HS19030761
Sample ID:	Trip Blank		Lab ID:HS19030761-03
Collection Date:	14-Mar-2019 14:00		Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	15-Mar-2019 12:52
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	15-Mar-2019 12:52
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	15-Mar-2019 12:52
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	15-Mar-2019 12:52
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	15-Mar-2019 12:52
Surr: 1,2-Dichloroethane-d4	*88.7*			**0**	*81-118*	*%REC*	*1*	*15-Mar-2019 12:52*
Surr: 4-Bromofluorobenzene	*102*			**0**	*85-114*	*%REC*	*1*	*15-Mar-2019 12:52*
Surr: Dibromofluoromethane	*90.1*			**0**	*80-119*	*%REC*	*1*	*15-Mar-2019 12:52*
Surr: Toluene-d8	*103*			**0**	*89-112*	*%REC*	*1*	*15-Mar-2019 12:52*

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: HS19030761

Batch ID: 138779 **Method:** SEMIVOLATILES SIM **Prep:** 3510_B_SIM

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19030761-01	1	980	1 (mL)	0.00102

Batch ID: 138939 **Method:** ICP-MS METALS BY SW6020A **Prep:** 3010A

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19030761-01	1	10	10 (mL)	1

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19030761

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID 138779	**Test Name :** SEMIVOLATILES SIM			**Matrix:** Water		
HS19030761-01	LH18/24-SP650_031419	14 Mar 2019 14:00		18 Mar 2019 12:38	18 Mar 2019 16:42	10
Batch ID 138939	**Test Name :** ICP-MS METALS BY SW6020A			**Matrix:** Water		
HS19030761-01	LH18/24-SP650_031419	14 Mar 2019 14:00		21 Mar 2019 10:00	23 Mar 2019 01:05	1
Batch ID R334643	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C			**Matrix:** Water		
HS19030761-01	LH18/24-SP650_031419	14 Mar 2019 14:00			15 Mar 2019 13:16	1
HS19030761-03	Trip Blank	14 Mar 2019 14:00			15 Mar 2019 12:52	1
Batch ID R334752	**Test Name :** HEXAVALENT CHROMIUM BY SW7196A			**Matrix:** Water		
HS19030761-01	LH18/24-SP650_031419	14 Mar 2019 14:00			15 Mar 2019 12:14	1
Batch ID R335660	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			**Matrix:** Water		
HS19030761-02	LH18/24-SP650_031419_BIX	14 Mar 2019 14:00			31 Mar 2019 12:13	1

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19030761

QC BATCH REPORT NEW

Batch ID: 138939 (0) **Instrument:** ICPMS04 **Method:** ICP-MS METALS BY SW6020A

MBLK Sample ID: **MBLK-138939** Units: **mg/L** Analysis Date: **23-Mar-2019 00:40**
Client ID: Run ID: **ICPMS04_335069** SeqNo: **5003309** PrepDate: **21-Mar-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-138939** Units: **mg/L** Analysis Date: **23-Mar-2019 00:42**
Client ID: Run ID: **ICPMS04_335069** SeqNo: **5003310** PrepDate: **21-Mar-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.05067	0.00400	0.05	0	101	80 - 120				
Lead	0.05015	0.00200	0.05	0	100	80 - 120				
Selenium	0.05143	0.00200	0.05	0	103	80 - 120				
Silver	0.05011	0.00200	0.05	0	100	80 - 120				

MS Sample ID: **HS19030918-01MS** Units: **mg/L** Analysis Date: **23-Mar-2019 00:49**
Client ID: Run ID: **ICPMS04_335069** SeqNo: **5003313** PrepDate: **21-Mar-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.4055	0.00400	0.05	0.3415	128	80 - 120				SO
Lead	0.04827	0.00200	0.05	0.000163	96.2	80 - 120				
Selenium	0.05006	0.00200	0.05	-0.000569	101	80 - 120				
Silver	0.04751	0.00200	0.05	-0.000012	95.0	80 - 120				

MSD Sample ID: **HS19030918-01MSD** Units: **mg/L** Analysis Date: **23-Mar-2019 00:51**
Client ID: Run ID: **ICPMS04_335069** SeqNo: **5003314** PrepDate: **21-Mar-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.4147	0.00400	0.05	0.3415	146	80 - 120	0.4055	2.23	20	SO
Lead	0.05045	0.00200	0.05	0.000163	101	80 - 120	0.04827	4.41	20	
Selenium	0.0556	0.00200	0.05	-0.000569	112	80 - 120	0.05006	10.5	20	
Silver	0.04885	0.00200	0.05	-0.000012	97.7	80 - 120	0.04751	2.79	20	

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19030761

QC BATCH REPORT NEW

Batch ID: 138939 (0) **Instrument:** ICPMS04 **Method:** ICP-MS METALS BY SW6020A

PDS Sample ID: **HS19030918-01PDS** Units: **mg/L** Analysis Date: **23-Mar-2019 00:53**
Client ID: Run ID: **ICPMS04_335069** SeqNo: **5003315** PrepDate: **21-Mar-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.4541	0.00400	0.1	0.3415	113	75 - 125				
Lead	0.09808	0.00200	0.1	0.000163	97.9	75 - 125				
Selenium	0.1029	0.00200	0.1	-0.000569	103	75 - 125				
Silver	0.08679	0.00200	0.1	-0.000012	86.8	75 - 125				

SD Sample ID: **HS19030918-01SD** Units: **mg/L** Analysis Date: **23-Mar-2019 00:47**
Client ID: Run ID: **ICPMS04_335069** SeqNo: **5003312** PrepDate: **21-Mar-2019** DF: **5**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Barium	0.3292	0.0200					0.3415	3.6	10	
Lead	0.00500	0.0100					0.000163	0	10	U
Selenium	0.0125	0.0100					-0.000569	0	10	U
Silver	0.00250	0.0100					-0.000012	0	10	U

The following samples were analyzed in this batch: HS19030761-01

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19030761

QC BATCH REPORT NEW

Batch ID: 138779 (0) **Instrument:** SV-5 **Method:** SEMIVOLATILES SIM

MBLK Sample ID: **MBLK-138779** Units: **ug/L** Analysis Date: **18-Mar-2019 12:55**
Client ID: Run ID: **SV-5_334775** SeqNo: **4995605** PrepDate: **18-Mar-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	*0.09739*	*0*	*0.08*	*0*	*122*	*40 - 140*				
Surr: 4-Terphenyl-d14	*0.08402*	*0*	*0.08*	*0*	*105*	*40 - 140*				
Surr: Nitrobenzene-d5	*0.07978*	*0*	*0.08*	*0*	*99.7*	*40 - 140*				

LCS Sample ID: **LCS-138779** Units: **ug/L** Analysis Date: **18-Mar-2019 13:16**
Client ID: Run ID: **SV-5_334775** SeqNo: **4995606** PrepDate: **18-Mar-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,4-Dioxane	0.08961	0.010	0.08	0	112	40 - 140				
Surr: 2-Fluorobiphenyl	*0.1004*	*0*	*0.08*	*0*	*126*	*40 - 140*				
Surr: 4-Terphenyl-d14	*0.05163*	*0*	*0.08*	*0*	*64.5*	*40 - 140*				
Surr: Nitrobenzene-d5	*0.07478*	*0*	*0.08*	*0*	*93.5*	*40 - 140*				

LCSD Sample ID: **LCSD-138779** Units: **ug/L** Analysis Date: **18-Mar-2019 13:37**
Client ID: Run ID: **SV-5_334775** SeqNo: **4995607** PrepDate: **18-Mar-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,4-Dioxane	0.09058	0.010	0.08	0	113	40 - 140	0.08961	1.07	20	
Surr: 2-Fluorobiphenyl	*0.1045*	*0*	*0.08*	*0*	*131*	*40 - 140*	*0.1004*	*4.04*	*20*	
Surr: 4-Terphenyl-d14	*0.05772*	*0*	*0.08*	*0*	*72.2*	*40 - 140*	*0.05163*	*11.1*	*20*	
Surr: Nitrobenzene-d5	*0.09447*	*0*	*0.08*	*0*	*118*	*40 - 140*	*0.07478*	*23.3*	*20*	R

The following samples were analyzed in this batch: HS19030761-01

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19030761

QC BATCH REPORT NEW

Batch ID: R334643 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-190315** Units: **UG/L** Analysis Date: **15-Mar-2019 12:28**
Client ID: Run ID: **VOA6_334643** SeqNo: **4992329** 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	2.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U
Bromomethane	0.50	1.0								U

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19030761

QC BATCH REPORT NEW

Batch ID: R334643 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-190315** Units: **UG/L** Analysis Date: **15-Mar-2019 12:28**
Client ID: Run ID: **VOA6_334643** SeqNo: **4992329** 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	0.50	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	*45.24*	*1.0*	*50*	*0*	*90.5*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49.92*	*1.0*	*50*	*0*	*99.8*	*85 - 114*				
Surr: Dibromofluoromethane	*45.41*	*1.0*	*50*	*0*	*90.8*	*80 - 119*				
Surr: Toluene-d8	*53.38*	*1.0*	*50*	*0*	*107*	*89 - 112*				

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19030761

QC BATCH REPORT NEW

Batch ID: R334643 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-190315** Units: **UG/L** Analysis Date: **15-Mar-2019 11:40**
Client ID: Run ID: **VOA6_334643** SeqNo: **4992328** 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	22.16	1.0	20	0	111	78 - 124				
1,1,1-Trichloroethane	16.14	1.0	20	0	80.7	74 - 131				
1,1,2,2-Tetrachloroethane	22.71	1.0	20	0	114	71 - 121				
1,1,2-Trichloroethane	22.94	1.0	20	0	115	80 - 119				
1,1-Dichloroethane	18.71	1.0	20	0	93.6	77 - 125				
1,1-Dichloroethene	15.69	1.0	20	0	78.5	71 - 131				
1,1-Dichloropropene	16.39	1.0	20	0	81.9	78 - 125				
1,2,3-Trichlorobenzene	18.01	1.0	20	0	90.1	69 - 129				
1,2,3-Trichloropropane	22.87	1.0	20	0	114	73 - 122				
1,2,4-Trichlorobenzene	19.19	1.0	20	0	95.9	69 - 130				
1,2,4-Trimethylbenzene	19.85	1.0	20	0	99.3	76 - 124				
1,2-Dibromo-3-chloropropane	22.7	1.0	20	0	114	62 - 128				
1,2-Dibromoethane	23.61	1.0	20	0	118	77 - 121				
1,2-Dichlorobenzene	21.03	1.0	20	0	105	80 - 119				
1,2-Dichloroethane	21.58	1.0	20	0	108	73 - 128				
1,2-Dichloropropane	20.91	1.0	20	0	105	78 - 122				
1,3,5-Trimethylbenzene	19.08	1.0	20	0	95.4	75 - 124				
1,3-Dichlorobenzene	20.4	1.0	20	0	102	80 - 119				
1,3-Dichloropropane	23.02	1.0	20	0	115	80 - 119				
1,4-Dichlorobenzene	20.42	1.0	20	0	102	79 - 118				
2,2-Dichloropropane	17.11	1.0	20	0	85.5	60 - 139				
2-Butanone	41.75	2.0	40	0	104	56 - 143				
2-Chlorotoluene	19.61	1.0	20	0	98.0	79 - 122				
2-Hexanone	45.67	2.0	40	0	114	57 - 139				
4-Chlorotoluene	19.89	1.0	20	0	99.5	78 - 122				
4-Isopropyltoluene	17.81	1.0	20	0	89.1	77 - 127				
4-Methyl-2-pentanone	45.87	2.0	40	0	115	67 - 130				
Acetone	41.97	2.0	40	0	105	39 - 160				
Benzene	20.55	1.0	20	0	103	79 - 120				
Bromobenzene	21.65	1.0	20	0	108	80 - 120				
Bromochloromethane	19.78	1.0	20	0	98.9	78 - 123				
Bromodichloromethane	21.11	1.0	20	0	106	79 - 125				
Bromoform	22.6	1.0	20	0	113	66 - 130				
Bromomethane	22.21	1.0	20	0	111	53 - 141				

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19030761

QC BATCH REPORT NEW

Batch ID: R334643 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-190315** Units: **UG/L** Analysis Date: **15-Mar-2019 11:40**
Client ID: Run ID: **VOA6_334643** SeqNo: **4992328** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	32.8	2.0	40	0	82.0	64 - 133				
Carbon tetrachloride	17.12	1.0	20	0	85.6	72 - 136				
Chlorobenzene	21.13	1.0	20	0	106	82 - 118				
Chloroethane	17.29	1.0	20	0	86.4	60 - 138				
Chloroform	19.52	1.0	20	0	97.6	79 - 124				
Chloromethane	19.05	1.0	20	0	95.3	50 - 139				
cis-1,2-Dichloroethene	19.07	1.0	20	0	95.3	78 - 123				
cis-1,3-Dichloropropene	21.65	1.0	20	0	108	75 - 124				
Dibromochloromethane	23.09	1.0	20	0	115	74 - 126				
Dibromomethane	21.72	1.0	20	0	109	79 - 123				
Dichlorodifluoromethane	14.43	1.0	20	0	72.1	32 - 152				
Ethylbenzene	19.86	1.0	20	0	99.3	79 - 121				
Hexachlorobutadiene	18.24	1.0	20	0	91.2	66 - 134				
Isopropylbenzene	18.08	1.0	20	0	90.4	72 - 131				
m,p-Xylene	39.8	2.0	40	0	99.5	80 - 121				
Methylene chloride	20.23	2.0	20	0	101	74 - 124				
Naphthalene	19.53	1.0	20	0	97.6	61 - 128				
n-Butylbenzene	17.73	1.0	20	0	88.6	75 - 128				
n-Propylbenzene	18.26	1.0	20	0	91.3	76 - 126				
o-Xylene	20.76	1.0	20	0	104	78 - 122				
sec-Butylbenzene	16.87	1.0	20	0	84.4	77 - 126				
Styrene	22.12	1.0	20	0	111	78 - 123				
tert-Butylbenzene	17.52	1.0	20	0	87.6	78 - 124				
Tetrachloroethene	18.01	1.0	20	0	90.0	74 - 129				
Toluene	20.99	1.0	20	0	105	80 - 121				
trans-1,2-Dichloroethene	18.14	1.0	20	0	90.7	75 - 124				
trans-1,3-Dichloropropene	22.11	1.0	20	0	111	73 - 127				
Trichloroethene	18.65	1.0	20	0	93.3	79 - 123				
Trichlorofluoromethane	14.72	1.0	20	0	73.6	65 - 141				
Vinyl chloride	15.41	1.0	20	0	77.1	58 - 137				
Surr: 1,2-Dichloroethane-d4	*44.38*	*1.0*	*50*	*0*	*88.8*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49.83*	*1.0*	*50*	*0*	*99.7*	*85 - 114*				
Surr: Dibromofluoromethane	*45.28*	*1.0*	*50*	*0*	*90.6*	*80 - 119*				
Surr: Toluene-d8	*52.92*	*1.0*	*50*	*0*	*106*	*89 - 112*				

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19030761

QC BATCH REPORT NEW

Batch ID: R334643 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19030640-01MS** Units: **UG/L** Analysis Date: **15-Mar-2019 15:16**
Client ID: Run ID: **VOA6_334643** SeqNo: **4993378** 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	21.87	1.0	20	0	109	78 - 124				
1,1,1-Trichloroethane	18.37	1.0	20	0	91.8	74 - 131				
1,1,2,2-Tetrachloroethane	22.01	1.0	20	0	110	71 - 121				
1,1,2-Trichloroethane	22.04	1.0	20	0	110	80 - 119				
1,1-Dichloroethane	18.38	1.0	20	0	91.9	77 - 125				
1,1-Dichloroethene	16.87	1.0	20	0	84.4	71 - 131				
1,1-Dichloropropene	19.1	1.0	20	0	95.5	78 - 125				
1,2,3-Trichlorobenzene	20.17	1.0	20	0	101	69 - 129				
1,2,3-Trichloropropane	21.55	1.0	20	0	108	73 - 122				
1,2,4-Trichlorobenzene	20.7	1.0	20	0	103	69 - 130				
1,2,4-Trimethylbenzene	21.33	1.0	20	0	107	76 - 124				
1,2-Dibromo-3-chloropropane	22.55	1.0	20	0	113	62 - 128				
1,2-Dibromoethane	22.2	1.0	20	0	111	77 - 121				
1,2-Dichlorobenzene	21.17	1.0	20	0	106	80 - 119				
1,2-Dichloroethane	20.86	1.0	20	0	104	73 - 128				
1,2-Dichloropropane	20.3	1.0	20	0	102	78 - 122				
1,3,5-Trimethylbenzene	20.92	1.0	20	0	105	75 - 124				
1,3-Dichlorobenzene	21.41	1.0	20	0	107	80 - 119				
1,3-Dichloropropane	22.07	1.0	20	0	110	80 - 119				
1,4-Dichlorobenzene	20.83	1.0	20	0	104	79 - 118				
2,2-Dichloropropane	18.57	1.0	20	0	92.9	60 - 139				
2-Butanone	40.73	2.0	40	0	102	56 - 143				
2-Chlorotoluene	21.03	1.0	20	0	105	79 - 122				
2-Hexanone	44.22	2.0	40	0	111	57 - 139				
4-Chlorotoluene	20.94	1.0	20	0	105	78 - 122				
4-Isopropyltoluene	20.89	1.0	20	0	104	77 - 127				
4-Methyl-2-pentanone	44.67	2.0	40	0	112	67 - 130				
Acetone	37.88	2.0	40	0	94.7	39 - 160				
Benzene	20.21	1.0	20	0	101	79 - 120				
Bromobenzene	21.83	1.0	20	0	109	80 - 120				
Bromochloromethane	18.73	1.0	20	0	93.6	78 - 123				
Bromodichloromethane	20.96	1.0	20	0	105	79 - 125				
Bromoform	21.92	1.0	20	0	110	66 - 130				
Bromomethane	21.2	1.0	20	0	106	53 - 141				

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19030761

QC BATCH REPORT NEW

Batch ID: R334643 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19030640-01MS** Units: **UG/L** Analysis Date: **15-Mar-2019 15:16**
Client ID: Run ID: **VOA6_334643** SeqNo: **4993378** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	31.5	2.0	40	0	78.8	64 - 133				
Carbon tetrachloride	20.18	1.0	20	0	101	72 - 136				
Chlorobenzene	21.21	1.0	20	0	106	82 - 118				
Chloroethane	15.49	1.0	20	0	77.5	60 - 138				
Chloroform	19.18	1.0	20	0	95.9	79 - 124				
Chloromethane	13.1	1.0	20	0	65.5	50 - 139				
cis-1,2-Dichloroethene	19.38	1.0	20	0	96.9	78 - 123				
cis-1,3-Dichloropropene	20.85	1.0	20	0	104	75 - 124				
Dibromochloromethane	22.27	1.0	20	0	111	74 - 126				
Dibromomethane	20.77	1.0	20	0	104	79 - 123				
Dichlorodifluoromethane	6.432	1.0	20	0	32.2	32 - 152				
Ethylbenzene	21.28	1.0	20	0	106	79 - 121				
Hexachlorobutadiene	20.9	1.0	20	0	104	66 - 134				
Isopropylbenzene	21.35	1.0	20	0	107	72 - 131				
m,p-Xylene	43	2.0	40	0	107	80 - 121				
Methylene chloride	19.69	2.0	20	0	98.4	74 - 124				
Naphthalene	21.03	1.0	20	0	105	61 - 128				
n-Butylbenzene	20.68	1.0	20	0	103	75 - 128				
n-Propylbenzene	21.1	1.0	20	0	105	76 - 126				
o-Xylene	21.6	1.0	20	0	108	78 - 122				
sec-Butylbenzene	20.35	1.0	20	0	102	77 - 126				
Styrene	0.6311	1.0	20	0	3.16	78 - 123				JS
tert-Butylbenzene	20.72	1.0	20	0	104	78 - 124				
Tetrachloroethene	21.75	1.0	20	0.6002	106	74 - 129				
Toluene	21.49	1.0	20	0	107	80 - 121				
trans-1,2-Dichloroethene	18.66	1.0	20	0	93.3	75 - 124				
trans-1,3-Dichloropropene	21.08	1.0	20	0	105	73 - 127				
Trichloroethene	24.07	1.0	20	0	120	79 - 123				
Trichlorofluoromethane	16.28	1.0	20	0	81.4	65 - 141				
Vinyl chloride	11.55	1.0	20	0	57.8	58 - 137				S
Surr: 1,2-Dichloroethane-d4	*44.6*	*1.0*	*50*	*0*	*89.2*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*50.01*	*1.0*	*50*	*0*	*100*	*85 - 114*				
Surr: Dibromofluoromethane	*45.51*	*1.0*	*50*	*0*	*91.0*	*80 - 119*				
Surr: Toluene-d8	*52.76*	*1.0*	*50*	*0*	*106*	*89 - 112*				

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.	**QC BATCH REPORT NEW**
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples	
WorkOrder:	HS19030761	

Batch ID: R334643 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19030640-01MSD** Units: **UG/L** Analysis Date: **15-Mar-2019 15:41**

Client ID: Run ID: **VOA6_334643** SeqNo: **4993379** 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	21.49	1.0	20	0	107	78 - 124	21.87	1.74	20	
1,1,1-Trichloroethane	19.31	1.0	20	0	96.6	74 - 131	18.37	5.02	20	
1,1,2,2-Tetrachloroethane	20.34	1.0	20	0	102	71 - 121	22.01	7.9	20	
1,1,2-Trichloroethane	21.49	1.0	20	0	107	80 - 119	22.04	2.51	20	
1,1-Dichloroethane	19.13	1.0	20	0	95.6	77 - 125	18.38	3.96	20	
1,1-Dichloroethene	18.15	1.0	20	0	90.8	71 - 131	16.87	7.33	20	
1,1-Dichloropropene	20.27	1.0	20	0	101	78 - 125	19.1	5.94	20	
1,2,3-Trichlorobenzene	20.76	1.0	20	0	104	69 - 129	20.17	2.85	20	
1,2,3-Trichloropropane	20.04	1.0	20	0	100	73 - 122	21.55	7.23	20	
1,2,4-Trichlorobenzene	21.24	1.0	20	0	106	69 - 130	20.7	2.58	20	
1,2,4-Trimethylbenzene	21	1.0	20	0	105	76 - 124	21.33	1.52	20	
1,2-Dibromo-3-chloropropane	20.98	1.0	20	0	105	62 - 128	22.55	7.21	20	
1,2-Dibromoethane	21.63	1.0	20	0	108	77 - 121	22.2	2.61	20	
1,2-Dichlorobenzene	20.55	1.0	20	0	103	80 - 119	21.17	2.97	20	
1,2-Dichloroethane	20.98	1.0	20	0	105	73 - 128	20.86	0.57	20	
1,2-Dichloropropane	20.63	1.0	20	0	103	78 - 122	20.3	1.62	20	
1,3,5-Trimethylbenzene	21.04	1.0	20	0	105	75 - 124	20.92	0.553	20	
1,3-Dichlorobenzene	20.51	1.0	20	0	103	80 - 119	21.41	4.28	20	
1,3-Dichloropropane	21.28	1.0	20	0	106	80 - 119	22.07	3.66	20	
1,4-Dichlorobenzene	20.2	1.0	20	0	101	79 - 118	20.83	3.05	20	
2,2-Dichloropropane	19.45	1.0	20	0	97.3	60 - 139	18.57	4.62	20	
2-Butanone	39.77	2.0	40	0	99.4	56 - 143	40.73	2.39	20	
2-Chlorotoluene	20.53	1.0	20	0	103	79 - 122	21.03	2.42	20	
2-Hexanone	42.25	2.0	40	0	106	57 - 139	44.22	4.55	20	
4-Chlorotoluene	20.55	1.0	20	0	103	78 - 122	20.94	1.88	20	
4-Isopropyltoluene	21.3	1.0	20	0	107	77 - 127	20.89	1.96	20	
4-Methyl-2-pentanone	42.72	2.0	40	0	107	67 - 130	44.67	4.46	20	
Acetone	37.52	2.0	40	0	93.8	39 - 160	37.88	0.939	20	
Benzene	20.89	1.0	20	0	104	79 - 120	20.21	3.31	20	
Bromobenzene	20.64	1.0	20	0	103	80 - 120	21.83	5.58	20	
Bromochloromethane	19.32	1.0	20	0	96.6	78 - 123	18.73	3.08	20	
Bromodichloromethane	21.16	1.0	20	0	106	79 - 125	20.96	0.916	20	
Bromoform	21.22	1.0	20	0	106	66 - 130	21.92	3.28	20	
Bromomethane	20.44	1.0	20	0	102	53 - 141	21.2	3.64	20	

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.	**QC BATCH REPORT NEW**
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples	
WorkOrder:	HS19030761	

Batch ID: R334643 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19030640-01MSD** Units: **UG/L** Analysis Date: **15-Mar-2019 15:41**

Client ID: Run ID: **VOA6_334643** SeqNo: **4993379** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	33.76	2.0	40	0	84.4	64 - 133	31.5	6.9	20	
Carbon tetrachloride	21.6	1.0	20	0	108	72 - 136	20.18	6.79	20	
Chlorobenzene	21.2	1.0	20	0	106	82 - 118	21.21	0.0564	20	
Chloroethane	16.4	1.0	20	0	82.0	60 - 138	15.49	5.68	20	
Chloroform	19.69	1.0	20	0	98.4	79 - 124	19.18	2.6	20	
Chloromethane	13.63	1.0	20	0	68.1	50 - 139	13.1	4	20	
cis-1,2-Dichloroethene	19.94	1.0	20	0	99.7	78 - 123	19.38	2.81	20	
cis-1,3-Dichloropropene	21.1	1.0	20	0	105	75 - 124	20.85	1.19	20	
Dibromochloromethane	21.77	1.0	20	0	109	74 - 126	22.27	2.23	20	
Dibromomethane	21.14	1.0	20	0	106	79 - 123	20.77	1.8	20	
Dichlorodifluoromethane	7.059	1.0	20	0	35.3	32 - 152	6.432	9.3	20	
Ethylbenzene	21.68	1.0	20	0	108	79 - 121	21.28	1.84	20	
Hexachlorobutadiene	22.92	1.0	20	0	115	66 - 134	20.9	9.22	20	
Isopropylbenzene	22.06	1.0	20	0	110	72 - 131	21.35	3.29	20	
m,p-Xylene	43.42	2.0	40	0	109	80 - 121	43	0.986	20	
Methylene chloride	19.76	2.0	20	0	98.8	74 - 124	19.69	0.346	20	
Naphthalene	20.95	1.0	20	0	105	61 - 128	21.03	0.392	20	
n-Butylbenzene	21.83	1.0	20	0	109	75 - 128	20.68	5.42	20	
n-Propylbenzene	21.19	1.0	20	0	106	76 - 126	21.1	0.431	20	
o-Xylene	21.72	1.0	20	0	109	78 - 122	21.6	0.556	20	
sec-Butylbenzene	21.17	1.0	20	0	106	77 - 126	20.35	3.96	20	
Styrene	0.6366	1.0	20	0	3.18	78 - 123	0.6311	0	20	JS
tert-Butylbenzene	21.05	1.0	20	0	105	78 - 124	20.72	1.59	20	
Tetrachloroethene	22.29	1.0	20	0.6002	108	74 - 129	21.75	2.43	20	
Toluene	21.39	1.0	20	0	107	80 - 121	21.49	0.458	20	
trans-1,2-Dichloroethene	19.33	1.0	20	0	96.6	75 - 124	18.66	3.49	20	
trans-1,3-Dichloropropene	21.38	1.0	20	0	107	73 - 127	21.08	1.42	20	
Trichloroethene	22.25	1.0	20	0	111	79 - 123	24.07	7.84	20	
Trichlorofluoromethane	17.9	1.0	20	0	89.5	65 - 141	16.28	9.48	20	
Vinyl chloride	12.21	1.0	20	0	61.0	58 - 137	11.55	5.5	20	
Surr: 1,2-Dichloroethane-d4	*44.83*	*1.0*	*50*	*0*	*89.7*	*81 - 118*	*44.6*	*0.518*	*20*	
Surr: 4-Bromofluorobenzene	*51.19*	*1.0*	*50*	*0*	*102*	*85 - 114*	*50.01*	*2.33*	*20*	
Surr: Dibromofluoromethane	*45.7*	*1.0*	*50*	*0*	*91.4*	*80 - 119*	*45.51*	*0.408*	*20*	
Surr: Toluene-d8	*50.92*	*1.0*	*50*	*0*	*102*	*89 - 112*	*52.76*	*3.54*	*20*	

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.	**QC BATCH REPORT NEW**
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples	
WorkOrder:	HS19030761	

Batch ID:	**R334643 (0)**	**Instrument:**	**VOA6**	**Method:**	**VOLATILES ORGANICS BY METHOD 8260C**

The following samples were analyzed in this batch: HS19030761-01 HS19030761-03

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
WorkOrder: HS19030761

QC BATCH REPORT NEW

Batch ID: R334752 (0) **Instrument: UV-2450** **Method: HEXAVALENT CHROMIUM BY SW7196A**

MBLK Sample ID: **MBLK-334752** Units: **mg/L** Analysis Date: **15-Mar-2019 12:14**
Client ID: Run ID: **UV-2450_334752** SeqNo: **4995036** 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-334752** Units: **mg/L** Analysis Date: **15-Mar-2019 12:14**
Client ID: Run ID: **UV-2450_334752** SeqNo: **4995037** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.244	0.0100	0.25	0	97.6	80 - 120				

LCSD Sample ID: **LCSD-334752** Units: **mg/L** Analysis Date: **15-Mar-2019 12:14**
Client ID: Run ID: **UV-2450_334752** SeqNo: **4995038** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.244	0.0100	0.25	0	97.6	80 - 120	0.244	0	20	

The following samples were analyzed in this batch: HS19030761-01

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.	**QUALIFIERS, ACRONYMS, UNITS**
Project:	LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples	
WorkOrder:	**HS19030761**	

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

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

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
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: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Monthly Effluent Samples
Work Order: HS19030761

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19030761-01	LH18/24-SP650_031419	Login	3/15/2019 10:54:17 AM	JRM	EXT075
HS19030761-01	LH18/24-SP650_031419	Login	3/15/2019 10:54:17 AM	JRM	WET176
HS19030761-01	LH18/24-SP650_031419	Login	3/15/2019 10:54:17 AM	JRM	MET068
HS19030761-01	LH18/24-SP650_031419	Login	3/15/2019 10:54:17 AM	JRM	VOA052
HS19030761-02	LH18/24-SP650_031419_BIX	Login	3/15/2019 10:54:17 AM	JRM	Sub
HS19030761-03	Trip Blank	Login	3/15/2019 10:54:17 AM	JRM	VOA052

ALS Houston, US Date: 31-Mar-19

Sample Receipt Checklist

Client Name:	Bhate Environmental	Date/Time Received:	**15-Mar-2019 08:38**
Work Order:	HS19030761	Received by:	**JRM**

Checklist completed by: *Jared R. Makan* (eSignature) 15-Mar-2019 (Date)

Reviewed by: *RJ Modashia* (eSignature) 15-Mar-2019 (Date)

Matrices: **Water**

Carrier name: **FedEx Priority Overnight**

	Yes	No	
Shipping container/cooler in good condition?	☑	☐	Not Present ☐
Custody seals intact on shipping container/cooler?	☑	☐	Not Present ☐
Custody seals intact on sample bottles?	☐	☐	Not Present ☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	☐	☐	Not Present ☑
Chain of custody present?	☑	☐	1 Page(s)
Chain of custody signed when relinquished and received?	☑	☐	COC IDs:N/A
Samplers name present on COC?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature in compliance?	☑	☐	

Temperature(s)/Thermometer(s):	1.3c/1.3c UC/C	IR25
Cooler(s)/Kit(s):	25780	
Date/Time sample(s) sent to storage:	03/15/2019 10:58	

	Yes	No	
Water - VOA vials have zero headspace?	☑	☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	☑	☐	N/A ☐
pH adjusted?	☐	☑	N/A ☐

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd., Suite 210 Houston, TX 77099 (281) 530 – 5656 ATTN: RJ Modashia

Page 1 of 1

Project: BHATE
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No. NWO1312.0150.016.0001

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	VOLATILES	SILVER, SELENIUM, LEAD, BARIUM	HEXAVALENT CHROMIUM	1, 4 - DIOXANE	PERCHLORATE						Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650_031419	Water	03/14/19 / 14:00		3	X										HCL	
LH18/24-SP650_031419	Water	03/14/19 / 14:00		2			X	X							NONE	
LH18/24-SP650_031419_BIX	Water	03/14/19 / 14:00		1					X						NONE	
LH18/24-SP650_031419	Water	03/14/19 / 14:00		1		X									HNO3	
Trip Blank	Water	03/14/19		2	X										HCL	

Additional Remarks: **STANDARD TURN AROUND TIME**

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	03/14/19	14:30				[illegible]	3/15/19	9:33			

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

HS19030761

Cooler 25780 1425
Temp 1.3 CF 0.0

Bhate Environmental Associates, Inc.
18/24 Longhorn GW Treatment Plant Monthly Effluer

(Word) S:\1-ces\Forms\Chain of Custod

ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

CUSTODY SEAL

Date: 3/14/19
Time: 930
Name: Scott
Company: BARSINGER

Seal Broken By: JM
Date: 3/15/19

FedEx
TRK# 0221 4380 9530 9490

FRI - 15 MAR 10:30A
PRIORITY OVERNIGHT

AB SGRA

77099
TX-US
IAH

FID 3588291 14MAR19 DGGA 553C1/46D3/RCBA

Case Narrative

Method: 6850
Analysis: Perchlorate
Analysis SOP: LC-MS-CLO4
ALS WO ID(s): 1907867; 1907869; 1907871; 1908794

Client: ALS Laboratories (Houston, TX)
Matrix: Water
ELMS Batch (HBN): 2230 (235529)

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. 50µL of an ^{18}O labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45µm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1907867001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

Method QC data: The method blank (LMB 645533) was less than 1/2 the CRDL. The recovery for the LCS (645534) was within acceptable parameters.

MS/MSD Analysis: MS/MSD was performed on sample 1907869001 (Client ID's: LH18/24-SP650_031419_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 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 – 645531) is reported from the analysis of the Laboratory Control Sample (LCS – 645534) 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	March 29, 2019
Analyst	Date

ANALYTICAL REPORT

Report Date: March 29, 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: **34-1907869**
Project ID: HS19030761
Purchase Order: HS19030761
Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_031419_BIX	1907869001	03/14/19	03/19/19	

ANALYTICAL REPORT

Workorder: 34-1907869
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID:	LH18/24-SP650_031419_BIX	Sampling Site:	NA	Collected:	03/14/2019
Lab ID:	1907869001	Media:	125 mL Nalgene	Received:	03/19/2019
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/2230 (HBN: 235529)	Percent Solid:	NA
		Analyzed:	03/28/2019 09:41	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: 235529)

Field sample 1907867001 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 03/28/2019 14:08	/S/ Stephen Brose 03/29/2019 12:58

Laboratory Contact Information

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

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

ANALYTICAL REPORT

Workorder: 34-1907869
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

Analysis Information

Workorder: 1907869

Limits:	Client SOW/Contract Specified	**Preparation:**	NA	**Analysis:**	EPA 6850, DoD QSM
Basis:	DoD QSM	**Batch:**	NA	**Batch:**	ELMS/2230 (HBN: 235529)
		Prepared By:	NA	**Analyzed By:**	Thomas Bosch

Blank

LMB: 645533
Analyzed: 03/28/2019 09:14

Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 645534
Analyzed: 03/28/2019 08:47
Dilution: 1
Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.00	4.00	99.9	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1907869001	MS: 645535	MSD: 645536
Analyzed: 03/28/2019 09:41	Analyzed: 03/28/2019 09:54	Analyzed: 03/28/2019 10:08
Dilution: 1	Dilution: 1	Dilution: 1
Units: ug/L	Units: ug/L	Units: ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	4.66	4	117	78.8	123.8	4.05	101	14	0.0	20.0

Comments

Field sample 1907867001 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 03/28/2019 14:23	/S/ Stephen Brose 03/29/2019 12:58

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 1907869

18698/#2

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: 10917

1907869

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:	HS19030761
TSR:	Danielle Winnings

	LAB SAMPLE ID / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / DUE DATE
1.	**HS19030761-02**	**LH18/24-SP650_031419_BIX**	**Water**	**14 Mar 2019 14:00**
	SUB_Perch-6850			25 Mar 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. Malcom	Date/Time:	3/18/19 18:00
Received By:	[signature]	Date/Time:	03-19-19 9:50
Cooler ID(s):		Temperature(s):	

RIGHT SOLUTIONS | RIGHT PARTNER

ALS Environmental
CHAIN-OF-CUSTODY

Project / Job / Task: HS19030761	***Split:***	**Workorder ID:** 1907869	Level: ENV_LVL4
Client: ALS Environmental (Houston)		**Account:** 8101	Type: 125Poly
Comments:			Preservatives: COOL

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	EPA 6850, DoD QSM
1	03/14/2019 14:00	LH18/24-SP650_031419_BIX	1907869001		Water	A	1	A
2								
3								
4								
5								
6								
7								
8								
9								
10								

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ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
Warath, Julie	03/19/2019 09:50	ALS Sample Receiving	Sample Login
Julie Warath	3/20/19 1200	ISC	Storage
R.33.1	3.27.19/11:45	T.Bosch	6850

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

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

Prepared / Analyzed by: ______ Date / Time: ______

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

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Houston
Project/Task/Site: 1907869
Date/Time of Receipt: 031919 9:50
Number of Coolers Received: 1

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

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

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 9350	1 °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: Tami Van Tassell (Signature) Tami Van Tassell (Printed Name) 03-19-19 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ 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: ____________ (Printed Name) Returned to Sample Receipt by: ____________ (Signature) Date: ____________

CRIR.doc

Revised 01/01/2018

Part # 159469-434 RIT2 EXP 11/19

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

SHIP DATE: 18MAR19
ACTWGT: 9.35 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE

SALT LAKE CITY UT 84123
(801) 266-7700
REF: HS19030749/761/763 RJ

551C1/45D3/104C

FedEx
Express
E

J181118060501uv

TUE - 19 MAR 3:00P
STANDARD OVERNIGHT

TRK# 0201 4809 7831 7725

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

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Con

Batch Worklist

Batch: **ELMS/ 2230** | Created: 3/28/2019 07:45 | Instrument: | HBN: 235529
Rule: EPA 6850, DoD QSM Water | Analyst: T. Bosch | Status: WP

Workorder: 1907867 [ENV_LVL4]
Workorder: 1907869 [ENV_LVL4]
Workorder: 1907871 [ENV_LVL4]
Workorder: 1908794 [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	645530	CCV for HBN 235529 [ELMS/2230]				CCV	3		E685041C3Q	5311		4/1/2019	
2	645531	RLVS for HBN 235529 [ELMS/2230				RLVS	3		E685041C3Q	5311		4/1/2019	
3	645532	ICS for HBN 235529 [ELMS/2230]				ICS	3		E6850..D3Q	5311		4/1/2019	
4	645533	LMB for HBN 235529 [ELMS/2230]				LMB	3		E6850Q413Q	5311		4/1/2019	
5	645534	LCS for HBN 235529 [ELMS/2230]				LCS	3		E6850Q413Q	5311		4/1/2019	
6	1907867001	LH18/24-SP140_031419				SAMPLE	3	1907867001-A	E6850Q41.3	5480	4/11/2019	4/1/2019	
7	1907869001	LH18/24-SP650_031419_BIX				SAMPLE	3	1907869001-A	E6850Q41.3	5480	4/11/2019	4/1/2019	
8	645535	LH18/24-SP650...(1907869001MS)				MS	3		E6850Q413Q	5311		4/1/2019	
9	645536	LH18/24-SP65...(1907869001MSD)				MSD	3		E6850Q413Q	5311		4/1/2019	
10	1907871001	LH18/24-SP650_031419_BIX				SAMPLE	3	1907871001-A	E6850Q41.3	5480	4/11/2019	4/1/2019	
11	1908794001	LH18/24-SP650_032119_BIX				SAMPLE	3	1908794001-A	E6850Q41.3	5480	4/18/2019	4/8/2019	
12	645537	CCV for HBN 235529 [ELMS/2230]				CCV	3		E685041C3Q	5311		4/1/2019	

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #( )'s: 1907867 (001); 1907869 (001); 1907871 (001); 1908794 (001)
ELMS Batch/HBN ID: 2230 (235529)
Prep Date: 03/27/2019 Analysis Date: 03/28/2019 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: 25µL
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 645534; Target = 4.0µg/L. ASTM type II water was used for LMB 645533.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1907869001 (Client ID's: LH18/24-SP650_031419_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 1907867001 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\MAR\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\235529-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\HBN#
5) The Reporting Limit Verification Standard (RLVS – 645531) is reported from the analysis of the Laboratory Control Sample (LCS – 645534) 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.

Chromatography (GC, HPLC, LC/MS) Technical Review Criteria Batch(es)/SDG: ELMS: 2230 HBN: 235529 Sample Set IDs if Applicable: 1907867/1907869/1907871/1908794	Analyst Initials	Reviewer Initials
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
MFG: ALS/SLC
MFG Lot: TNB: 09/18/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/18/2018 02:09PM

Amount: 10 mL
Expires: 09/18/2019
Usable: Yes
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
MFG: AccuStandard
MFG Lot: 218065075
Part ID: IC-PER-10X-1

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

Amount: 100 mL
Expires: 07/25/2020
Usable: 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)	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
MFG: ALS/SLC
MFG Lot: TNB: 09/18/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/18/2018 02:09PM

Amount: 10 mL
Expires: 09/18/2019
Usable: Yes
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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
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 Intmdt Std-QC 10ug/mL

Standard: 41830
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
Expires: 05/09/2019
Usable: Yes
Lab Lot: CLO4 QC INT 10.ug/mL

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

Composition

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

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
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

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
MFG: Cambridge Isotope
MFG Lot: SDFF-012A
Part ID: OLM-7310-S

Created By: Thomas Bosch
Create Date: 09/20/2018 09:09AM
Verified By: Thomas Bosch
Verify Date:

Amount: 1 mL
Expires: 04/28/2026
Usable: Yes
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

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

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

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

Solvent: water (low TOC, < 50 ppb)

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

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

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

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

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

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

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

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

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

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

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

D. Lamendola
Daniel J. Lamendola
Director of QA/RA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

125 Market Street
New Haven, CT 06513
USA

AccuStandard®

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

CERTIFICATE OF ANALYSIS

S 43659

AccuTrace™ Reference Standard

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

Signal Word: None

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

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

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

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

For use in routine laboratory analysis.

QR-ORG/IND-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

 00935344

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
*	645530 CCV@25	Vial 71	1	Control	1	1.81499e6	8.385	24.13647
*	645534 QC@4.0	Vial 72	1	Control	2	2.89937e5	8.542	3.99582
*	645532 ICS@4.0	Vial 73	1	Control	3	2.38655e5	8.226	3.65624
*	645533 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1907867001 1K	Vial 75	1	Sample	5	7.55115e5	8.548	8344.77963
*	1907869001	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	645535 78691MS	Vial 77	1	Sample	7	2.77046e5	8.030	4.66163
*	645536 78691SD	Vial 78	1	Sample	8	2.89384e5	8.027	4.05130
*	1907871001	Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1908794001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	645537 CCV@25	Vial 71	1	Control	11	1.79709e6	8.389	24.49119

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	645530 CCV@25	Vial 71	1	Control	1	5.33395e5	8.403	23.90219
*	645534 QC@4.0	Vial 72	1	Control	2	9.52963e4	8.559	4.26699
*	645532 ICS@4.0	Vial 73	1	Control	3	7.88339e4	8.237	3.90865
*	645533 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1907867001 1K	Vial 75	1	Sample	5	2.38827e5	8.562	8762.35701
*	1907869001	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	645535 78691MS	Vial 77	1	Sample	7	8.93399e4	8.046	4.91371
*	645536 78691SD	Vial 78	1	Sample	8	9.85690e4	8.049	4.48457
*	1907871001	Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1908794001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	645537 CCV@25	Vial 71	1	Control	11	5.35802e5	8.404	24.59111

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	645530 CCV@25	Vial 71	1	Control	1	2.29255e5	8.411	5.00000
*	645534 QC@4.0	Vial 72	1	Control	2	2.39106e5	8.571	5.00000
*	645532 ICS@4.0	Vial 73	1	Control	3	2.16080e5	8.242	5.00000
*	645533 LMB	Vial 74	1	Control	4	2.42742e5	8.463	5.00000
*	1907867001 1K	Vial 75	1	Sample	5	2.89136e5	8.567	5000.00000
*	1907869001	Vial 76	1	Sample	6	1.89925e5	8.088	5.00000
*	645535 78691MS	Vial 77	1	Sample	7	1.94413e5	8.053	5.00000
*	645536 78691SD	Vial 78	1	Sample	8	2.35220e5	8.053	5.00000
*	1907871001	Vial 79	1	Sample	9	1.89609e5	8.089	5.00000
*	1908794001	Vial 80	1	Sample	10	1.92453e5	8.070	5.00000
*	645537 CCV@25	Vial 71	1	Control	11	2.23514e5	8.412	5.00000

*** End of Report ***

Sequence Table:

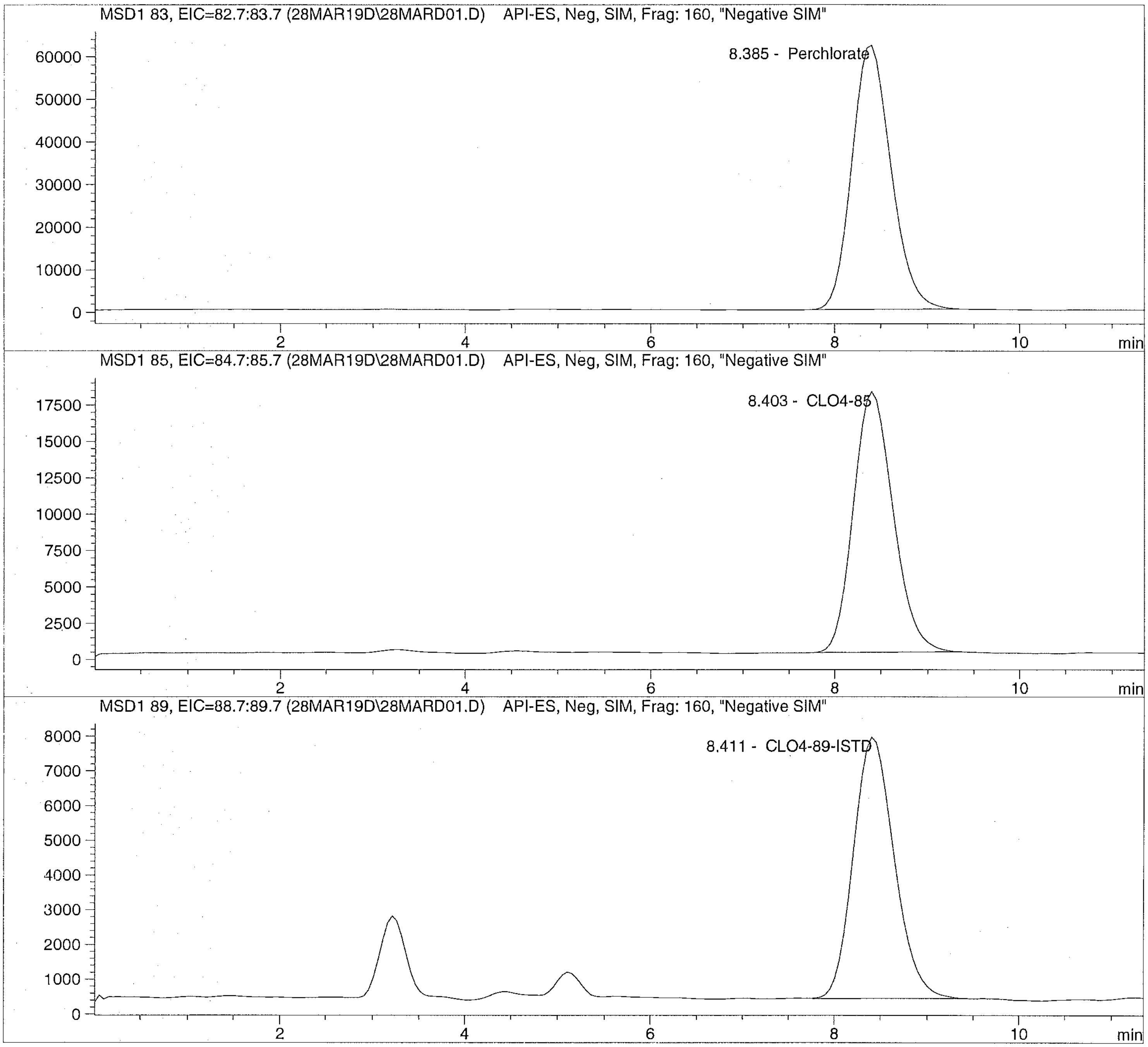
Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	645530 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	645534 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	645532 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	645533 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1907867001 1K	CLO4-AQN	1	Sample		
6	Vial 76	1907869001	CLO4-AQN	1	Sample		
7	Vial 77	645535 78691MS	CLO4-AQN	1	Sample		
8	Vial 78	645536 78691SD	CLO4-AQN	1	Sample		
9	Vial 79	1907871001	CLO4-AQN	1	Sample		
10	Vial 80	1908794001	CLO4-AQN	1	Sample		
11	Vial 71	645537 CCV@25	CLO4-AQN	1	Ctrl Samp		

```
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD01.D       Sample Name: 645530   CCV@25
=====================================================================================
Injection Date:    3/28/2019  08:30:53             Seq Line:              1
Sample Name:       645530   CCV@25                 Location:        Vial 71
Acq Operator:      TNB                             Inj. No.:              1
                                                   Inj. Vol.:         25 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
=====================================================================================
```



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Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD01.D       Sample Name: 645530   CCV@25
=====================================================================================
Injection Date:   3/28/2019  08:30:53                 Seq Line:            1
Sample Name:      645530   CCV@25                     Location:       Vial 71
Acq Operator:     TNB                                 Inj. No.:            1
                                                      Inj. Vol.:        25 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
8.385	PBA	1814992.7	24.1365	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.403	PBA	533395.5	23.9022	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.411	BBA	229255.1	5.0000	CLO4-89-ISTD

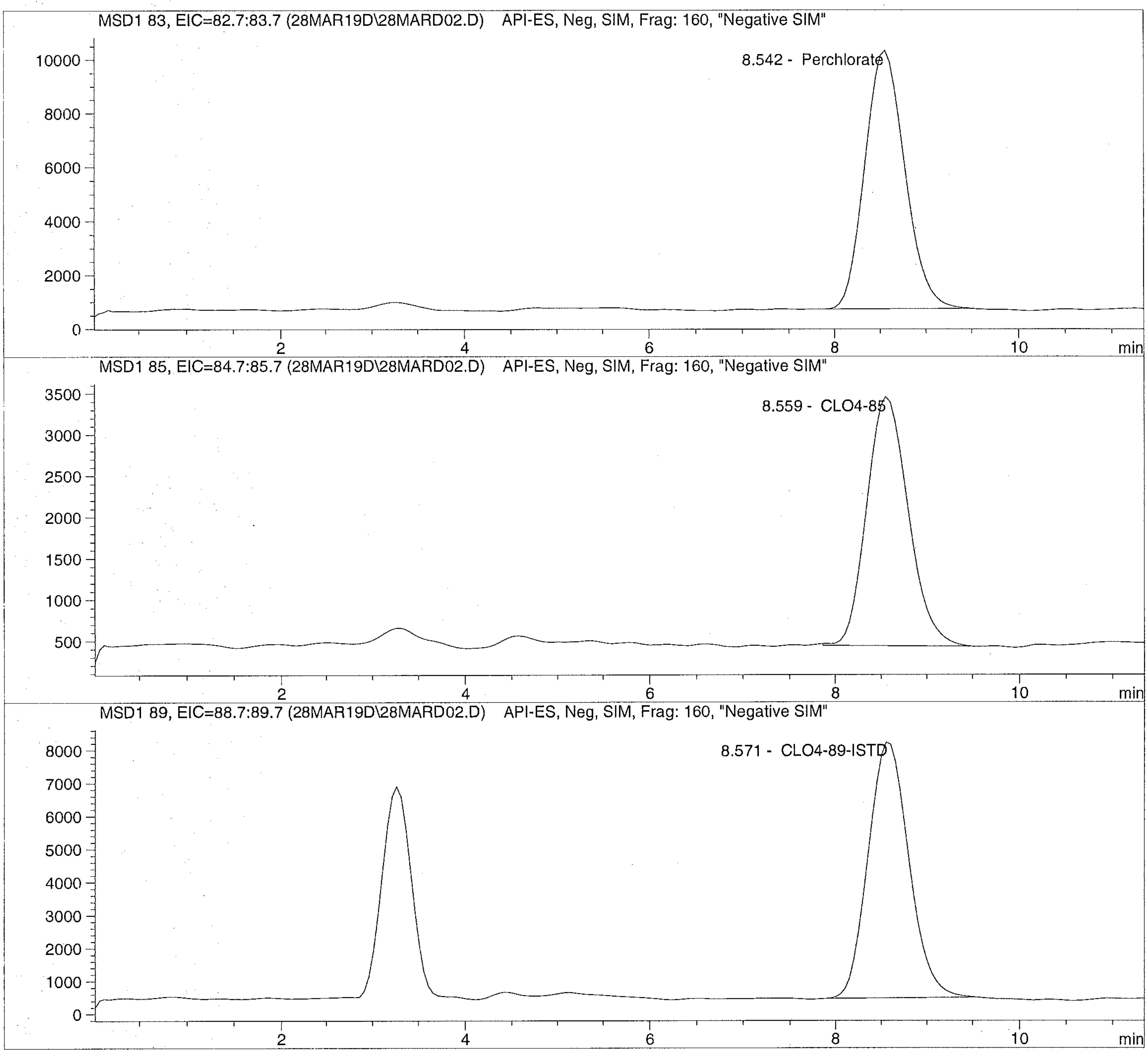
```
=====================================================================================
                             *** End of Report ***
```

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD02.D   Sample Name: 645534   QC@4.0

Injection Date:	3/28/2019 08:47:42	Seq Line:	2
Sample Name:	645534 QC@4.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD02.D   Sample Name: 645534   QC@4.0

Injection Date:	3/28/2019 08:47:42	Seq Line:	2
Sample Name:	645534 QC@4.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.542	PBA	289937.1	3.9958	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.559	BBA	95296.3	4.2670	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.571	PBA	239105.9	5.0000	CLO4-89-ISTD

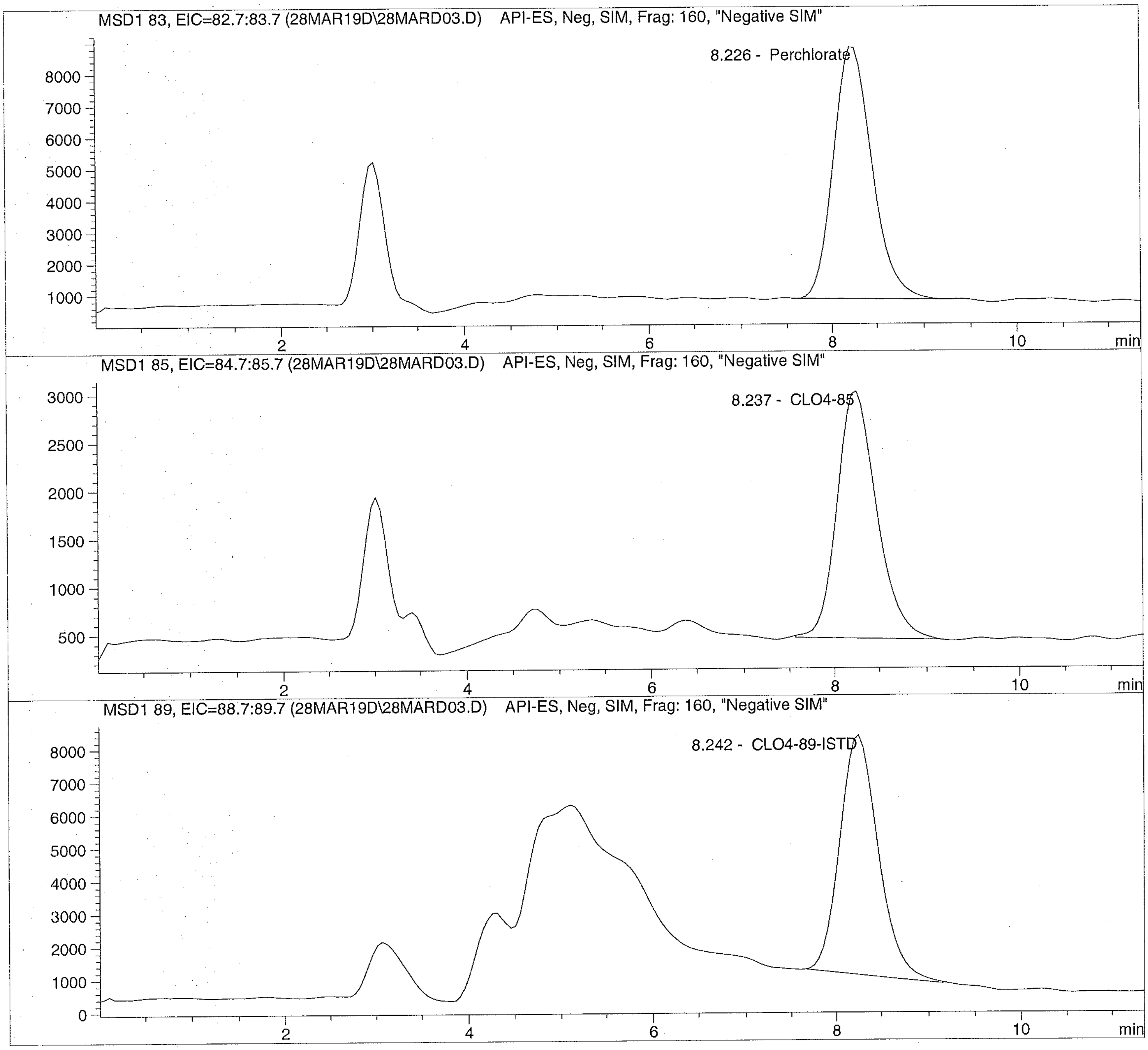
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD03.D   Sample Name: 645532   ICS@4.0

Injection Date:	3/28/2019 09:00:54	Seq Line:	3
Sample Name:	645532 ICS@4.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD03.D Sample Name: 645532 ICS@4.0

Injection Date:	3/28/2019 09:00:54	Seq Line:	3
Sample Name:	645532 ICS@4.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.226	BBA	238654.8	3.6562	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.237	BBA	78833.9	3.9087	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.242	PBA	216079.7	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD04.D Sample Name: 645533 LMB

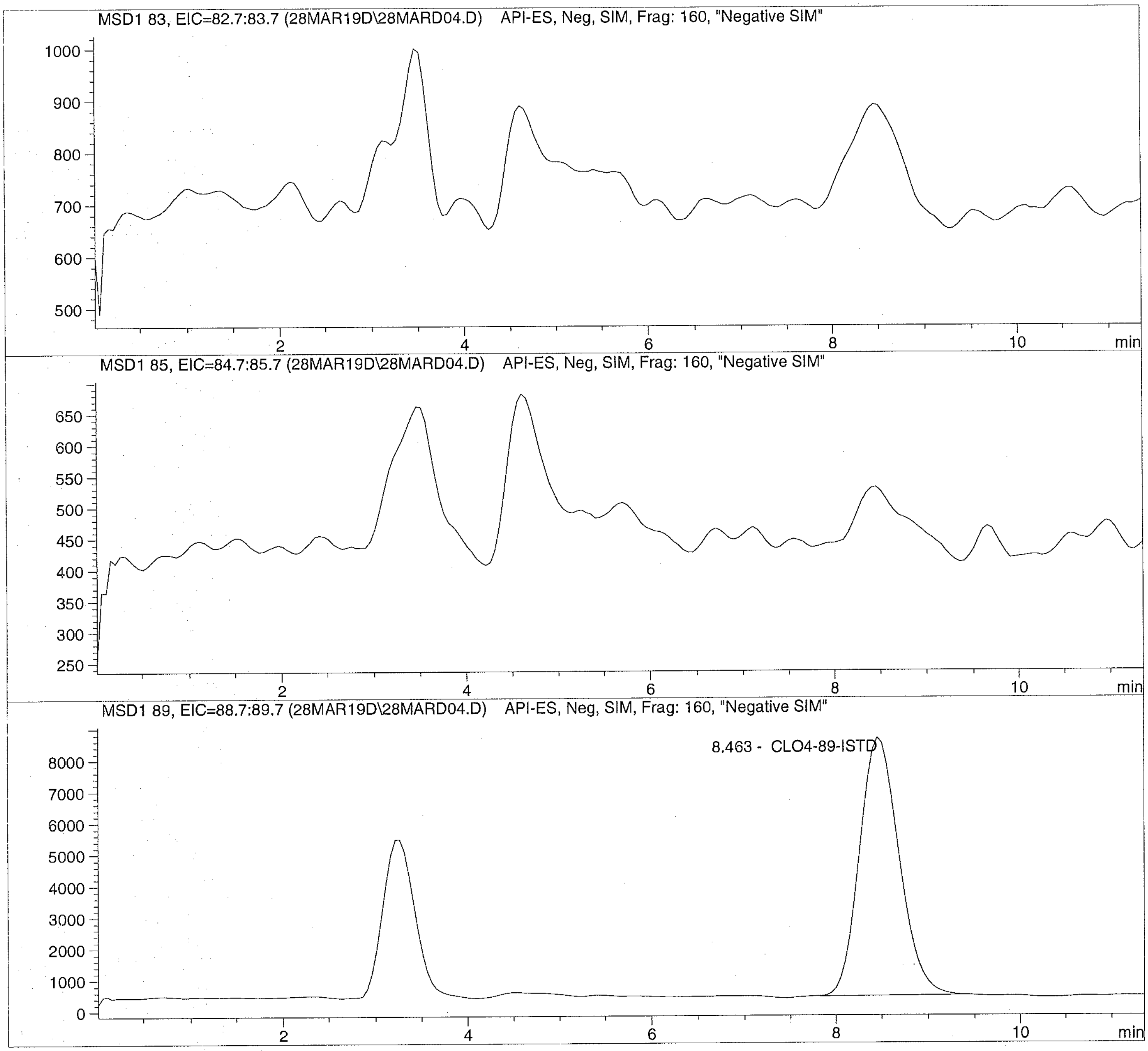
===

Injection Date:	3/28/2019 09:14:08	Seq Line:	4
Sample Name:	645533 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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

===



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD04.D Sample Name: 645533 LMB

Injection Date:	3/28/2019 09:14:08	Seq Line:	4
Sample Name:	645533 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.463	BBA	242742.3	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD05.D   Sample Name: 1907867001 1K

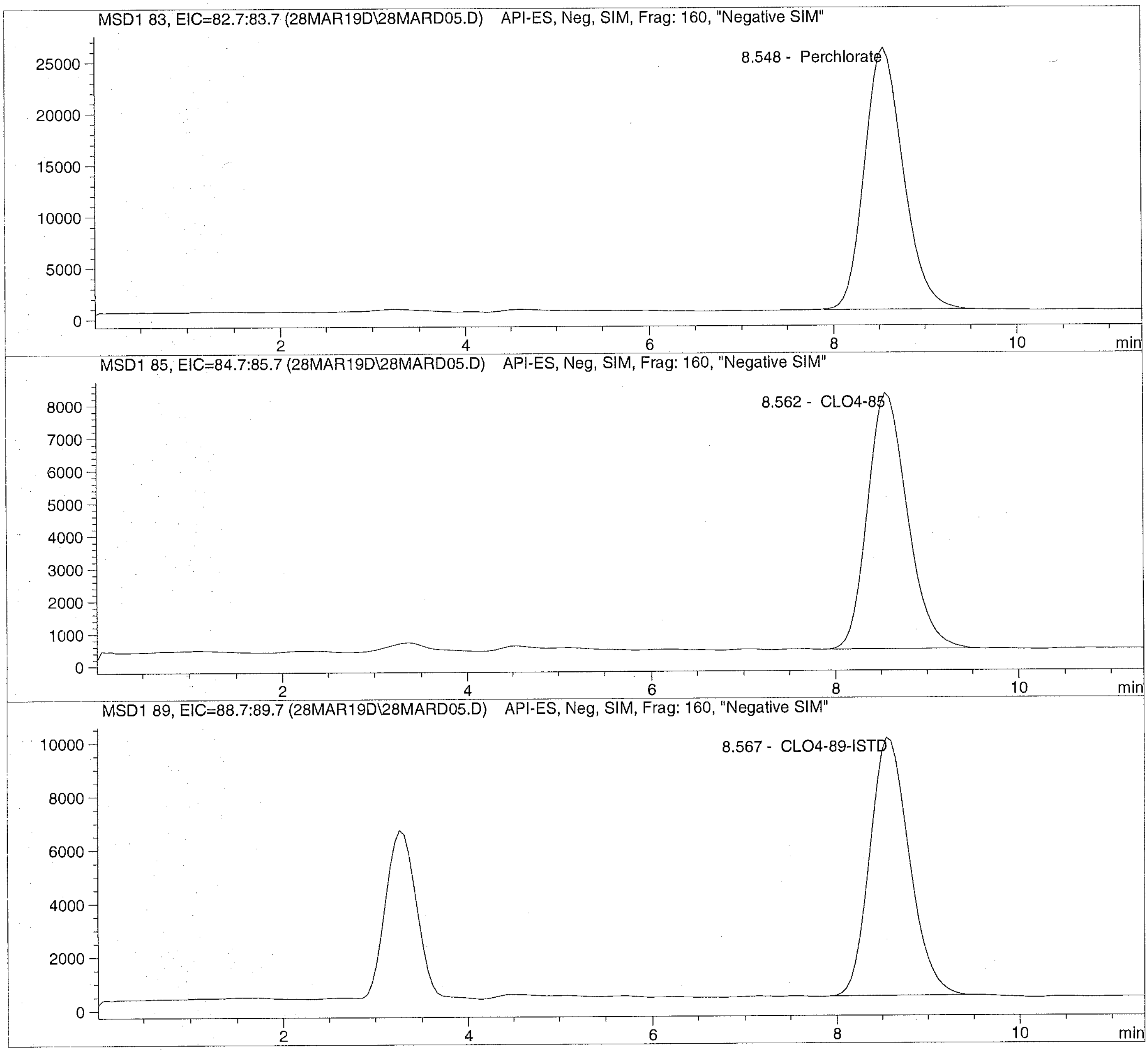
===

Injection Date:	3/28/2019 09:28:25	Seq Line:	5
Sample Name:	1907867001 1K	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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

===



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD05.D Sample Name: 1907867001 1K

Injection Date:	3/28/2019 09:28:25	Seq Line:	5
Sample Name:	1907867001 1K	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.548	BBA	755115.1	8344.7796	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.562	PBA	238826.8	8762.3570	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

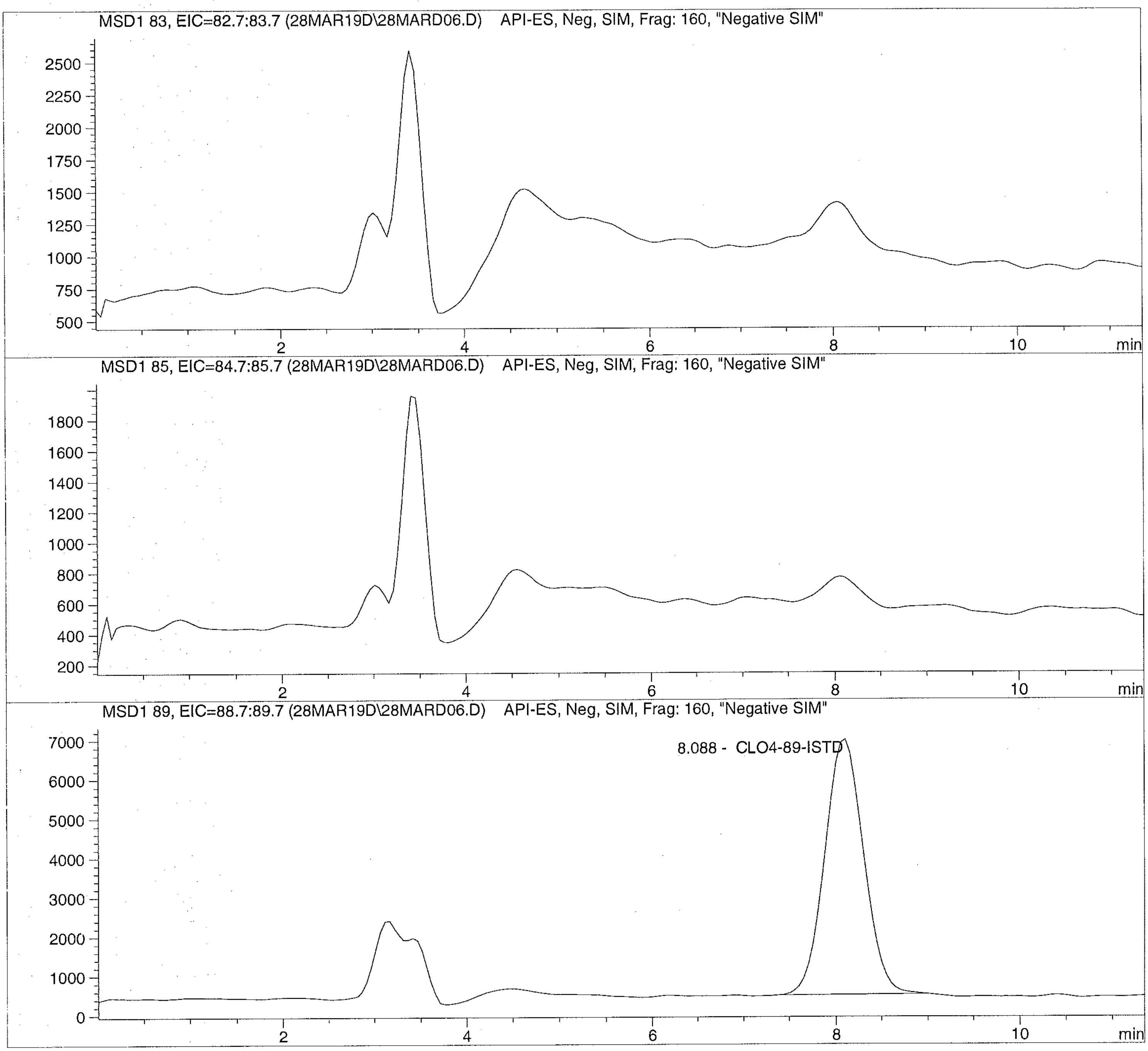
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.567	PBA	289135.6	5000.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD06.D        Sample Name: 1907869001
=====================================================================================
Injection Date:    3/28/2019   09:41:37               Seq Line:              6
Sample Name:       1907869001                          Location:         Vial 76
Acq Operator:      TNB                                 Inj. No.:              1
                                                       Inj. Vol.:          25 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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD06.D   Sample Name: 1907869001

===

Injection Date: 3/28/2019 09:41:37   Seq Line: 6
Sample Name: 1907869001   Location: Vial 76
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 25 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
8.088	BBA	189925.3	5.0000	CLO4-89-ISTD

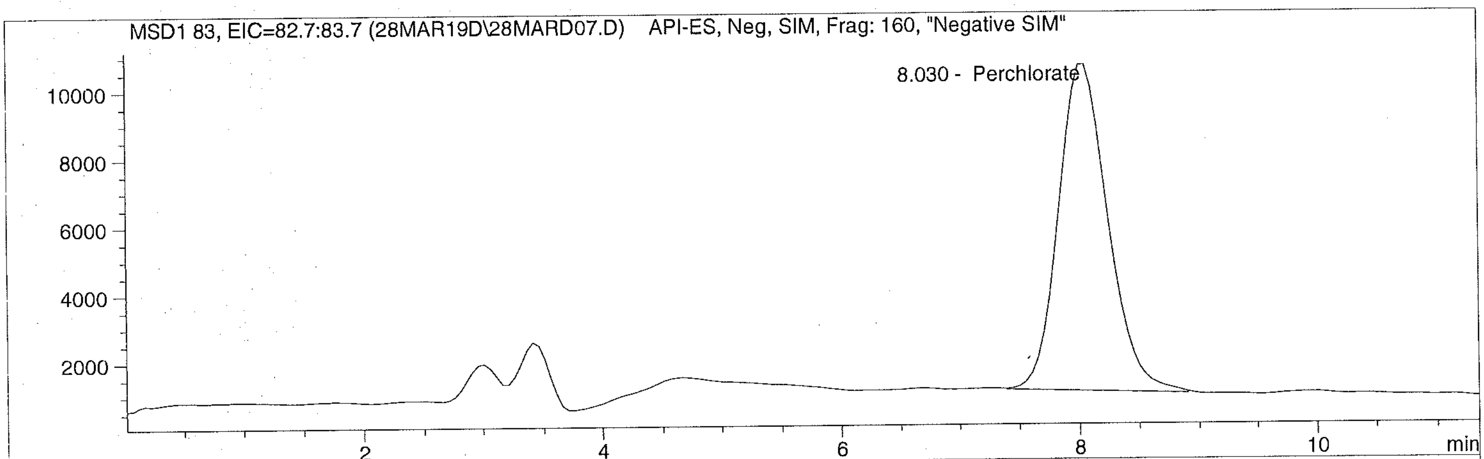
===

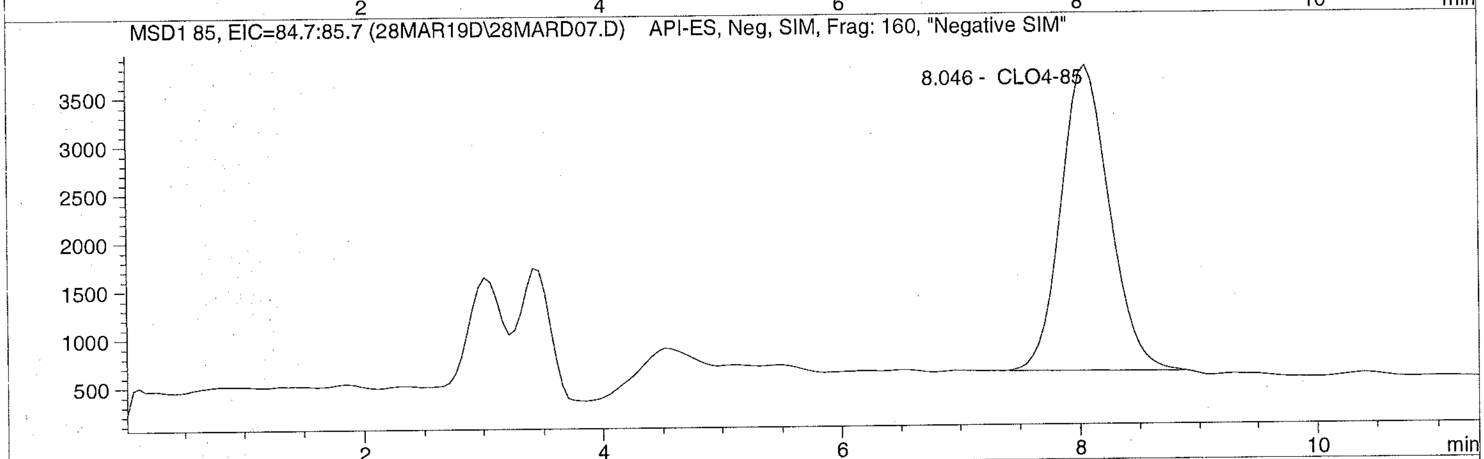
*** End of Report ***

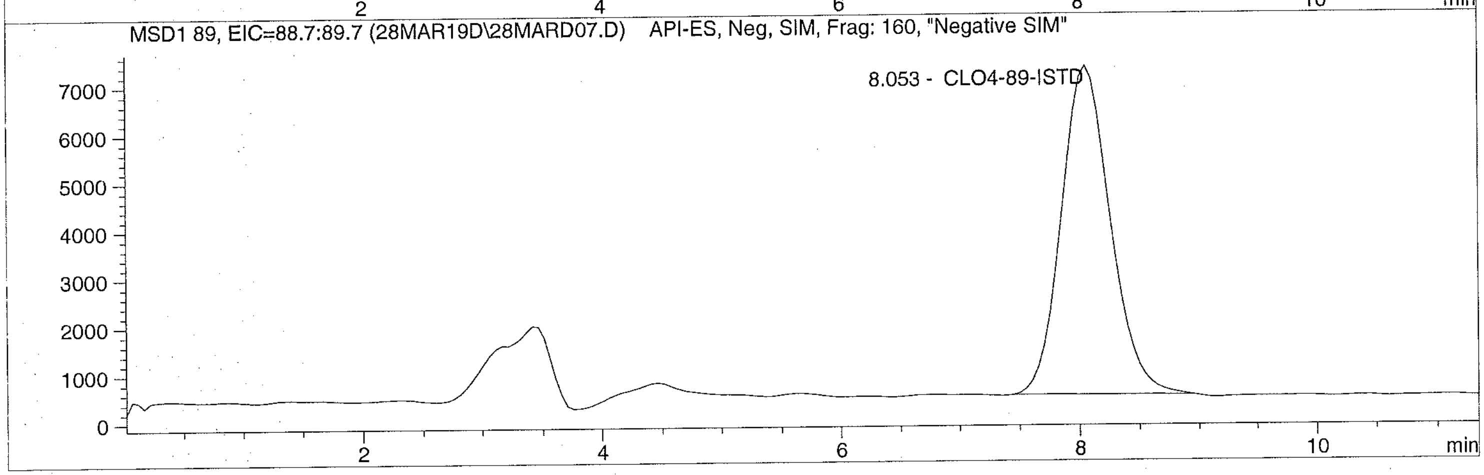
```
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD07.D        Sample Name: 645535   78691MS
=====================================================================================
Injection Date:    3/28/2019  09:54:47               Seq Line:           7
Sample Name:       645535   78691MS                  Location:       Vial 77
Acq Operator:      TNB                               Inj. No.:           1
                                                     Inj. Vol.:        25 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
=====================================================================================
```







Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD07.D   Sample Name: 645535   78691MS

Injection Date: 3/28/2019 09:54:47   Seq Line: 7
Sample Name: 645535 78691MS   Location: Vial 77
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 25 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
8.030	BBA	277046.3	4.6616	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.046	BBA	89339.9	4.9137	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.053	BBA	194412.9	5.0000	CLO4-89-ISTD

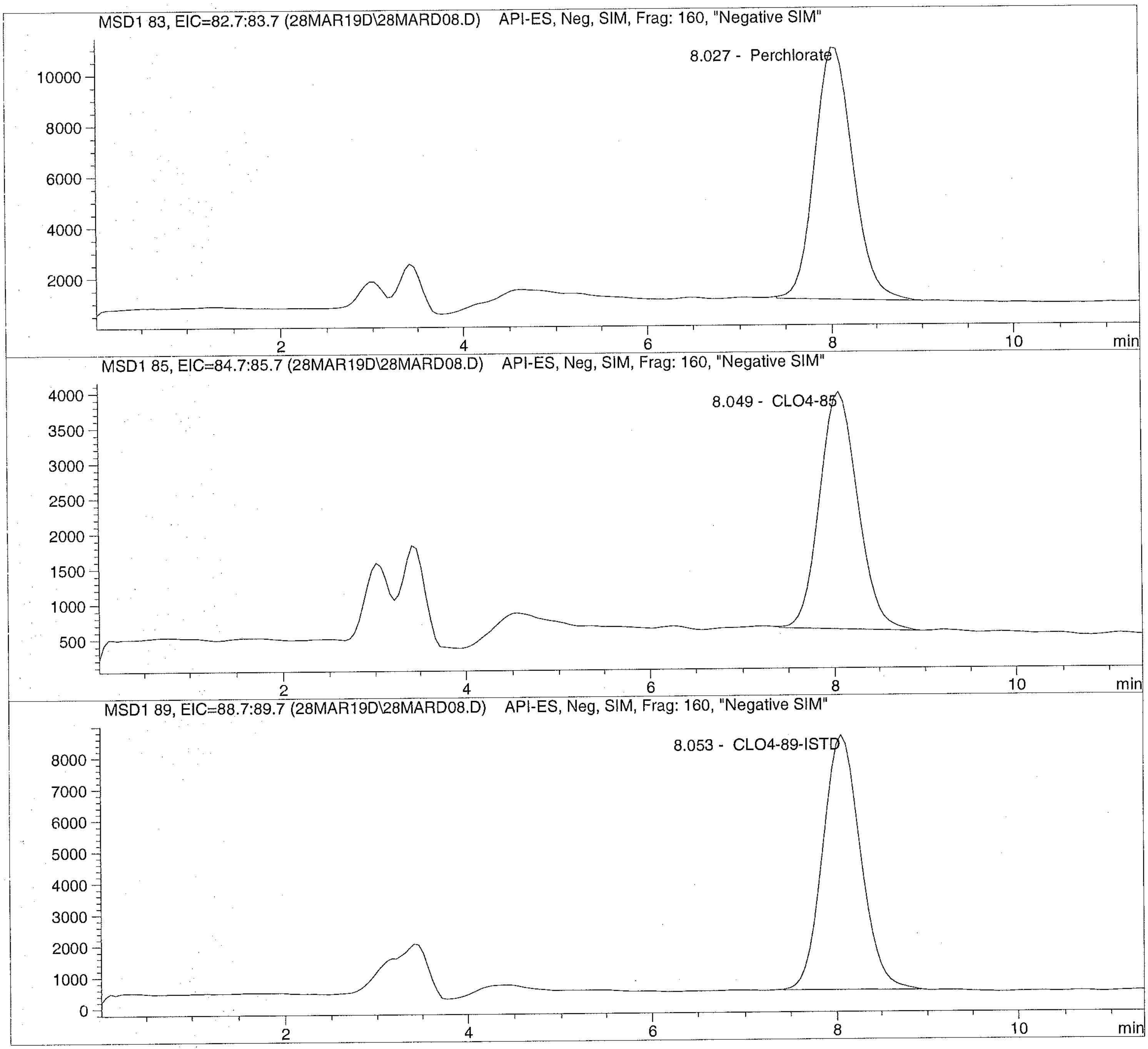
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD08.D Sample Name: 645536 78691SD

Injection Date:	3/28/2019 10:08:05	Seq Line:	8
Sample Name:	645536 78691SD	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD08.D   Sample Name: 645536   78691SD

Injection Date:	3/28/2019 10:08:05	Seq Line:	8
Sample Name:	645536 78691SD	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.027	BBA	289383.7	4.0513	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.049	BBA	98569.0	4.4846	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.053	BBA	235219.8	5.0000	CLO4-89-ISTD

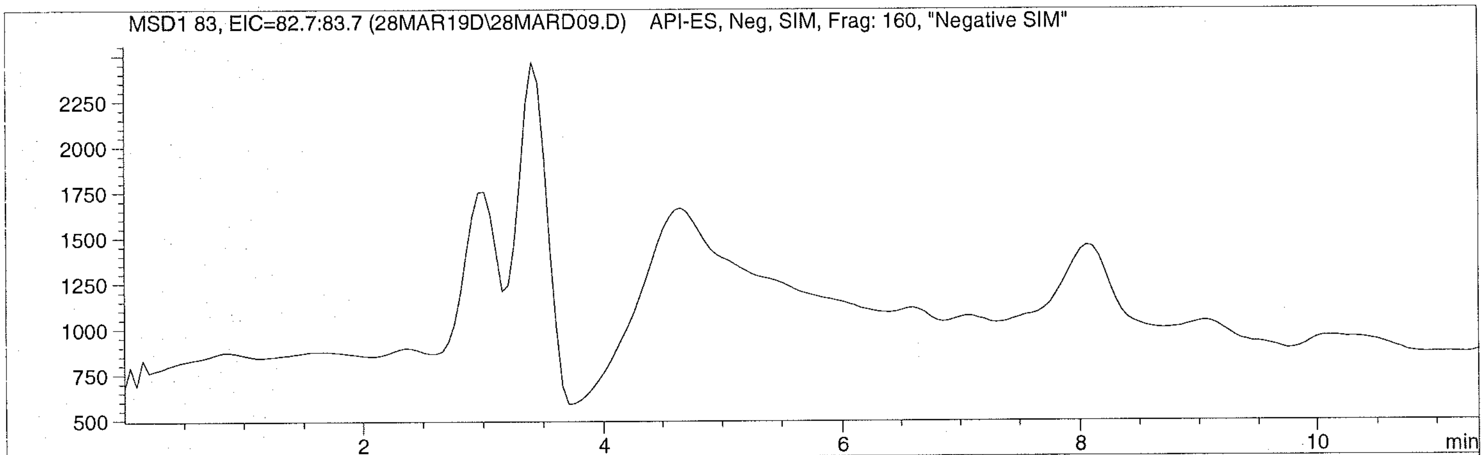
*** End of Report ***

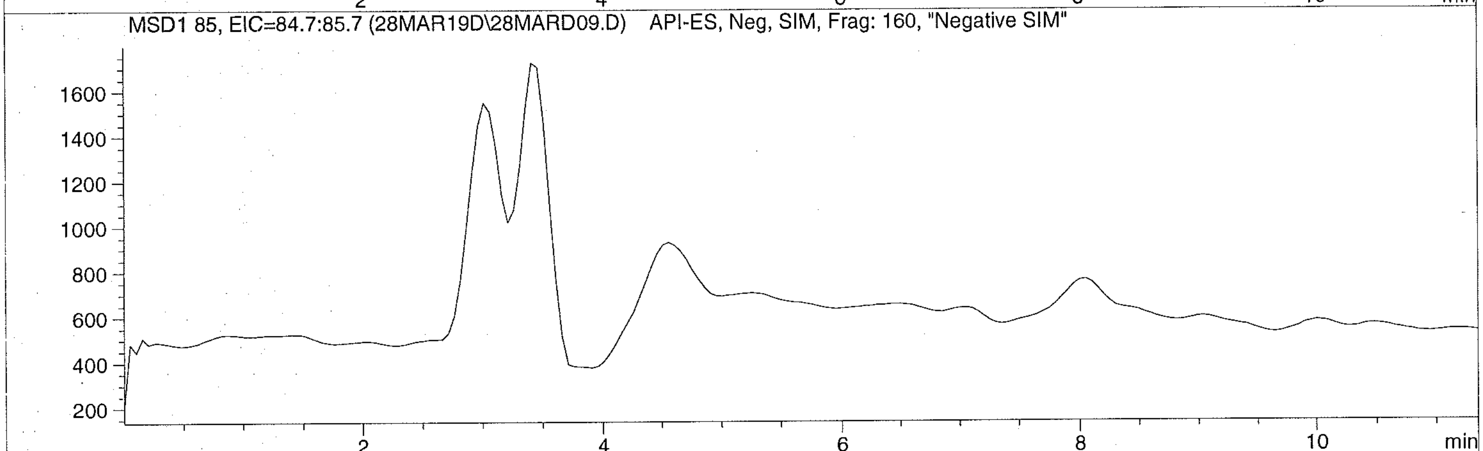
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD09.D   Sample Name: 1907871001

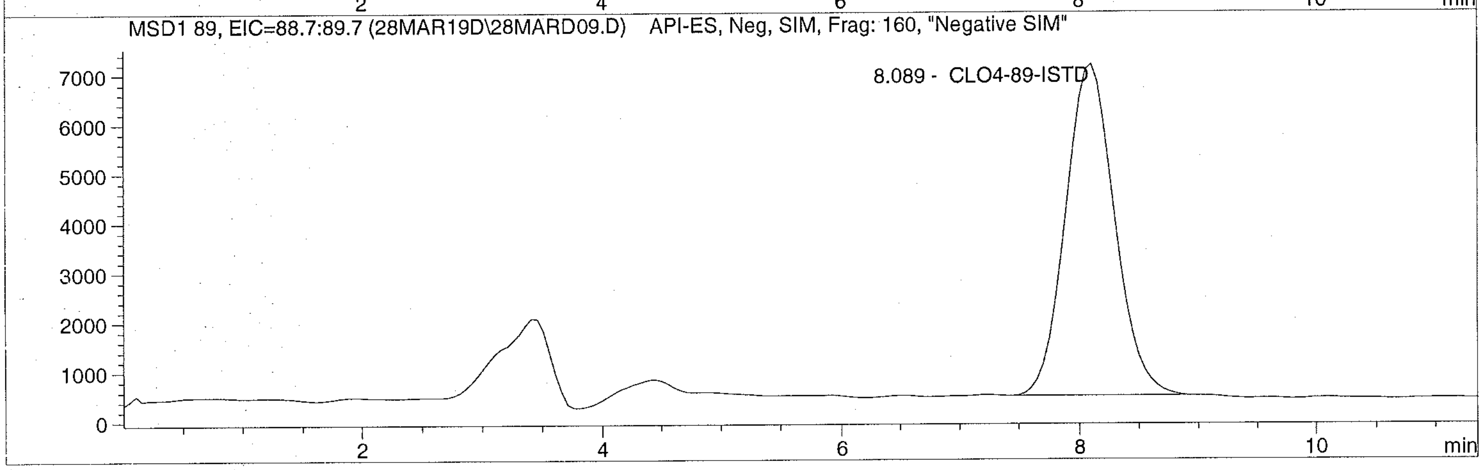
Injection Date:	3/28/2019 10:21:14	Seq Line:	9
Sample Name:	1907871001	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

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

Perchlorate analysis







Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD09.D Sample Name: 1907871001

===

Injection Date:	3/28/2019 10:21:14	Seq Line:	9
Sample Name:	1907871001	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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

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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
8.089	PBA	189608.5	5.0000	CLO4-89-ISTD

===

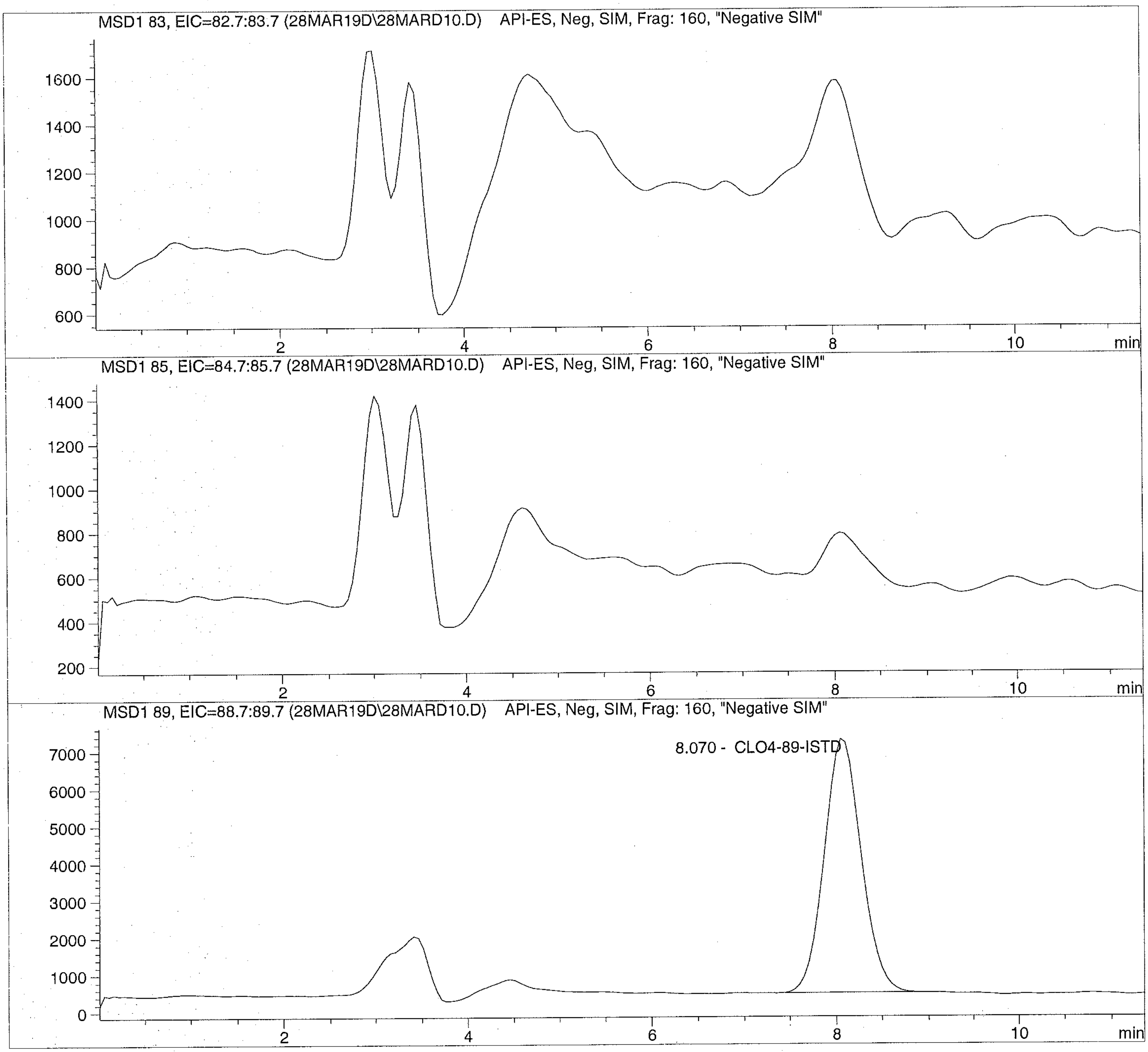
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD10.D Sample Name: 1908794001

Injection Date:	3/28/2019 10:34:27	Seq Line:	10
Sample Name:	1908794001	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD10.D Sample Name: 1908794001

===

Injection Date:	3/28/2019 10:34:27	Seq Line:	10
Sample Name:	1908794001	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.070	PBA	192453.4	5.0000	CLO4-89-ISTD

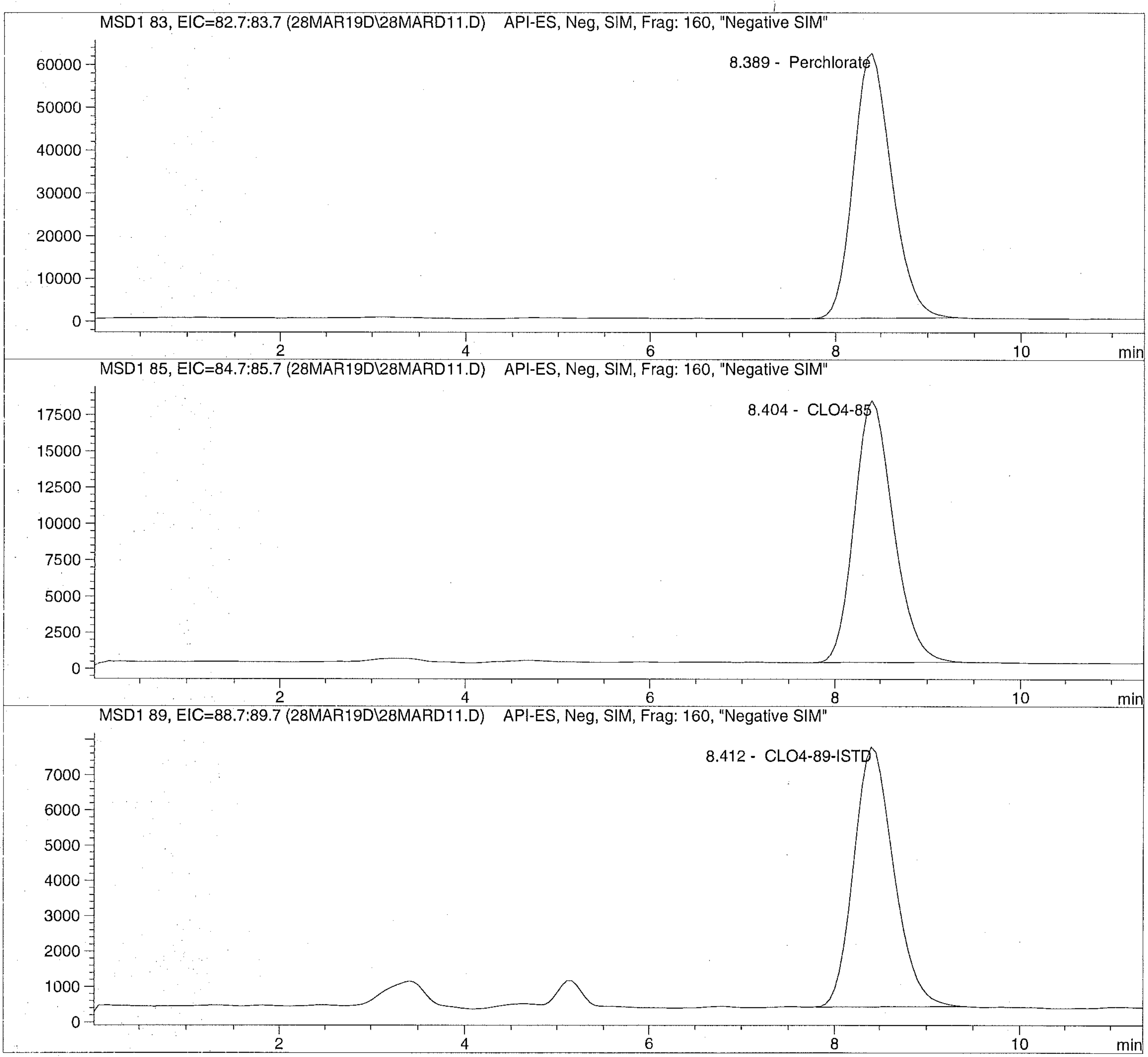
===

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD11.D       Sample Name: 645537   CCV@25
=====================================================================================
Injection Date:    3/28/2019  10:49:41              Seq Line:            11
Sample Name:       645537   CCV@25                  Location:       Vial 71
Acq Operator:      TNB                              Inj. No.:             1
                                                    Inj. Vol.:        25 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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD11.D Sample Name: 645537 CCV@25

Injection Date:	3/28/2019 10:49:41	Seq Line:	11
Sample Name:	645537 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.389	PBA	1797085.1	24.4912	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.404	PBA	535801.9	24.5911	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.412	BBA	223514.2	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]	Sig	Lvl	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:

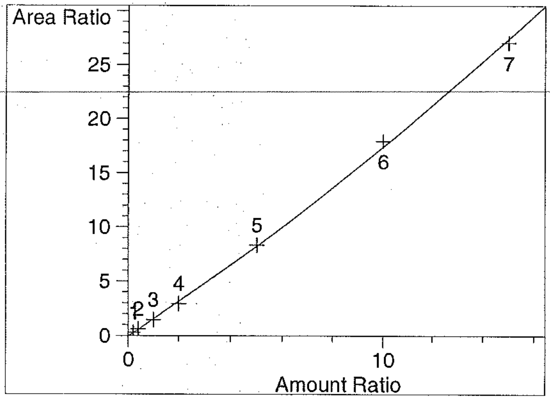
```
Compound: Perchlorate
  Time Window               : From 6.654 min To 12.544 min
  Curve Type                : Quadratic
  Origin                    : Ignored
  Calibration Level Weights:/
    Level 1                 : 1
    Level 2                 : 0.5
    Level 3                 : 0.2
    Level 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

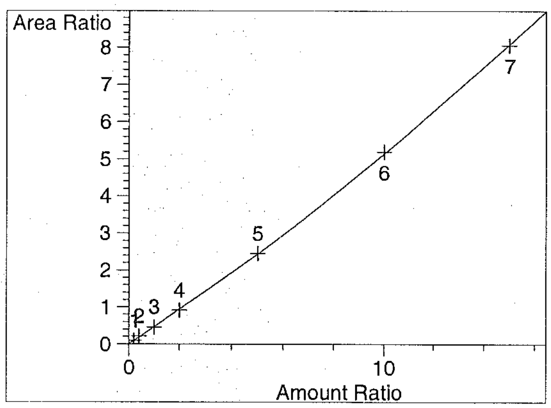
Compound: CLO4-89-ISTD
  Time Window               : From 6.659 min To 12.466 min
  Curve Type                : Linear
  Origin                    : Included
  Calibration Level Weights:/
    Level 1                 : 1
    Level 2                 : 1
    Level 3                 : 1
    Level 4                 : 1
    Level 5                 : 1
    Level 6                 : 1
    Level 7                 : 1
=====================================================================
                          Peak Sum Table
=====================================================================

***No Entries in table***
=====================================================================
```

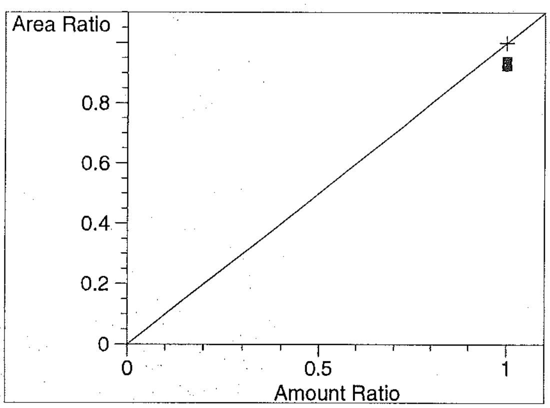
Calibration Curves



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	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:

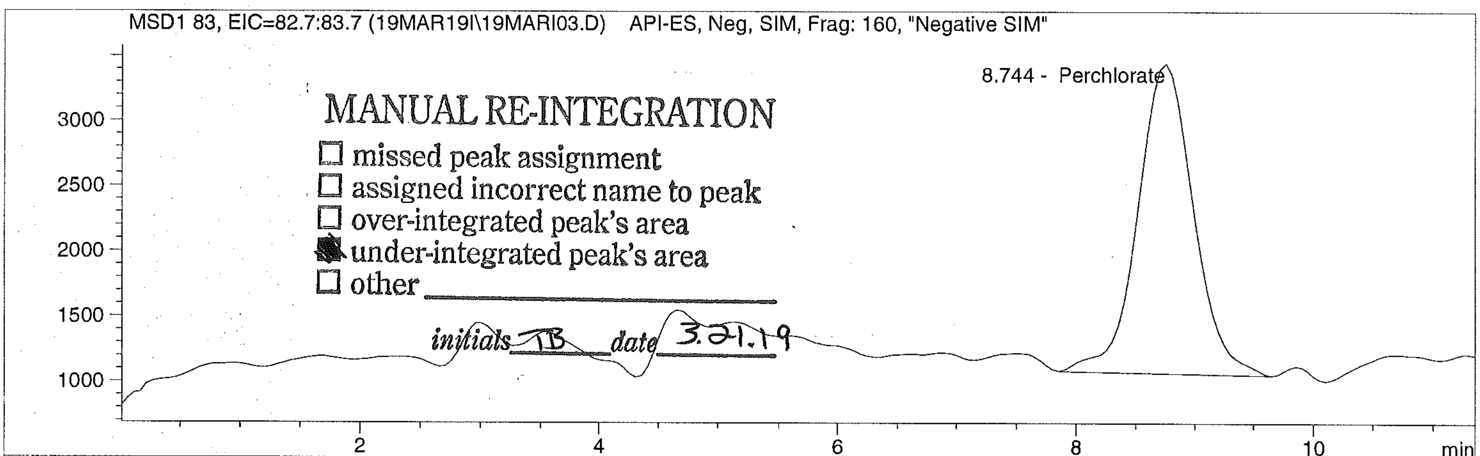
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	CLO4@ 5.0ug/L	CLO4-AQN	1	Ctrl Samp		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

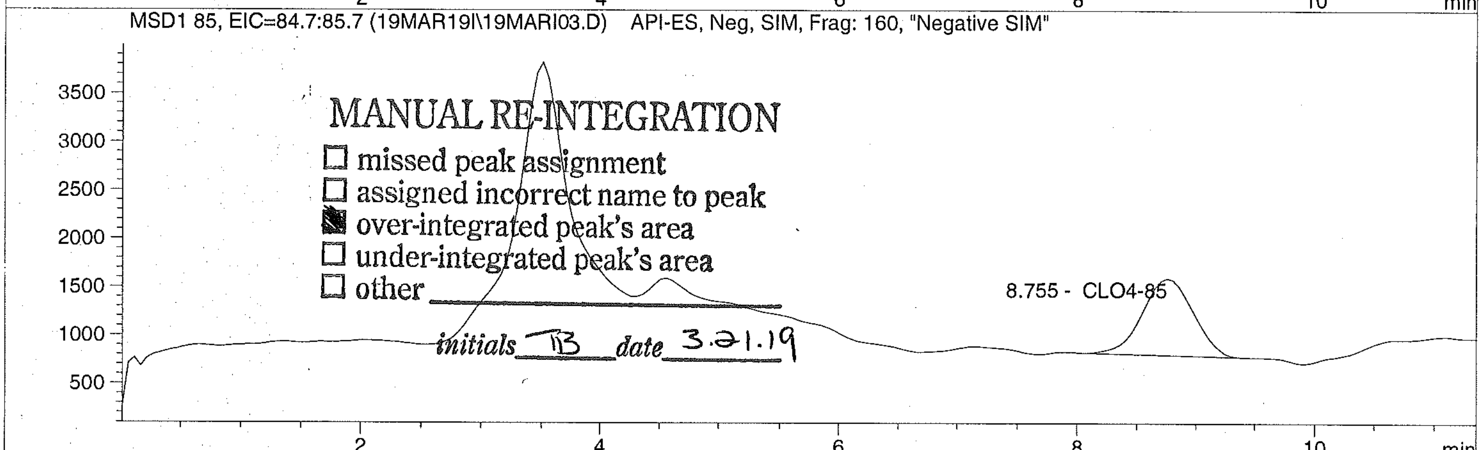
Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI03.D   Sample Name: CLO4@ 1.0ug/L

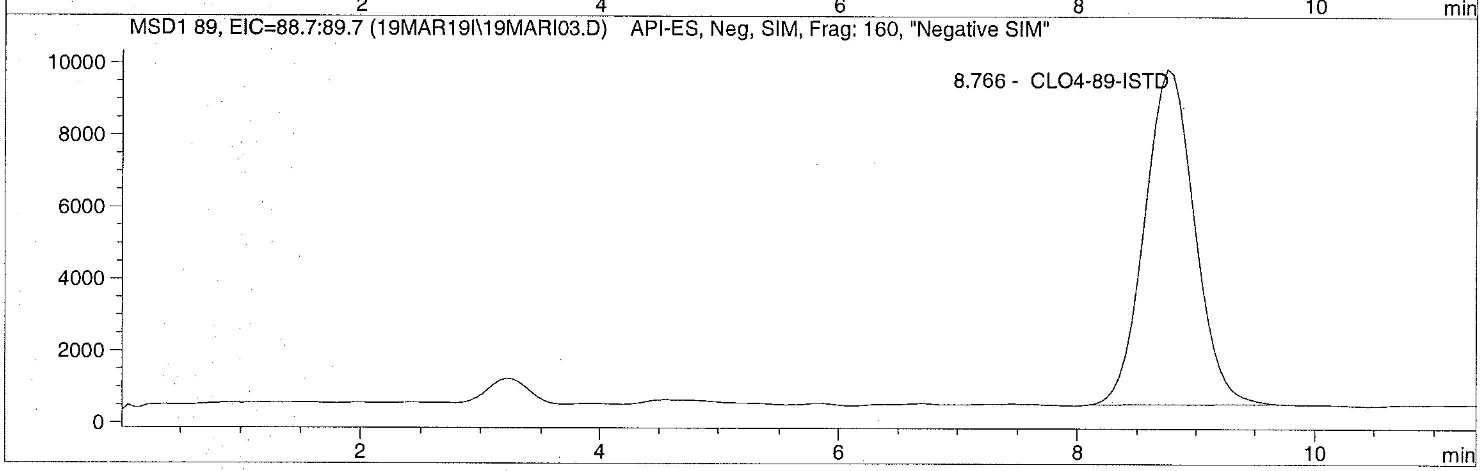
Injection Date:	3/19/2019 09:39:40	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis







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 ***

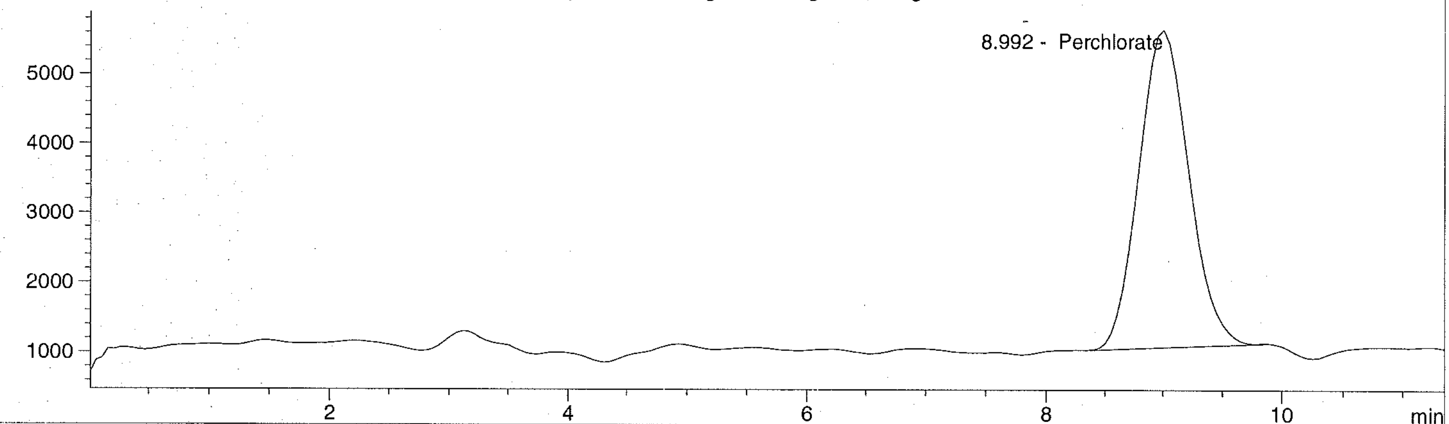
Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D   Sample Name: CLO4@ 2.0ug/L

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

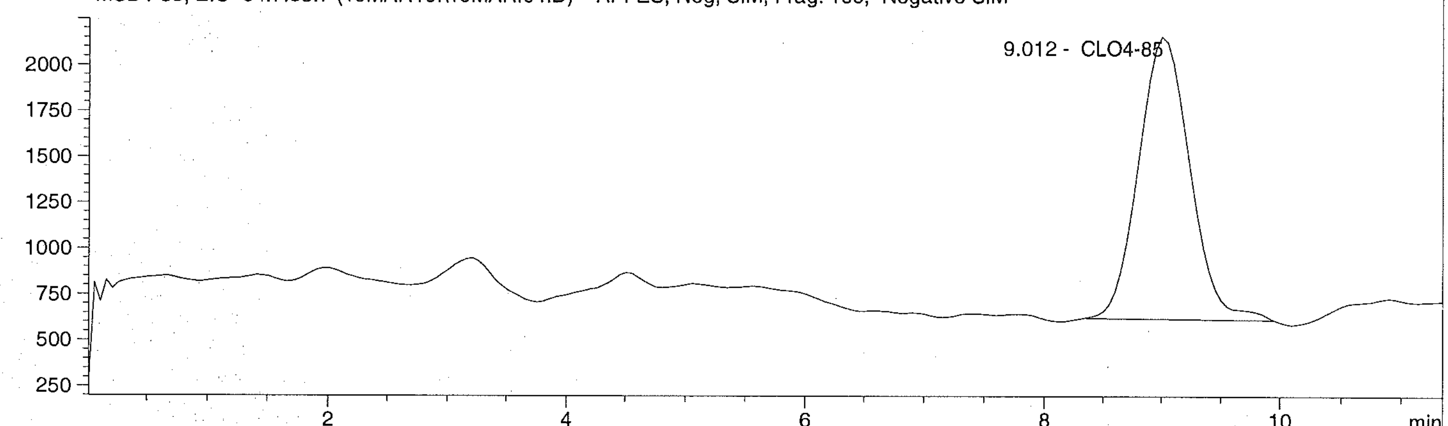
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

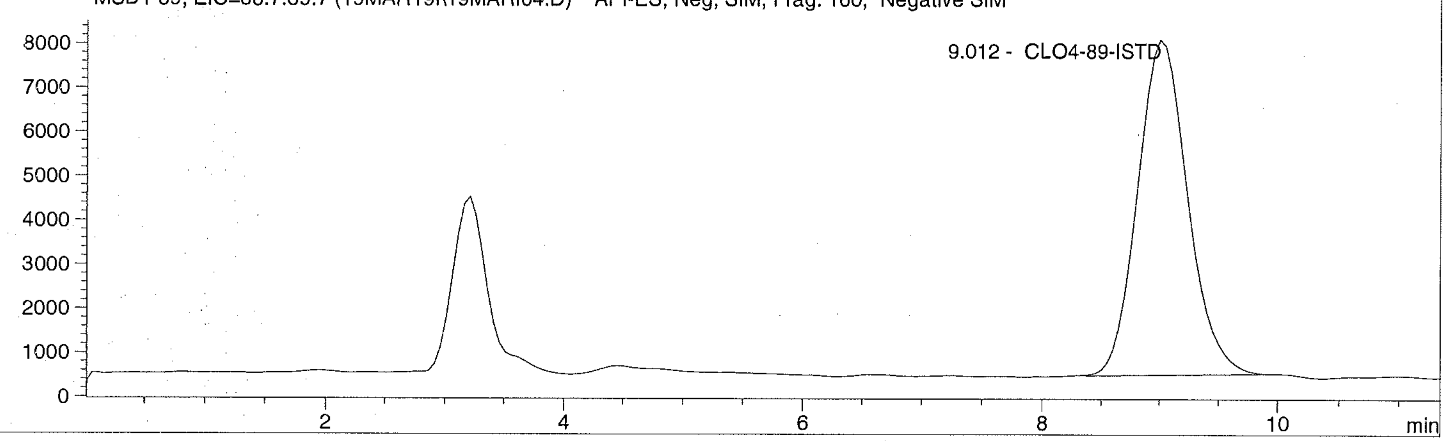
MSD1 83, EIC=82.7:83.7 (19MAR19I\19MARI04.D) API-ES, Neg, SIM, Frag: 160, "Negative SIM"



MSD1 85, EIC=84.7:85.7 (19MAR19I\19MARI04.D) API-ES, Neg, SIM, Frag: 160, "Negative SIM"



MSD1 89, EIC=88.7:89.7 (19MAR19I\19MARI04.D) API-ES, Neg, SIM, Frag: 160, "Negative SIM"



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D   Sample Name: CLO4@ 2.0ug/L

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 ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI05.D   Sample Name: CLO4@ 5.0ug/L

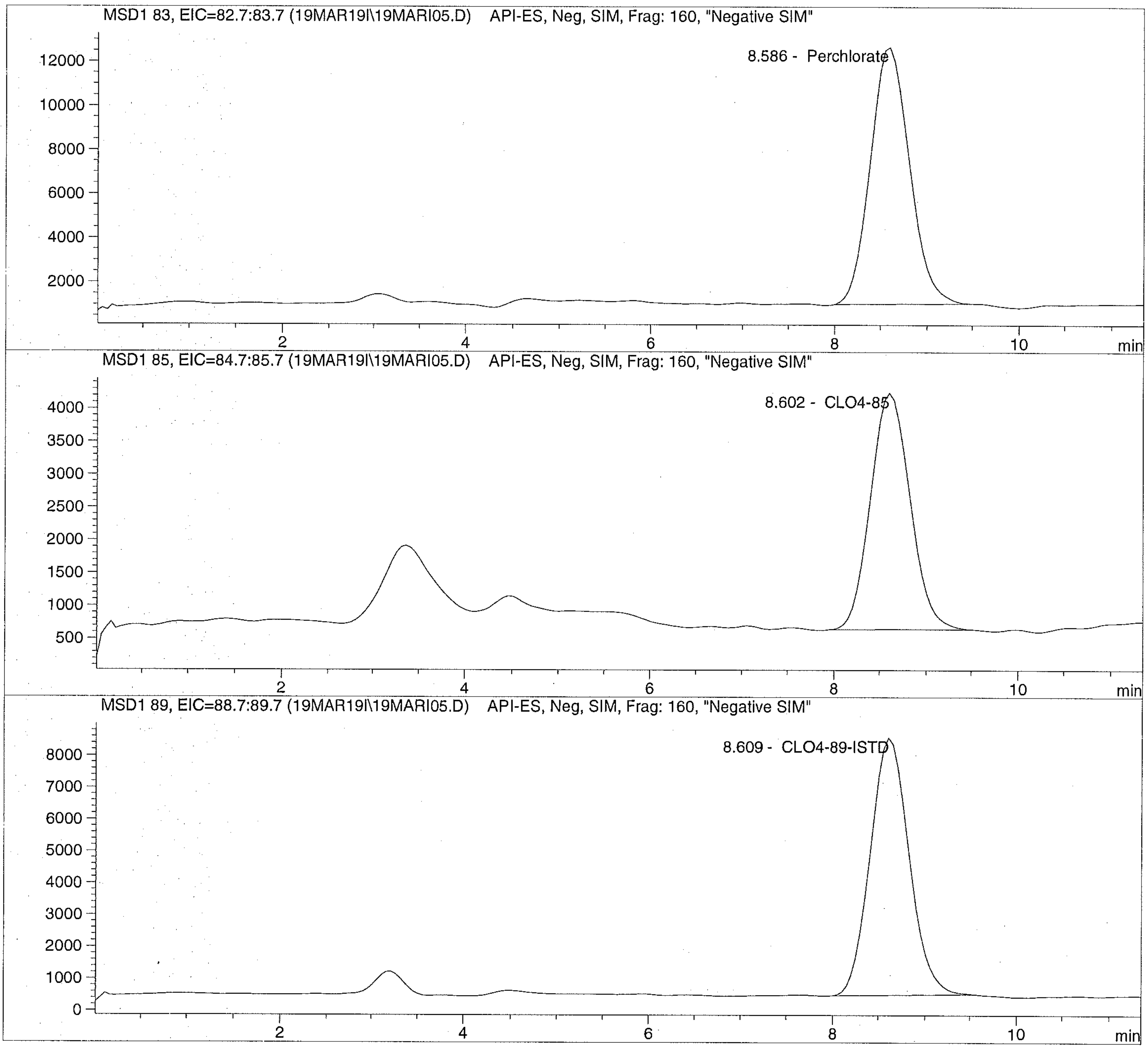
===

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

===



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

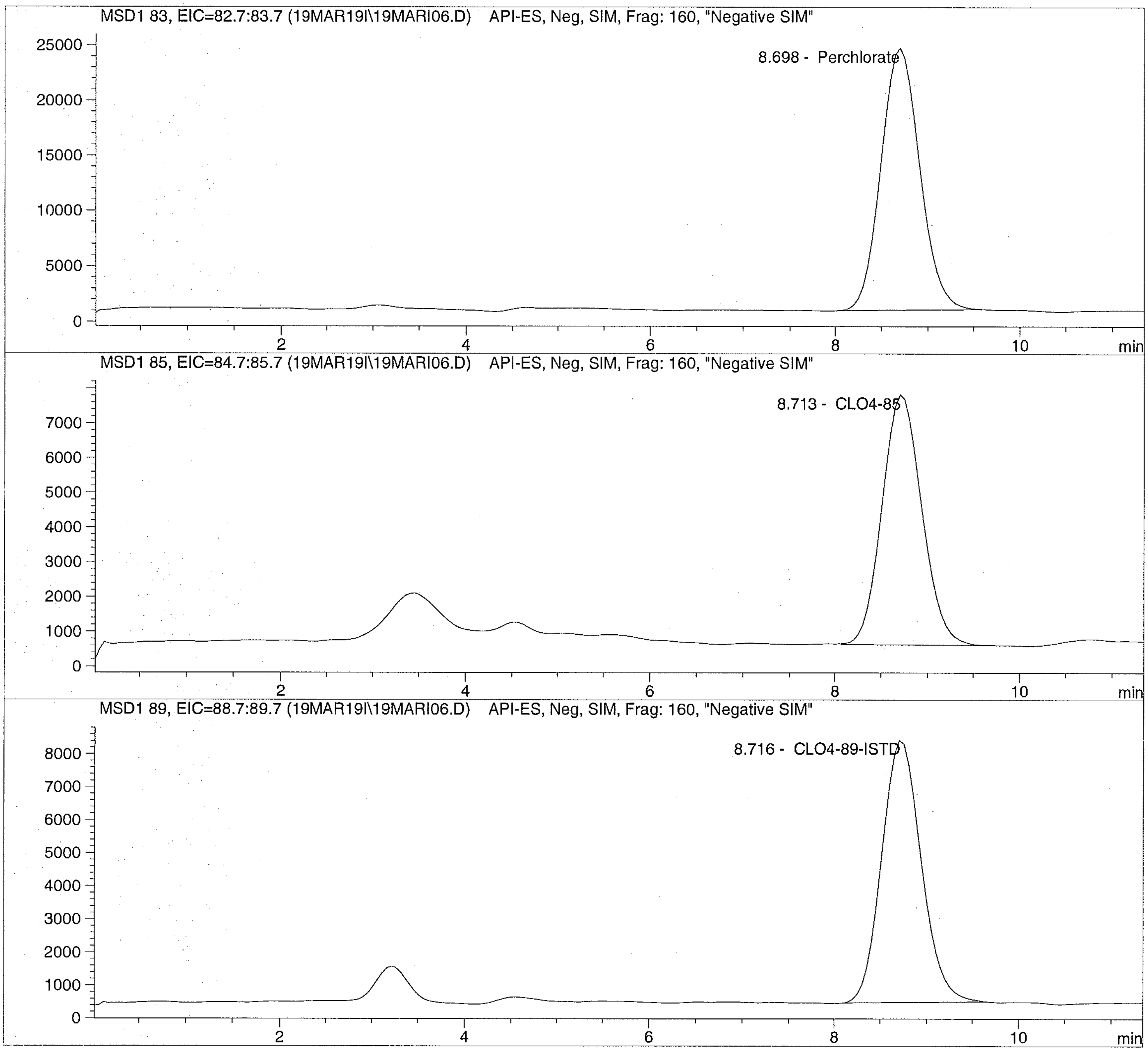
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

*** End of Report ***

```
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
=====================================================================================
```



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

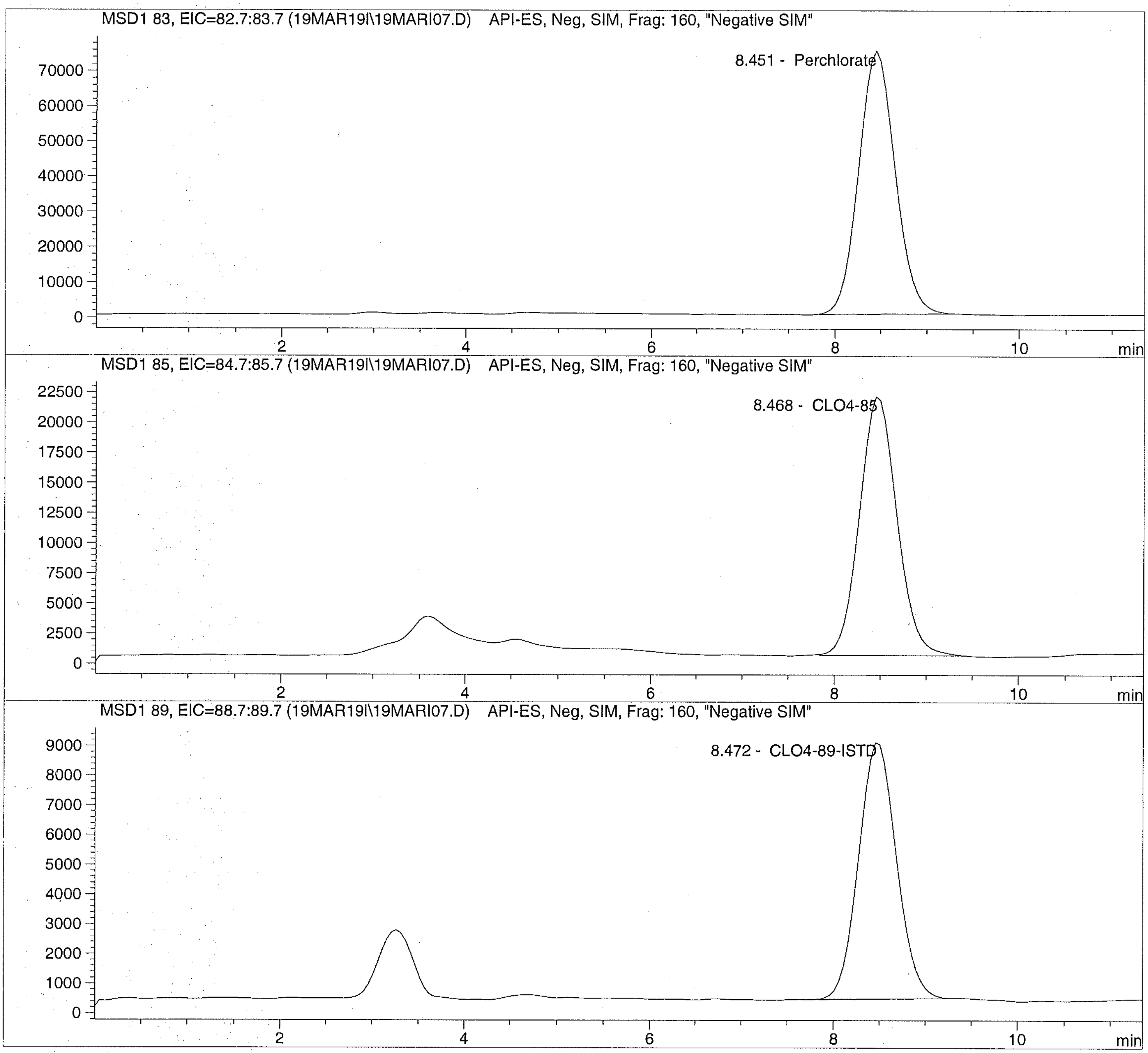
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D Sample Name: CLO4@ 25.ug/L

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



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D Sample Name: CLO4@ 25.ug/L

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

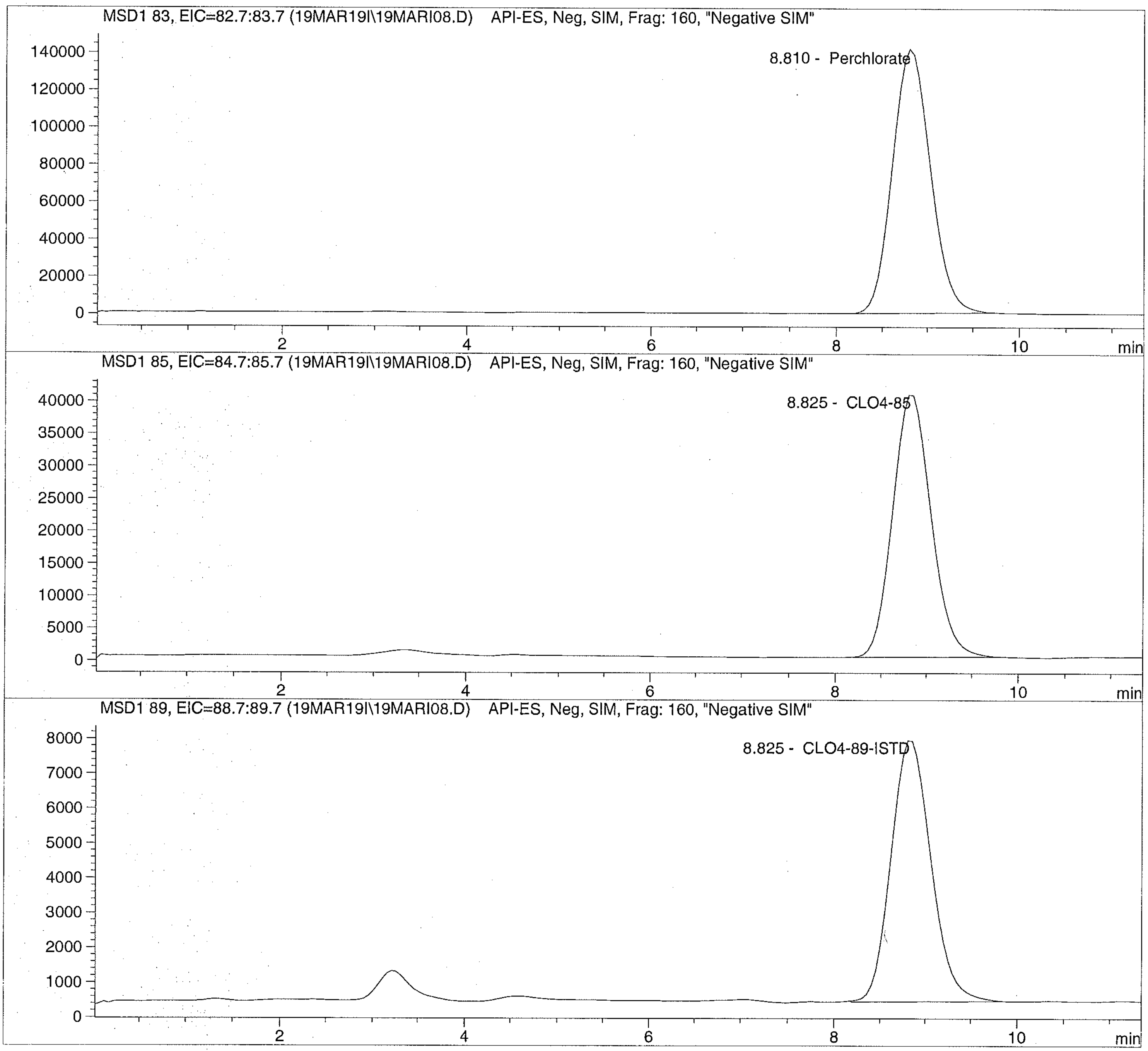
*** End of Report ***

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

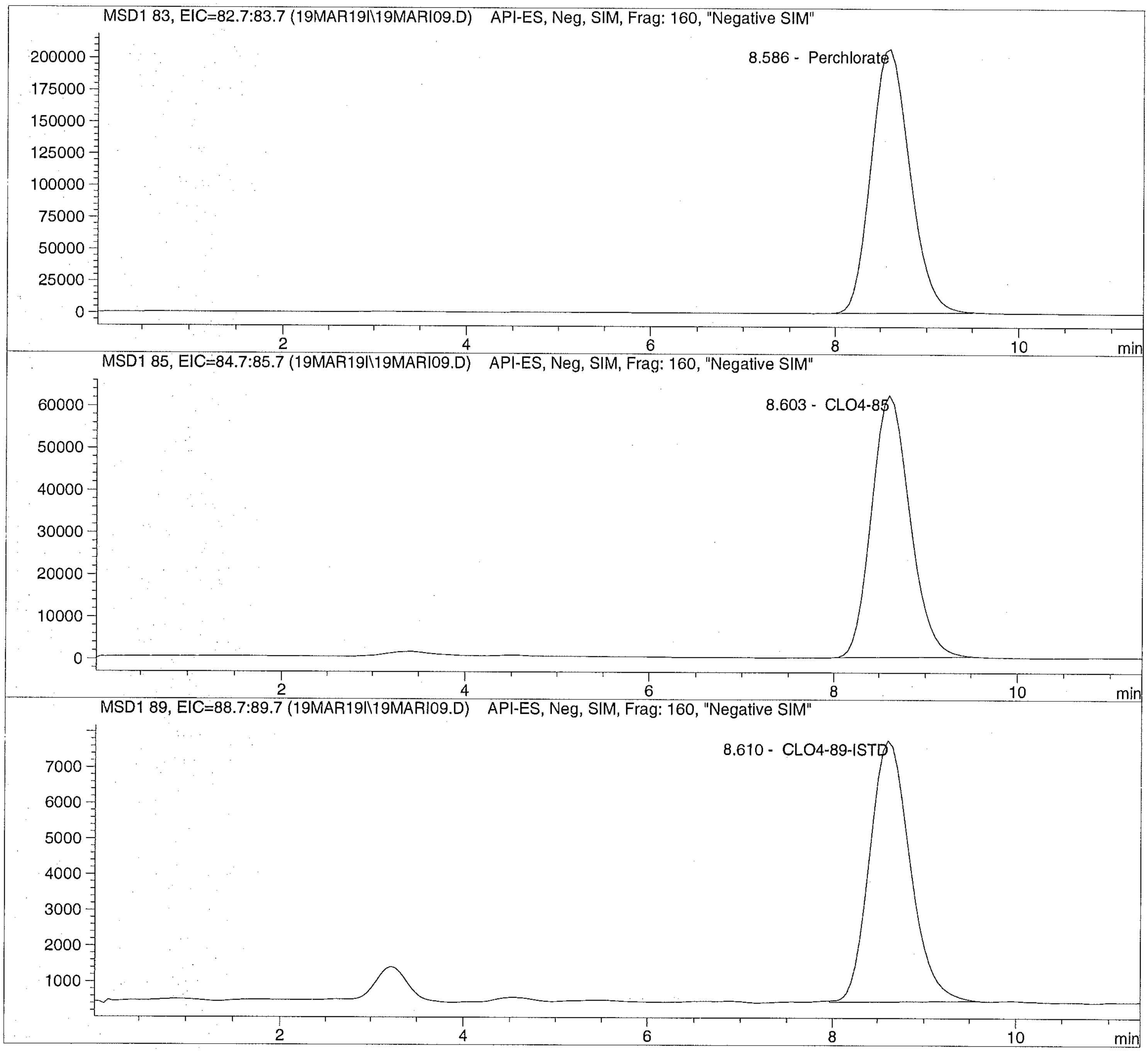
*** End of Report ***

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



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

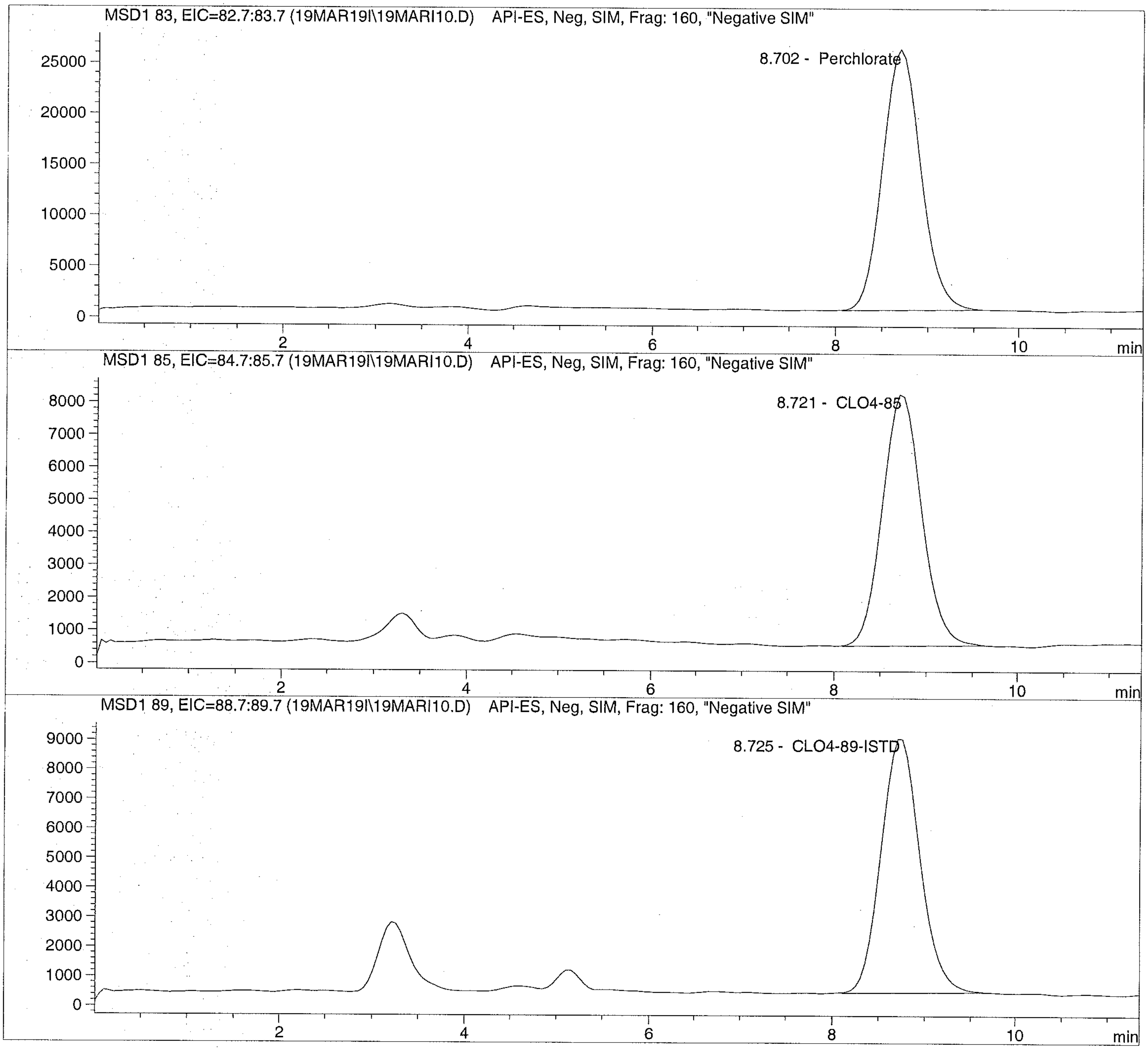
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

*** End of Report ***

```
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
=====================================================================================
```



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

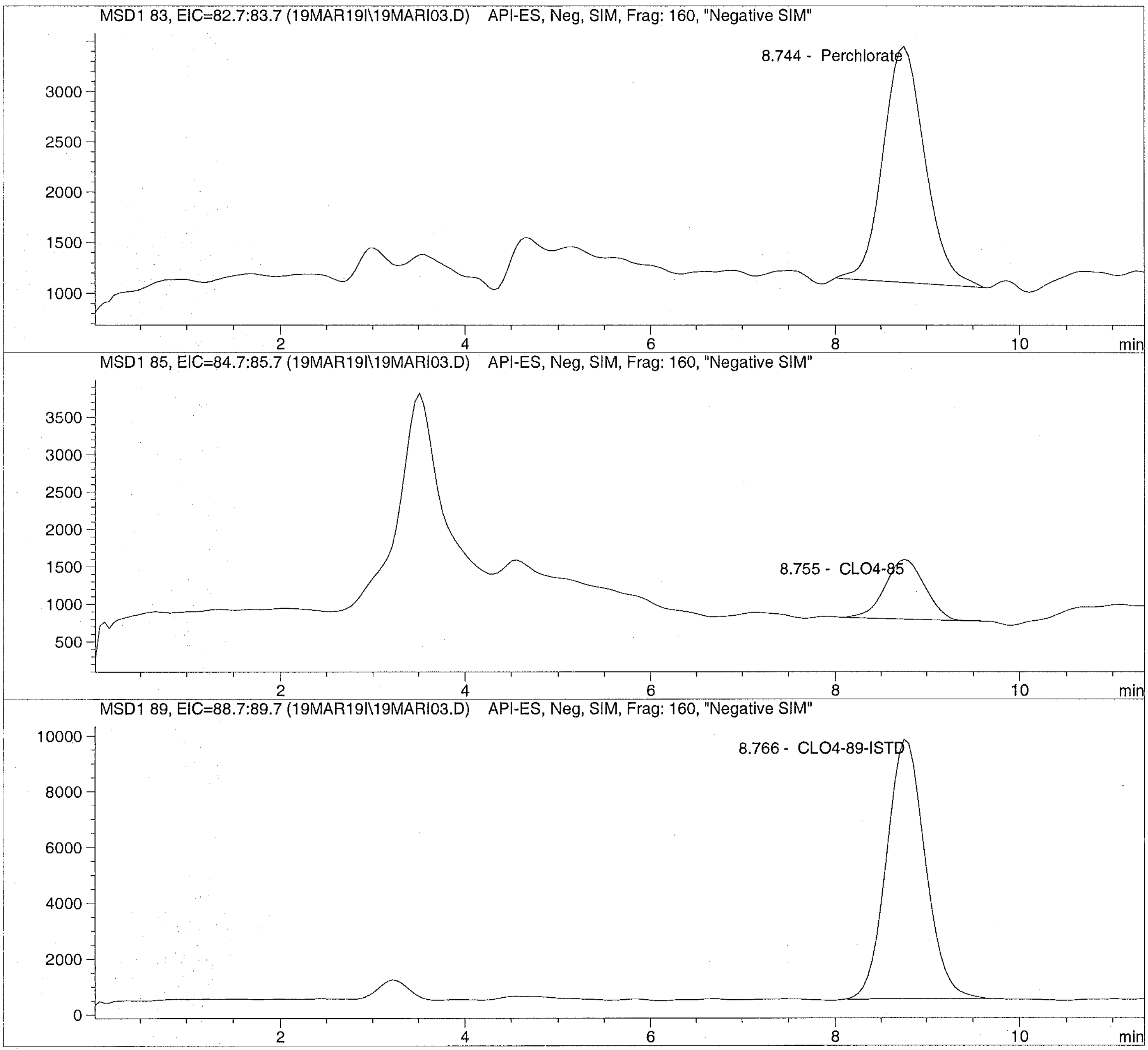
Raw Data

Unmodified

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



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 ***

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
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March 31, 2019

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

Work Order: **HS19030763**

Laboratory Results for: **LH18/24 GW Treatment Plant Monthly Influent Samples**

Dear Marcia,

ALS Environmental received 1 sample(s) on Mar 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

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
Work Order: HS19030763

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19030763-01	LH18/24-SP140_031419	Water		14-Mar-2019 14:00	15-Mar-2019 08:38	☐

ALS Houston, US Date: 31-Mar-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: 138939

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

WetChemistry by Method SW7196

Batch ID: R334751

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

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 GW Treatment Plant Monthly Influent Samples		WorkOrder:HS19030763
Sample ID:	LH18/24-SP140_031419		Lab ID:HS19030763-01
Collection Date:	14-Mar-2019 14:00		Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
ICP-MS METALS BY SW6020A		**Method:SW6020**				Prep:SW3010A / 21-Mar-2019		Analyst: JCJ
Selenium	0.00250	U	0.00110	0.00250	0.00200	mg/L	1	23-Mar-2019 01:07
Silver	0.000500	U	0.000200	0.000500	0.00200	mg/L	1	23-Mar-2019 01:07
HEXAVALENT CHROMIUM BY SW7196A		**Method:SW7196**						Analyst: MZD
Chromium, Hexavalent	0.0100	U	0.00600	0.0100	0.0100	mg/L	1	15-Mar-2019 12:14
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	31-Mar-2019 12:13

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: HS19030763

Batch ID: 138939 **Method:** ICP-MS METALS BY SW6020A **Prep:** 3010A

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19030763-01	1	10	10 (mL)	1

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19030763

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID 138939	**Test Name :** ICP-MS METALS BY SW6020A			**Matrix:** Water		
HS19030763-01	LH18/24-SP140_031419	14 Mar 2019 14:00		21 Mar 2019 10:00	23 Mar 2019 01:07	1
Batch ID R334751	**Test Name :** HEXAVALENT CHROMIUM BY SW7196A			**Matrix:** Water		
HS19030763-01	LH18/24-SP140_031419	14 Mar 2019 14:00			15 Mar 2019 12:14	1
Batch ID R335660	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			**Matrix:** Water		
HS19030763-01	LH18/24-SP140_031419	14 Mar 2019 14:00			31 Mar 2019 12:13	1

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19030763

QC BATCH REPORT NEW

Batch ID: 138939 (0) **Instrument:** ICPMS04 **Method:** ICP-MS METALS BY SW6020A

MBLK Sample ID: **MBLK-138939** Units: **mg/L** Analysis Date: **23-Mar-2019 00:40**
Client ID: Run ID: **ICPMS04_335069** SeqNo: **5003309** PrepDate: **21-Mar-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-138939** Units: **mg/L** Analysis Date: **23-Mar-2019 00:42**
Client ID: Run ID: **ICPMS04_335069** SeqNo: **5003310** PrepDate: **21-Mar-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.05143	0.00200	0.05	0	103	80 - 120				
Silver	0.05011	0.00200	0.05	0	100	80 - 120				

MS Sample ID: **HS19030918-01MS** Units: **mg/L** Analysis Date: **23-Mar-2019 00:49**
Client ID: Run ID: **ICPMS04_335069** SeqNo: **5003313** PrepDate: **21-Mar-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.05006	0.00200	0.05	-0.000569	101	80 - 120				
Silver	0.04751	0.00200	0.05	-0.000012	95.0	80 - 120				

MSD Sample ID: **HS19030918-01MSD** Units: **mg/L** Analysis Date: **23-Mar-2019 00:51**
Client ID: Run ID: **ICPMS04_335069** SeqNo: **5003314** PrepDate: **21-Mar-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.0556	0.00200	0.05	-0.000569	112	80 - 120	0.05006	10.5	20	
Silver	0.04885	0.00200	0.05	-0.000012	97.7	80 - 120	0.04751	2.79	20	

PDS Sample ID: **HS19030918-01PDS** Units: **mg/L** Analysis Date: **23-Mar-2019 00:53**
Client ID: Run ID: **ICPMS04_335069** SeqNo: **5003315** PrepDate: **21-Mar-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.1029	0.00200	0.1	-0.000569	103	75 - 125				
Silver	0.08679	0.00200	0.1	-0.000012	86.8	75 - 125				

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19030763

QC BATCH REPORT NEW

Batch ID: **138939 (0)** **Instrument:** **ICPMS04** **Method:** **ICP-MS METALS BY SW6020A**

SD Sample ID: **HS19030918-01SD** Units: **mg/L** Analysis Date: **23-Mar-2019 00:47**
Client ID: Run ID: **ICPMS04_335069** SeqNo: **5003312** PrepDate: **21-Mar-2019** DF: **5**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Selenium	0.0125	0.0100					-0.000569	0	10	U
Silver	0.00250	0.0100					-0.000012	0	10	U

The following samples were analyzed in this batch: HS19030763-01

ALS Houston, US Date: 31-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
WorkOrder: HS19030763

QC BATCH REPORT NEW

Batch ID: R334751 (0) **Instrument:** UV-2450 **Method:** HEXAVALENT CHROMIUM BY SW7196A

MBLK Sample ID: **MBLK-334751** Units: **mg/L** Analysis Date: **15-Mar-2019 12:14**
Client ID: Run ID: **UV-2450_334751** SeqNo: **4995026** 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-334751** Units: **mg/L** Analysis Date: **15-Mar-2019 12:14**
Client ID: Run ID: **UV-2450_334751** SeqNo: **4995027** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.244	0.0100	0.25	0	97.6	90 - 111				

LCSD Sample ID: **LCSD-334751** Units: **mg/L** Analysis Date: **15-Mar-2019 12:14**
Client ID: Run ID: **UV-2450_334751** SeqNo: **4995028** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.244	0.0100	0.25	0	97.6	90 - 111	0.244	0	20	

The following samples were analyzed in this batch: HS19030763-01

ALS Houston, US Date: 31-Mar-19

Client:	Bhate Environmental Associates, Inc.	**QUALIFIERS, ACRONYMS, UNITS**
Project:	LH18/24 GW Treatment Plant Monthly Influent Samples	
WorkOrder:	**HS19030763**	

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

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

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
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.
Project: LH18/24 GW Treatment Plant Monthly Influent Samples
Work Order: HS19030763

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19030763-01	LH18/24-SP140_031419	Login	3/15/2019 11:03:24 AM	JRM	WET176
HS19030763-01	LH18/24-SP140_031419	Login	3/15/2019 11:03:24 AM	JRM	WET176
HS19030763-01	LH18/24-SP140_031419	Login	3/15/2019 11:03:24 AM	JRM	MET068

ALS Houston, US Date: 31-Mar-19

Sample Receipt Checklist

Client Name:	Bhate Environmental	Date/Time Received:	**15-Mar-2019 08:38**
Work Order:	HS19030763	Received by:	**JRM**

Checklist completed by: *Jared R. Makan* (eSignature) 15-Mar-2019 (Date)

Reviewed by: *RJ Modashia* (eSignature) 15-Mar-2019 (Date)

Matrices: **Water**

Carrier name: **FedEx Priority Overnight**

	Yes	No	
Shipping container/cooler in good condition?	☑	☐	Not Present ☐
Custody seals intact on shipping container/cooler?	☑	☐	Not Present ☐
Custody seals intact on sample bottles?	☐	☐	Not Present ☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	☐	☐	Not Present ☑
Chain of custody present?	☑	☐	1 Page(s)
Chain of custody signed when relinquished and received?	☑	☐	COC IDs:N/A
Samplers name present on COC?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature in compliance?	☑	☐	

Temperature(s)/Thermometer(s): 1.3c/1.3c UC/C | IR25

Cooler(s)/Kit(s): 25780

Date/Time sample(s) sent to storage: 03/15/2019 11:10

	Yes	No	
Water - VOA vials have zero headspace?	☐	☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	☑	☐	N/A ☐
pH adjusted?	☐	☑	N/A ☐

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

CHAIN OF CUSTODY

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

Page 1 of 1

Project: BHATE
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No. NWO1312.0150.016.0001

Job:
GROUNDWATER TREATMENT PLANT MONTHLY INFLUENT SAMPLES

Prepared By: Scott Beesinger

P.O. Number

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	SILVER & SELENIUM	HEXAVALENT CHROMIUM	PERCHLORATE							Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP140_031419	Water	03/14/19 / 14:00		1	X									HNO3	
LH18/24-SP140_031419	Water	03/14/19 / 14:00		2		X	X							NONE	

Additional Remarks: **STANDARD TURN AROUND TIME**

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	03/14/19	14:30									

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition
J. [illegible]	3/15/19	08:38							

Remarks: Cooler 25780 IR25
Temp 1.3 CF0.0

HS19030763
Bhate Environmental Associates, Inc.
18/24 GW Treatment Plant Monthly Influent Samples

(Word) S:\L-ces\Forms\Chain of Custody - BiWeekly

ALS
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

CUSTODY SEAL

Date: 3/14/19 Time: 1430
Name: Scott Bessinger
Company: BHT

Seal Broken By: JM
Date: 3/15/19

FedEx
TRK# 0221 4380 9530 9490

FRI - 15 MAR 10:30A
PRIORITY OVERNIGHT

AB SGRA

77099
TX-US
IAH

FID 3586291 14MAR19 GGGA 553C1/46D3/0C8A

Case Narrative

Method: 6850
Analysis: Perchlorate
Analysis SOP: LC-MS-CLO4
ALS WO ID(s): 1907867; 1907869; 1907871; 1908794

Client: ALS Laboratories (Houston, TX)
Matrix: Water
ELMS Batch (HBN): 2230 (235529)

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. 50µL of an ^{18}O labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45µm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1907867001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

Method QC data: The method blank (LMB 645533) was less than 1/2 the CRDL. The recovery for the LCS (645534) was within acceptable parameters.

MS/MSD Analysis: MS/MSD was performed on sample 1907869001 (Client ID's: LH18/24-SP650_031419_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 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 – 645531) is reported from the analysis of the Laboratory Control Sample (LCS – 645534) 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 March 29, 2019
Analyst Date

ANALYTICAL REPORT

Report Date: March 29, 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: **34-1907867**
Project ID: HS19030763
Purchase Order: HS19030763
Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP140_031419	1907867001	03/14/19	03/19/19	

ANALYTICAL REPORT

Workorder: 34-1907867
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **LH18/24-SP140_031419**	Sampling Site: NA	Collected: 03/14/2019
Lab ID: 1907867001	Media: 125 mL Nalgene	Received: 03/19/2019
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/2230 (HBN: 235529)	**Percent Solid:** NA
	Analyzed: 03/28/2019 09:28	**Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**8300**	1000	2000	4000	1000	

Comments

Quality Control: EPA 6850, DoD QSM - (HBN: 235529)

Field sample 1907867001 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 03/28/2019 14:08	/S/ Stephen Brose 03/29/2019 12:58

Laboratory Contact Information

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

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

ANALYTICAL REPORT

Workorder: 34-1907867
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

Analysis Information

Workorder: 1907867

Limits: Client SOW/Contract Specified
Basis: DoD QSM

Preparation: NA
Batch: NA
Prepared By: NA

Analysis: EPA 6850, DoD QSM
Batch: ELMS/2230 (HBN: 235529)
Analyzed By: Thomas Bosch

Blank

LMB: 645533
Analyzed: 03/28/2019 09:14

Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 645534
Analyzed: 03/28/2019 08:47
Dilution: 1
Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.00	4.00	99.9	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1907869001
Analyzed: 03/28/2019 09:41
Dilution: 1
Units: ug/L

MS: 645535
Analyzed: 03/28/2019 09:54
Dilution: 1
Units: ug/L

MSD: 645536
Analyzed: 03/28/2019 10:08
Dilution: 1
Units: ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	4.66	4	117	78.8	123.8	4.05	101	14	0.0	20.0

Comments

Field sample 1907867001 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 03/28/2019 14:23	/S/ Stephen Brose 03/29/2019 12:58

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 1907867

10450 Stancliff Rd, Ste 210
Houston, TX 77099
T: +1 281 530 5656
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18698/#2

Subcontract Chain of Custody

COC ID: 10918

1907867

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:	HS19030763
TSR:	Danielle Winnings

	LAB SAMPLE ID / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / DUE DATE
1.	**HS19030763-01**	**LH18/24-SP140_031419**	**Water**	**14 Mar 2019 14:00**
	SUB_Perch-6850			29 Mar 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:	3/18/19 18:00
Received By:	Tamra Russell	Date/Time:	3-19-19 9:50
Cooler ID(s):		Temperature(s):	

ALS Environmental
CHAIN-OF-CUSTODY

Project / Job / Task: HS19030763 | ***Split:*** | **Workorder ID:** 1907867 | Level: ENV_LVL4

Client: ALS Environmental (Houston) | **Account:** 8101

Type: 125Poly

Preservatives: COOL

Comments:

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	EPA 6850, DoD QSM
1	03/14/2019 14:00	LH18/24-SP140_031419	1907867001		Water	A	1	A
2								
3								
4								
5								
6								
7								
8								
9								
10								

23 of 93

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
Warath, Julie	03/19/2019 09:50	ALS Sample Receiving	Sample Login
Julie Warath	3/20/19 1200	KC	Storage
R.33.1	3-27-19/11:45	T.Bush	6850

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

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

Prepared / Analyzed by: ______ Date / Time: ______

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

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Houston
Project/Task/Site: 1907867
Date/Time of Receipt: 03-19-19 9:50
Number of Coolers Received: 1

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

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

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 9750	1 °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: Tami Van Tassel (Signature) Tami Van Tassel (Printed Name) 03-19-19 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ 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: ____________ (Printed Name) Returned to Sample Receipt by: ____________ (Signature) Date: ____________

CRIR.doc Revised 01/01/2018

Part # 159469-434 RIT2 EXP 11/19

ALS

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

SHIP DATE: 18MAR19
ACTWGT: 9.35 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE

SALT LAKE CITY UT 84123
(801) 266-7700
REF: HS19030749/761/763 RJ

FedEx Express

E

J181118060501uv

TUE - 19 MAR 3:00P
STANDARD OVERNIGHT

TRK# 0201 4809 7831 7725

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/ 2230** Created: 3/28/2019 07:45 Instrument: HBN: 235529
Rule: EPA 6850, DoD QSM Water Analyst: T. Bosch Status: WP

Workorder: 1907867 [ENV_LVL4]
Workorder: 1907869 [ENV_LVL4]
Workorder: 1907871 [ENV_LVL4]
Workorder: 1908794 [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	645530	CCV for HBN 235529 [ELMS/2230]				CCV	3		E685041C3Q	5311		4/1/2019	
2	645531	RLVS for HBN 235529 [ELMS/2230				RLVS	3		E685041C3Q	5311		4/1/2019	
3	645532	ICS for HBN 235529 [ELMS/2230]				ICS	3		E6850..D3Q	5311		4/1/2019	
4	645533	LMB for HBN 235529 [ELMS/2230]				LMB	3		E6850Q413Q	5311		4/1/2019	
5	645534	LCS for HBN 235529 [ELMS/2230]				LCS	3		E6850Q413Q	5311		4/1/2019	
6	1907867001	LH18/24-SP140_031419				SAMPLE	3	1907867001-A	E6850Q41.3	5480	4/11/2019	4/1/2019	
7	1907869001	LH18/24-SP650_031419_BIX				SAMPLE	3	1907869001-A	E6850Q41.3	5480	4/11/2019	4/1/2019	
8	645535	LH18/24-SP650...(1907869001MS)				MS	3		E6850Q413Q	5311		4/1/2019	
9	645536	LH18/24-SP65...(1907869001MSD)				MSD	3		E6850Q413Q	5311		4/1/2019	
10	1907871001	LH18/24-SP650_031419_BIX				SAMPLE	3	1907871001-A	E6850Q41.3	5480	4/11/2019	4/1/2019	
11	1908794001	LH18/24-SP650_032119_BIX				SAMPLE	3	1908794001-A	E6850Q41.3	5480	4/18/2019	4/8/2019	
12	645537	CCV for HBN 235529 [ELMS/2230]				CCV	3		E685041C3Q	5311		4/1/2019	

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ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #( )'s: 1907867 (001); 1907869 (001); 1907871 (001); 1908794 (001)
ELMS Batch/HBN ID: 2230 (235529)
Prep Date: 03/27/2019 Analysis Date: 03/28/2019 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: 25µL
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 645534; Target = 4.0µg/L. ASTM type II water was used for LMB 645533.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1907869001 (Client ID's: LH18/24-SP650_031419_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 1907867001 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\MAR\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\235529-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\HBN#
5) The Reporting Limit Verification Standard (RLVS – 645531) is reported from the analysis of the Laboratory Control Sample (LCS – 645534) 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.

Chromatography (GC, HPLC, LC/MS) Technical Review Criteria Batch(es)/SDG: ELMS: 2230 HBN: 235529 Sample Set IDs if Applicable: 1907867/1907869/1907871/1908794	Analyst Initials	Reviewer Initials
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

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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
Expires: 05/09/2019
Usable: Yes
Lab Lot: CLO4 QC INT 10.ug/mL

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

Composition

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

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
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

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

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

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

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

Solvent: water (low TOC, < 50 ppb)

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

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

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

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

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

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

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

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

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

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

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

D. Lamendola
Daniel J. Lamendola
Director of QA/RA

125 Market Street
New Haven, CT 06513
USA

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

AccuStandard®

CERTIFICATE OF ANALYSIS

S 43659

AccuTrace™ Reference Standard

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

Signal Word: None

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

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

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

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

For use in routine laboratory analysis.

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 Report: C:\HPCHEM\1\DATA\28MAR19D\28MAR19S.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
*	645530 CCV@25	Vial 71	1	Control	1	1.81499e6	8.385	24.13647
*	645534 QC@4.0	Vial 72	1	Control	2	2.89937e5	8.542	3.99582
*	645532 ICS@4.0	Vial 73	1	Control	3	2.38655e5	8.226	3.65624
*	645533 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1907867001 1K	Vial 75	1	Sample	5	7.55115e5	8.548	8344.77963
*	1907869001	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	645535 78691MS	Vial 77	1	Sample	7	2.77046e5	8.030	4.66163
*	645536 78691SD	Vial 78	1	Sample	8	2.89384e5	8.027	4.05130
*	1907871001	Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1908794001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	645537 CCV@25	Vial 71	1	Control	11	1.79709e6	8.389	24.49119

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	645530 CCV@25	Vial 71	1	Control	1	5.33395e5	8.403	23.90219
*	645534 QC@4.0	Vial 72	1	Control	2	9.52963e4	8.559	4.26699
*	645532 ICS@4.0	Vial 73	1	Control	3	7.88339e4	8.237	3.90865
*	645533 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1907867001 1K	Vial 75	1	Sample	5	2.38827e5	8.562	8762.35701
*	1907869001	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	645535 78691MS	Vial 77	1	Sample	7	8.93399e4	8.046	4.91371
*	645536 78691SD	Vial 78	1	Sample	8	9.85690e4	8.049	4.48457
*	1907871001	Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1908794001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	645537 CCV@25	Vial 71	1	Control	11	5.35802e5	8.404	24.59111

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	645530 CCV@25	Vial 71	1	Control	1	2.29255e5	8.411	5.00000
*	645534 QC@4.0	Vial 72	1	Control	2	2.39106e5	8.571	5.00000
*	645532 ICS@4.0	Vial 73	1	Control	3	2.16080e5	8.242	5.00000
*	645533 LMB	Vial 74	1	Control	4	2.42742e5	8.463	5.00000
*	1907867001 1K	Vial 75	1	Sample	5	2.89136e5	8.567	5000.00000
*	1907869001	Vial 76	1	Sample	6	1.89925e5	8.088	5.00000
*	645535 78691MS	Vial 77	1	Sample	7	1.94413e5	8.053	5.00000
*	645536 78691SD	Vial 78	1	Sample	8	2.35220e5	8.053	5.00000
*	1907871001	Vial 79	1	Sample	9	1.89609e5	8.089	5.00000
*	1908794001	Vial 80	1	Sample	10	1.92453e5	8.070	5.00000
*	645537 CCV@25	Vial 71	1	Control	11	2.23514e5	8.412	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

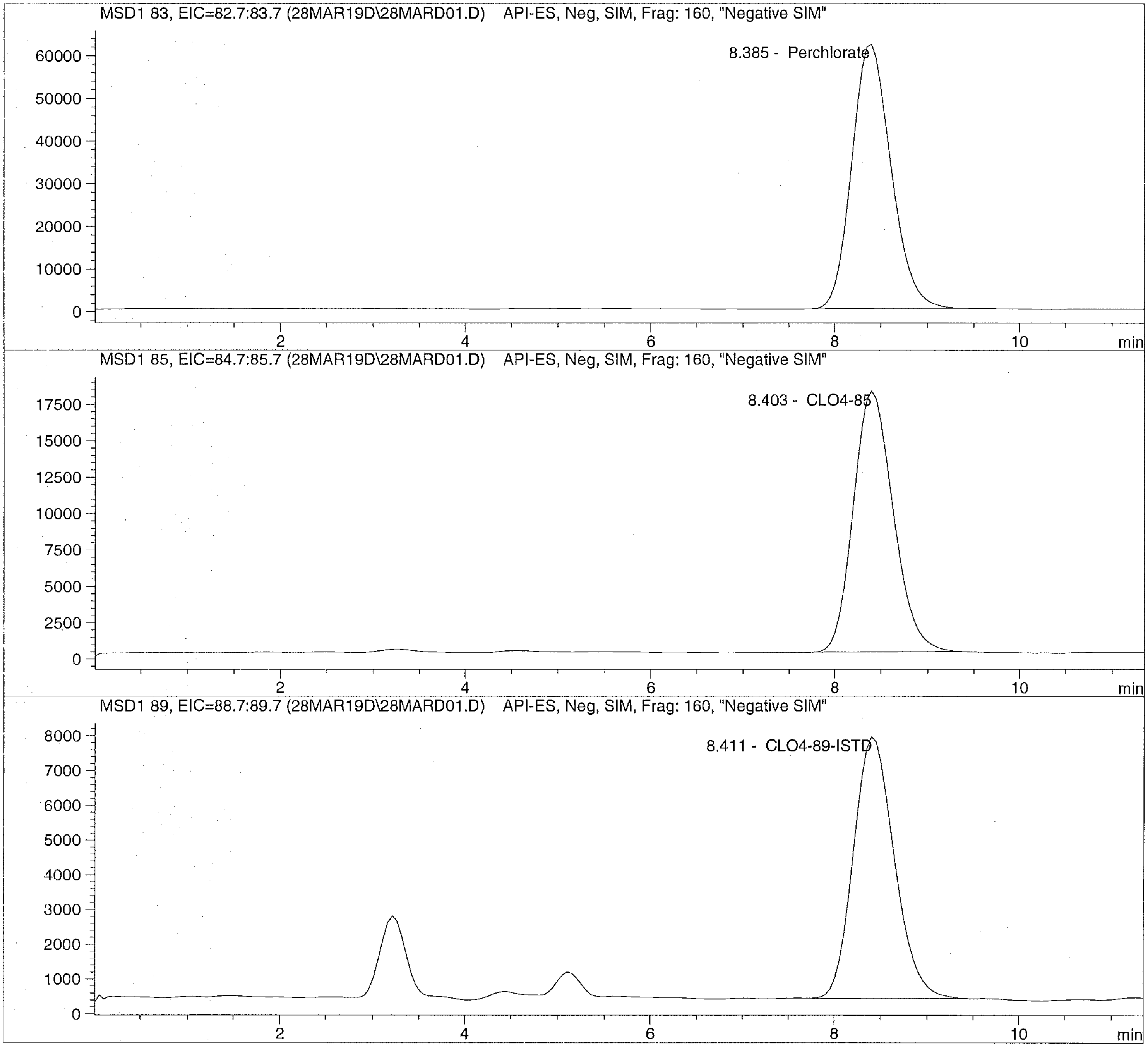
Line	Location	SampleName		Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	645530	CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	645534	QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	645532	ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	645533	LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1907867001	1K	CLO4-AQN	1	Sample		
6	Vial 76	1907869001		CLO4-AQN	1	Sample		
7	Vial 77	645535	78691MS	CLO4-AQN	1	Sample		
8	Vial 78	645536	78691SD	CLO4-AQN	1	Sample		
9	Vial 79	1907871001		CLO4-AQN	1	Sample		
10	Vial 80	1908794001		CLO4-AQN	1	Sample		
11	Vial 71	645537	CCV@25	CLO4-AQN	1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD01.D   Sample Name: 645530   CCV@25

Injection Date:	3/28/2019 08:30:53	Seq Line:	1
Sample Name:	645530 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD01.D   Sample Name: 645530 CCV@25

Injection Date:	3/28/2019 08:30:53	Seq Line:	1
Sample Name:	645530 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.385	PBA	1814992.7	24.1365	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.403	PBA	533395.5	23.9022	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.411	BBA	229255.1	5.0000	CLO4-89-ISTD

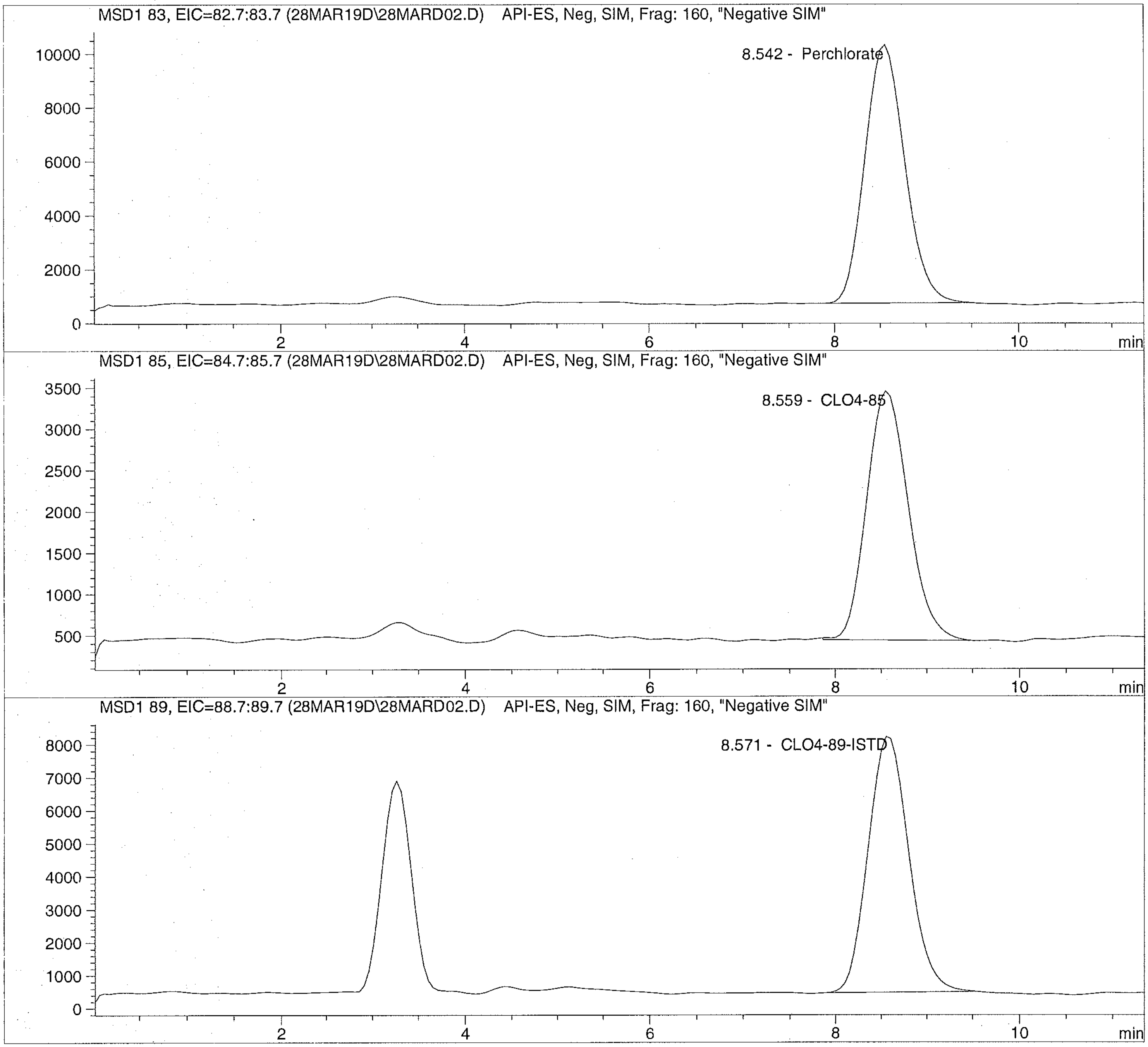
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD02.D Sample Name: 645534 QC@4.0

Injection Date:	3/28/2019 08:47:42	Seq Line:	2
Sample Name:	645534 QC@4.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD02.D Sample Name: 645534 QC@4.0

Injection Date: 3/28/2019 08:47:42
Sample Name: 645534 QC@4.0
Acq Operator: TNB
Seq Line: 2
Location: Vial 72
Inj. No.: 1
Inj. Vol.: 25 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
8.542	PBA	289937.1	3.9958	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.559	BBA	95296.3	4.2670	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.571	PBA	239105.9	5.0000	CLO4-89-ISTD

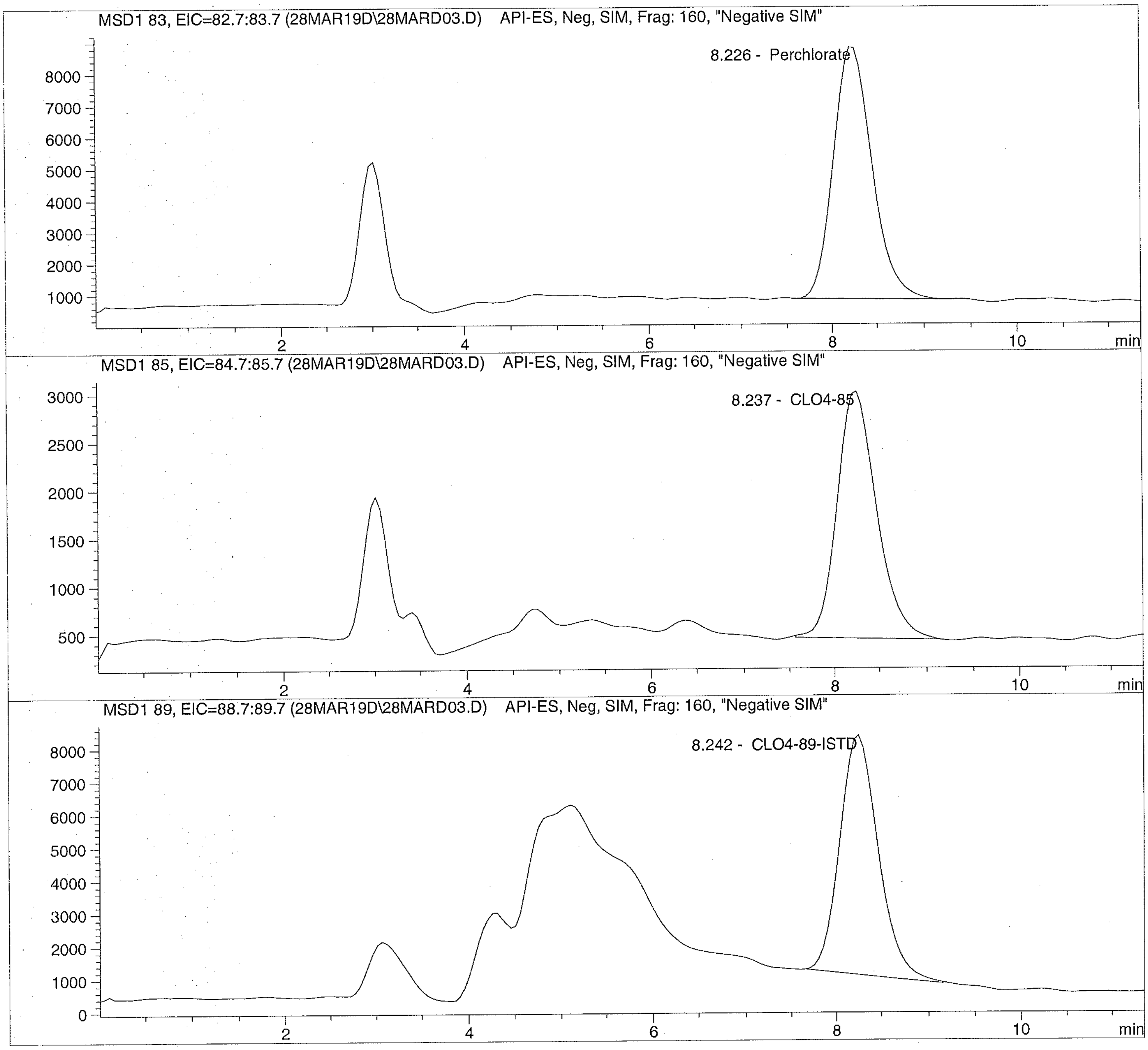
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD03.D   Sample Name: 645532   ICS@4.0

Injection Date:	3/28/2019 09:00:54	Seq Line:	3
Sample Name:	645532 ICS@4.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD03.D Sample Name: 645532 ICS@4.0

Injection Date:	3/28/2019 09:00:54	Seq Line:	3
Sample Name:	645532 ICS@4.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.226	BBA	238654.8	3.6562	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.237	BBA	78833.9	3.9087	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.242	PBA	216079.7	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD04.D Sample Name: 645533 LMB

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Injection Date:	3/28/2019 09:14:08	Seq Line:	4
Sample Name:	645533 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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

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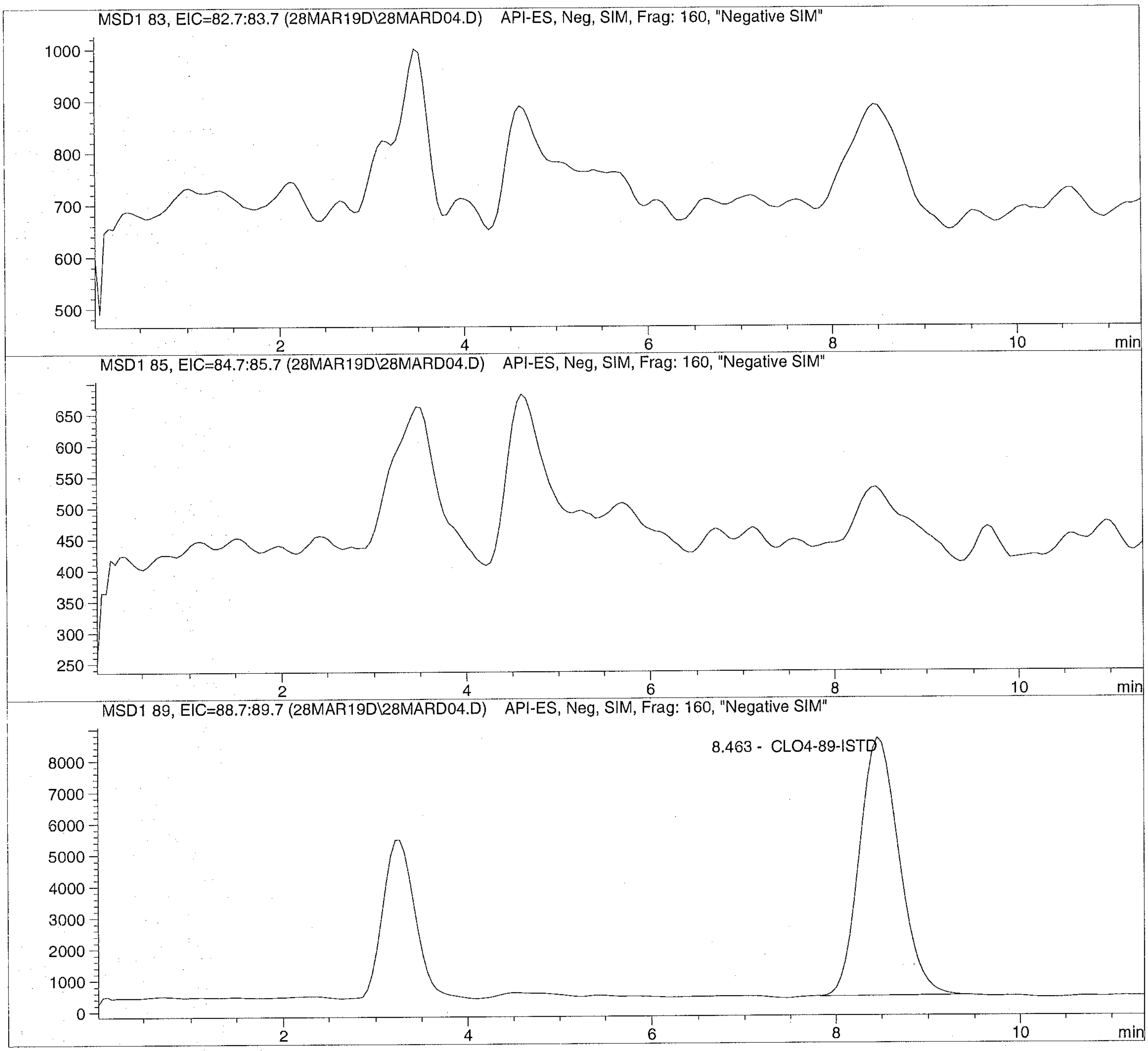


Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD04.D   Sample Name: 645533 LMB

Injection Date: 3/28/2019 09:14:08   Seq Line: 4
Sample Name: 645533 LMB   Location: Vial 74
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 25 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
8.463	BBA	242742.3	5.0000	CLO4-89-ISTD

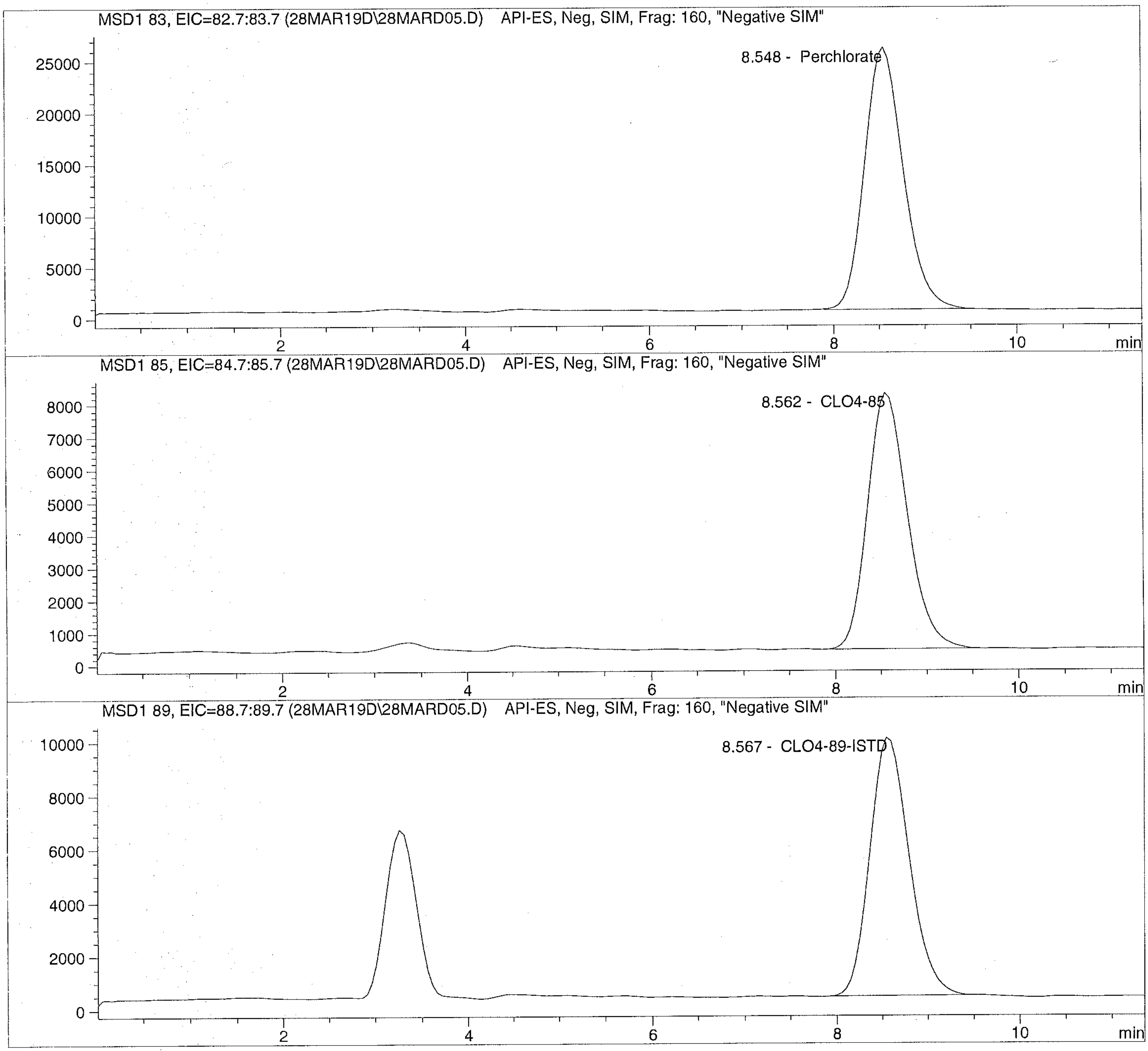
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD05.D   Sample Name: 1907867001 1K

Injection Date:	3/28/2019 09:28:25	Seq Line:	5
Sample Name:	1907867001 1K	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD05.D Sample Name: 1907867001 1K

Injection Date:	3/28/2019 09:28:25	Seq Line:	5
Sample Name:	1907867001 1K	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.548	BBA	755115.1	8344.7796	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.562	PBA	238826.8	8762.3570	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.567	PBA	289135.6	5000.0000	CLO4-89-ISTD

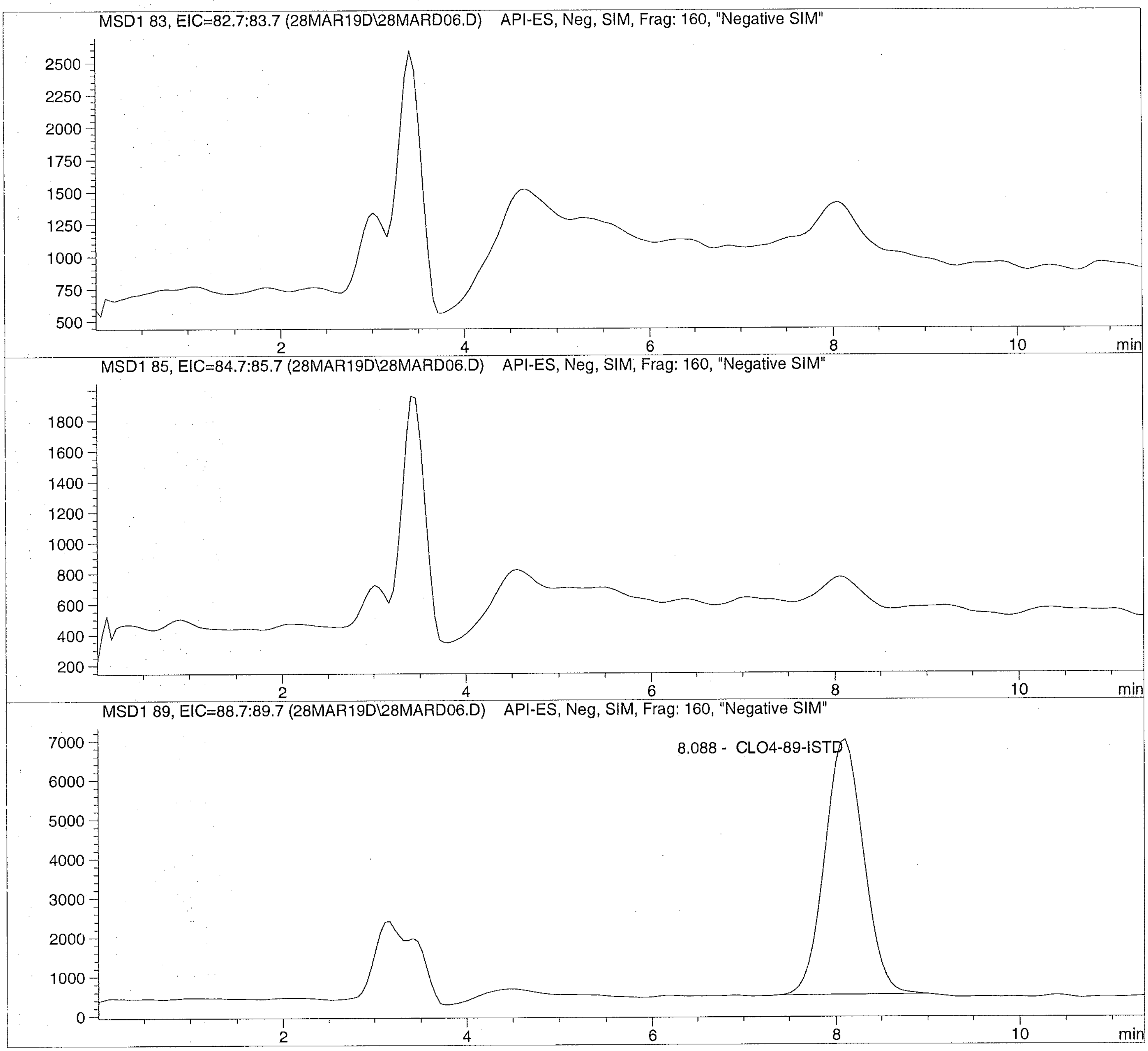
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD06.D Sample Name: 1907869001

Injection Date:	3/28/2019 09:41:37	Seq Line:	6
Sample Name:	1907869001	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD06.D Sample Name: 1907869001

Injection Date:	3/28/2019 09:41:37	Seq Line:	6
Sample Name:	1907869001	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.088	BBA	189925.3	5.0000	CLO4-89-ISTD

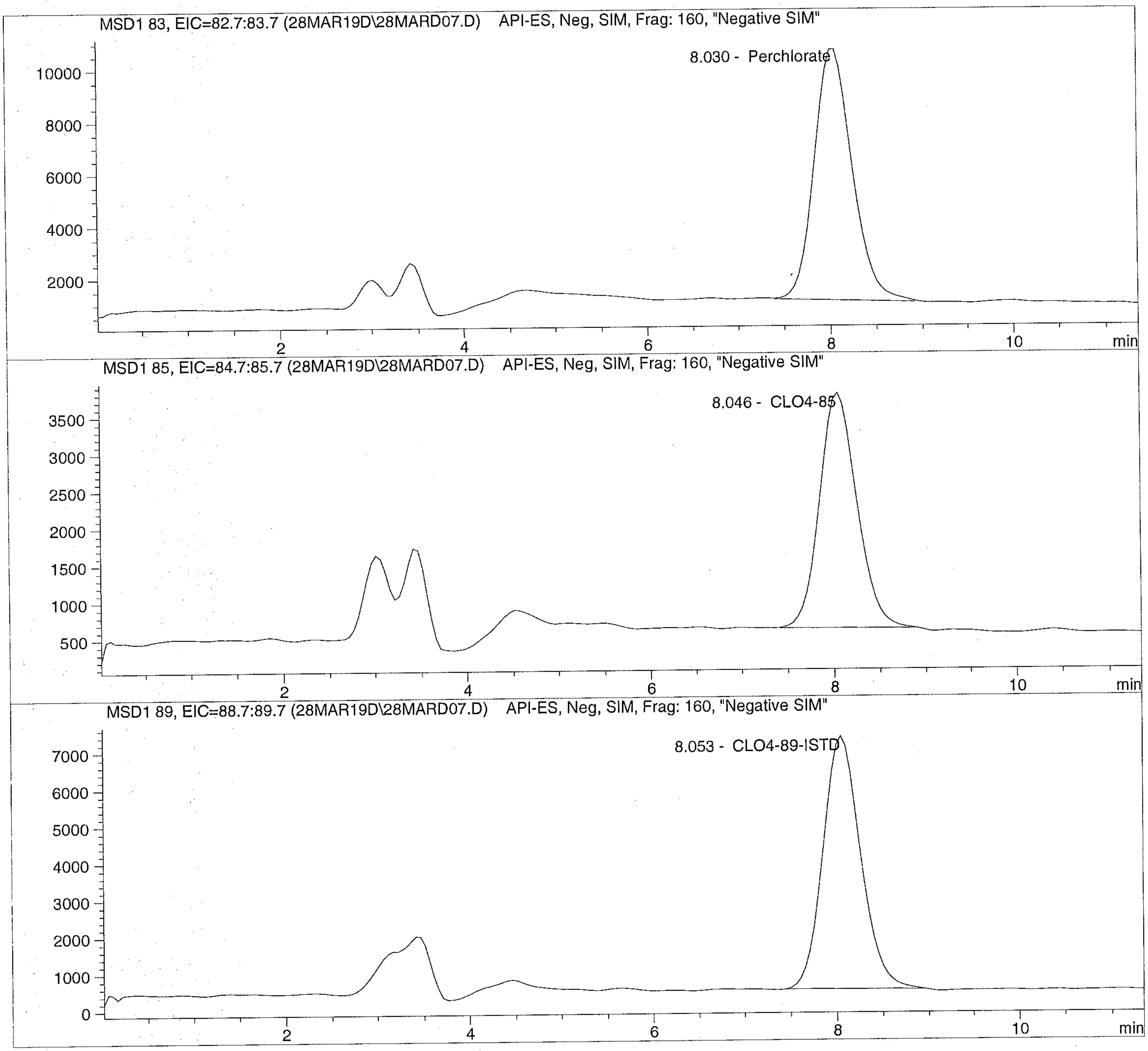
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD07.D   Sample Name: 645535   78691MS

Injection Date:	3/28/2019 09:54:47	Seq Line:	7
Sample Name:	645535 78691MS	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD07.D   Sample Name: 645535 78691MS

Injection Date: 3/28/2019 09:54:47   Seq Line: 7
Sample Name: 645535 78691MS   Location: Vial 77
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 25 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
8.030	BBA	277046.3	4.6616	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.046	BBA	89339.9	4.9137	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.053	BBA	194412.9	5.0000	CLO4-89-ISTD

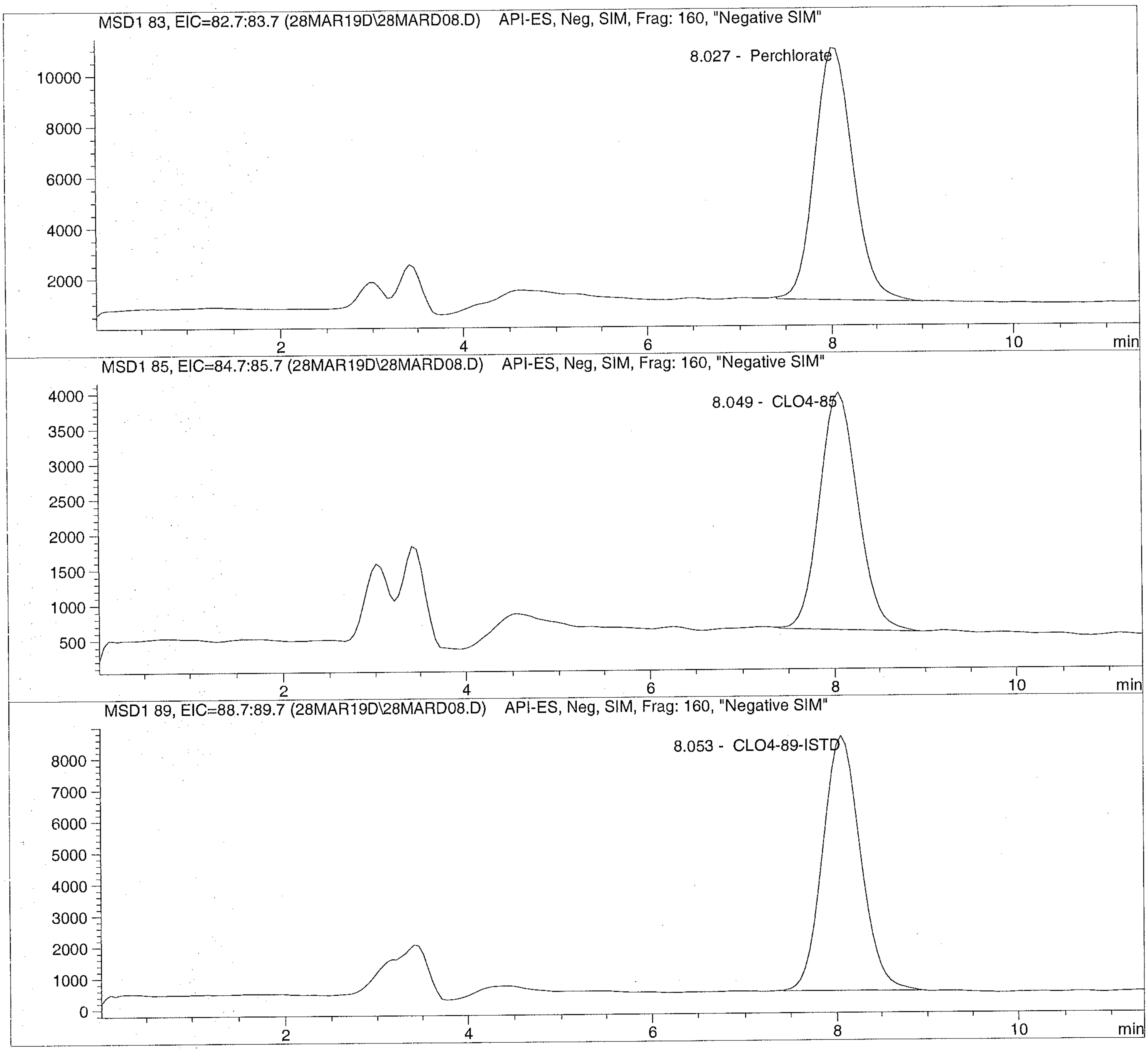
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD08.D Sample Name: 645536 78691SD

Injection Date:	3/28/2019 10:08:05	Seq Line:	8
Sample Name:	645536 78691SD	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD08.D Sample Name: 645536 78691SD

Injection Date:	3/28/2019 10:08:05	Seq Line:	8
Sample Name:	645536 78691SD	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.027	BBA	289383.7	4.0513	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.049	BBA	98569.0	4.4846	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.053	BBA	235219.8	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD09.D   Sample Name: 1907871001

==

Injection Date:	3/28/2019 10:21:14	Seq Line:	9
Sample Name:	1907871001	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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

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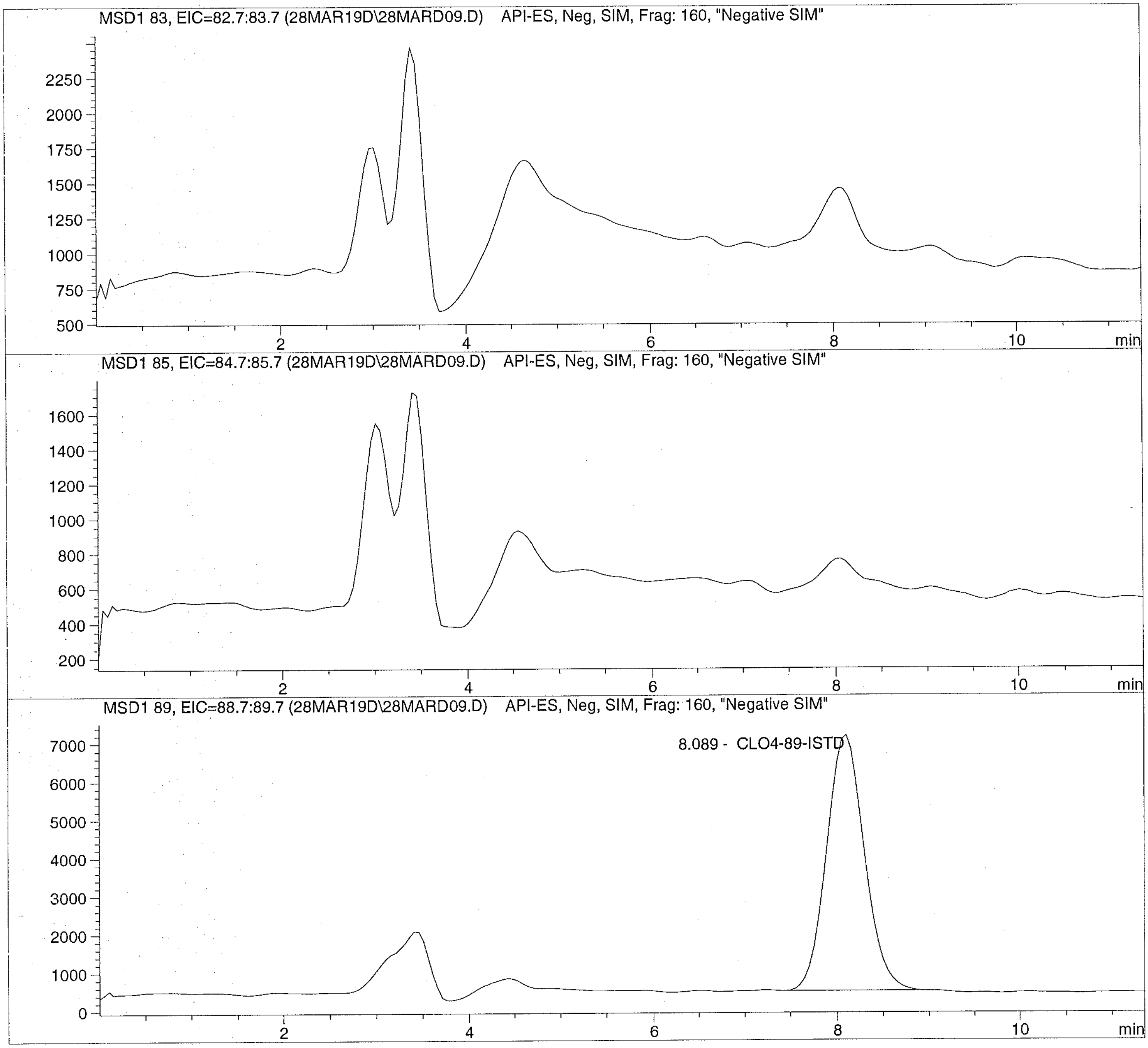

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD09.D Sample Name: 1907871001

Injection Date:	3/28/2019 10:21:14	Seq Line:	9
Sample Name:	1907871001	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.089	PBA	189608.5	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD10.D       Sample Name: 1908794001
=====================================================================================
Injection Date:    3/28/2019  10:34:27                Seq Line:          10
Sample Name:       1908794001                         Location:      Vial 80
Acq Operator:      TNB                                Inj. No.:           1
                                                      Inj. Vol.:      25 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
=====================================================================================
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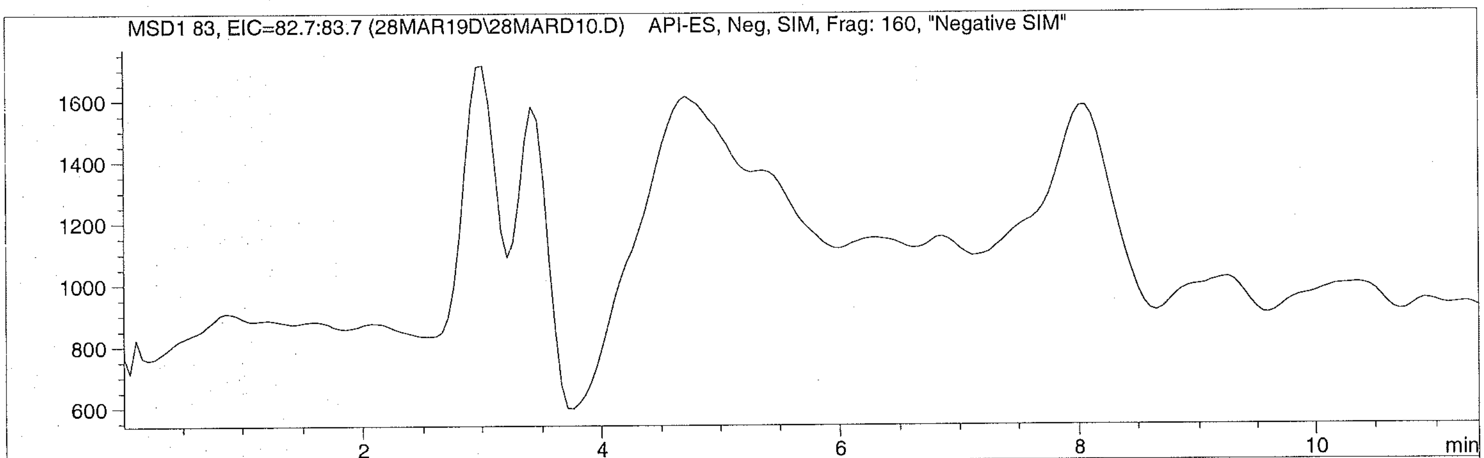
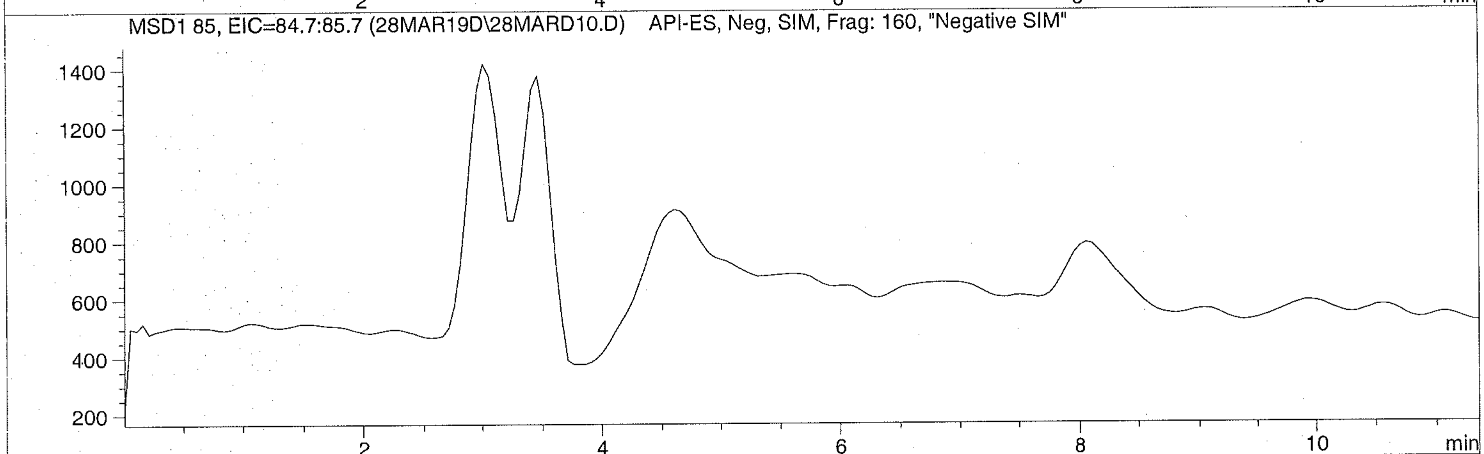
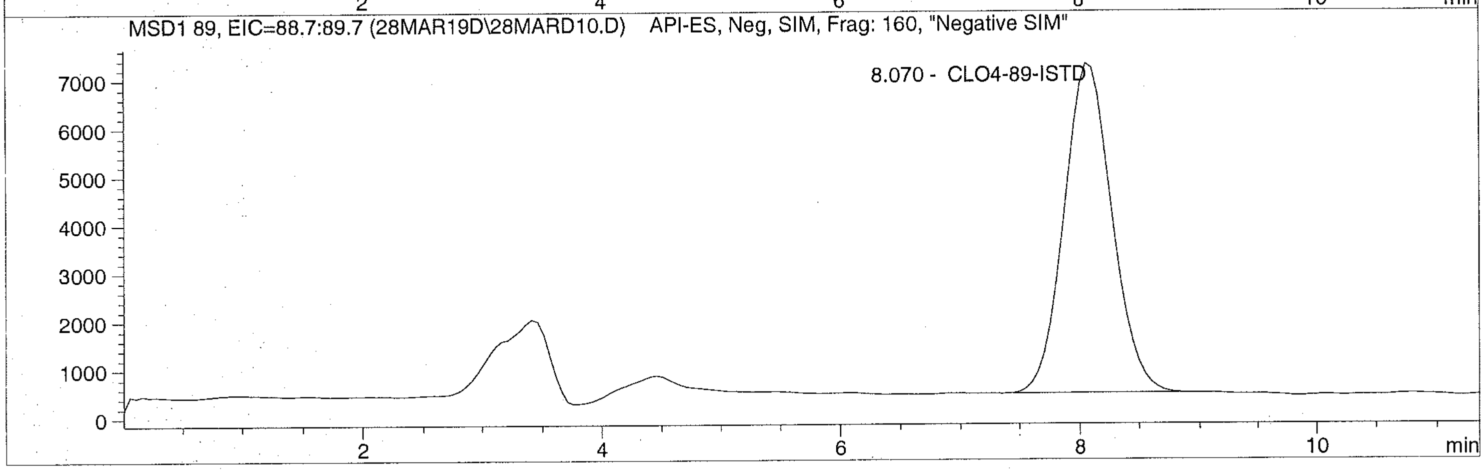






Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD10.D   Sample Name: 1908794001

Injection Date:	3/28/2019 10:34:27	Seq Line:	10
Sample Name:	1908794001	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.070	PBA	192453.4	5.0000	CLO4-89-ISTD

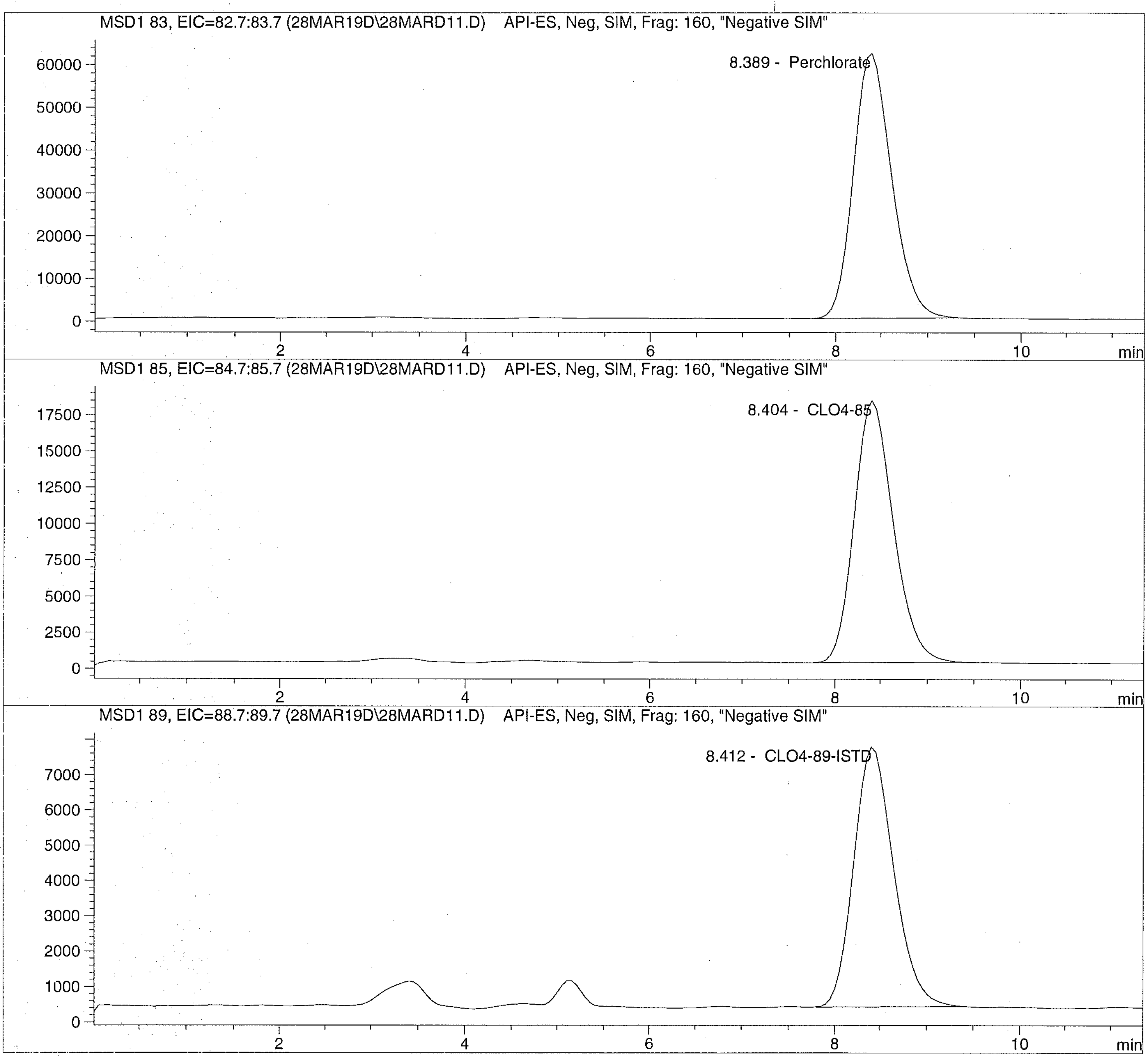
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD11.D   Sample Name: 645537 CCV@25

Injection Date:	3/28/2019 10:49:41	Seq Line:	11
Sample Name:	645537 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD11.D Sample Name: 645537 CCV@25

Injection Date: 3/28/2019 10:49:41 Seq Line: 11
Sample Name: 645537 CCV@25 Location: Vial 71
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 25 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
8.389	PBA	1797085.1	24.4912	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.404	PBA	535801.9	24.5911	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.412	BBA	223514.2	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

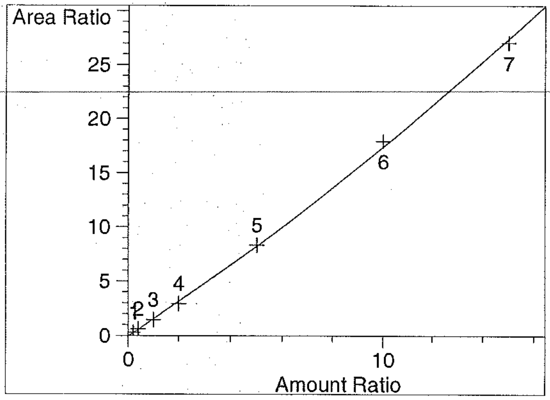
RetTime [min]	Sig	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
8.744	1	1	1.00000	7.76074e4	1.28854e-5	1		Perchlorate
		2	2.00000	1.35273e5	1.47849e-5			
		3	5.00000	3.37764e5	1.48033e-5			
		4	10.00000	6.83454e5	1.46316e-5			
		5	25.00000	2.08433e6	1.19943e-5			
		6	50.00000	4.13334e6	1.20968e-5			
		7	75.00000	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
```

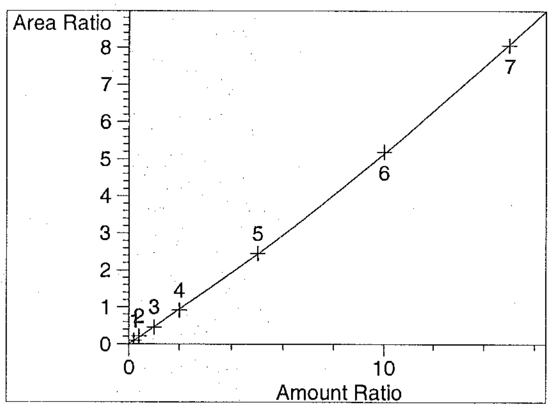
More compound-specific settings:

```
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***
=====================================================================
```

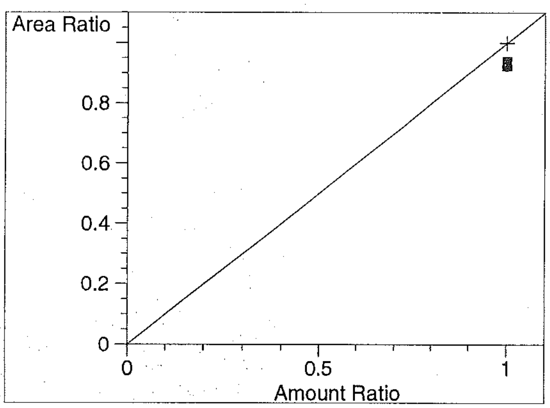
Calibration Curves



Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation: 0.99957
Residual Std. Dev.: 0.30744
Formula: y = ax² + 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 = ax² + 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

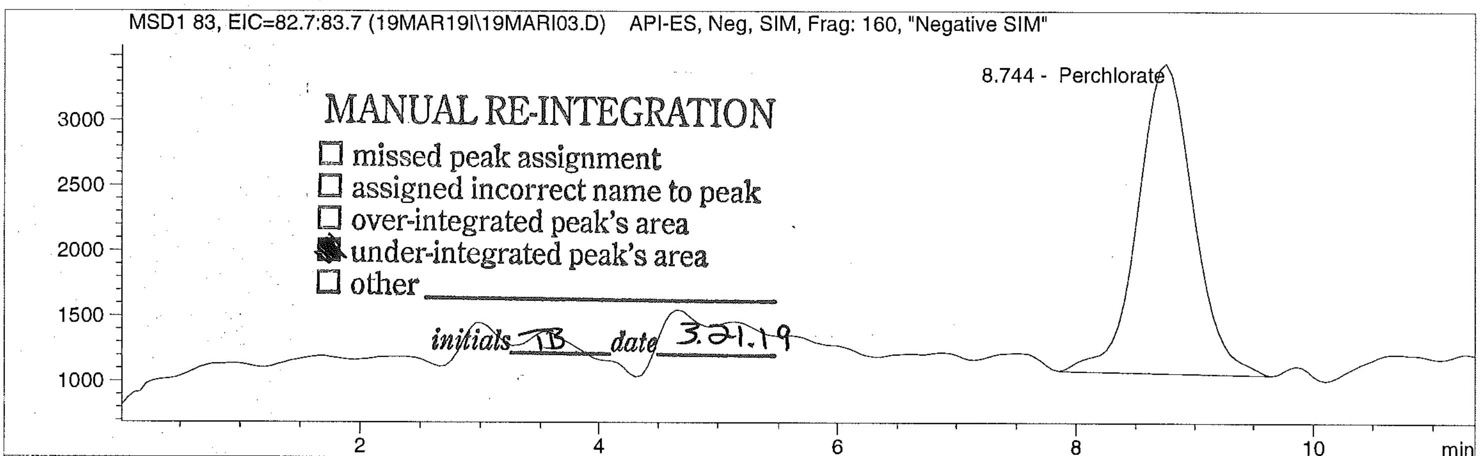
*** End of Report ***

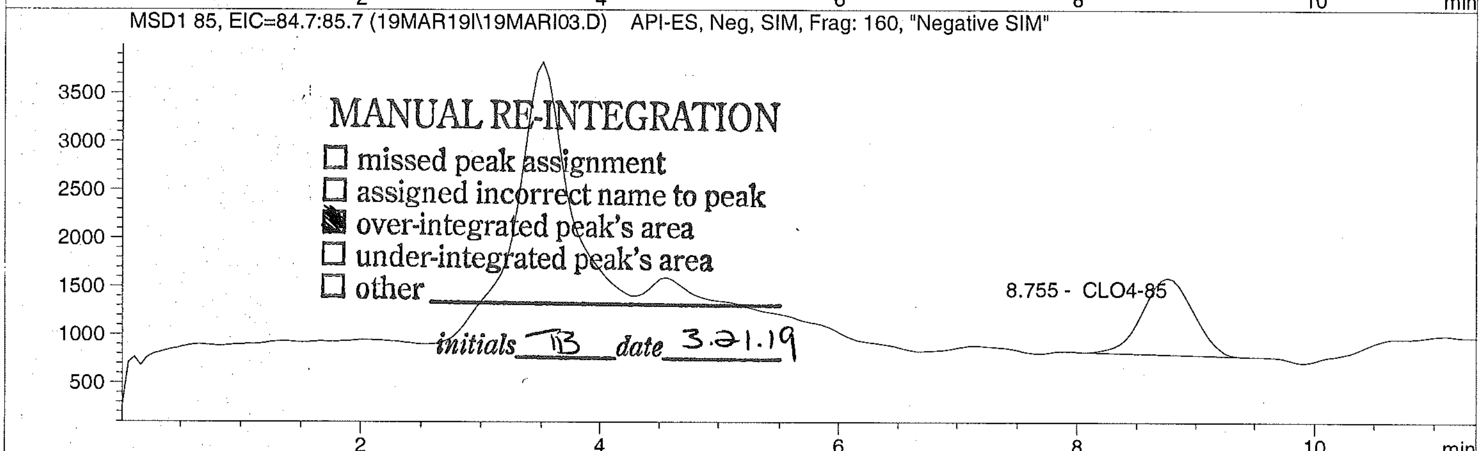
Sequence Table:

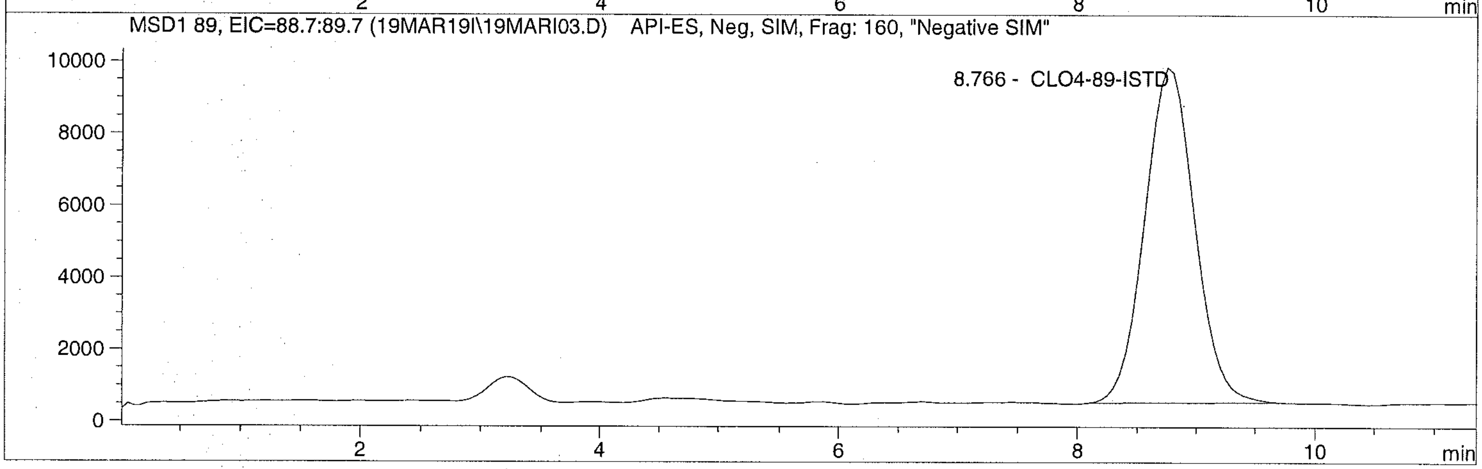
Method and Injection Info Part:

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		

```
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
=====================================================================================
```







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

===

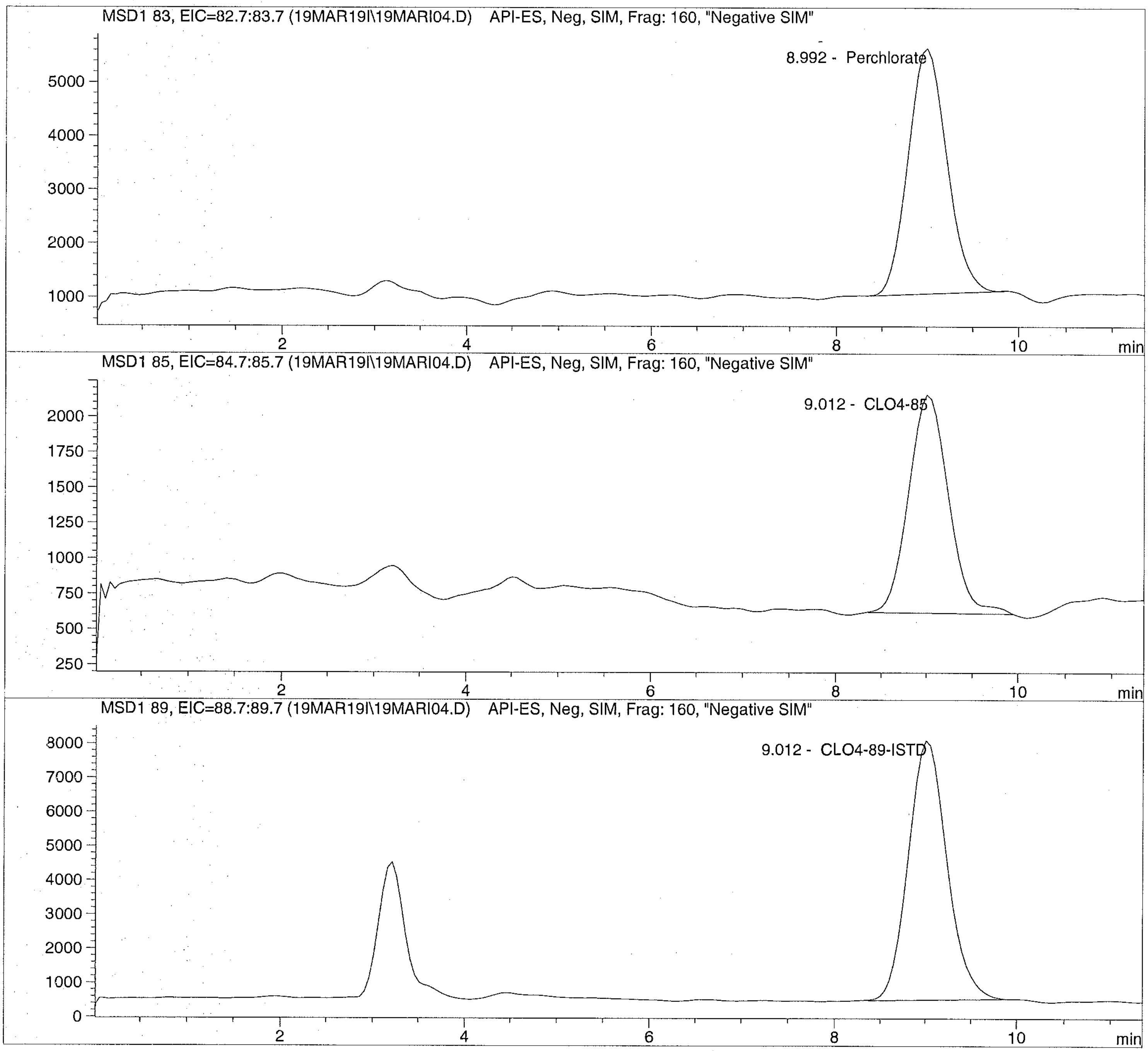
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D   Sample Name: CLO4@ 2.0ug/L

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



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D   Sample Name: CLO4@ 2.0ug/L

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

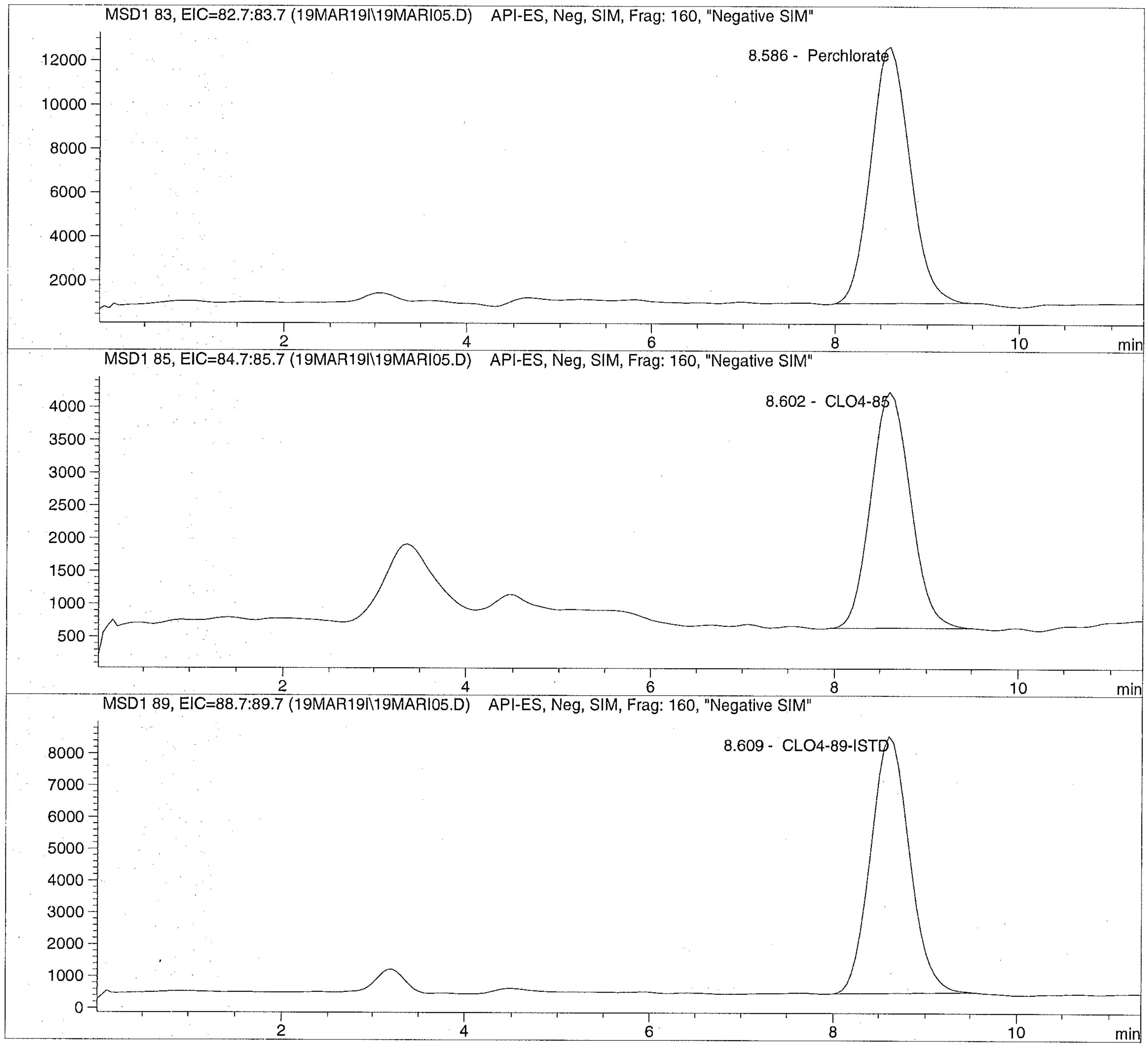
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

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 ***

```
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
=====================================================================================
```



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

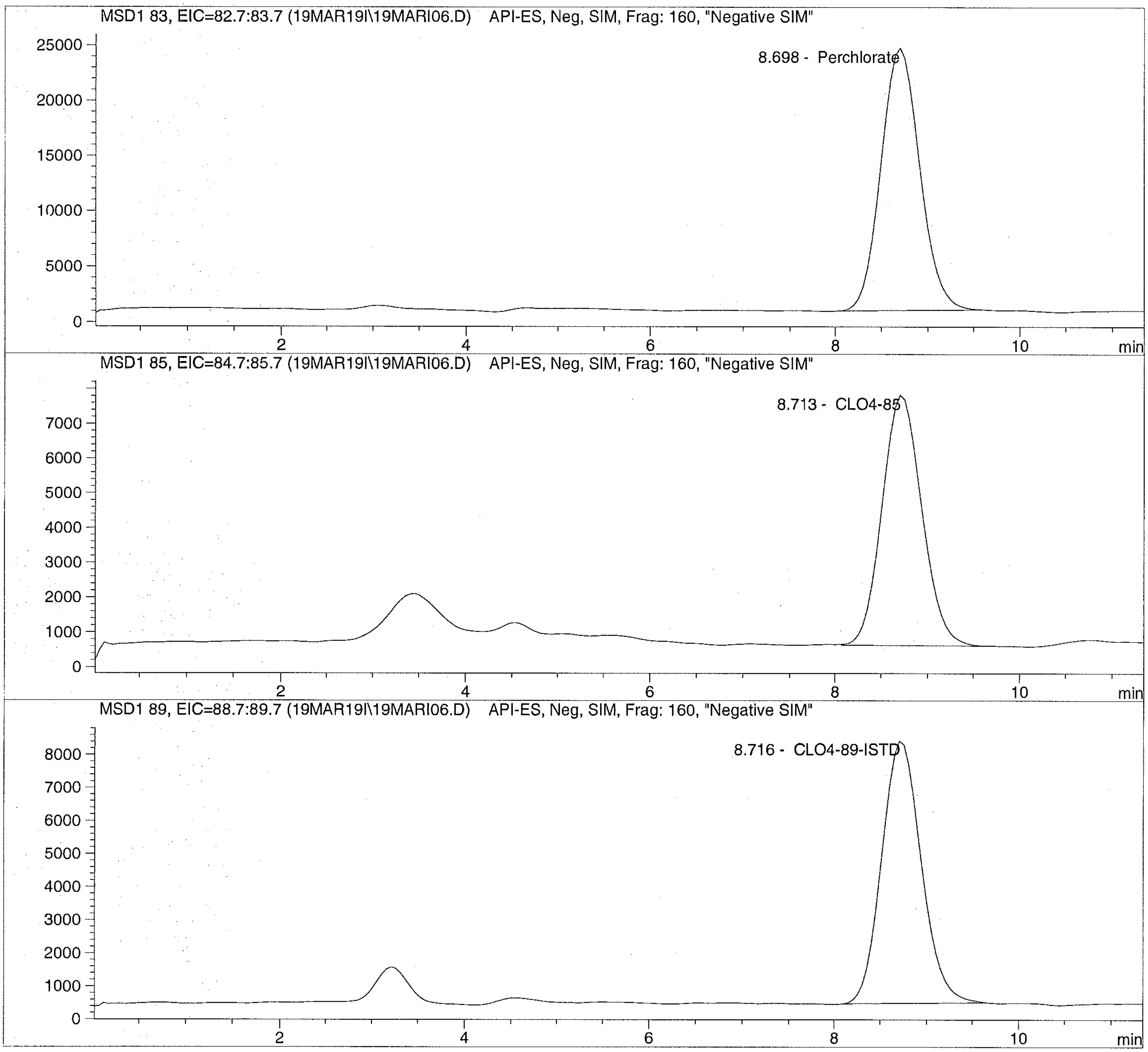
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

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 ***

```
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
=====================================================================================
```



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

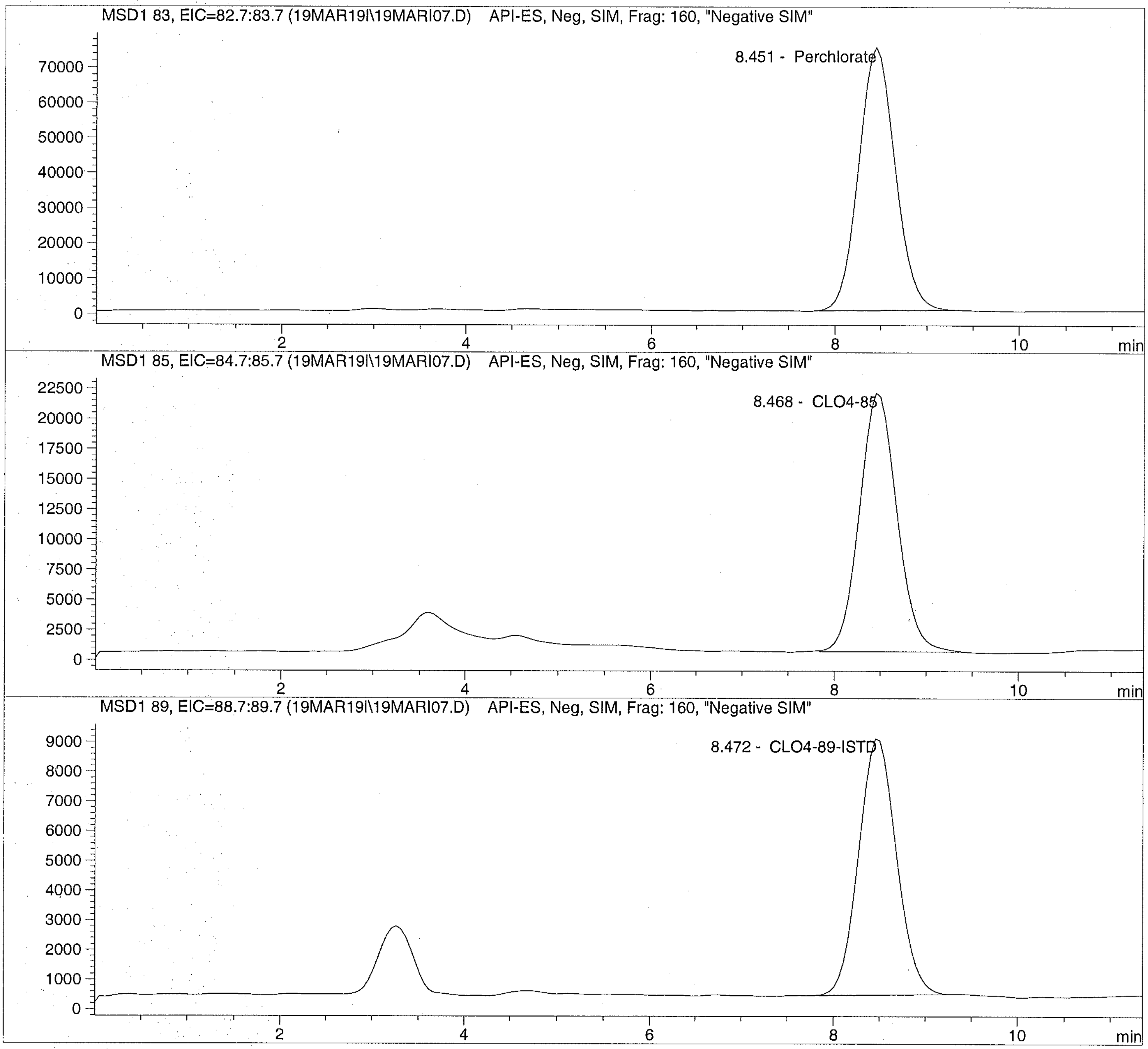
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

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 ***

```
Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D        Sample Name: CLO4@ 25.ug/L
=================================================================================
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
=================================================================================
```



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D Sample Name: CLO4@ 25.ug/L

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

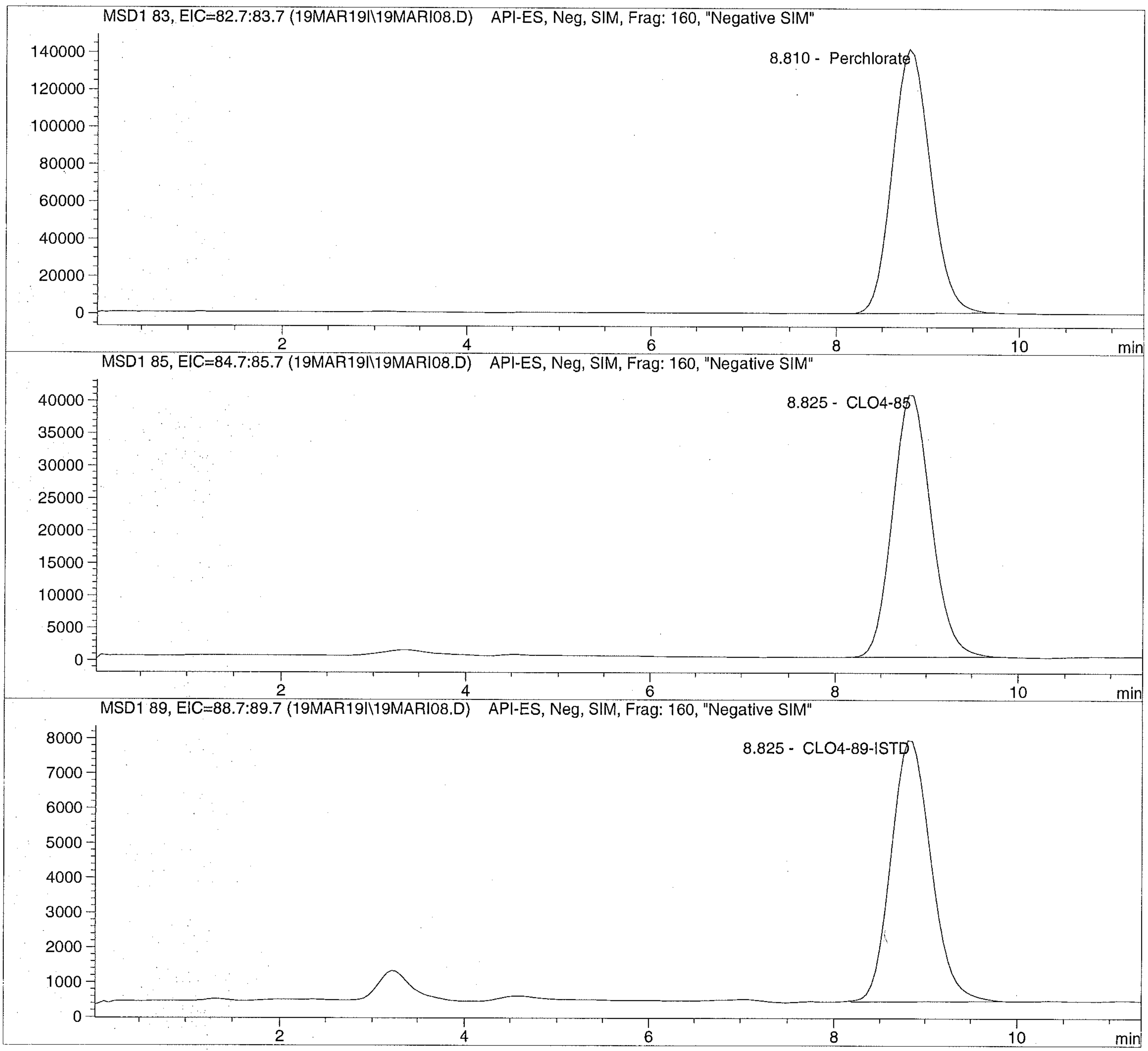
*** End of Report ***

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

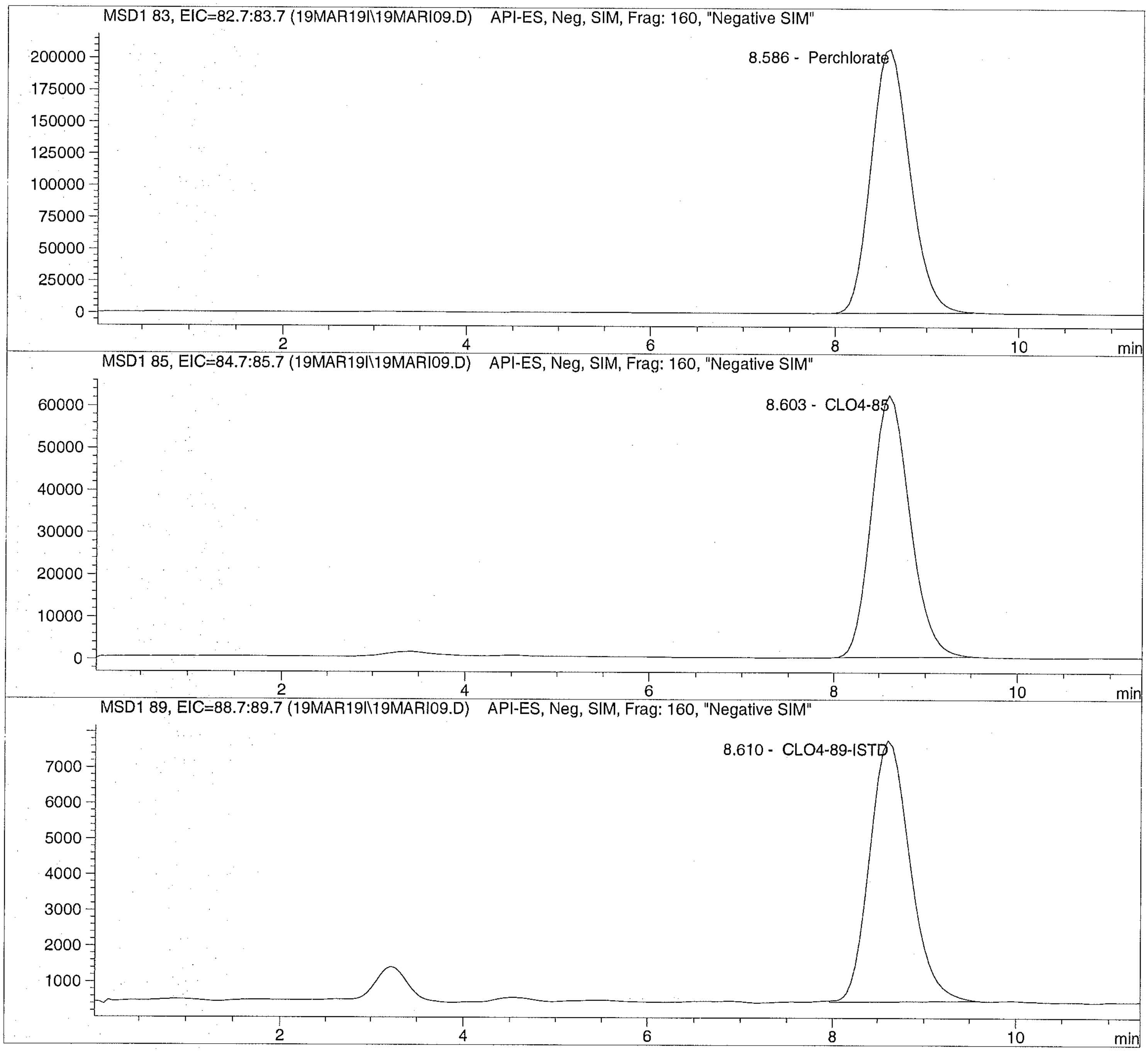
*** End of Report ***

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



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

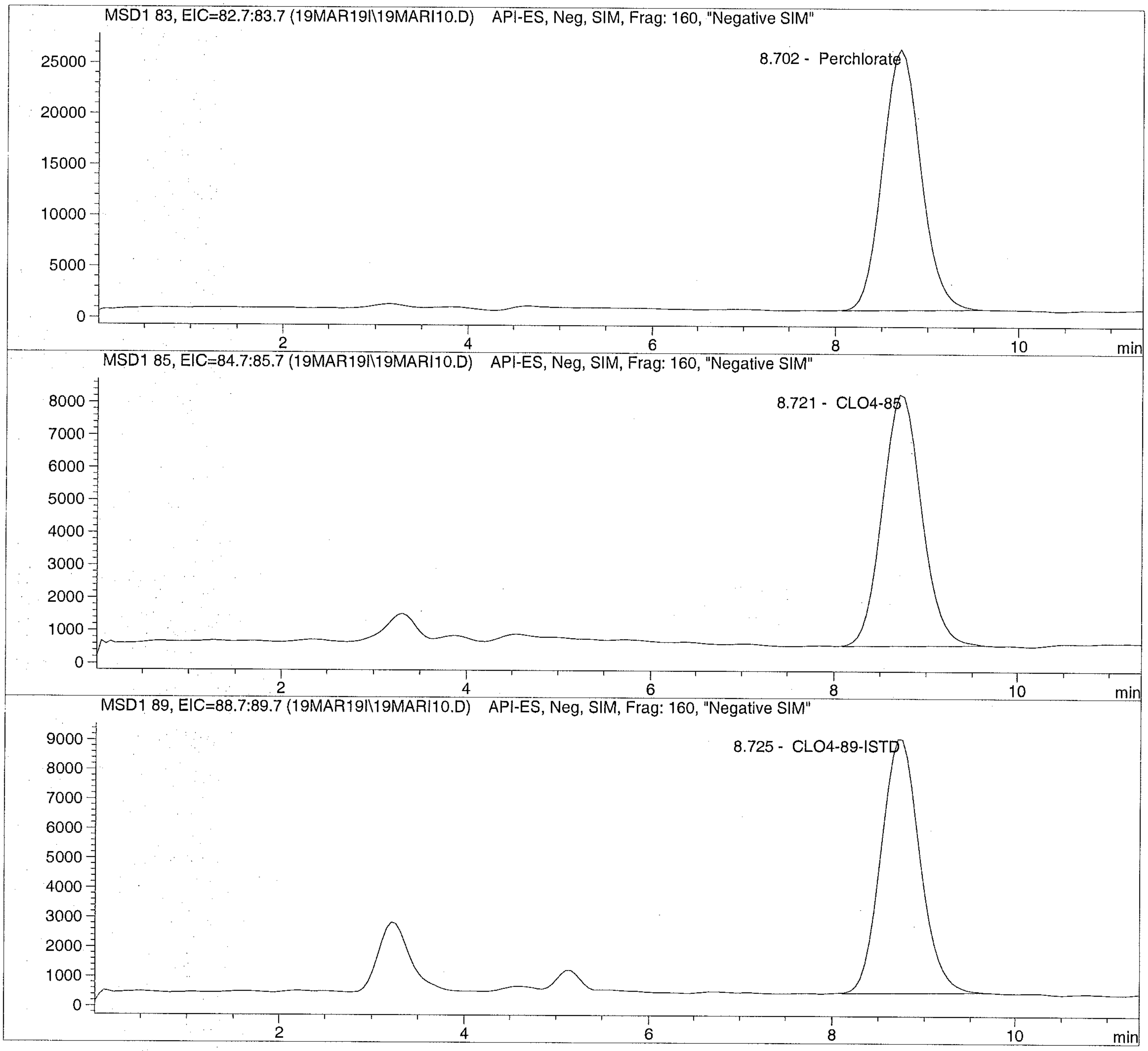
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

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 ***

```
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
=================================================================================
```



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 ***

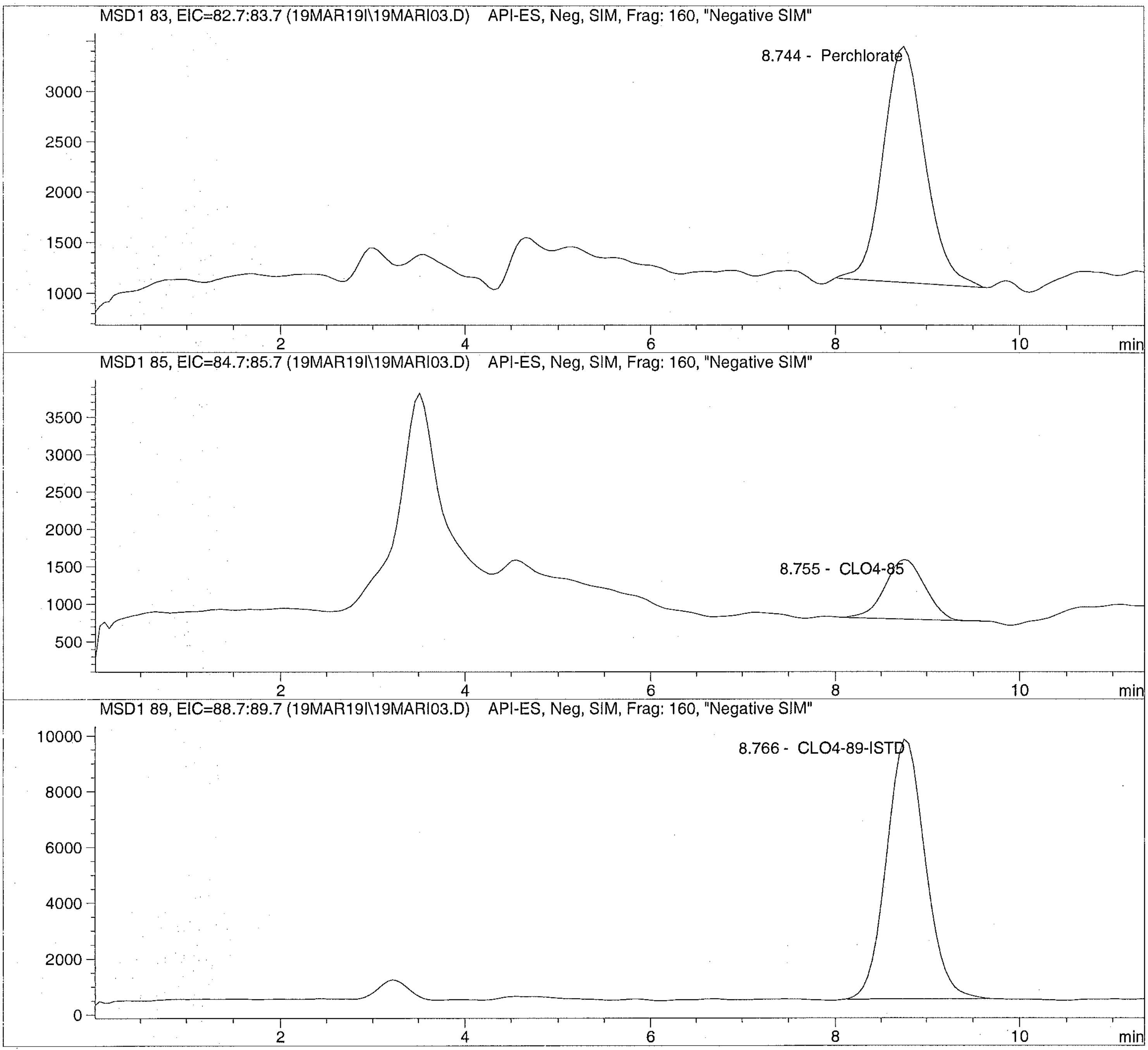
ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Unmodified

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



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 ***

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

April 01, 2019

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

Work Order: **HS19031160**

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

Dear Marcia,

ALS Environmental received 2 sample(s) on Mar 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

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19031160

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19031160-01	LH18/24-SP650_032119	Water		21-Mar-2019 14:00	22-Mar-2019 08:52	☐
HS19031160-02	LH18/24-SP650_032119_BIX	Water		21-Mar-2019 14:00	22-Mar-2019 08:52	☐

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 Kelso, WA. Final report attached.

WetChemistry by Method E350.3

Batch ID: R335466

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

WetChemistry by Method E365.3

Batch ID: R335143

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

ALS Houston, US Date: 01-Apr-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples		WorkOrder:HS19031160
Sample ID:	LH18/24-SP650_032119		Lab ID:HS19031160-01
Collection Date:	21-Mar-2019 14:00		Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
AMMONIA AS N BY E350.3(ISE)		**Method:E350.3**						Analyst: MZD
Nitrogen, Ammonia (As N)	**16**		**0.20**	**0.20**	**0.20**	**mg/L**	1	28-Mar-2019 10:45
ORTHO PHOSPHATE (PO4) AS P BY E365.3		**Method:E365.3**						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	**4.15**		**0.100**	**0.250**	**0.250**	**mg/L**	10	22-Mar-2019 17:28
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	01-Apr-2019 18:17

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

ALS Houston, US Date: 01-Apr-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples		WorkOrder:HS19031160
Sample ID:	LH18/24-SP650_032119_BIX		Lab ID:HS19031160-02
Collection Date:	21-Mar-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	31-Mar-2019 12:13

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

ALS Houston, US Date: 01-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031160

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R335143	**Test Name :** ORTHO PHOSPHATE (PO4) AS P BY E365.3			**Matrix:** Water		
HS19031160-01	LH18/24-SP650_032119	21 Mar 2019 14:00			22 Mar 2019 17:28	10
Batch ID R335466	**Test Name :** AMMONIA AS N BY E350.3(ISE)			**Matrix:** Water		
HS19031160-01	LH18/24-SP650_032119	21 Mar 2019 14:00			28 Mar 2019 10:45	1
Batch ID R335660	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			**Matrix:** Water		
HS19031160-02	LH18/24-SP650_032119_BIX	21 Mar 2019 14:00			31 Mar 2019 12:13	1
Batch ID R335735	**Test Name :** SUBCONTRACT ANALYSIS - TOC ANALYSIS			**Matrix:** Water		
HS19031160-01	LH18/24-SP650_032119	21 Mar 2019 14:00			01 Apr 2019 18:17	1

ALS Houston, US Date: 01-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031160

QC BATCH REPORT NEW

Batch ID: R335143 (0) **Instrument:** UV-2450 **Method:** ORTHO PHOSPHATE (PO4) AS P BY E365.3

MBLK Sample ID: **MBLK-335143** Units: **mg/L** Analysis Date: **22-Mar-2019 17:28**
Client ID: Run ID: **UV-2450_335143** SeqNo: **5003495** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.0250	0.0250								U

LCS Sample ID: **LCS-335143** Units: **mg/L** Analysis Date: **22-Mar-2019 17:28**
Client ID: Run ID: **UV-2450_335143** SeqNo: **5003496** 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)	0.233	0.0250	0.25	0	93.2	85 - 115				

MS Sample ID: **HS19031160-01MS** Units: **mg/L** Analysis Date: **22-Mar-2019 17:28**
Client ID: **LH18/24-SP650_032119** Run ID: **UV-2450_335143** SeqNo: **5003498** 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)	6.4	0.250	2.5	4.15	90.0	80 - 120				

MSD Sample ID: **HS19031160-01MSD** Units: **mg/L** Analysis Date: **22-Mar-2019 17:28**
Client ID: **LH18/24-SP650_032119** Run ID: **UV-2450_335143** SeqNo: **5003499** 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)	6.51	0.250	2.5	4.15	94.4	80 - 120	6.4	1.7	20	

The following samples were analyzed in this batch: HS19031160-01

ALS Houston, US Date: 01-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031160

QC BATCH REPORT NEW

Batch ID: R335466 (0) **Instrument:** WetChem_HS **Method:** AMMONIA AS N BY E350.3(ISE)

MBLK Sample ID: **MBLK-335466** Units: **mg/L** Analysis Date: **28-Mar-2019 10:45**
Client ID: Run ID: **WetChem_HS_335466** SeqNo: **5010825** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.20	0.20								U

LCS Sample ID: **LCS-335466** Units: **mg/L** Analysis Date: **28-Mar-2019 10:45**
Client ID: Run ID: **WetChem_HS_335466** SeqNo: **5010826** 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)	8.922	0.20	10	0	89.2	80 - 120				

MS Sample ID: **HS19031270-01MS** Units: **mg/L** Analysis Date: **28-Mar-2019 10:45**
Client ID: Run ID: **WetChem_HS_335466** SeqNo: **5010828** 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)	10.01	0.20	10	0.5221	94.9	80 - 120				

MSD Sample ID: **HS19031270-01MSD** Units: **mg/L** Analysis Date: **28-Mar-2019 10:45**
Client ID: Run ID: **WetChem_HS_335466** SeqNo: **5010829** 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)	9.997	0.20	10	0.5221	94.7	80 - 120	10.01	0.13	20	

The following samples were analyzed in this batch: HS19031160-01

ALS Houston, US Date: 01-Apr-19

Client:	Bhate Environmental Associates, Inc.	**QUALIFIERS, ACRONYMS, UNITS**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	**HS19031160**	

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

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

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
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: 01-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19031160

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19031160-01	LH18/24-SP650_032119	Login	3/22/2019 4:19:21 PM	JRM	WET069
HS19031160-01	LH18/24-SP650_032119	Login	3/22/2019 4:19:21 PM	JRM	WET069
HS19031160-01	LH18/24-SP650_032119	Login	3/22/2019 4:19:21 PM	JRM	Sub
HS19031160-02	LH18/24-SP650_032119_BIX	Login	3/22/2019 4:19:21 PM	JRM	Sub

ALS Houston, US Date: 01-Apr-19

Sample Receipt Checklist

Client Name:	Bhate Environmental	Date/Time Received:	**22-Mar-2019 08:52**
Work Order:	HS19031160	Received by:	**NDR**

Checklist completed by: *Jared R. Makan* (eSignature) 22-Mar-2019 (Date)

Reviewed by: *Corey Grandits* (eSignature) 26-Mar-2019 (Date)

Matrices: **Water**

Carrier name: **FedEx Priority Overnight**

	Yes	No	Not Present
Shipping container/cooler in good condition?	☑	☐	☐
Custody seals intact on shipping container/cooler?	☑	☐	☐
Custody seals intact on sample bottles?	☐	☐	☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	☐	☐	☑
Chain of custody present?	☑	☐	1 Page(s)
Chain of custody signed when relinquished and received?	☑	☐	COC IDs:N/A
Samplers name present on COC?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature in compliance?	☑	☐	

Temperature(s)/Thermometer(s): 0.7c/0.7c UC/C | IR11

Cooler(s)/Kit(s): 43950

Date/Time sample(s) sent to storage: 03/22/2019 16:25

	Yes	No	
Water - VOA vials have zero headspace?	☐	☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	☑	☐	N/A ☐
pH adjusted?	☐	☑	N/A ☐

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210 Houston, TX. 77099 (281) 530-5656 ATTN: R.J 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							Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650_032119	Water	03/21/19 / 14:00		2	X	X									H2SO4	
LH18/24-SP650_032119	Water	03/21/19 / 14:00		1			X								NONE	
LH18/24-SP650_032119_BIX	Water	03/21/19 / 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
Scott Beesinger	03/21/19	14:30							NM	3/22/19	08:52

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks: 43950 Temp 4/c 0.7 IR# 11

HS19031160
Bhate Environmental Associates, Inc.
18/24 Longhorn GW Treatment Plant Weekly Sampl

(Word) S:\I-ces\Forms\Chain of Custody - BiWeekl

ALS Environmental
10450 Stancliff Rd., Suite 210
Houston, Texas 77099 43950
Tel. +1 281 530 5656
Fax. +1 281 530 5887

CUSTODY SEAL		Seal Broken By:
Date: 3/21/19	Time: 1430	RM
Name: Scott Beesinger		Date: 03/22/19
Company: BHATE		

43950 MAR 2 2 2019

Must Deliver Next Business Day
Time and Tempature Sensitive!

917 1
B03 10:30 A

ORIGIN ID:SGRA (303) 597-2450
SCOTT BEESINER
BHATE ENVIRONMENTAL ASSOCIATES
1203-B EAST GRAND AVE. PMB202

MARSHALL, TX 75670
UNITED STATES US

DIMS.

TO CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON TX 77099
(281) 530-5656
REF: LHAAP-58-BO 64113-RJ

RMA:

FedEx Express E

RETURNS MON-SAT

FedEx
TRK# 0221 4809 7831 3400

FRI - 22 MAR 10:30A
PRIORITY OVERNIGHT

AB SGRA

77099
TX-US
IAH

FID 162785 21MAR19 GGGA 553C1/4603/NCBA

Case Narrative

Method: 6850
Analysis: Perchlorate
Analysis SOP: LC-MS-CLO4
ALS WO ID(s): 1907867; 1907869; 1907871; 1908794

Client: ALS Laboratories (Houston, TX)
Matrix: Water
ELMS Batch (HBN): 2230 (235529)

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. 50µL of an ^{18}O labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45µm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 1907867001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

Method QC data: The method blank (LMB 645533) was less than 1/2 the CRDL. The recovery for the LCS (645534) was within acceptable parameters.

MS/MSD Analysis: MS/MSD was performed on sample 1907869001 (Client ID's: LH18/24-SP650_031419_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 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 – 645531) is reported from the analysis of the Laboratory Control Sample (LCS – 645534) 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 — March 29, 2019
Analyst — Date

ANALYTICAL REPORT

Report Date: March 29, 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: **34-1908794**
Project ID: HS19031160
Purchase Order: HS19031160
Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_032119_BIX	1908794001	03/21/19	03/26/19	

ANALYTICAL REPORT

Workorder: 34-1908794
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **LH18/24-SP650_032119_BIX**	Sampling Site: NA	Collected: 03/21/2019
Lab ID: 1908794001	Media: 125 mL Nalgene	Received: 03/26/2019
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/2230 (HBN: 235529)	**Percent Solid:** NA
	Analyzed: 03/28/2019 10:34	**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: 235529)

Field sample 1907867001 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 03/28/2019 14:08	/S/ Stephen Brose 03/29/2019 12:58

Laboratory Contact Information

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

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

ANALYTICAL REPORT

Workorder: 34-1908794
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

Analysis Information

Workorder: 1908794

Limits: Client SOW/Contract Specified
Basis: DoD QSM

Preparation: NA
Batch: NA
Prepared By: NA

Analysis: EPA 6850, DoD QSM
Batch: ELMS/2230 (HBN: 235529)
Analyzed By: Thomas Bosch

Blank

LMB: 645533
Analyzed: 03/28/2019 09:14

Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 645534
Analyzed: 03/28/2019 08:47
Dilution: 1
Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.00	4.00	99.9	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1907869001
Analyzed: 03/28/2019 09:41
Dilution: 1
Units: ug/L

MS: 645535
Analyzed: 03/28/2019 09:54
Dilution: 1
Units: ug/L

MSD: 645536
Analyzed: 03/28/2019 10:08
Dilution: 1
Units: ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	4.66	4	117	78.8	123.8	4.05	101	14	0.0	20.0

Comments

Field sample 1907867001 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 03/28/2019 14:23	/S/ Stephen Brose 03/29/2019 12:58

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 1908794

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: 10960

18698/#2
1908794

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: HS19031160
TSR: Danielle Winnings

	LAB SAMPLE ID / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / DUE DATE
1.	**HS19031160-02**	**LH18/24-SP650_032119_BIX**	**Water**	**21 Mar 2019 14:00**
	SUB_Perch-6850			01 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: 3/25/19 1800

Received By: ______ Date/Time: 3.26.19 10:05

Cooler ID(s): ______ Temperature(s): ______

ALS Environmental

CHAIN-OF-CUSTODY

Project / Job / Task: HS19031160	**Split:**	**Workorder ID:** 1908794	**Level:** ENV_LVL4
Client: ALS Environmental (Houston)		**Account:** 8101	**Type:** 125Poly
Comments:			**Preservatives:** COOL

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	Requested Analysis: EPA 6850, DoD QSM
1	03/21/2019 14:00	LH18/24-SP650_032119_BIX	1908794001		Water	A	1	A
2								
3								
4								
5								
6								
7								
8								
9								
10								

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
Warath, Julie	03/26/2019 10:05	ALS Sample Receiving	Sample Login
Julie Warath	3/27/19 1330	4C	Storage
R.33.1	3.27.19/14:20	T. Brad	6850

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

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

Prepared / Analyzed by: ______ Date / Time: ______

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

 Wed, 03/27/19 12:37 PM ALSCOCV3.1

W327a9
1908794

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS HOUSTON

Project/Task/Site: HS19031160

Date/Time of Receipt: 3-26-19 10:05

Number of Coolers Received: 1

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

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

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 9266	1 °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: [signature] (Signature) GAYLEEN COATES (Printed Name) 3-26-19 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ 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: ____________ (Printed Name) Returned to Sample Receipt by: ____________ (Signature) Date: ____________

CRIR.doc

Revised 01/01/2018

Must Deliver Next Business Day
Time and Tempature Sensitive!

Part # 159469-434 RIT2 EXP 11/19

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

SHIP DATE: 25MAR19
ACTWGT: 8.90 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

551CJ/4EB3/104C

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE

SALT LAKE CITY UT 84123
(801) 266-7700
REF: HS19031160 - RJ

FedEx
Express

E

J181118060501uv

TRK# 0201 4809 7832 0971

TUE - 26 MAR 3:00P
STANDARD OVERNIGHT

AX BTFA

84123
UT-US SLC

Batch Worklist

Batch: ELMS/ 2230
Rule: EPA 6850, DoD QSM Water

Created: 3/28/2019 07:45
Analyst: T. Bosch

Instrument:
Status: WP

HBN: 235529

Workorder: 1907867 [ENV_LVL4]
Workorder: 1907869 [ENV_LVL4]
Workorder: 1907871 [ENV_LVL4]
Workorder: 1908794 [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	645530	CCV for HBN 235529 [ELMS/2230]				CCV	3		E685041C3Q	5311		4/1/2019	
2	645531	RLVS for HBN 235529 [ELMS/2230				RLVS	3		E685041C3Q	5311		4/1/2019	
3	645532	ICS for HBN 235529 [ELMS/2230]				ICS	3		E6850..D3Q	5311		4/1/2019	
4	645533	LMB for HBN 235529 [ELMS/2230]				LMB	3		E6850Q413Q	5311		4/1/2019	
5	645534	LCS for HBN 235529 [ELMS/2230]				LCS	3		E6850Q413Q	5311		4/1/2019	
6	1907867001	LH18/24-SP140_031419				SAMPLE	3	1907867001-A	E6850Q41.3	5480	4/11/2019	4/1/2019	
7	1907869001	LH18/24-SP650_031419_BIX				SAMPLE	3	1907869001-A	E6850Q41.3	5480	4/11/2019	4/1/2019	
8	645535	LH18/24-SP650...(1907869001MS)				MS	3		E6850Q413Q	5311		4/1/2019	
9	645536	LH18/24-SP65...(1907869001MSD)				MSD	3		E6850Q413Q	5311		4/1/2019	
10	1907871001	LH18/24-SP650_031419_BIX				SAMPLE	3	1907871001-A	E6850Q41.3	5480	4/11/2019	4/1/2019	
11	1908794001	LH18/24-SP650_032119_BIX				SAMPLE	3	1908794001-A	E6850Q41.3	5480	4/18/2019	4/8/2019	
12	645537	CCV for HBN 235529 [ELMS/2230]				CCV	3		E685041C3Q	5311		4/1/2019	

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ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #( )'s: 1907867 (001); 1907869 (001); 1907871 (001); 1908794 (001)
ELMS Batch/HBN ID: 2230 (235529)
Prep Date: 03/27/2019 Analysis Date: 03/28/2019 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: 25µL
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 645534; Target = 4.0µg/L. ASTM type II water was used for LMB 645533.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on sample 1907869001 (Client ID's: LH18/24-SP650_031419_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 1907867001 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\MAR\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\235529-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\HBN#
5) The Reporting Limit Verification Standard (RLVS – 645531) is reported from the analysis of the Laboratory Control Sample (LCS – 645534) 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.

Chromatography (GC, HPLC, LC/MS) Technical Review Criteria Batch(es)/SDG: ELMS: 2230 HBN: 235529 Sample Set IDs if Applicable: 1907867/1907869/1907871/1908794	Analyst Initials	Reviewer Initials
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

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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
Expires: 05/09/2019
Usable: Yes
Lab Lot: CLO4 QC INT 10.ug/mL

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

Composition

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

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

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

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

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

Solvent: water (low TOC, < 50 ppb)

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

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

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

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

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

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

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

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

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

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

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

Daniel J. Lamendola
Director of QA/RA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

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*

GHS

Signal Word: None

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

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

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

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

For use in routine laboratory analysis.

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-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
*	645530 CCV@25	Vial 71	1	Control	1	1.81499e6	8.385	24.13647
*	645534 QC@4.0	Vial 72	1	Control	2	2.89937e5	8.542	3.99582
*	645532 ICS@4.0	Vial 73	1	Control	3	2.38655e5	8.226	3.65624
*	645533 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1907867001 1K	Vial 75	1	Sample	5	7.55115e5	8.548	8344.77963
*	1907869001	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	645535 78691MS	Vial 77	1	Sample	7	2.77046e5	8.030	4.66163
*	645536 78691SD	Vial 78	1	Sample	8	2.89384e5	8.027	4.05130
*	1907871001	Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1908794001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	645537 CCV@25	Vial 71	1	Control	11	1.79709e6	8.389	24.49119

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	645530 CCV@25	Vial 71	1	Control	1	5.33395e5	8.403	23.90219
*	645534 QC@4.0	Vial 72	1	Control	2	9.52963e4	8.559	4.26699
*	645532 ICS@4.0	Vial 73	1	Control	3	7.88339e4	8.237	3.90865
*	645533 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1907867001 1K	Vial 75	1	Sample	5	2.38827e5	8.562	8762.35701
*	1907869001	Vial 76	1	Sample	6	0.00000	0.000	0.00000
*	645535 78691MS	Vial 77	1	Sample	7	8.93399e4	8.046	4.91371
*	645536 78691SD	Vial 78	1	Sample	8	9.85690e4	8.049	4.48457
*	1907871001	Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1908794001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	645537 CCV@25	Vial 71	1	Control	11	5.35802e5	8.404	24.59111

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	645530 CCV@25	Vial 71	1	Control	1	2.29255e5	8.411	5.00000
*	645534 QC@4.0	Vial 72	1	Control	2	2.39106e5	8.571	5.00000
*	645532 ICS@4.0	Vial 73	1	Control	3	2.16080e5	8.242	5.00000
*	645533 LMB	Vial 74	1	Control	4	2.42742e5	8.463	5.00000
*	1907867001 1K	Vial 75	1	Sample	5	2.89136e5	8.567	5000.00000
*	1907869001	Vial 76	1	Sample	6	1.89925e5	8.088	5.00000
*	645535 78691MS	Vial 77	1	Sample	7	1.94413e5	8.053	5.00000
*	645536 78691SD	Vial 78	1	Sample	8	2.35220e5	8.053	5.00000
*	1907871001	Vial 79	1	Sample	9	1.89609e5	8.089	5.00000
*	1908794001	Vial 80	1	Sample	10	1.92453e5	8.070	5.00000
*	645537 CCV@25	Vial 71	1	Control	11	2.23514e5	8.412	5.00000

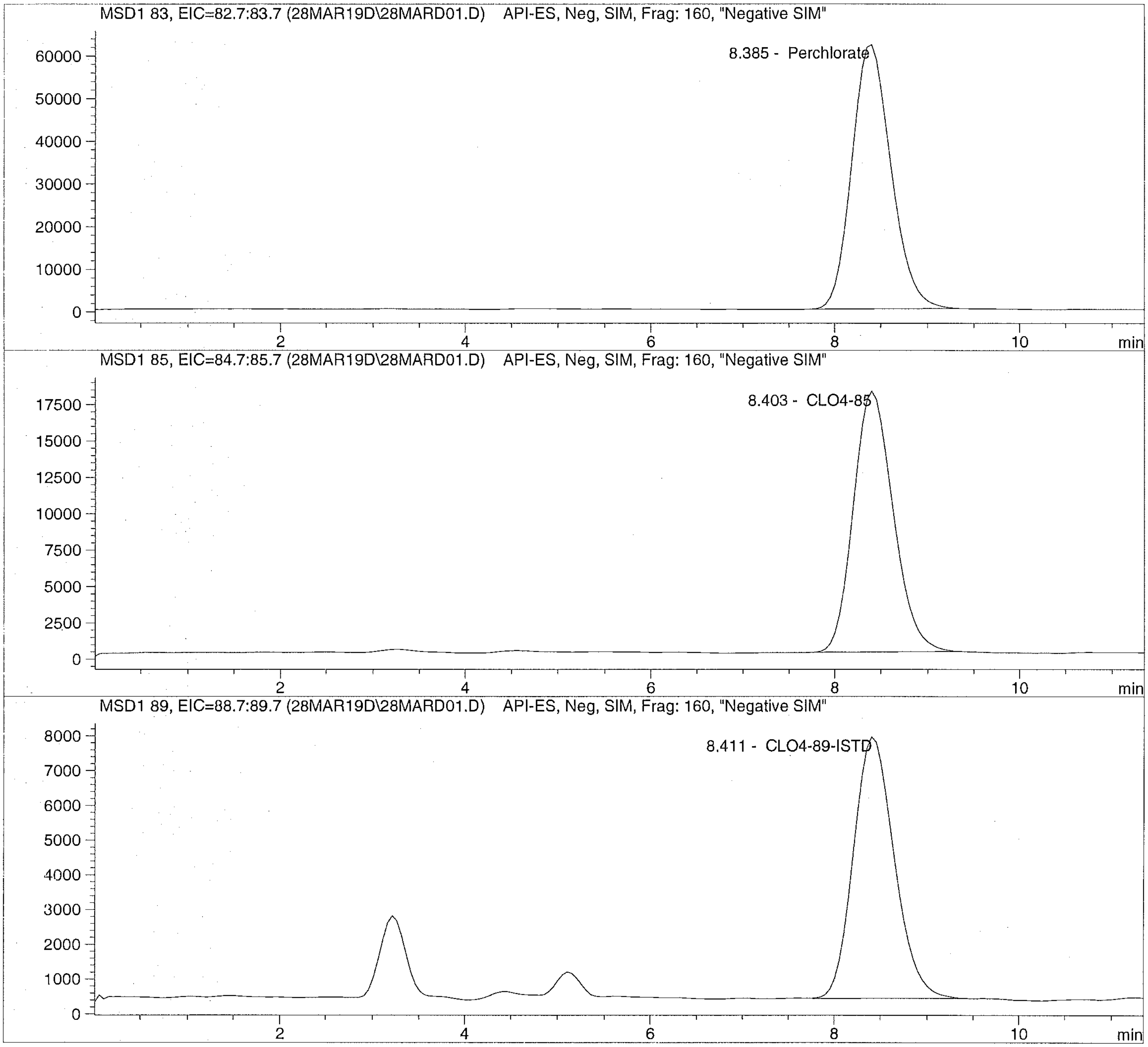
*** End of Report ***

Sequence Table:

Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	645530 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	645534 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	645532 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	645533 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1907867001 1K	CLO4-AQN	1	Sample		
6	Vial 76	1907869001	CLO4-AQN	1	Sample		
7	Vial 77	645535 78691MS	CLO4-AQN	1	Sample		
8	Vial 78	645536 78691SD	CLO4-AQN	1	Sample		
9	Vial 79	1907871001	CLO4-AQN	1	Sample		
10	Vial 80	1908794001	CLO4-AQN	1	Sample		
11	Vial 71	645537 CCV@25	CLO4-AQN	1	Ctrl Samp		

```
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD01.D       Sample Name: 645530   CCV@25
=====================================================================================
Injection Date:    3/28/2019  08:30:53              Seq Line:          1
Sample Name:       645530   CCV@25                  Location:      Vial 71
Acq Operator:      TNB                              Inj. No.:          1
                                                    Inj. Vol.:        25 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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD01.D   Sample Name: 645530 CCV@25

Injection Date:	3/28/2019 08:30:53	Seq Line:	1
Sample Name:	645530 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.385	PBA	1814992.7	24.1365	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.403	PBA	533395.5	23.9022	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.411	BBA	229255.1	5.0000	CLO4-89-ISTD

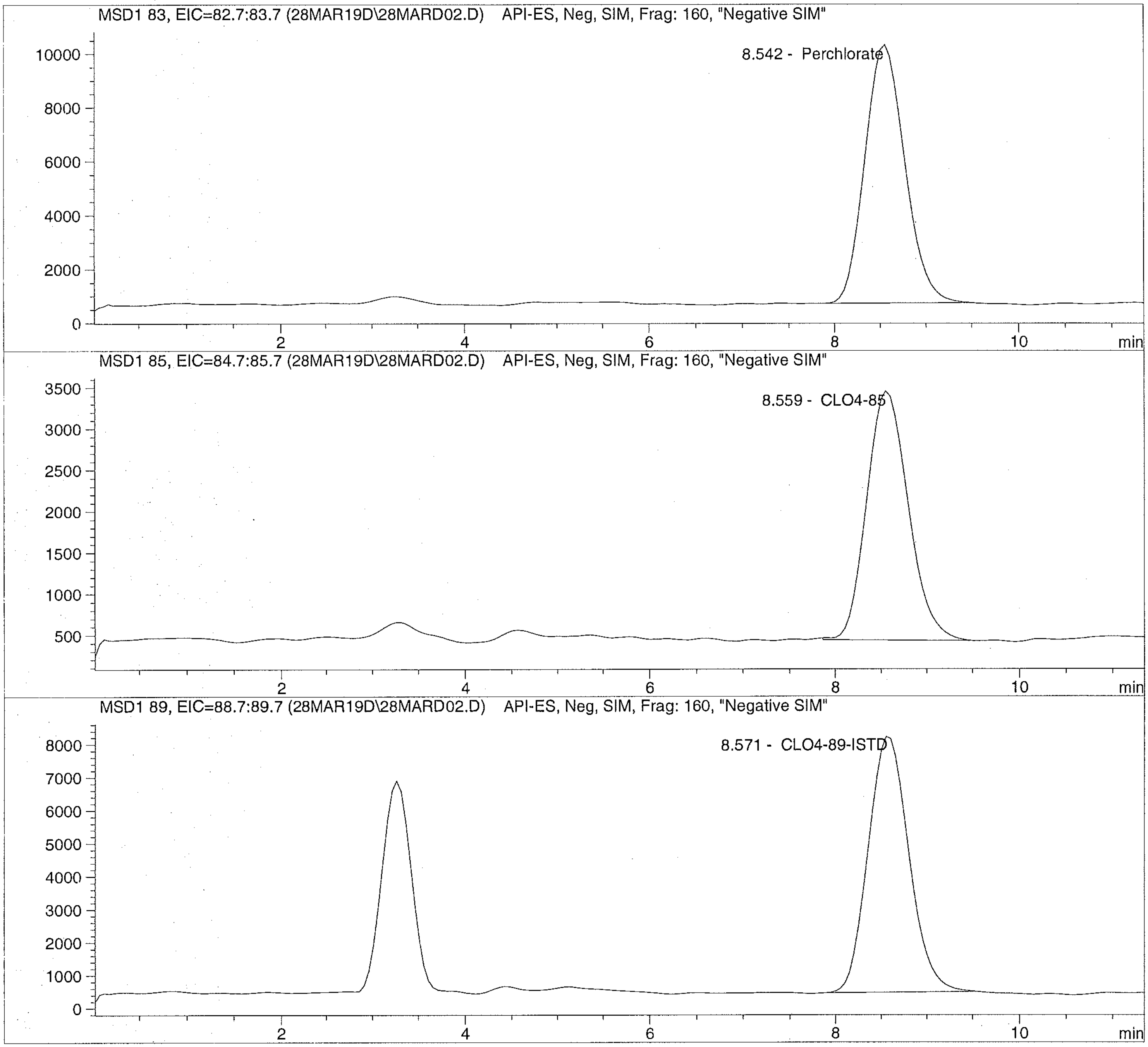
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD02.D Sample Name: 645534 QC@4.0

Injection Date:	3/28/2019 08:47:42	Seq Line:	2
Sample Name:	645534 QC@4.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD02.D Sample Name: 645534 QC@4.0

Injection Date:	3/28/2019 08:47:42	Seq Line:	2
Sample Name:	645534 QC@4.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.542	PBA	289937.1	3.9958	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

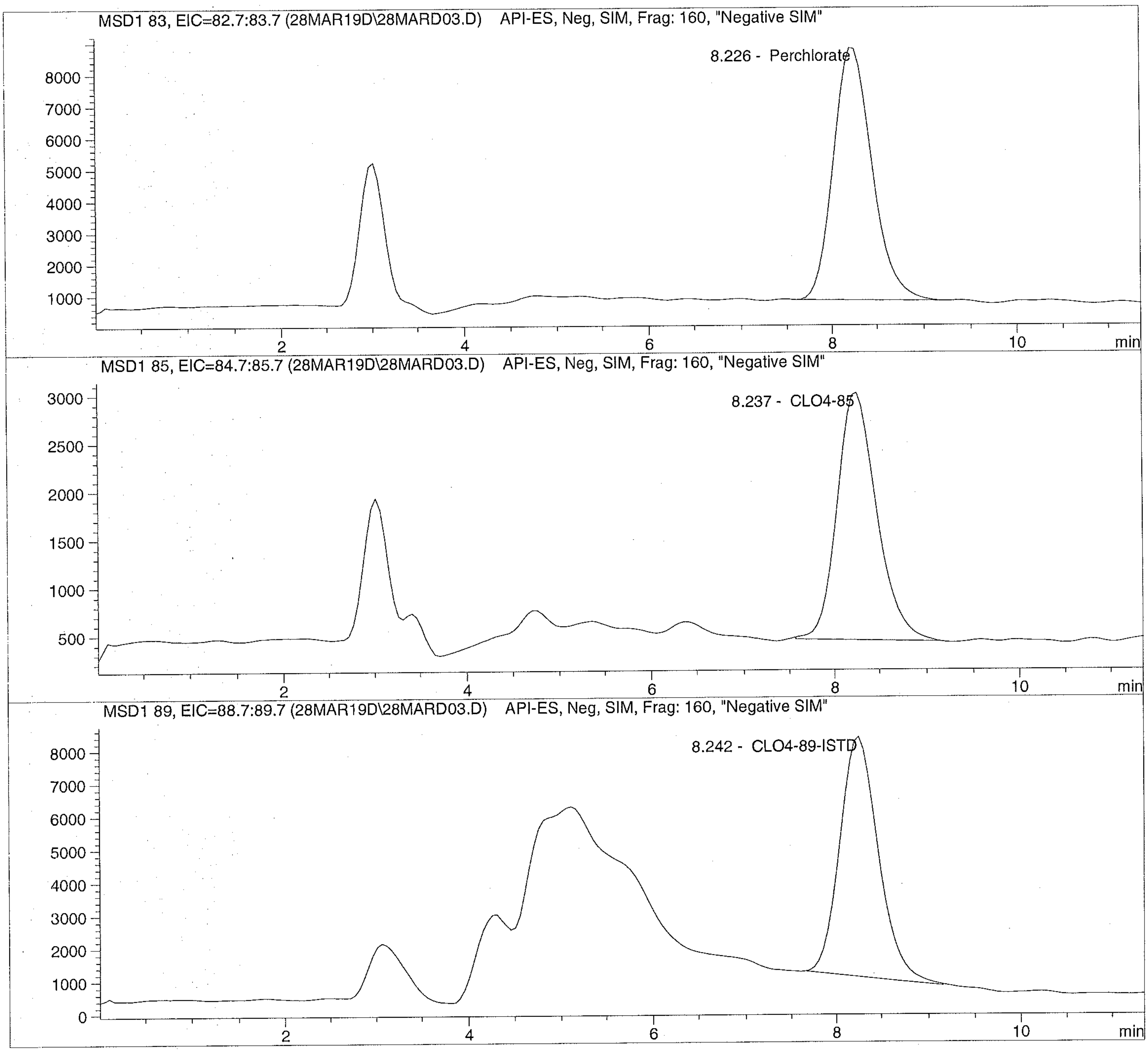
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.559	BBA	95296.3	4.2670	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.571	PBA	239105.9	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD03.D        Sample Name: 645532   ICS@4.0
=====================================================================================
Injection Date:     3/28/2019   09:00:54              Seq Line:                3
Sample Name:        645532   ICS@4.0                  Location:          Vial 73
Acq Operator:       TNB                               Inj. No.:                1
                                                      Inj. Vol.:           25 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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD03.D Sample Name: 645532 ICS@4.0

==

Injection Date: 3/28/2019 09:00:54 Seq Line: 3
Sample Name: 645532 ICS@4.0 Location: Vial 73
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 25 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
8.226	BBA	238654.8	3.6562	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.237	BBA	78833.9	3.9087	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.242	PBA	216079.7	5.0000	CLO4-89-ISTD

==

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD04.D Sample Name: 645533 LMB

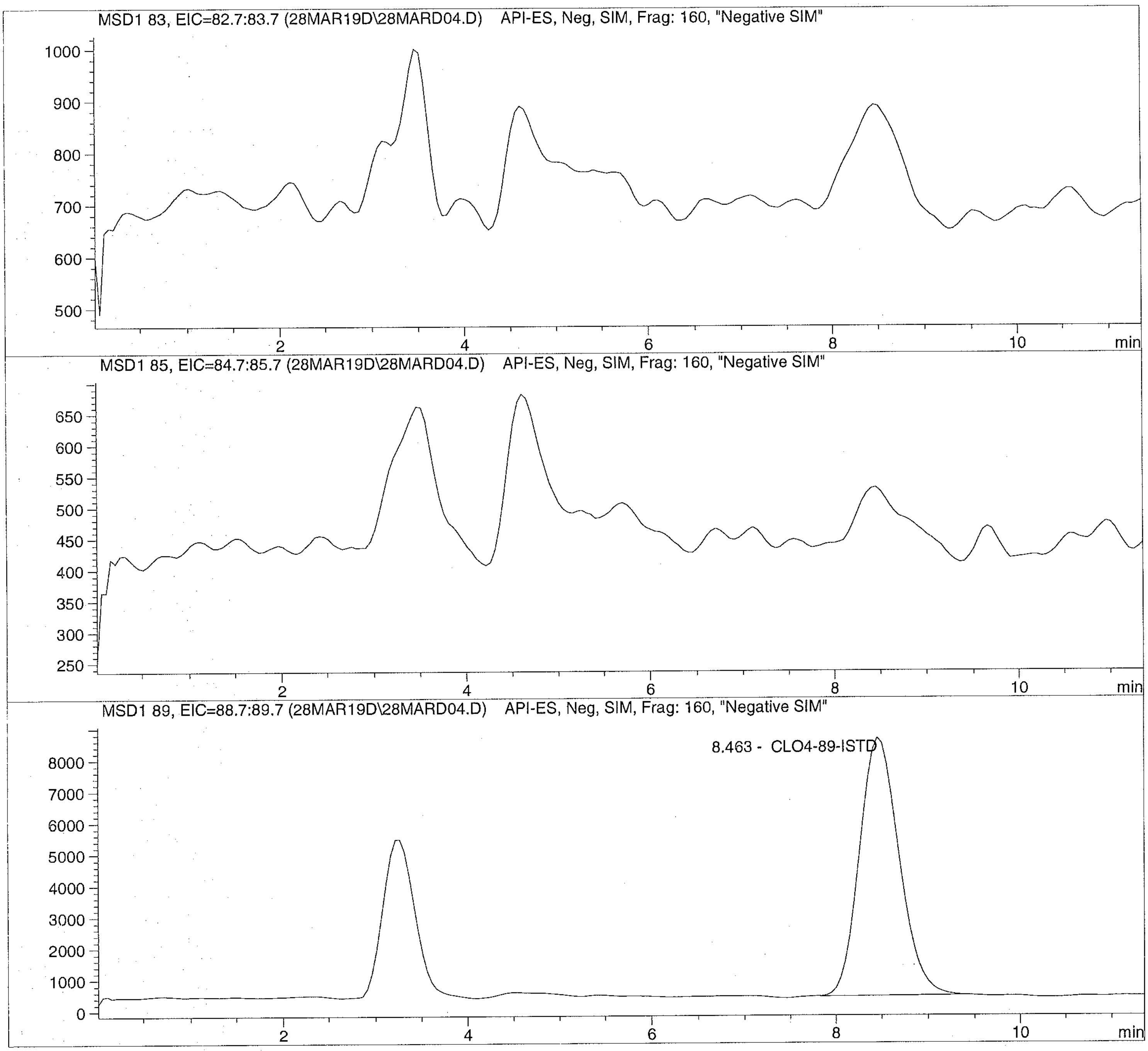
===

Injection Date:	3/28/2019 09:14:08	Seq Line:	4
Sample Name:	645533 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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

===



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD04.D Sample Name: 645533 LMB

Injection Date:	3/28/2019 09:14:08	Seq Line:	4
Sample Name:	645533 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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

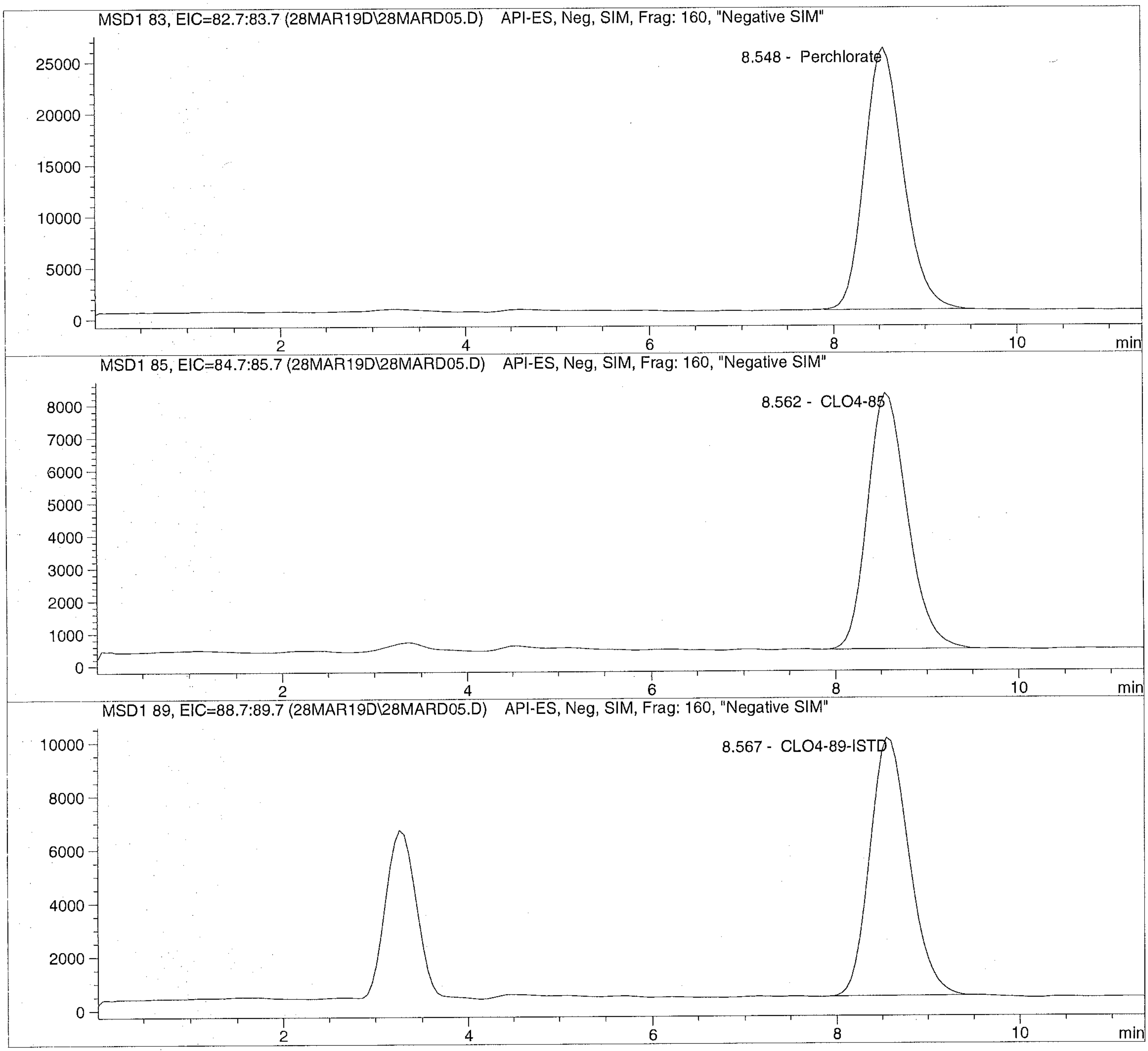
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.463	BBA	242742.3	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD05.D       Sample Name: 1907867001   1K
=====================================================================================
Injection Date:    3/28/2019   09:28:25                Seq Line:             5
Sample Name:       1907867001    1K                    Location:         Vial 75
Acq Operator:      TNB                                 Inj. No.:             1
                                                       Inj. Vol.:          25 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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD05.D   Sample Name: 1907867001 1K

Injection Date: 3/28/2019 09:28:25   Seq Line: 5
Sample Name: 1907867001 1K   Location: Vial 75
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 25 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
8.548	BBA	755115.1	8344.7796	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.562	PBA	238826.8	8762.3570	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.567	PBA	289135.6	5000.0000	CLO4-89-ISTD

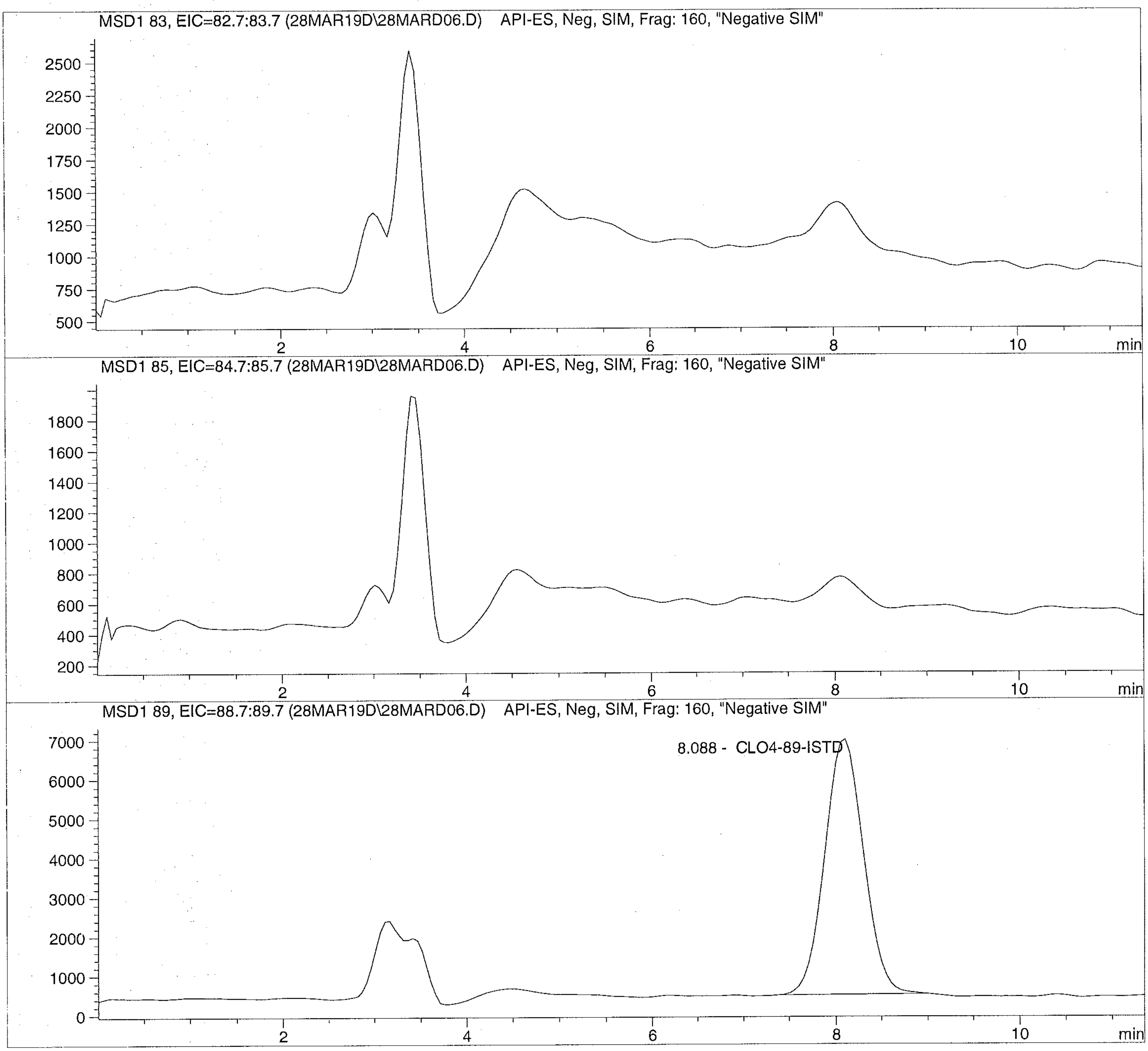
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD06.D Sample Name: 1907869001

Injection Date:	3/28/2019 09:41:37	Seq Line:	6
Sample Name:	1907869001	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD06.D Sample Name: 1907869001

Injection Date:	3/28/2019 09:41:37	Seq Line:	6
Sample Name:	1907869001	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.088	BBA	189925.3	5.0000	CLO4-89-ISTD

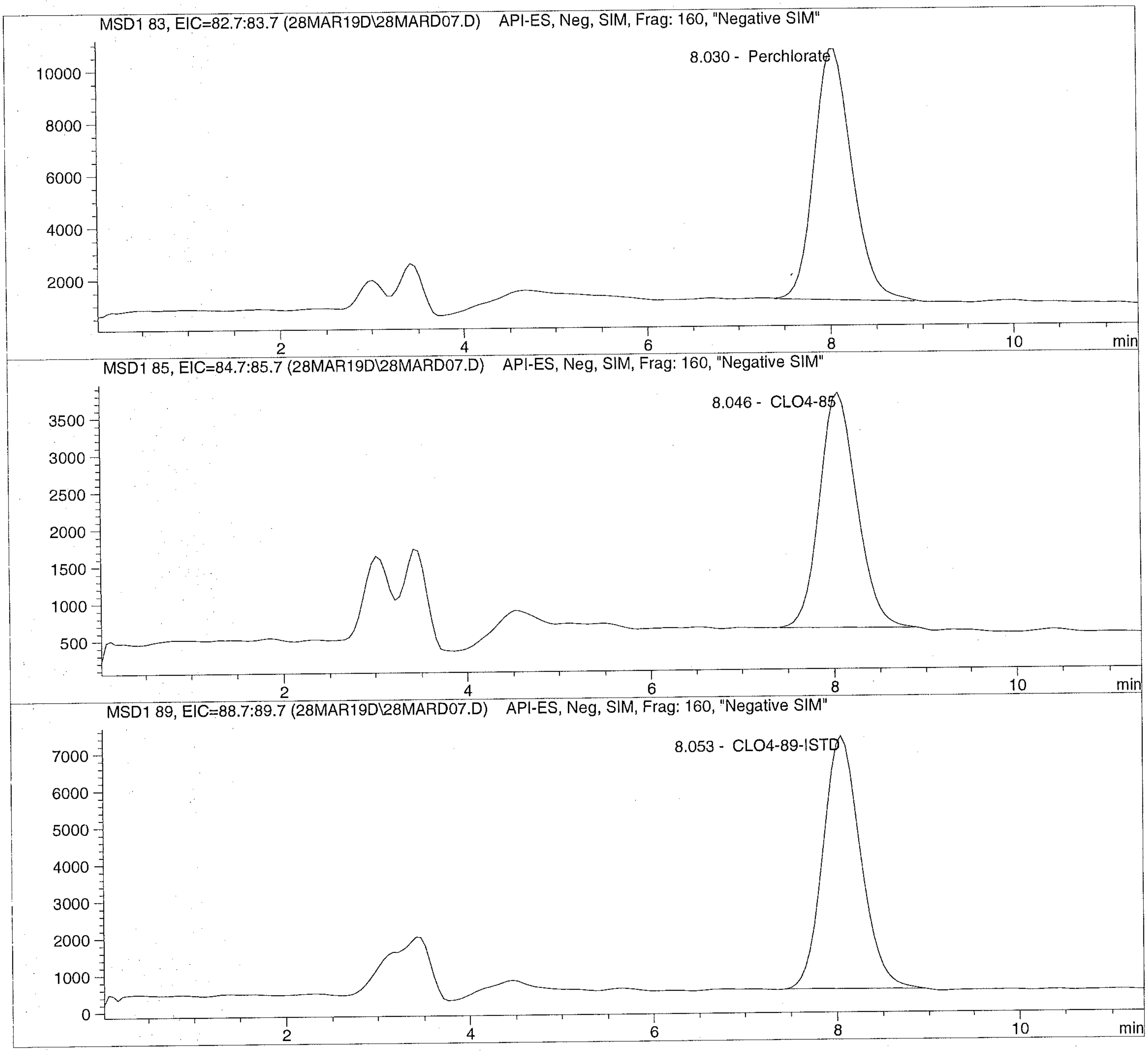
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD07.D   Sample Name: 645535   78691MS

Injection Date:	3/28/2019 09:54:47	Seq Line:	7
Sample Name:	645535 78691MS	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD07.D   Sample Name: 645535   78691MS

Injection Date:	3/28/2019 09:54:47	Seq Line:	7
Sample Name:	645535 78691MS	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.030	BBA	277046.3	4.6616	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.046	BBA	89339.9	4.9137	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.053	BBA	194412.9	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD08.D   Sample Name: 645536   78691SD

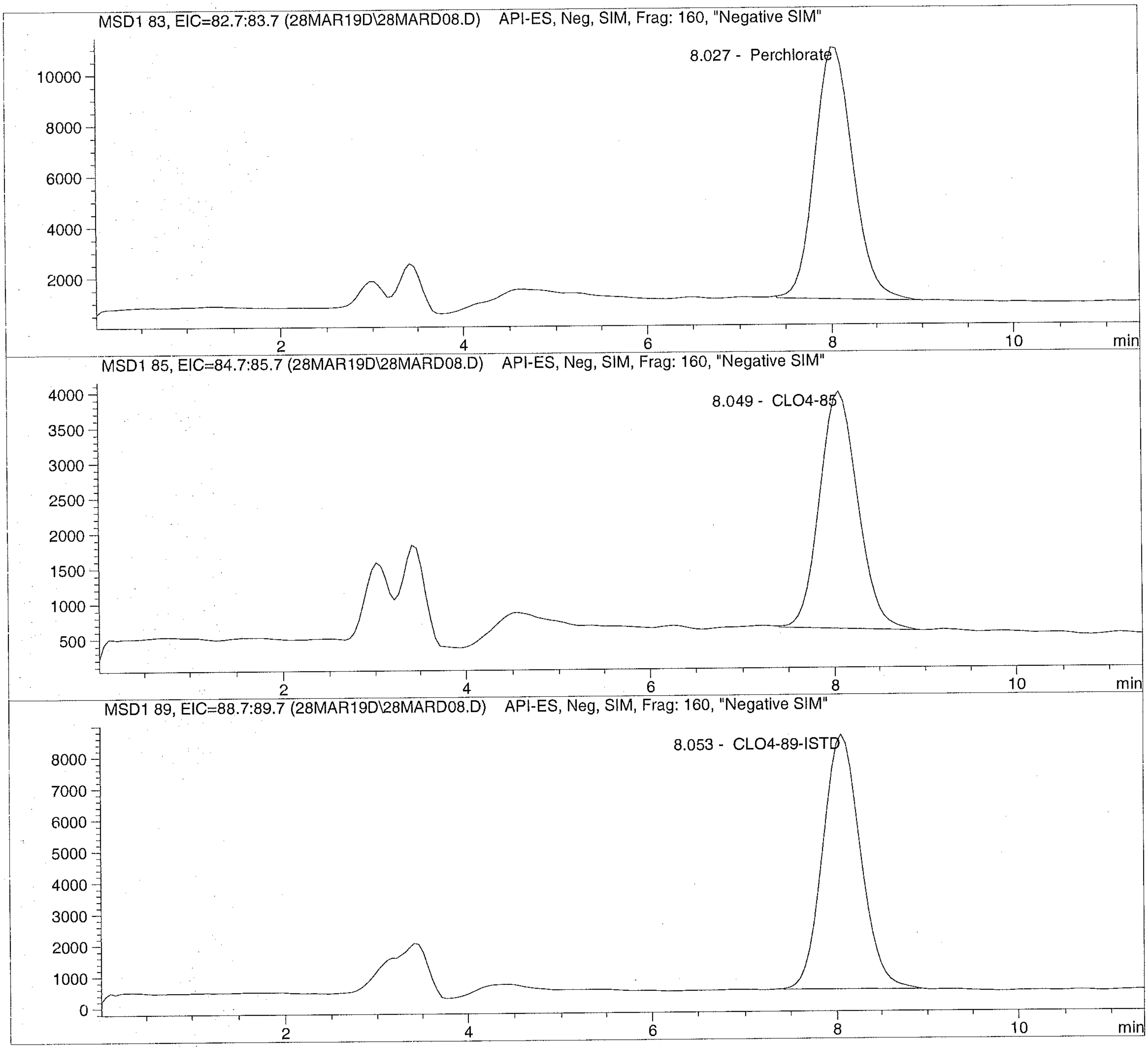
===

Injection Date:	3/28/2019 10:08:05	Seq Line:	8
Sample Name:	645536 78691SD	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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

===



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD08.D Sample Name: 645536 78691SD

Injection Date:	3/28/2019 10:08:05	Seq Line:	8
Sample Name:	645536 78691SD	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.027	BBA	289383.7	4.0513	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.049	BBA	98569.0	4.4846	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.053	BBA	235219.8	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD09.D   Sample Name: 1907871001

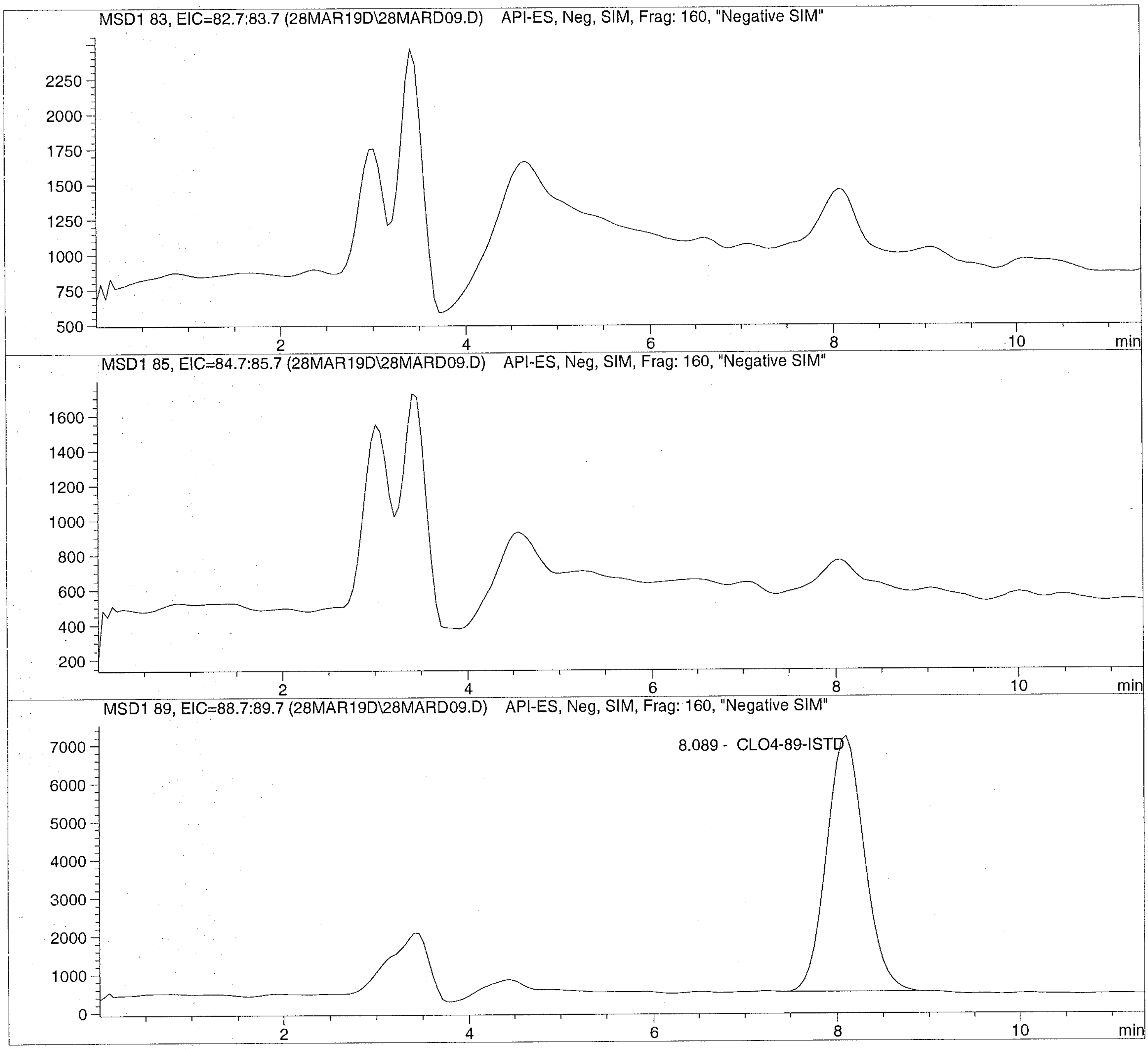
===

Injection Date: 3/28/2019 10:21:14   Seq Line: 9
Sample Name: 1907871001   Location: Vial 79
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 25 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

===



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD09.D   Sample Name: 1907871001

Injection Date:	3/28/2019 10:21:14	Seq Line:	9
Sample Name:	1907871001	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.089	PBA	189608.5	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD10.D Sample Name: 1908794001

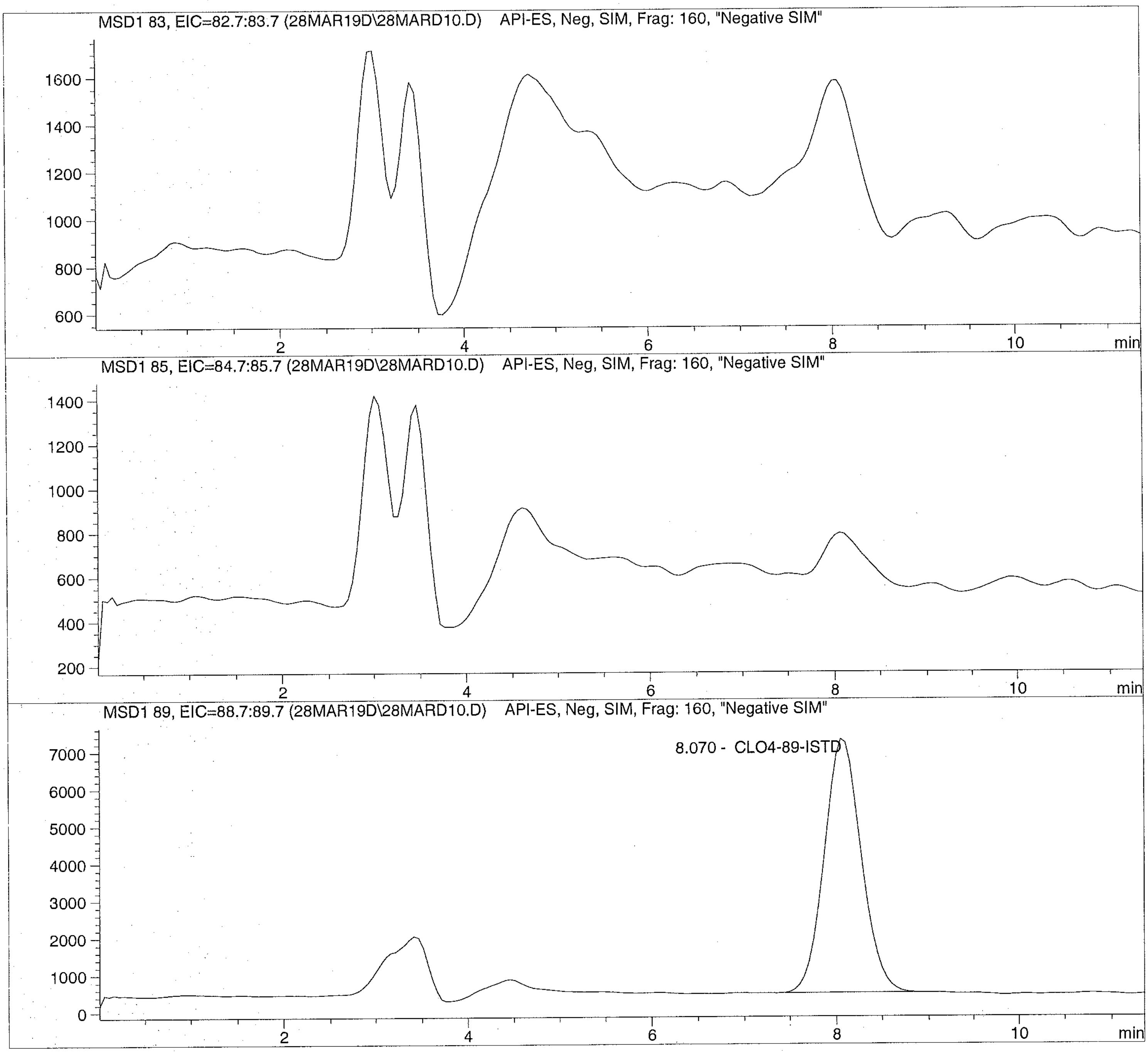
===

Injection Date:	3/28/2019 10:34:27	Seq Line:	10
Sample Name:	1908794001	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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

===



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD10.D   Sample Name: 1908794001

Injection Date:	3/28/2019 10:34:27	Seq Line:	10
Sample Name:	1908794001	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.070	PBA	192453.4	5.0000	CLO4-89-ISTD

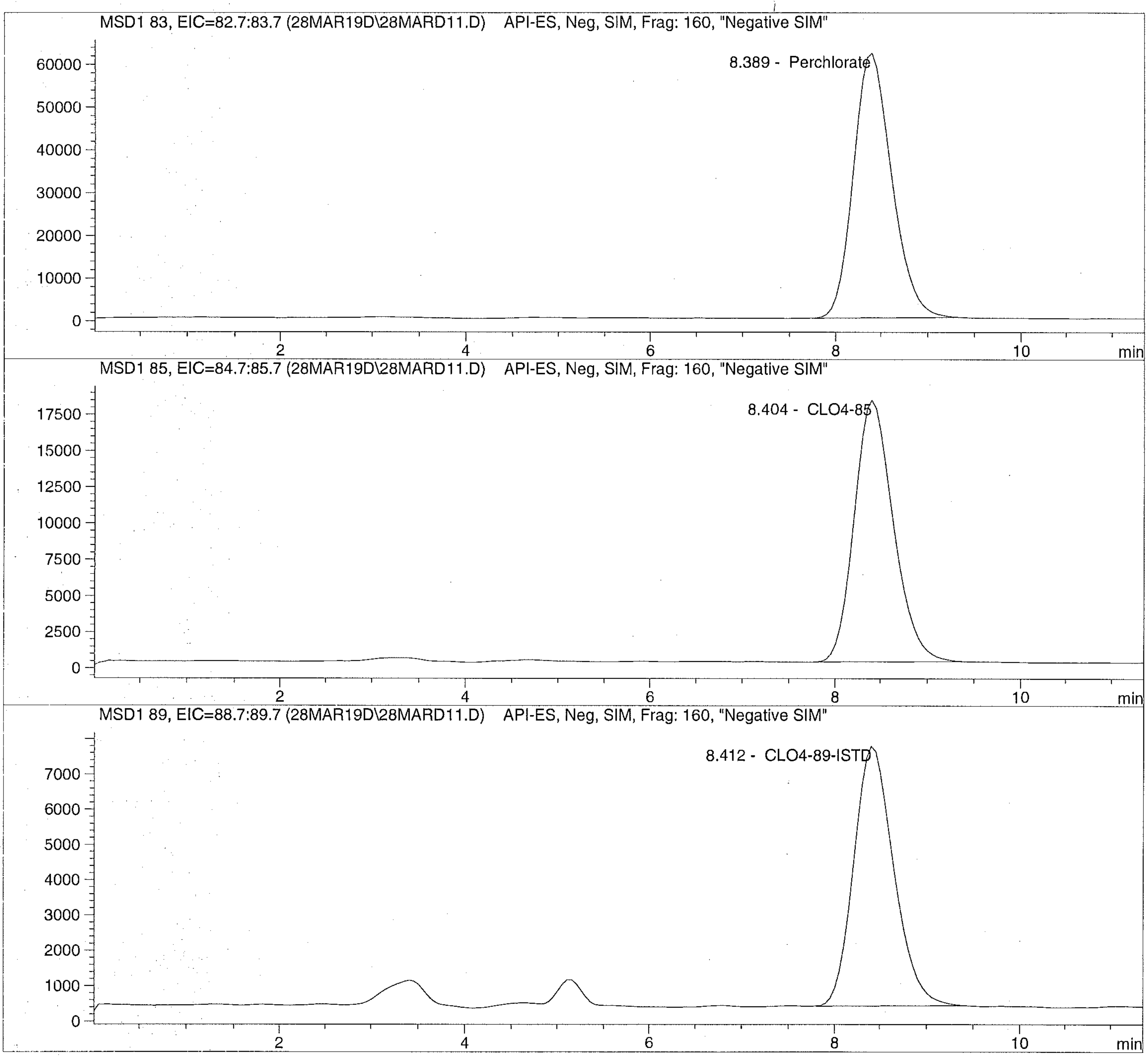
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD11.D Sample Name: 645537 CCV@25

Injection Date:	3/28/2019 10:49:41	Seq Line:	11
Sample Name:	645537 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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



Data file: C:\HPCHEM\1\DATA\28MAR19D\28MARD11.D Sample Name: 645537 CCV@25

Injection Date:	3/28/2019 10:49:41	Seq Line:	11
Sample Name:	645537 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 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
8.389	PBA	1797085.1	24.4912	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.404	PBA	535801.9	24.5911	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.412	BBA	223514.2	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

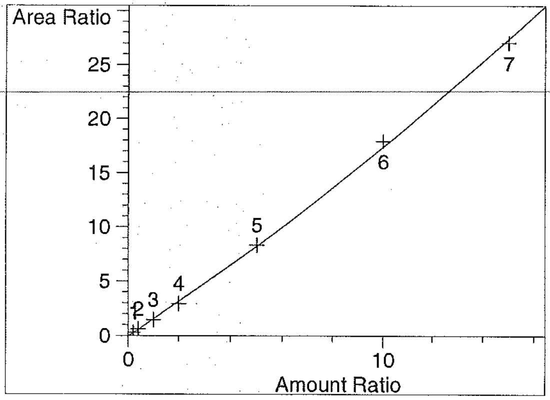
RetTime [min]	Sig	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
8.744	1	1	1.00000	7.76074e4	1.28854e-5	1		Perchlorate
		2	2.00000	1.35273e5	1.47849e-5			
		3	5.00000	3.37764e5	1.48033e-5			
		4	10.00000	6.83454e5	1.46316e-5			
		5	25.00000	2.08433e6	1.19943e-5			
		6	50.00000	4.13334e6	1.20968e-5			
		7	75.00000	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
```

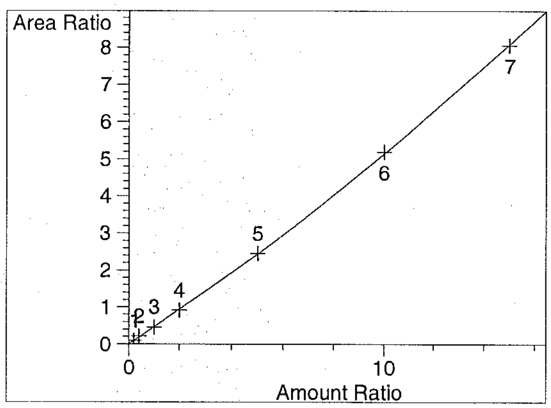
More compound-specific settings:

```
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***
=====================================================================
```

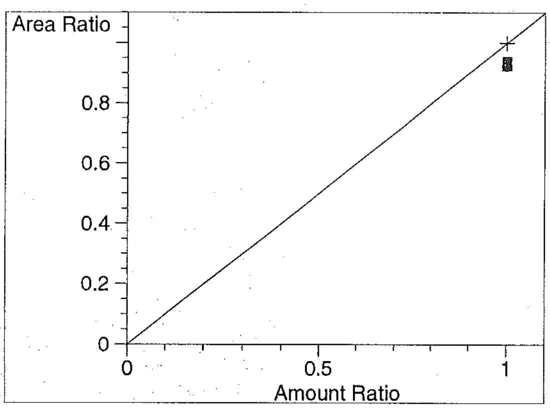
Calibration Curves



Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation: 0.99957
Residual Std. Dev.: 0.30744
Formula: y = ax² + 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 = ax² + 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		

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI03.D Sample Name: CLO4@ 1.0ug/L

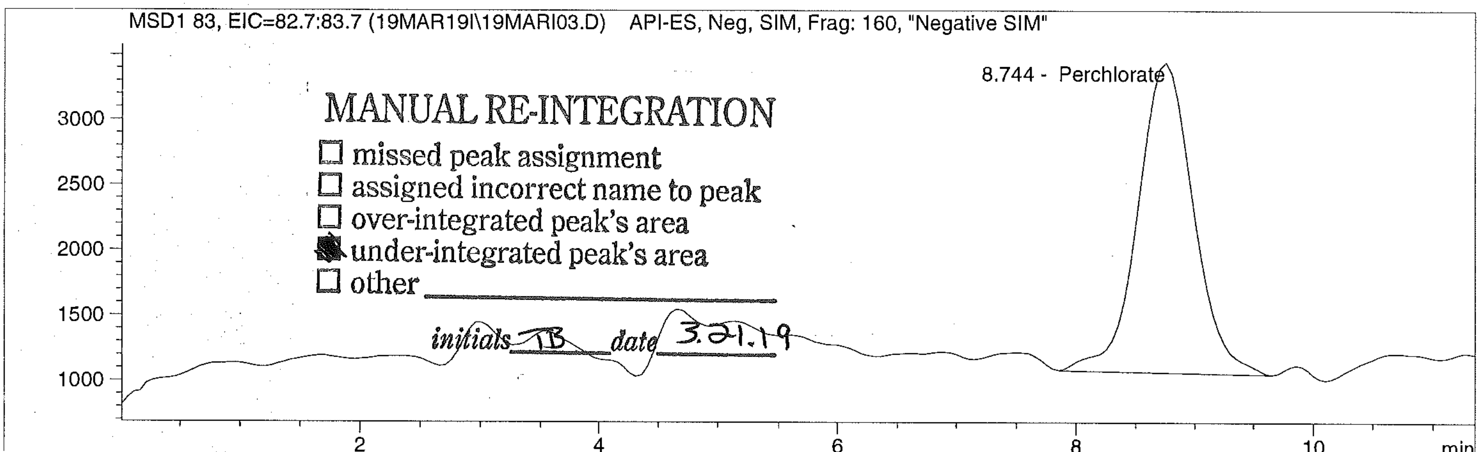
===

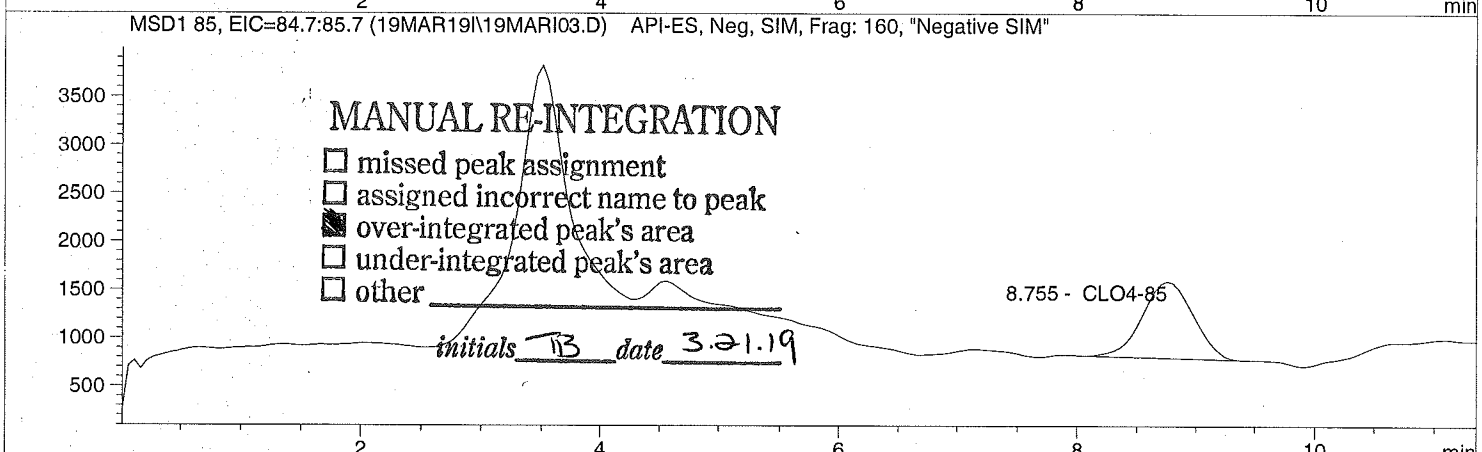
Injection Date:	3/19/2019 09:39:40	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

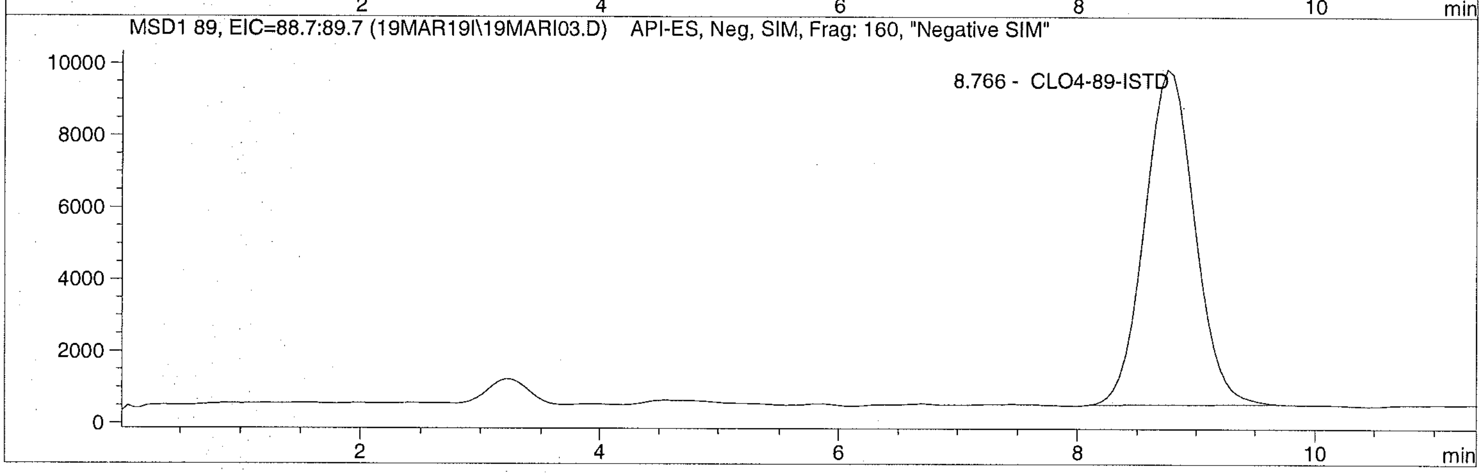
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis

===







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

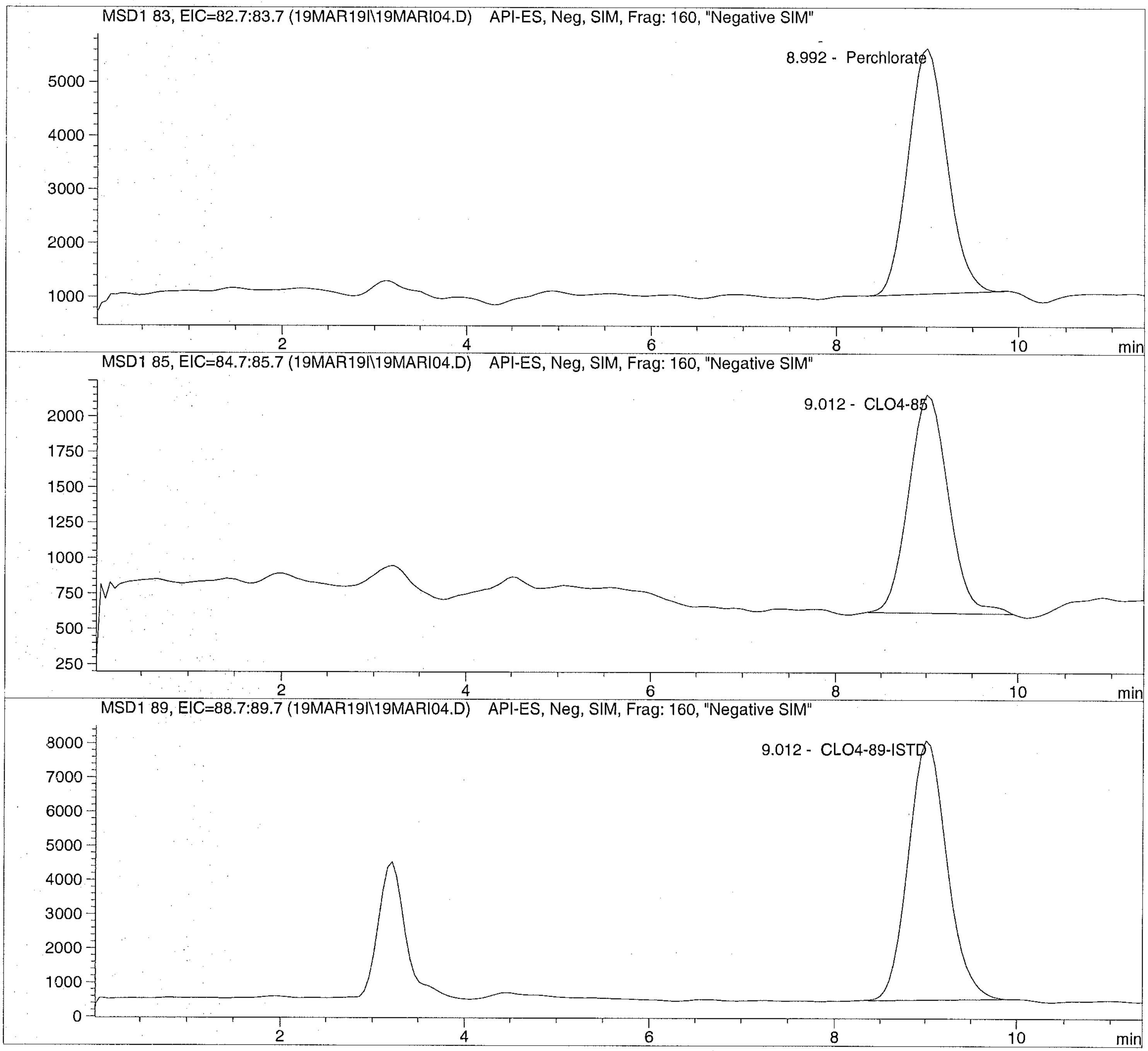
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D Sample Name: CLO4@ 2.0ug/L

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



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D   Sample Name: CLO4@ 2.0ug/L

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

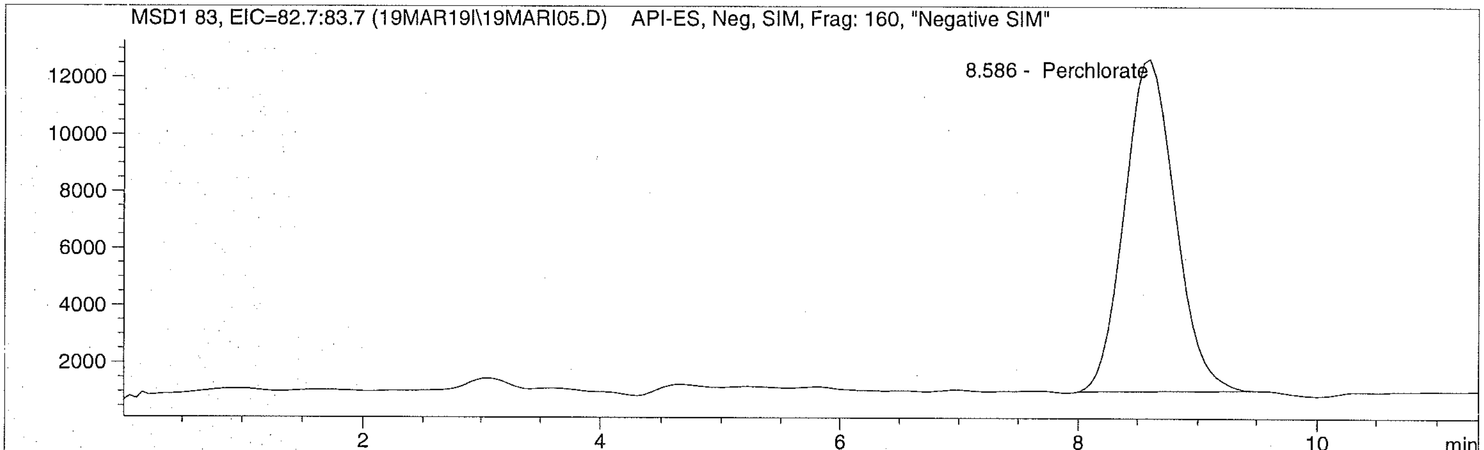
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

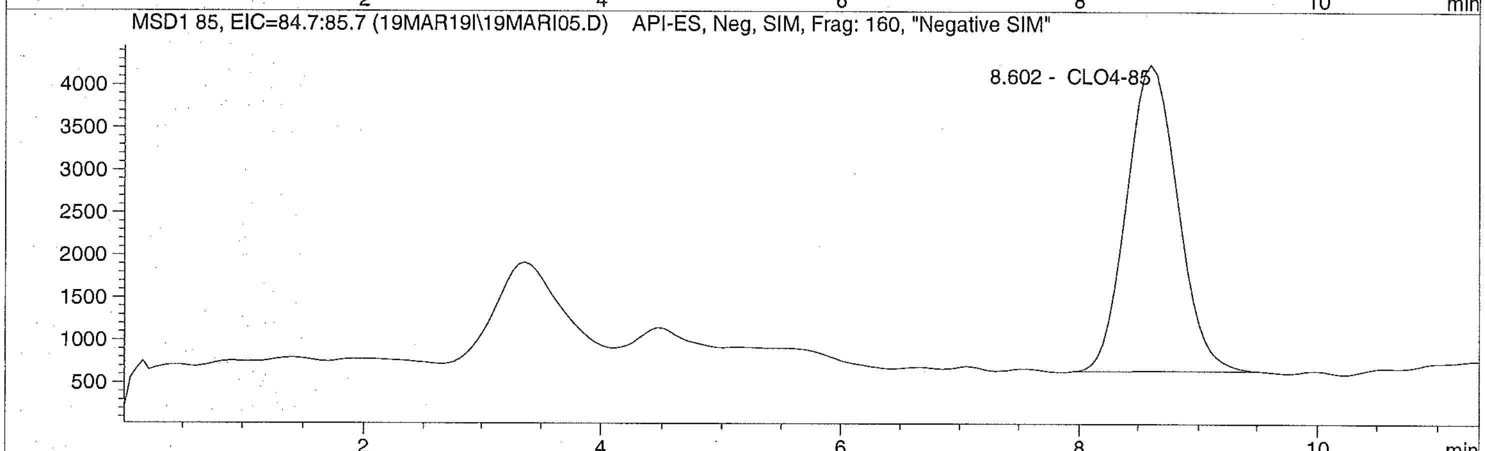
Signal3: MSD1 89, EIC=88.7:89.7

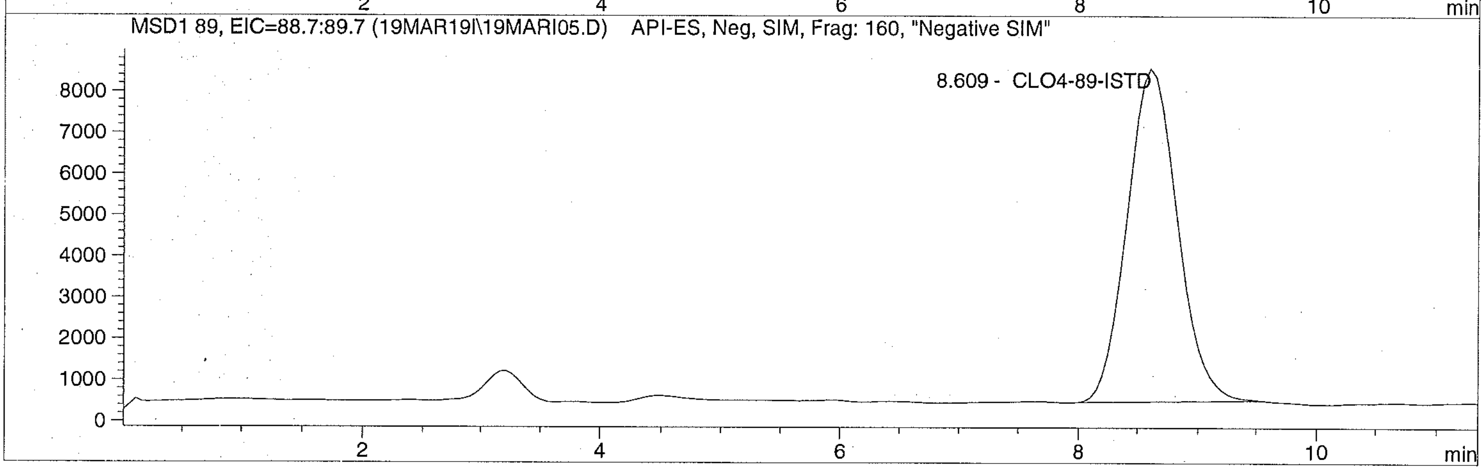
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

*** End of Report ***

```
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
=================================================================================
```







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

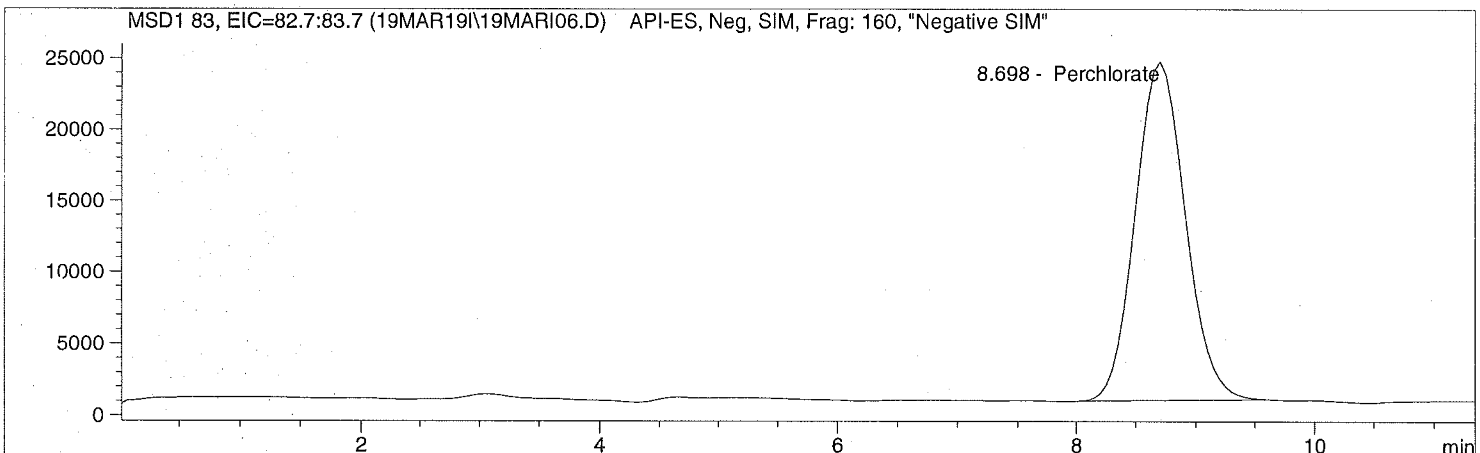
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

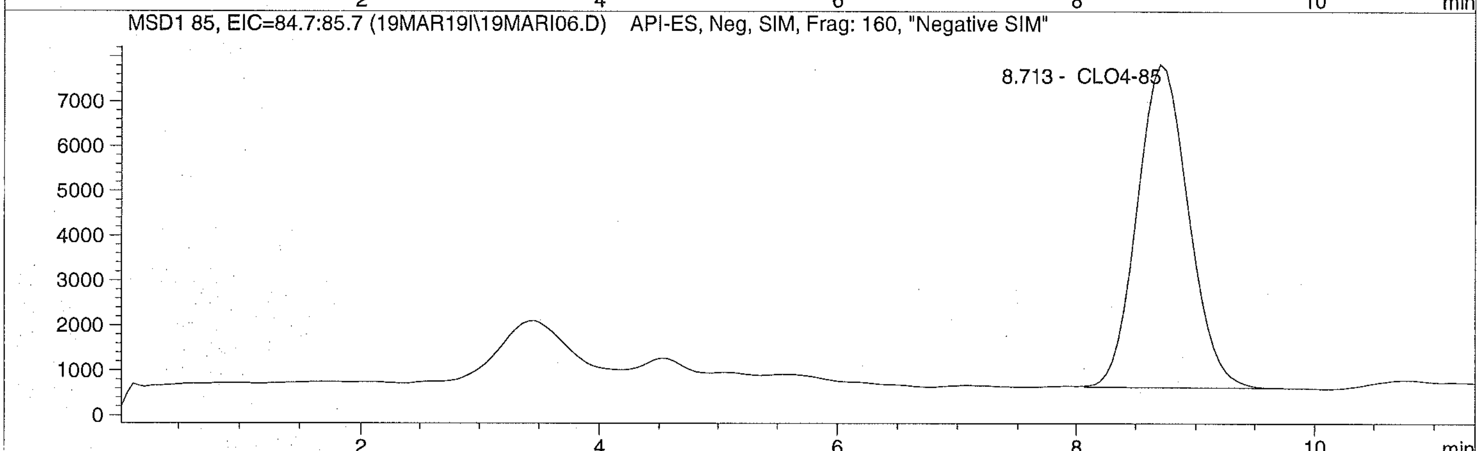
Signal3: MSD1 89, EIC=88.7:89.7

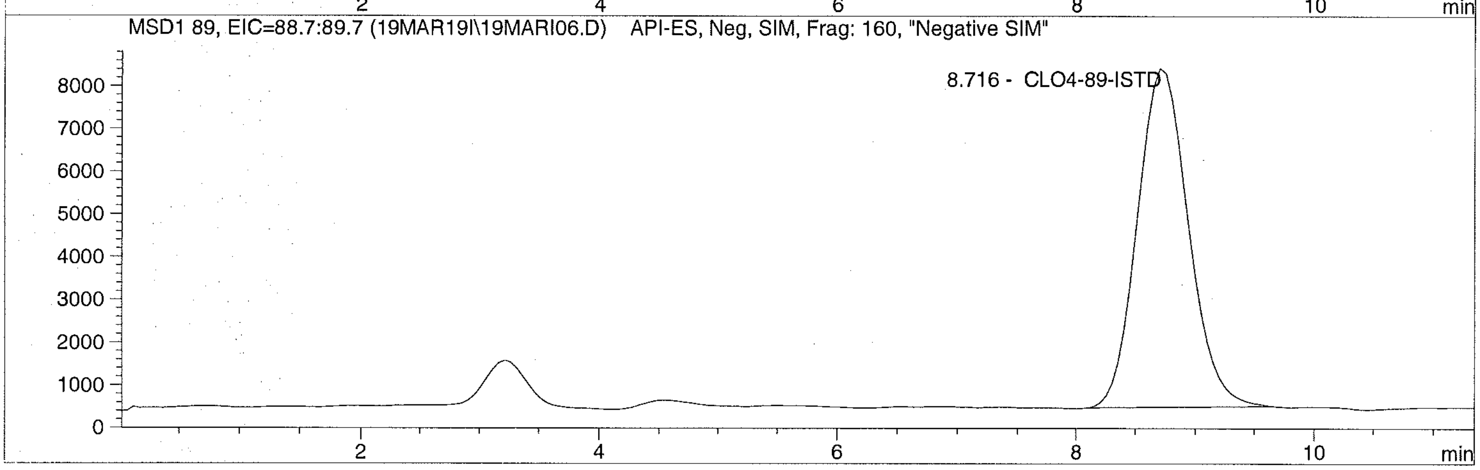
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

*** End of Report ***

```
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
=================================================================================
```







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

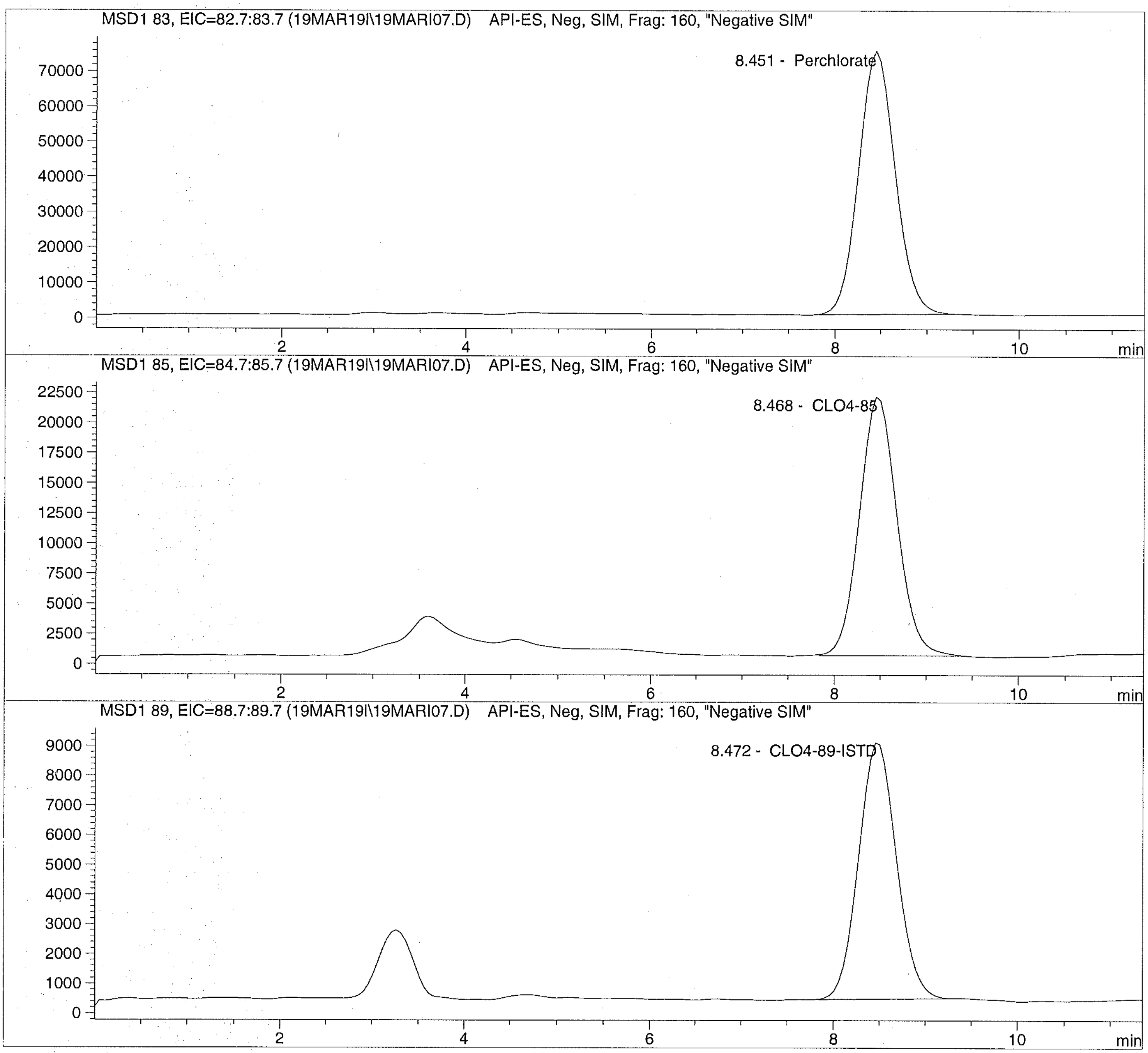
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

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 ***

```
Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D        Sample Name: CLO4@ 25.ug/L
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D   Sample Name: CLO4@ 25.ug/L

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

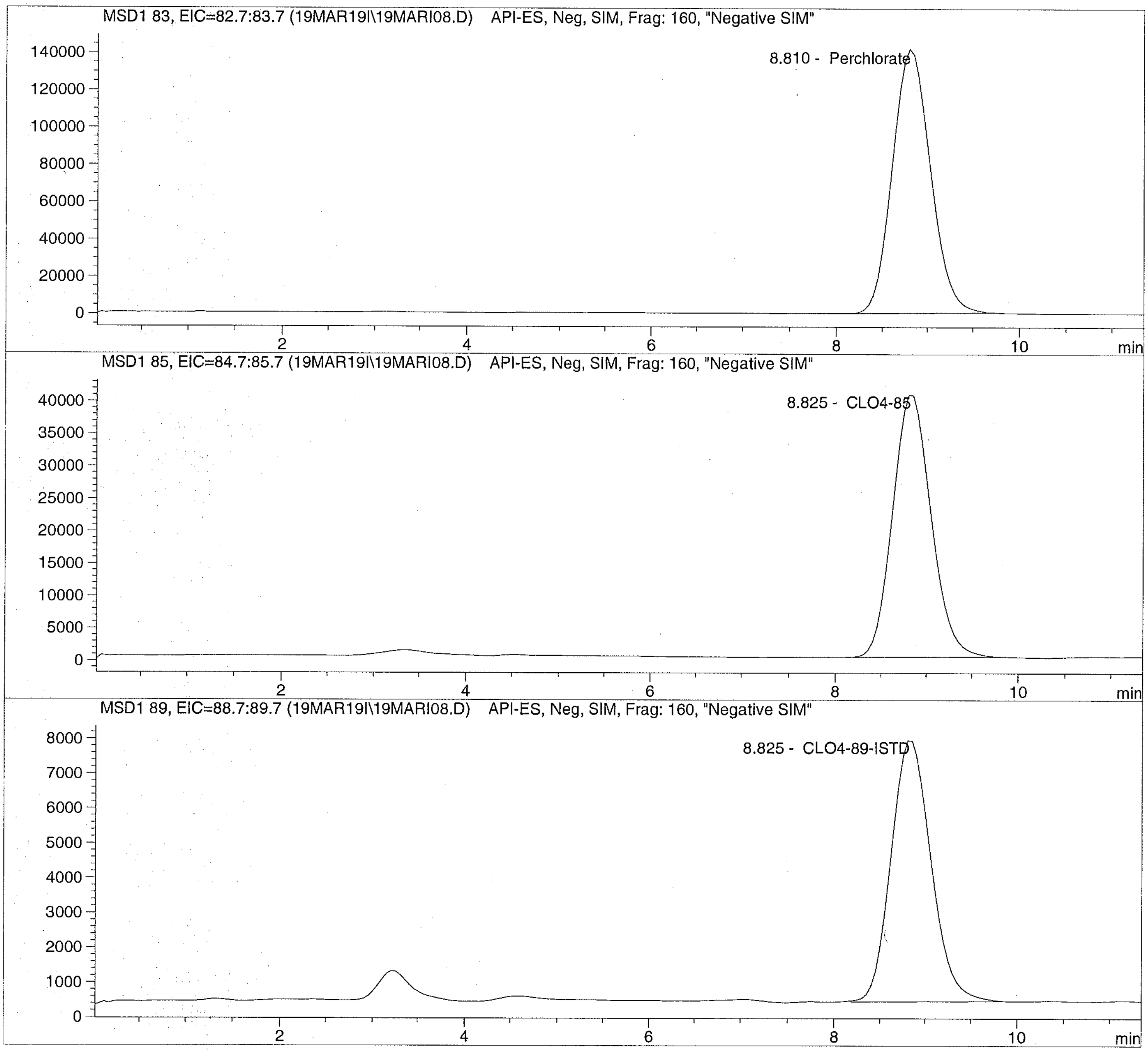
*** End of Report ***

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

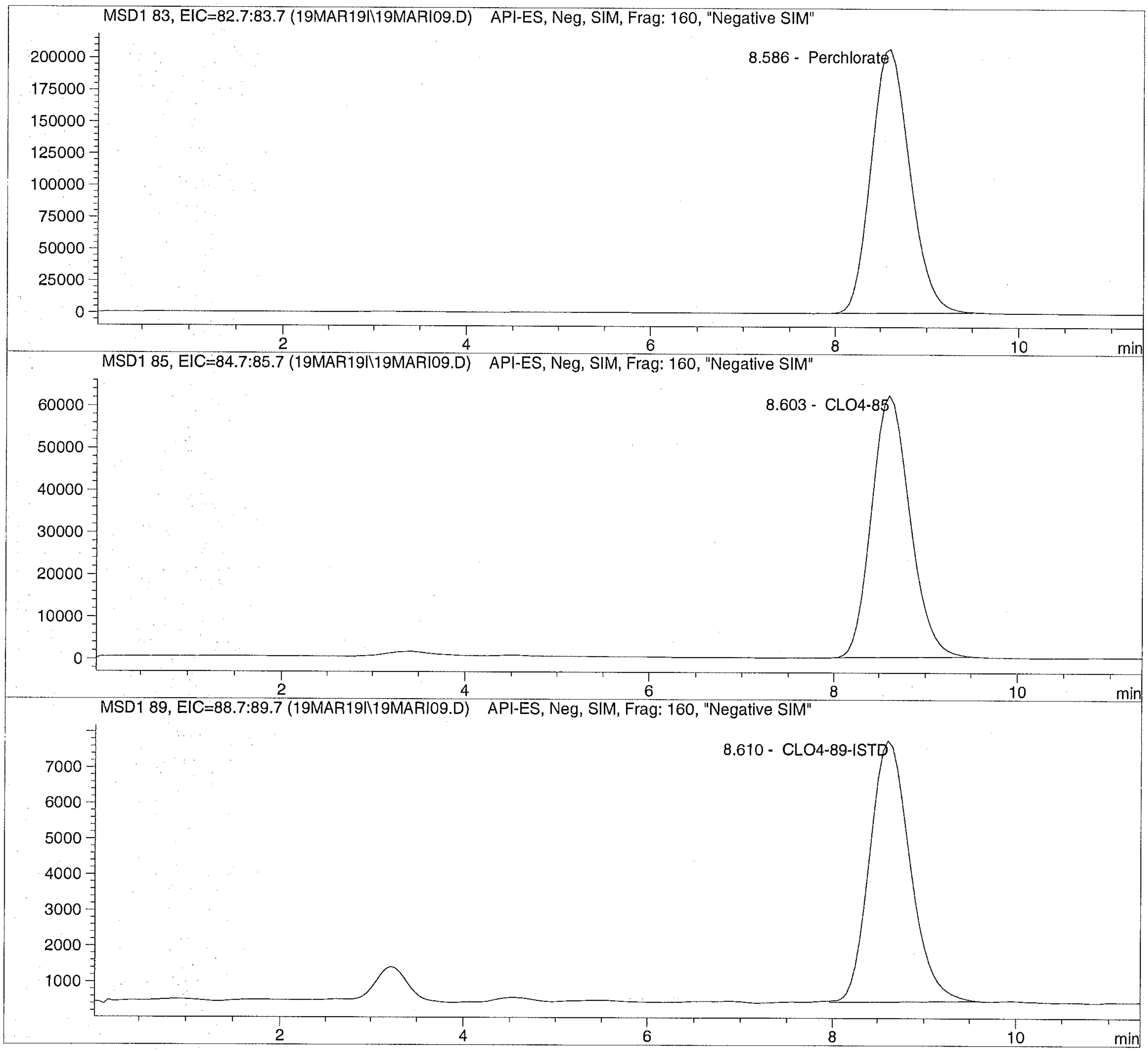
*** End of Report ***

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



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

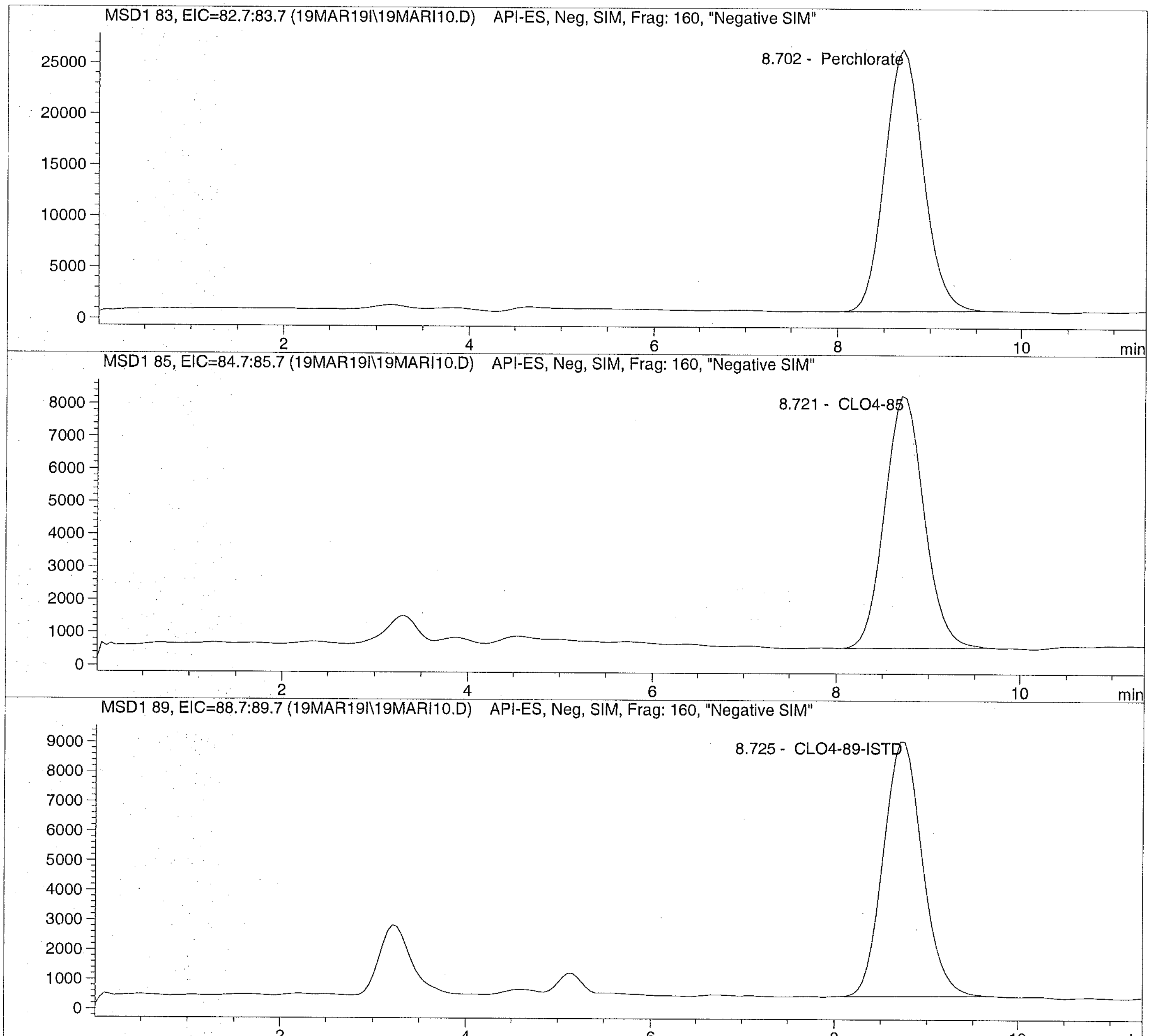
*** End of Report ***

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



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

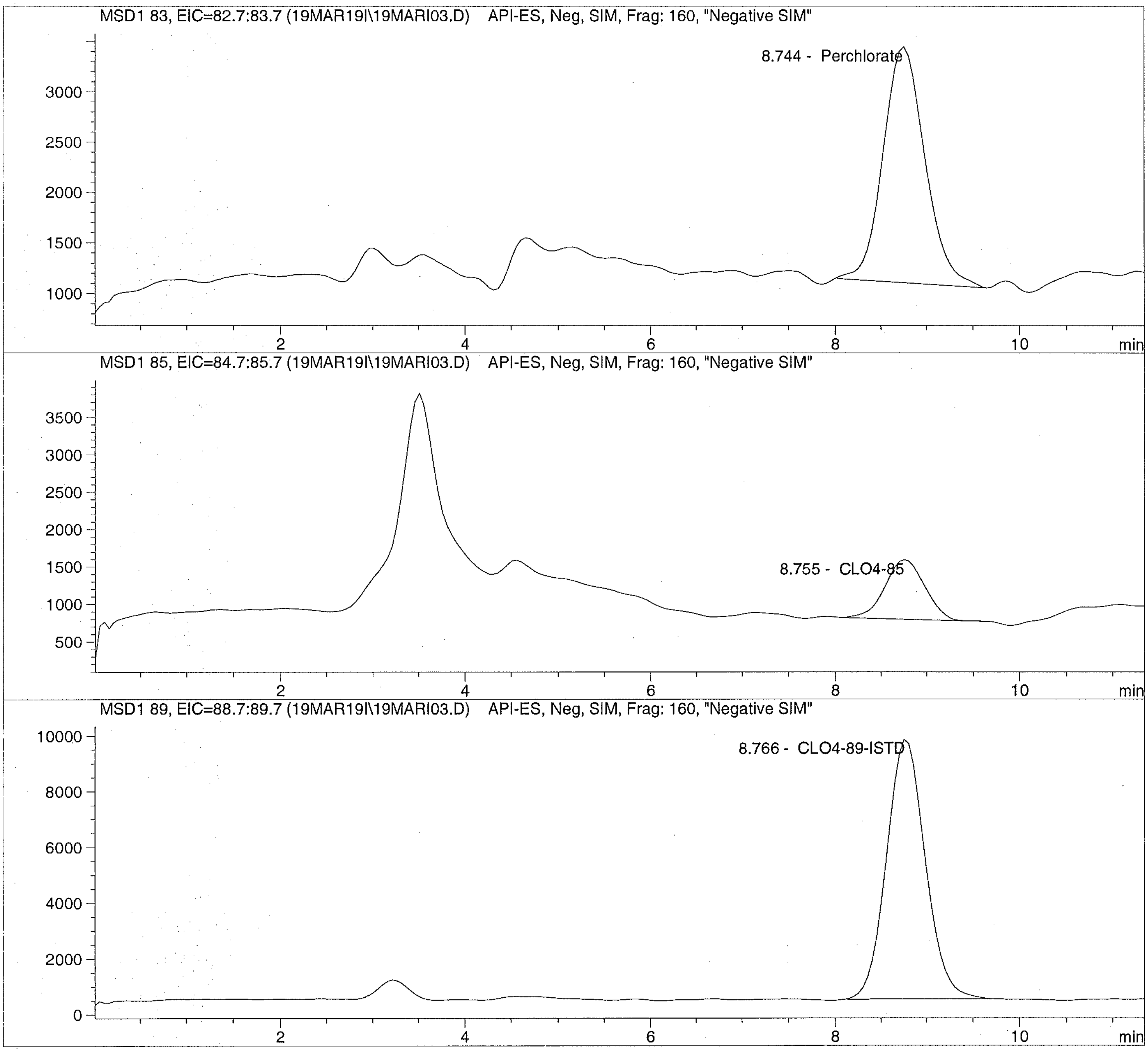
Unmodified

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



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 ***

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April 01, 2019

Analytical Report for Service Request No: K1902558

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

RE: ALS Houston DOD TOC

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory March 26, 2019
For your reference, these analyses have been assigned our service request number **K1902558.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3350. You may also contact me via email at Kelley.Lovejoy@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Kelley Lovejoy

Kelley Lovejoy
Project Manager

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Table of Contents

Acronyms

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

Inorganic Data Qualifiers

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

Metals Data Qualifiers

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

Organic Data Qualifiers

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

Additional Petroleum Hydrocarbon Specific Qualifiers

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

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

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
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ALS Environmental

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

Service Request: K1902558
Date Received: 03/26/2019

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Group. This report contains analytical results and quality control parameters for samples designated for Tier IV validation deliverables, which includes summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt:

One water sample was received for analysis at ALS laboratory on 03/26/2019. The sample was received in good condition and consistent with the accompanying chain of custody form. Unless otherwise noted, samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

General Chemistry:

No significant anomalies were noted with this analysis.

Approved by Kelley Lovejoy

Date 04/01/2019

Chain of Custody

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
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10450 Stancliff Rd, Ste 210
Houston, TX 77099
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F: +1 281 530 5887
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K1902558

Subcontract Chain of Custody

COC ID: 10959

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:	HS19031160
TSR:	Danielle Winnings

	LAB SAMPLE ID / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / DUE DATE
1.	**HS19031160-01**	**LH18/24-SP650_032119**	**Water**	**21 Mar 2019 14:00**
	TOC Analysis for DOD Level IV			01 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 Gage	Date/Time:	3/25/19
Received By:	L Morrow ALS-Kelso	Date/Time:	3/26/19 0940
Cooler ID(s):		Temperature(s):	

ALS

PC KL

Cooler Receipt and Preservation Form

Client ALS Houston Service Request K19 02558

Received: 3/26/19 Opened: 3/26/19 By: KM Unloaded: 3/26/19 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? 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 NA	Tracking Number NA	Filed
-0.6	-0.3	N/A	N/A	+0.3	384	10959	4809 7832 0993	

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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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	K1902558
Project:	ALS Houston DOD TOC	**Date Collected:**	03/21/19
Sample Matrix:	Water	**Date Received:**	03/26/19
Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_032119	K1902558-001	**2.50**	0.50	0.20	0.07	1	03/28/19 22:24	
Method Blank	K1902558-MB	ND U	0.50	0.20	0.07	1	03/29/19 00:17	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1902558
Project	ALS Houston DOD TOC	**Date Collected:**	03/21/19
Sample Matrix:	Water	**Date Received:**	03/26/19
Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Replicate Sample Summary
Carbon, Total Organic

Sample Name:	Lab Code:	MRL	LOQ	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
Batch QC	K1902526-001DUP	50	20	7	353	348	350	2	10	03/28/19
Batch QC	K1902526-002DUP	50	20	7	378	377	378	<1	10	03/28/19
LH18/24-SP650_032119	K1902558-001DUP	0.50	0.20	0.07	2.50	2.49	2.49	<1	10	03/28/19
Batch QC	K1902567-001DUP	0.50	0.20	0.07	11.3	11.2	11.3	<1	10	03/29/19
Batch QC	K1902567-002DUP	0.50	0.20	0.07	3.20	3.10	3.15	3	10	03/29/19
Batch QC	K1902567-003DUP	0.50	0.20	0.07	3.30	3.25	3.27	1	10	03/29/19
Batch QC	K1902567-004DUP	0.50	0.20	0.07	1.33	1.32	1.32	<1	10	03/29/19
Batch QC	K1902567-005DUP	0.50	0.20	0.07	2.44	2.37	2.41	3	10	03/29/19
Batch QC	K1902603-001DUP	0.50	0.20	0.07	3.10	3.04	3.07	2	10	03/29/19
Batch QC	K1902603-002DUP	0.50	0.20	0.07	1.46	1.46	1.46	<1	10	03/29/19
Batch QC	K1902603-003DUP	0.50	0.20	0.07	1.61	1.65	1.63	2	10	03/29/19
Batch QC	K1902603-004DUP	0.50	0.20	0.07	1.69	1.65	1.67	3	10	03/29/19

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

Results flagged with a pound (#) indicate the control criteria is not applicable.

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

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1902558
Project:	ALS Houston DOD TOC	**Date Collected:**	N/A
Sample Matrix:	Water	**Date Received:**	N/A
		Date Analyzed:	03/29/19
		Date Extracted:	NA

Matrix Spike Summary
Carbon, Total Organic

Sample Name:	Batch QC	**Units:**	mg/L
Lab Code:	K1902603-002	**Basis:**	NA
Analysis Method:	SM 5310 C		
Prep Method:	None		

Matrix Spike
K1902603-002MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic	1.46	29.3	25.0	112	83-117

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

Results flagged with a pound (#) indicate the control criteria is not applicable.

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

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1902558
Project:	ALS Houston DOD TOC	**Date Analyzed:**	03/29/19
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	629967

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1902558-LCS	26.6	25.0	106	83-117

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: ALS Houston DOD TOC
Service Request: K1902558

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	629967	KQ1904109-05	03/28/19 18:38	25.0	26.9	107	90-110
CCV2	629967	KQ1904109-06	03/28/19 23:48	25.0	26.0	104	90-110
CCV3	629967	KQ1904109-07	03/29/19 04:59	25.0	26.0	104	90-110
CCV4	629967	KQ1904109-08	03/29/19 09:43	25.0	26.3	105	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: ALS Houston DOD TOC
Service Request: K1902558

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	629967	KQ1904109-01	03/28/19 18:52	0.50	0.20	0.07	0.09	J
CCB2	629967	KQ1904109-02	03/29/19 00:03	0.50	0.20	0.07	ND	U
CCB3	629967	KQ1904109-03	03/29/19 05:14	0.50	0.20	0.07	ND	U
CCB4	629967	KQ1904109-04	03/29/19 09:58	0.50	0.20	0.07	ND	U

Raw Data

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General Chemistry

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Work Request # (Original ______) K1902469, 2514, 2526, 2558, 2567, 2603, 2607, 2623

Tier: II IV II IV II II I II

Date Analyzed: 3/28/19

Analyst: BCD

Run # TOC: 629966, 629967 DOC: 629968

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: K1902607-1/14 report on high %RSD. However, these samples are less than 5x the MRL.

Final Approved by: [signature] Date: 03/29/19

DQREPORT

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 629966 **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
K1902469-001	Carbon, Total Organic	N/A		Water	3.83 mg/L	10 ml	3.83 mg/L	1	0.07	0.50			3/28/19 19:07	N	II
K1902469-002	Carbon, Total Organic	N/A		Water	7.70 mg/L	10 ml	7.70 mg/L	1	0.07	0.50			3/28/19 19:35	N	II
K1902469-003	Carbon, Total Organic	N/A		Water	6.83 mg/L	10 ml	6.83 mg/L	1	0.07	0.50			3/28/19 20:03	N	II
K1902469-004	Carbon, Total Organic	N/A		Water	3.65 mg/L	10 ml	3.65 mg/L	1	0.07	0.50			3/28/19 20:31	N	II
K1902469-005	Carbon, Total Organic	N/A		Water	7.13 mg/L	10 ml	7.13 mg/L	1	0.07	0.50			3/28/19 20:59	N	II
K1902469-006	Carbon, Total Organic	N/A		Water	6.53 mg/L	10 ml	6.53 mg/L	1	0.07	0.50			3/28/19 21:27	N	II
K1902514-001	Carbon, Total Organic	N/A		Water	0.33 mg/L	10 ml	0.33 mg/L J	1	0.07	0.50			3/28/19 16:16	Y	IV
K1902514-002	Carbon, Total Organic	N/A		Water	0.56 mg/L	10 ml	0.56 mg/L	1	0.07	0.50			3/28/19 17:13	N	IV
K1902514-003	Carbon, Total Organic	N/A		Water	0.21 mg/L	10 ml	0.21 mg/L J	1	0.07	0.50			3/28/19 17:41	N	IV
K1902514-004	Carbon, Total Organic	N/A		Water	0.36 mg/L	10 ml	0.36 mg/L J	1	0.07	0.50			3/28/19 18:09	N	IV
KQ1904107-01	Carbon, Total Organic	CCB		Water	0.10 mg/L	10 ml	0.10 mg/L J	1	0.07	0.50			3/28/19 14:49	N	IV
KQ1904107-02	Carbon, Total Organic	CCB		Water	0.09 mg/L	10 ml	0.09 mg/L J	1	0.07	0.50			3/28/19 18:52	N	IV
KQ1904107-03	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/29/19 00:03	N	IV
KQ1904107-04	Carbon, Total Organic	CCV		Water	26.99 mg/L	10 ml	27.0 mg/L	1			108		3/28/19 14:34	N	IV
KQ1904107-05	Carbon, Total Organic	CCV		Water	26.85 mg/L	10 ml	26.9 mg/L	1			108		3/28/19 18:38	N	IV
KQ1904107-06	Carbon, Total Organic	CCV		Water	25.98 mg/L	10 ml	26.0 mg/L	1			104		3/28/19 23:48	N	IV
KQ1904107-07	Carbon, Total Organic	MB		Water	0.10 mg/L	10 ml	0.10 mg/L J	1	0.07	0.50			3/28/19 15:04	N	IV
KQ1904107-08	Carbon, Total Organic	LCS		Water	27.22 mg/L	10 ml	27.2 mg/L	1	0.07	0.50	109		3/28/19 15:18	N	IV
KQ1904107-09	Carbon, Total Organic	MS	K1902514-001	Water	28.37 mg/L	10 ml	28.4 mg/L	1	0.07	0.50	112		3/28/19 16:44	N	IV
KQ1904107-10	Carbon, Total Organic	DUP	K1902514-001	Water	0.35 mg/L	10 ml	0.35 mg/L J	1	0.07	0.50		5	3/28/19 16:16	N	IV
KQ1904107-11	Carbon, Total Organic	DUP	K1902514-002	Water	0.51 mg/L	10 ml	0.51 mg/L	1	0.07	0.50		8	3/28/19 17:13	N	IV
KQ1904107-12	Carbon, Total Organic	DUP	K1902514-003	Water	0.21 mg/L	10 ml	0.21 mg/L J	1	0.07	0.50		1	3/28/19 17:41	N	IV
KQ1904107-13	Carbon, Total Organic	DUP	K1902514-004	Water	0.35 mg/L	10 ml	0.35 mg/L J	1	0.07	0.50		<1	3/28/19 18:09	N	IV
KQ1904107-14	Carbon, Total Organic	DUP	K1902469-001	Water	3.71 mg/L	10 ml	3.71 mg/L	1	0.07	0.50		3	3/28/19 19:07	N	II
KQ1904107-15	Carbon, Total Organic	DUP	K1902469-002	Water	7.63 mg/L	10 ml	7.63 mg/L	1	0.07	0.50		<1	3/28/19 19:35	N	II
KQ1904107-16	Carbon, Total Organic	DUP	K1902469-003	Water	6.77 mg/L	10 ml	6.77 mg/L	1	0.07	0.50		<1	3/28/19 20:03	N	II
KQ1904107-17	Carbon, Total Organic	DUP	K1902469-004	Water	3.53 mg/L	10 ml	3.53 mg/L	1	0.07	0.50		3	3/28/19 20:31	N	II
KQ1904107-18	Carbon, Total Organic	DUP	K1902469-005	Water	7.18 mg/L	10 ml	7.18 mg/L	1	0.07	0.50		<1	3/28/19 20:59	N	II
KQ1904107-19	Carbon, Total Organic	DUP	K1902469-006	Water	6.45 mg/L	10 ml	6.45 mg/L	1	0.07	0.50		1	3/28/19 21:27	N	II

03/29/19

# 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:** 629967 **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
K1902526-001	Carbon, Total Organic	N/A		Water	3.53 mg/L	10 ml	353 mg/L	100	7	50			3/28/19 22:52	N	II
K1902526-002	Carbon, Total Organic	N/A		Water	3.78 mg/L	10 ml	378 mg/L	100	7	50			3/28/19 23:20	N	II
K1902558-001	Carbon, Total Organic	N/A		Water	2.50 mg/L	10 ml	2.50 mg/L	1	0.07	0.50			3/28/19 22:24	N	IV
K1902567-001	Carbon, Total Organic	N/A		Ground Water	11.32 mg/L	10 ml	11.3 mg/L	1	0.07	0.50			3/29/19 00:47	N	II
K1902567-002	Carbon, Total Organic	N/A		Ground Water	3.20 mg/L	10 ml	3.20 mg/L	1	0.07	0.50			3/29/19 01:15	N	II
K1902567-003	Carbon, Total Organic	N/A		Ground Water	3.30 mg/L	10 ml	3.30 mg/L	1	0.07	0.50			3/29/19 01:43	N	II
K1902567-004	Carbon, Total Organic	N/A		Ground Water	1.33 mg/L	10 ml	1.33 mg/L	1	0.07	0.50			3/29/19 02:11	N	II
K1902567-005	Carbon, Total Organic	N/A		Ground Water	2.45 mg/L	10 ml	2.44 mg/L	1	0.07	0.50			3/29/19 03:07	N	II
K1902603-001	Carbon, Total Organic	N/A		Ground Water	3.10 mg/L	10 ml	3.10 mg/L	1	0.07	0.50			3/29/19 04:03	N	II
K1902603-002	Carbon, Total Organic	N/A		Ground Water	1.46 mg/L	10 ml	1.46 mg/L	1	0.07	0.50			3/29/19 05:28	N	II
K1902603-003	Carbon, Total Organic	N/A		Ground Water	1.61 mg/L	10 ml	1.61 mg/L	1	0.07	0.50			3/29/19 06:26	N	II
K1902603-004	Carbon, Total Organic	N/A		Ground Water	1.69 mg/L	10 ml	1.69 mg/L	1	0.07	0.50			3/29/19 06:54	N	II
KQ1904109-01	Carbon, Total Organic	CCB		Water	0.09 mg/L	10 ml	0.09 mg/L J	1	0.07	0.50			3/28/19 18:52	N	IV
KQ1904109-02	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/29/19 00:03	N	IV
KQ1904109-03	Carbon, Total Organic	CCB		Water	-0.07 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/29/19 05:14	N	IV
KQ1904109-04	Carbon, Total Organic	CCB		Water	-0.07 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/29/19 09:58	N	IV
KQ1904109-05	Carbon, Total Organic	CCV		Water	26.85 mg/L	10 ml	26.9 mg/L	1			108		3/28/19 18:38	N	IV
KQ1904109-06	Carbon, Total Organic	CCV		Water	25.98 mg/L	10 ml	26.0 mg/L	1			104		3/28/19 23:48	N	IV
KQ1904109-07	Carbon, Total Organic	CCV		Water	25.99 mg/L	10 ml	26.0 mg/L	1			104		3/29/19 04:59	N	IV
KQ1904109-08	Carbon, Total Organic	CCV		Water	26.27 mg/L	10 ml	26.3 mg/L	1			105		3/29/19 09:43	N	IV
KQ1904109-09	Carbon, Total Organic	LCS		Water	26.62 mg/L	10 ml	26.6 mg/L	1	0.07	0.50	106		3/29/19 00:32	N	IV
KQ1904109-10	Carbon, Total Organic	MB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/29/19 00:17	N	IV
KQ1904109-11	Carbon, Total Organic	MS	K1902603-002	Ground Water	29.33 mg/L	10 ml	29.3 mg/L	1	0.07	0.50	112		3/29/19 05:57	N	II
KQ1904109-12	Carbon, Total Organic	DUP	K1902558-001	Water	2.49 mg/L	10 ml	2.49 mg/L	1	0.07	0.50		<1	3/28/19 22:24	N	IV
KQ1904109-13	Carbon, Total Organic	DUP	K1902526-001	Water	3.48 mg/L	10 ml	348 mg/L	100	7	50		2	3/28/19 22:52	N	II
KQ1904109-14	Carbon, Total Organic	DUP	K1902526-002	Water	3.77 mg/L	10 ml	377 mg/L	100	7	50		<1	3/28/19 23:20	N	II
KQ1904109-15	Carbon, Total Organic	DUP	K1902567-001	Ground Water	11.24 mg/L	10 ml	11.2 mg/L	1	0.07	0.50		<1	3/29/19 00:47	N	II
KQ1904109-16	Carbon, Total Organic	DUP	K1902567-002	Ground Water	3.10 mg/L	10 ml	3.10 mg/L	1	0.07	0.50		3	3/29/19 01:15	N	II
KQ1904109-17	Carbon, Total Organic	DUP	K1902567-003	Ground Water	3.25 mg/L	10 ml	3.25 mg/L	1	0.07	0.50		1	3/29/19 01:43	N	II

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

03/29/19

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 629967 **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
KQ1904109-18	Carbon, Total Organic	DUP	K1902567-004	Ground Water	1.32 mg/L	10 ml	1.32 mg/L	1	0.07	0.50		<1	3/29/19 02:11	N	II
KQ1904109-19	Carbon, Total Organic	DUP	K1902567-005	Ground Water	2.37 mg/L	10 ml	2.37 mg/L	1	0.07	0.50		3	3/29/19 03:07	N	II
KQ1904109-20	Carbon, Total Organic	DUP	K1902603-001	Ground Water	3.04 mg/L	10 ml	3.04 mg/L	1	0.07	0.50		2	3/29/19 04:03	N	II
KQ1904109-21	Carbon, Total Organic	DUP	K1902603-002	Ground Water	1.46 mg/L	10 ml	1.46 mg/L	1	0.07	0.50		<1	3/29/19 05:28	N	II
KQ1904109-22	Carbon, Total Organic	DUP	K1902603-003	Ground Water	1.65 mg/L	10 ml	1.65 mg/L	1	0.07	0.50		2	3/29/19 06:26	N	II
KQ1904109-23	Carbon, Total Organic	DUP	K1902603-004	Ground Water	1.65 mg/L	10 ml	1.65 mg/L	1	0.07	0.50		3	3/29/19 06:54	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:** 629968 **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
K1902607-001	Carbon, Dissolved Organic (DOC)	N/A		Water	1.09 mg/L	10 ml	1.09 mg/L	1	0.07	0.50			3/29/19 08:46	N	I
K1902607-002	Carbon, Dissolved Organic (DOC)	N/A		Water	16.60 mg/L	10 ml	33.2 mg/L	2	0.2	1.0			3/29/19 10:42	N	I
K1902623-001	Carbon, Dissolved Organic (DOC)	N/A		Water	0.74 mg/L	10 ml	74 mg/L	100	7	50			3/29/19 11:10	N	II
K1902623-002	Carbon, Dissolved Organic (DOC)	N/A		Water	1.93 mg/L	10 ml	1.93 mg/L	1	0.07	0.50			3/29/19 12:06	N	II
KQ1904111-01	Carbon, Dissolved Organic (DOC)	CCB		Water	-0.07 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/29/19 05:14	N	I
KQ1904111-02	Carbon, Dissolved Organic (DOC)	CCB		Water	-0.07 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/29/19 09:58	N	I
KQ1904111-03	Carbon, Dissolved Organic (DOC)	CCB		Water	-0.04 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			3/29/19 13:17	N	I
KQ1904111-04	Carbon, Dissolved Organic (DOC)	CCV		Water	25.99 mg/L	10 ml	26.0 mg/L	1			104		3/29/19 04:59	N	I
KQ1904111-05	Carbon, Dissolved Organic (DOC)	CCV		Water	26.27 mg/L	10 ml	26.3 mg/L	1			105		3/29/19 09:43	N	I
KQ1904111-06	Carbon, Dissolved Organic (DOC)	CCV		Water	26.43 mg/L	10 ml	26.4 mg/L	1			106		3/29/19 13:02	N	I
KQ1904111-07	Carbon, Dissolved Organic (DOC)	MB		Water	-0.07 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			3/29/19 10:12:00	N	I
KQ1904111-08	Carbon, Dissolved Organic (DOC)	LCS		Water	26.73 mg/L	10 ml	26.7 mg/L	1	0.07	0.50	107		3/29/19 10:27	N	I
KQ1904111-09	Carbon, Dissolved Organic (DOC)	MS	K1902607-001	Water	29.41 mg/L	10 ml	29.4 mg/L	1	0.07	0.50	113		3/29/19 09:14	N	I
KQ1904111-10	Carbon, Dissolved Organic (DOC)	DUP	K1902607-001	Water	1.27 mg/L	10 ml	1.27 mg/L	1	0.07	0.50		15*	3/29/19 08:46	N	I
KQ1904111-11	Carbon, Dissolved Organic (DOC)	DUP	K1902607-002	Water	16.05 mg/L	10 ml	32.1 mg/L	2	0.2	1.0		3	3/29/19 10:42	N	I
KQ1904111-12	Carbon, Dissolved Organic (DOC)	DUP	K1902623-001	Water	0.76 mg/L	10 ml	76 mg/L	100	7	50		2	3/29/19 11:10	N	II
KQ1904111-13	Carbon, Dissolved Organic (DOC)	DUP	K1902623-002	Water	1.92 mg/L	10 ml	1.92 mg/L	1	0.07	0.50		<1	3/29/19 12:06	N	II

03/29/19

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

TOC: 629966,
629967
DOC: 629968

Schedule: 03282019

Version: 6
Instrument: Fusion1
Last Saved by: Fusion1 (Fusion1)
Last Saved on: 2019/03/29 10:38 - 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	H2SO4 W142572	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
4	Sample	K1902514-001.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
5	Sample	K1902514-001.05 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
6	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
7	Sample	K1902514-002.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
8	Sample	K1902514-003.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
9	Sample	K1902514-004.05	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	K1902469-001.16	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K1902469-002.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	K1902469-003.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	K1902469-004.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K1902469-005.16	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1902469-006.16	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1902558-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1902526-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	Sample	K1902526-002.01 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	K1902567-001.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K1902567-002.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	K1902567-003.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K1902567-004.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K1902567-005.03	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
27	Sample	K1902603-001.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
28	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
29	Sample	K1902603-002.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1902603-002.03 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
31	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
32	Sample	K1902603-003.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
33	Sample	K1902603-004.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
34	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
35	Sample	FB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
36	Sample	K1902607-001.03 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
37	Sample	K1902607-001.03 ms doc	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

03/29/19
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Schedule: 03282019

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	K1902607-002.03 doc 2x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
41	Sample	K1902623-001.07 doc 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
42	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
43	Sample	K1902623-002.07 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
44	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
					False	

Fusion Report - 03282019
Thursday, March 28, 2019 12:22 PM

(View - Reps, Unused Reps, Meta-Data, Signature, History)
Printed on 2019/03/29 13:37 - Friday

Report Summary Information

Company Location:	Gen Chem Lab
Schedule Name:	03282019
Instrument Name:	Fusion1
Report Version:	1 of 1
Report Creation by Operators (schedule version):	Fusion1 (Fusion1) (v2) Fusion1 (Fusion1) (v3) Fusion1 (Fusion1) (v4) Fusion1 (Fusion1) (v5) Fusion1 (Fusion1) (v6)
Comment:	

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

Report Results

03/29/19

Sample Type: Clean

From Schedule Version 2

	Pos	Analysis Type	Sample ID	Start Time
◈	(clean)		Clean	2019/03/28 12:22

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	12.77	15.74	2.97	49.67	05:24
2	TC Clean	5.47	8.34	2.86	49.86	07:16
3	TC Clean	2.02	5.15	3.13	50.03	03:57
4	TC Clean	1.43	4.57	3.14	50.04	03:56

Sample Type: Clean

From Schedule Version 3

	Pos	Analysis Type	Sample ID	Start Time
◈	(clean)		Clean	2019/03/28 12:48

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	10.76	13.67	2.90	49.66	05:24
2	TC Clean	3.58	6.55	2.98	50.02	04:05
3	TC Clean	1.57	4.51	2.94	50.03	03:48

4	TC Clean	1.27	4.29	3.02	50.01	03:56

Sample Type: Clean From Schedule Version 4

	Pos	Analysis Type	Sample ID	Start Time
◈	(clean)		Clean	2019/03/28 13:20

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	10.78	13.56	2.78	49.70	05:25
2	TC Clean	4.15	7.11	2.95	50.00	04:05
3	TC Clean	1.96	4.96	3.00	50.00	03:48
4	TC Clean	1.27	4.27	3.00	50.03	03:56

Sample Type: Blank (Creating v1240) From Schedule Version 4

	Pos	Analysis Type	Sample ID	Start Time
◈	(blank)		Reagent/Acid Blank	2019/03/28 13:42

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.65	3.57	2.91	49.63	05:24
2	TC Clean	3.66	6.78	3.12	50.02	04:06
3	TC Clean	2.11	5.18	3.07	50.01	03:58
4	TC Clean	1.45	4.47	3.01	50.04	03:55
5	Reagent Blank	7.18	9.96	2.77	49.83	08:13
6	Acid Blank	1.31	4.25	2.94	49.74	05:33

Sample Type: Sample From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	D	TOC	RB	0.5296 ppm	0.0000 ppm	0.0000%	2019/03/28 14:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5296	5.2960	12.59	15.63	3.04	50.04	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	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)	27.0597 ppm (PASS)	0.0000 ppm	0%	2019/03/28 14:34

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	27.0597	270.5968	193.14	196.16	3.02	50.04	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 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)	0.1693 ppm (PASS)	0.0000 ppm	0%	2019/03/28 14:49

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.1693	1.6935	10.61	13.62	3.00	50.02	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample

From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	1	TOC	MB1	0.1693 ppm	0.0000 ppm	0.0000%	2019/03/28 15:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1693	1.6926	10.14	12.87	2.72	50.00	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	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)	27.2866 ppm (PASS)	0.0000 ppm	0%	2019/03/28 15:18

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	27.2866	272.8655	194.68	197.53	2.85	49.98	10:29

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 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	2	TOC	ICS	0.5331 ppm	0.0000 ppm	0.0000%	2019/03/28 15:33

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5331	5.3314	12.61	15.59	2.97	49.96	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	3	TOC	H2SO4 W142572	0.3003 ppm	0.0120 ppm	3.9900%	2019/03/28 15:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2918	2.9183	10.98	13.78	2.80	49.93	10:26
2	TOC	0.3088	3.0877	11.09	13.91	2.82	49.96	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	4	TOC	K1902514-001.05	0.4081 ppm	0.0110 ppm	2.7100%	2019/03/28 16:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4003	4.0025	11.71	14.55	2.83	49.90	10:25
2	TOC	0.4159	4.1587	11.82	14.78	2.96	49.88	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	5	TOC	K1902514-001.05 ms	28.4356 ppm	0.0000 ppm	0.0000%	2019/03/28 16:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	28.4356	284.3556	202.01	205.02	3.01	49.86	10:32

Dilution	Blank Contribution	Method	Calibration

1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	6	TOC	RB	0.3207 ppm	0.0000 ppm	0.0000%	2019/03/28 16:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3207	3.2070	11.17	14.08	2.91	49.90	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Sample From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	7	TOC	K1902514-002.05	0.6042 ppm	0.0301 ppm	4.9800%	2019/03/28 17:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6255	6.2551	13.24	16.17	2.93	49.81	10:27
2	TOC	0.5829	5.8293	12.95	15.87	2.92	49.82	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	8	TOC	K1902514-003.05	0.2805 ppm	0.0019 ppm	0.6700%	2019/03/28 17:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2792	2.7916	10.89	13.82	2.93	49.85	10:29
2	TOC	0.2818	2.8181	10.91	13.94	3.04	49.71	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	9	TOC	K1902514-004.05	0.4246 ppm	0.0015 ppm	0.3400%	2019/03/28 18:09

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4256	4.2559	11.88	14.84	2.96	49.79	10:29
2	TOC	0.4235	4.2353	11.87	14.76	2.89	49.79	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	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)	26.9205 ppm (PASS)	0.0000 ppm	0%	2019/03/28 18:38

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	26.9205	269.2046	192.20	195.11	2.92	49.79	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 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)	0.1587 ppm (PASS)	0.0000 ppm	0%	2019/03/28 18:52

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.1587	1.5874	10.54	13.59	3.05	49.79	10:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	10	TOC	K1902469-001.16	3.8357 ppm	0.0843 ppm	2.2000%	2019/03/28 19:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.8953	38.9527	35.44	38.16	2.73	49.80	10:31
2	TOC	3.7761	37.7609	34.63	37.52	2.90	49.82	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	11	TOC	K1902469-002.15	7.7316 ppm	0.0454 ppm	0.5900%	2019/03/28 19:35

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.7638	77.6375	61.70	64.74	3.05	49.85	10:26
2	TOC	7.6995	76.9952	61.26	64.12	2.86	49.87	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	12	TOC	K1902469-003.15	6.8677 ppm	0.0418 ppm	0.6100%	2019/03/28 20:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.8972	68.9722	55.81	58.63	2.82	49.88	10:26
2	TOC	6.8381	68.3814	55.41	58.28	2.86	49.92	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	13	TOC	K1902469-004.15	3.6574 ppm	0.0881 ppm	2.4100%	2019/03/28 20:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.7197	37.1967	34.24	37.13	2.88	49.94	10:28
2	TOC	3.5950	35.9504	33.40	36.42	3.02	49.96	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	14	TOC	K1902469-005.16	7.2204 ppm	0.0342 ppm	0.4700%	2019/03/28 20:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.1963	71.9628	57.84	60.75	2.90	49.99	10:26
2	TOC	7.2446	72.4460	58.17	61.12	2.95	50.02	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	15	TOC	K1902469-006.16	6.5588 ppm	0.0523 ppm	0.8000%	2019/03/28 21:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.5958	65.9580	53.77	56.71	2.95	50.03	10:28
2	TOC	6.5218	65.2184	53.26	56.21	2.95	50.08	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	16	TOC	RB	0.1506 ppm	0.0436 ppm	28.9800%	2019/03/28 21:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1198	1.1976	9.81	12.79	2.98	50.10	10:29
2	TOC	0.1815	1.8148	10.23	13.03	2.80	50.12	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	17	TOC	K1902558-001.01	2.5634 ppm	0.0089 ppm	0.3500%	2019/03/28 22:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.5697	25.6969	26.44	29.30	2.86	50.15	10:27
2	TOC	2.5572	25.5717	26.35	29.31	2.95	50.17	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	18	TOC	K1902526-001.01 100x	3.5724 ppm	0.0395 ppm	1.1100%	2019/03/28 22:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.6003	36.0034	33.43	36.40	2.97	50.17	10:27
2	TOC	3.5445	35.4451	33.06	36.09	3.03	50.20	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	19	TOC	K1902526-002.01 100x	3.8439 ppm	0.0019 ppm	0.0500%	2019/03/28 23:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.8452	38.4519	35.10	38.10	3.00	50.23	10:26
2	TOC	3.8425	38.4253	35.08	38.06	2.99	50.20	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	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)	26.0455 ppm (PASS)	0.0000 ppm	0%	2019/03/28 23:48

Pos	Base Analysis	ID	Rep	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run

	Type		#							Time
B	TOC	25 ppm	1	26.0455	260.4553	186.26	189.19	2.93	50.24	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 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)	0.0671 ppm (PASS)	0.0000 ppm	0%	2019/03/29 00:03

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0671	0.6711	9.92	12.89	2.97	50.26	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample From Schedule Version 5

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	20	TOC	MB2	0.0704 ppm	0.0000 ppm	0.0000%	2019/03/29 00:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0704	0.7040	9.47	12.51	3.04	50.23	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	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)	26.6903 ppm (PASS)	0.0000 ppm	0%	2019/03/29 00:32

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	26.6903	266.9035	190.64	193.77	3.14	50.23	10:33

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	K1902567-001.03	11.3478 ppm	0.0566 ppm	0.5000%	2019/03/29 00:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	11.3878	113.8783	86.29	89.36	3.06	50.27	10:26
2	TOC	11.3078	113.0783	85.75	88.77	3.02	50.24	10:23

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	22	TOC	K1902567-002.03	3.2184 ppm	0.0726 ppm	2.2600%	2019/03/29 01:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.2698	32.6975	31.19	34.11	2.92	50.26	10:29
2	TOC	3.1671	31.6707	30.49	33.44	2.95	50.28	10:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	23	TOC	K1902567-003.03	3.3409 ppm	0.0346 ppm	1.0400%	2019/03/29 01:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.3654	33.6536	31.84	34.76	2.92	50.23	10:31
2	TOC	3.3165	33.1645	31.51	34.40	2.89	50.22	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	24	TOC	K1902567-004.03	1.3922 ppm	0.0033 ppm	0.2400%	2019/03/29 02:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.3945	13.9452	18.46	21.31	2.85	50.27	10:30
2	TOC	1.3898	13.8980	18.43	21.34	2.92	50.25	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	25	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/03/29 02:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time

1	TOC	0.0000	0.0000	8.82	11.77	2.95	50.26	10:27
2	TOC	0.0000	0.0000	8.84	11.82	2.98	50.30	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	26	TOC	K1902567-005.03	2.4650 ppm	0.0327 ppm	1.3300%	2019/03/29 03:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.5137	25.1371	26.06	28.90	2.84	50.28	10:27
2	TOC	2.4434	24.4344	25.58	28.53	2.95	50.30	10:24
3	TOC	2.4492	24.4918	25.62	28.78	3.16	50.31	10:30
4	TOC	2.4536	24.5360	25.65	28.58	2.93	50.29	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	27	TOC	K1902603-001.03	3.1388 ppm	0.0402 ppm	1.2800%	2019/03/29 04:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.1672	31.6722	30.49	33.41	2.92	50.31	10:30
2	TOC	3.1104	31.1035	30.11	33.07	2.96	50.30	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	28	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/03/29 04:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.62	11.73	3.10	50.30	10:28
2	TOC	0.0000	0.0000	8.78	11.76	2.98	50.32	10:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	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)	26.0566 ppm (PASS)	0.0000 ppm	0%	2019/03/29 04:59

	Base		Rep							Run

Pos	Analysis Type	ID	#	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Time
B	TOC	25 ppm	1	26.0566	260.5658	186.33	189.40	3.06	50.33	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 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%	2019/03/29 05:14

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	9.26	12.30	3.04	50.31	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
◈	29	TOC	K1902603-002.03	1.5256 ppm	0.0021 ppm	0.1400%	2019/03/29 05:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5271	15.2710	19.36	22.47	3.11	50.32	10:29
2	TOC	1.5242	15.2416	19.34	22.44	3.10	50.34	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	30	TOC	K1902603-002.03 ms	29.4024 ppm	0.0000 ppm	0.0000%	2019/03/29 05:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	29.4024	294.0242	208.58	211.47	2.89	50.36	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	31	TOC	RB	0.1231 ppm	0.0000 ppm	0.0000%	2019/03/29 06:11

Rep	Base	ppm	µg	Adjusted	NDIR (Abs)	Baseline	Pressure	Run

#	Analysis Type			(Abs)		(Abs)	(psig)	Time
1	TOC	0.1231	1.2314	9.83	12.73	2.90	50.39	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	32	TOC	K1902603-003.03	1.7012 ppm	0.0280 ppm	1.6500%	2019/03/29 06:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.6813	16.8135	20.41	23.51	3.10	50.30	10:26
2	TOC	1.7210	17.2098	20.68	23.66	2.98	50.23	10:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	33	TOC	K1902603-004.03	1.7390 ppm	0.0300 ppm	1.7300%	2019/03/29 06:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.7602	17.6016	20.94	23.65	2.71	50.22	10:26
2	TOC	1.7177	17.1774	20.66	23.64	2.99	50.18	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	34	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/03/29 07:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.75	11.63	2.88	50.14	10:30
2	TOC	0.0000	0.0000	8.46	11.37	2.91	50.13	10:27
3	TOC	0.0000	0.0000	8.56	11.44	2.89	50.13	10:29
4	TOC	0.0000	0.0000	8.53	11.42	2.89	50.08	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	35	TOC	FB	0.0297 ppm	0.0175 ppm	58.8400%	2019/03/29 08:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0421	0.4212	9.28	12.01	2.73	49.99	10:31
2	TOC	0.0174	0.1737	9.11	11.94	2.83	50.08	10:24

Dilution	Blank Contribution	Method	Calibration

1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	36	TOC	K1902607-001.03 doc	1.2481 ppm	0.1250 ppm	10.0200%	2019/03/29 08:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.1597	11.5969	16.87	19.76	2.90	50.15	10:27
2	TOC	1.3365	13.3647	18.07	21.09	3.02	50.23	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	37	TOC	K1902607-001.03 ms doc	29.4740 ppm	0.0000 ppm	0.0000%	2019/03/29 09:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	29.4740	294.7402	209.06	212.00	2.94	50.26	10:33

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	38	TOC	RB	0.1616 ppm	0.0000 ppm	0.0000%	2019/03/29 09:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1616	1.6159	10.09	13.05	2.96	50.28	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	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)	26.3431 ppm (PASS)	0.0000 ppm	0%	2019/03/29 09:43

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	26.3431	263.4312	188.28	191.09	2.81	50.26	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 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%	2019/03/29 09:58

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	9.36	12.36	3.00	50.26	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 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%	2019/03/29 10:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.76	11.71	2.95	50.24	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	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)	26.7989 ppm (PASS)	0.0000 ppm	0%	2019/03/29 10:27

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	26.7989	267.9892	191.37	194.35	2.98	50.25	10:29

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 6

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	40	TOC	K1902607-002.03 doc 2x	16.3952 ppm	0.3933 ppm	2.4000%	2019/03/29 10:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time

1	TOC	16.6734	166.7338	122.17	125.20	3.02	50.23	10:29
2	TOC	16.1171	161.1710	118.40	121.48	3.08	50.19	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	41	TOC	K1902623-001.07 doc 100x	0.8175 ppm	0.0091 ppm	1.1100%	2019/03/29 11:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8111	8.1113	14.50	17.48	2.98	50.19	10:26
2	TOC	0.8239	8.2395	14.59	17.54	2.95	50.15	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	42	TOC	RB	0.1606 ppm	0.0653 ppm	40.6600%	2019/03/29 11:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1145	1.1445	9.77	12.62	2.85	50.15	10:26
2	TOC	0.2068	2.0682	10.40	13.47	3.07	50.15	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	43	TOC	K1902623-002.07 doc	1.9932 ppm	0.0042 ppm	0.2100%	2019/03/29 12:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.9962	19.9617	22.54	25.71	3.17	50.14	10:27
2	TOC	1.9903	19.9028	22.50	25.48	2.98	50.16	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	44	TOC	RB	0.0225 ppm	0.0318 ppm	141.4200%	2019/03/29 12:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.86	11.78	2.92	50.17	10:28
2	TOC	0.0449	0.4492	9.30	12.23	2.93	50.16	10:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9951 (IC) (v1240)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 6

	Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◈	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	26.4972 ppm (PASS)	0.0000 ppm	0%	2019/03/29 13:02

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	26.4972	264.9721	189.32	192.19	2.87	50.13	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 6

	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)	0.0300 ppm (PASS)	0.0000 ppm	0%	2019/03/29 13:17

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0300	0.2998	9.67	12.46	2.79	50.12	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

Meta Data Used in this Report

Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1239	1.1963	1.0700	0.0000	0.0000	0.0000	2019/03/26 13:09	Fusion1 (Fusion1)
v1240	2.3943	1.3110	0.0000	0.0000	0.0000	2019/03/28 14:20	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
SampleVolume	10.0 mL
Dilution	1:10
AcidVolume	0.5 ml
ReagentVolume	2.0 ml
UVReactorPrerinse	Off
UVReactorPrerinseVolume	5.0
NumberOfUVReactorPrerinses	1
ICSpargeTime	1.00 mins
DetectorSweepFlow	500 ml/min
PreSpargeTime	2.00 mins
SystemFlow	500 ml/min

Advanced Parameter	Value
NeedleRinseVolume	5.0 ml
VialPrimeVolume	2.0 ml
ICSamplePrimeVolume	2.0 ml
ICSpargeRinseVolume	12.0 ml
BaselineStabilizeTime	0.70 min
DetectorPressureFlow	150 ml/min
SyringeSpeedWaste	10
SyringeSpeedAcid	7
SyringeSpeedReagent	7
SyringeSpeedDIWater	7
NDIRPressurization	60 psig
SyringeSpeedSampleDispense	5
SyringeSpeedSampleAspirate	4
SyringeSpeedUVDispense	5
SyringeSpeedUVAspirate	5
SyringeSpeedICDispense	5
SyringeSpeedICAspirate	5
NDIRPressureStabilize	1.75 min
SampleMixing	Off
SampleMixingCycles	1
SampleMixingVolume	10.0
LowLevelFilterNDIR	Off

Acceptance / Approval

Electronic Signatures

Report Version	User Name	Acceptance	Reason	Date

Report History

Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/03/29 13:33

ALS Environmental

StarLIMS Run: 629966, 629967, 629968

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-05-70O 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-77E

21 % H3PO4: 11-GEN-05-77A

Equipment ID: K-TOC-03

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

FILTER ID: NA

CBA: 0.06875

Analyzed By: BCD	Date Analyzed: 3/28/19
Reviewed By: [signature]	Date Reviewed: 03/29/19

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
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April 03, 2019

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

Work Order: **HS19031189**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia,

ALS Environmental received 2 sample(s) on Mar 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: DAYNA.FISHER
RJ Modashia
Project Manager

ALS Houston, US Date: 03-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
Work Order: HS19031189

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19031189-01	LH18/24-SP650_032119	Water		21-Mar-2019 14:00	22-Mar-2019 08:52	☐
HS19031189-02	Trip Blank	Water	ALS-022719-71	21-Mar-2019 00:00	22-Mar-2019 08:52	☐

ALS Houston, US Date: 03-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
Work Order: HS19031189

CASE NARRATIVE

GCMS Volatiles by Method SW8260

Batch ID: R335378

Sample ID: CCV_END

- Benzene and Toluene exceeded %D recoveries for closing CCV due to carryover from previous sample .

Sample ID: HS19031013-07MS

- MS and MSD are for an unrelated sample

Sample ID: VLCSW-190326

- 1,2,4_Trimethyl benzene exceeded QC limits for LCS. CCV is OK.

WetChemistry by Method SW9056

Batch ID: R335875

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

ALS Houston, US Date: 03-Apr-19

Client:	Bhate Environmental Associates, Inc.	**ANALYTICAL REPORT**
Project:	Longhorn GW Treatment Plant	WorkOrder:HS19031189
Sample ID:	LH18/24-SP650_032119	Lab ID:HS19031189-01
Collection Date:	21-Mar-2019 14:00	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	26-Mar-2019 20:42
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 20:42
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	26-Mar-2019 20:42
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	26-Mar-2019 20:42
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 20:42
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	26-Mar-2019 20:42
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	26-Mar-2019 20:42
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	26-Mar-2019 20:42
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42

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

ALS Houston, US Date: 03-Apr-19

ANALYTICAL REPORT

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
Sample ID: LH18/24-SP650_032119
Collection Date: 21-Mar-2019 14:00

WorkOrder:HS19031189
Lab ID:HS19031189-01
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	26-Mar-2019 20:42
cis-1,2-Dichloroethene	**1.8**		**0.20**	**0.50**	**1.0**	**UG/L**	1	26-Mar-2019 20:42
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	26-Mar-2019 20:42
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	26-Mar-2019 20:42
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	26-Mar-2019 20:42
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 20:42
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Trichloroethene	**0.71**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	26-Mar-2019 20:42
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 20:42
Surr: 1,2-Dichloroethane-d4	*90.5*			**0**	*81-118*	*%REC*	*1*	*26-Mar-2019 20:42*
Surr: 4-Bromofluorobenzene	*97.6*			**0**	*85-114*	*%REC*	*1*	*26-Mar-2019 20:42*
Surr: Dibromofluoromethane	*92.4*			**0**	*80-119*	*%REC*	*1*	*26-Mar-2019 20:42*
Surr: Toluene-d8	*108*			**0**	*89-112*	*%REC*	*1*	*26-Mar-2019 20:42*
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**314**		**2.00**	**5.00**	**5.00**	**mg/L**	10	03-Apr-2019 03:29
Sulfate	**26.8**		**2.00**	**5.00**	**5.00**	**mg/L**	10	03-Apr-2019 03:29

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

ALS Houston, US Date: 03-Apr-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	Longhorn GW Treatment Plant	WorkOrder:	HS19031189
Sample ID:	Trip Blank	Lab ID:	HS19031189-02
Collection Date:	21-Mar-2019 00:00	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	26-Mar-2019 15:51
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 15:51
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	26-Mar-2019 15:51
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	26-Mar-2019 15:51
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 15:51
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	26-Mar-2019 15:51
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	26-Mar-2019 15:51
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	26-Mar-2019 15:51
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51

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

ALS Houston, US Date: 03-Apr-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	Longhorn GW Treatment Plant		WorkOrder:HS19031189
Sample ID:	Trip Blank		Lab ID:HS19031189-02
Collection Date:	21-Mar-2019 00:00		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	26-Mar-2019 15:51
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	26-Mar-2019 15:51
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	26-Mar-2019 15:51
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	26-Mar-2019 15:51
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Mar-2019 15:51
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	26-Mar-2019 15:51
Surr: 1,2-Dichloroethane-d4	*90.9*			**0**	*81-118*	*%REC*	*1*	*26-Mar-2019 15:51*
Surr: 4-Bromofluorobenzene	*97.8*			**0**	*85-114*	*%REC*	*1*	*26-Mar-2019 15:51*
Surr: Dibromofluoromethane	*91.1*			**0**	*80-119*	*%REC*	*1*	*26-Mar-2019 15:51*
Surr: Toluene-d8	*107*			**0**	*89-112*	*%REC*	*1*	*26-Mar-2019 15:51*

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

ALS Houston, US Date: 03-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
WorkOrder: HS19031189

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R335378	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C			**Matrix:** Water		
HS19031189-01	LH18/24-SP650_032119	21 Mar 2019 14:00			26 Mar 2019 20:42	1
HS19031189-02	Trip Blank	21 Mar 2019 00:00			26 Mar 2019 15:51	1
Batch ID R335875	**Test Name :** ANIONS BY SW9056A			**Matrix:** Water		
HS19031189-01	LH18/24-SP650_032119	21 Mar 2019 14:00			03 Apr 2019 03:29	10

ALS Houston, US Date: 03-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
WorkOrder: HS19031189

QC BATCH REPORT NEW

Batch ID: R335378 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-190325** Units: **UG/L** Analysis Date: **26-Mar-2019 15:03**
Client ID: Run ID: **VOA6_335378** SeqNo: **5008738** 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	2.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U
Bromomethane	0.50	1.0								U

ALS Houston, US Date: 03-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
WorkOrder: HS19031189

QC BATCH REPORT NEW

Batch ID: R335378 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-190325** Units: **UG/L** Analysis Date: **26-Mar-2019 15:03**
Client ID: Run ID: **VOA6_335378** SeqNo: **5008738** 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	0.50	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	*45.09*	*1.0*	*50*	*0*	*90.2*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*48.89*	*1.0*	*50*	*0*	*97.8*	*85 - 114*				
Surr: Dibromofluoromethane	*45.31*	*1.0*	*50*	*0*	*90.6*	*80 - 119*				
Surr: Toluene-d8	*52.99*	*1.0*	*50*	*0*	*106*	*89 - 112*				

ALS Houston, US Date: 03-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
WorkOrder: HS19031189

QC BATCH REPORT NEW

Batch ID: R335378 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-190326** Units: **UG/L** Analysis Date: **26-Mar-2019 13:26**
Client ID: Run ID: **VOA6_335378** SeqNo: **5008736** 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	59.18	1.0	50	0	118	78 - 124				
1,1,1-Trichloroethane	49.91	1.0	50	0	99.8	74 - 131				
1,1,2,2-Tetrachloroethane	56.51	1.0	50	0	113	71 - 121				
1,1,2-Trichloroethane	56.76	1.0	50	0	114	80 - 119				
1,1-Dichloroethane	48.82	1.0	50	0	97.6	77 - 125				
1,1-Dichloroethene	48.97	1.0	50	0	97.9	71 - 131				
1,1-Dichloropropene	50.25	1.0	50	0	100	78 - 125				
1,2,3-Trichlorobenzene	62.38	1.0	50	0	125	69 - 129				
1,2,3-Trichloropropane	60.16	1.0	50	0	120	73 - 122				
1,2,4-Trichlorobenzene	62.08	1.0	50	0	124	69 - 130				
1,2,4-Trimethylbenzene	62.05	1.0	50	0	124	76 - 124				S
1,2-Dibromo-3-chloropropane	60.85	1.0	50	0	122	62 - 128				
1,2-Dibromoethane	59.41	1.0	50	0	119	77 - 121				
1,2-Dichlorobenzene	57.13	1.0	50	0	114	80 - 119				
1,2-Dichloroethane	53.57	1.0	50	0	107	73 - 128				
1,2-Dichloropropane	52.36	1.0	50	0	105	78 - 122				
1,3,5-Trimethylbenzene	60.55	1.0	50	0	121	75 - 124				
1,3-Dichlorobenzene	57.8	1.0	50	0	116	80 - 119				
1,3-Dichloropropane	57.1	1.0	50	0	114	80 - 119				
1,4-Dichlorobenzene	56.85	1.0	50	0	114	79 - 118				
2,2-Dichloropropane	51.22	1.0	50	0	102	60 - 139				
2-Butanone	109.7	2.0	100	0	110	56 - 143				
2-Chlorotoluene	56	1.0	50	0	112	79 - 122				
2-Hexanone	117.1	2.0	100	0	117	57 - 139				
4-Chlorotoluene	57.36	1.0	50	0	115	78 - 122				
4-Isopropyltoluene	60.43	1.0	50	0	121	77 - 127				
4-Methyl-2-pentanone	115.8	2.0	100	0	116	67 - 130				
Acetone	104.5	2.0	100	0	104	39 - 160				
Benzene	54.3	1.0	50	0	109	79 - 120				
Bromobenzene	59.62	1.0	50	0	119	80 - 120				
Bromochloromethane	51.72	1.0	50	0	103	78 - 123				
Bromodichloromethane	56.5	1.0	50	0	113	79 - 125				
Bromoform	60.49	1.0	50	0	121	66 - 130				
Bromomethane	52.77	1.0	50	0	106	53 - 141				

ALS Houston, US Date: 03-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
WorkOrder: HS19031189

QC BATCH REPORT NEW

Batch ID: R335378 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-190326** Units: **UG/L** Analysis Date: **26-Mar-2019 13:26**
Client ID: Run ID: **VOA6_335378** SeqNo: **5008736** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	94.6	2.0	100	0	94.6	64 - 133				
Carbon tetrachloride	55.46	1.0	50	0	111	72 - 136				
Chlorobenzene	54.64	1.0	50	0	109	82 - 118				
Chloroethane	47.94	1.0	50	0	95.9	60 - 138				
Chloroform	50.48	1.0	50	0	101	79 - 124				
Chloromethane	51.79	1.0	50	0	104	50 - 139				
cis-1,2-Dichloroethene	50.02	1.0	50	0	100	78 - 123				
cis-1,3-Dichloropropene	53.85	1.0	50	0	108	75 - 124				
Dibromochloromethane	59.63	1.0	50	0	119	74 - 126				
Dibromomethane	55.72	1.0	50	0	111	79 - 123				
Dichlorodifluoromethane	59.44	1.0	50	0	119	32 - 152				
Ethylbenzene	58.6	1.0	50	0	117	79 - 121				
Hexachlorobutadiene	62.03	1.0	50	0	124	66 - 134				
Isopropylbenzene	58.17	1.0	50	0	116	72 - 131				
m,p-Xylene	114.5	2.0	100	0	115	80 - 121				
Methylene chloride	50.68	2.0	50	0	101	74 - 124				
Naphthalene	63.48	1.0	50	0	127	61 - 128				
n-Butylbenzene	62.6	1.0	50	0	125	75 - 128				
n-Propylbenzene	58.67	1.0	50	0	117	76 - 126				
o-Xylene	56.01	1.0	50	0	112	78 - 122				
sec-Butylbenzene	58.01	1.0	50	0	116	77 - 126				
Styrene	59.49	1.0	50	0	119	78 - 123				
tert-Butylbenzene	57.39	1.0	50	0	115	78 - 124				
Tetrachloroethene	57.94	1.0	50	0	116	74 - 129				
Toluene	57.21	1.0	50	0	114	80 - 121				
trans-1,2-Dichloroethene	49.24	1.0	50	0	98.5	75 - 124				
trans-1,3-Dichloropropene	58.56	1.0	50	0	117	73 - 127				
Trichloroethene	51.9	1.0	50	0	104	79 - 123				
Trichlorofluoromethane	49.99	1.0	50	0	100.0	65 - 141				
Vinyl chloride	48.66	1.0	50	0	97.3	58 - 137				
Surr: 1,2-Dichloroethane-d4	*45.08*	*1.0*	*50*	*0*	*90.2*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49.32*	*1.0*	*50*	*0*	*98.6*	*85 - 114*				
Surr: Dibromofluoromethane	*46.14*	*1.0*	*50*	*0*	*92.3*	*80 - 119*				
Surr: Toluene-d8	*52.93*	*1.0*	*50*	*0*	*106*	*89 - 112*				

ALS Houston, US Date: 03-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
WorkOrder: HS19031189

QC BATCH REPORT NEW

Batch ID: R335378 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19031013-07MS** Units: **UG/L** Analysis Date: **26-Mar-2019 17:03**
Client ID: Run ID: **VOA6_335378** SeqNo: **5008743** 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	11.16	1.0	20	0	55.8	78 - 124				S
1,1,1-Trichloroethane	11.15	1.0	20	0	55.7	74 - 131				S
1,1,2,2-Tetrachloroethane	15.76	1.0	20	0	78.8	71 - 121				
1,1,2-Trichloroethane	53.04	1.0	20	37.94	75.5	80 - 119				S
1,1-Dichloroethane	185.5	1.0	20	186	-2.54	77 - 125				SO
1,1-Dichloroethene	1050	1.0	20	1097	-235	71 - 131				SEO
1,1-Dichloropropene	11.14	1.0	20	0	55.7	78 - 125				S
1,2,3-Trichlorobenzene	10.79	1.0	20	0	53.9	69 - 129				S
1,2,3-Trichloropropane	16.08	1.0	20	0	80.4	73 - 122				
1,2,4-Trichlorobenzene	10.13	1.0	20	0	50.7	69 - 130				S
1,2,4-Trimethylbenzene	11.2	1.0	20	0	56.0	76 - 124				S
1,2-Dibromo-3-chloropropane	19.5	1.0	20	0	97.5	62 - 128				
1,2-Dibromoethane	12.4	1.0	20	0	62.0	77 - 121				S
1,2-Dichlorobenzene	20.35	1.0	20	7.577	63.9	80 - 119				S
1,2-Dichloroethane	23.92	1.0	20	13.75	50.8	73 - 128				S
1,2-Dichloropropane	9.635	1.0	20	0	48.2	78 - 122				S
1,3,5-Trimethylbenzene	10.98	1.0	20	0	54.9	75 - 124				S
1,3-Dichlorobenzene	10.86	1.0	20	0	54.3	80 - 119				S
1,3-Dichloropropane	11.74	1.0	20	0	58.7	80 - 119				S
1,4-Dichlorobenzene	11.93	1.0	20	0	59.7	79 - 118				S
2,2-Dichloropropane	10.85	1.0	20	0	54.2	60 - 139				S
2-Butanone	33.46	2.0	40	0	83.6	56 - 143				
2-Chlorotoluene	10.92	1.0	20	0	54.6	79 - 122				S
2-Hexanone	38.21	2.0	40	0	95.5	57 - 139				
4-Chlorotoluene	10.67	1.0	20	0	53.4	78 - 122				S
4-Isopropyltoluene	10.47	1.0	20	0	52.3	77 - 127				S
4-Methyl-2-pentanone	35.59	2.0	40	0	89.0	67 - 130				
Acetone	31.41	2.0	40	0	78.5	39 - 160				
Benzene	13.32	1.0	20	3.04	51.4	79 - 120				S
Bromobenzene	11.36	1.0	20	0	56.8	80 - 120				S
Bromochloromethane	9.213	1.0	20	0	46.1	78 - 123				S
Bromodichloromethane	9.838	1.0	20	0	49.2	79 - 125				S
Bromoform	13.52	1.0	20	0	67.6	66 - 130				
Bromomethane	10.32	1.0	20	0	51.6	53 - 141				S

ALS Houston, US Date: 03-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
WorkOrder: HS19031189

QC BATCH REPORT NEW

Batch ID: R335378 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19031013-07MS** Units: **UG/L** Analysis Date: **26-Mar-2019 17:03**
Client ID: Run ID: **VOA6_335378** SeqNo: **5008743** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	23.57	2.0	40	0	58.9	64 - 133				S
Carbon tetrachloride	13.73	1.0	20	0	68.6	72 - 136				S
Chlorobenzene	10.51	1.0	20	0	52.6	82 - 118				S
Chloroethane	175	1.0	20	0	875	60 - 138				S
Chloroform	9.489	1.0	20	0	47.4	79 - 124				S
Chloromethane	7.613	1.0	20	0	38.1	50 - 139				S
cis-1,2-Dichloroethene	55.42	1.0	20	49.43	30.0	78 - 123				S
cis-1,3-Dichloropropene	9.595	1.0	20	0	48.0	75 - 124				S
Dibromochloromethane	11.47	1.0	20	0	57.4	74 - 126				S
Dibromomethane	10.62	1.0	20	0	53.1	79 - 123				S
Dichlorodifluoromethane	13.94	1.0	20	0	69.7	32 - 152				
Ethylbenzene	10.95	1.0	20	0	54.8	79 - 121				S
Hexachlorobutadiene	8.847	1.0	20	0	44.2	66 - 134				S
Isopropylbenzene	10.98	1.0	20	0	54.9	72 - 131				S
m,p-Xylene	21.6	2.0	40	0	54.0	80 - 121				S
Methylene chloride	9.478	2.0	20	0	47.4	74 - 124				S
Naphthalene	14.29	1.0	20	0	71.4	61 - 128				
n-Butylbenzene	9.619	1.0	20	0	48.1	75 - 128				S
n-Propylbenzene	11.04	1.0	20	0	55.2	76 - 126				S
o-Xylene	11.05	1.0	20	0	55.2	78 - 122				S
sec-Butylbenzene	10.57	1.0	20	0	52.8	77 - 126				S
Styrene	10.37	1.0	20	0	51.8	78 - 123				S
tert-Butylbenzene	11.34	1.0	20	0	56.7	78 - 124				S
Tetrachloroethene	12.65	1.0	20	0	63.3	74 - 129				S
Toluene	11.44	1.0	20	0	57.2	80 - 121				S
trans-1,2-Dichloroethene	14.44	1.0	20	4.915	47.6	75 - 124				S
trans-1,3-Dichloropropene	10.16	1.0	20	0	50.8	73 - 127				S
Trichloroethene	178.6	1.0	20	177.3	6.25	79 - 123				SO
Trichlorofluoromethane	13.2	1.0	20	0	66.0	65 - 141				
Vinyl chloride	61.81	1.0	20	53.81	40.0	58 - 137				S
Surr: 1,2-Dichloroethane-d4	*47.29*	*1.0*	*50*	*0*	*94.6*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*47.34*	*1.0*	*50*	*0*	*94.7*	*85 - 114*				
Surr: Dibromofluoromethane	*45.97*	*1.0*	*50*	*0*	*91.9*	*80 - 119*				
Surr: Toluene-d8	*54.67*	*1.0*	*50*	*0*	*109*	*89 - 112*				

ALS Houston, US Date: 03-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
WorkOrder: HS19031189

QC BATCH REPORT NEW

Batch ID: R335378 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19031013-07MSD** Units: **UG/L** Analysis Date: **26-Mar-2019 17:27**
Client ID: Run ID: **VOA6_335378** SeqNo: **5008744** 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	14.29	1.0	20	0	71.5	78 - 124	11.16	24.6	20	SR
1,1,1-Trichloroethane	13.73	1.0	20	0	68.7	74 - 131	11.15	20.7	20	SR
1,1,2,2-Tetrachloroethane	16.44	1.0	20	0	82.2	71 - 121	15.76	4.24	20	
1,1,2-Trichloroethane	66.89	1.0	20	37.94	145	80 - 119	53.04	23.1	20	SR
1,1-Dichloroethane	248.9	1.0	20	186	315	77 - 125	185.5	29.2	20	SREO
1,1-Dichloroethene	1262	1.0	20	1097	824	71 - 131	1050	18.3	20	SEO
1,1-Dichloropropene	13.99	1.0	20	0	70.0	78 - 125	11.14	22.7	20	SR
1,2,3-Trichlorobenzene	13.99	1.0	20	0	69.9	69 - 129	10.79	25.8	20	R
1,2,3-Trichloropropane	16.44	1.0	20	0	82.2	73 - 122	16.08	2.23	20	
1,2,4-Trichlorobenzene	13.67	1.0	20	0	68.3	69 - 130	10.13	29.7	20	SR
1,2,4-Trimethylbenzene	13.83	1.0	20	0	69.1	76 - 124	11.2	21	20	SR
1,2-Dibromo-3-chloropropane	18.23	1.0	20	0	91.1	62 - 128	19.5	6.76	20	
1,2-Dibromoethane	15.92	1.0	20	0	79.6	77 - 121	12.4	24.9	20	R
1,2-Dichlorobenzene	25.18	1.0	20	7.577	88.0	80 - 119	20.35	21.2	20	R
1,2-Dichloroethane	33.16	1.0	20	13.75	97.1	73 - 128	23.92	32.4	20	R
1,2-Dichloropropane	13.43	1.0	20	0	67.1	78 - 122	9.635	32.9	20	SR
1,3,5-Trimethylbenzene	13.61	1.0	20	0	68.1	75 - 124	10.98	21.4	20	SR
1,3-Dichlorobenzene	13.83	1.0	20	0	69.1	80 - 119	10.86	24.1	20	SR
1,3-Dichloropropane	14.82	1.0	20	0	74.1	80 - 119	11.74	23.2	20	SR
1,4-Dichlorobenzene	14.9	1.0	20	0	74.5	79 - 118	11.93	22.1	20	SR
2,2-Dichloropropane	13.44	1.0	20	0	67.2	60 - 139	10.85	21.4	20	R
2-Butanone	35.67	2.0	40	0	89.2	56 - 143	33.46	6.39	20	
2-Chlorotoluene	13.5	1.0	20	0	67.5	79 - 122	10.92	21.1	20	SR
2-Hexanone	38.9	2.0	40	0	97.2	57 - 139	38.21	1.77	20	
4-Chlorotoluene	13.3	1.0	20	0	66.5	78 - 122	10.67	22	20	SR
4-Isopropyltoluene	13.64	1.0	20	0	68.2	77 - 127	10.47	26.3	20	SR
4-Methyl-2-pentanone	37.71	2.0	40	0	94.3	67 - 130	35.59	5.77	20	
Acetone	31.97	2.0	40	0	79.9	39 - 160	31.41	1.77	20	
Benzene	17.94	1.0	20	3.04	74.5	79 - 120	13.32	29.6	20	SR
Bromobenzene	13.7	1.0	20	0	68.5	80 - 120	11.36	18.7	20	S
Bromochloromethane	13.51	1.0	20	0	67.5	78 - 123	9.213	37.8	20	SR
Bromodichloromethane	14.1	1.0	20	0	70.5	79 - 125	9.838	35.6	20	SR
Bromoform	16.39	1.0	20	0	82.0	66 - 130	13.52	19.2	20	
Bromomethane	13.02	1.0	20	0	65.1	53 - 141	10.32	23.1	20	R

ALS Houston, US Date: 03-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
WorkOrder: HS19031189

QC BATCH REPORT NEW

Batch ID: R335378 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19031013-07MSD** Units: **UG/L** Analysis Date: **26-Mar-2019 17:27**
Client ID: Run ID: **VOA6_335378** SeqNo: **5008744** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	29.42	2.0	40	0	73.5	64 - 133	23.57	22.1	20	R
Carbon tetrachloride	15.62	1.0	20	0	78.1	72 - 136	13.73	12.9	20	
Chlorobenzene	13.94	1.0	20	0	69.7	82 - 118	10.51	28	20	SR
Chloroethane	213.7	1.0	20	0	1070	60 - 138	175	19.9	20	SE
Chloroform	13.25	1.0	20	0	66.3	79 - 124	9.489	33.1	20	SR
Chloromethane	11.04	1.0	20	0	55.2	50 - 139	7.613	36.7	20	R
cis-1,2-Dichloroethene	77.1	1.0	20	49.43	138	78 - 123	55.42	32.7	20	SR
cis-1,3-Dichloropropene	13.7	1.0	20	0	68.5	75 - 124	9.595	35.2	20	SR
Dibromochloromethane	14.83	1.0	20	0	74.2	74 - 126	11.47	25.6	20	R
Dibromomethane	14.69	1.0	20	0	73.4	79 - 123	10.62	32.1	20	SR
Dichlorodifluoromethane	14.89	1.0	20	0	74.5	32 - 152	13.94	6.58	20	
Ethylbenzene	14.37	1.0	20	0	71.9	79 - 121	10.95	27	20	SR
Hexachlorobutadiene	12.89	1.0	20	0	64.4	66 - 134	8.847	37.2	20	SR
Isopropylbenzene	14.32	1.0	20	0	71.6	72 - 131	10.98	26.4	20	SR
m,p-Xylene	28.13	2.0	40	0	70.3	80 - 121	21.6	26.2	20	SR
Methylene chloride	13.2	2.0	20	0	66.0	74 - 124	9.478	32.8	20	SR
Naphthalene	16.74	1.0	20	0	83.7	61 - 128	14.29	15.8	20	
n-Butylbenzene	13.53	1.0	20	0	67.7	75 - 128	9.619	33.8	20	SR
n-Propylbenzene	13.92	1.0	20	0	69.6	76 - 126	11.04	23.1	20	SR
o-Xylene	14.08	1.0	20	0	70.4	78 - 122	11.05	24.1	20	SR
sec-Butylbenzene	13.79	1.0	20	0	68.9	77 - 126	10.57	26.5	20	SR
Styrene	13.9	1.0	20	0	69.5	78 - 123	10.37	29.1	20	SR
tert-Butylbenzene	13.72	1.0	20	0	68.6	78 - 124	11.34	19	20	S
Tetrachloroethene	15.63	1.0	20	0	78.1	74 - 129	12.65	21.1	20	R
Toluene	14.2	1.0	20	0	71.0	80 - 121	11.44	21.5	20	SR
trans-1,2-Dichloroethene	19.45	1.0	20	4.915	72.7	75 - 124	14.44	29.6	20	SR
trans-1,3-Dichloropropene	14.54	1.0	20	0	72.7	73 - 127	10.16	35.5	20	SR
Trichloroethene	235.7	1.0	20	177.3	292	79 - 123	178.6	27.6	20	SREO
Trichlorofluoromethane	14.65	1.0	20	0	73.2	65 - 141	13.2	10.4	20	
Vinyl chloride	74.06	1.0	20	53.81	101	58 - 137	61.81	18	20	
Surr: 1,2-Dichloroethane-d4	*46.8*	*1.0*	*50*	*0*	*93.6*	*81 - 118*	*47.29*	*1.04*	*20*	
Surr: 4-Bromofluorobenzene	*50.69*	*1.0*	*50*	*0*	*101*	*85 - 114*	*47.34*	*6.83*	*20*	
Surr: Dibromofluoromethane	*46.32*	*1.0*	*50*	*0*	*92.6*	*80 - 119*	*45.97*	*0.744*	*20*	
Surr: Toluene-d8	*50.95*	*1.0*	*50*	*0*	*102*	*89 - 112*	*54.67*	*7.05*	*20*	

ALS Houston, US Date: 03-Apr-19

Client:	Bhate Environmental Associates, Inc.	**QC BATCH REPORT NEW**
Project:	Longhorn GW Treatment Plant	
WorkOrder:	HS19031189	

Batch ID:	**R335378 (0)**	**Instrument:**	**VOA6**	**Method:**	**VOLATILES ORGANICS BY METHOD 8260C**

The following samples were analyzed in this batch: HS19031189-01 HS19031189-02

ALS Houston, US Date: 03-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: Longhorn GW Treatment Plant
WorkOrder: HS19031189

QC BATCH REPORT NEW

Batch ID: R335875 (0) **Instrument:** ICS2100 **Method:** ANIONS BY SW9056A

MBLK Sample ID: **WBLKW2-040219** Units: **mg/L** Analysis Date: **03-Apr-2019 01:16**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020414** 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: **WLCSW2-040219** Units: **mg/L** Analysis Date: **03-Apr-2019 01:31**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020415** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	20.22	0.500	20	0	101	80 - 120				
Sulfate	19.98	0.500	20	0	99.9	80 - 120				

LCSD Sample ID: **WLCSDW2-040219** Units: **mg/L** Analysis Date: **03-Apr-2019 01:46**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020416** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	18.95	0.500	20	0	94.8	80 - 120	20.22	6.51	20	
Sulfate	18.67	0.500	20	0	93.3	80 - 120	19.98	6.79	20	

MS Sample ID: **HS19031013-07MS** Units: **mg/L** Analysis Date: **03-Apr-2019 04:28**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020427** PrepDate: DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1535	25.0	500	1090	89.1	80 - 120				
Sulfate	1565	25.0	500	1119	89.2	80 - 120				

MSD Sample ID: **HS19031013-07MSD** Units: **mg/L** Analysis Date: **03-Apr-2019 04:43**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020428** PrepDate: DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1605	25.0	500	1090	103	80 - 120	1535	4.46	20	
Sulfate	1638	25.0	500	1119	104	80 - 120	1565	4.57	20	

The following samples were analyzed in this batch: HS19031189-01

ALS Houston, US Date: 03-Apr-19

Client:	Bhate Environmental Associates, Inc.
Project:	Longhorn GW Treatment Plant
WorkOrder:	**HS19031189**

QUALIFIERS, ACRONYMS, UNITS

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

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

Unit Reported	Description
mg/L	Milligrams per Liter

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
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: 03-Apr-19

Sample Receipt Checklist

Client Name:	Bhate Environmental	Date/Time Received:	**22-Mar-2019 08:52**
Work Order:	HS19031189	Received by:	**NDR**

Checklist completed by: *Paresh M. Giga* (eSignature) 22-Mar-2019 (Date)

Reviewed by: *Bernadette A. Fini* (eSignature) 25-Mar-2019 (Date)

Matrices: **Water** Carrier name: **FedEx**

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

Temperature(s)/Thermometer(s):	0.7c/0.7c U/c	IR11
Cooler(s)/Kit(s):	43950	
Date/Time sample(s) sent to storage:	3/22/19 19:30	

Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☐	N/A ☑

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd. Suite 210, Houston, Tx. 77099 ATTN: R.J. Modashia

Project: BHATE
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No. NWO1312.0150.016.0001

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								Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650_032119	Water	03/21/19 / 14:00		3	3									HCL	
LH18/24-SP650_032119	Water	03/21/19 / 14:00		1		1								NONE	
Trip Blank	Water	03/21/19		2	2									HCL	

HS19031189
Bhate Environmental Associates, Inc.
Longhorn GW Treatment Plant

Additional Remarks: **STANDARD TAT ON ALL PARAMETERS.**

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	03/21/19	14:30							NR	3/21/19	08:52

9For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks
43950 Temp uc 0.7
IR #4 11

(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly

00935646

ALS Environmental
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

43950

CUSTODY SEAL

Date: 3/21/19 Time: 1430
Name: Scott Beesinger
Company: BHATE

Seal Broken By: KM
Date: 03/22/19

43950 MAR 2 2 2019

Must Deliver Next Business Day
Time and Tempature Sensitive!

917 B03 1 10:30 A

ORIGIN ID:SGRA (303) 597-2450
SCOTT BEESINER
BHATE ENVIRONMENTAL ASSOCIATES
1203-B EAST GRAND AVE. PMB202

MARSHALL, TX 75670
UNITED STATES US

DIMS.

TO CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON TX 77099
(281) 530-5656
REF: LHAAP-58-BO 64113-RJ

RMA.

FedEx Express E

RETURNS MON-SAT

FedEx
TRK# 0221 4809 7831 3400

FRI - 22 MAR 10:30A
PRIORITY OVERNIGHT

AB SGRA

77099
TX-US
IAH

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

April 12, 2019

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

Work Order: **HS19031492**

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

Dear Marcia,

ALS Environmental received 2 sample(s) on Mar 28, 2019 for the analysis presented in the following report.

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

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

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

Sincerely,

Generated By: JUMOKE.LAWAL
RJ Modashia
Project Manager

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19031492

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19031492-01	LH18/24-SP650_032719	Water		27-Mar-2019 14:00	28-Mar-2019 08:30	☐
HS19031492-02	LH18/24-SP650_032719_BIX	Water		27-Mar-2019 14:00	28-Mar-2019 08:30	☐

ALS Houston, US Date: 12-Apr-19

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

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: R336046

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

WetChemistry by Method E365.3

Batch ID: R335561

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

ALS Houston, US

Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples		WorkOrder:HS19031492
Sample ID:	LH18/24-SP650_032719		Lab ID:HS19031492-01
Collection Date:	27-Mar-2019 14:00		Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
AMMONIA AS N BY E350.3(ISE)		**Method:E350.3**						Analyst: KVL
Nitrogen, Ammonia (As N)	**11**		**0.20**	**0.20**	**0.20**	**mg/L**	1	05-Apr-2019 11:45
ORTHO PHOSPHATE (PO4) AS P BY E365.3		**Method:E365.3**						Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	**2.42**		**0.100**	**0.250**	**0.250**	**mg/L**	10	29-Mar-2019 12:03
SUBCONTRACT ANALYSIS - TOC ANALYSIS		**Method:NA**						Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	05-Apr-2019 15:17

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

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples		WorkOrder:HS19031492
Sample ID:	LH18/24-SP650_032719_BIX		Lab ID:HS19031492-02
Collection Date:	27-Mar-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	12-Apr-2019 18:22

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

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031492

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R335561	**Test Name :** ORTHO PHOSPHATE (PO4) AS P BY E365.3			**Matrix:** Water		
HS19031492-01	LH18/24-SP650_032719	27 Mar 2019 14:00			29 Mar 2019 12:03	10
Batch ID R336046	**Test Name :** AMMONIA AS N BY E350.3(ISE)			**Matrix:** Water		
HS19031492-01	LH18/24-SP650_032719	27 Mar 2019 14:00			05 Apr 2019 11:45	1
Batch ID R336059	**Test Name :** SUBCONTRACT ANALYSIS - TOC ANALYSIS			**Matrix:** Water		
HS19031492-01	LH18/24-SP650_032719	27 Mar 2019 14:00			05 Apr 2019 15:17	1
Batch ID R336536	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			**Matrix:** Water		
HS19031492-02	LH18/24-SP650_032719_BIX	27 Mar 2019 14:00			12 Apr 2019 18:22	1

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031492

QC BATCH REPORT NEW

Batch ID: R335561 (0) **Instrument:** UV-2450 **Method:** ORTHO PHOSPHATE (PO4) AS P BY E365.3

MBLK Sample ID: **MBLK-335561** Units: **mg/L** Analysis Date: **29-Mar-2019 12:03**
Client ID: Run ID: **UV-2450_335561** SeqNo: **5012948** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	0.0250	0.0250								U

LCS Sample ID: **LCS-335561** Units: **mg/L** Analysis Date: **29-Mar-2019 12:03**
Client ID: Run ID: **UV-2450_335561** SeqNo: **5012949** 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)	0.252	0.0250	0.25	0	101	85 - 115				

MS Sample ID: **HS19031492-01MS** Units: **mg/L** Analysis Date: **29-Mar-2019 12:03**
Client ID: **LH18/24-SP650_032719** Run ID: **UV-2450_335561** SeqNo: **5012951** 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)	5.01	0.250	2.5	2.42	104	80 - 120				

MSD Sample ID: **HS19031492-01MSD** Units: **mg/L** Analysis Date: **29-Mar-2019 12:03**
Client ID: **LH18/24-SP650_032719** Run ID: **UV-2450_335561** SeqNo: **5012952** PrepDate: DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Phosphorus, Total Orthophosphate (As P)	4.89	0.250	2.5	2.42	98.8	80 - 120	5.01	2.42	20	

The following samples were analyzed in this batch: HS19031492-01

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031492

QC BATCH REPORT NEW

Batch ID: R336046 (0) **Instrument:** WetChem_HS **Method:** AMMONIA AS N BY E350.3(ISE)

MBLK Sample ID: **MBLK-R336046** Units: **mg/L** Analysis Date: **05-Apr-2019 11:45**
Client ID: Run ID: **WetChem_HS_336046** SeqNo: **5024111** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	0.20	0.20								U

LCS Sample ID: **LCS-R336046** Units: **mg/L** Analysis Date: **05-Apr-2019 11:45**
Client ID: Run ID: **WetChem_HS_336046** SeqNo: **5024110** 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)	10.1	0.20	10	0	101	85 - 115				

MS Sample ID: **HS19031533-01MS** Units: **mg/L** Analysis Date: **05-Apr-2019 11:45**
Client ID: Run ID: **WetChem_HS_336046** SeqNo: **5024113** 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)	15.09	0.20	10	4.085	110	80 - 120				

MSD Sample ID: **HS19031533-01MSD** Units: **mg/L** Analysis Date: **05-Apr-2019 11:45**
Client ID: Run ID: **WetChem_HS_336046** SeqNo: **5024112** 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)	14.88	0.20	10	4.085	108	80 - 120	15.09	1.4	20	

The following samples were analyzed in this batch: HS19031492-01

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.	**QUALIFIERS, ACRONYMS, UNITS**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	**HS19031492**	

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

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

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
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: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19031492

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19031492-01	LH18/24-SP650_032719	Login	3/29/2019 7:48:43 AM	JRM	WET069
HS19031492-01	LH18/24-SP650_032719	Login	3/29/2019 7:48:43 AM	JRM	WET069
HS19031492-01	LH18/24-SP650_032719	Login	3/29/2019 7:48:43 AM	JRM	Sub
HS19031492-02	LH18/24-SP650_032719_BIX	Login	3/29/2019 7:48:43 AM	JRM	Sub

ALS Houston, US Date: 12-Apr-19

Sample Receipt Checklist

Client Name: Bhate Environmental
Work Order: HS19031492
Date/Time Received: **28-Mar-2019 08:30**
Received by: **PMG**

Checklist completed by: *Jared R. Makan* (eSignature) 29-Mar-2019 (Date)
Reviewed by: *RJ Modashia* (eSignature) 29-Mar-2019 (Date)

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

	Yes	No	
Shipping container/cooler in good condition?	☑	☐	Not Present ☐
Custody seals intact on shipping container/cooler?	☑	☐	Not Present ☐
Custody seals intact on sample bottles?	☐	☐	Not Present ☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	☐	☐	Not Present ☑
Chain of custody present?	☑	☐	1 Page(s)
Chain of custody signed when relinquished and received?	☑	☐	COC IDs:N/A
Samplers name present on COC?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature in compliance?	☑	☐	

Temperature(s)/Thermometer(s): 1.5c/1.5c UC/C | IR25
Cooler(s)/Kit(s): 44581
Date/Time sample(s) sent to storage: 03/28/2019 19:50

	Yes	No	
Water - VOA vials have zero headspace?	☑	☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	☑	☐	N/A ☐
pH adjusted?	☐	☑	N/A ☐

pH adjusted by:

Login Notes: Sample refrigerated prior to login.

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. NWO1312.0150.016.0001

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							Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650_032719	Water	03/27/19 / 14:00		2	X	X									H2SO4	
LH18/24-SP650_032719	Water	03/27/19 / 14:00		1			X								NONE	
LH18/24-SP650_032719_BIX	Water	03/27/19 / 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
Scott Beesinger	03/27/19	14:30	[signature]	3/28/19	09:30						

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

HS19031492
Bhate Environmental Associates, Inc.
18/24 Longhorn GW Treatment Plant Weekly Sampl

44581 1.5° +.25 1.75 c/c

(Word) S:\Il-ces\Forms\Chain of Custody - BiWeekly

ALS Environmental
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

44581

CUSTODY SEAL

Date: 3/27/19 Time: 1430
Name: Scott Beesinger
Company: Bhate

Seal Broken By: SM
Date: 03/28/19

44581 MAR 28 2019

Must Deliver Next Business Day
Time and Tempature Sensitive!

44581

ORIGIN ID:SGRA (303) 597-2450
SCOTT BEESINER
BHATE ENVIRONMENTAL ASSOCIATES
1203-B EAST GRAND AVE. PMB202

MARSHALL, TX 75670
UNITED STATES US

SHIP DATE: 06MAR19
ACTWGT: 1.00 LB MAN
CAD: 300130/CAFE3211
DIMS: 26x14x14 IN

TO CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON TX 77099
(281) 530-5656
REF: LHAAP-58-BO 64113-RJ

RMA:

FedEx Express

E

FedEx
TRK# 0221 4809 7831 3421

THU - 28 MAR 10:30A
PRIORITY OVERNIGHT

AB SGRA

77099
TX-US
IAH

FID 162785 27MAR19 GGGA 553C1/46D3/0E0A

ALS Environmental
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April 05, 2019

Analytical Report for Service Request No: K1902766

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

RE: HS19031492

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory March 30, 2019
For your reference, these analyses have been assigned our service request number **K1902766.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3350. You may also contact me via email at Kelley.Lovejoy@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Kelley Lovejoy

Kelley Lovejoy
Project Manager

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Table of Contents

Acronyms

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

Inorganic Data Qualifiers

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

Metals Data Qualifiers

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

Organic Data Qualifiers

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

Additional Petroleum Hydrocarbon Specific Qualifiers

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

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

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

ALS Environmental

Case Narrative

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ALS Environmental

Client: ALS Environmental - US
Project: HS19031492
Sample Matrix: Water

Service Request: K1902766
Date Received: 03/30/2019

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 03/30/2019. 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 Lovejoy Date 04/05/2019

Chain of Custody

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K1902766

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Subcontract Chain of Custody

COC ID: 11011

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:	HS19031492
TSR:	Danielle Winnings

	LAB SAMPLE ID / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / DUE DATE
1.	**HS19031492-01**	**LH18/24-SP650_032719**	**Water**	**27 Mar 2019 14:00**
	TOC Analysis for DOD Level IV			05 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:	3/29/19 18:00
Received By:		Date/Time:	3/30/19 1100
Cooler ID(s):		Temperature(s):	

ALS

PC KL

Cooler Receipt and Preservation Form

Client ALS/Houston Service Request K19 02766

Received: 3/30/19 Opened: 3/30/19 By: [illegible] Unloaded: 3/30/19 By: [illegible]

1. Samples were received via? USPS **Fed Ex** UPS DHL PDX Courier Hand Delivered
2. Samples were received in: (circle) **Cooler** Box Envelope Other NA
3. Were custody seals on coolers? NA **Y** N If yes, how many and where? 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
0.1	0.1	1.5	1.5	0	349	Various	4809 7832 2378	
0.7	1.0	0.2	0.5	+0.3	384		〃 〃 2389	
						11011		

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:

7/25/16

Page ___ of ___

General Chemistry

ALS Environmental—Kelso Laboratory
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Phone (360)577- 7222 Fax (360)636-1 068
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	ALS Environmental - US	**Service Request:**	K1902766
Project:	HS19031492	**Date Collected:**	03/27/19
Sample Matrix:	Water	**Date Received:**	03/30/19
Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA

Carbon, Total Organic

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_032719	K1902766-001	**2.29**	0.50	0.20	0.07	1	04/04/19 08:25	
Method Blank	K1902766-MB	ND U	0.50	0.20	0.07	1	04/04/19 06:02	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1902766
Project:	HS19031492	**Date Collected:**	N/A
Sample Matrix:	Water	**Date Received:**	N/A
		Date Analyzed:	04/4/19
		Date Extracted:	NA

Matrix Spike Summary
Carbon, Total Organic

Sample Name:	Batch QC	**Units:**	mg/L
Lab Code:	K1902703-001	**Basis:**	NA
Analysis Method:	SM 5310 C		
Prep Method:	None		

Matrix Spike
K1902703-001MS

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Carbon, Total Organic	3.05	29.7	25.0	107	83-117

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

Results flagged with a pound (#) indicate the control criteria is not applicable.

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

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	ALS Environmental - US	**Service Request:**	K1902766
Project:	HS19031492	**Date Analyzed:**	04/04/19
Sample Matrix:	Water	**Date Extracted:**	NA

Lab Control Sample Summary
Carbon, Total Organic

Analysis Method:	SM 5310 C	**Units:**	mg/L
Prep Method:	None	**Basis:**	NA
		Analysis Lot:	630890

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1902766-LCS	26.4	25.0	106	83-117

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US **Service Request:** K1902766
Project: HS19031492

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	630890	KQ1904456-04	04/04/19 05:33	25.0	25.5	102	90-110
CCV2	630890	KQ1904456-05	04/04/19 09:21	25.0	25.3	101	90-110
CCV3	630890	KQ1904456-06	04/04/19 14:32	25.0	25.8	103	90-110

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US
Project: HS19031492

Service Request: K1902766

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	630890	KQ1904456-01	04/04/19 05:47	0.50	0.20	0.07	ND	U
CCB2	630890	KQ1904456-02	04/04/19 09:36	0.50	0.20	0.07	ND	U
CCB3	630890	KQ1904456-03	04/04/19 14:46	0.50	0.20	0.07	ND	U

ALS Environmental

Raw Data

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General Chemistry

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Work Request # Original ( ) K1902828, 2829, 2526, 2660, 2703, 2766, 2818, 2831, 2853

Tier: IV IV II II II IV II II II

Date Analyzed: 4/3/19

Analyst: BCD

Analysis: TOC/DOC

Run # TOC:630888, 630890 DOC:630891

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: K1902660-3/3d report a high %RSD. However, these samples are less than the MRL.

Final Approved by: [signature] Date: 04/05/19

DQREPORT

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 630888 **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
K1902828-003	Carbon, Total Organic	N/A		Ground Water	0.88 mg/L	10 ml	0.88 mg/L	1	0.07	0.50			4/3/19 16:30	N	IV
K1902828-004	Carbon, Total Organic	N/A		Ground Water	0.86 mg/L	10 ml	0.86 mg/L	1	0.07	0.50			4/3/19 17:26	Y	IV
K1902828-005	Carbon, Total Organic	N/A		Ground Water	0.90 mg/L	10 ml	0.90 mg/L	1	0.07	0.50			4/3/19 19:32	N	IV
K1902828-006	Carbon, Total Organic	N/A		Ground Water	1.47 mg/L	10 ml	1.47 mg/L	1	0.07	0.50			4/3/19 20:57	N	IV
K1902828-007	Carbon, Total Organic	N/A		Ground Water	1.51 mg/L	10 ml	1.51 mg/L	1	0.07	0.50			4/3/19 21:53	N	IV
K1902828-008	Carbon, Total Organic	N/A		Ground Water	0.01 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/3/19 22:49	N	IV
K1902829-003	Carbon, Total Organic	N/A		Ground Water	0.52 mg/L	10 ml	0.52 mg/L	1	0.07	0.50			4/3/19 23:44	N	IV
K1902829-004	Carbon, Total Organic	N/A		Ground Water	0.37 mg/L	10 ml	0.37 mg/L J	1	0.07	0.50			4/4/19 00:40	Y	IV
K1902829-005	Carbon, Total Organic	N/A		Ground Water	0.23 mg/L	10 ml	0.23 mg/L J	1	0.07	0.50			4/4/19 02:46	N	IV
K1902829-006	Carbon, Total Organic	N/A		Ground Water	0.21 mg/L	10 ml	0.21 mg/L J	1	0.07	0.50			4/4/19 03:41	N	IV
K1902829-007	Carbon, Total Organic	N/A		Ground Water	8.38 mg/L	10 ml	8.38 mg/L	1	0.07	0.50			4/4/19 04:37	N	IV
KQ1904455-01	Carbon, Total Organic	CCB		Ground Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/3/19 12:17	N	IV
KQ1904455-02	Carbon, Total Organic	CCB		Ground Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/3/19 20:42	N	IV
KQ1904455-03	Carbon, Total Organic	CCB		Ground Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/4/19 05:47	N	IV
KQ1904455-04	Carbon, Total Organic	CCV		Ground Water	25.78 mg/L	10 ml	25.8 mg/L	1			103		4/3/19 12:02	N	IV
KQ1904455-05	Carbon, Total Organic	CCV		Ground Water	25.44 mg/L	10 ml	25.4 mg/L	1			102		4/3/19 20:28	N	IV
KQ1904455-06	Carbon, Total Organic	CCV		Ground Water	25.51 mg/L	10 ml	25.5 mg/L	1			102		4/4/19 05:33	N	IV
KQ1904455-07	Carbon, Total Organic	MB		Ground Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/3/19 12:32	N	IV
KQ1904455-08	Carbon, Total Organic	MB		Ground Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/3/19 12:32	N	IV
KQ1904455-09	Carbon, Total Organic	MB		Ground Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/3/19 12:32	N	IV
KQ1904455-10	Carbon, Total Organic	MB		Ground Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/3/19 12:32	N	IV
KQ1904455-11	Carbon, Total Organic	LCS		Ground Water	26.27 mg/L	10 ml	26.3 mg/L	1	0.07	0.50	105		4/3/19 13:28	N	IV
KQ1904455-12	Carbon, Total Organic	LCS		Ground Water	26.32 mg/L	10 ml	26.3 mg/L	1	0.07	0.50	105		4/3/19 13:28	N	IV

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

04/05/19

Printed 4/5/19 10:08

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 630888 **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
KQ1904455-13	Carbon, Total Organic	LCS		Ground Water	26.41 mg/L	10 ml	26.4 mg/L	1	0.07	0.50	106		4/3/19 13:28	N	IV
KQ1904455-14	Carbon, Total Organic	LCS		Ground Water	26.29 mg/L	10 ml	26.3 mg/L	1	0.07	0.50	105		4/3/19 13:28	N	IV
KQ1904455-15	Carbon, Total Organic	MS	K1902828-004	Ground Water	28.15 mg/L	10 ml	28.1 mg/L	1	0.07	0.50	109		4/3/19 18:22	N	IV
KQ1904455-16	Carbon, Total Organic	MS	K1902828-004	Ground Water	28.12 mg/L	10 ml	28.1 mg/L	1	0.07	0.50	109		4/3/19 18:22	N	IV
KQ1904455-17	Carbon, Total Organic	MS	K1902828-004	Ground Water	27.87 mg/L	10 ml	27.9 mg/L	1	0.07	0.50	108		4/3/19 18:22	N	IV
KQ1904455-18	Carbon, Total Organic	MS	K1902828-004	Ground Water	27.80 mg/L	10 ml	27.8 mg/L	1	0.07	0.50	108		4/3/19 18:22	N	IV
KQ1904455-19	Carbon, Total Organic	MS	K1902829-004	Ground Water	27.22 mg/L	10 ml	27.2 mg/L	1	0.07	0.50	107		4/4/19 01:36	N	IV
KQ1904455-20	Carbon, Total Organic	MS	K1902829-004	Ground Water	27.07 mg/L	10 ml	27.1 mg/L	1	0.07	0.50	107		4/4/19 01:36	N	IV
KQ1904455-21	Carbon, Total Organic	MS	K1902829-004	Ground Water	27.23 mg/L	10 ml	27.2 mg/L	1	0.07	0.50	107		4/4/19 01:36	N	IV
KQ1904455-22	Carbon, Total Organic	MS	K1902829-004	Ground Water	27.03 mg/L	10 ml	27.0 mg/L	1	0.07	0.50	107		4/4/19 01:36	N	IV
KQ1904455-23	Carbon, Total Organic	DUP	K1902828-003	Ground Water	0.87 mg/L	10 ml	0.87 mg/L	1	0.07	0.50		<1	4/3/19 16:30	N	IV
KQ1904455-24	Carbon, Total Organic	TRP	K1902828-003	Ground Water	0.89 mg/L	10 ml	0.89 mg/L	1	0.07	0.50		1	4/3/19 16:30	N	IV
KQ1904455-25	Carbon, Total Organic	QUAD	K1902828-003	Ground Water	0.86 mg/L	10 ml	0.86 mg/L	1	0.07	0.50		1	4/3/19 16:30	N	IV
KQ1904455-26	Carbon, Total Organic	DUP	K1902828-004	Ground Water	0.82 mg/L	10 ml	0.82 mg/L	1	0.07	0.50		5	4/3/19 17:26	N	IV
KQ1904455-27	Carbon, Total Organic	TRP	K1902828-004	Ground Water	0.83 mg/L	10 ml	0.83 mg/L	1	0.07	0.50		3	4/3/19 17:26	N	IV
KQ1904455-28	Carbon, Total Organic	QUAD	K1902828-004	Ground Water	0.83 mg/L	10 ml	0.83 mg/L	1	0.07	0.50		2	4/3/19 17:26	N	IV
KQ1904455-29	Carbon, Total Organic	DUP	K1902828-005	Ground Water	0.85 mg/L	10 ml	0.85 mg/L	1	0.07	0.50		6	4/3/19 19:32	N	IV
KQ1904455-30	Carbon, Total Organic	TRP	K1902828-005	Ground Water	0.84 mg/L	10 ml	0.84 mg/L	1	0.07	0.50		4	4/3/19 19:32	N	IV
KQ1904455-31	Carbon, Total Organic	QUAD	K1902828-005	Ground Water	0.82 mg/L	10 ml	0.82 mg/L	1	0.07	0.50		4	4/3/19 19:32	N	IV
KQ1904455-32	Carbon, Total Organic	DUP	K1902828-006	Ground Water	1.45 mg/L	10 ml	1.45 mg/L	1	0.07	0.50		1	4/3/19 20:57	N	IV
KQ1904455-33	Carbon, Total Organic	TRP	K1902828-006	Ground Water	1.41 mg/L	10 ml	1.41 mg/L	1	0.07	0.50		2	4/3/19 20:57	N	IV
KQ1904455-34	Carbon, Total Organic	QUAD	K1902828-006	Ground Water	1.44 mg/L	10 ml	1.44 mg/L	1	0.07	0.50		2	4/3/19 20:57	N	IV
KQ1904455-35	Carbon, Total Organic	DUP	K1902828-007	Ground Water	1.44 mg/L	10 ml	1.44 mg/L	1	0.07	0.50		5	4/3/19 21:53	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:** 630888 **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
KQ1904455-36	Carbon, Total Organic	TRP	K1902828-007	Ground Water	1.44 mg/L	10 ml	1.44 mg/L	1	0.07	0.50		3	4/3/19 21:53	N	IV
KQ1904455-37	Carbon, Total Organic	QUAD	K1902828-007	Ground Water	1.47 mg/L	10 ml	1.47 mg/L	1	0.07	0.50		2	4/3/19 21:53	N	IV
KQ1904455-38	Carbon, Total Organic	DUP	K1902828-008	Ground Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50		NC	4/3/19 22:49	N	IV
KQ1904455-39	Carbon, Total Organic	TRP	K1902828-008	Ground Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50		NC	4/3/19 22:49	N	IV
KQ1904455-40	Carbon, Total Organic	QUAD	K1902828-008	Ground Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50		NC	4/3/19 22:49	N	IV
KQ1904455-41	Carbon, Total Organic	DUP	K1902829-003	Ground Water	0.52 mg/L	10 ml	0.52 mg/L	1	0.07	0.50		<1	4/3/19 23:44	N	IV
KQ1904455-42	Carbon, Total Organic	TRP	K1902829-003	Ground Water	0.51 mg/L	10 ml	0.51 mg/L	1	0.07	0.50		1	4/3/19 23:44	N	IV
KQ1904455-43	Carbon, Total Organic	QUAD	K1902829-003	Ground Water	0.53 mg/L	10 ml	0.53 mg/L	1	0.07	0.50		2	4/3/19 23:44	N	IV
KQ1904455-44	Carbon, Total Organic	DUP	K1902829-004	Ground Water	0.35 mg/L	10 ml	0.35 mg/L J	1	0.07	0.50		7	4/4/19 00:40	N	IV
KQ1904455-45	Carbon, Total Organic	TRP	K1902829-004	Ground Water	0.38 mg/L	10 ml	0.38 mg/L J	1	0.07	0.50		5	4/4/19 00:40	N	IV
KQ1904455-46	Carbon, Total Organic	QUAD	K1902829-004	Ground Water	0.35 mg/L	10 ml	0.35 mg/L J	1	0.07	0.50		4	4/4/19 00:40	N	IV
KQ1904455-47	Carbon, Total Organic	DUP	K1902829-005	Ground Water	0.25 mg/L	10 ml	0.25 mg/L J	1	0.07	0.50		12	4/4/19 02:46	N	IV
KQ1904455-48	Carbon, Total Organic	TRP	K1902829-005	Ground Water	0.18 mg/L	10 ml	0.18 mg/L J	1	0.07	0.50		18	4/4/19 02:46	N	IV
KQ1904455-49	Carbon, Total Organic	QUAD	K1902829-005	Ground Water	0.24 mg/L	10 ml	0.24 mg/L J	1	0.07	0.50		15	4/4/19 02:46	N	IV
KQ1904455-50	Carbon, Total Organic	DUP	K1902829-006	Ground Water	0.24 mg/L	10 ml	0.24 mg/L J	1	0.07	0.50		17	4/4/19 03:41	N	IV
KQ1904455-51	Carbon, Total Organic	TRP	K1902829-006	Ground Water	0.20 mg/L	10 ml	0.20 mg/L J	1	0.07	0.50		11	4/4/19 03:41	N	IV
KQ1904455-52	Carbon, Total Organic	QUAD	K1902829-006	Ground Water	0.19 mg/L	10 ml	0.19 mg/L J	1	0.07	0.50		11	4/4/19 03:41	N	IV
KQ1904455-53	Carbon, Total Organic	DUP	K1902829-007	Ground Water	8.27 mg/L	10 ml	8.27 mg/L	1	0.07	0.50		1	4/4/19 04:37	N	IV
KQ1904455-54	Carbon, Total Organic	TRP	K1902829-007	Ground Water	8.42 mg/L	10 ml	8.42 mg/L	1	0.07	0.50		<1	4/4/19 04:37	N	IV
KQ1904455-55	Carbon, Total Organic	QUAD	K1902829-007	Ground Water	8.37 mg/L	10 ml	8.37 mg/L	1	0.07	0.50		<1	4/4/19 04:37	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:** 630890 **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?	Ti
K1902526-003	Carbon, Total Organic	N/A		Water	4.23 mg/L	10 ml	423 mg/L	100	7	50			4/4/19 09:51	N	I
K1902526-004	Carbon, Total Organic	N/A		Water	4.85 mg/L	10 ml	485 mg/L	100	7	50			4/4/19 10:19	N	I
K1902660-001	Carbon, Total Organic	N/A		Ground Water	2.00 mg/L	10 ml	2.00 mg/L	1	0.07	0.50			4/4/19 11:16	N	I
K1902660-002	Carbon, Total Organic	N/A		Ground Water	1.17 mg/L	10 ml	1.17 mg/L	1	0.07	0.50			4/4/19 12:12	N	II
K1902660-003	Carbon, Total Organic	N/A		Ground Water	0.12 mg/L	10 ml	0.12 mg/L J	1	0.07	0.50			4/4/19 12:40	N	II
K1902703-001	Carbon, Total Organic	N/A		Water	3.05 mg/L	10 ml	3.05 mg/L	1	0.07	0.50			4/4/19 07:28	N	II
K1902766-001	Carbon, Total Organic	N/A		Water	2.29 mg/L	10 ml	2.29 mg/L	1	0.07	0.50			4/4/19 08:25	N	II
K1902818-001	Carbon, Total Organic	N/A		Water	3.29 mg/L	10 ml	3.29 mg/L	1	0.07	0.50			4/4/19 13:36	N	I
K1902818-003	Carbon, Total Organic	N/A		Water	2.47 mg/L	10 ml	2.47 mg/L	1	0.07	0.50			4/4/19 14:04	N	II
K1902831-001	Carbon, Total Organic	N/A		Water	5.74 mg/L	10 ml	574 mg/L	100	7	50			4/4/19 13:08	N	II
K1902853-001	Carbon, Total Organic	N/A		Water	4.86 mg/L	10 ml	4.86 mg/L	1	0.07	0.50			4/4/19 08:53	N	II
KQ1904456-01	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/4/19 05:47	N	II
KQ1904456-02	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/4/19 09:36	N	II
KQ1904456-03	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/4/19 14:46	N	II
KQ1904456-04	Carbon, Total Organic	CCV		Water	25.51 mg/L	10 ml	25.5 mg/L	1			102		4/4/19 05:33	N	II
KQ1904456-05	Carbon, Total Organic	CCV		Water	25.25 mg/L	10 ml	25.3 mg/L	1			101		4/4/19 09:21	N	II
KQ1904456-06	Carbon, Total Organic	CCV		Water	25.75 mg/L	10 ml	25.8 mg/L	1			103		4/4/19 14:32	N	II
KQ1904456-07	Carbon, Total Organic	LCS		Water	26.39 mg/L	10 ml	26.4 mg/L	1	0.07	0.50	106		4/4/19 06:17	N	II
KQ1904456-08	Carbon, Total Organic	MB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/4/19 06:02	N	II
KQ1904456-09	Carbon, Total Organic	MS	K1902703-001	Water	29.74 mg/L	10 ml	29.7 mg/L	1	0.07	0.50	107		4/4/19 07:56	N	II
KQ1904456-10	Carbon, Total Organic	DUP	K1902703-001	Water	3.01 mg/L	10 ml	3.01 mg/L	1	0.07	0.50		1	4/4/19 07:28	N	II
KQ1904456-11	Carbon, Total Organic	DUP	K1902766-001	Water	2.20 mg/L	10 ml	2.20 mg/L	1	0.07	0.50		4	4/4/19 08:25	N	IV
KQ1904456-12	Carbon, Total Organic	DUP	K1902853-001	Water	4.78 mg/L	10 ml	4.78 mg/L	1	0.07	0.50		2	4/4/19 08:53	N	II
KQ1904456-13	Carbon, Total Organic	DUP	K1902526-003	Water	4.07 mg/L	10 ml	407 mg/L	100	7	50		4	4/4/19 09:51	N	II
KQ1904456-14	Carbon, Total Organic	DUP	K1902526-004	Water	4.78 mg/L	10 ml	478 mg/L	100	7	50		1	4/4/19 10:19	N	II
KQ1904456-15	Carbon, Total Organic	DUP	K1902660-001	Ground Water	1.86 mg/L	10 ml	1.86 mg/L	1	0.07	0.50		7	4/4/19 11:16	N	II
KQ1904456-16	Carbon, Total Organic	DUP	K1902660-002	Ground Water	1.13 mg/L	10 ml	1.13 mg/L	1	0.07	0.50		4	4/4/19 12:12	N	II
KQ1904456-17	Carbon, Total Organic	DUP	K1902660-003	Ground Water	0.15 mg/L	10 ml	0.15 mg/L J	1	0.07	0.50		27*	4/4/19 12:40	N	II
KQ1904456-18	Carbon, Total Organic	DUP	K1902831-001	Water	5.83 mg/L	10 ml	583 mg/L	100	7	50		2	4/4/19 13:08	N	II
KQ1904456-19	Carbon, Total Organic	DUP	K1902818-001	Water	3.28 mg/L	10 ml	3.28 mg/L	1	0.07	0.50		<1	4/4/19 13:36	N	II
KQ1904456-20	Carbon, Total Organic	DUP	K1902818-003	Water	2.46 mg/L	10 ml	2.46 mg/L	1	0.07	0.50		<1	4/4/19 14:04	N	II

04/05/19

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Printed 4/5/19 10:11

Analytical Results Summary

Instrument Name: K-TOC-03 **Analyst:** BDITZLER **Analysis Lot:** 630891 **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
K1902818-002	Carbon, Dissolved Organic (DOC)	N/A		Water	3.20 mg/L	10 ml	3.20 mg/L	1	0.07	0.50			4/4/19 15:31	N	II
K1902818-004	Carbon, Dissolved Organic (DOC)	N/A		Water	2.36 mg/L	10 ml	2.36 mg/L	1	0.07	0.50			4/4/19 16:28	N	II
KQ1904457-01	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/4/19 14:46	N	II
KQ1904457-02	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/4/19 17:11	N	II
KQ1904457-03	Carbon, Dissolved Organic (DOC)	CCV		Water	25.75 mg/L	10 ml	25.8 mg/L	1			103		4/4/19 14:32	N	II
KQ1904457-04	Carbon, Dissolved Organic (DOC)	CCV		Water	25.70 mg/L	10 ml	25.7 mg/L	1			103		4/4/19 16:56	N	II
KQ1904457-05	Carbon, Dissolved Organic (DOC)	LCS		Water	26.54 mg/L	10 ml	26.5 mg/L	1	0.07	0.50	106		4/4/19 15:16	N	II
KQ1904457-06	Carbon, Dissolved Organic (DOC)	MB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			4/4/19 15:01	N	II
KQ1904457-07	Carbon, Dissolved Organic (DOC)	MS	K1902818-002	Water	30.57 mg/L	10 ml	30.6 mg/L	1	0.07	0.50	110		4/4/19 15:59	N	II
KQ1904457-08	Carbon, Dissolved Organic (DOC)	DUP	K1902818-002	Water	3.11 mg/L	10 ml	3.11 mg/L	1	0.07	0.50		3	4/4/19 15:31	N	II
KQ1904457-09	Carbon, Dissolved Organic (DOC)	DUP	K1902818-004	Water	2.28 mg/L	10 ml	2.28 mg/L	1	0.07	0.50		4	4/4/19 16:28	N	II

04/05/19

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TOC: 630888, 630890
DOC: 630891

Schedule: 04032019

Version: 4
Instrument: Fusion1
Last Saved by: Fusion1 (Fusion1)
Last Saved on: 2019/04/03 10:38 - 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	K1902828-003.08	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
6	Sample	K1902828-004.08	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
7	Sample	K1902828-004.33 ms	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
8	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
9	Sample	K1902828-005.08	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
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
10	Sample	K1902828-006.08	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
11	Sample	K1902828-007.08	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
12	Sample	K1902828-008.08	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
13	Sample	K1902829-003.08	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
14	Sample	K1902829-004.08	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
15	Sample	K1902829-004.33 ms	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
16	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
17	Sample	K1902829-005.08	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
18	Sample	K1902829-006.08	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
19	Sample	K1902829-007.08	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
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	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	LOD	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
23	Sample	LOQ	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
24	Sample	K1902703-001.02	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K1902703-001.02 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
26	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
27	Sample	K1902766-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
28	Sample	K1902853-001.01	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
29	Sample	K1902526-003.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1902526-004.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
31	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
32	Sample	K1902660-001.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
33	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
34	Sample	K1902660-002.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
35	Sample	K1902660-003.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
36	Sample	K1902831-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
37	Sample	K1902818-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
38	Sample	K1902818-003.01	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

04/05/19

Schedule: 04032019

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps	Use	State
D	Check Standard	[TOC] CCB [0 ppm]	CAS_cal_010711 (CAS_cal_010711)	1	True	Ready
39	Sample	[illegible]	CAS_cal_010711 (CAS_cal_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [24.0 ppm]	CAS_cal_010711 (CAS_cal_010711)	1	True	Ready
40	Sample	K1902818-002.02 doc	CAS_cal_010711 (CAS_cal_010711)	2	True	Ready
41	Sample	K1902818-002.02 ms doc	CAS_cal_010711 (CAS_cal_010711)	1	True	Ready
42	Sample	[illegible]	CAS_cal_010711 (CAS_cal_010711)	1	True	Ready
43	Sample	K1903118-004.02 doc	CAS_cal_010711 (CAS_cal_010711)	2	True	Ready
E	Check Standard	[illegible]	CAS_cal_010711 (CAS_cal_010711)	[illegible]	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_cal_010711 (CAS_cal_010711)	1	True	Ready
					False	

Fusion Report - 04032019
Wednesday, April 03, 2019 09:54 AM

(View - Reps, Unused Reps, Meta-Data, Signature, History)
Printed on 2019/04/05 09:08 - Friday

Report Summary Information

Company Location:	Gen Chem Lab
Schedule Name:	04032019
Instrument Name:	Fusion1
Report Version:	1 of 1
Report Creation by Operators (schedule version):	Fusion1 (Fusion1) (v2) Fusion1 (Fusion1) (v3) Fusion1 (Fusion1) (v4)
Comment:	

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

Report Results

04/05/19

Sample Type: Clean

From Schedule Version 2

	Pos	Analysis Type	Sample ID	Start Time
◈	(clean)		Clean	2019/04/03 09:55

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	13.40	18.23	4.83	49.70	05:26
2	TC Clean	10.63	13.62	2.99	49.84	07:19
3	TC Clean	2.30	5.41	3.10	49.87	07:03
4	TC Clean	1.52	4.69	3.17	49.88	07:00

Sample Type: Clean

From Schedule Version 3

	Pos	Analysis Type	Sample ID	Start Time
◈	(clean)		Clean	2019/04/03 10:27

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	13.30	16.37	3.07	49.71	05:24
2	TC Clean	4.02	7.14	3.11	49.86	07:16
3	TC Clean	1.69	4.73	3.04	50.02	03:49
4	TC Clean	1.42	4.51	3.09	50.04	03:56

Sample Type: Clean
From Schedule Version 4

	Pos	Analysis Type	Sample ID	Start Time
◈	(clean)		Clean	2019/04/03 10:52

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.89	3.96	3.07	49.77	05:23
2	TC Clean	3.44	6.46	3.03	50.01	04:03
3	TC Clean	1.68	4.69	3.01	50.05	03:48
4	TC Clean	1.69	4.50	2.81	50.03	03:49

Sample Type: Blank (Creating v1242)
From Schedule Version 4

	Pos	Analysis Type	Sample ID	Start Time
◈	(blank)		Reagent/Acid Blank	2019/04/03 11:14

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.73	3.76	3.03	49.76	05:26
2	TC Clean	3.88	6.85	2.97	49.99	04:04
3	TC Clean	2.13	5.12	2.99	50.00	03:55
4	TC Clean	1.72	4.93	3.22	49.99	03:56
5	Reagent Blank	3.55	6.56	3.01	50.01	05:06
6	Acid Blank	1.06	3.83	2.77	49.72	05:30

Sample Type: Sample
From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	D	TOC	RB	0.4227 ppm	0.0000 ppm	0.0000%	2019/04/03 11:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
~~1~~	~~TOC~~	~~0.4227~~	~~4.2266~~	~~11.62~~	~~14.73~~	~~3.11~~	~~50.09~~	~~10:34~~

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	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)	25.7836 ppm (PASS)	0.0000 ppm	0%	2019/04/03 12:02

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.7836	257.8359	184.48	187.58	3.10	50.10	10:35

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 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/04/03 12:17

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	8.04	11.15	3.11	50.10	10:32

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample

From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/03 12:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.65	10.39	2.75	50.11	10:31
2	TOC	0.0000	0.0000	7.29	10.24	2.95	50.10	10:28
3	TOC	0.0000	0.0000	7.15	10.19	3.04	50.12	10:29
4	TOC	0.0000	0.0000	7.46	10.28	2.82	50.12	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	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)	26.3222 ppm	0.0626 ppm	0.24%	2019/04/03 13:28

a

							(PASS)			

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	26.2700	262.7005	187.78	190.71	2.93	50.10	10:27
C	TOC	25.0 ppm	2	26.3167	263.1675	188.10	191.08	2.98	50.09	10:30
C	TOC	25.0 ppm	3	26.4116	264.1162	188.74	191.81	3.07	50.09	10:29
C	TOC	25.0 ppm	4	26.2902	262.9023	187.92	190.77	2.85	50.07	10:24

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 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	2	TOC	ICS	0.1226 ppm	0.0000 ppm	0.0000%	2019/04/03 14:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1226	1.2256	9.59	12.41	2.82	50.04	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	3	TOC	LOD	0.0166 ppm	0.0191 ppm	115.1300%	2019/04/03 14:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0368	0.3682	9.00	11.80	2.80	50.04	10:27
2	TOC	0.0006	0.0058	8.76	11.68	2.92	50.02	10:29
3	TOC	0.0289	0.2887	8.95	11.77	2.82	50.00	10:26
4	TOC	0.0000	0.0000	8.50	11.56	3.06	49.99	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	4	TOC	LOQ	0.3479 ppm	0.0297 ppm	8.5400%	2019/04/03 15:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3483	3.4826	11.12	14.03	2.91	49.96	10:28
2	TOC	0.3297	3.2970	10.99	14.12	3.13	49.95	10:28
3	TOC	0.3897	3.8966	11.40	14.30	2.90	49.94	10:28
4	TOC	0.3240	3.2395	10.95	13.90	2.95	49.93	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC)	CAS_salt_010711	CAS_salt_010711

(v1242) (v4) (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	5	TOC	K1902828-003.08	0.8751 ppm	0.0119 ppm	1.3500%	2019/04/03 16:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8758	8.7581	14.70	17.55	2.85	49.93	10:27
2	TOC	0.8720	8.7198	14.67	17.44	2.77	49.91	10:26
3	TOC	0.8905	8.9054	14.80	17.61	2.81	49.90	10:28
4	TOC	0.8620	8.6196	14.60	17.69	3.08	49.90	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	6	TOC	K1902828-004.08	0.8332 ppm	0.0183 ppm	2.2000%	2019/04/03 17:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8587	8.5872	14.58	17.57	2.99	49.89	10:30
2	TOC	0.8151	8.1512	14.29	17.42	3.14	49.89	10:29
3	TOC	0.8293	8.2926	14.38	17.47	3.09	49.91	10:30
4	TOC	0.8296	8.2955	14.38	17.33	2.95	49.90	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	7	TOC	K1902828-004.33 ms	27.9836 ppm	0.1749 ppm	0.6200%	2019/04/03 18:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	28.1474	281.4741	199.82	202.95	3.13	49.91	10:28
2	TOC	28.1177	281.1765	199.61	202.59	2.97	49.92	10:26
3	TOC	27.8707	278.7074	197.94	201.07	3.13	49.93	10:25
4	TOC	27.7987	277.9870	197.45	200.42	2.97	49.95	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	8	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/03 19:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.01	11.07	3.06	49.95	10:33

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9003	9.0027	14.86	17.73	2.87	49.97	10:29
2	TOC	0.8471	8.4708	14.50	17.46	2.96	49.99	10:30
3	TOC	0.8365	8.3648	14.43	17.25	2.82	50.00	10:30
4	TOC	0.8248	8.2484	14.35	17.32	2.97	50.00	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	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)	25.4415 ppm (PASS)	0.0000 ppm	0%	2019/04/03 20:28

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.4415	254.4152	182.16	185.05	2.89	50.00	10:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/04/03 20:42

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.17	10.24	3.07	50.03	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (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	K1902828-006.08	1.4433 ppm	0.0273 ppm	1.8900%	2019/04/03 20:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4705	14.7054	18.74	21.59	2.85	50.04	10:30
2	TOC	1.4535	14.5345	18.62	21.42	2.81	50.07	10:28
3	TOC	1.4060	14.0602	18.30	21.24	2.95	50.07	10:27
4	TOC	1.4431	14.4314	18.55	21.39	2.84	50.09	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	11	TOC	K1902828-007.08	1.4624 ppm	0.0336 ppm	2.2900%	2019/04/03 21:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5053	15.0531	18.97	21.68	2.71	50.11	10:28
2	TOC	1.4350	14.3504	18.49	21.42	2.92	50.09	10:28
3	TOC	1.4364	14.3636	18.50	21.55	3.05	50.11	10:30
4	TOC	1.4729	14.7290	18.75	21.63	2.88	50.11	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	12	TOC	K1902828-008.08	0.0017 ppm	0.0033 ppm	200.0000%	2019/04/03 22:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0066	0.0662	8.80	11.64	2.84	50.09	10:31
2	TOC	0.0000	0.0000	8.36	11.40	3.04	50.10	10:28
3	TOC	0.0000	0.0000	8.59	11.58	2.98	50.10	10:30
4	TOC	0.0000	0.0000	8.63	11.52	2.89	50.10	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	13	TOC	K1902829-003.08	0.5158 ppm	0.0085 ppm	1.6500%	2019/04/03 23:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5161	5.1606	12.26	15.37	3.11	50.07	10:26
2	TOC	0.5162	5.1620	12.26	15.28	3.02	50.07	10:26
3	TOC	0.5050	5.0501	12.18	15.29	3.10	50.07	10:27
4	TOC	0.5258	5.2578	12.32	15.39	3.06	50.06	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis	Sample ID	Result (ppmC)	Std. Dev.	RSD	Start Time

		Type			(ppmC)		
◈	14	TOC	K1902829-004.08	0.3633 ppm	0.0157 ppm	4.3300%	2019/04/04 00:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3727	3.7271	11.28	14.41	3.12	50.07	10:30
2	TOC	0.3459	3.4590	11.10	14.18	3.08	50.07	10:30
3	TOC	0.3799	3.7993	11.33	14.36	3.03	50.06	10:29
4	TOC	0.3547	3.5474	11.16	14.28	3.12	50.05	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	15	TOC	K1902829-004.33 ms	27.1361 ppm	0.1030 ppm	0.3800%	2019/04/04 01:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	27.2163	272.1635	193.50	196.30	2.80	50.05	10:31
2	TOC	27.0690	270.6903	192.50	195.51	3.01	50.05	10:27
3	TOC	27.2314	272.3138	193.60	196.55	2.95	50.03	10:26
4	TOC	27.0275	270.2748	192.21	195.25	3.03	50.06	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	16	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/04 02:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.75	10.84	3.09	50.07	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	17	TOC	K1902829-005.08	0.2235 ppm	0.0326 ppm	14.5800%	2019/04/04 02:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2261	2.2613	10.29	13.32	3.03	50.06	10:29
2	TOC	0.2546	2.5456	10.48	13.37	2.89	50.05	10:29
3	TOC	0.1780	1.7796	9.96	13.10	3.13	50.06	10:29
4	TOC	0.2353	2.3526	10.35	13.48	3.13	50.06	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	18	TOC	K1902829-006.08	0.2106 ppm	0.0234 ppm	11.1200%	2019/04/04 03:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2068	2.0683	10.16	13.22	3.06	50.06	10:28
2	TOC	0.2445	2.4455	10.41	13.40	2.99	50.07	10:31
3	TOC	0.1983	1.9829	10.10	13.15	3.05	50.08	10:26
4	TOC	0.1925	1.9254	10.06	13.01	2.95	50.06	10:23

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	19	TOC	K1902829-007.08	8.3598 ppm	0.0640 ppm	0.7700%	2019/04/04 04:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.3757	83.7573	65.61	68.70	3.10	50.05	10:26
2	TOC	8.2698	82.6981	64.89	67.91	3.03	50.06	10:27
3	TOC	8.4213	84.2125	65.92	68.97	3.06	50.05	10:28
4	TOC	8.3725	83.7249	65.58	68.73	3.15	50.07	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	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)	25.5103 ppm (PASS)	0.0000 ppm	0%	2019/04/04 05:33

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.5103	255.1032	182.62	185.55	2.92	50.09	10:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/04/04 05:47

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time

D	TOC	0 ppm	1	0.0000	0.0000	7.88	10.92	3.04	50.06	10:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample From Schedule Version 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/04 06:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.96	10.94	2.98	50.07	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	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)	26.3894 ppm (PASS)	0.0000 ppm	0%	2019/04/04 06:17

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	26.3894	263.8937	188.59	191.64	3.05	50.08	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 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	21	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/04 06:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.05	11.14	3.09	50.07	10:27
2	TOC	0.0000	0.0000	7.32	10.51	3.20	50.07	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	22	TOC	LOD	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/04 06:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.77	10.93	3.16	50.07	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	23	TOC	LOQ	0.4151 ppm	0.0000 ppm	0.0000%	2019/04/04 07:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4151	4.1514	11.57	14.72	3.15	50.06	10:34

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	24	TOC	K1902703-001.02	3.0262 ppm	0.0276 ppm	0.9100%	2019/04/04 07:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.0457	30.4569	29.43	32.32	2.89	50.06	10:26
2	TOC	3.0066	30.0665	29.16	32.17	3.00	50.09	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	25	TOC	K1902703-001.02 ms	29.7416 ppm	0.0000 ppm	0.0000%	2019/04/04 07:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	29.7416	297.4156	210.64	213.66	3.03	50.05	10:34

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	26	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/04 08:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.20	11.27	3.07	50.07	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	27	TOC	K1902766-001.01	2.2477 ppm	0.0649 ppm	2.8900%	2019/04/04 08:25

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.2936	22.9362	24.32	27.22	2.90	50.08	10:29
2	TOC	2.2018	22.0184	23.70	26.64	2.94	50.09	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	28	TOC	K1902853-001.01	4.8178 ppm	0.0573 ppm	1.1900%	2019/04/04 08:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.8583	48.5832	41.73	44.66	2.93	50.09	10:25
2	TOC	4.7773	47.7729	41.18	44.24	3.05	50.08	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	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)	25.2521 ppm (PASS)	0.0000 ppm	0%	2019/04/04 09:21

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.2521	252.5206	180.87	183.96	3.09	50.09	10:33

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/04/04 09:36

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.73	10.83	3.10	50.08	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 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	29	TOC	K1902526-003.01 100x	4.1472 ppm	0.1115 ppm	2.6900%	2019/04/04 09:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.2260	42.2602	37.44	40.45	3.01	50.09	10:25
2	TOC	4.0684	40.6839	36.37	39.44	3.07	50.08	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	30	TOC	K1902526-004.01 100x	4.8155 ppm	0.0434 ppm	0.9000%	2019/04/04 10:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.8462	48.4624	41.65	44.75	3.10	50.07	10:32
2	TOC	4.7848	47.8480	41.23	44.26	3.03	50.06	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	31	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/04 10:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.40	10.46	3.06	50.05	10:28
2	TOC	0.0000	0.0000	7.44	10.45	3.01	50.04	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	32	TOC	K1902660-001.03	1.9294 ppm	0.1023 ppm	5.3000%	2019/04/04 11:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.0018	20.0178	22.34	25.41	3.07	50.05	10:29
2	TOC	1.8571	18.5711	21.36	24.29	2.93	50.04	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	33	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/04 11:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time

1	TOC	0.0000	0.0000	6.76	9.80	3.04	50.04	10:28
2	TOC	0.0000	0.0000	6.90	9.83	2.93	50.05	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	34	TOC	K1902660-002.03	1.1509 ppm	0.0306 ppm	2.6600%	2019/04/04 12:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.1725	11.7251	16.71	19.69	2.98	50.04	10:27
2	TOC	1.1292	11.2920	16.42	19.46	3.04	50.05	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	35	TOC	K1902660-003.03	0.1343 ppm	0.0257 ppm	19.1600%	2019/04/04 12:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1161	1.1608	9.54	12.60	3.06	50.05	10:26
2	TOC	0.1525	1.5247	9.79	12.65	2.86	50.07	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	36	TOC	K1902831-001.01 100x	5.7811 ppm	0.0621 ppm	1.0700%	2019/04/04 13:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.7372	57.3723	47.70	50.65	2.95	50.05	10:29
2	TOC	5.8250	58.2503	48.29	51.20	2.91	50.06	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	37	TOC	K1902818-001.01	3.2864 ppm	0.0025 ppm	0.0800%	2019/04/04 13:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.2882	32.8818	31.07	34.09	3.02	50.03	10:26
2	TOC	3.2846	32.8464	31.05	33.92	2.87	50.03	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	38	TOC	K1902818-003.01	2.4624 ppm	0.0071 ppm	0.2900%	2019/04/04 14:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.4675	24.6746	25.50	28.37	2.87	50.01	10:30
2	TOC	2.4574	24.5744	25.43	28.32	2.89	50.00	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	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)	25.7540 ppm (PASS)	0.0000 ppm	0%	2019/04/04 14:32

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.7540	257.5398	184.28	187.15	2.87	49.97	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

Sample Type: Check Standard --> CCB

From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/04/04 14:46

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.96	10.97	3.01	49.97	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 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	39	TOC	MB3	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/04 15:01

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time

1	TOC	0.0000	0.0000	7.38	10.48	3.10	49.96	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	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)	**26.5417** ppm (PASS)	0.0000 ppm	0%	2019/04/04 15:16

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	26.5417	265.4170	189.63	192.72	3.09	49.94	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 4

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	40	TOC	K1902818-002.02 doc	3.1511 ppm	0.0641 ppm	2.0300%	2019/04/04 15:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.1964	31.9640	30.45	33.46	3.01	49.94	10:28
2	TOC	3.1058	31.0580	29.84	32.78	2.95	49.93	10:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	41	TOC	K1902818-002.02 ms doc	30.5720 ppm	0.0000 ppm	0.0000%	2019/04/04 15:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	30.5720	305.7201	216.27	219.15	2.87	49.92	10:32

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	42	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/04/04 16:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time

1	TOC	0.0000	0.0000	8.40	11.41	3.01	49.93	10:35

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

	Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◈	43	TOC	K1902818-004.02 doc	2.3184 ppm	0.0584 ppm	2.5200%	2019/04/04 16:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.3598	23.5977	24.77	27.75	2.98	49.93	10:30
2	TOC	2.2771	22.7712	24.21	27.20	2.99	49.93	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7530 (IC) (v1242)	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)	25.7046 ppm (PASS)	0.0000 ppm	0%	2019/04/04 16:56

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.7046	257.0463	183.94	186.96	3.02	49.91	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 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/04/04 17:11

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.93	10.80	2.87	49.91	10:31

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Meta Data Used in this Report

Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1241	1.6887	1.2060	0.0000	0.0000	0.0000	2019/04/01 15:29	Fusion1 (Fusion1)
v1242	1.1840	1.0590	0.0000	0.0000	0.0000	2019/04/03 11:48	Fusion1 (Fusion1)

Calibrations

Name: CAS_salt_010711 (TOC)

Version: v30

Ver Creation: 2019/03/05 17:42

Comment:

Operator: Fusion1 (Fusion1)

Basic Analysis Type TOC

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

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

Basic Analysis Type: TOC

Sample ID	Y Raw Value	X Expected	Message	End Time
DI Water	7.8970	0.0000		2019/03/05 16:15
0.500 ppm	11.5280	0.5000		2019/03/05 16:29
1.0 ppm	14.9760	1.0000		2019/03/05 16:44
5.0 ppm	43.6500	5.0000		2019/03/05 16:58
10 ppm	79.6020	10.0000		2019/03/05 17:12
25 ppm	183.3580	25.0000		2019/03/05 17:26
50 ppm	346.3230	50.0000		2019/03/05 17:40

Methods

Name: CAS_salt_010711 (TOC)

Version: v4

Operator: Fusion1 (Fusion1)

Ver Creation: 2019/02/21 17:57

Comment:

Parameter	Value
SampleVolume	10.0 mL
Dilution	1:10
AcidVolume	0.5 ml
ReagentVolume	2.0 ml
UVReactorPrerinse	Off
UVReactorPrerinseVolume	5.0
NumberOfUVReactorPrerinses	1
ICSpargeTime	1.00 mins
DetectorSweepFlow	500 ml/min

Advanced Parameter	Value
NeedleRinseVolume	5.0 ml
VialPrimeVolume	2.0 ml
ICSamplePrimeVolume	2.0 ml
ICSpargeRinseVolume	12.0 ml
BaselineStabilizeTime	0.70 min
DetectorPressureFlow	150 ml/min
SyringeSpeedWaste	10
SyringeSpeedAcid	7
SyringeSpeedReagent	7

PreSpargeTime	2.00 mins
SystemFlow	500 ml/min

SyringeSpeedDIWater	7
NDIRPressurization	60 psig
SyringeSpeedSampleDispense	5
SyringeSpeedSampleAspirate	4
SyringeSpeedUVDispense	5
SyringeSpeedUVAspirate	5
SyringeSpeedICDispense	5
SyringeSpeedICAspirate	5
NDIRPressureStabilize	1.75 min
SampleMixing	Off
SampleMixingCycles	1
SampleMixingVolume	10.0
LowLevelFilterNDIR	Off

Acceptance / Approval

Electronic Signatures

Report Version	User Name	Acceptance	Reason	Date

Report History

Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/04/04 17:28

ALS Environmental

StarLIMS Run: 630888, 630890, 630891

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-05-70O 0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-77E

21 % H3PO4: 11-GEN-05-77F

Equipment ID: K-TOC-03

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

FILTER ID: NA

CBA: ~~0.06875~~ 0

Analyzed By: BCD	Date Analyzed: 4/3/19
Reviewed By: Hauwyn	Date Reviewed: 04/05/19

0 BCD 4/5/19

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. 50µL of an ^{18}O labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45µm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 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

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: **34-1909152**
Project ID: HS19031492
Purchase Order: HS19031492
Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_032719_BIX	1909152001	03/27/19	03/30/19	

ANALYTICAL REPORT

Workorder: 34-1909152
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **LH18/24-SP650_032719_BIX**	Sampling Site: NA	Collected: 03/27/2019
Lab ID: 1909152001	Media: 125 mL Nalgene	Received: 03/30/2019
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 10:55	**Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	2.6	1.0	2.0	4.0	1	J

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: alslt.lab@ALSGlobal.com
Web: www.alsslc.com

ANALYTICAL REPORT

Workorder: 34-1909152
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

Analysis Information

Workorder: 1909152

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	MS: 647200	MSD: 647201
Analyzed: 04/10/2019 10:55	Analyzed: 04/10/2019 11:08	Analyzed: 04/10/2019 11:22
Dilution: 1	Dilution: 1	Dilution: 1
Units: ug/L	Units: ug/L	Units: ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	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 1909152

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

1909152

COC ID: 11012

18698/#2

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: HS19031492
TSR: Danielle Winnings

	LAB SAMPLE ID / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / DUE DATE
1.	**HS19031492-02**	**LH18/24-SP650_032719_BIX**	**Water**	**27 Mar 2019 14:00**
	SUB_Perch-6850			05 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. Malum Date/Time: 3/29/19 18:00

Received By: Meredith [illegible] Date/Time: 3/30/19 / 858

Cooler ID(s): [illegible] Temperature(s): 2

ALS Environmental
CHAIN-OF-CUSTODY

Project / Job / Task:	Split:	Workorder ID: 1909152	Level: ENV_LVL4
Client: ALS Environmental (Houston)		Account: 8101	Type: 125Poly
Comments:			Preservatives: COOL

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	EPA 6850, DoD QSM
1	03/27/2019 14:00	LH18/24-SP650_032719_BIX	1909152001		Water	A	1	A
2								
3								
4								
5								
6								
7								
8								
9								
10								

Requested Analysis

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
Warath, Julie	03/30/2019 08:58	ALS Sample Receiving	Sample Login
Julie Warath	4/1/19 1330	CB	Storage
R-33.1	4-8-19 / 10:00	T. Bush	6850

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

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

Prepared / Analyzed by: ______ Date / Time: ______

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

 Mon, 04/01/19 12:56 PM ALSCOCV3.1

00935714

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Houston
Project/Task/Site: 1969152
Date/Time of Receipt: 3/30/19 858
Number of Coolers Received: 1

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

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

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 9276	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: Meredith Edens (Signature) Meredith Edens (Printed Name) 3/30/19 (Date)

CLIENT-RELATED INFORMATION

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

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES ☐ NO ☐

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

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

CRIR.doc Revised 01/01/2018

Must Deliver Next Business Day
Time and Tempature Sensitive!

ALS

Part # 159469-434 RIT2 EXP 11/19

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

SHIP DATE: 29MAR19
ACTWGT: 9.25 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN
BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE

SALT LAKE CITY UT 84123
(801) 266-7700
REF: HS19031492/1508/1511 RJ

551C1/46D3/104C

FedEx Express

E

J181118060501uv

TRK# 0201 4809 7832 2367

SATURDAY 12:00P
PRIORITY OVERNIGHT

X0 BTFA

84123
UT-US SLC

Batch Worklist

Batch: ELMS/ 2233 **Created:** 4/9/2019 08:42 **Instrument:** LCMS04 **HBN:** 236356
Rule: EPA 6850, DoD QSM Water **Analyst:** T. Bosch **Status:** WP

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	5311		4/11/2019	4/10/2019
2	647199	LCS for HBN 236356 [ELMS/2233]				LCS	3		E6850Q413Q	5311		4/11/2019	4/10/2019
3	647197	ICS for HBN 236356 [ELMS/2233]				ICS	3		E6850..D3Q	5311		4/11/2019	4/10/2019
4	647198	LMB for HBN 236356 [ELMS/2233]				LMB	3		E6850Q413Q	5311		4/11/2019	4/10/2019
5	1909152001	LH18/24-SP650_032719_BIX				SAMPLE	3	1909152001-A	E6850Q41.3	5480	4/24/2019	4/11/2019	4/10/2019
6	647200	LH18/24-SP650...(1909152001MS)				MS	3		E6850Q413Q	5311		4/11/2019	4/10/2019
7	647201	LH18/24-SP65...(1909152001MSD)				MSD	3		E6850Q413Q	5311		4/11/2019	4/10/2019
8	1909153001	LH18-24-SP140_032719				SAMPLE	3	1909153001-A	E6850Q41.3	5480	4/24/2019	4/11/2019	4/10/2019
9	1909154001	LH18/24-SP650_032719_BIX				SAMPLE	3	1909154001-A	E6850Q41.3	5480	4/24/2019	4/11/2019	4/10/2019
10	1909947001	LH18/25-SP650_040419_BIX				SAMPLE	3	1909947001-A	E6850Q41.3	5480	5/2/2019	4/18/2019	4/10/2019
11	1909949001	HBW7_040119				SAMPLE	3	1909949001-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
12	1909949002	HBW7_040119-a				SAMPLE	3	1909949002-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
13	1909949003	HBW10_040119				SAMPLE	3	1909949003-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
14	1909949004	HBW1_040119				SAMPLE	3	1909949004-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
15	1909949005	GPW1_040119				SAMPLE	3	1909949005-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
16	1909949006	GPW3_040119				SAMPLE	3	1909949006-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
17	647196	RLVS for HBN 236356 [ELMS/2233				RLVS	3		E685041C3Q	5311		4/11/2019	4/10/2019
18	647202	CCV for HBN 236356 [ELMS/2233]				CCV	3		E685041C3Q	5311		4/11/2019	4/10/2019

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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: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\236356-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\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.

Chromatography (GC, HPLC, LC/MS) Technical Review Criteria Batch(es)/SDG: ELMS: 2233 HBN: 236356 Sample Set IDs if Applicable: 1909152/1909153/1909154 1909947/1909949	Analyst Initials	Reviewer Initials
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

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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
Expires: 05/09/2019
Usable: Yes
Lab Lot: CLO4 QC INT 10.ug/mL

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

Composition

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

STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

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

CLO4ISTDWRK Description - Perchlorate ISTD Wrk 1,000ug/L

Standard: 43730
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/20/2018 09:09AM
Verified By: Thomas Bosch
Verify Date:

Amount: 25 mL
Expires: 09/20/2019
Usable: Yes
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

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

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

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

Solvent: water (low TOC, < 50 ppb)

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

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

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

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

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

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

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

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

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

00935732

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

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

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

Daniel J. Lamendola
Director of QA/RA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

ISO 9001 Registered Quality System – TUV USA

125 Market Street
New Haven, CT 06513
USA

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

AccuStandard®

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*

GHS

Signal Word: None

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

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

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

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

For use in routine laboratory analysis.

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

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

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-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	8.907	21.31933
#*	647199 QC@4.0	Vial 72	1	Control	2	1.97600e5	9.094	3.67714
#*	647197 ICS@4.0	Vial 73	1	Control	3	1.49399e5	8.651	3.21517
#*	647198 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
#*	1909152001	Vial 75	1	Sample	5	9.15156e4	8.529	2.57433
#*	647200 91521MS	Vial 76	1	Sample	6	2.25049e5	8.454	6.17769
#*	647201 91521SD	Vial 77	1	Sample	7	2.49579e5	8.497	6.36091
#*	1909153001 1K	Vial 78	1	Sample	8	3.70174e5	9.061	6532.86203
#*	1909154001	Vial 79	1	Sample	9	7.79123e4	8.495	2.34023
#*	1909947001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
#*	1909949001	Vial 81	1	Sample	11	0.00000	0.000	0.00000
#*	1909949002	Vial 82	1	Sample	12	0.00000	0.000	0.00000
#*	1909949003	Vial 83	1	Sample	13	0.00000	0.000	0.00000
#*	1909949004	Vial 84	1	Sample	14	0.00000	0.000	0.00000
#*	1909949005	Vial 85	1	Sample	15	0.00000	0.000	0.00000
#*	1909949006	Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	647202 CCV@25	Vial 71	1	Control	17	1.08007e6	8.867	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	8.922	23.09461
#*	647199 QC@4.0	Vial 72	1	Control	2	7.01681e4	9.105	4.22460
#*	647197 ICS@4.0	Vial 73	1	Control	3	5.45965e4	8.666	3.77625
#*	647198 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
#*	1909152001	Vial 75	1	Sample	5	3.18275e4	8.549	2.84107
#*	647200 91521MS	Vial 76	1	Sample	6	7.61114e4	8.479	6.88356
#*	647201 91521SD	Vial 77	1	Sample	7	8.42686e4	8.512	7.08137
#*	1909153001 1K	Vial 78	1	Sample	8	1.21054e5	9.077	7051.77497
#*	1909154001	Vial 79	1	Sample	9	2.76117e4	8.519	2.61418
#*	1909947001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
#*	1909949001	Vial 81	1	Sample	11	0.00000	0.000	0.00000
#*	1909949002	Vial 82	1	Sample	12	0.00000	0.000	0.00000
#*	1909949003	Vial 83	1	Sample	13	0.00000	0.000	0.00000
#*	1909949004	Vial 84	1	Sample	14	0.00000	0.000	0.00000
#*	1909949005	Vial 85	1	Sample	15	0.00000	0.000	0.00000
#*	1909949006	Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	647202 CCV@25	Vial 71	1	Control	17	3.36319e5	8.885	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	8.927	5.00000
#*	647199 QC@4.0	Vial 72	1	Control	2	1.77838e5	9.122	5.00000
#*	647197 ICS@4.0	Vial 73	1	Control	3	1.54931e5	8.667	5.00000
#*	647198 LMB	Vial 74	1	Control	4	1.76915e5	8.988	5.00000
#*	1909152001	Vial 75	1	Sample	5	1.20240e5	8.559	5.00000
#*	647200 91521MS	Vial 76	1	Sample	6	1.17757e5	8.476	5.00000
#*	647201 91521SD	Vial 77	1	Sample	7	1.26683e5	8.527	5.00000
#*	1909153001 1K	Vial 78	1	Sample	8	1.82758e5	9.082	5000.00000
#*	1909154001	Vial 79	1	Sample	9	1.13404e5	8.524	5.00000
#*	1909947001	Vial 80	1	Sample	10	1.15130e5	8.458	5.00000
#*	1909949001	Vial 81	1	Sample	11	1.14791e5	8.694	5.00000
#*	1909949002	Vial 82	1	Sample	12	1.24046e5	8.693	5.00000
#*	1909949003	Vial 83	1	Sample	13	1.23373e5	8.718	5.00000
#*	1909949004	Vial 84	1	Sample	14	1.20241e5	8.690	5.00000
#*	1909949005	Vial 85	1	Sample	15	1.27767e5	8.755	5.00000
#*	1909949006	Vial 86	1	Sample	16	1.23965e5	8.816	5.00000
*	647202 CCV@25	Vial 71	1	Control	17	1.46281e5	8.890	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		

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD01.D   Sample Name: 647195   CCV@25

===

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

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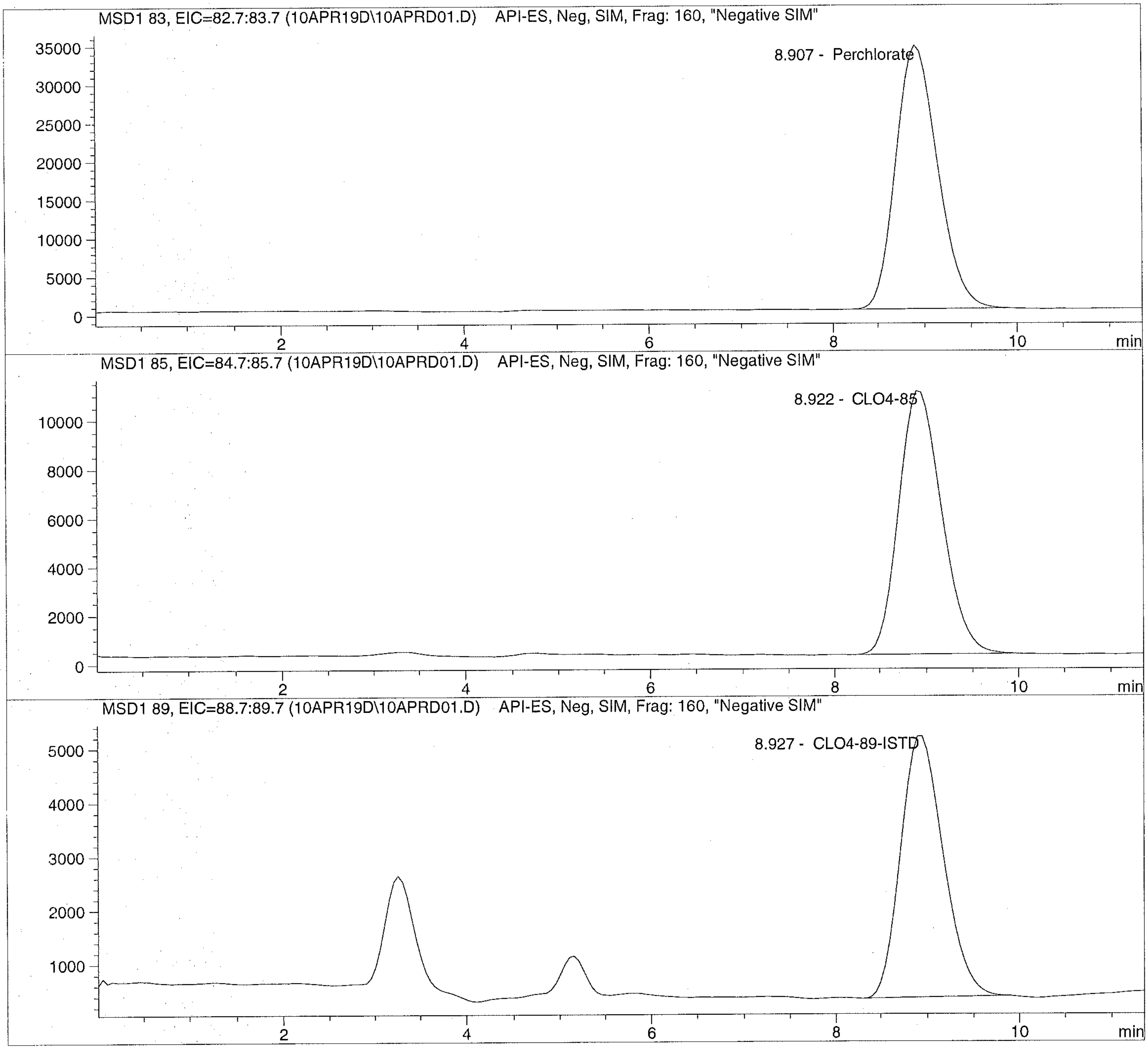


Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD01.D Sample Name: 647195 CCV@25

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

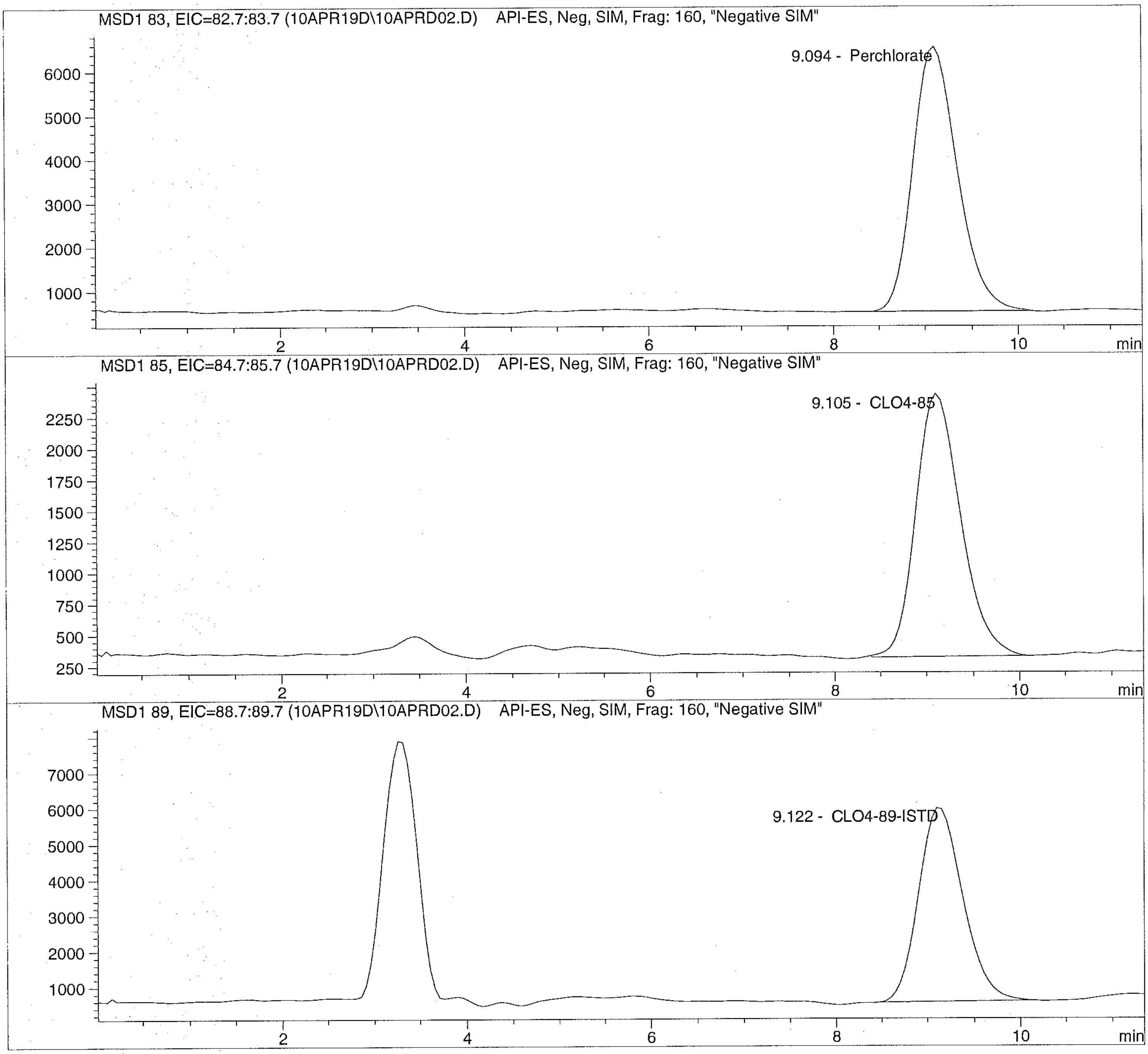
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.927	PBA	153120.0	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD02.D       Sample Name: 647199   QC@4.0
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD02.D Sample Name: 647199 QC@4.0

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

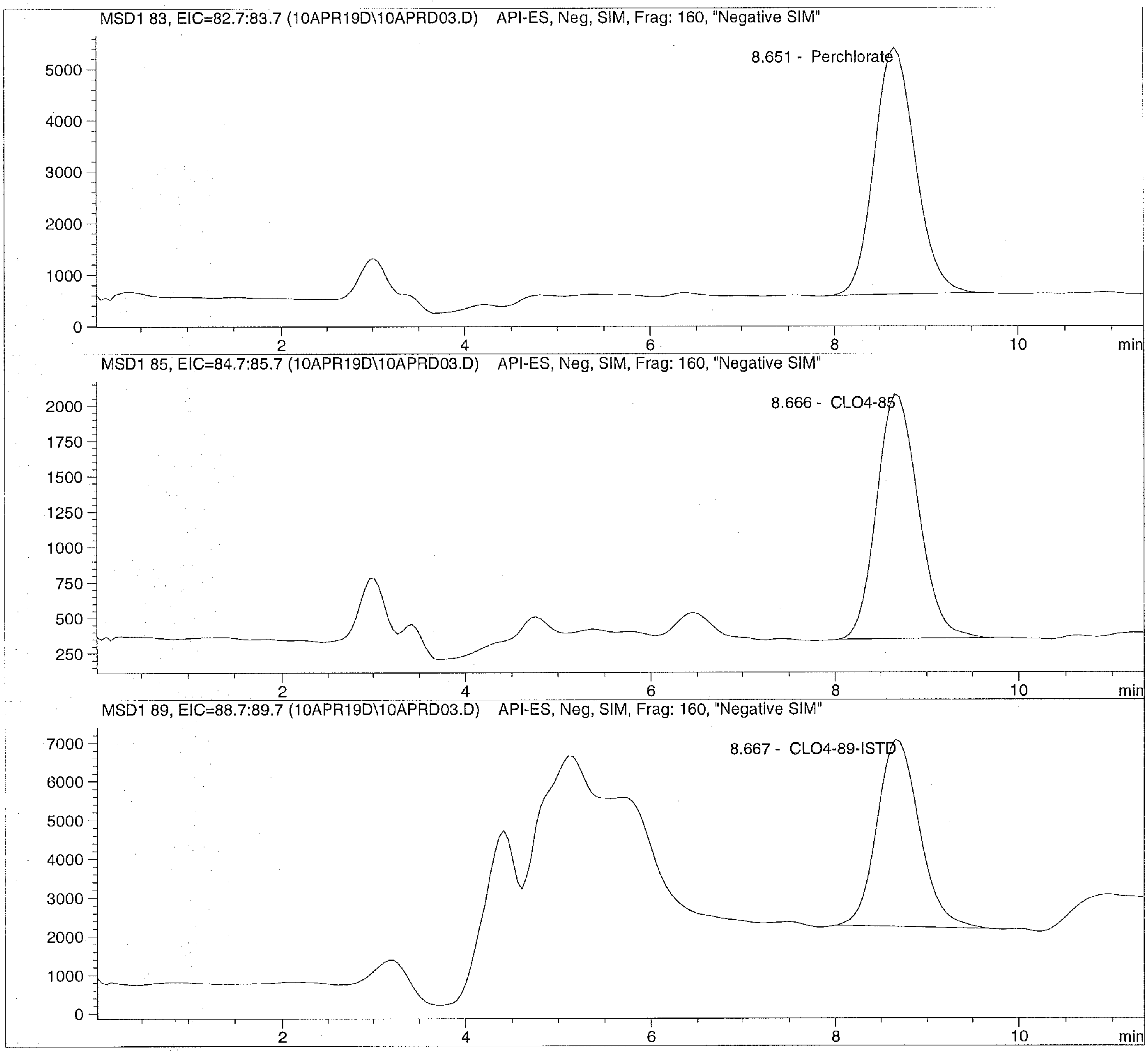
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD03.D   Sample Name: 647197 ICS@4.0

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD03.D Sample Name: 647197 ICS@4.0

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 ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD04.D   Sample Name: 647198   LMB

==

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

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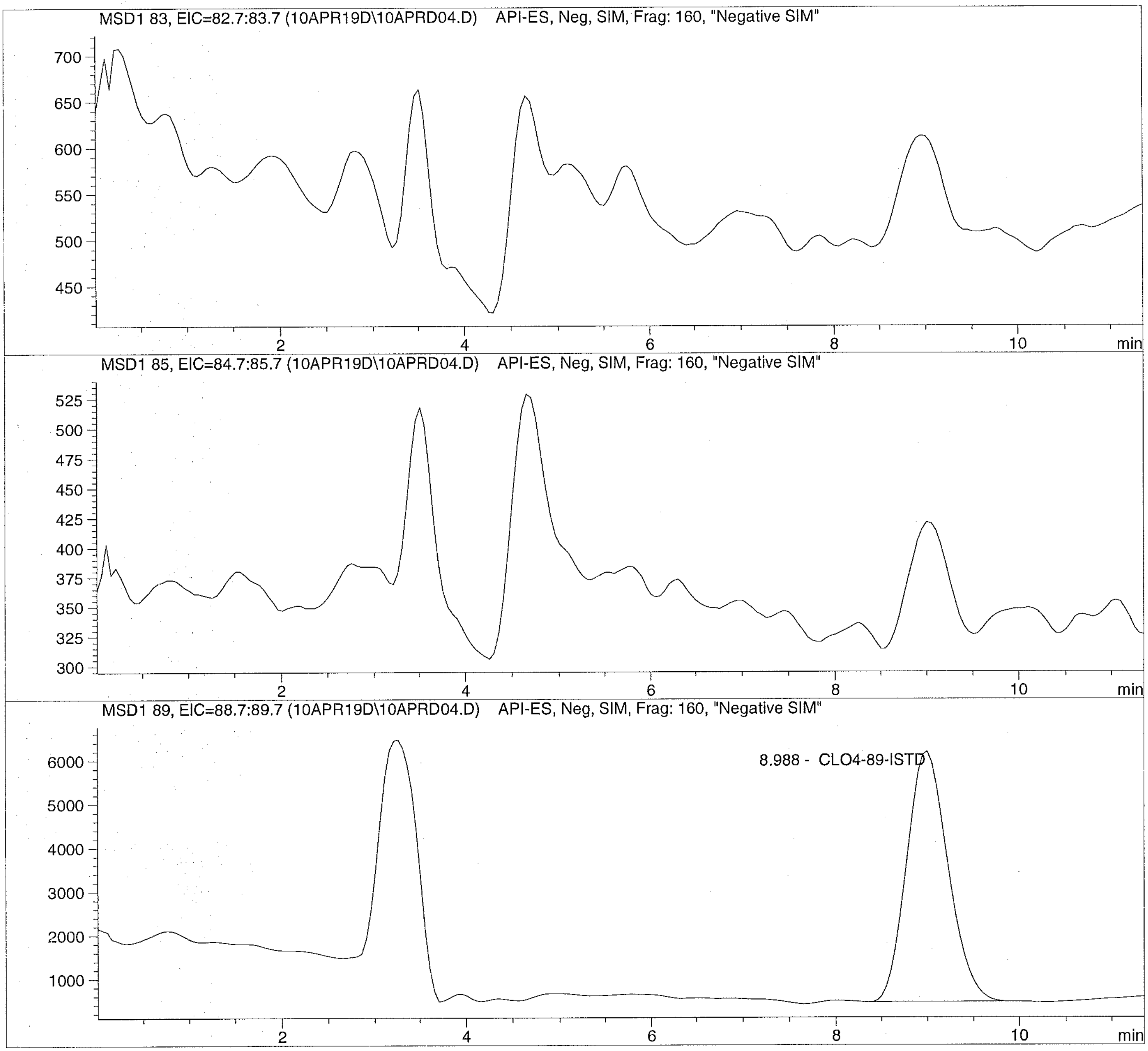


Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD04.D Sample Name: 647198 LMB

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

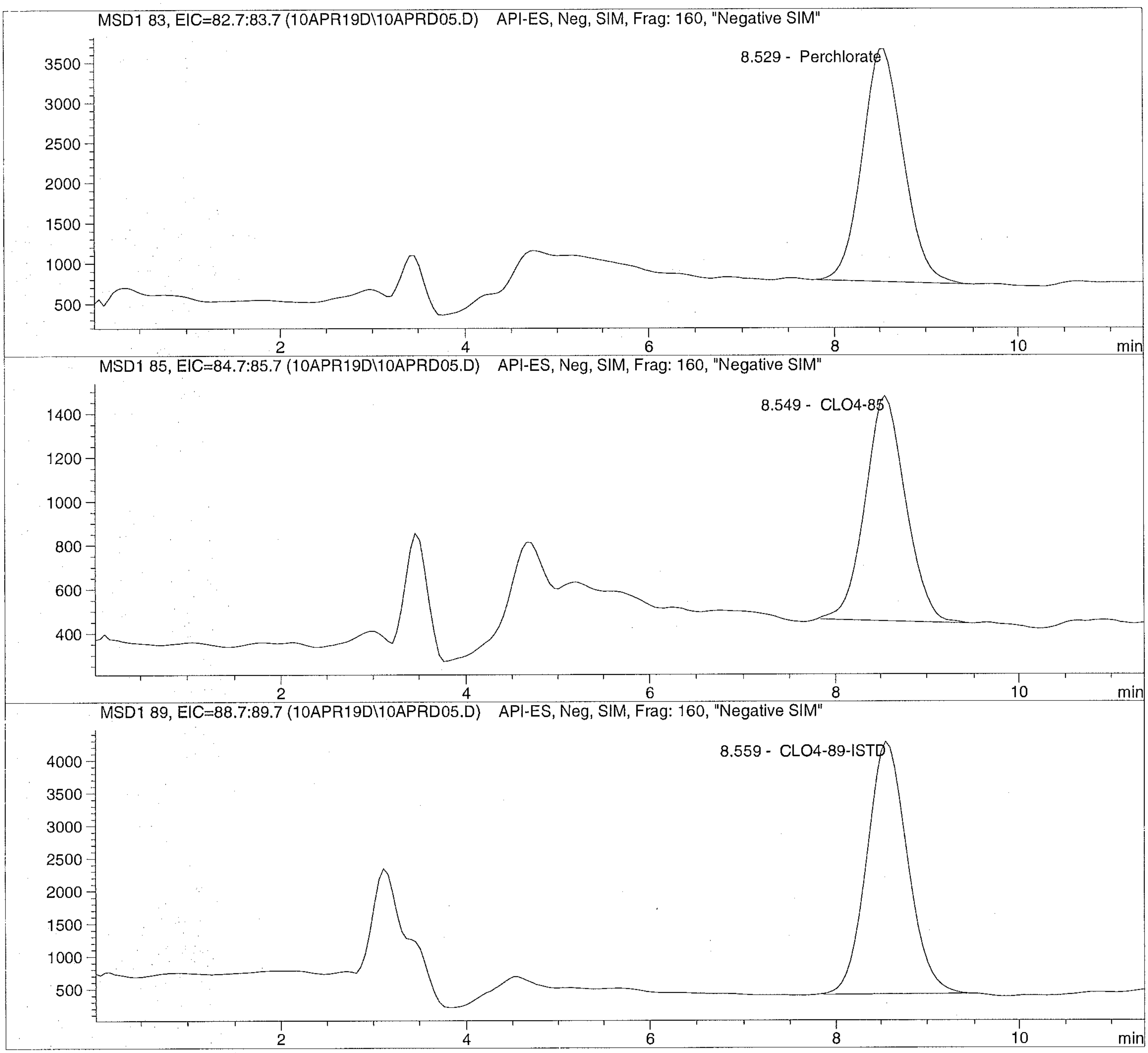
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD05.D Sample Name: 1909152001

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD05.D Sample Name: 1909152001

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

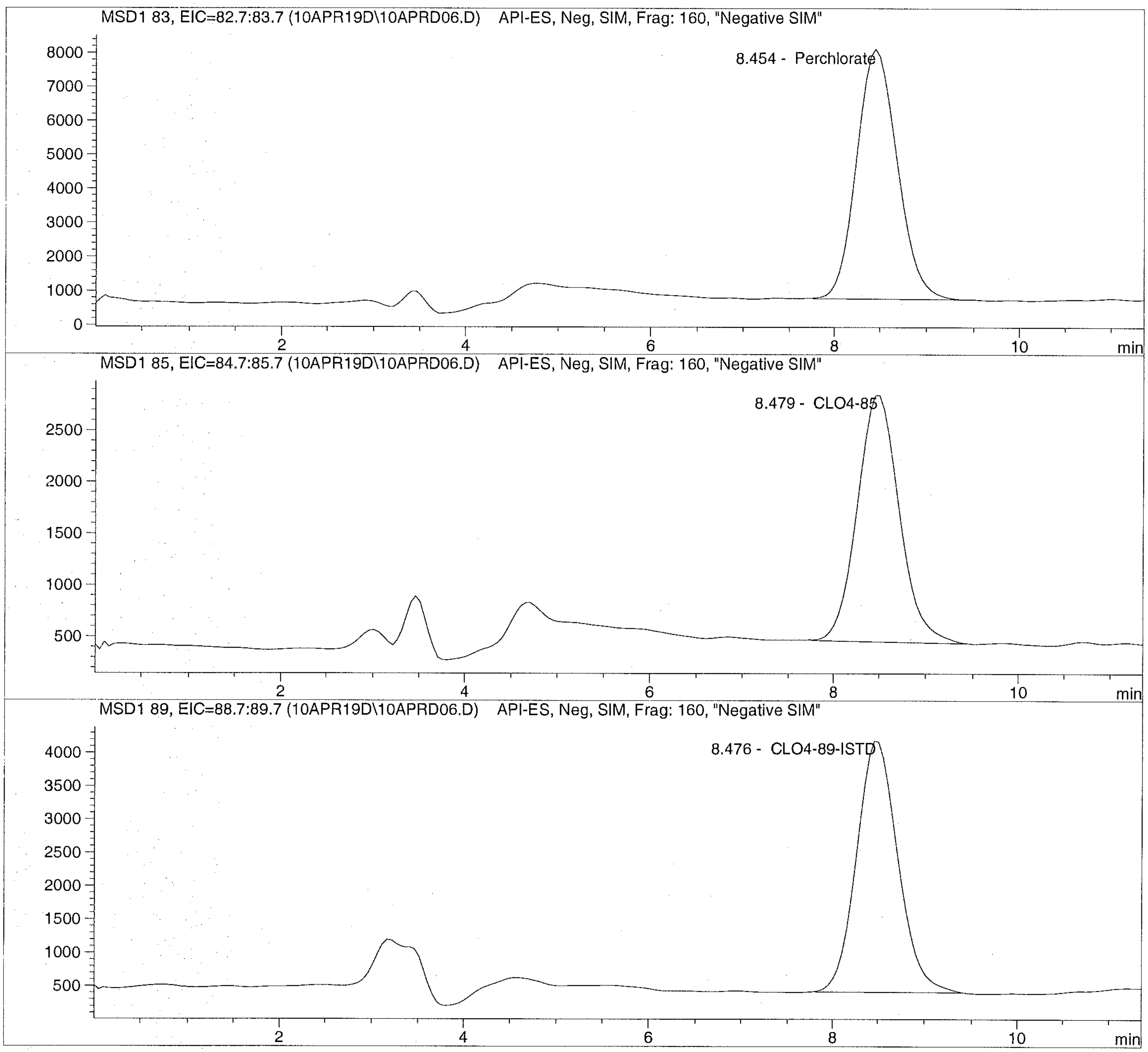
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.549	BBA	31827.5	2.8411	CLO4-85

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 ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD06.D       Sample Name: 647200   91521MS
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD06.D   Sample Name: 647200   91521MS

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

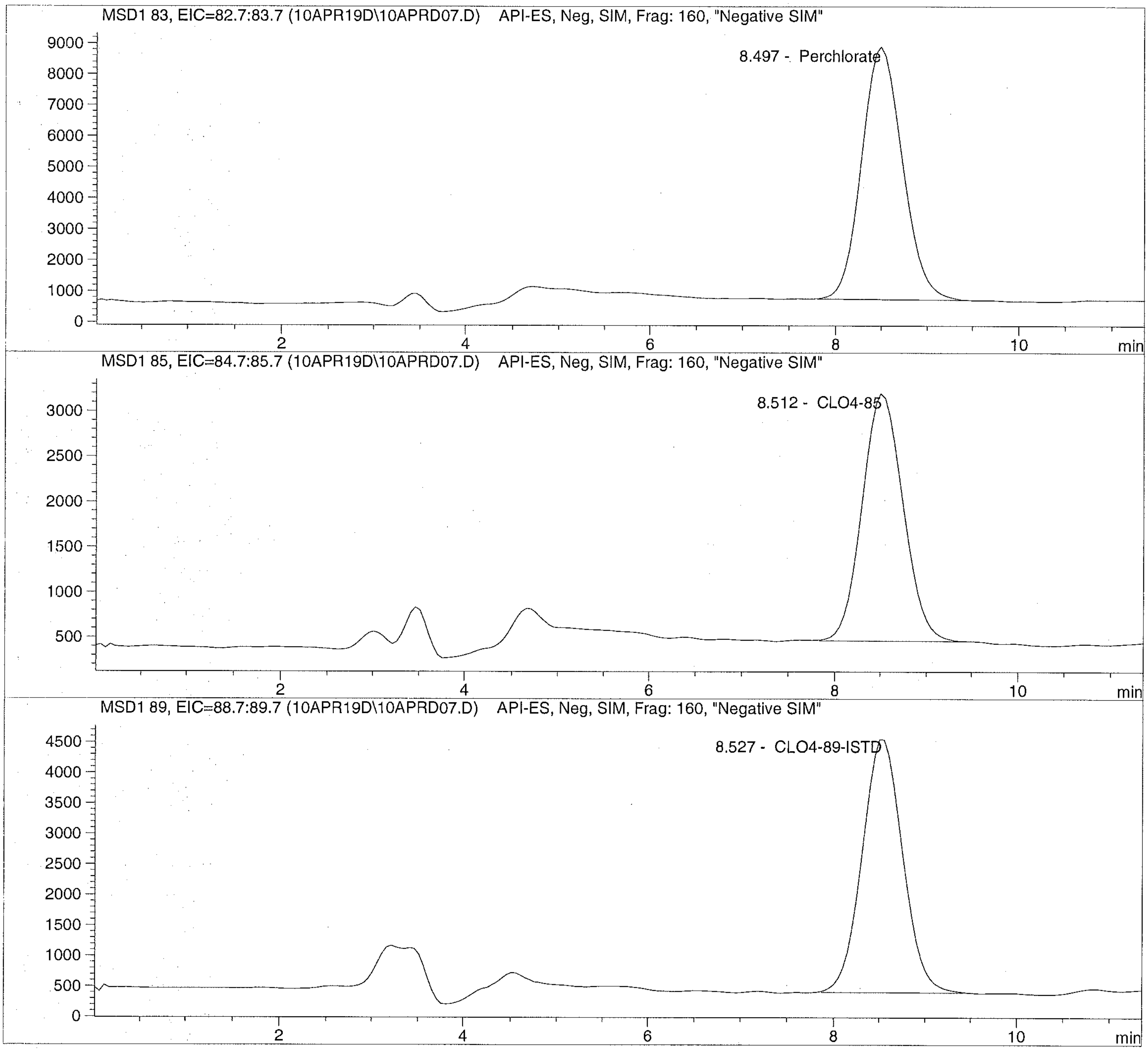
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD07.D   Sample Name: 647201   91521SD

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD07.D   Sample Name: 647201   91521SD

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

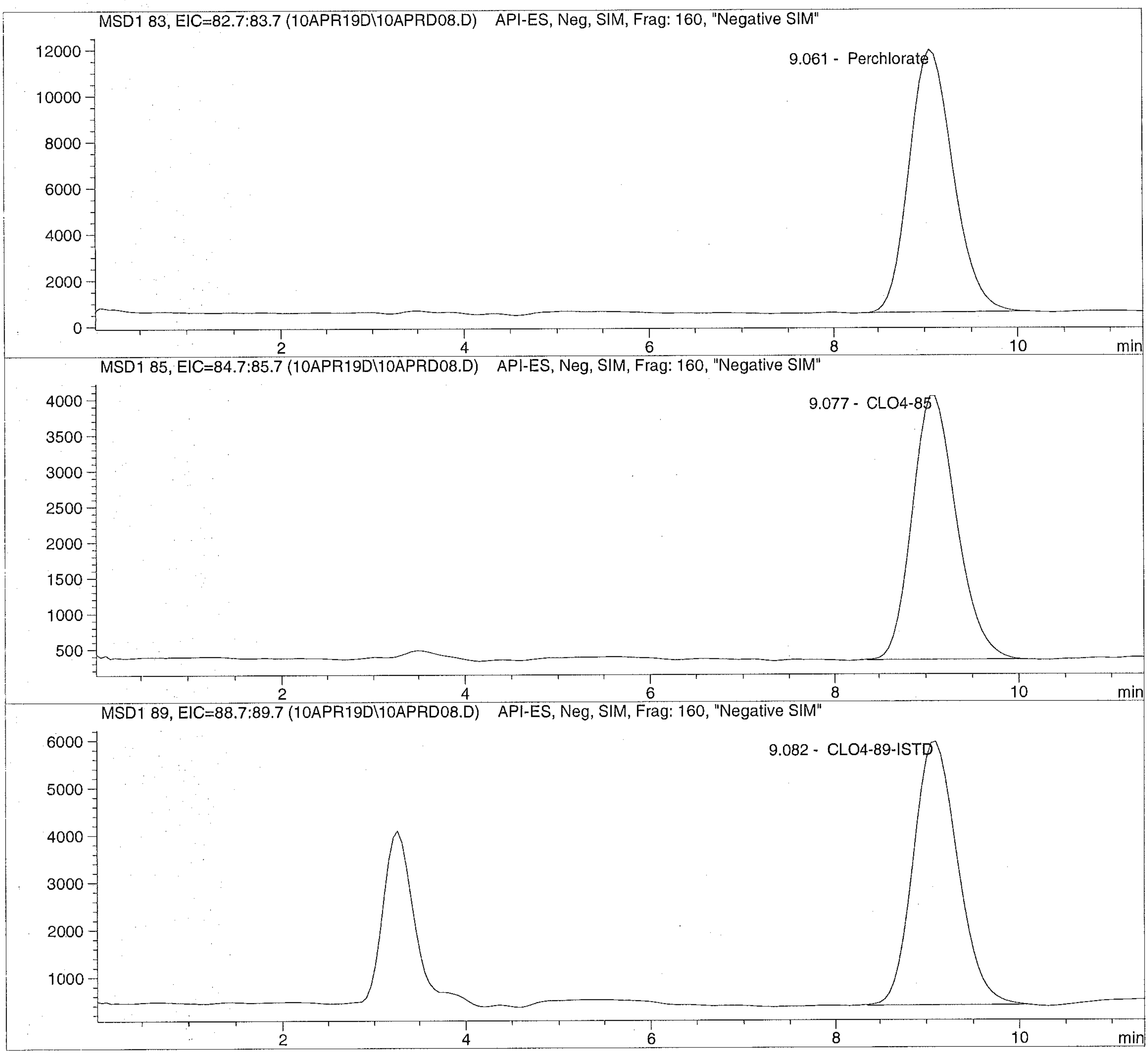
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.512	BBA	84268.6	7.0814	CLO4-85

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 ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD08.D        Sample Name: 1909153001   1K
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD08.D Sample Name: 1909153001 1K

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 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

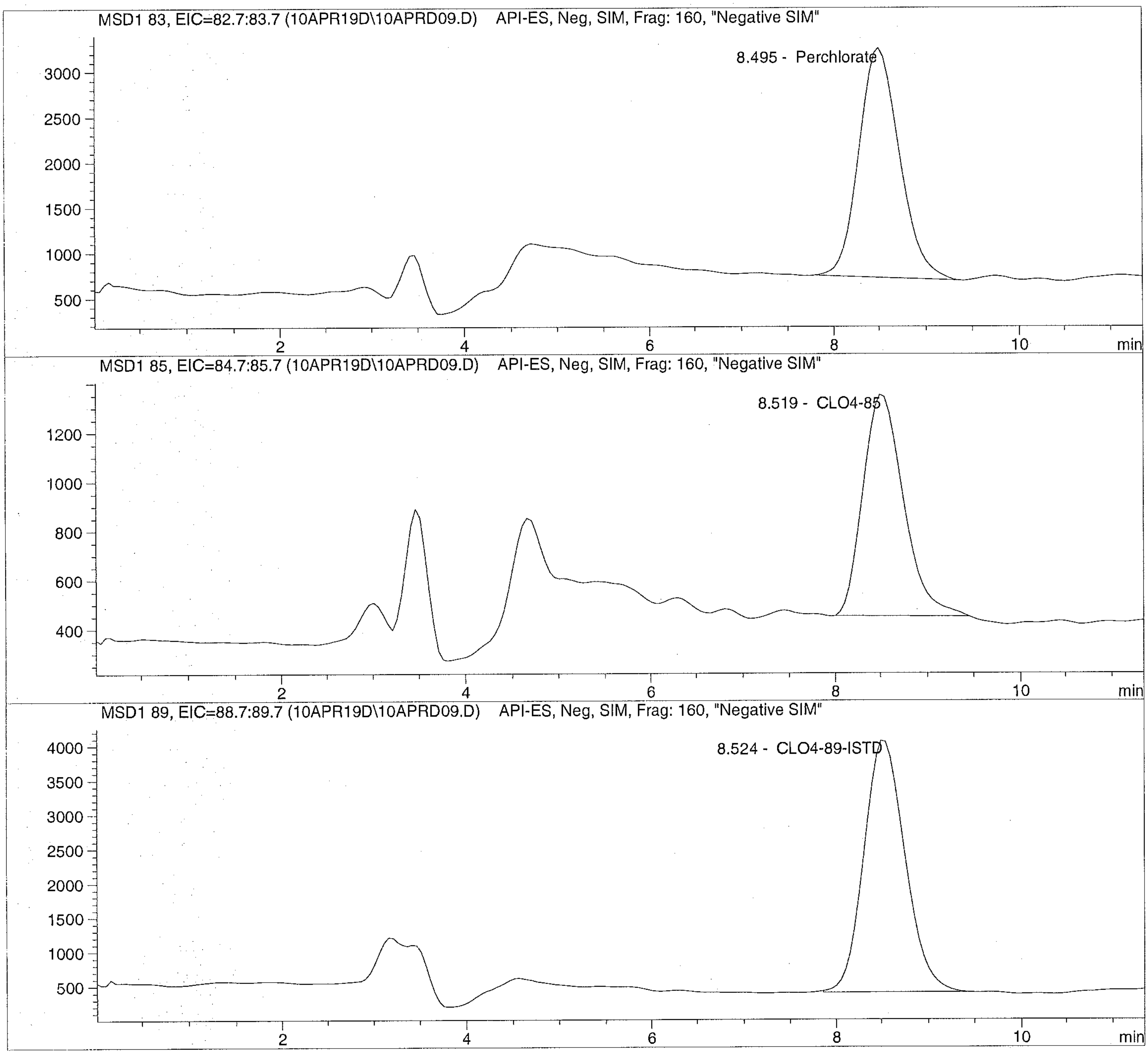
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD09.D Sample Name: 1909154001

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD09.D Sample Name: 1909154001

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

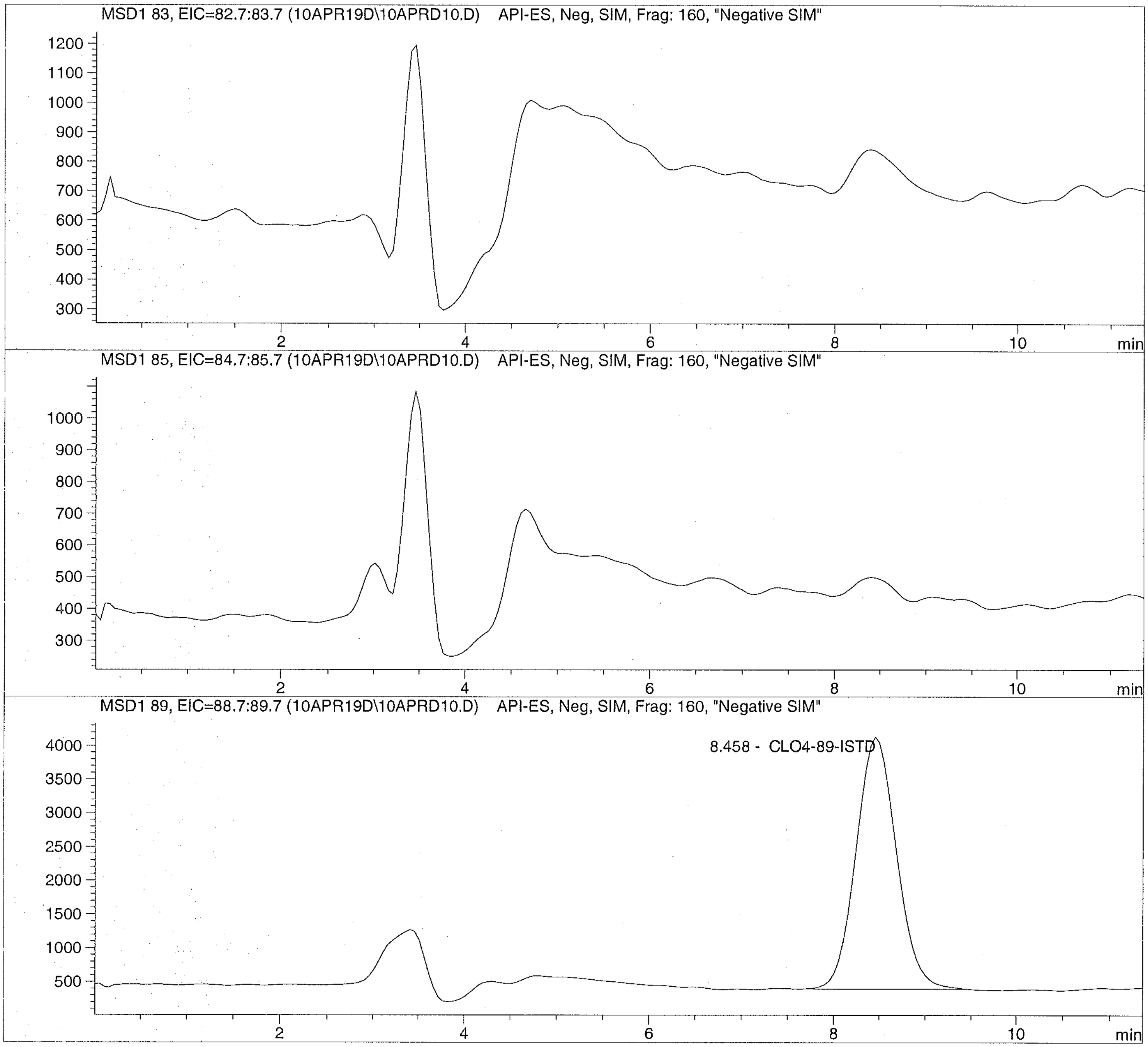
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD10.D   Sample Name: 1909947001

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD10.D Sample Name: 1909947001

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

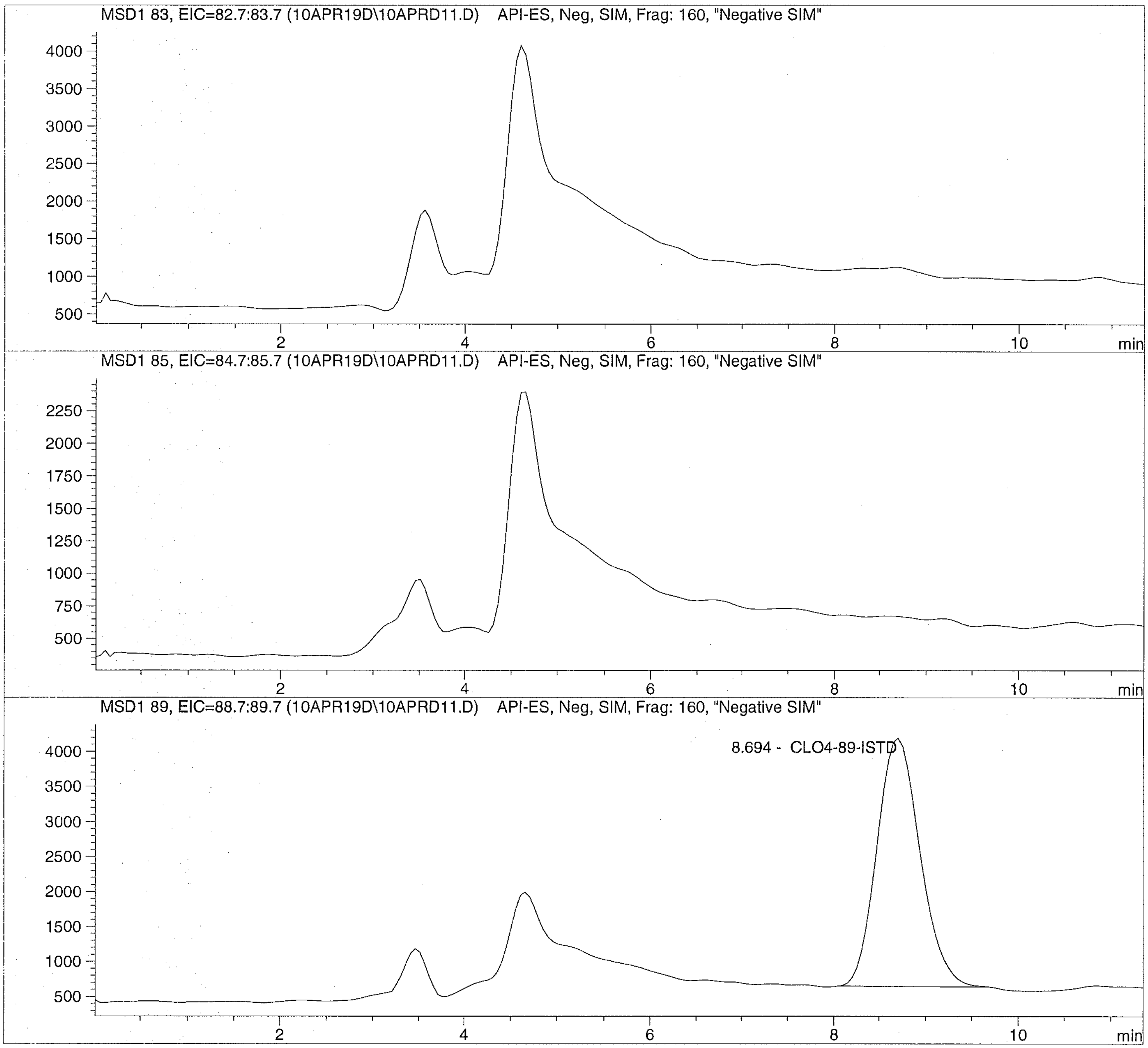
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD11.D   Sample Name: 1909949001

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD11.D   Sample Name: 1909949001

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 ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD12.D   Sample Name: 1909949002

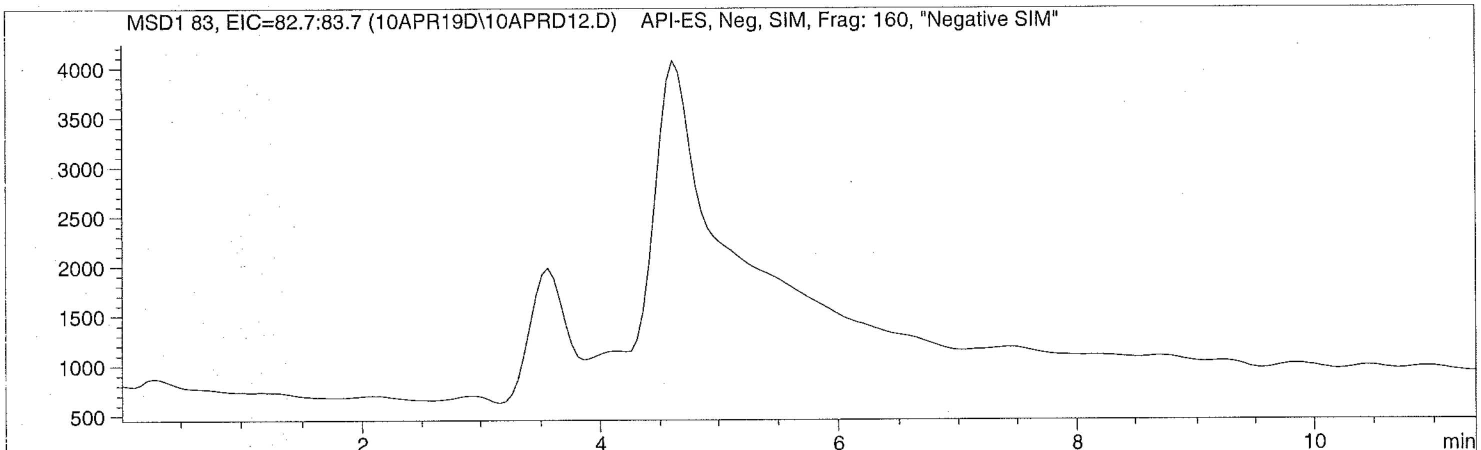
===

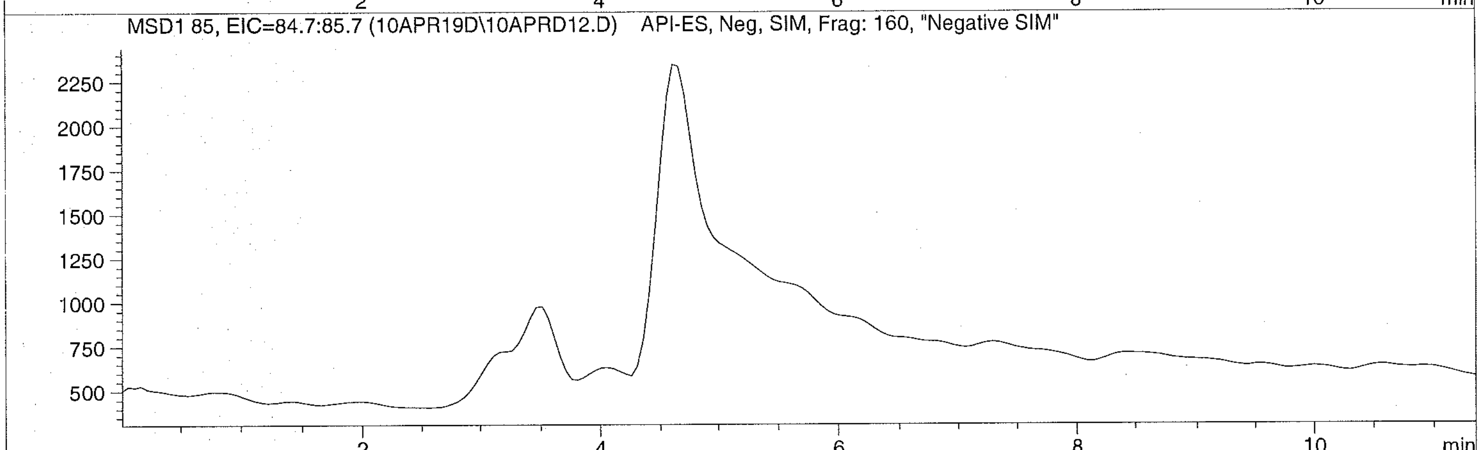
Injection Date:	4/10/2019 12:28:41	Seq Line:	12
Sample Name:	1909949002	Location:	Vial 82
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

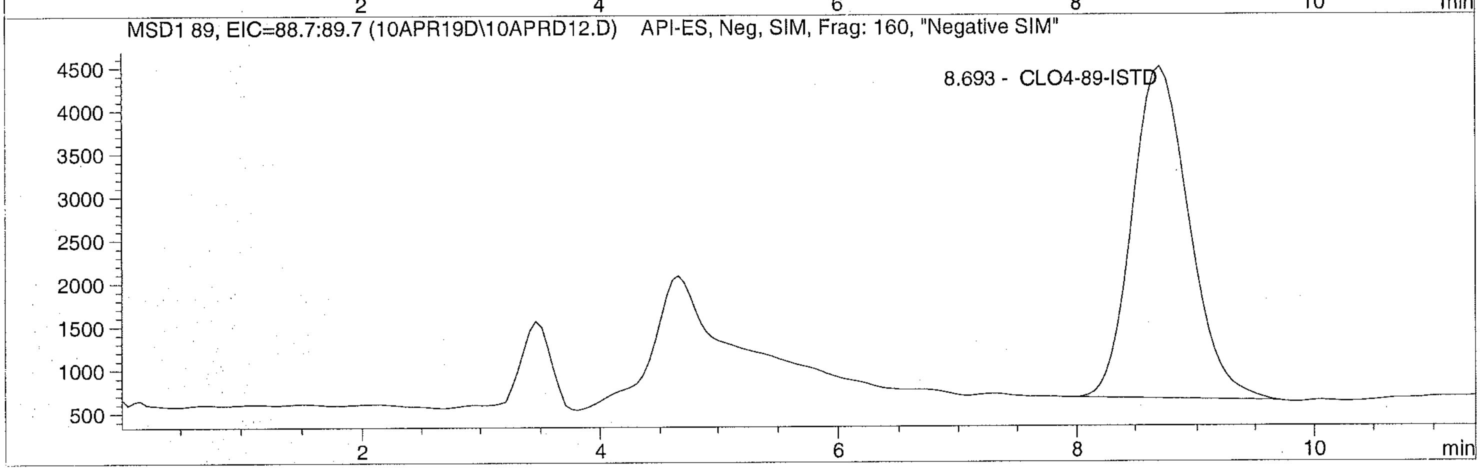
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:48:09

Perchlorate analysis

===







Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD12.D Sample Name: 1909949002

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

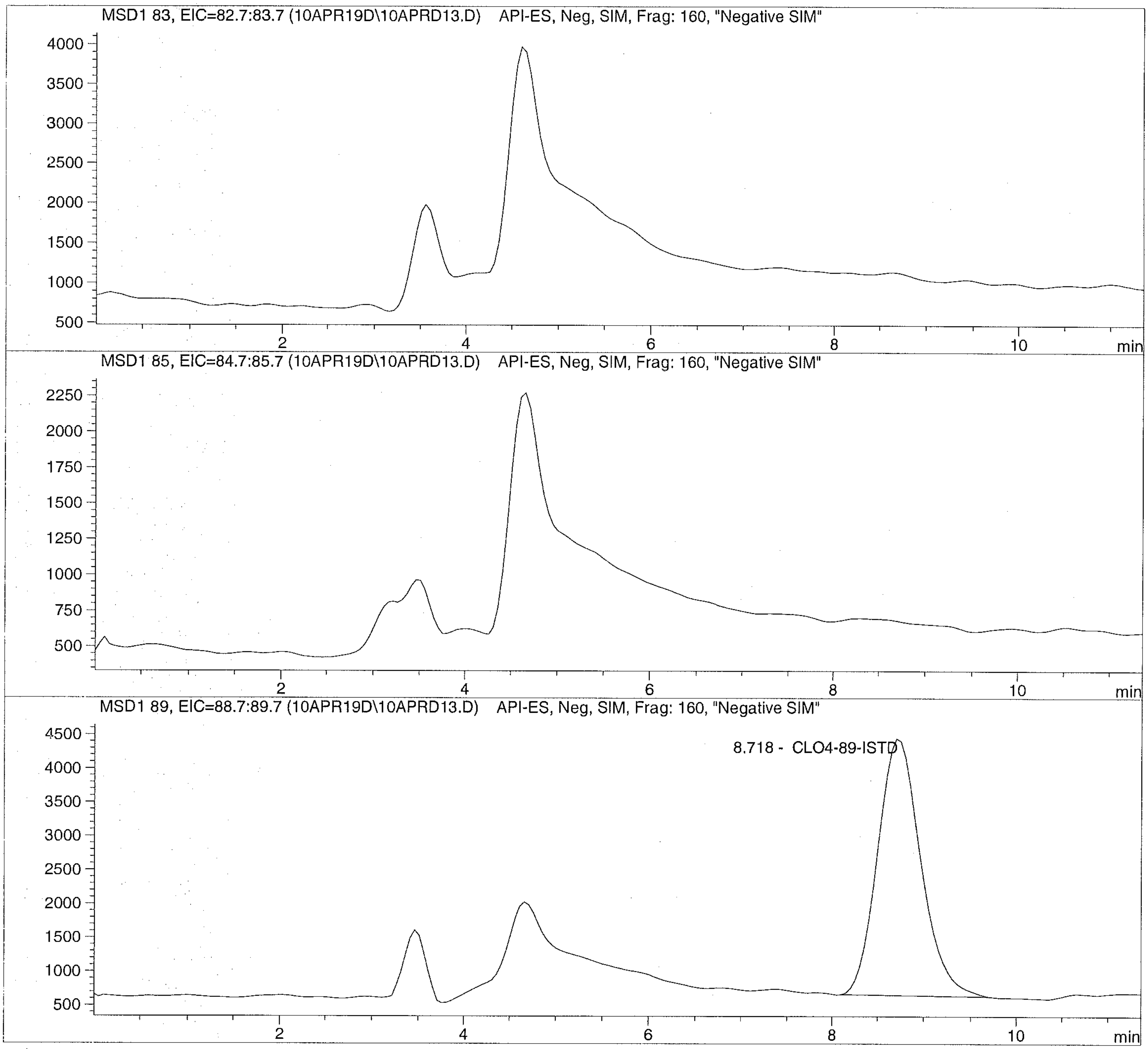
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

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 ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD13.D       Sample Name: 1909949003
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD13.D Sample Name: 1909949003

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

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 ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD14.D Sample Name: 1909949004

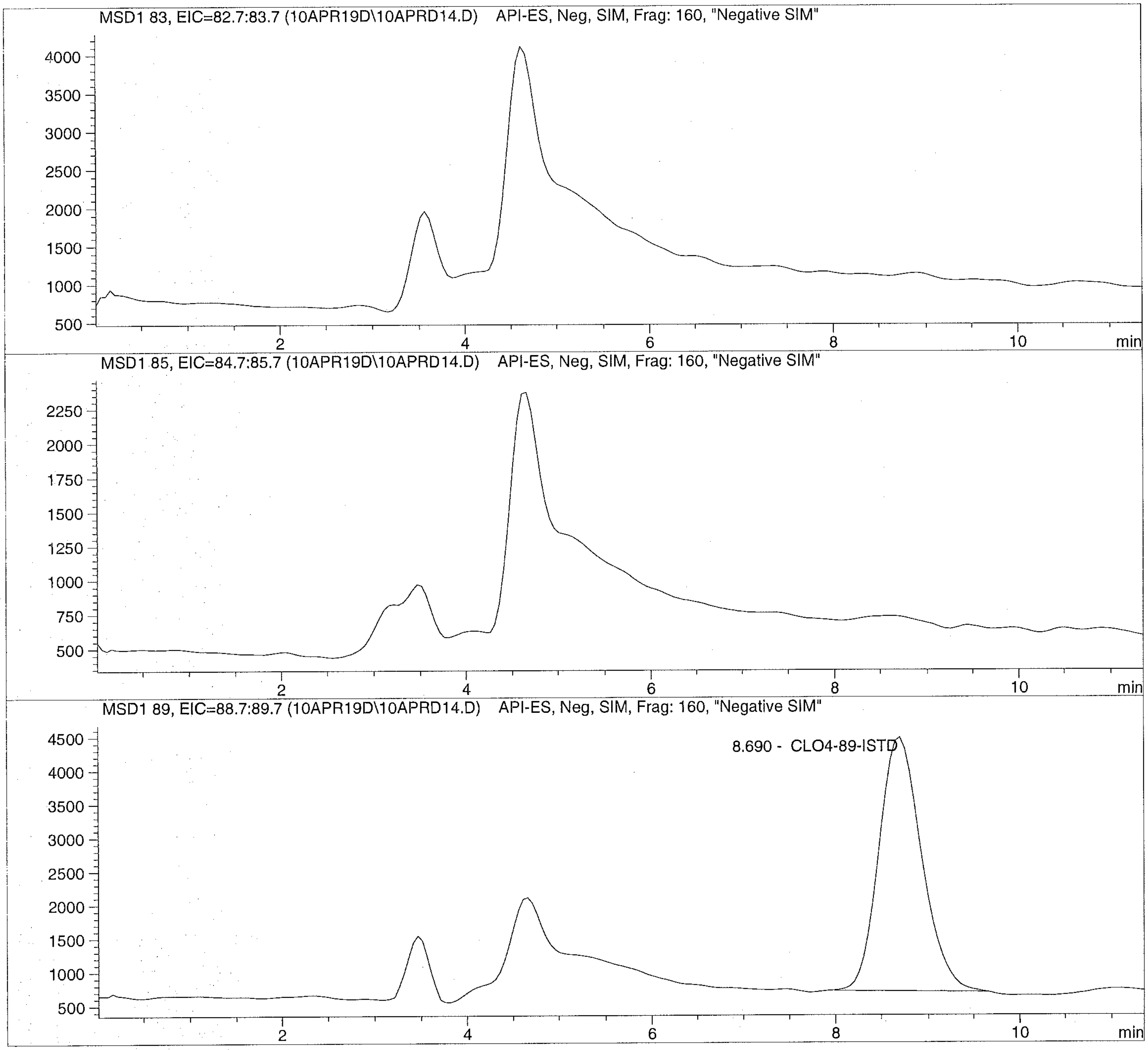
===

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

===



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD14.D   Sample Name: 1909949004

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

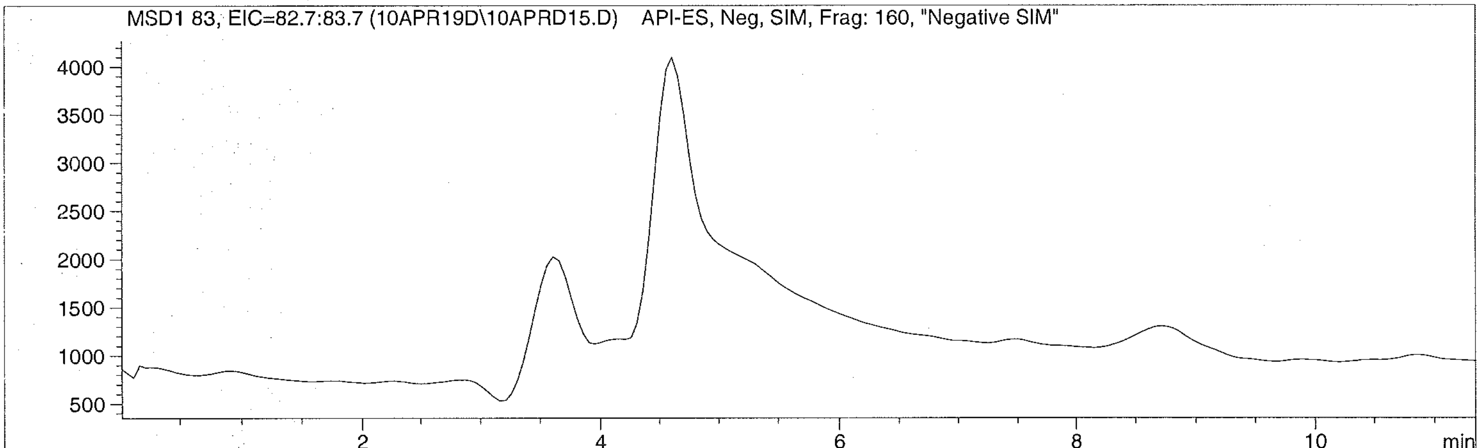
*** End of Report ***

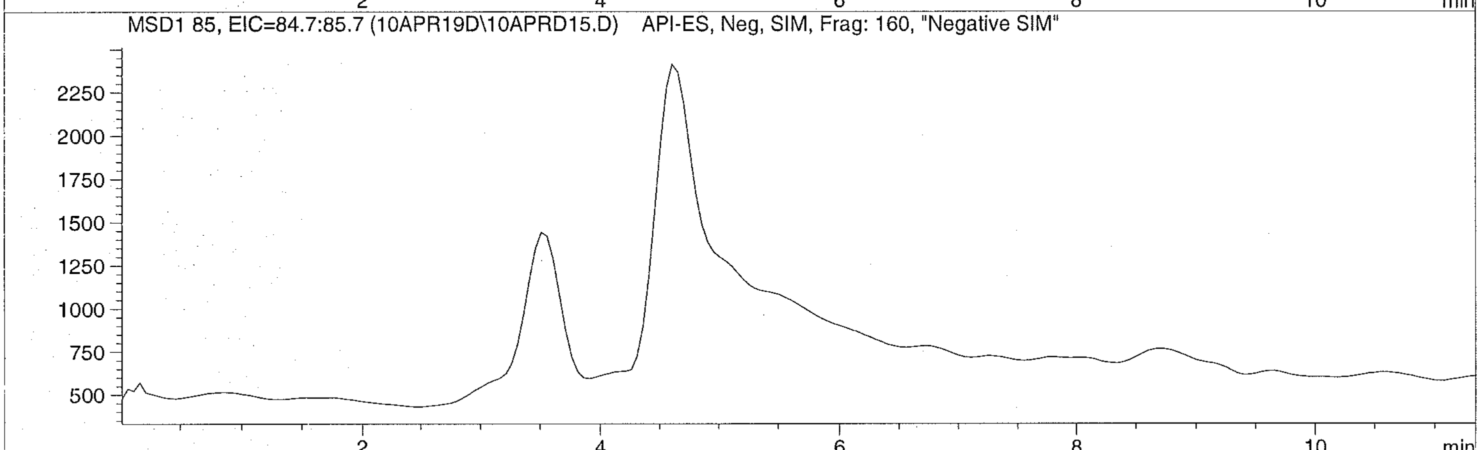
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD15.D Sample Name: 1909949005

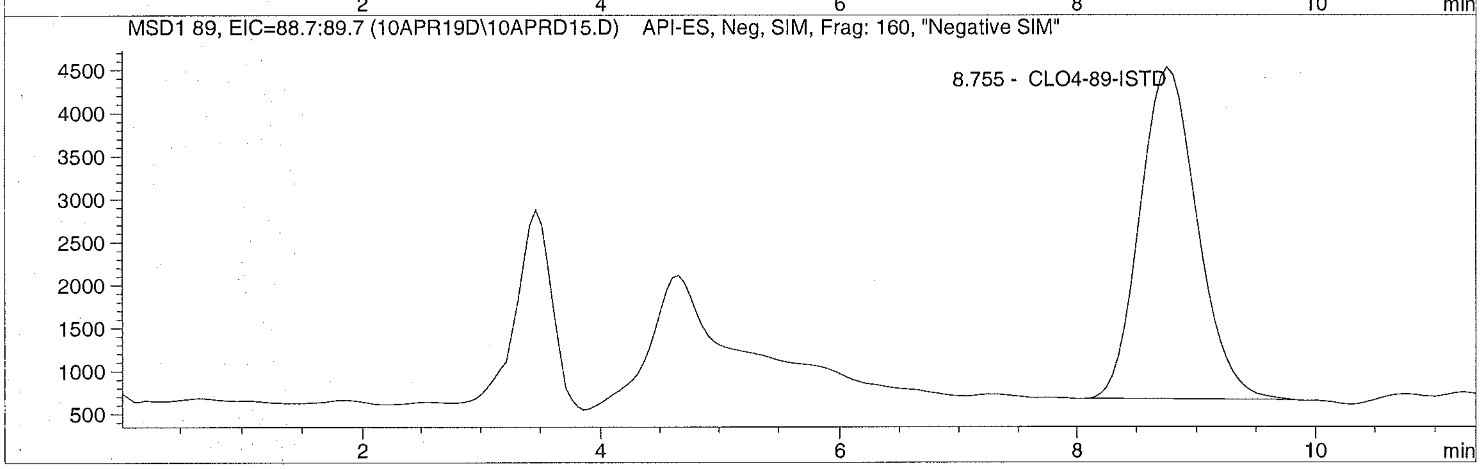
Injection Date:	4/10/2019 13:08:30	Seq Line:	15
Sample Name:	1909949005	Location:	Vial 85
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

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

Perchlorate analysis







Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD15.D Sample Name: 1909949005

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

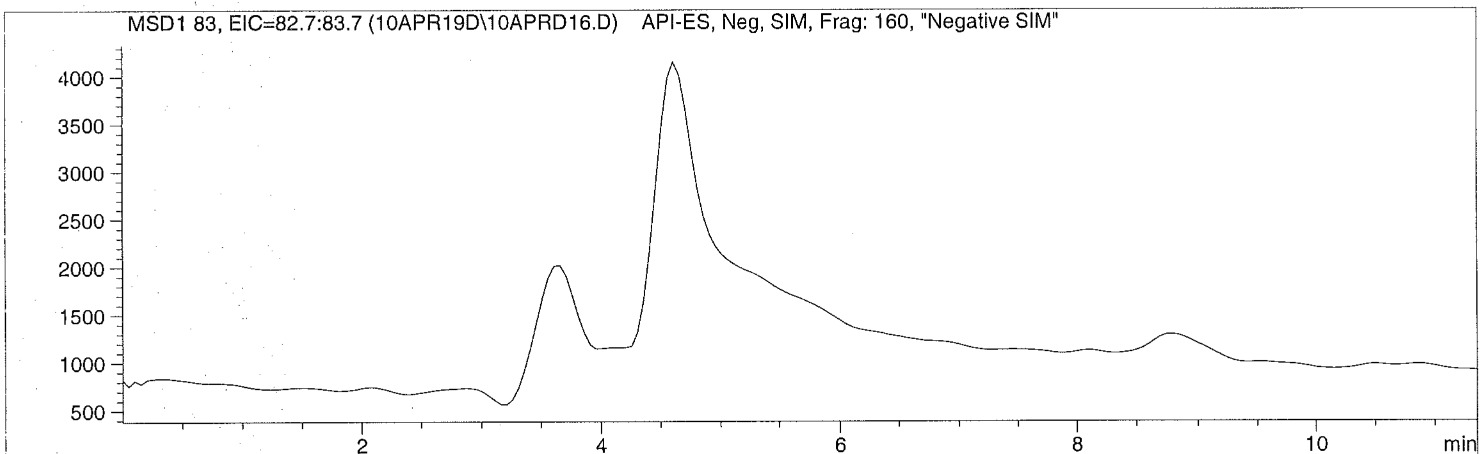
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

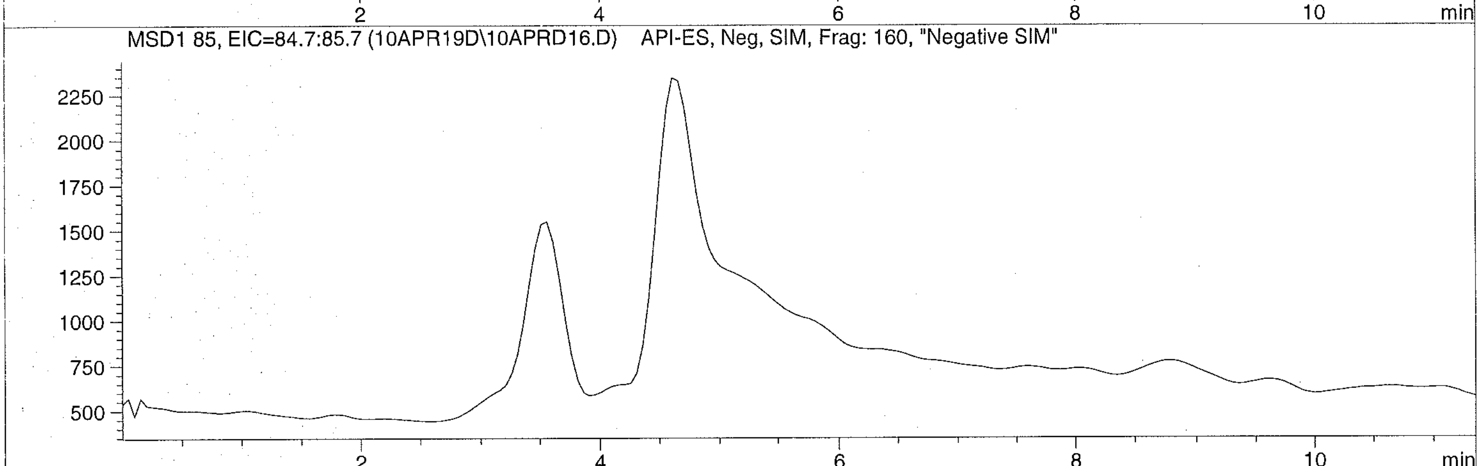
Signal3: MSD1 89, EIC=88.7:89.7

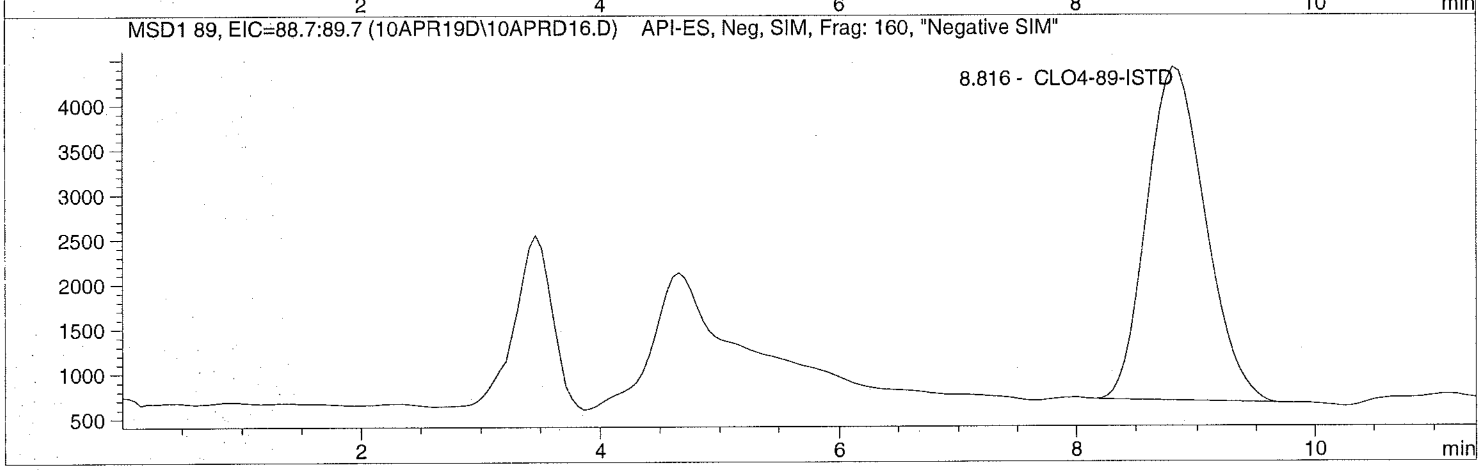
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	PBA	127767.0	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD16.D       Sample Name: 1909949006
=====================================================================================
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
=====================================================================================
```







Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD16.D Sample Name: 1909949006

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

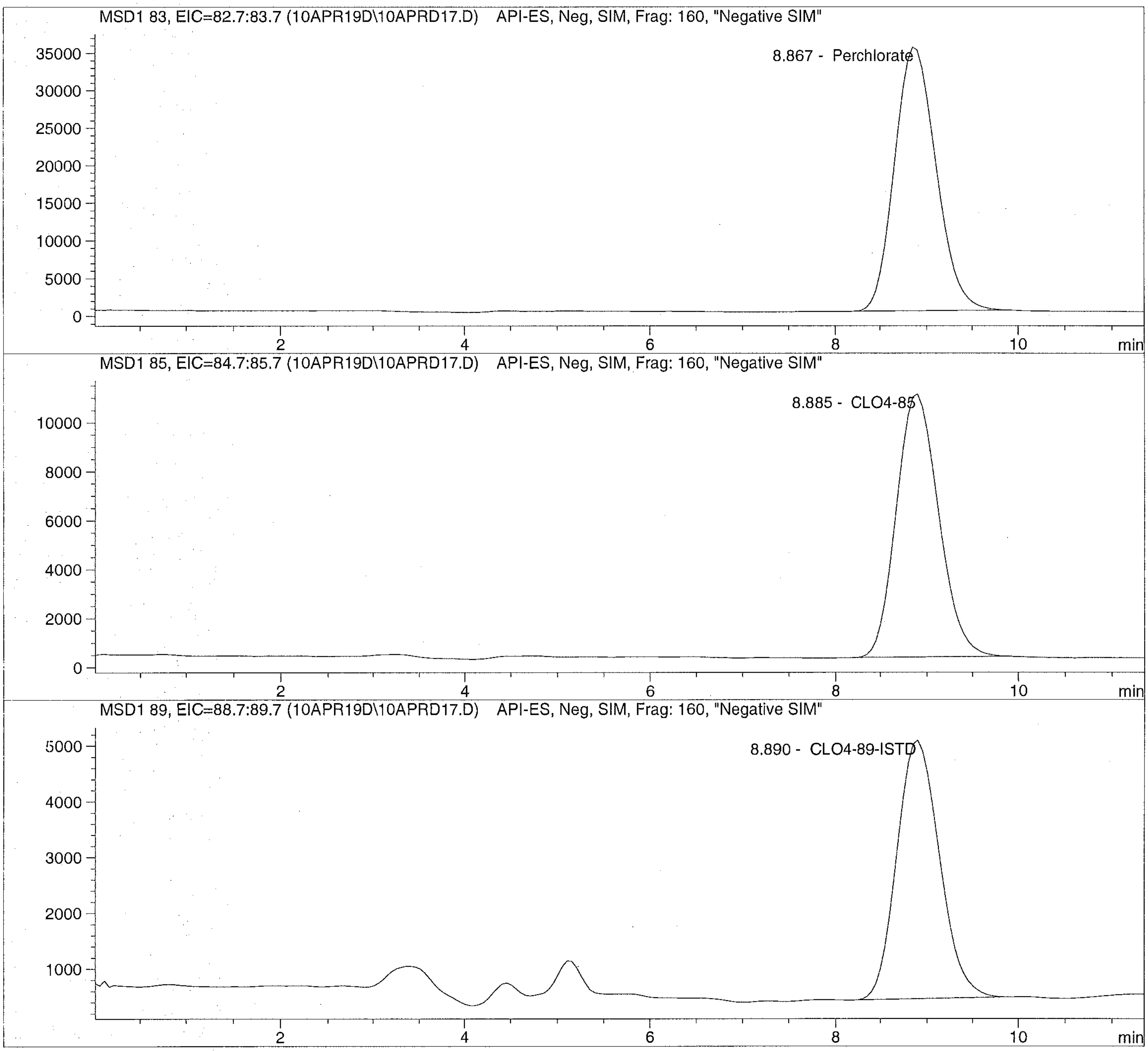
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

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 ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD17.D        Sample Name: 647202    CCV@25
=====================================================================================
Injection Date:    4/10/2019  13:35:04              Seq Line:           17
Sample Name:       647202    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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD17.D   Sample Name: 647202   CCV@25

Injection Date:	4/10/2019 13:35:04	Seq Line:	17
Sample Name:	647202 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
8.867	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):

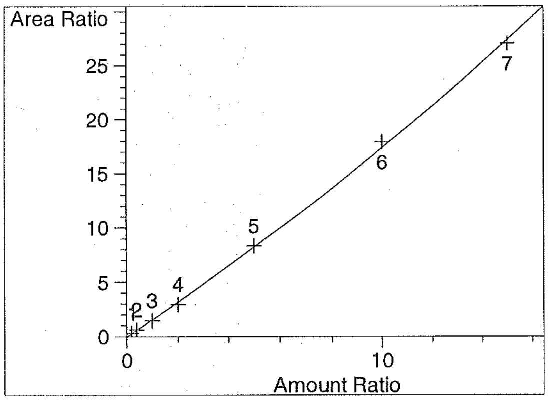
ISTD #	ISTD Amount	Name
1	5.00000	CLO4-89-ISTD

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 [min]	Sig	Lvl	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			

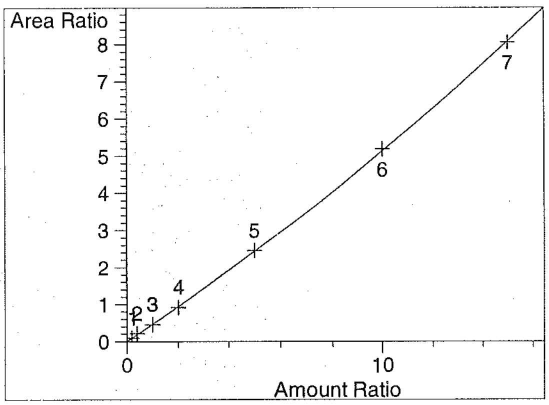
```
RetTime  Lvl   Amount      Area      Amt/Area  Ref Grp Name
 [min] Sig
-------|--|--|----------|----------|----------|---|--|---------------
          7    5.00000 2.21504e5  2.25729e-5

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



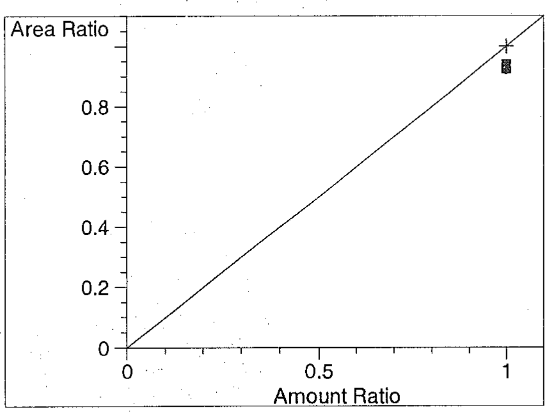
Perchlorate at exp. RT: 8.744
MSD1 83, EIC=82.7:83.7
Correlation: 0.99957
Residual Std. Dev.: 0.30744
Formula: $y = ax^2 + bx + c$
a: 1.76988e-2
b: 1.56480
c: -4.92430e-2
x: Amount Ratio
y: Area Ratio
Calibration Level Weights:

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

00935776

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:

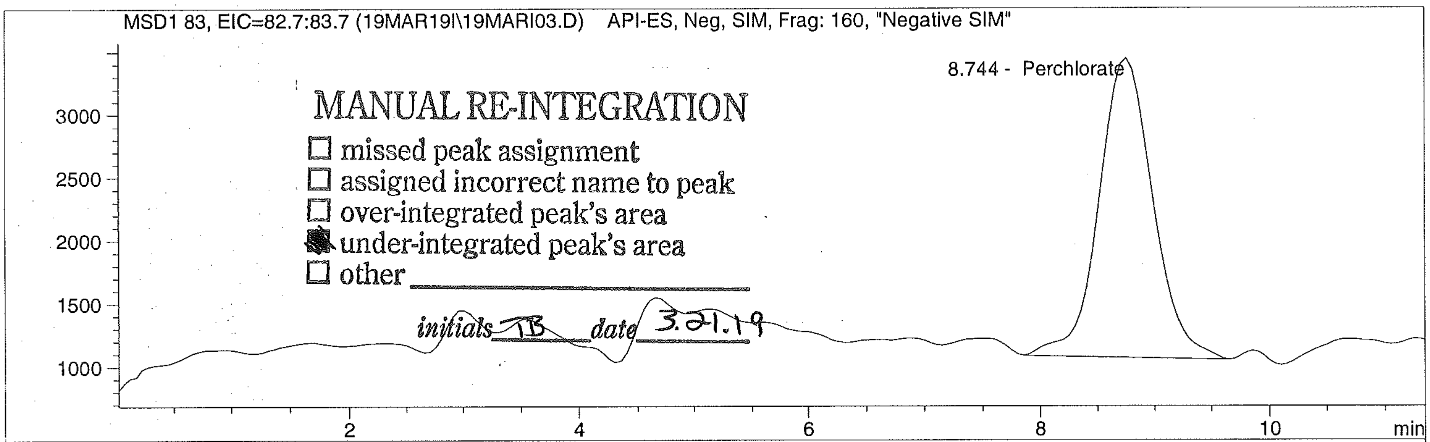
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	CLO4@ 5.0ug/L	CLO4-AQN	1	Ctrl Samp		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

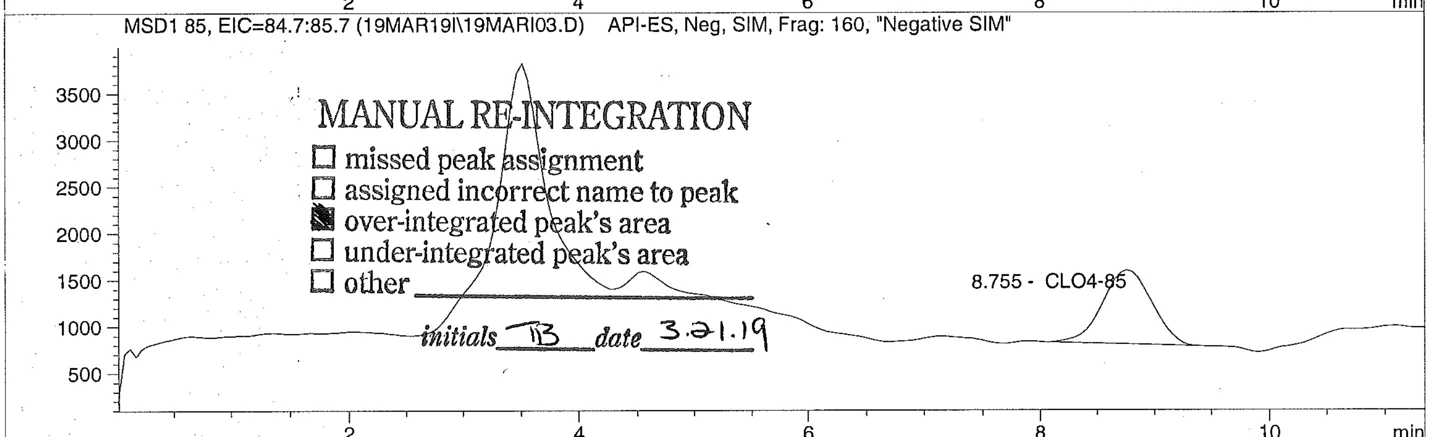
Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI03.D   Sample Name: CLO4@ 1.0ug/L

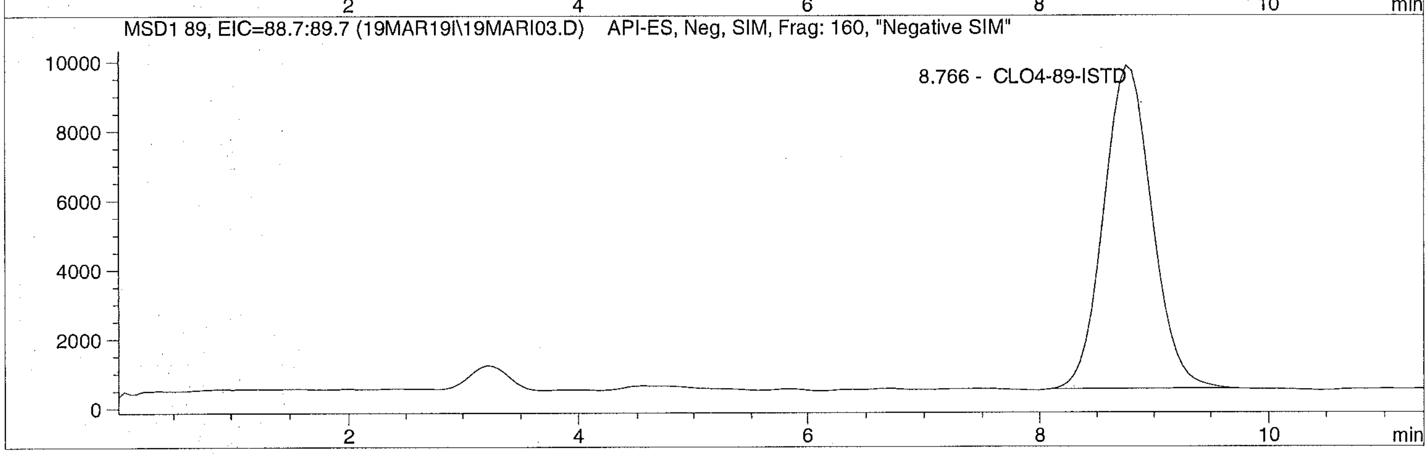
Injection Date:	3/19/2019 09:39:40	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis







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

===

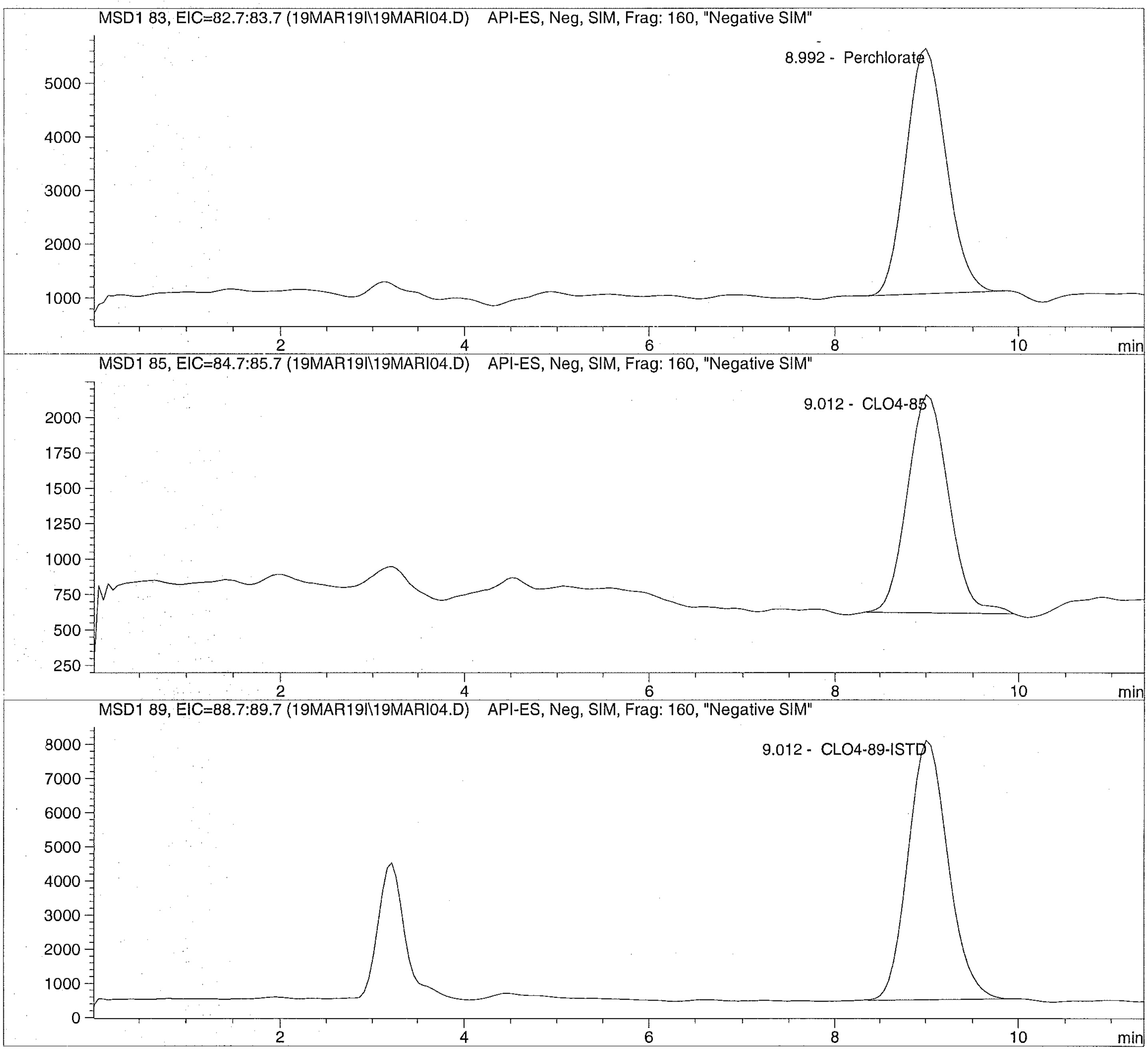
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D   Sample Name: CLO4@ 2.0ug/L

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



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D Sample Name: CLO4@ 2.0ug/L

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

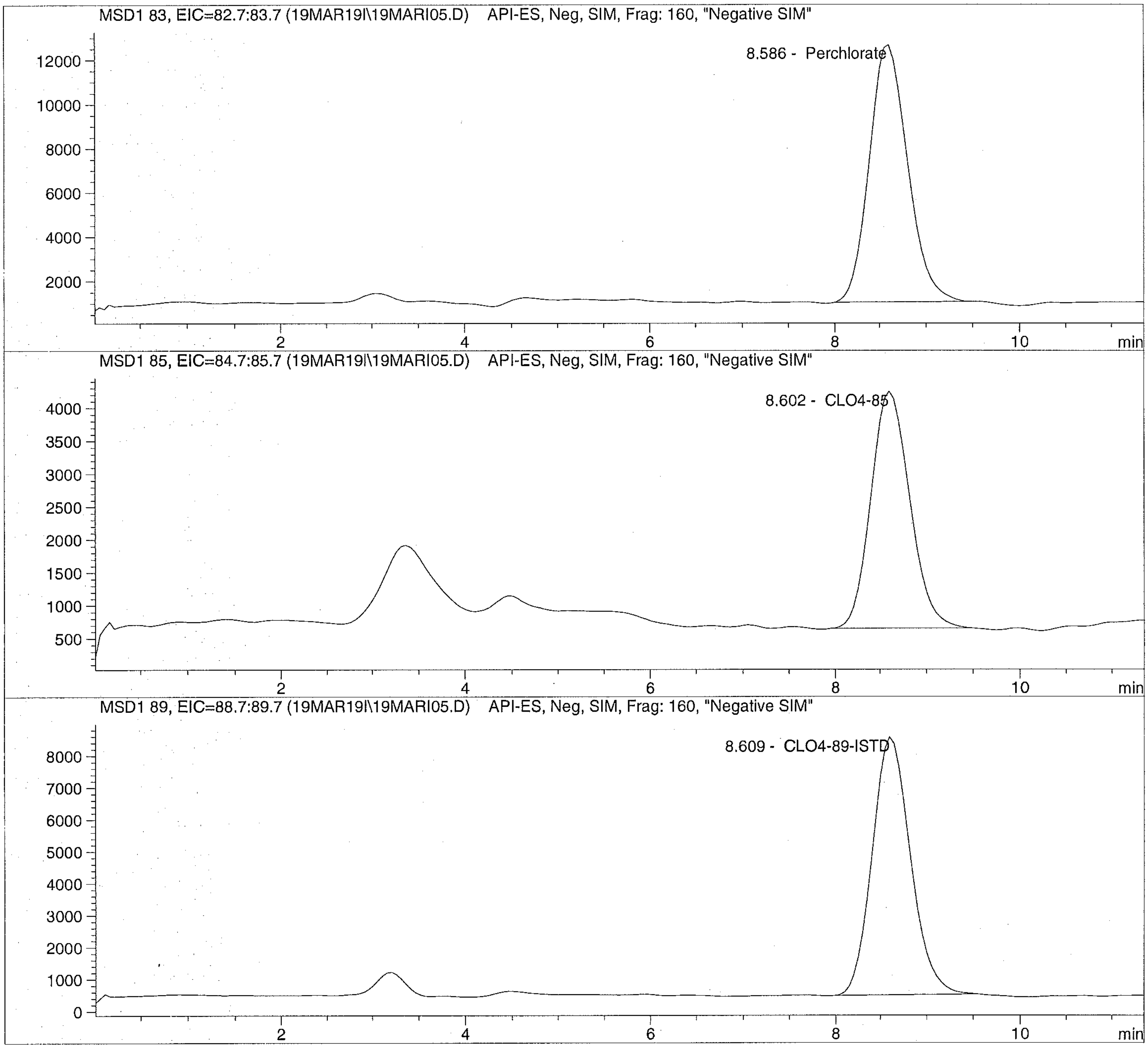
*** End of Report ***

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



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

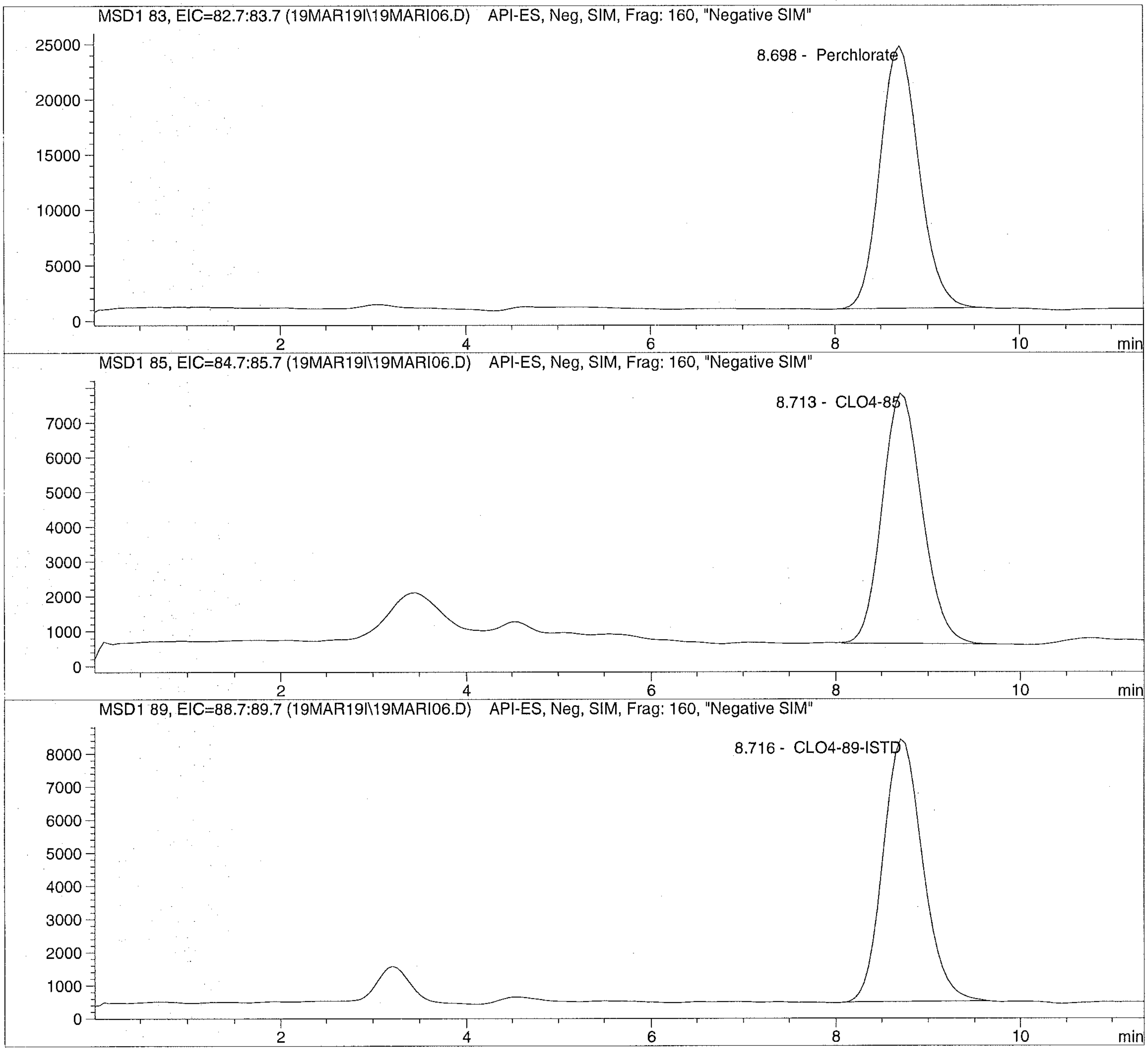
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

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 ***

```
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
===================================================================================
```



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

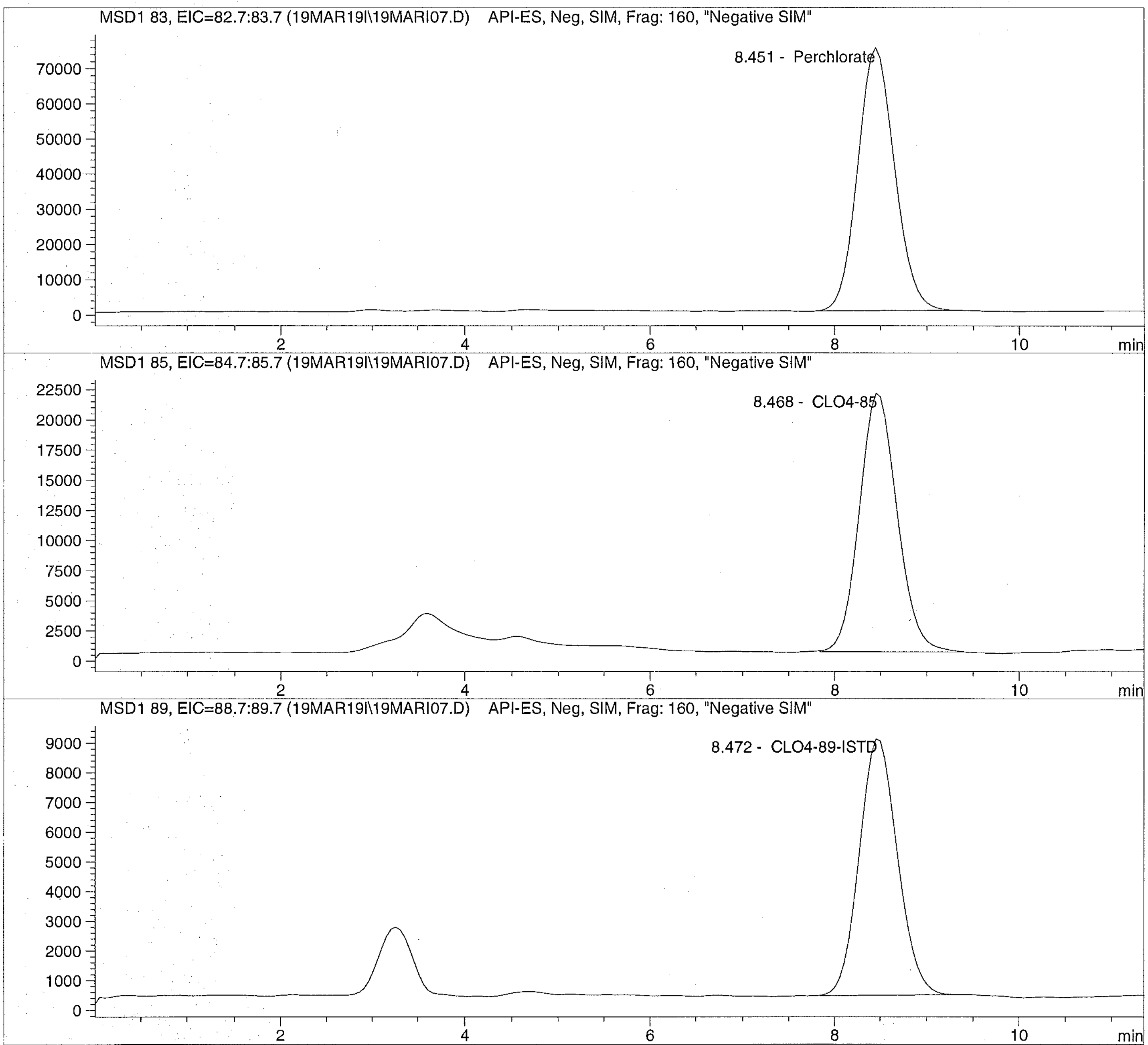
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

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 ***

```
Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D       Sample Name: CLO4@ 25.ug/L
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D Sample Name: CLO4@ 25.ug/L

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

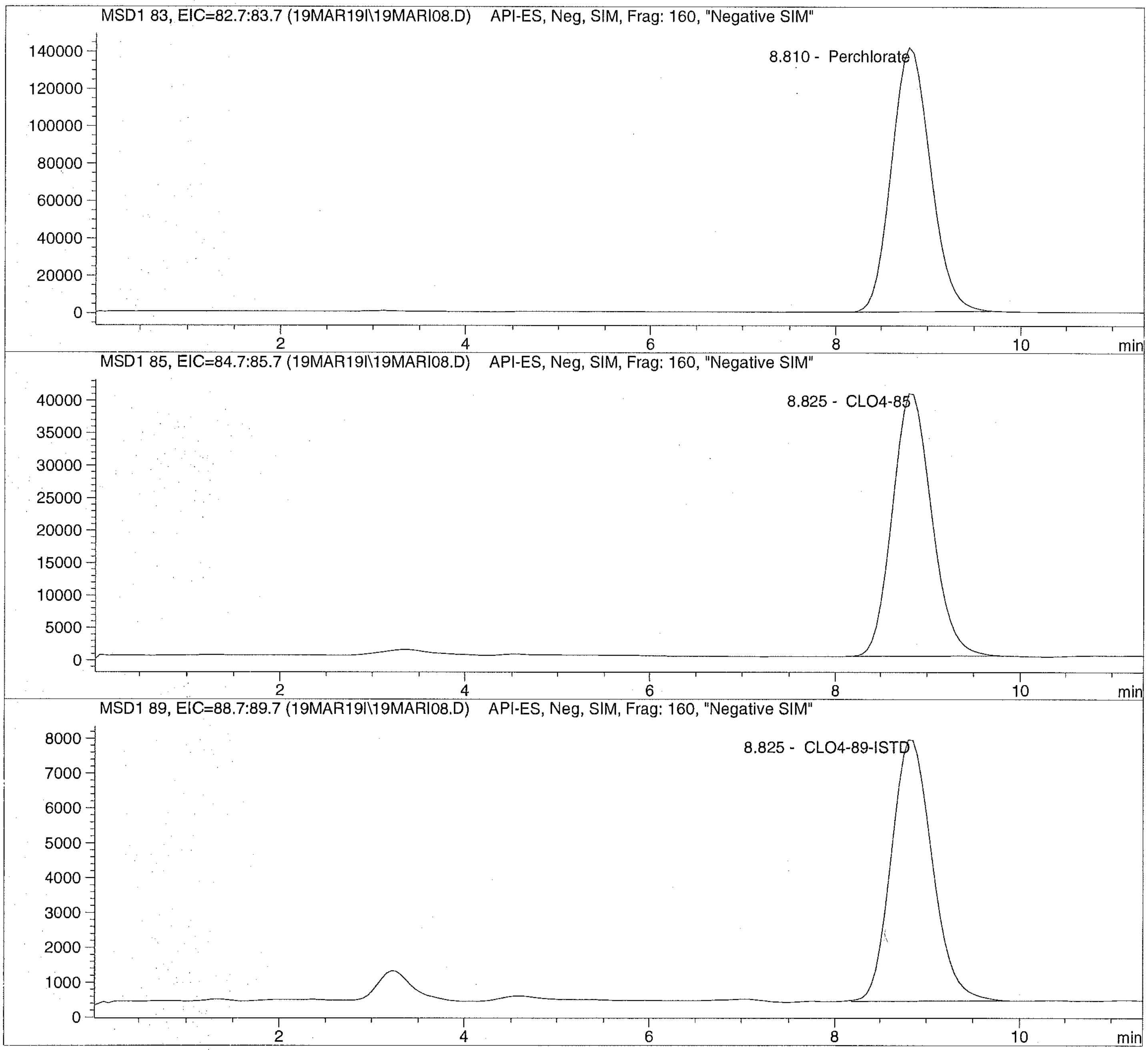
*** End of Report ***

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

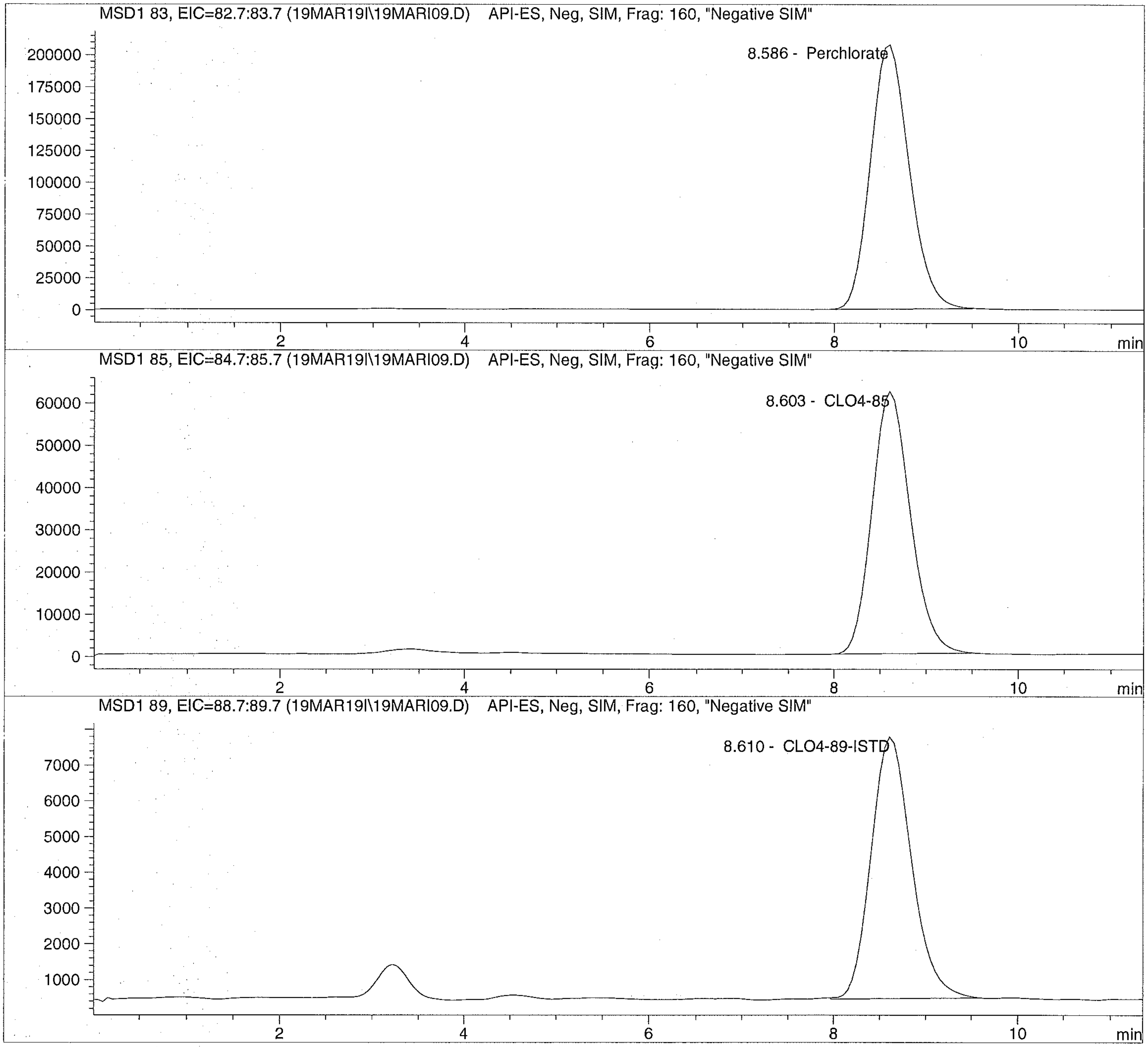
*** End of Report ***

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



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

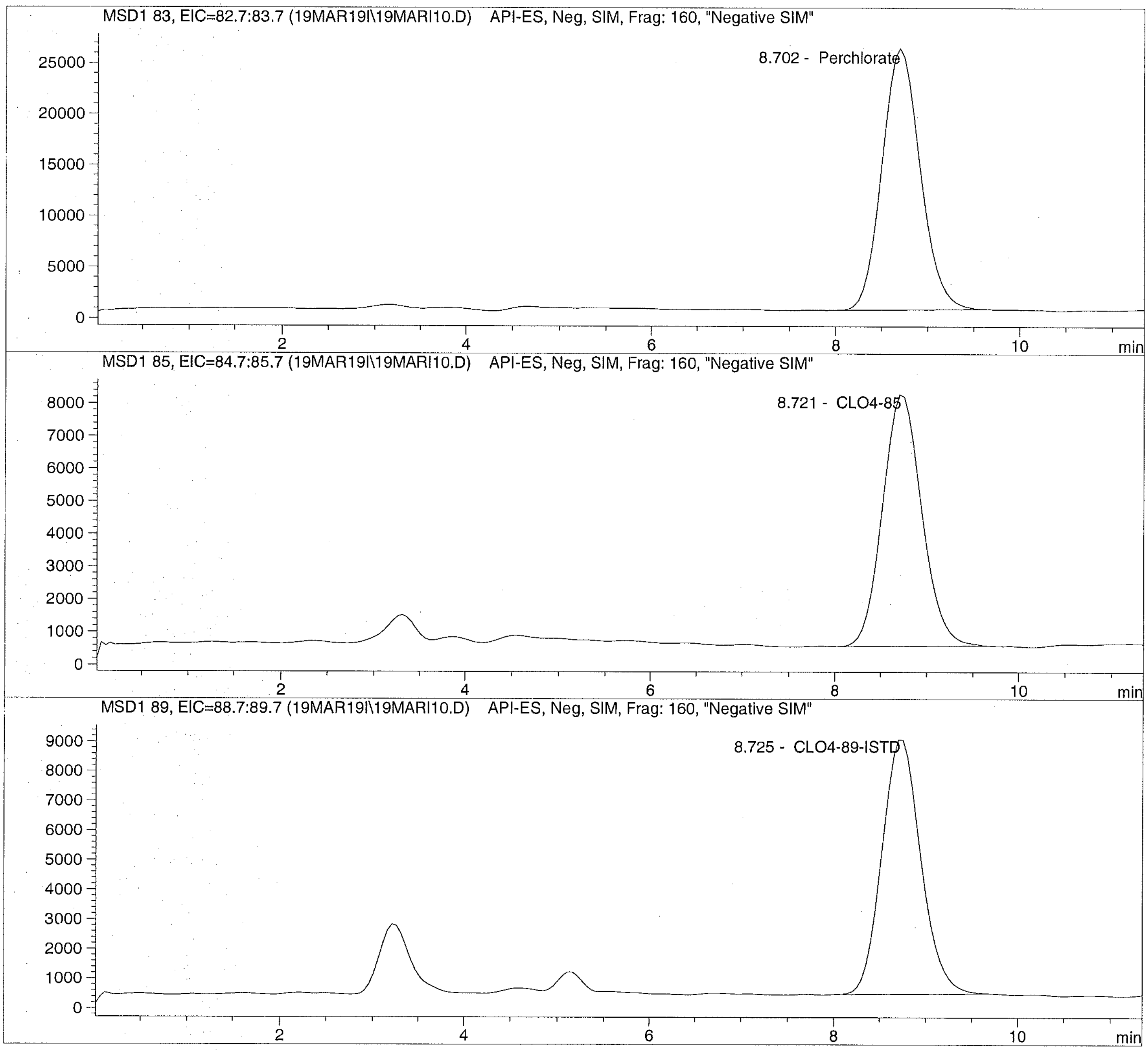
*** End of Report ***

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



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

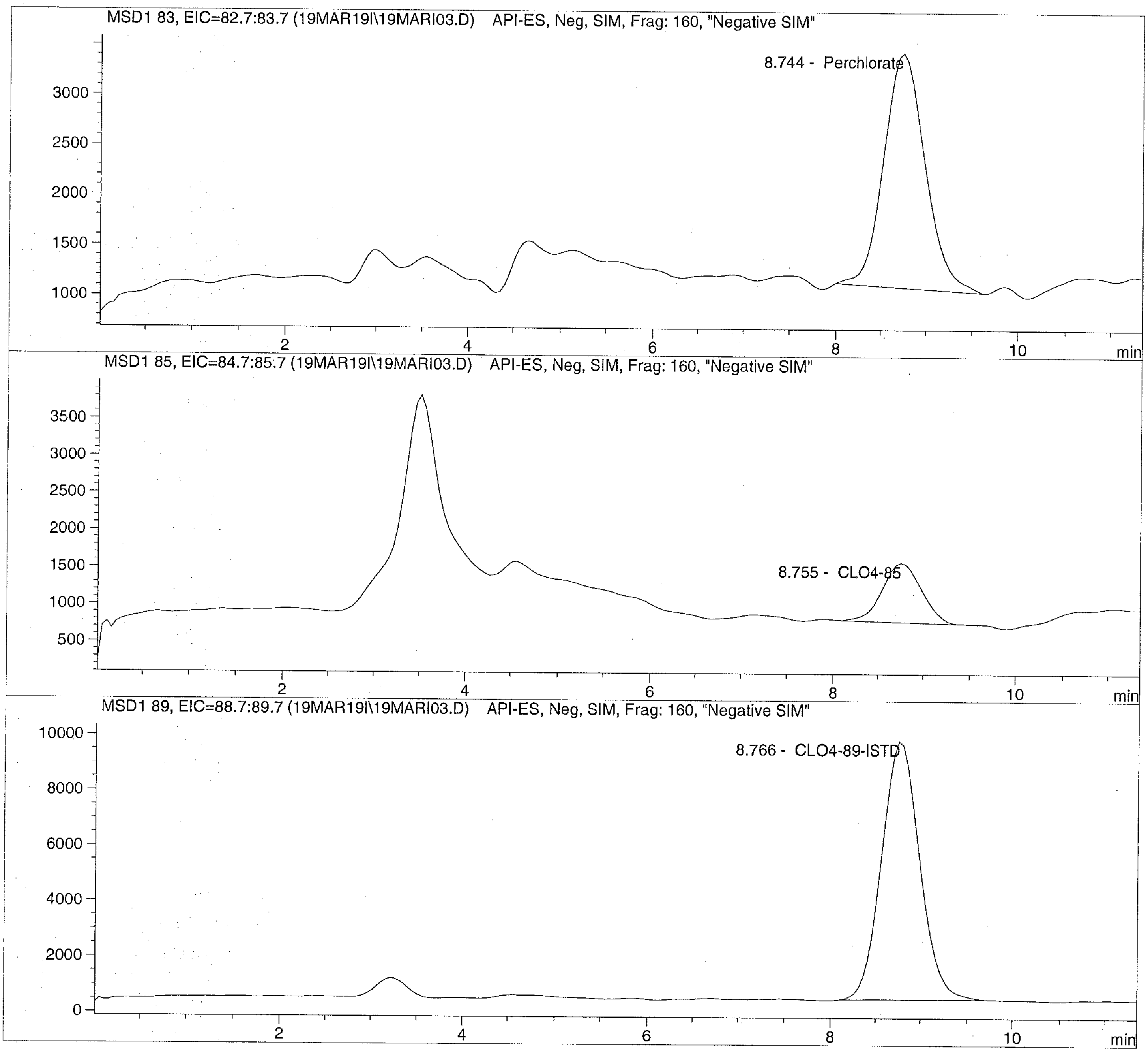
Unmodified

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



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 ***

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April 12, 2019

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

Work Order: **HS19031508**

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

Dear Marcia,

ALS Environmental received 2 sample(s) on Mar 28, 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: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19031508

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19031508-01	LH18/24-SP140_032719	Water		27-Mar-2019 14:00	28-Mar-2019 08:30	☐
HS19031508-02	Trip Blank -ALS-020119-59	Water		27-Mar-2019 00:00	28-Mar-2019 08:30	☐

ALS Houston, US Date: 12-Apr-19

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

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: 139415

Sample ID: LH18/24-SP140_032719 (HS19031508-01)

- The surrogate recoveries could not be determined due to dilution below the calibration range.

GCMS Volatiles by Method SW8260

Batch ID: R335882

Sample ID: CCV

- 1,2-Dibromoethane, Bromoform and Dibromochloromethane exceeded %D limits for CCV. Samples are ND for these compounds.

Sample ID: HS19040036-36MS

- MS and MSD are for an unrelated sample

Metals by Method SW6020

Batch ID: 139323

Sample ID: HS19031584-01MS

- MS/MSD and DUPs are for an unrelated sample

Metals by Method SW7470

Batch ID: 139318

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

WetChemistry by Method E1664A

Batch ID: R336080

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

WetChemistry by Method SW9056

Batch ID: R335875

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

WetChemistry by Method E410.4

Batch ID: R335804

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

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.	**ANALYTICAL REPORT**	
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS19031508	
Sample ID:	LH18/24-SP140_032719	Lab ID:HS19031508-01	
Collection Date:	27-Mar-2019 14:00	Matrix:Water	

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
1,1,1,2-Tetrachloroethane	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,1,1-Trichloroethane	5.0	U	2.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,1,2,2-Tetrachloroethane	5.0	U	5.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,1,2-Trichloroethane	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,1-Dichloroethane	**6.4**	J	**2.0**	**5.0**	**10**	**UG/L**	10	03-Apr-2019 14:28
1,1-Dichloroethene	5.0	U	2.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,1-Dichloropropene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,2,3-Trichlorobenzene	5.0	U	4.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,2,3-Trichloropropane	5.0	U	5.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,2,4-Trichlorobenzene	5.0	U	5.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,2,4-Trimethylbenzene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,2-Dibromo-3-chloropropane	5.0	U	2.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,2-Dibromoethane	5.0	U	2.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,2-Dichlorobenzene	5.0	U	5.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,2-Dichloroethane	**58**		**2.0**	**5.0**	**10**	**UG/L**	10	03-Apr-2019 14:28
1,2-Dichloropropane	5.0	U	5.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,3,5-Trimethylbenzene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,3-Dichlorobenzene	5.0	U	4.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,3-Dichloropropane	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
1,4-Dichlorobenzene	5.0	U	4.0	5.0	10	UG/L	10	03-Apr-2019 14:28
2,2-Dichloropropane	5.0	U	2.0	5.0	10	UG/L	10	03-Apr-2019 14:28
2-Butanone	10	U	5.0	10	20	UG/L	10	03-Apr-2019 14:28
2-Chlorotoluene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
2-Hexanone	10	U	10	10	20	UG/L	10	03-Apr-2019 14:28
4-Chlorotoluene	5.0	U	4.0	5.0	10	UG/L	10	03-Apr-2019 14:28
4-Isopropyltoluene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
4-Methyl-2-pentanone	10	U	7.0	10	20	UG/L	10	03-Apr-2019 14:28
Acetone	20	U	4.0	20	20	UG/L	10	03-Apr-2019 14:28
Benzene	**7.8**	J	**2.0**	**5.0**	**10**	**UG/L**	10	03-Apr-2019 14:28
Bromobenzene	5.0	U	4.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Bromochloromethane	5.0	U	2.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Bromodichloromethane	5.0	U	2.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Bromoform	5.0	U	4.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Bromomethane	5.0	U	4.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Carbon disulfide	10	U	6.0	10	20	UG/L	10	03-Apr-2019 14:28
Carbon tetrachloride	**25**		**5.0**	**5.0**	**10**	**UG/L**	10	03-Apr-2019 14:28
Chlorobenzene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Chloroethane	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Chloroform	**9.1**	J	**2.0**	**5.0**	**10**	**UG/L**	10	03-Apr-2019 14:28

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

ALS Houston, US Date: 12-Apr-19

ANALYTICAL REPORT

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples WorkOrder:HS19031508
Sample ID: LH18/24-SP140_032719 Lab ID:HS19031508-01
Collection Date: 27-Mar-2019 14:00 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloromethane	5.0	U	2.0	5.0	10	UG/L	10	03-Apr-2019 14:28
cis-1,2-Dichloroethene	**1,900**		**2.0**	**5.0**	**10**	**UG/L**	10	03-Apr-2019 14:28
cis-1,3-Dichloropropene	5.0	U	1.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Dibromochloromethane	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Dibromomethane	5.0	U	2.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Dichlorodifluoromethane	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Ethylbenzene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Hexachlorobutadiene	10	U	10	10	10	UG/L	10	03-Apr-2019 14:28
Isopropylbenzene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
m,p-Xylene	10	U	5.0	10	20	UG/L	10	03-Apr-2019 14:28
Methylene chloride	**110**		**4.0**	**5.0**	**20**	**UG/L**	10	03-Apr-2019 14:28
n-Butylbenzene	5.0	U	4.0	5.0	10	UG/L	10	03-Apr-2019 14:28
n-Propylbenzene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Naphthalene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
o-Xylene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
sec-Butylbenzene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Styrene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
tert-Butylbenzene	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Tetrachloroethene	**15**		**3.0**	**5.0**	**10**	**UG/L**	10	03-Apr-2019 14:28
Toluene	5.0	U	2.0	5.0	10	UG/L	10	03-Apr-2019 14:28
trans-1,2-Dichloroethene	**5.1**	J	**2.0**	**5.0**	**10**	**UG/L**	10	03-Apr-2019 14:28
trans-1,3-Dichloropropene	5.0	U	2.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Trichloroethene	**5,600**		**20**	**50**	**100**	**UG/L**	100	03-Apr-2019 15:40
Trichlorofluoromethane	5.0	U	3.0	5.0	10	UG/L	10	03-Apr-2019 14:28
Vinyl chloride	**41**		**2.0**	**5.0**	**10**	**UG/L**	10	03-Apr-2019 14:28
Surr: 1,2-Dichloroethane-d4	*88.0*			**0**	*81-118*	*%REC*	*10*	*03-Apr-2019 14:28*
Surr: 1,2-Dichloroethane-d4	*88.1*			**0**	*81-118*	*%REC*	*100*	*03-Apr-2019 15:40*
Surr: 4-Bromofluorobenzene	*99.4*			**0**	*85-114*	*%REC*	*10*	*03-Apr-2019 14:28*
Surr: 4-Bromofluorobenzene	*97.7*			**0**	*85-114*	*%REC*	*100*	*03-Apr-2019 15:40*
Surr: Dibromofluoromethane	*90.6*			**0**	*80-119*	*%REC*	*100*	*03-Apr-2019 15:40*
Surr: Dibromofluoromethane	*90.2*			**0**	*80-119*	*%REC*	*10*	*03-Apr-2019 14:28*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*100*	*03-Apr-2019 15:40*
Surr: Toluene-d8	*105*			**0**	*89-112*	*%REC*	*10*	*03-Apr-2019 14:28*
SEMIVOLATILES SIM		**Method:SW8270SIM**				Prep:SW3510 / 03-Apr-2019		Analyst: QX
1,4-Dioxane	**16**		**1.0**	**1.0**	**1.0**	**ug/L**	100	03-Apr-2019 14:32
Surr: 2-Fluorobiphenyl	*0*	*S*		0	*40-140*	*%REC*	*100*	*03-Apr-2019 14:32*
Surr: 4-Terphenyl-d14	*0*	*S*		0	*40-140*	*%REC*	*100*	*03-Apr-2019 14:32*
Surr: Nitrobenzene-d5	*0*	*S*		0	*40-140*	*%REC*	*100*	*03-Apr-2019 14:32*

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

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.	ANALYTICAL REPORT	
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:HS19031508	
Sample ID:	LH18/24-SP140_032719	Lab ID:HS19031508-01	
Collection Date:	27-Mar-2019 14:00	Matrix:Water	

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
ICP-MS METALS BY SW6020A		**Method:SW6020**				Prep:SW3010A / 01-Apr-2019		Analyst: JHD
Aluminum	**0.0643**		**0.00180**	**0.00500**	**0.0100**	**mg/L**	1	03-Apr-2019 13:22
Antimony	**0.00216**		**0.000400**	**0.000500**	**0.00200**	**mg/L**	1	03-Apr-2019 13:22
Arsenic	**0.000971**	J	**0.000400**	**0.000500**	**0.00200**	**mg/L**	1	03-Apr-2019 13:22
Barium	**0.223**		**0.00190**	**0.00250**	**0.00400**	**mg/L**	1	03-Apr-2019 13:22
Beryllium	0.00250	U	0.000200	0.00250	0.00200	mg/L	1	03-Apr-2019 13:22
Cadmium	0.000500	U	0.000200	0.000500	0.00200	mg/L	1	03-Apr-2019 13:22
Calcium	**16.8**		**0.0340**	**0.0500**	**0.500**	**mg/L**	1	03-Apr-2019 13:22
Chromium	**0.00307**	J	**0.000400**	**0.000500**	**0.00400**	**mg/L**	1	03-Apr-2019 13:22
Cobalt	**0.00548**		**0.000200**	**0.000500**	**0.00500**	**mg/L**	1	03-Apr-2019 13:22
Iron	**0.317**		**0.0120**	**0.0500**	**0.200**	**mg/L**	1	03-Apr-2019 13:22
Lead	0.00100	U	0.000600	0.00100	0.00200	mg/L	1	03-Apr-2019 13:22
Magnesium	**13.8**		**0.0100**	**0.0500**	**0.200**	**mg/L**	1	03-Apr-2019 13:22
Manganese	**0.214**		**0.000700**	**0.00100**	**0.00500**	**mg/L**	1	03-Apr-2019 13:22
Nickel	**0.0114**		**0.000600**	**0.00100**	**0.00200**	**mg/L**	1	03-Apr-2019 13:22
Potassium	**1.30**		**0.0180**	**0.0500**	**0.200**	**mg/L**	1	03-Apr-2019 13:22
Selenium	0.00250	U	0.00110	0.00250	0.00200	mg/L	1	03-Apr-2019 13:22
Silver	0.000500	U	0.000200	0.000500	0.00200	mg/L	1	03-Apr-2019 13:22
Sodium	**196**		**0.140**	**0.500**	**2.00**	**mg/L**	10	02-Apr-2019 16:00
Thallium	0.00100	U	0.000200	0.00100	0.00200	mg/L	1	03-Apr-2019 13:22
Vanadium	**0.00237**	J	**0.000600**	**0.00100**	**0.00500**	**mg/L**	1	03-Apr-2019 13:22
Zinc	**0.119**		**0.00200**	**0.00250**	**0.00400**	**mg/L**	1	03-Apr-2019 13:22
MERCURY BY SW7470A		**Method:SW7470**				Prep:SW7470 / 01-Apr-2019		Analyst: FO
Mercury	0.000100	U	0.0000300	0.000100	0.000200	mg/L	1	01-Apr-2019 17:52
OIL & GREASE (HEM) BY E1664A		**Method:E1664A**						Analyst: KAH
Oil and Grease	**0.729**	J	**0.610**	**1.00**	**2.00**	**mg/L**	1	05-Apr-2019 14:45
CHEMICAL OXYGEN DEMAND BY E410.4		**Method:E410.4**						Analyst: AJH
Chemical Oxygen Demand	**6.00**	J	**5.00**	**5.00**	**15.0**	**mg/L**	1	02-Apr-2019 16:45
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**197**		**2.00**	**5.00**	**5.00**	**mg/L**	10	03-Apr-2019 05:42
Sulfate	**32.0**		**2.00**	**5.00**	**5.00**	**mg/L**	10	03-Apr-2019 05:42
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	12-Apr-2019 18:22

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

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:	HS19031508
Sample ID:	Trip Blank -ALS-020119-59	Lab ID:	HS19031508-02
Collection Date:	27-Mar-2019 00:00	Matrix:	Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 16:53
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	03-Apr-2019 16:53
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	03-Apr-2019 16:53
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 16:53
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	03-Apr-2019 16:53
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	03-Apr-2019 16:53
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	03-Apr-2019 16:53
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53

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

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples		WorkOrder:HS19031508
Sample ID:	Trip Blank -ALS-020119-59		Lab ID:HS19031508-02
Collection Date:	27-Mar-2019 00:00		Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	03-Apr-2019 16:53
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	03-Apr-2019 16:53
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	03-Apr-2019 16:53
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 16:53
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 16:53
Surr: 1,2-Dichloroethane-d4	*88.6*			**0**	*81-118*	*%REC*	*1*	*03-Apr-2019 16:53*
Surr: 4-Bromofluorobenzene	*99.3*			**0**	*85-114*	*%REC*	*1*	*03-Apr-2019 16:53*
Surr: Dibromofluoromethane	*90.0*			**0**	*80-119*	*%REC*	*1*	*03-Apr-2019 16:53*
Surr: Toluene-d8	*104*			**0**	*89-112*	*%REC*	*1*	*03-Apr-2019 16:53*

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 Weekly Samples
WorkOrder: HS19031508

Batch ID: 139318 **Method:** MERCURY BY SW7470A **Prep:** HG_WPR

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19031508-01	1	10 (mL)	10 (mL)	1

Batch ID: 139323 **Method:** ICP-MS METALS BY SW6020A **Prep:** 3010A

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19031508-01	1	10	10 (mL)	1

Batch ID: 139415 **Method:** SEMIVOLATILES SIM **Prep:** 3510_B_SIM

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19031508-01	1	1000	1 (mL)	0.001

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID 139318	**Test Name :** MERCURY BY SW7470A			**Matrix:** Water		
HS19031508-01	LH18/24-SP140_032719	27 Mar 2019 14:00		01 Apr 2019 11:00	01 Apr 2019 17:52	1
Batch ID 139323	**Test Name :** ICP-MS METALS BY SW6020A			**Matrix:** Water		
HS19031508-01	LH18/24-SP140_032719	27 Mar 2019 14:00		01 Apr 2019 12:30	03 Apr 2019 13:22	1
HS19031508-01	LH18/24-SP140_032719	27 Mar 2019 14:00		01 Apr 2019 12:30	02 Apr 2019 16:00	10
Batch ID 139415	**Test Name :** SEMIVOLATILES SIM			**Matrix:** Water		
HS19031508-01	LH18/24-SP140_032719	27 Mar 2019 14:00		03 Apr 2019 10:00	03 Apr 2019 14:32	100
Batch ID R335804	**Test Name :** CHEMICAL OXYGEN DEMAND BY E410.4			**Matrix:** Water		
HS19031508-01	LH18/24-SP140_032719	27 Mar 2019 14:00			02 Apr 2019 16:45	1
Batch ID R335875	**Test Name :** ANIONS BY SW9056A			**Matrix:** Water		
HS19031508-01	LH18/24-SP140_032719	27 Mar 2019 14:00			03 Apr 2019 05:42	10
Batch ID R335882	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C			**Matrix:** Water		
HS19031508-01	LH18/24-SP140_032719	27 Mar 2019 14:00			03 Apr 2019 15:40	100
HS19031508-01	LH18/24-SP140_032719	27 Mar 2019 14:00			03 Apr 2019 14:28	10
HS19031508-02	Trip Blank -ALS-020119-59	27 Mar 2019 00:00			03 Apr 2019 16:53	1
Batch ID R336080	**Test Name :** OIL & GREASE (HEM) BY E1664A			**Matrix:** Water		
HS19031508-01	LH18/24-SP140_032719	27 Mar 2019 14:00			05 Apr 2019 14:45	1
Batch ID R336536	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			**Matrix:** Water		
HS19031508-01	LH18/24-SP140_032719	27 Mar 2019 14:00			12 Apr 2019 18:22	1

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: **139318 (0)** **Instrument:** **HG03** **Method:** **MERCURY BY SW7470A**

MBLK Sample ID: **MBLK-139318** Units: **mg/L** Analysis Date: **01-Apr-2019 17:33**
Client ID: Run ID: **HG03_335717** SeqNo: **5016992** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.000100	0.000200								U

LCS Sample ID: **LCS-139318** Units: **mg/L** Analysis Date: **01-Apr-2019 17:35**
Client ID: Run ID: **HG03_335717** SeqNo: **5016993** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00509	0.000200	0.005	0	102	80 - 120				

MS Sample ID: **HS19031507-01MS** Units: **mg/L** Analysis Date: **01-Apr-2019 17:38**
Client ID: Run ID: **HG03_335717** SeqNo: **5016995** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00514	0.000200	0.005	-0.000029	103	75 - 125				

MSD Sample ID: **HS19031507-01MSD** Units: **mg/L** Analysis Date: **01-Apr-2019 17:40**
Client ID: Run ID: **HG03_335717** SeqNo: **5016996** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00518	0.000200	0.005	-0.000029	104	75 - 125	0.00514	0.775	20	

The following samples were analyzed in this batch: HS19031508-01

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: 139323 (0) **Instrument:** ICPMS05 **Method:** ICP-MS METALS BY SW6020A

MBLK Sample ID: **MBLK-139323** Units: **mg/L** Analysis Date: **03-Apr-2019 13:13**
Client ID: Run ID: **ICPMS05_335865** SeqNo: **5020436** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.00500	0.0100								U
Antimony	0.000500	0.00200								U
Arsenic	0.000500	0.00200								U
Barium	0.00250	0.00400								U
Beryllium	0.00250	0.00200								U
Cadmium	0.000500	0.00200								U
Calcium	0.0500	0.500								U
Chromium	0.000500	0.00400								U
Cobalt	0.000500	0.00500								U
Iron	0.0500	0.200								U
Lead	0.00100	0.00200								U
Magnesium	0.0500	0.200								U
Manganese	0.00100	0.00500								U
Nickel	0.00100	0.00200								U
Potassium	0.0500	0.200								U
Selenium	0.00250	0.00200								U
Silver	0.000500	0.00200								U
Sodium	0.0500	0.200								U
Thallium	0.00100	0.00200								U
Vanadium	0.001347	0.00500								J
Zinc	0.00250	0.00400								U

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: 139323 (0) **Instrument:** ICPMS05 **Method:** ICP-MS METALS BY SW6020A

LCS Sample ID: **LCS-139323** Units: **mg/L** Analysis Date: **02-Apr-2019 15:47**
Client ID: Run ID: **ICPMS05_335757** SeqNo: **5018925** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1079	0.0100	0.1	0	108	80 - 120				
Antimony	0.05106	0.00200	0.05	0	102	80 - 120				
Arsenic	0.05071	0.00200	0.05	0	101	80 - 120				
Barium	0.05062	0.00400	0.05	0	101	80 - 120				
Beryllium	0.04871	0.00200	0.05	0	97.4	80 - 120				
Cadmium	0.05226	0.00200	0.05	0	105	80 - 120				
Calcium	5.088	0.500	5	0	102	80 - 120				
Chromium	0.05165	0.00400	0.05	0	103	80 - 120				
Cobalt	0.05122	0.00500	0.05	0	102	80 - 120				
Iron	5.174	0.200	5	0	103	80 - 120				
Lead	0.04996	0.00200	0.05	0	99.9	80 - 120				
Magnesium	4.996	0.200	5	0	99.9	80 - 120				
Manganese	0.05141	0.00500	0.05	0	103	80 - 120				
Nickel	0.05127	0.00200	0.05	0	103	80 - 120				
Potassium	4.971	0.200	5	0	99.4	80 - 120				
Selenium	0.05018	0.00200	0.05	0	100	80 - 120				
Silver	0.05235	0.00200	0.05	0	105	80 - 120				
Sodium	5.458	0.200	5	0	109	80 - 120				
Thallium	0.04811	0.00200	0.05	0	96.2	80 - 120				
Vanadium	0.05077	0.00500	0.05	0	102	80 - 120				
Zinc	0.05274	0.00400	0.05	0	105	80 - 120				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: **139323 (0)** **Instrument:** **ICPMS05** **Method:** **ICP-MS METALS BY SW6020A**

MS Sample ID: **HS19031584-01MS** Units: **mg/L** Analysis Date: **02-Apr-2019 15:53**
Client ID: Run ID: **ICPMS05_335757** SeqNo: **5018928** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.106	0.0100	0.1	0.004897	101	80 - 120				
Antimony	0.05139	0.00200	0.05	0.000336	102	80 - 120				
Arsenic	0.05303	0.00200	0.05	0.000014	106	80 - 120				
Barium	1.01	0.00400	0.05	0.9881	44.4	80 - 120				SO
Beryllium	0.04853	0.00200	0.05	0.000012	97.0	80 - 120				
Cadmium	0.04927	0.00200	0.05	0.000018	98.5	80 - 120				
Calcium	81.44	0.500	5	74.56	138	80 - 120				SO
Chromium	0.05181	0.00400	0.05	-0.00017	104	80 - 120				
Cobalt	0.0509	0.00500	0.05	0.000005	102	80 - 120				
Iron	5.334	0.200	5	0.2078	103	80 - 120				
Lead	0.04855	0.00200	0.05	0.000157	96.8	80 - 120				
Magnesium	28.82	0.200	5	23.36	109	80 - 120				O
Manganese	0.1757	0.00500	0.05	0.1227	106	80 - 120				
Nickel	0.05074	0.00200	0.05	0.000118	101	80 - 120				
Potassium	7.73	0.200	5	2.581	103	80 - 120				
Selenium	0.0507	0.00200	0.05	0.00072	100.0	80 - 120				
Silver	0.04762	0.00200	0.05	0.000047	95.1	80 - 120				
Sodium	360.5	0.200	5	354.5	119	80 - 120				EO
Thallium	0.04538	0.00200	0.05	0.000243	90.3	80 - 120				
Vanadium	0.05283	0.00500	0.05	0.000556	105	80 - 120				
Zinc	0.1307	0.00400	0.05	0.07703	107	80 - 120				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: 139323 (0) **Instrument:** ICPMS05 **Method:** ICP-MS METALS BY SW6020A

MSD Sample ID: **HS19031584-01MSD** Units: **mg/L** Analysis Date: **02-Apr-2019 15:56**

Client ID: Run ID: **ICPMS05_335757** SeqNo: **5018929** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1071	0.0100	0.1	0.004897	102	80 - 120	0.106	1.01	20	
Antimony	0.05105	0.00200	0.05	0.000336	101	80 - 120	0.05139	0.658	20	
Arsenic	0.05169	0.00200	0.05	0.000014	103	80 - 120	0.05303	2.56	20	
Barium	1.007	0.00400	0.05	0.9881	37.2	80 - 120	1.01	0.356	20	SO
Beryllium	0.04992	0.00200	0.05	0.000012	99.8	80 - 120	0.04853	2.83	20	
Cadmium	0.05007	0.00200	0.05	0.000018	100	80 - 120	0.04927	1.62	20	
Calcium	78.73	0.500	5	74.56	83.3	80 - 120	81.44	3.38	20	O
Chromium	0.05081	0.00400	0.05	-0.00017	102	80 - 120	0.05181	1.95	20	
Cobalt	0.04989	0.00500	0.05	0.000005	99.8	80 - 120	0.0509	2	20	
Iron	5.239	0.200	5	0.2078	101	80 - 120	5.334	1.78	20	
Lead	0.04939	0.00200	0.05	0.000157	98.5	80 - 120	0.04855	1.72	20	
Magnesium	28.59	0.200	5	23.36	105	80 - 120	28.82	0.802	20	O
Manganese	0.1711	0.00500	0.05	0.1227	96.7	80 - 120	0.1757	2.64	20	
Nickel	0.04944	0.00200	0.05	0.000118	98.6	80 - 120	0.05074	2.59	20	
Potassium	7.883	0.200	5	2.581	106	80 - 120	7.73	1.95	20	
Selenium	0.05281	0.00200	0.05	0.00072	104	80 - 120	0.0507	4.08	20	
Silver	0.04711	0.00200	0.05	0.000047	94.1	80 - 120	0.04762	1.07	20	
Sodium	357.6	0.200	5	354.5	60.2	80 - 120	360.5	0.816	20	SEO
Thallium	0.04656	0.00200	0.05	0.000243	92.6	80 - 120	0.04538	2.57	20	
Vanadium	0.05292	0.00500	0.05	0.000556	105	80 - 120	0.05283	0.161	20	
Zinc	0.1301	0.00400	0.05	0.07703	106	80 - 120	0.1307	0.456	20	

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: 139323 (0) **Instrument:** ICPMS05 **Method:** ICP-MS METALS BY SW6020A

PDS Sample ID: **HS19031584-01PDS** Units: **mg/L** Analysis Date: **02-Apr-2019 15:58**
Client ID: Run ID: **ICPMS05_335757** SeqNo: **5018930** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.09986	0.0100	0.1	0.004897	95.0	75 - 125				
Antimony	0.08829	0.00200	0.1	0.000336	88.0	75 - 125				
Arsenic	0.0993	0.00200	0.1	0.000014	99.3	75 - 125				
Barium	1.062	0.00400	0.1	0.9881	74.1	75 - 125				SO
Beryllium	0.1001	0.00200	0.1	0.000012	100	75 - 125				
Cadmium	0.09637	0.00200	0.1	0.000018	96.4	75 - 125				
Calcium	80.82	0.500	10	74.56	62.6	75 - 125				SO
Chromium	0.09674	0.00400	0.1	-0.00017	96.9	75 - 125				
Cobalt	0.09603	0.00500	0.1	0.000005	96.0	75 - 125				
Iron	9.848	0.200	10	0.2078	96.4	75 - 125				
Lead	0.0916	0.00200	0.1	0.000157	91.4	75 - 125				
Magnesium	31.73	0.200	10	23.36	83.7	75 - 125				
Manganese	0.2125	0.00500	0.1	0.1227	89.8	75 - 125				
Nickel	0.09352	0.00200	0.1	0.000118	93.4	75 - 125				
Potassium	12.44	0.200	10	2.581	98.6	75 - 125				
Selenium	0.09928	0.00200	0.1	0.00072	98.6	75 - 125				
Silver	0.08785	0.00200	0.1	0.000047	87.8	75 - 125				
Thallium	0.08932	0.00200	0.1	0.000243	89.1	75 - 125				
Vanadium	0.09766	0.00500	0.1	0.000556	97.1	75 - 125				
Zinc	0.1737	0.00400	0.1	0.07703	96.7	75 - 125				

PDS Sample ID: **HS19031584-01PDS** Units: **mg/L** Analysis Date: **03-Apr-2019 13:20**
Client ID: Run ID: **ICPMS05_335865** SeqNo: **5020439** PrepDate: **01-Apr-2019** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sodium	430.6	2.00	100	334.6	96.0	75 - 125				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: 139323 (0) **Instrument:** ICPMS05 **Method:** ICP-MS METALS BY SW6020A

SD Sample ID: **HS19031584-01SD** Units: **mg/L** Analysis Date: **02-Apr-2019 15:51**
Client ID: Run ID: **ICPMS05_335757** SeqNo: **5018927** PrepDate: **01-Apr-2019** DF: **5**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Aluminum	0.009832	0.0500					0.004897	0	10	J
Antimony	0.00250	0.0100					0.000336	0	10	U
Arsenic	0.00250	0.0100					0.000014	0	10	U
Barium	0.9199	0.0200					0.9881	6.9	10	
Beryllium	0.0125	0.0100					0.000012	0	10	U
Cadmium	0.00250	0.0100					0.000018	0	10	U
Calcium	70.09	2.50					74.56	5.99	10	
Chromium	0.00250	0.0200					-0.00017	0	10	U
Cobalt	0.00250	0.0250					0.000005	0	10	U
Iron	0.2043	1.00					0.2078	0	10	J
Lead	0.00500	0.0100					0.000157	0	10	U
Magnesium	21.3	1.00					23.36	8.79	10	
Manganese	0.1188	0.0250					0.1227	3.19	10	
Nickel	0.00500	0.0100					0.000118	0	10	U
Potassium	2.471	1.00					2.581	4.24	10	
Selenium	0.0125	0.0100					0.00072	0	10	U
Silver	0.00250	0.0100					0.000047	0	10	U
Thallium	0.00500	0.0100					0.000243	0	10	U
Vanadium	0.005215	0.0250					0.000556	0	10	J
Zinc	0.07308	0.0200					0.07703	5.12	10	

SD Sample ID: **HS19031584-01SD** Units: **mg/L** Analysis Date: **03-Apr-2019 13:18**
Client ID: Run ID: **ICPMS05_335865** SeqNo: **5020438** PrepDate: **01-Apr-2019** DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Sodium	340.7	10.0					334.6	1.83	10	

The following samples were analyzed in this batch: HS19031508-01

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: 139415 (0) **Instrument:** SV-5 **Method:** SEMIVOLATILES SIM

MBLK Sample ID: **MBLK-139415** Units: **ug/L** Analysis Date: **03-Apr-2019 12:47**
Client ID: Run ID: **SV-5_335930** SeqNo: **5021779** PrepDate: **03-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	*0.09201*	*0*	*0.08*	*0*	*115*	*40 - 140*				
Surr: 4-Terphenyl-d14	*0.07352*	*0*	*0.08*	*0*	*91.9*	*40 - 140*				
Surr: Nitrobenzene-d5	*0.08203*	*0*	*0.08*	*0*	*103*	*40 - 140*				

LCS Sample ID: **LCS-139415** Units: **ug/L** Analysis Date: **03-Apr-2019 13:08**
Client ID: Run ID: **SV-5_335930** SeqNo: **5021780** PrepDate: **03-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	0.07995	0.010	0.08	0	99.9	40 - 140				
Surr: 2-Fluorobiphenyl	*0.08927*	*0*	*0.08*	*0*	*112*	*40 - 140*				
Surr: 4-Terphenyl-d14	*0.07072*	*0*	*0.08*	*0*	*88.4*	*40 - 140*				
Surr: Nitrobenzene-d5	*0.07169*	*0*	*0.08*	*0*	*89.6*	*40 - 140*				

LCSD Sample ID: **LCSD-139415** Units: **ug/L** Analysis Date: **03-Apr-2019 13:29**
Client ID: Run ID: **SV-5_335930** SeqNo: **5021781** PrepDate: **03-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	0.08058	0.010	0.08	0	101	40 - 140	0.07995	0.787	20	
Surr: 2-Fluorobiphenyl	*0.08169*	*0*	*0.08*	*0*	*102*	*40 - 140*	*0.08927*	*8.86*	*20*	
Surr: 4-Terphenyl-d14	*0.07017*	*0*	*0.08*	*0*	*87.7*	*40 - 140*	*0.07072*	*0.788*	*20*	
Surr: Nitrobenzene-d5	*0.07503*	*0*	*0.08*	*0*	*93.8*	*40 - 140*	*0.07169*	*4.56*	*20*	

The following samples were analyzed in this batch: HS19031508-01

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-190403** Units: **UG/L** Analysis Date: **03-Apr-2019 12:28**
Client ID: Run ID: **VOA6_335882** SeqNo: **5020560** 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	2.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U
Bromomethane	0.50	1.0								U

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-190403** Units: **UG/L** Analysis Date: **03-Apr-2019 12:28**
Client ID: Run ID: **VOA6_335882** SeqNo: **5020560** 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	0.50	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	*43.62*	*1.0*	*50*	*0*	*87.2*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49.43*	*1.0*	*50*	*0*	*98.9*	*85 - 114*				
Surr: Dibromofluoromethane	*45.1*	*1.0*	*50*	*0*	*90.2*	*80 - 119*				
Surr: Toluene-d8	*53*	*1.0*	*50*	*0*	*106*	*89 - 112*				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-190403** Units: **UG/L** Analysis Date: **03-Apr-2019 11:40**
Client ID: Run ID: **VOA6_335882** SeqNo: **5020559** 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	23.34	1.0	20	0	117	78 - 124				
1,1,1-Trichloroethane	19.93	1.0	20	0	99.7	74 - 131				
1,1,2,2-Tetrachloroethane	20.44	1.0	20	0	102	71 - 121				
1,1,2-Trichloroethane	22.06	1.0	20	0	110	80 - 119				
1,1-Dichloroethane	19.85	1.0	20	0	99.2	77 - 125				
1,1-Dichloroethene	19.49	1.0	20	0	97.4	71 - 131				
1,1-Dichloropropene	19.9	1.0	20	0	99.5	78 - 125				
1,2,3-Trichlorobenzene	21.21	1.0	20	0	106	69 - 129				
1,2,3-Trichloropropane	21.32	1.0	20	0	107	73 - 122				
1,2,4-Trichlorobenzene	21.68	1.0	20	0	108	69 - 130				
1,2,4-Trimethylbenzene	23.62	1.0	20	0	118	76 - 124				
1,2-Dibromo-3-chloropropane	21.63	1.0	20	0	108	62 - 128				
1,2-Dibromoethane	22.93	1.0	20	0	115	77 - 121				
1,2-Dichlorobenzene	21.63	1.0	20	0	108	80 - 119				
1,2-Dichloroethane	21.35	1.0	20	0	107	73 - 128				
1,2-Dichloropropane	20.9	1.0	20	0	104	78 - 122				
1,3,5-Trimethylbenzene	22.82	1.0	20	0	114	75 - 124				
1,3-Dichlorobenzene	21.78	1.0	20	0	109	80 - 119				
1,3-Dichloropropane	22.02	1.0	20	0	110	80 - 119				
1,4-Dichlorobenzene	21.6	1.0	20	0	108	79 - 118				
2,2-Dichloropropane	20.72	1.0	20	0	104	60 - 139				
2-Butanone	39.59	2.0	40	0	99.0	56 - 143				
2-Chlorotoluene	21.51	1.0	20	0	108	79 - 122				
2-Hexanone	42.13	2.0	40	0	105	57 - 139				
4-Chlorotoluene	21.85	1.0	20	0	109	78 - 122				
4-Isopropyltoluene	22.25	1.0	20	0	111	77 - 127				
4-Methyl-2-pentanone	41.02	2.0	40	0	103	67 - 130				
Acetone	36.89	2.0	40	0	92.2	39 - 160				
Benzene	21.72	1.0	20	0	109	79 - 120				
Bromobenzene	22.97	1.0	20	0	115	80 - 120				
Bromochloromethane	20.97	1.0	20	0	105	78 - 123				
Bromodichloromethane	22.16	1.0	20	0	111	79 - 125				
Bromoform	23.37	1.0	20	0	117	66 - 130				
Bromomethane	24.03	1.0	20	0	120	53 - 141				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-190403** Units: **UG/L** Analysis Date: **03-Apr-2019 11:40**
Client ID: Run ID: **VOA6_335882** SeqNo: **5020559** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	37.4	2.0	40	0	93.5	64 - 133				
Carbon tetrachloride	22.65	1.0	20	0	113	72 - 136				
Chlorobenzene	21.88	1.0	20	0	109	82 - 118				
Chloroethane	18.95	1.0	20	0	94.7	60 - 138				
Chloroform	20.52	1.0	20	0	103	79 - 124				
Chloromethane	19.74	1.0	20	0	98.7	50 - 139				
cis-1,2-Dichloroethene	20.43	1.0	20	0	102	78 - 123				
cis-1,3-Dichloropropene	20.84	1.0	20	0	104	75 - 124				
Dibromochloromethane	22.56	1.0	20	0	113	74 - 126				
Dibromomethane	21.6	1.0	20	0	108	79 - 123				
Dichlorodifluoromethane	21.85	1.0	20	0	109	32 - 152				
Ethylbenzene	23.41	1.0	20	0	117	79 - 121				
Hexachlorobutadiene	23.54	1.0	20	0	118	66 - 134				
Isopropylbenzene	22.97	1.0	20	0	115	72 - 131				
m,p-Xylene	45.47	2.0	40	0	114	80 - 121				
Methylene chloride	20.82	2.0	20	0	104	74 - 124				
Naphthalene	21.06	1.0	20	0	105	61 - 128				
n-Butylbenzene	22.89	1.0	20	0	114	75 - 128				
n-Propylbenzene	21.9	1.0	20	0	109	76 - 126				
o-Xylene	22.22	1.0	20	0	111	78 - 122				
sec-Butylbenzene	21.56	1.0	20	0	108	77 - 126				
Styrene	23.58	1.0	20	0	118	78 - 123				
tert-Butylbenzene	21.9	1.0	20	0	109	78 - 124				
Tetrachloroethene	22.75	1.0	20	0	114	74 - 129				
Toluene	22.69	1.0	20	0	113	80 - 121				
trans-1,2-Dichloroethene	20.31	1.0	20	0	102	75 - 124				
trans-1,3-Dichloropropene	22.21	1.0	20	0	111	73 - 127				
Trichloroethene	20.76	1.0	20	0	104	79 - 123				
Trichlorofluoromethane	19.87	1.0	20	0	99.3	65 - 141				
Vinyl chloride	18.34	1.0	20	0	91.7	58 - 137				
Surr: 1,2-Dichloroethane-d4	*44.85*	*1.0*	*50*	*0*	*89.7*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49.44*	*1.0*	*50*	*0*	*98.9*	*85 - 114*				
Surr: Dibromofluoromethane	*46.66*	*1.0*	*50*	*0*	*93.3*	*80 - 119*				
Surr: Toluene-d8	*52.9*	*1.0*	*50*	*0*	*106*	*89 - 112*				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19040036-36MS** Units: **UG/L** Analysis Date: **03-Apr-2019 14:52**
Client ID: Run ID: **VOA6_335882** SeqNo: **5020790** PrepDate: DF: **1000**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	24370	1000	20000	0	122	78 - 124				
1,1,1-Trichloroethane	22280	1000	20000	0	111	74 - 131				
1,1,2,2-Tetrachloroethane	22750	1000	20000	0	114	71 - 121				
1,1,2-Trichloroethane	23590	1000	20000	0	118	80 - 119				
1,1-Dichloroethane	21090	1000	20000	0	105	77 - 125				
1,1-Dichloroethene	22220	1000	20000	0	111	71 - 131				
1,1-Dichloropropene	22920	1000	20000	0	115	78 - 125				
1,2,3-Trichlorobenzene	21690	1000	20000	0	108	69 - 129				
1,2,3-Trichloropropane	22780	1000	20000	0	114	73 - 122				
1,2,4-Trichlorobenzene	22700	1000	20000	0	114	69 - 130				
1,2,4-Trimethylbenzene	24950	1000	20000	0	125	76 - 124				S
1,2-Dibromo-3-chloropropane	23950	1000	20000	0	120	62 - 128				
1,2-Dibromoethane	23610	1000	20000	0	118	77 - 121				
1,2-Dichlorobenzene	23700	1000	20000	0	118	80 - 119				
1,2-Dichloroethane	23200	1000	20000	0	116	73 - 128				
1,2-Dichloropropane	21950	1000	20000	0	110	78 - 122				
1,3,5-Trimethylbenzene	24840	1000	20000	0	124	75 - 124				S
1,3-Dichlorobenzene	24090	1000	20000	0	120	80 - 119				S
1,3-Dichloropropane	23000	1000	20000	0	115	80 - 119				
1,4-Dichlorobenzene	23350	1000	20000	0	117	79 - 118				
2,2-Dichloropropane	22210	1000	20000	0	111	60 - 139				
2-Butanone	41410	2000	40000	0	104	56 - 143				
2-Chlorotoluene	23870	1000	20000	0	119	79 - 122				
2-Hexanone	44400	2000	40000	0	111	57 - 139				
4-Chlorotoluene	23820	1000	20000	0	119	78 - 122				
4-Isopropyltoluene	25150	1000	20000	0	126	77 - 127				
4-Methyl-2-pentanone	44310	2000	40000	0	111	67 - 130				
Acetone	39450	2000	40000	0	98.6	39 - 160				
Benzene	163700	1000	20000	136400	137	79 - 120				SO
Bromobenzene	24010	1000	20000	0	120	80 - 120				S
Bromochloromethane	20610	1000	20000	0	103	78 - 123				
Bromodichloromethane	22820	1000	20000	0	114	79 - 125				
Bromoform	23650	1000	20000	0	118	66 - 130				
Bromomethane	24600	1000	20000	0	123	53 - 141				

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.	**QC BATCH REPORT NEW**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19031508	

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19040036-36MS** Units: **UG/L** Analysis Date: **03-Apr-2019 14:52**

Client ID: Run ID: **VOA6_335882** SeqNo: **5020790** PrepDate: DF: **1000**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	43460	2000	40000	0	109	64 - 133				
Carbon tetrachloride	25400	1000	20000	0	127	72 - 136				
Chlorobenzene	23430	1000	20000	0	117	82 - 118				
Chloroethane	20830	1000	20000	0	104	60 - 138				
Chloroform	21220	1000	20000	0	106	79 - 124				
Chloromethane	23190	1000	20000	0	116	50 - 139				
cis-1,2-Dichloroethene	21440	1000	20000	0	107	78 - 123				
cis-1,3-Dichloropropene	22680	1000	20000	0	113	75 - 124				
Dibromochloromethane	24100	1000	20000	0	120	74 - 126				
Dibromomethane	22210	1000	20000	0	111	79 - 123				
Dichlorodifluoromethane	22700	1000	20000	0	113	32 - 152				
Ethylbenzene	25690	1000	20000	1292	122	79 - 121				S
Hexachlorobutadiene	26030	1000	20000	0	130	66 - 134				
Isopropylbenzene	24720	1000	20000	0	124	72 - 131				
m,p-Xylene	53610	2000	40000	4701	122	80 - 121				S
Methylene chloride	22110	2000	20000	0	111	74 - 124				
Naphthalene	21950	1000	20000	0	110	61 - 128				
n-Butylbenzene	25170	1000	20000	0	126	75 - 128				
n-Propylbenzene	25030	1000	20000	0	125	76 - 126				
o-Xylene	26700	1000	20000	2345	122	78 - 122				
sec-Butylbenzene	24850	1000	20000	0	124	77 - 126				
Styrene	26250	1000	20000	1811	122	78 - 123				
tert-Butylbenzene	24760	1000	20000	0	124	78 - 124				
Tetrachloroethene	25340	1000	20000	0	127	74 - 129				
Toluene	52760	1000	20000	28020	124	80 - 121				S
trans-1,2-Dichloroethene	22170	1000	20000	0	111	75 - 124				
trans-1,3-Dichloropropene	22600	1000	20000	0	113	73 - 127				
Trichloroethene	24510	1000	20000	0	123	79 - 123				
Trichlorofluoromethane	23470	1000	20000	0	117	65 - 141				
Vinyl chloride	20510	1000	20000	0	103	58 - 137				
Surr: 1,2-Dichloroethane-d4	*43910*	*1000*	*50000*	*0*	*87.8*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49050*	*1000*	*50000*	*0*	*98.1*	*85 - 114*				
Surr: Dibromofluoromethane	*45590*	*1000*	*50000*	*0*	*91.2*	*80 - 119*				
Surr: Toluene-d8	*52160*	*1000*	*50000*	*0*	*104*	*89 - 112*				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19040036-36MSD** Units: **UG/L** Analysis Date: **03-Apr-2019 15:16**
Client ID: Run ID: **VOA6_335882** SeqNo: **5020791** PrepDate: DF: **1000**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	24320	1000	20000	0	122	78 - 124	24370	0.228	20	
1,1,1-Trichloroethane	21690	1000	20000	0	108	74 - 131	22280	2.69	20	
1,1,2,2-Tetrachloroethane	22810	1000	20000	0	114	71 - 121	22750	0.276	20	
1,1,2-Trichloroethane	23280	1000	20000	0	116	80 - 119	23590	1.3	20	
1,1-Dichloroethane	20610	1000	20000	0	103	77 - 125	21090	2.28	20	
1,1-Dichloroethene	21230	1000	20000	0	106	71 - 131	22220	4.59	20	
1,1-Dichloropropene	22490	1000	20000	0	112	78 - 125	22920	1.87	20	
1,2,3-Trichlorobenzene	22690	1000	20000	0	113	69 - 129	21690	4.52	20	
1,2,3-Trichloropropane	23960	1000	20000	0	120	73 - 122	22780	5.05	20	
1,2,4-Trichlorobenzene	22750	1000	20000	0	114	69 - 130	22700	0.208	20	
1,2,4-Trimethylbenzene	24690	1000	20000	0	123	76 - 124	24950	1.03	20	
1,2-Dibromo-3-chloropropane	24840	1000	20000	0	124	62 - 128	23950	3.68	20	
1,2-Dibromoethane	23750	1000	20000	0	119	77 - 121	23610	0.569	20	
1,2-Dichlorobenzene	23560	1000	20000	0	118	80 - 119	23700	0.565	20	
1,2-Dichloroethane	23300	1000	20000	0	116	73 - 128	23200	0.421	20	
1,2-Dichloropropane	21950	1000	20000	0	110	78 - 122	21950	0.0278	20	
1,3,5-Trimethylbenzene	24400	1000	20000	0	122	75 - 124	24840	1.78	20	
1,3-Dichlorobenzene	23770	1000	20000	0	119	80 - 119	24090	1.35	20	
1,3-Dichloropropane	23040	1000	20000	0	115	80 - 119	23000	0.159	20	
1,4-Dichlorobenzene	23460	1000	20000	0	117	79 - 118	23350	0.488	20	
2,2-Dichloropropane	21530	1000	20000	0	108	60 - 139	22210	3.12	20	
2-Butanone	42690	2000	40000	0	107	56 - 143	41410	3.06	20	
2-Chlorotoluene	23450	1000	20000	0	117	79 - 122	23870	1.75	20	
2-Hexanone	45910	2000	40000	0	115	57 - 139	44400	3.33	20	
4-Chlorotoluene	23550	1000	20000	0	118	78 - 122	23820	1.15	20	
4-Isopropyltoluene	24580	1000	20000	0	123	77 - 127	25150	2.31	20	
4-Methyl-2-pentanone	45920	2000	40000	0	115	67 - 130	44310	3.58	20	
Acetone	43390	2000	40000	0	108	39 - 160	39450	9.5	20	
Benzene	161100	1000	20000	136400	123	79 - 120	163700	1.64	20	SO
Bromobenzene	23980	1000	20000	0	120	80 - 120	24010	0.139	20	
Bromochloromethane	20980	1000	20000	0	105	78 - 123	20610	1.77	20	
Bromodichloromethane	22510	1000	20000	0	113	79 - 125	22820	1.39	20	
Bromoform	24000	1000	20000	0	120	66 - 130	23650	1.45	20	
Bromomethane	22690	1000	20000	0	113	53 - 141	24600	8.06	20	

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.	**QC BATCH REPORT NEW**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19031508	

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19040036-36MSD** Units: **UG/L** Analysis Date: **03-Apr-2019 15:16**

Client ID: Run ID: **VOA6_335882** SeqNo: **5020791** PrepDate: DF: **1000**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	41860	2000	40000	0	105	64 - 133	43460	3.75	20	
Carbon tetrachloride	24790	1000	20000	0	124	72 - 136	25400	2.42	20	
Chlorobenzene	23190	1000	20000	0	116	82 - 118	23430	1.07	20	
Chloroethane	19980	1000	20000	0	99.9	60 - 138	20830	4.15	20	
Chloroform	20990	1000	20000	0	105	79 - 124	21220	1.06	20	
Chloromethane	21200	1000	20000	0	106	50 - 139	23190	8.96	20	
cis-1,2-Dichloroethene	20790	1000	20000	0	104	78 - 123	21440	3.08	20	
cis-1,3-Dichloropropene	22920	1000	20000	0	115	75 - 124	22680	1.02	20	
Dibromochloromethane	24120	1000	20000	0	121	74 - 126	24100	0.0892	20	
Dibromomethane	22680	1000	20000	0	113	79 - 123	22210	2.1	20	
Dichlorodifluoromethane	21730	1000	20000	0	109	32 - 152	22700	4.35	20	
Ethylbenzene	25210	1000	20000	1292	120	79 - 121	25690	1.92	20	
Hexachlorobutadiene	26760	1000	20000	0	134	66 - 134	26030	2.75	20	
Isopropylbenzene	24210	1000	20000	0	121	72 - 131	24720	2.07	20	
m,p-Xylene	52410	2000	40000	4701	119	80 - 121	53610	2.27	20	
Methylene chloride	21630	2000	20000	0	108	74 - 124	22110	2.19	20	
Naphthalene	23380	1000	20000	0	117	61 - 128	21950	6.3	20	
n-Butylbenzene	24790	1000	20000	0	124	75 - 128	25170	1.55	20	
n-Propylbenzene	24480	1000	20000	0	122	76 - 126	25030	2.2	20	
o-Xylene	26170	1000	20000	2345	119	78 - 122	26700	2.01	20	
sec-Butylbenzene	24340	1000	20000	0	122	77 - 126	24850	2.07	20	
Styrene	26210	1000	20000	1811	122	78 - 123	26250	0.147	20	
tert-Butylbenzene	24250	1000	20000	0	121	78 - 124	24760	2.09	20	
Tetrachloroethene	24480	1000	20000	0	122	74 - 129	25340	3.45	20	
Toluene	51510	1000	20000	28020	117	80 - 121	52760	2.38	20	
trans-1,2-Dichloroethene	21410	1000	20000	0	107	75 - 124	22170	3.5	20	
trans-1,3-Dichloropropene	23180	1000	20000	0	116	73 - 127	22600	2.52	20	
Trichloroethene	23240	1000	20000	0	116	79 - 123	24510	5.32	20	
Trichlorofluoromethane	23010	1000	20000	0	115	65 - 141	23470	1.98	20	
Vinyl chloride	19890	1000	20000	0	99.5	58 - 137	20510	3.06	20	
Surr: 1,2-Dichloroethane-d4	*43970*	*1000*	*50000*	*0*	*87.9*	*81 - 118*	*43910*	*0.129*	*20*	
Surr: 4-Bromofluorobenzene	*49970*	*1000*	*50000*	*0*	*99.9*	*85 - 114*	*49050*	*1.86*	*20*	
Surr: Dibromofluoromethane	*45550*	*1000*	*50000*	*0*	*91.1*	*80 - 119*	*45590*	*0.0906*	*20*	
Surr: Toluene-d8	*51790*	*1000*	*50000*	*0*	*104*	*89 - 112*	*52160*	*0.709*	*20*	

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.	**QC BATCH REPORT NEW**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19031508	

Batch ID:	**R335882 (0)**	**Instrument:**	**VOA6**	**Method:**	**VOLATILES ORGANICS BY METHOD 8260C**

The following samples were analyzed in this batch: HS19031508-01 HS19031508-02

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: R335804 (0) **Instrument:** WetChem_HS **Method:** CHEMICAL OXYGEN DEMAND BY E410.4

MBLK Sample ID: **MBLK-R335804** Units: **mg/L** Analysis Date: **02-Apr-2019 16:45**
Client ID: Run ID: **WetChem_HS_335804** SeqNo: **5018767** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chemical Oxygen Demand	5.00	15.0								U

LCS Sample ID: **LCS-R335804** Units: **mg/L** Analysis Date: **02-Apr-2019 16:45**
Client ID: Run ID: **WetChem_HS_335804** SeqNo: **5018766** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chemical Oxygen Demand	97	15.0	100	0	97.0	85 - 115				

MS Sample ID: **HS19040002-01MS** Units: **mg/L** Analysis Date: **02-Apr-2019 16:45**
Client ID: Run ID: **WetChem_HS_335804** SeqNo: **5020059** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chemical Oxygen Demand	60	15.0	50	7	106	80 - 120				

MS Sample ID: **HS19031461-01MS** Units: **mg/L** Analysis Date: **02-Apr-2019 16:45**
Client ID: Run ID: **WetChem_HS_335804** SeqNo: **5018770** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chemical Oxygen Demand	94	15.0	50	37	114	80 - 120				

DUP Sample ID: **HS19040002-01DUP** Units: **mg/L** Analysis Date: **02-Apr-2019 16:45**
Client ID: Run ID: **WetChem_HS_335804** SeqNo: **5020060** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chemical Oxygen Demand	8	15.0					7	0	20	J

DUP Sample ID: **HS19031461-01DUP** Units: **mg/L** Analysis Date: **02-Apr-2019 16:45**
Client ID: Run ID: **WetChem_HS_335804** SeqNo: **5018771** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chemical Oxygen Demand	37	15.0					37	0	20	

The following samples were analyzed in this batch: HS19031508-01

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: R335875 (0) **Instrument:** ICS2100 **Method:** ANIONS BY SW9056A

MBLK Sample ID: **WBLKW2-040219** Units: **mg/L** Analysis Date: **03-Apr-2019 01:16**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020414** 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: **WLCSW2-040219** Units: **mg/L** Analysis Date: **03-Apr-2019 01:31**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020415** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	20.22	0.500	20	0	101	80 - 120				
Sulfate	19.98	0.500	20	0	99.9	80 - 120				

LCSD Sample ID: **WLCSDW2-040219** Units: **mg/L** Analysis Date: **03-Apr-2019 01:46**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020416** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	18.95	0.500	20	0	94.8	80 - 120	20.22	6.51	20	
Sulfate	18.67	0.500	20	0	93.3	80 - 120	19.98	6.79	20	

MS Sample ID: **HS19031013-07MS** Units: **mg/L** Analysis Date: **03-Apr-2019 04:28**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020427** PrepDate: DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1535	25.0	500	1090	89.1	80 - 120				
Sulfate	1565	25.0	500	1119	89.2	80 - 120				

MSD Sample ID: **HS19031013-07MSD** Units: **mg/L** Analysis Date: **03-Apr-2019 04:43**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020428** PrepDate: DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1605	25.0	500	1090	103	80 - 120	1535	4.46	20	
Sulfate	1638	25.0	500	1119	104	80 - 120	1565	4.57	20	

The following samples were analyzed in this batch: HS19031508-01

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031508

QC BATCH REPORT NEW

Batch ID: R336080 (0) **Instrument:** Balance1 **Method:** OIL & GREASE (HEM) BY E1664A

MBLK Sample ID: **WBLKW-040519** Units: **mg/L** Analysis Date: **05-Apr-2019 14:45**
Client ID: Run ID: **Balance1_336080** SeqNo: **5024526** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	1.00	2.00								U

LCS Sample ID: **WLCSW-040519** Units: **mg/L** Analysis Date: **05-Apr-2019 14:45**
Client ID: Run ID: **Balance1_336080** SeqNo: **5024528** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	38.8	2.00	40	0	97.0	78 - 114				

LCSD Sample ID: **WLCSDW-040519** Units: **mg/L** Analysis Date: **05-Apr-2019 14:45**
Client ID: Run ID: **Balance1_336080** SeqNo: **5024527** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	38.8	2.00	40	0	97.0	78 - 114	38.8	0	18	

MS Sample ID: **HS19031453-01MS** Units: **mg/L** Analysis Date: **05-Apr-2019 14:45**
Client ID: Run ID: **Balance1_336080** SeqNo: **5024506** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	39.58	2.00	40	1.25	95.8	78 - 114				

The following samples were analyzed in this batch: HS19031508-01

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.	**QUALIFIERS, ACRONYMS, UNITS**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	**HS19031508**	

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

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

Unit Reported	Description
mg/L	Milligrams per Liter

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
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: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19031508

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19031508-01	LH18/24-SP140_032719	Login	3/29/2019 10:12:37 AM	NDR	WET094
HS19031508-01	LH18/24-SP140_032719	Login	3/29/2019 10:12:37 AM	NDR	WET094
HS19031508-01	LH18/24-SP140_032719	Login	3/29/2019 10:12:37 AM	NDR	Sub

ALS Houston, US Date: 12-Apr-19

Sample Receipt Checklist

Client Name: Bhate Environmental
Date/Time Received: **28-Mar-2019 08:30**
Work Order: HS19031508
Received by: **PMG**

Checklist completed by: *Nilesh D. Ranchod* (eSignature) 29-Mar-2019 (Date)
Reviewed by: *RJ Modashia* (eSignature) 29-Mar-2019 (Date)

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

	Yes	No	
Shipping container/cooler in good condition?	☑	☐	Not Present ☐
Custody seals intact on shipping container/cooler?	☑	☐	Not Present ☐
Custody seals intact on sample bottles?	☐	☐	Not Present ☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	☐	☐	Not Present ☑
Chain of custody present?	☑	☐	1 Page(s)
Chain of custody signed when relinquished and received?	☑	☐	COC IDs:N/A
Samplers name present on COC?	☐	☑	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature in compliance?	☑	☐	

Temperature(s)/Thermometer(s): 1.5c UC/C | IR25
Cooler(s)/Kit(s): 44581
Date/Time sample(s) sent to storage: 03/28/2019 18:00

	Yes	No	
Water - VOA vials have zero headspace?	☑	☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	☑	☐	N/A ☐
pH adjusted?	☐	☑	N/A ☐

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

00935831

HS19031508

Bhate Environmental Associates, Inc.

l18/24 Longhorn GW Treatment Plant Weekly Sampl

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd., Suite 210 Houston, Tx. 77099 ATTN: RJ Modashia

Project: BHATE
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No. NWO1312.0150.016.0001

Job:
GROUNDWATER TREATMENT PLANT QUARTERLY INFLUENT SAMPLES

Prepared By: Scott Beesinger

P. O. Number

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	ROD Volatiles	Total Metals	Oil & Grease	Chemical Oxygen Demand	Chloride & Sulfate	1, 4 - DIOXANE	Perchlorate				Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP140_032719	Water	03/27/19 / 14:00		4	3		1								HCL	
LH18/24-SP140_032719	Water	03/27/19 / 14:00		1		1									HNO3	
LH18/24-SP140_032719	Water	03/27/19 / 14:00		2					1	1					NONE	
LH18/24-SP140_032719	Water	03/27/19 / 14:00		1				1							H2SO4	
LH18/24-SP140_032719	Water	03/27/19 / 14:00		1							1				NONE	
Trip Blank	Water	03/27/19		2	2										HCL	

Additional Remarks: **STANDARD TURN AROUND TIME**

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	03/27/19	14:30	[signature]	3/28/19	0830						

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

44531 NIC 1.50 4(2.5) c(6.0.54)

(Word) S:\I-ces\Forms\Chain of Custody - BiWeekly

ALS Environmental
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

44581

CUSTODY SEAL
Date: 3/27/19 Time: 1430
Name: Scott Beesinger
Company: Bhate

Seal Broken By: SM
Date: 03/28/19

44581 MAR 2 8 2019

Must Deliver Next Business Day
Time and Tempature Sensitive!

44581

ORIGIN ID:SGRA (303) 597-2450
SCOTT BEESINER
BHATE ENVIRONMENTAL ASSOCIATES
1203-B EAST GRAND AVE. PMB202

MARSHALL, TX 75670
UNITED STATES US

SHIP DATE: 06MAR19
ACTWGT: 1.00 LB MAN
CAD: 300130/CAFE3211
DIMS: 26x14x14 IN

TO CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON TX 77099
(281) 530-5656
REF: LHAAP-58-BO 64113-RJ
RMA:

FedEx Express
E

FedEx
TRK# 0221 4809 7831 3421

THU - 28 MAR 10:30A
PRIORITY OVERNIGHT

AB SGRA

77099
TX-US
IAH

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. 50µL of an ^{18}O labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45µm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 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

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: **34-1909153**

Project ID: HS19031508

Purchase Order: HS19031508

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18-24-SP140_032719	1909153001	03/27/19	03/30/19	

ANALYTICAL REPORT

Workorder: 34-1909153
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **LH18-24-SP140_032719**	Sampling Site: NA	Collected: 03/27/2019
Lab ID: 1909153001	Media: 125 mL Nalgene	Received: 03/30/2019
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 11:35	**Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**6500**	1000	2000	4000	1000	

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: alslt.lab@ALSGlobal.com
Web: www.alsslc.com

ANALYTICAL REPORT

Workorder: 34-1909153
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

Analysis Information

Workorder: 1909153

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	**MS:** 647200	**MSD:** 647201
Analyzed: 04/10/2019 10:55	**Analyzed:** 04/10/2019 11:08	**Analyzed:** 04/10/2019 11:22
Dilution: 1	**Dilution:** 1	**Dilution:** 1
Units: ug/L	**Units:** ug/L	**Units:** ug/L

Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	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 1909153

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

18698/#2

Subcontract Chain of Custody

COC ID: 11013

1909153

SUBCONTRACT TO:

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

Phone: +1 801 266 7700

CUSTOMER INFORMATION:		**INVOICE INFORMATION:**	
Company:	ALS Houston	**Company:**	ALS Houston
Contact:	RJ Modashia	**Contact:**	Accounts Payable
Address:	10450 Stancliff Rd, Ste 210	**Address:**	10450 Stancliff Rd, Ste 210
Phone:	+1 281 530 5656	**Phone:**	+1 281 530 5656
Email:	RJ.Modashia@alsglobal.com	**Reference:**	HS19031508
Alternate Contact:	Jumoke M. Lawal	**TSR:**	Danielle Winnings
Email:	jumoke.lawal@alsglobal.com		

	LAB SAMPLE ID / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / DUE DATE
1.	**HS19031508-01**	**LH18/24-SP140_032719**	**Water**	**27 Mar 2019 14:00**
	SUB_Perch-6850			05 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. Makany	Date/Time:	3/29/19 18:00
Received By:	Meredith Hunsl	Date/Time:	3/30/19 858
Cooler ID(s):	9076	Temperature(s):	2°

RIGHT SOLUTIONS | RIGHT PARTNER

ALS Environmental
CHAIN-OF-CUSTODY

Project / Job / Task: HS19031508 | **Split:** | **Workorder ID:** 1909153 | **Level:** ENV_LVL4

Client: ALS Environmental (Houston) | **Account:** 8101 | **Type:** 125Poly

Comments:

Preservatives: COOL

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	Requested Analysis: EPA 6850, DoD QSM
1	03/27/2019 14:00	LH18-24-SP140_032719	1909153001		Water	A	1	A
2								
3								
4								
5								
6								
7								
8								
9								
10								

44 of 126

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
Warath, Julie	03/30/2019 08:58	ALS Sample Receiving	Sample Login
Julie Warath	4/1/19 1330	GB	Storage
R-33.1	4-8-19/10:00	T. Busch	6850

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

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

Prepared / Analyzed by: ____________ Date / Time: ____________

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

 Mon, 04/01/19 1:00 PM ALSCOCV3.1

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Houston	Project/Task/Site: 1909153
Date/Time of Receipt: 3/30/19 | 858	Number of Coolers Received: 1

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

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

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 9276	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: Meredith Edwards (Signature) Meredith Edwards (Printed Name) 3/30/19 (Date)

CLIENT-RELATED INFORMATION

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

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES ☐ NO ☐

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

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

CRIR.doc

Revised 01/01/2018

Must Deliver Next Business Day
Time and Tempature Sensitive!

Part # 159469-434 RIT2 EXP 11/19

ALS

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

SHIP DATE: 29MAR19
ACTWGT: 9.25 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE

SALT LAKE CITY UT 84123
(801) 266-7700
REF: HS19031492/1508/1511 RJ

551C1/46B3/104C

FedEx
Express
E

J181118060501uv

TRK# 0201 4809 7832 2367

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO BTFA

84123
UT-US SLC

Batch Worklist

Batch: ELMS/ 2233 **Created:** 4/9/2019 08:42 **Instrument:** LCMS04 **HBN:** 236356
Rule: EPA 6850, DoD QSM Water **Analyst:** T. Bosch **Status:** WP

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	5311		4/11/2019	4/10/2019
2	647199	LCS for HBN 236356 [ELMS/2233]				LCS	3		E6850Q413Q	5311		4/11/2019	4/10/2019
3	647197	ICS for HBN 236356 [ELMS/2233]				ICS	3		E6850..D3Q	5311		4/11/2019	4/10/2019
4	647198	LMB for HBN 236356 [ELMS/2233]				LMB	3		E6850Q413Q	5311		4/11/2019	4/10/2019
5	1909152001	LH18/24-SP650_032719_BIX				SAMPLE	3	1909152001-A	E6850Q41.3	5480	4/24/2019	4/11/2019	4/10/2019
6	647200	LH18/24-SP650...(1909152001MS)				MS	3		E6850Q413Q	5311		4/11/2019	4/10/2019
7	647201	LH18/24-SP65...(1909152001MSD)				MSD	3		E6850Q413Q	5311		4/11/2019	4/10/2019
8	1909153001	LH18-24-SP140_032719				SAMPLE	3	1909153001-A	E6850Q41.3	5480	4/24/2019	4/11/2019	4/10/2019
9	1909154001	LH18/24-SP650_032719_BIX				SAMPLE	3	1909154001-A	E6850Q41.3	5480	4/24/2019	4/11/2019	4/10/2019
10	1909947001	LH18/25-SP650_040419_BIX				SAMPLE	3	1909947001-A	E6850Q41.3	5480	5/2/2019	4/18/2019	4/10/2019
11	1909949001	HBW7_040119				SAMPLE	3	1909949001-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
12	1909949002	HBW7_040119-a				SAMPLE	3	1909949002-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
13	1909949003	HBW10_040119				SAMPLE	3	1909949003-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
14	1909949004	HBW1_040119				SAMPLE	3	1909949004-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
15	1909949005	GPW1_040119				SAMPLE	3	1909949005-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
16	1909949006	GPW3_040119				SAMPLE	3	1909949006-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
17	647196	RLVS for HBN 236356 [ELMS/2233				RLVS	3		E685041C3Q	5311		4/11/2019	4/10/2019
18	647202	CCV for HBN 236356 [ELMS/2233]				CCV	3		E685041C3Q	5311		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: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\236356-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\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.

Chromatography (GC, HPLC, LC/MS) Technical Review Criteria Batch(es)/SDG: ELMS: 2233 HBN: 236356 Sample Set IDs if Applicable: 1909152/1909153/1909154 1909947/1909949	Analyst Initials	Reviewer Initials
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

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

Standard: **43701**
MFG: ALS/SLC
MFG Lot: TNB: 09/18/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/18/2018 02:09PM

Amount: 10 mL
Expires: 09/18/2019
Usable: Yes
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 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)	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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/20/2018 09:09AM
Verified By: Thomas Bosch
Verify Date:

Amount: 25 mL
Expires: 09/20/2019
Usable: Yes
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

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

Product Number:	ICC-013	Lot Issue Date:	29-Feb 2016
Lot Number:	CP-0860	Expiration Date:	31-Mar 2020

Product Name: Perchlorate IC Standard

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

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

Solvent: water (low TOC, < 50 ppb)

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

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

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

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

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

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

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

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

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

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

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

Daniel J. Lamendola
Director of QA/RA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

ISO 9001 Registered Quality System — TUV USA

125 Market Street
New Haven, CT 06513
USA

AccuStandard®

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

CERTIFICATE OF ANALYSIS

S 43659

AccuTrace™ Reference Standard

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

Signal Word: None

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

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

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

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

For use in routine laboratory analysis.

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

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

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-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	8.907	21.31933
#*	647199 QC@4.0	Vial 72	1	Control	2	1.97600e5	9.094	3.67714
#*	647197 ICS@4.0	Vial 73	1	Control	3	1.49399e5	8.651	3.21517
#*	647198 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
#*	1909152001	Vial 75	1	Sample	5	9.15156e4	8.529	2.57433
#*	647200 91521MS	Vial 76	1	Sample	6	2.25049e5	8.454	6.17769
#*	647201 91521SD	Vial 77	1	Sample	7	2.49579e5	8.497	6.36091
#*	1909153001 1K	Vial 78	1	Sample	8	3.70174e5	9.061	6532.86203
#*	1909154001	Vial 79	1	Sample	9	7.79123e4	8.495	2.34023
#*	1909947001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
#*	1909949001	Vial 81	1	Sample	11	0.00000	0.000	0.00000
#*	1909949002	Vial 82	1	Sample	12	0.00000	0.000	0.00000
#*	1909949003	Vial 83	1	Sample	13	0.00000	0.000	0.00000
#*	1909949004	Vial 84	1	Sample	14	0.00000	0.000	0.00000
#*	1909949005	Vial 85	1	Sample	15	0.00000	0.000	0.00000
#*	1909949006	Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	647202 CCV@25	Vial 71	1	Control	17	1.08007e6	8.867	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	8.922	23.09461
#*	647199 QC@4.0	Vial 72	1	Control	2	7.01681e4	9.105	4.22460
#*	647197 ICS@4.0	Vial 73	1	Control	3	5.45965e4	8.666	3.77625
#*	647198 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
#*	1909152001	Vial 75	1	Sample	5	3.18275e4	8.549	2.84107
#*	647200 91521MS	Vial 76	1	Sample	6	7.61114e4	8.479	6.88356
#*	647201 91521SD	Vial 77	1	Sample	7	8.42686e4	8.512	7.08137
#*	1909153001 1K	Vial 78	1	Sample	8	1.21054e5	9.077	7051.77497
#*	1909154001	Vial 79	1	Sample	9	2.76117e4	8.519	2.61418
#*	1909947001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
#*	1909949001	Vial 81	1	Sample	11	0.00000	0.000	0.00000
#*	1909949002	Vial 82	1	Sample	12	0.00000	0.000	0.00000
#*	1909949003	Vial 83	1	Sample	13	0.00000	0.000	0.00000
#*	1909949004	Vial 84	1	Sample	14	0.00000	0.000	0.00000
#*	1909949005	Vial 85	1	Sample	15	0.00000	0.000	0.00000
#*	1909949006	Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	647202 CCV@25	Vial 71	1	Control	17	3.36319e5	8.885	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	8.927	5.00000
#*	647199 QC@4.0	Vial 72	1	Control	2	1.77838e5	9.122	5.00000
#*	647197 ICS@4.0	Vial 73	1	Control	3	1.54931e5	8.667	5.00000
#*	647198 LMB	Vial 74	1	Control	4	1.76915e5	8.988	5.00000
#*	1909152001	Vial 75	1	Sample	5	1.20240e5	8.559	5.00000
#*	647200 91521MS	Vial 76	1	Sample	6	1.17757e5	8.476	5.00000
#*	647201 91521SD	Vial 77	1	Sample	7	1.26683e5	8.527	5.00000
#*	1909153001 1K	Vial 78	1	Sample	8	1.82758e5	9.082	5000.00000
#*	1909154001	Vial 79	1	Sample	9	1.13404e5	8.524	5.00000
#*	1909947001	Vial 80	1	Sample	10	1.15130e5	8.458	5.00000
#*	1909949001	Vial 81	1	Sample	11	1.14791e5	8.694	5.00000
#*	1909949002	Vial 82	1	Sample	12	1.24046e5	8.693	5.00000
#*	1909949003	Vial 83	1	Sample	13	1.23373e5	8.718	5.00000
#*	1909949004	Vial 84	1	Sample	14	1.20241e5	8.690	5.00000
#*	1909949005	Vial 85	1	Sample	15	1.27767e5	8.755	5.00000
#*	1909949006	Vial 86	1	Sample	16	1.23965e5	8.816	5.00000
*	647202 CCV@25	Vial 71	1	Control	17	1.46281e5	8.890	5.00000

*** End of Report ***

Sequence Table:

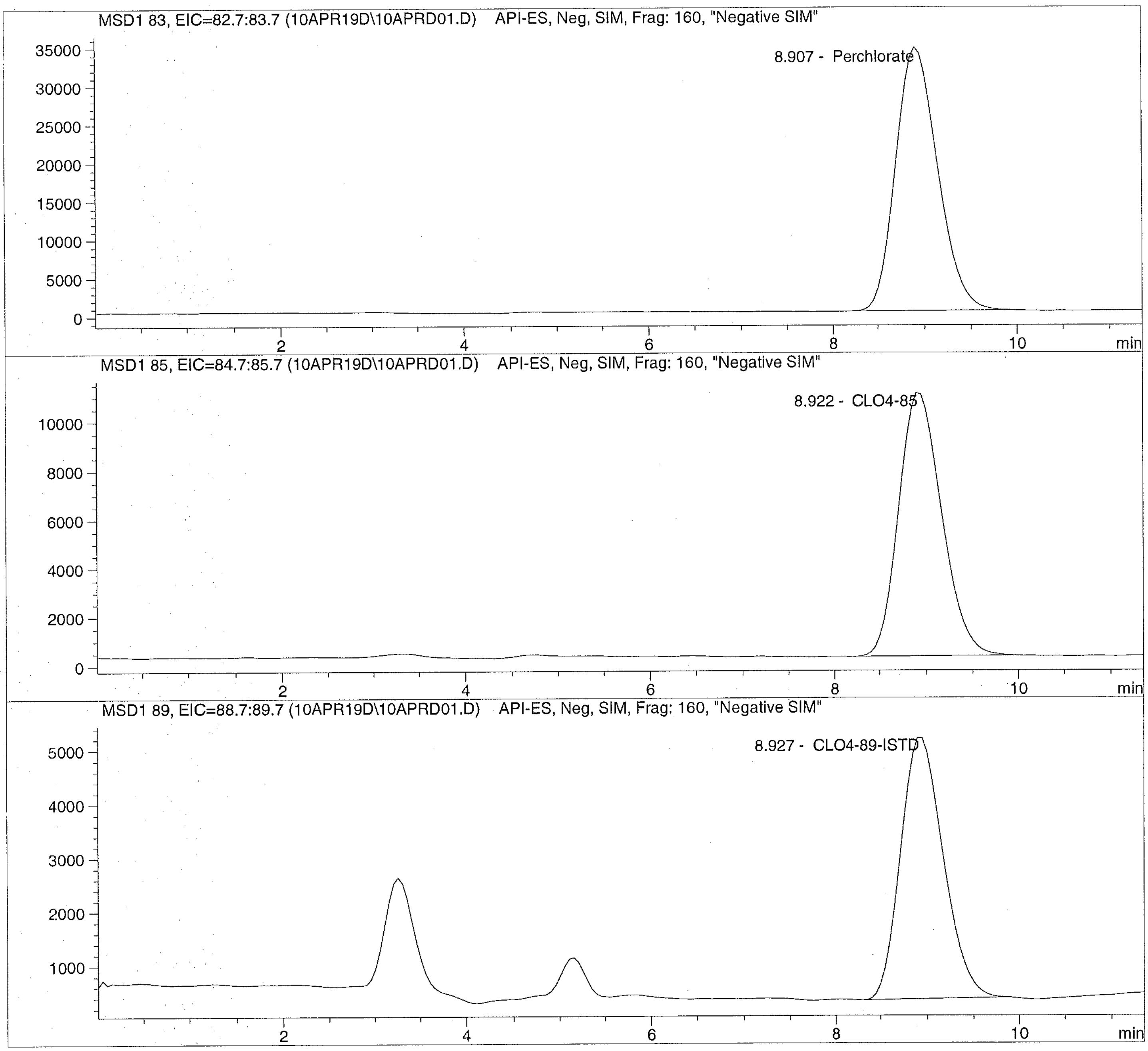
Method and Injection Info Part:

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		

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD01.D       Sample Name: 647195    CCV@25
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD01.D Sample Name: 647195 CCV@25

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

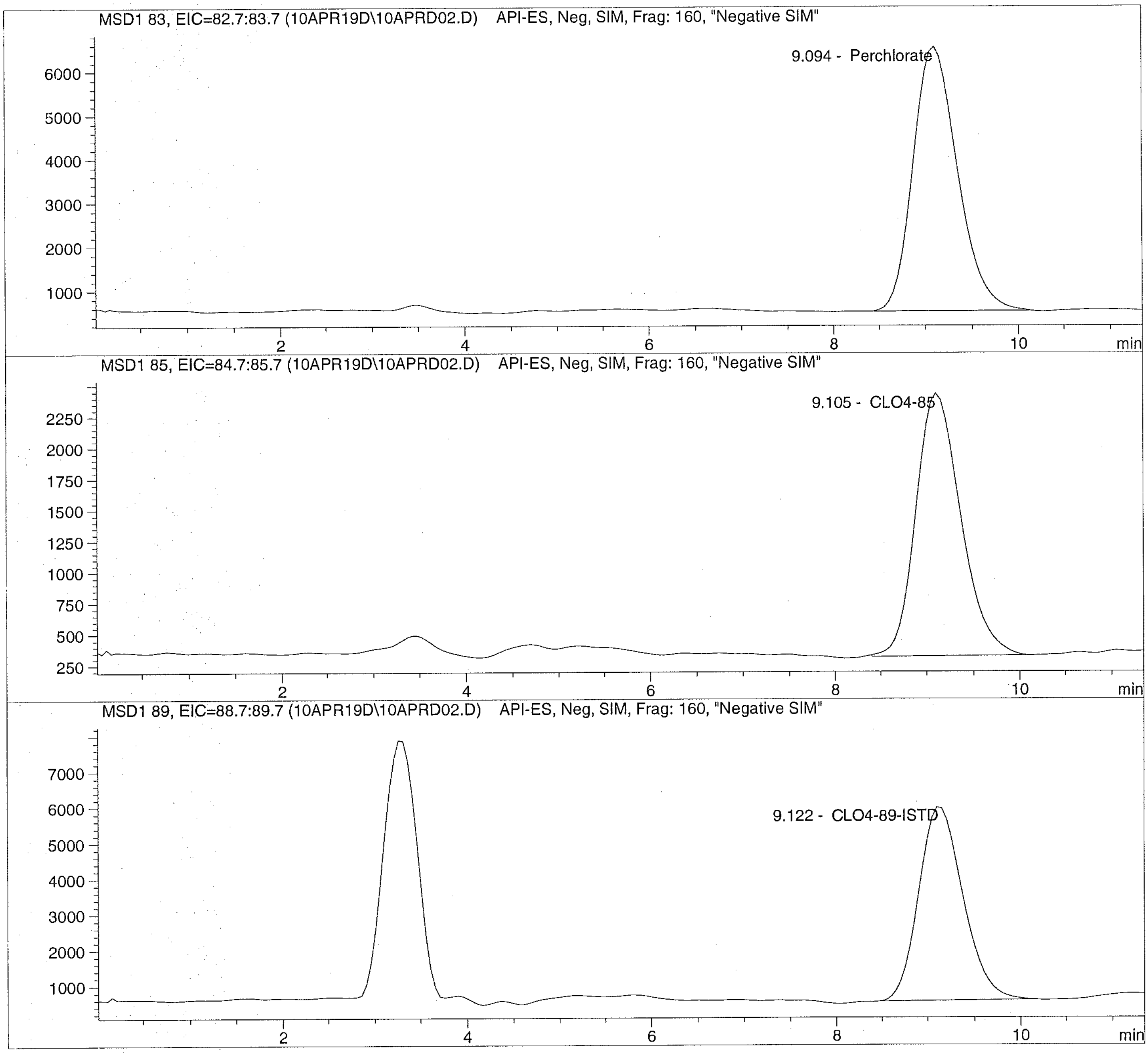
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.927	PBA	153120.0	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD02.D        Sample Name: 647199   QC@4.0
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD02.D Sample Name: 647199 QC@4.0

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 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

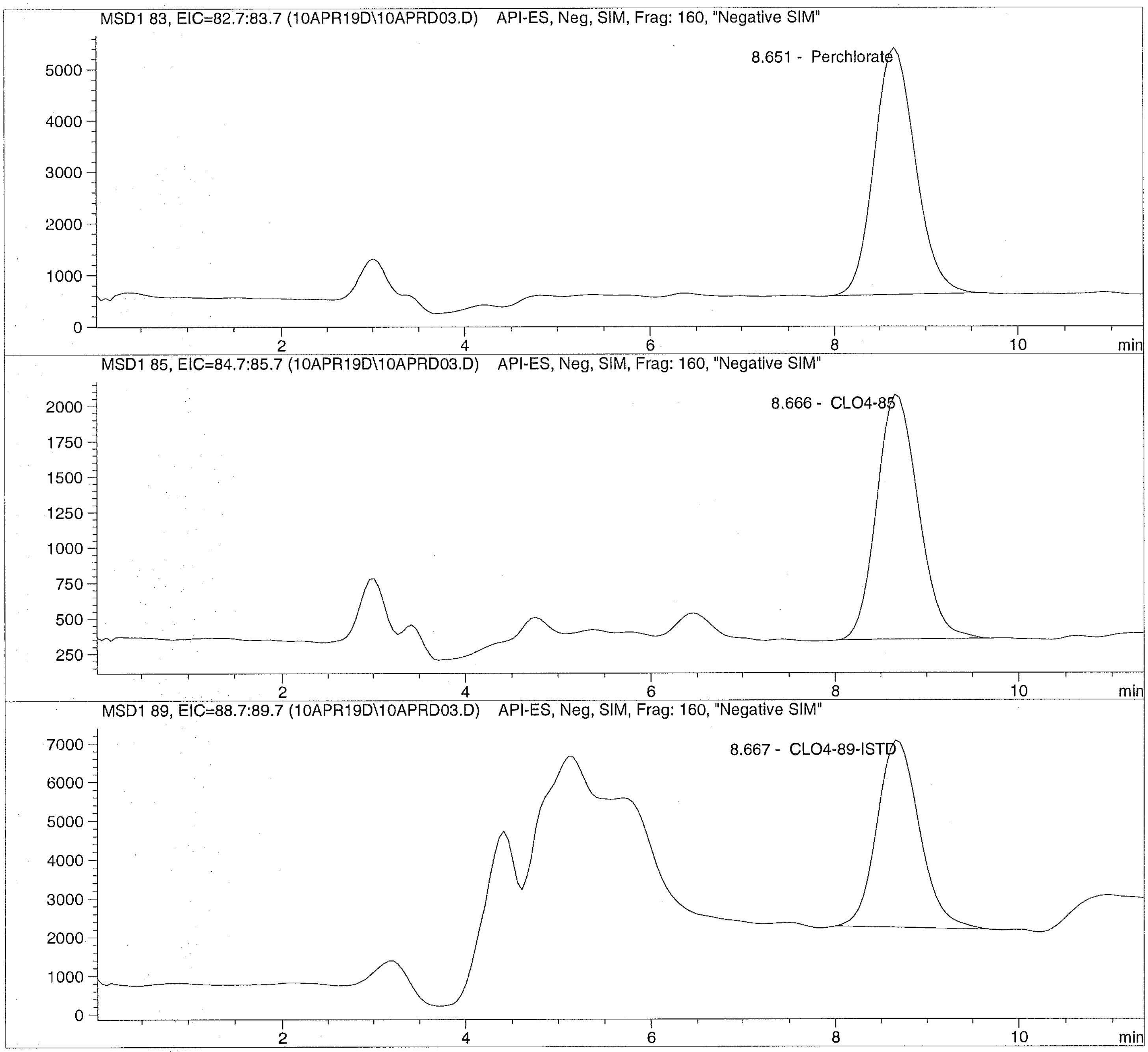
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.122	BBA	177837.9	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD03.D       Sample Name: 647197   ICS@4.0
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD03.D   Sample Name: 647197   ICS@4.0

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

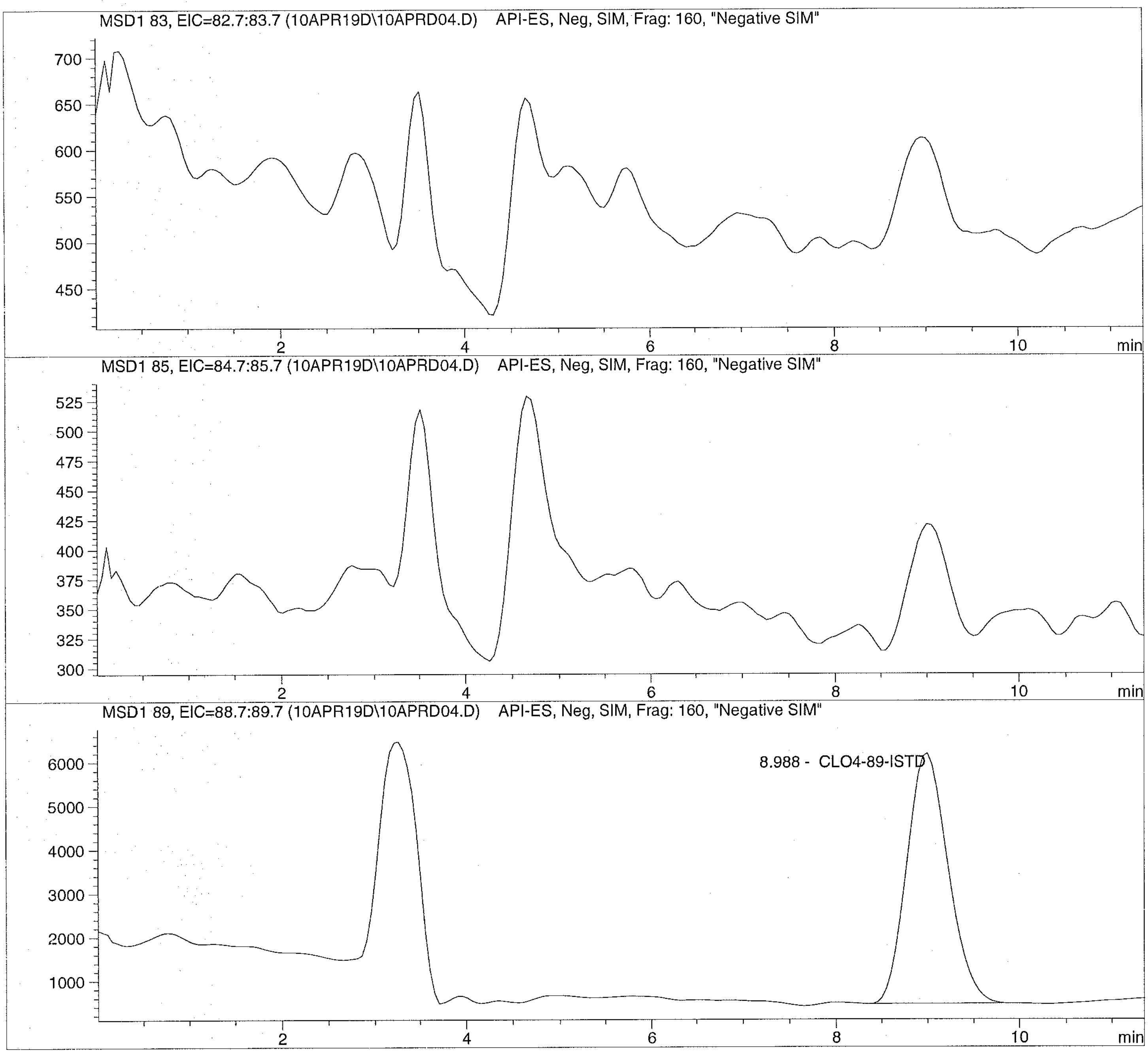
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.667	PBA	154930.6	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD04.D       Sample Name: 647198   LMB
=================================================================================
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
=================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD04.D Sample Name: 647198 LMB

===

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

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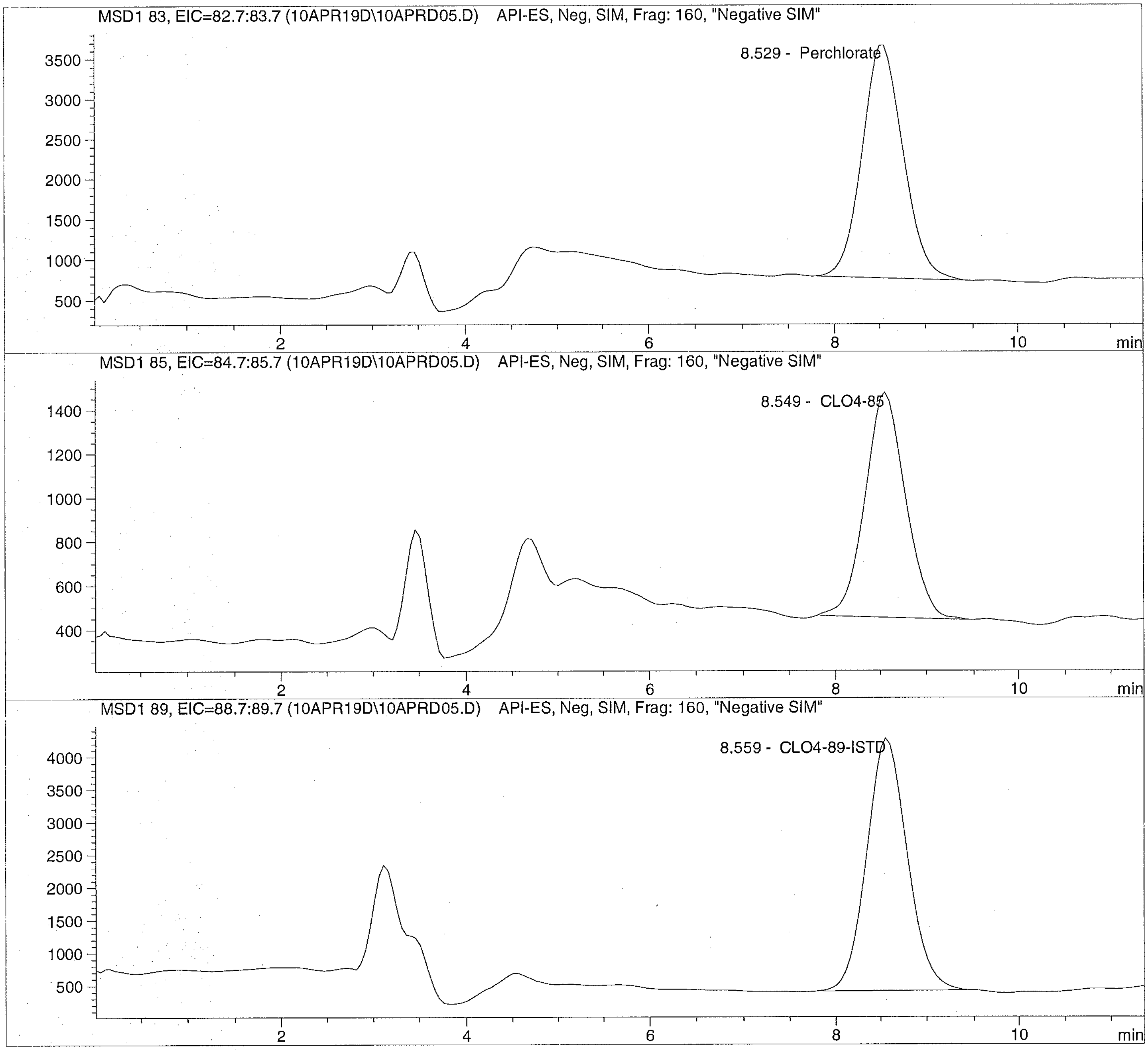
*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD05.D       Sample Name: 1909152001
=================================================================================
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
=================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD05.D   Sample Name: 1909152001

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 ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD06.D Sample Name: 647200 91521MS

===

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

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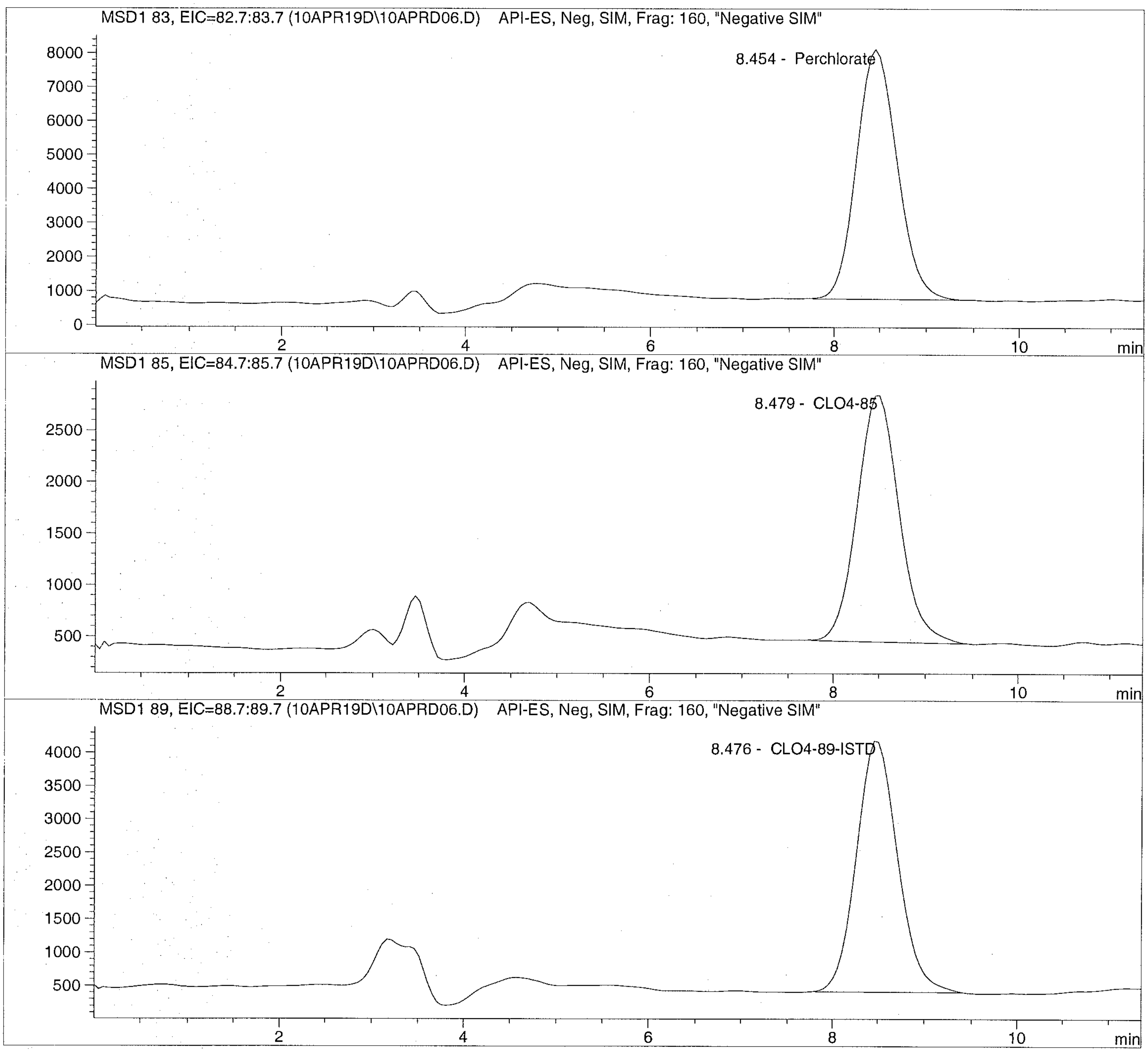


Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD06.D   Sample Name: 647200   91521MS

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

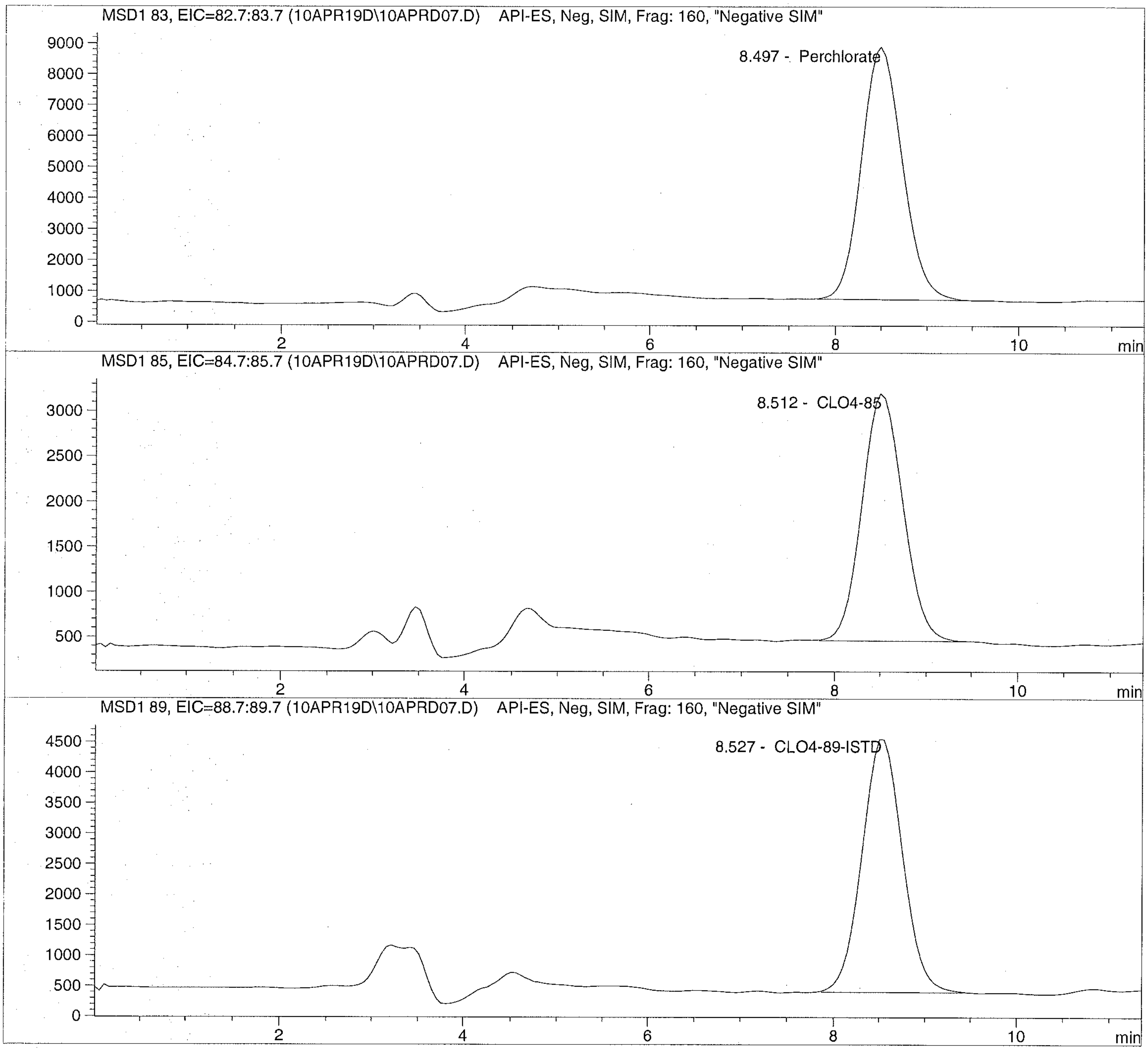
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD07.D   Sample Name: 647201   91521SD

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD07.D Sample Name: 647201 91521SD

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

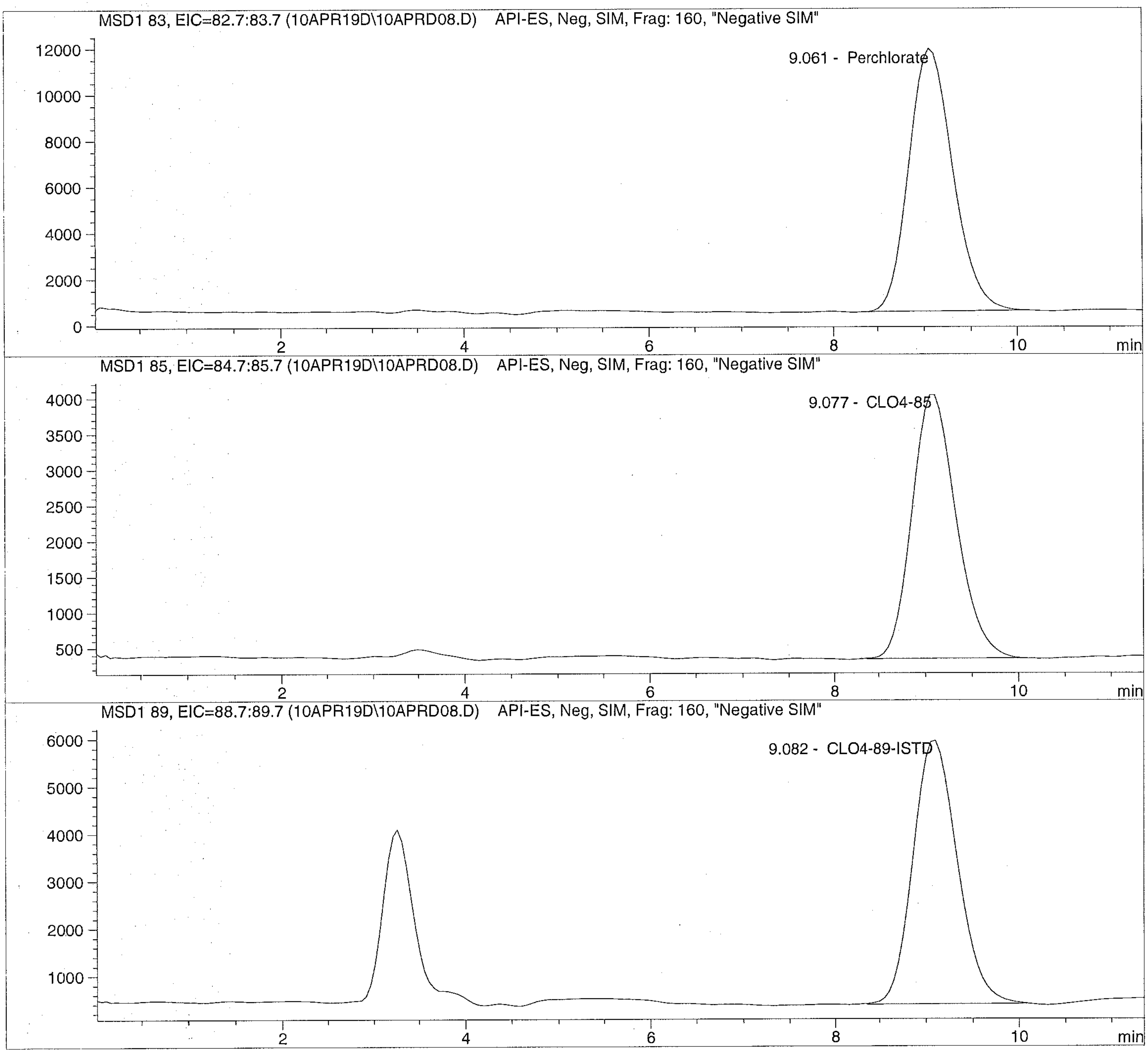
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD08.D Sample Name: 1909153001 1K

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD08.D   Sample Name: 1909153001   1K

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

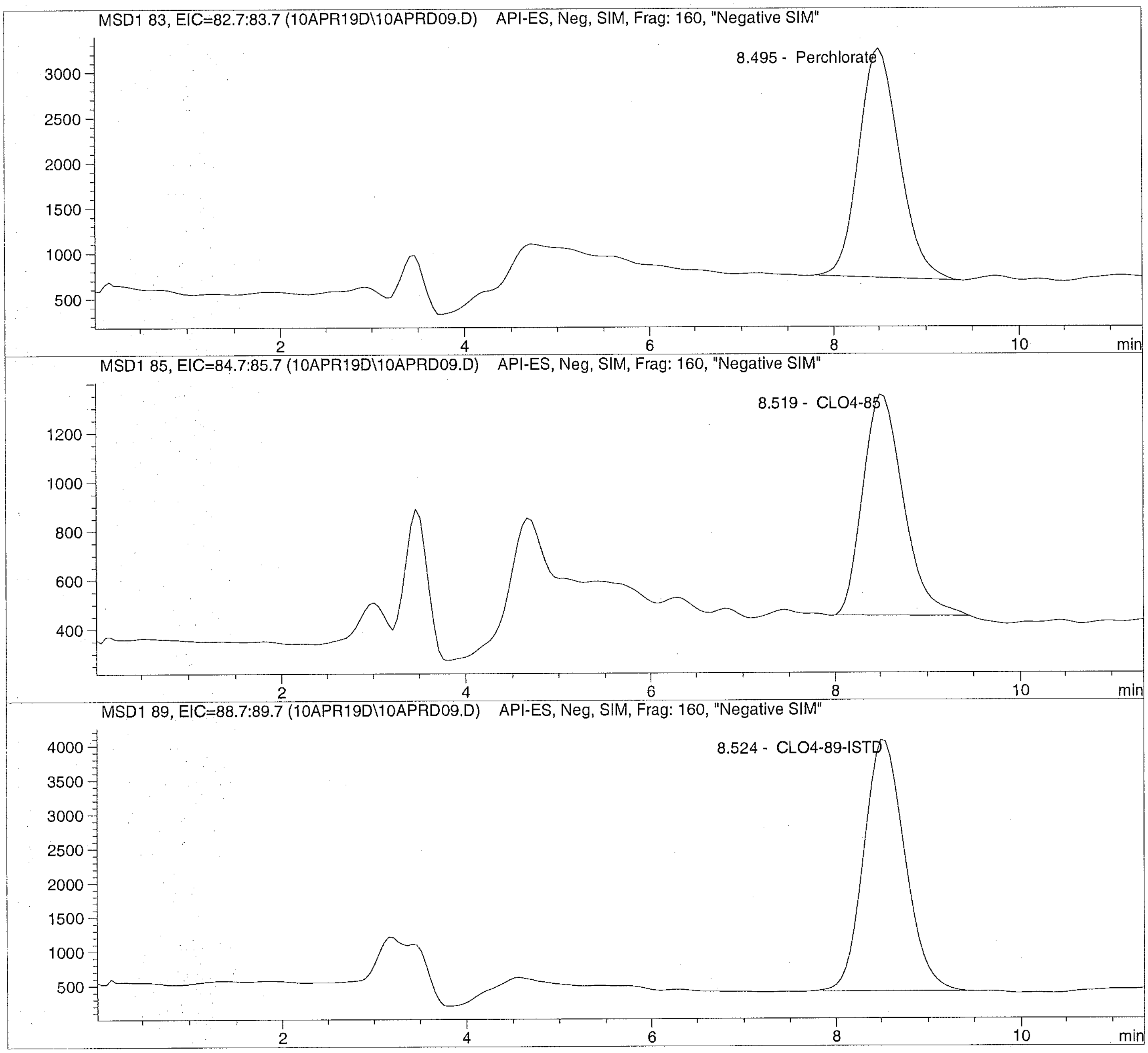
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD09.D   Sample Name: 1909154001

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD09.D Sample Name: 1909154001

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

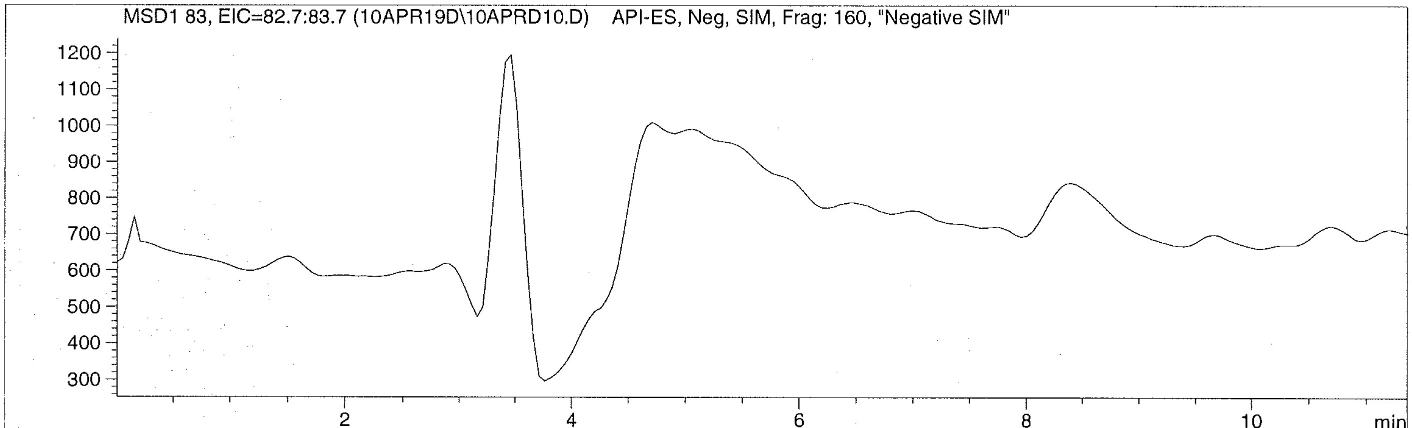
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.524	BBA	113404.4	5.0000	CLO4-89-ISTD

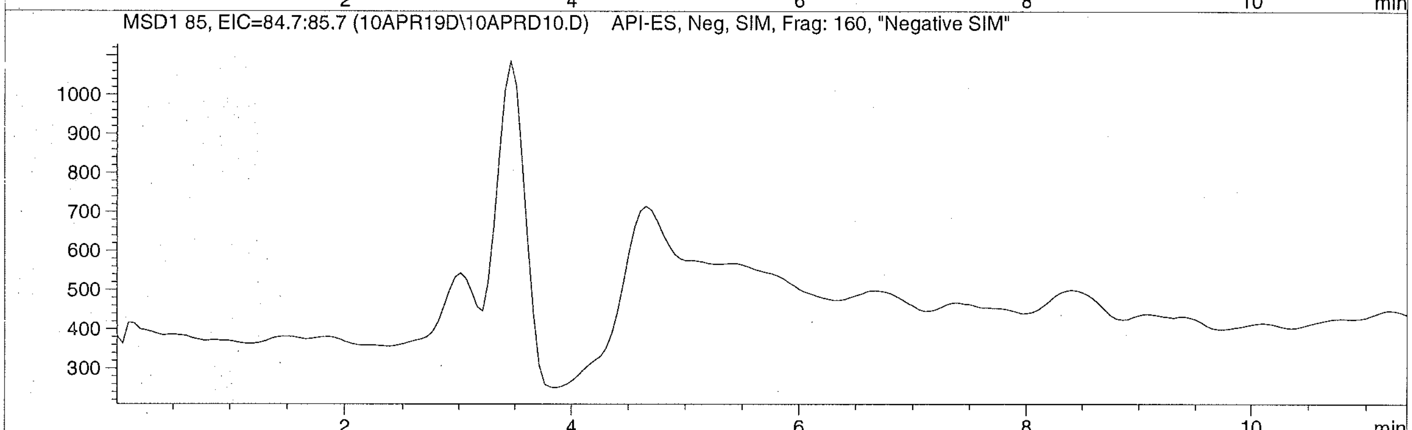
*** End of Report ***

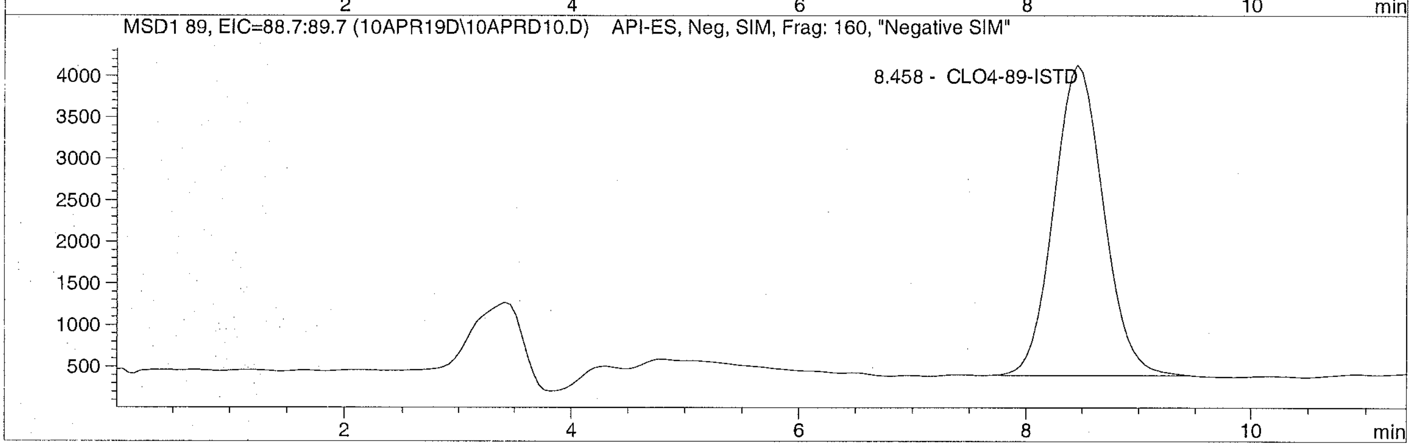
```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD10.D        Sample Name: 1909947001
=================================================================================
Injection Date:    4/10/2019  12:02:10              Seq Line:          10
Sample Name:       1909947001                       Location:      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
=================================================================================
```







Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD10.D Sample Name: 1909947001

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

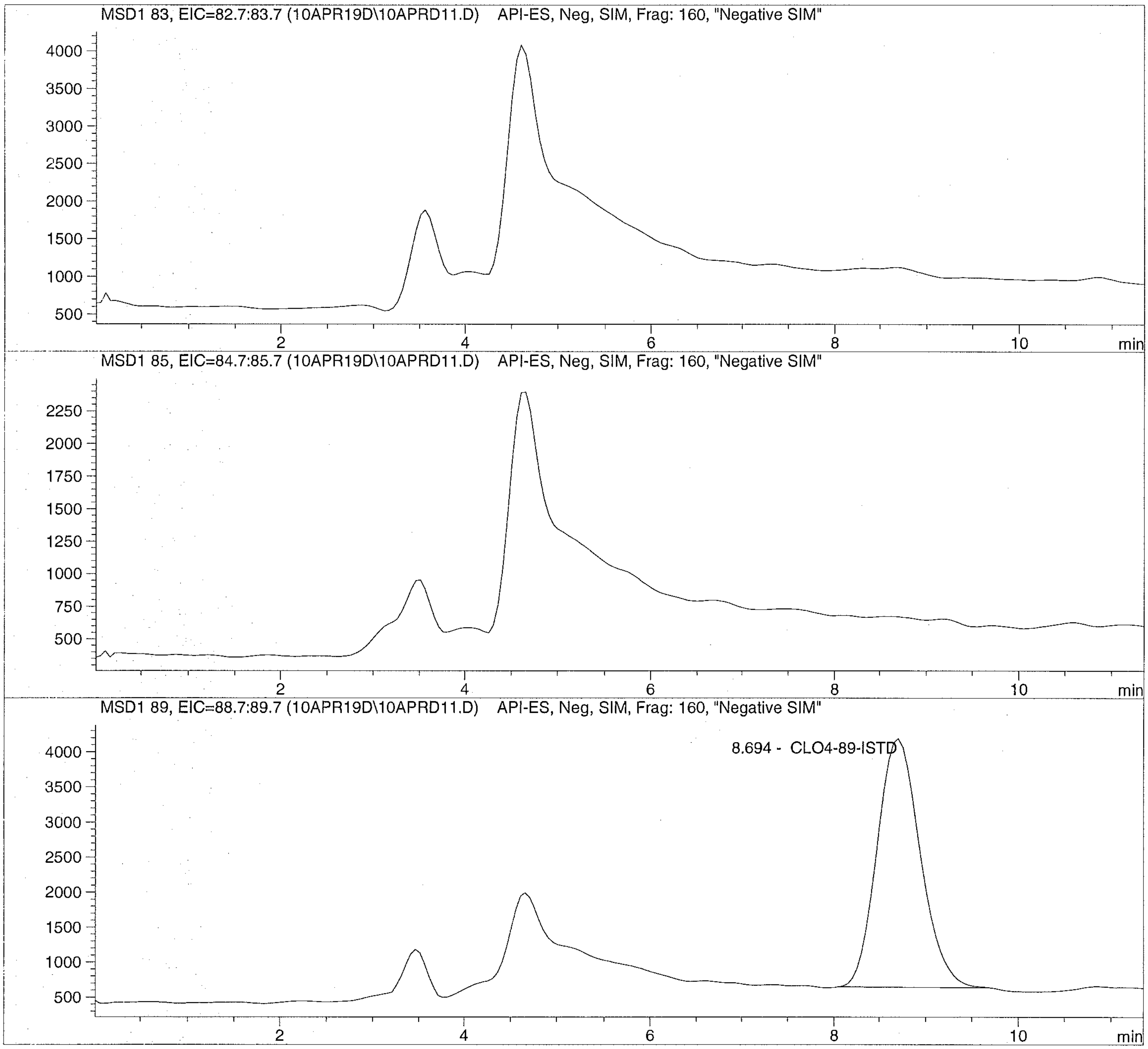
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.458	BBA	115129.6	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD11.D       Sample Name: 1909949001
===================================================================================
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
===================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD11.D Sample Name: 1909949001

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

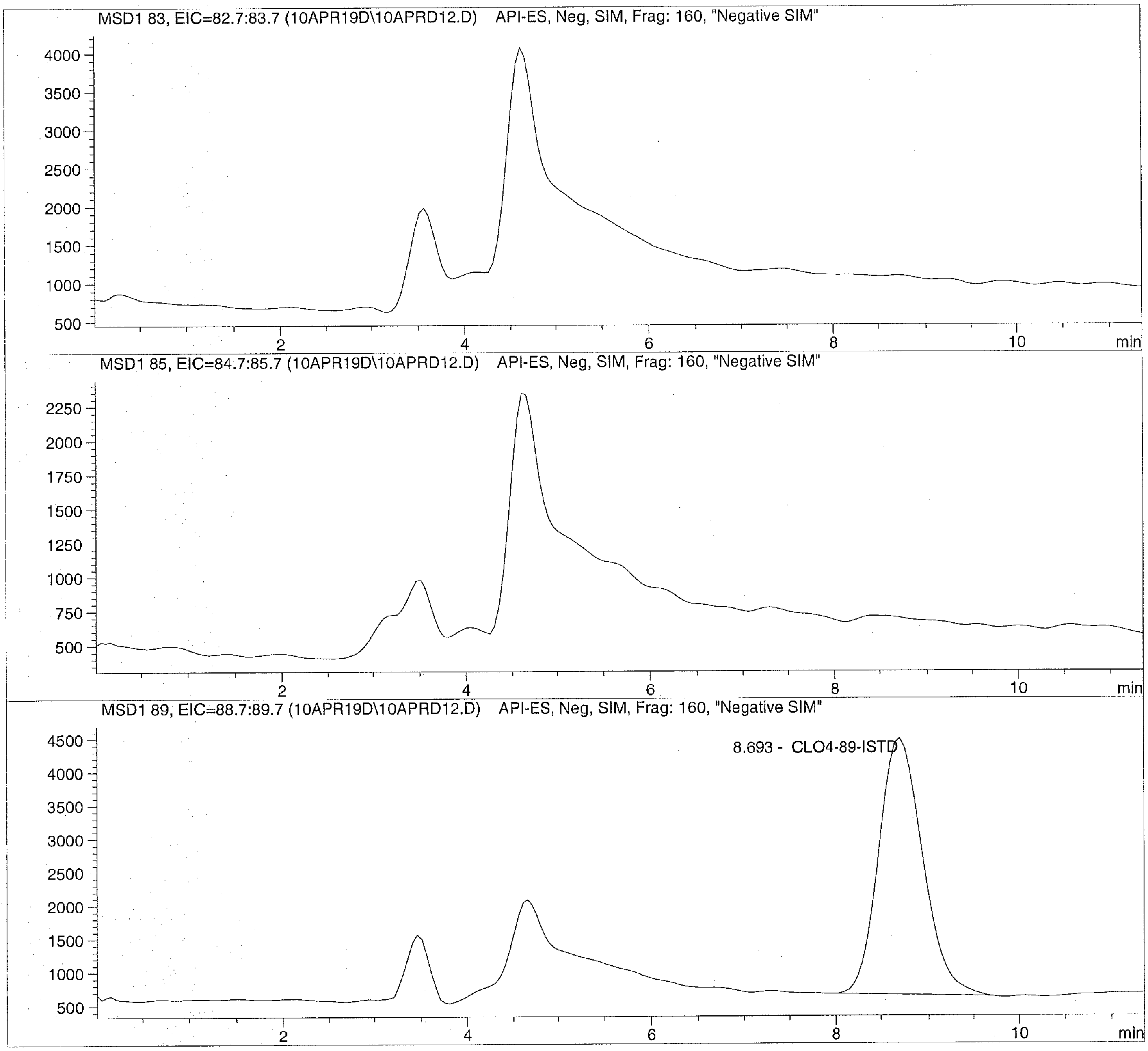
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD12.D   Sample Name: 1909949002

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD12.D   Sample Name: 1909949002

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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

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Sample Information

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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

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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

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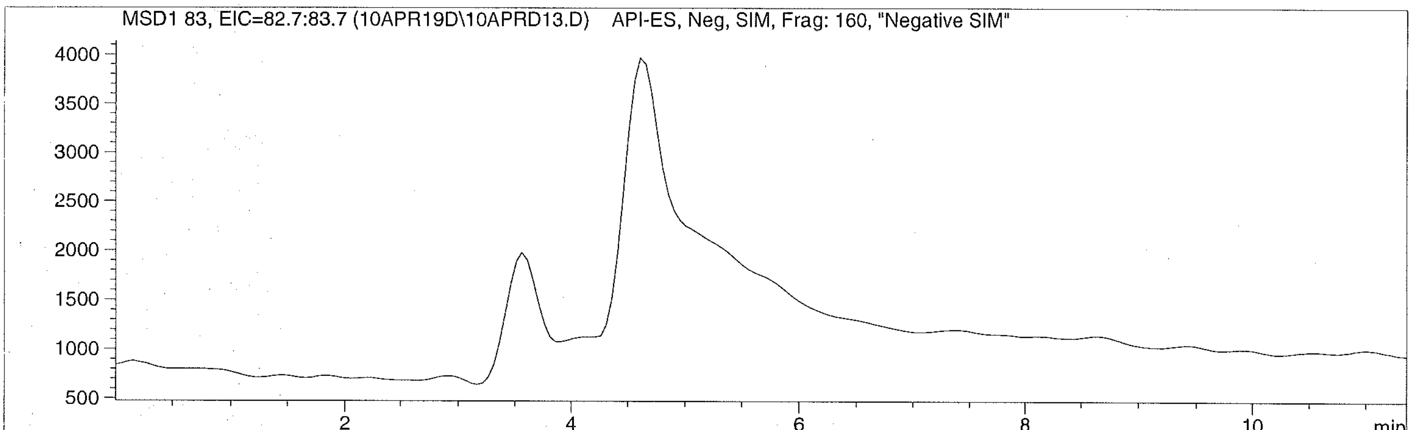
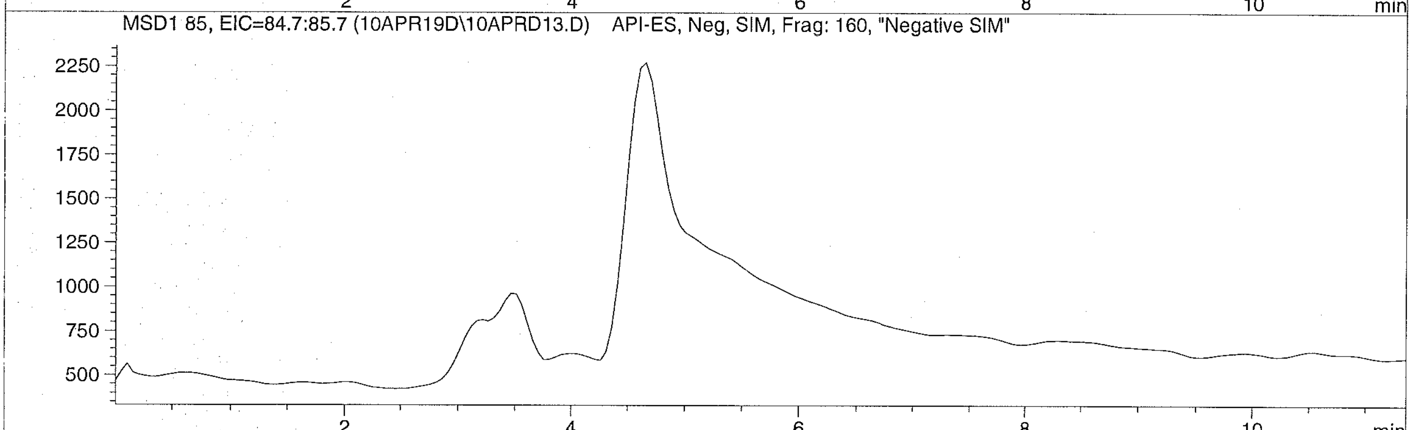
*** End of Report ***

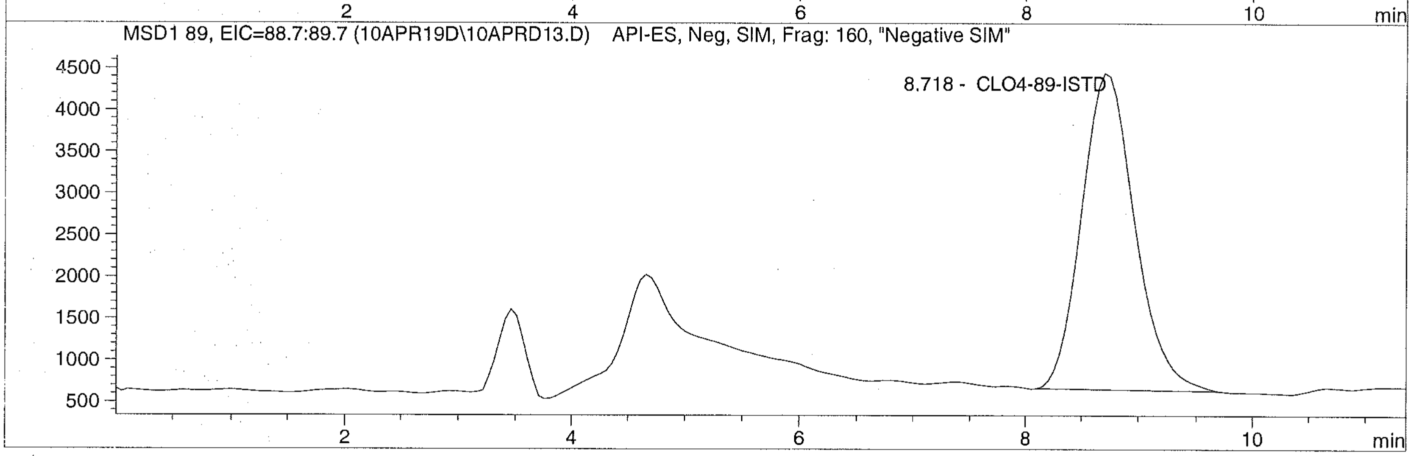
```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD13.D       Sample Name: 1909949003
=====================================================================================
Injection Date:   4/10/2019  12:41:59              Seq Line:          13
Sample Name:      1909949003                       Location:     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
=====================================================================================
```







Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD13.D Sample Name: 1909949003

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

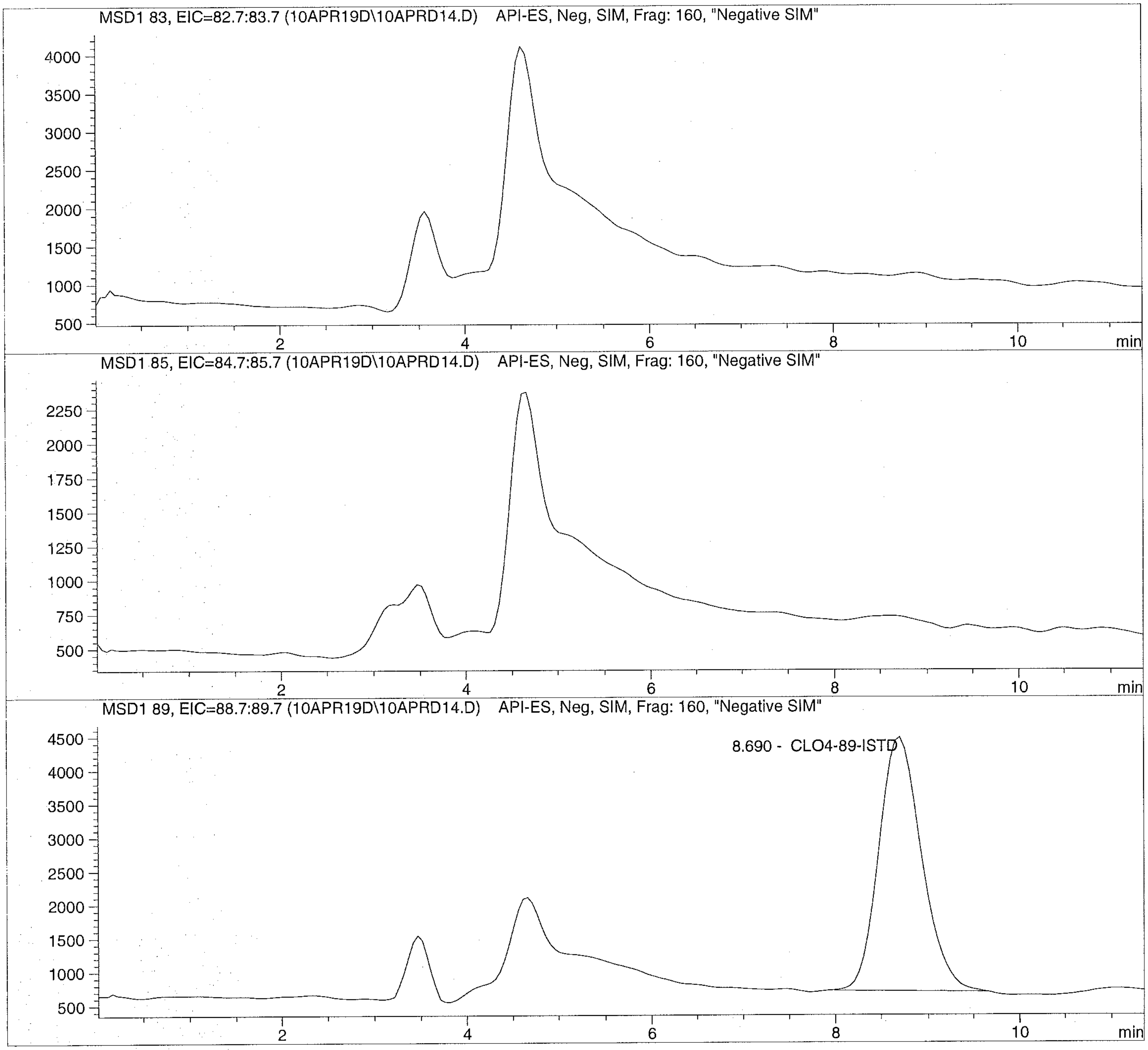
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD14.D Sample Name: 1909949004

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD14.D   Sample Name: 1909949004

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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

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Sample Information

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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

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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

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*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD15.D   Sample Name: 1909949005

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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

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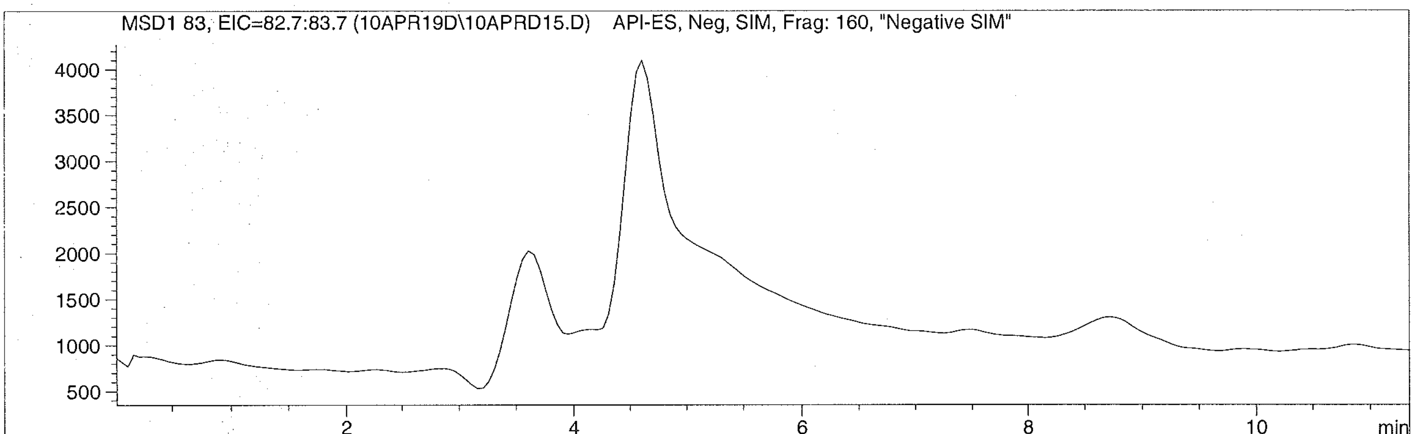
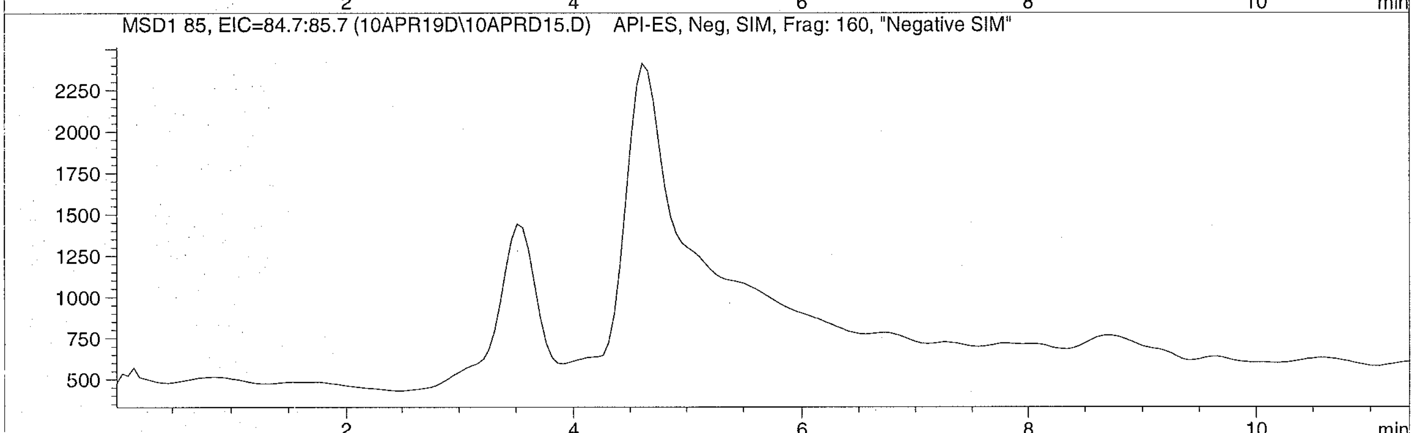
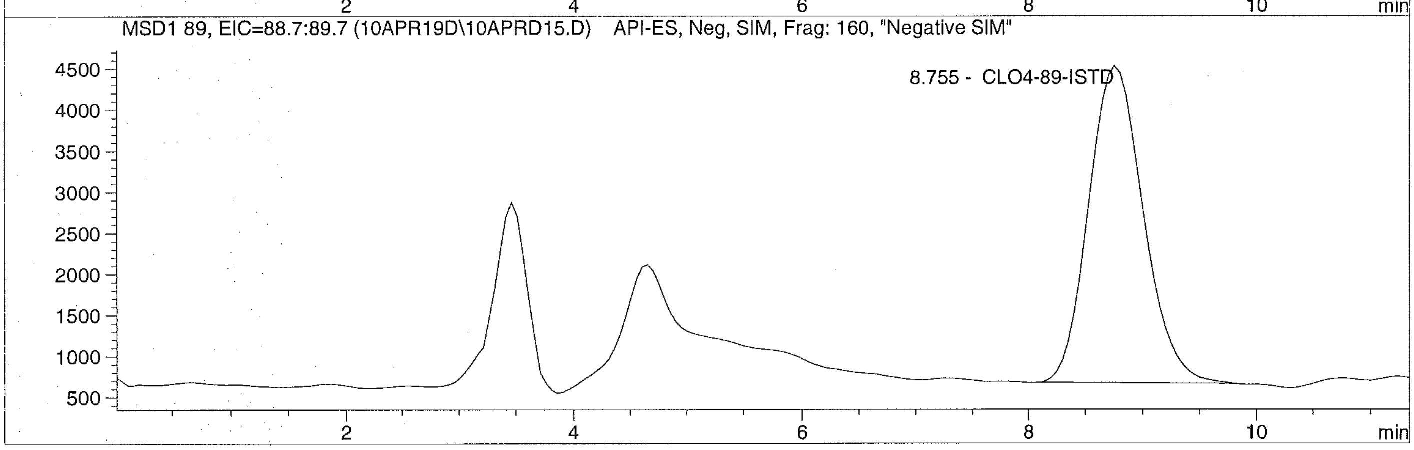






Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD15.D Sample Name: 1909949005

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

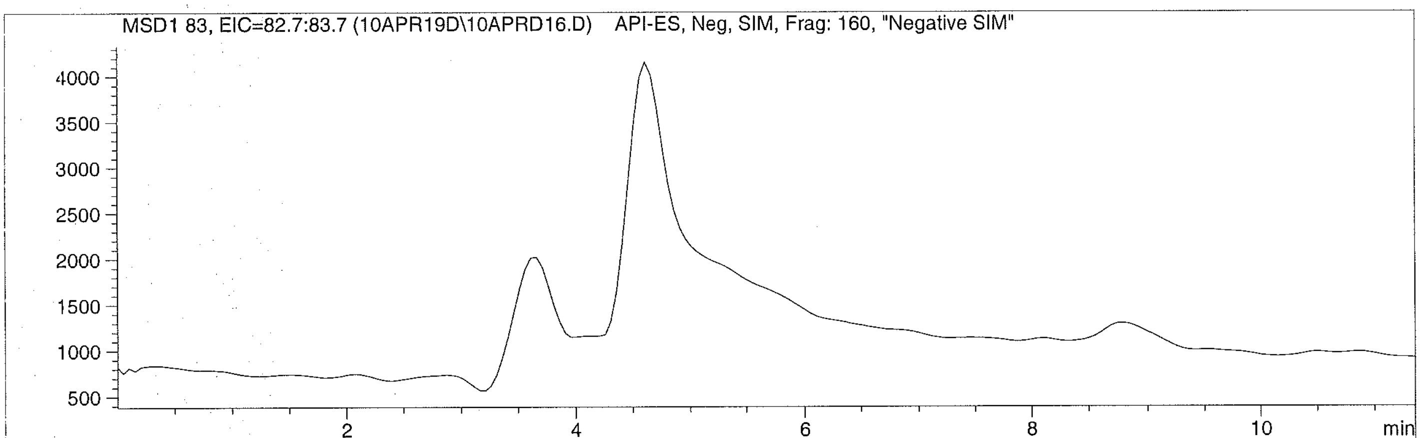
*** End of Report ***

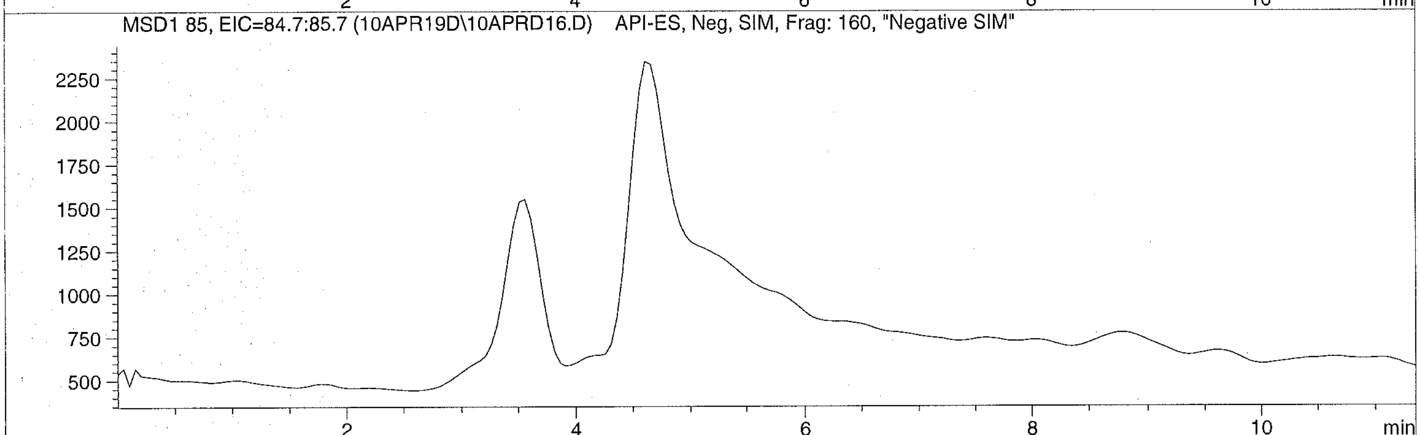
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD16.D   Sample Name: 1909949006

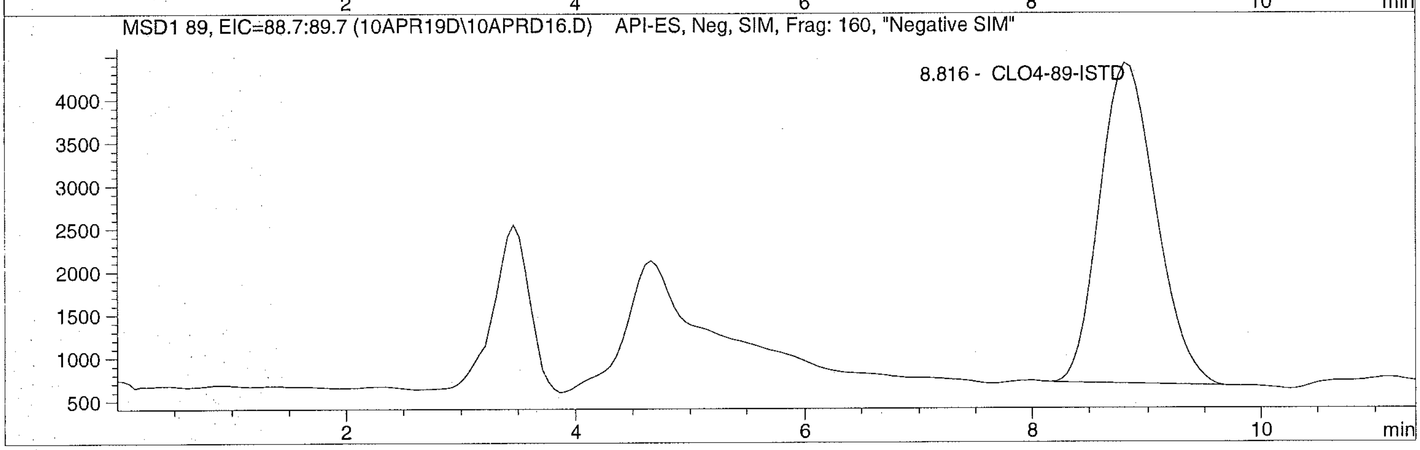
Injection Date:	4/10/2019 13:21:46	Seq Line:	16
Sample Name:	1909949006	Location:	Vial 86
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

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

Perchlorate analysis







Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD16.D Sample Name: 1909949006

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

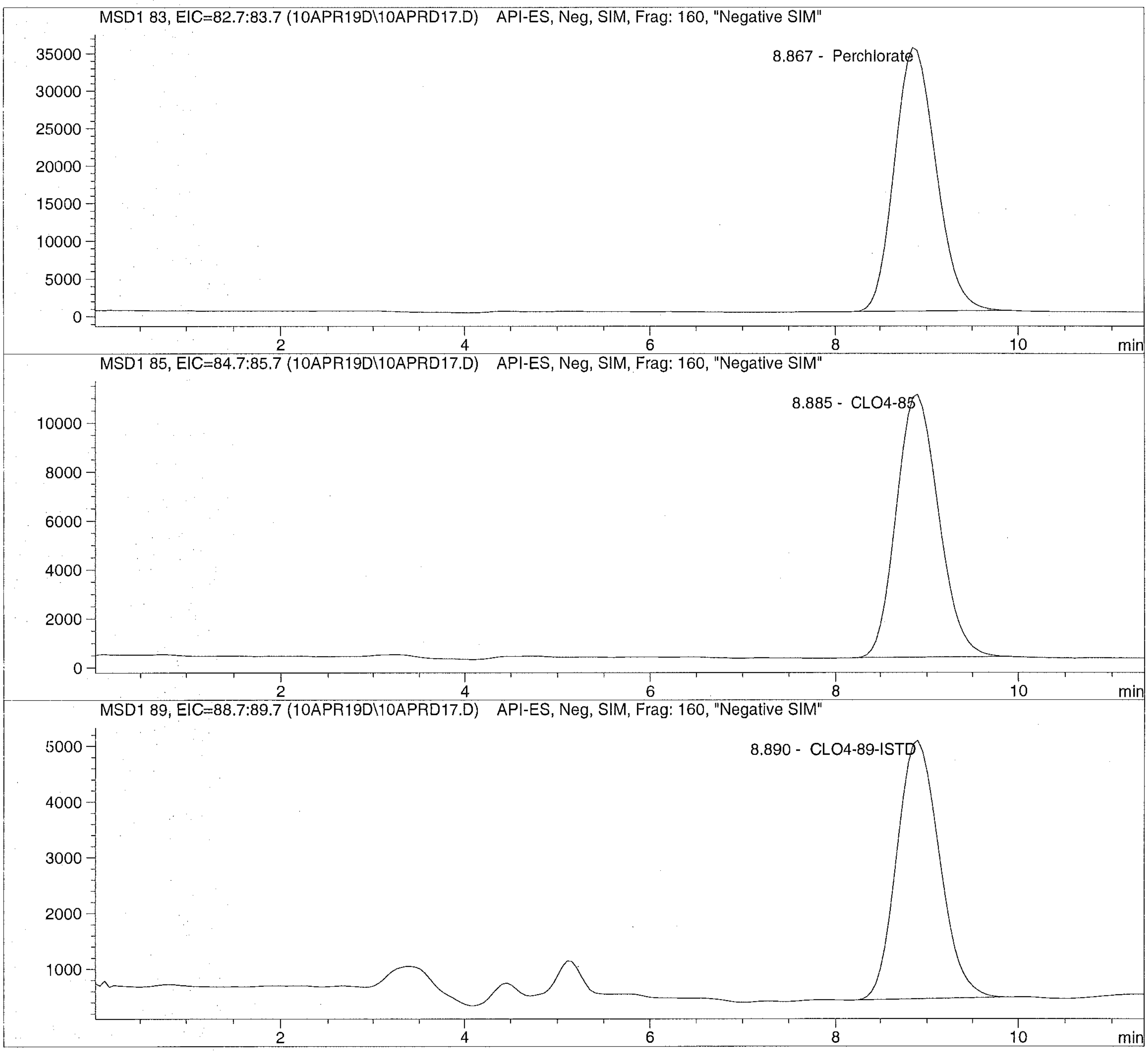
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

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 ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD17.D       Sample Name: 647202   CCV@25
=====================================================================================
Injection Date:     4/10/2019  13:35:04           Seq Line:           17
Sample Name:        647202   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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD17.D   Sample Name: 647202   CCV@25

Injection Date:	4/10/2019 13:35:04	Seq Line:	17
Sample Name:	647202 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
8.867	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

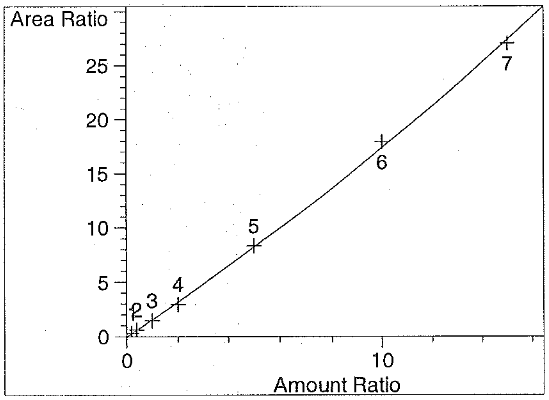
RetTime [min]	Sig	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
8.744	1	1	1.00000	7.76074e4	1.28854e-5	1		Perchlorate
		2	2.00000	1.35273e5	1.47849e-5			
		3	5.00000	3.37764e5	1.48033e-5			
		4	10.00000	6.83454e5	1.46316e-5			
		5	25.00000	2.08433e6	1.19943e-5			
		6	50.00000	4.13334e6	1.20968e-5			
		7	75.00000	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
```

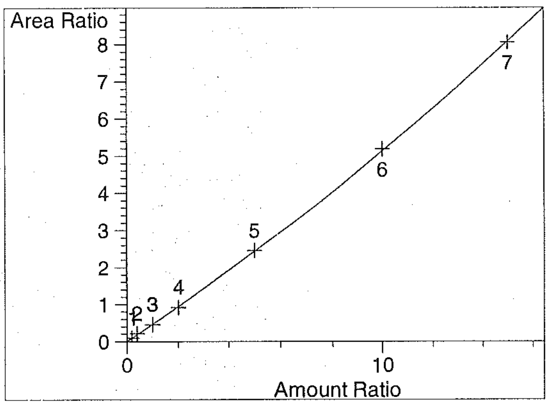
More compound-specific settings:

```
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***
=====================================================================
```

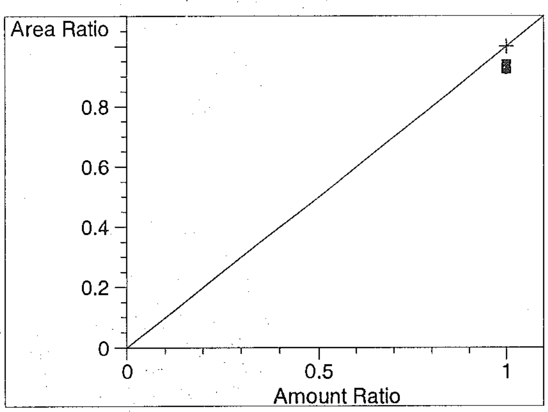
Calibration Curves



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 Report: C:\HPCHEM\1\DATA\19MAR19I\19MAR19D.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
#*	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

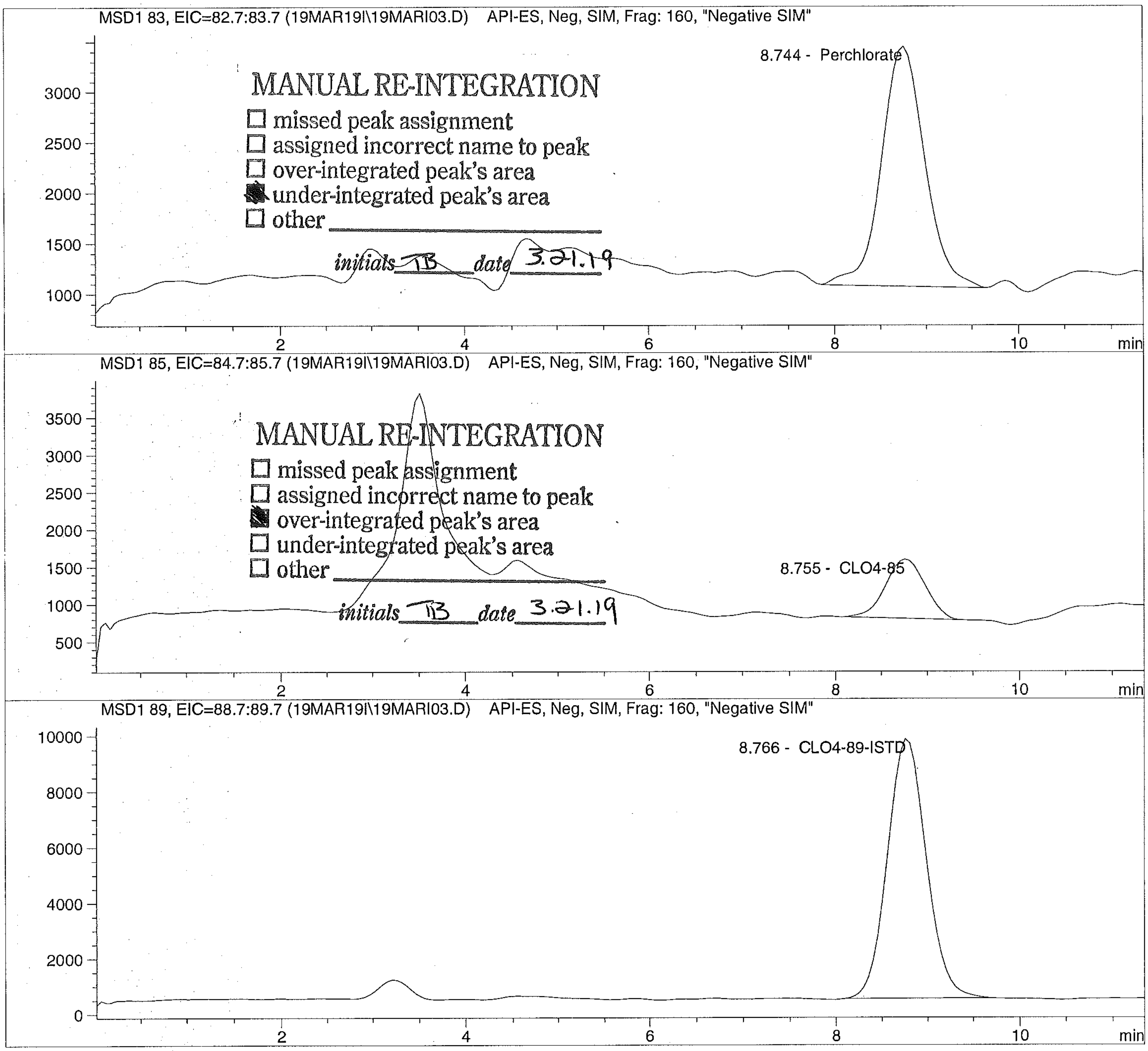
*** End of Report ***

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		

```
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
=====================================================================================
```



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 ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D   Sample Name: CLO4@ 2.0ug/L

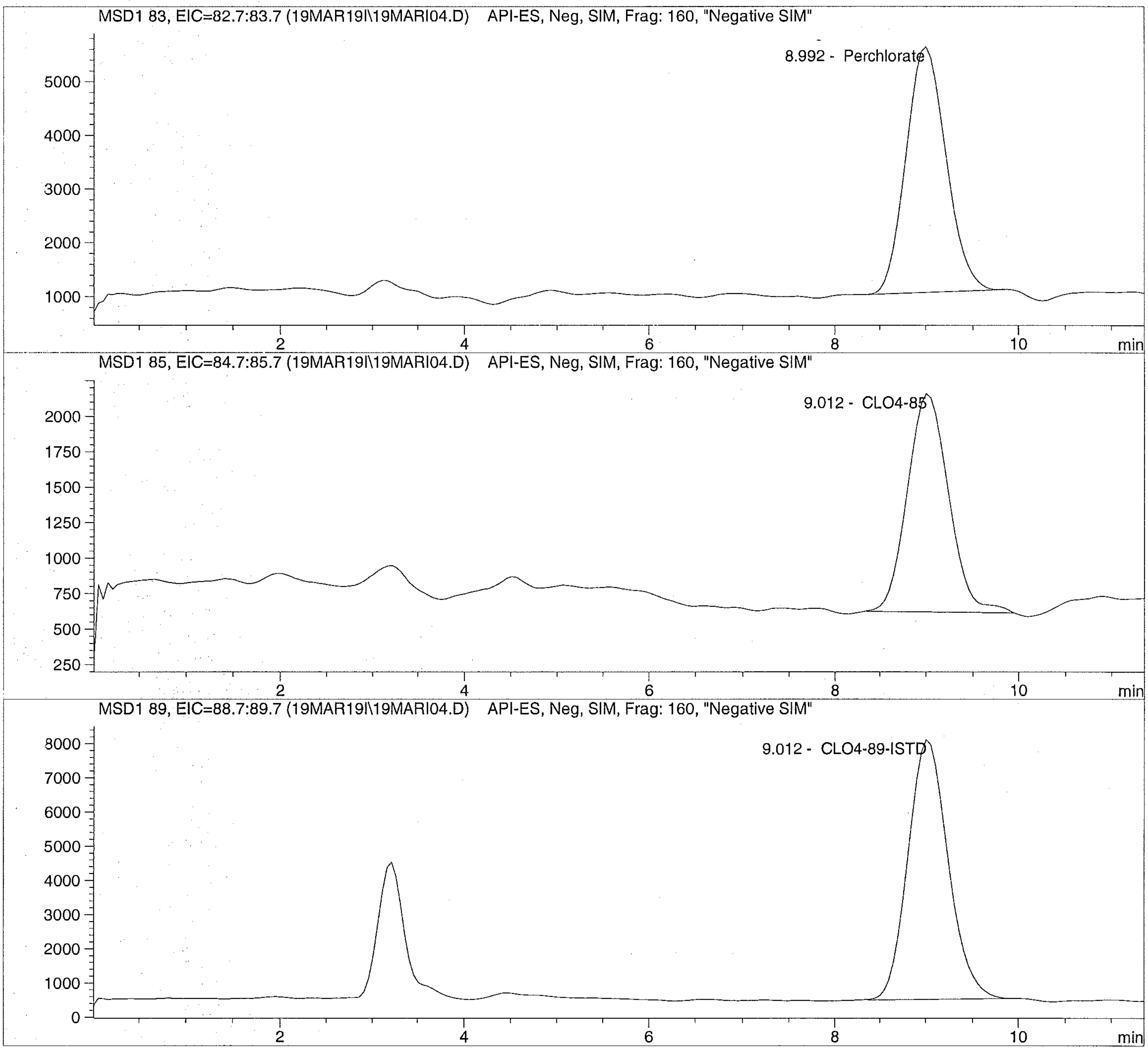
===

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

===



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D Sample Name: CLO4@ 2.0ug/L

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

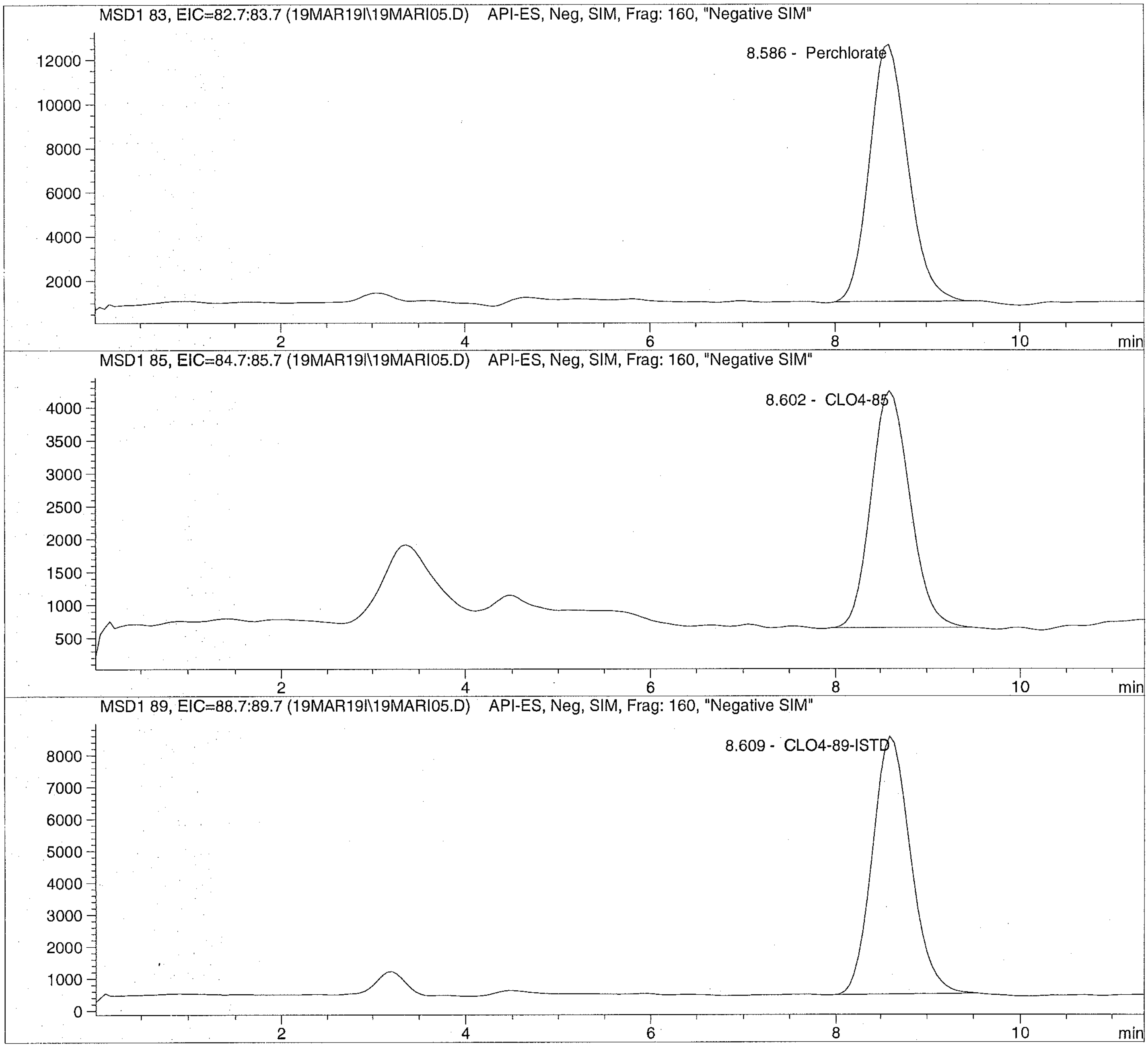
*** End of Report ***

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



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

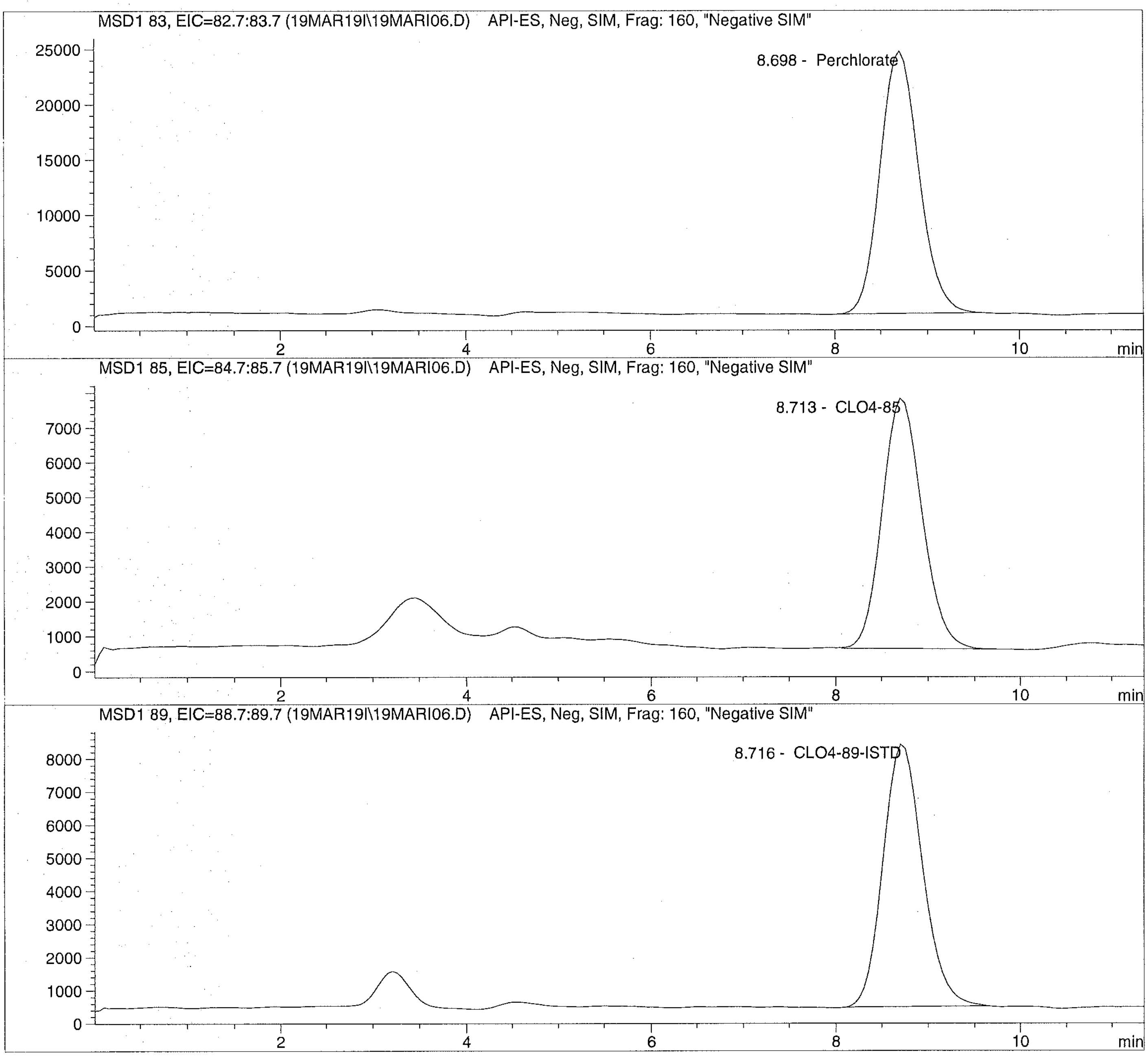
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

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 ***

```
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
=====================================================================================
```



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

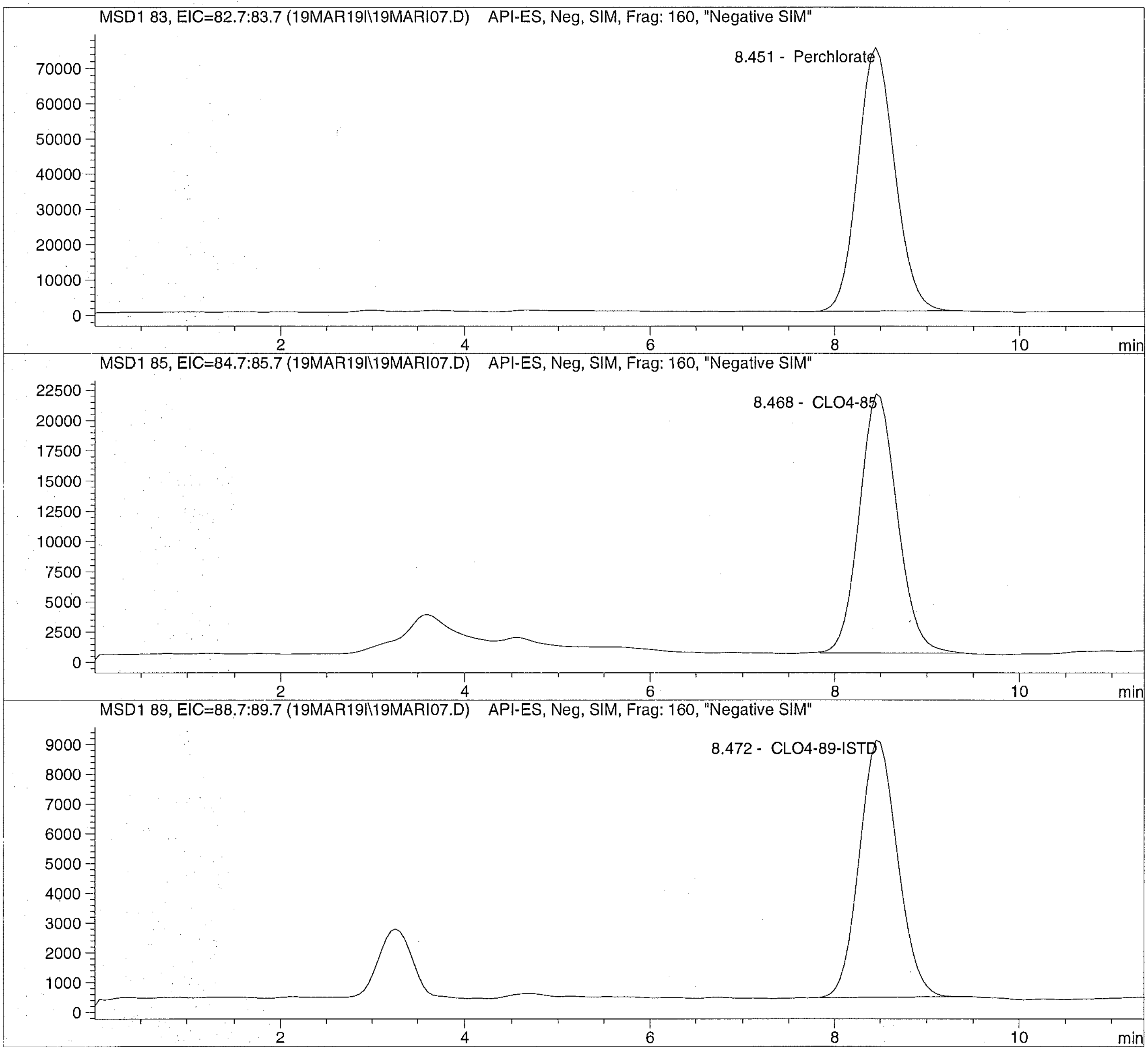
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

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 ***

```
Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D       Sample Name: CLO4@ 25.ug/L
==================================================================================
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
==================================================================================
```



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D   Sample Name: CLO4@ 25.ug/L

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

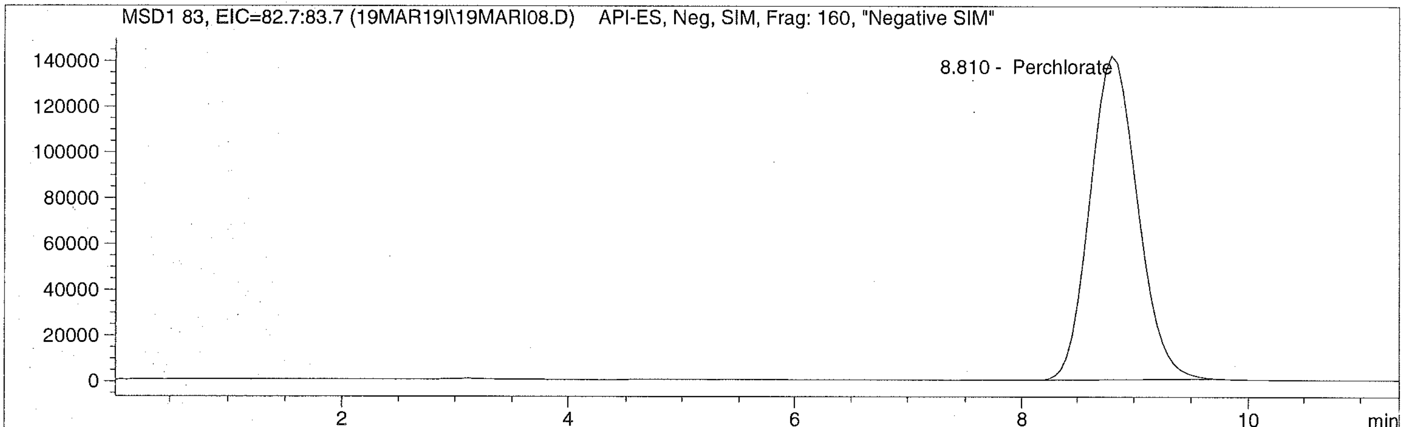
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.468	BBA	614294.8	25.1216	CLO4-85

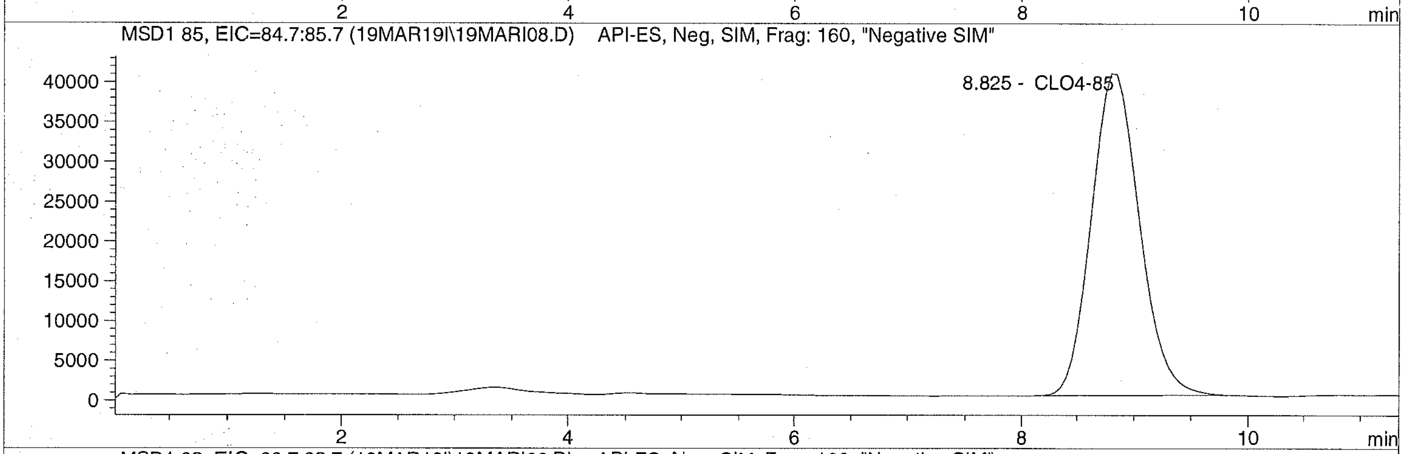
Signal3: MSD1 89, EIC=88.7:89.7

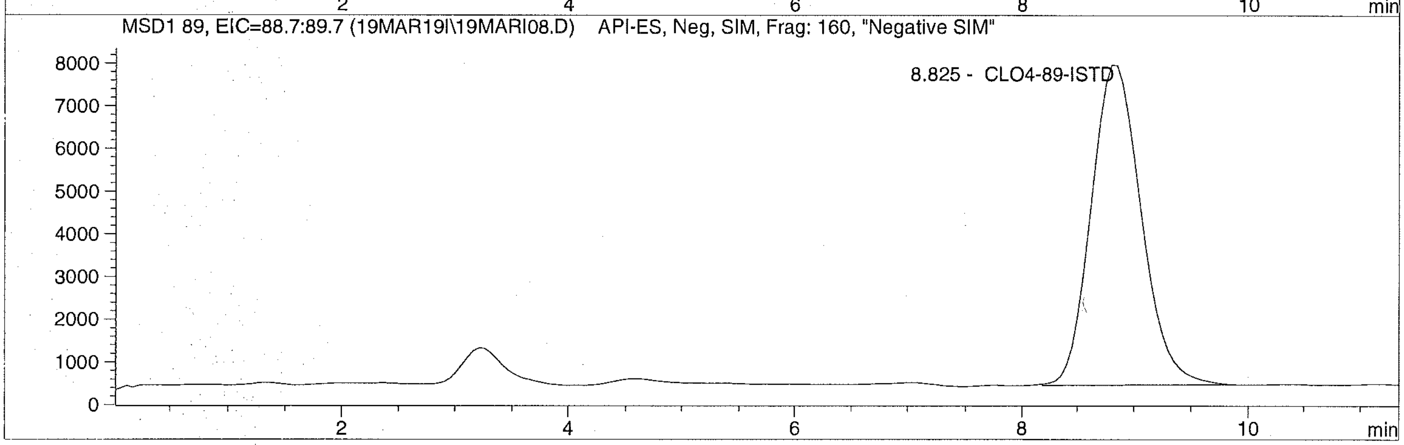
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

*** 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

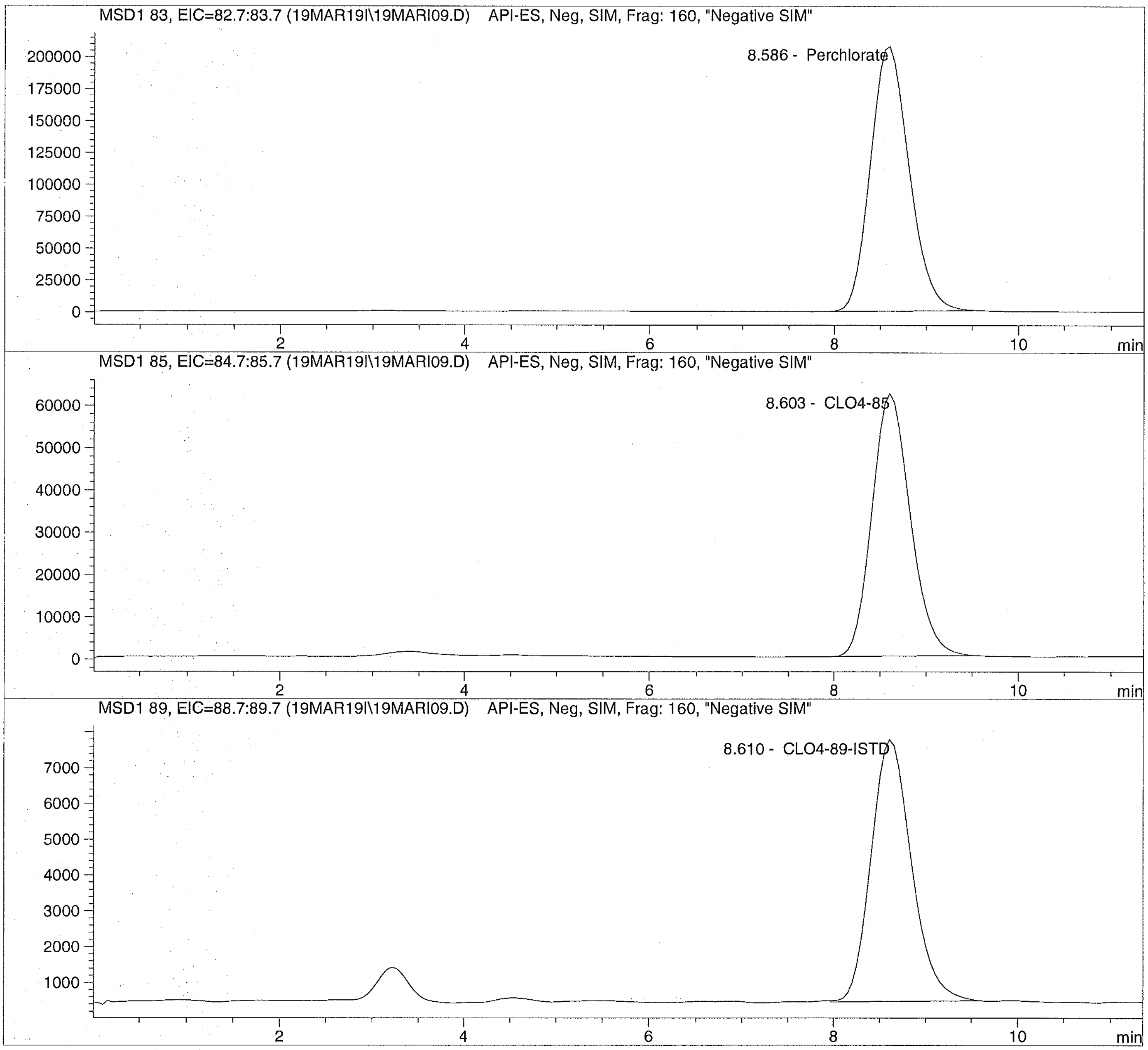
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.4672	CLO4-85

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 ***

```
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
==================================================================================
```



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

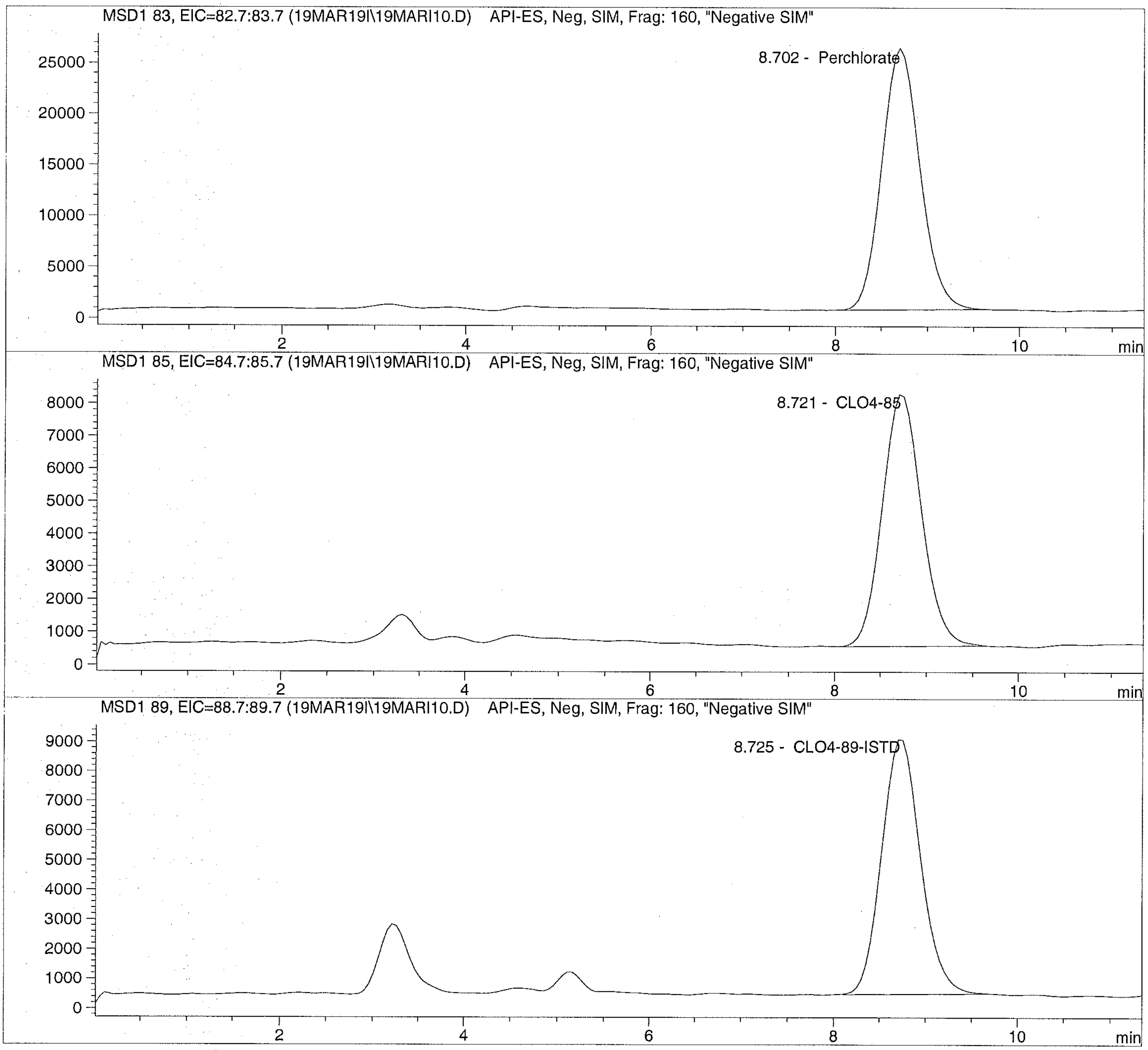
*** End of Report ***

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



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\19MAR19I\19MARI03.D   Sample Name: CLO4@ 1.0ug/L

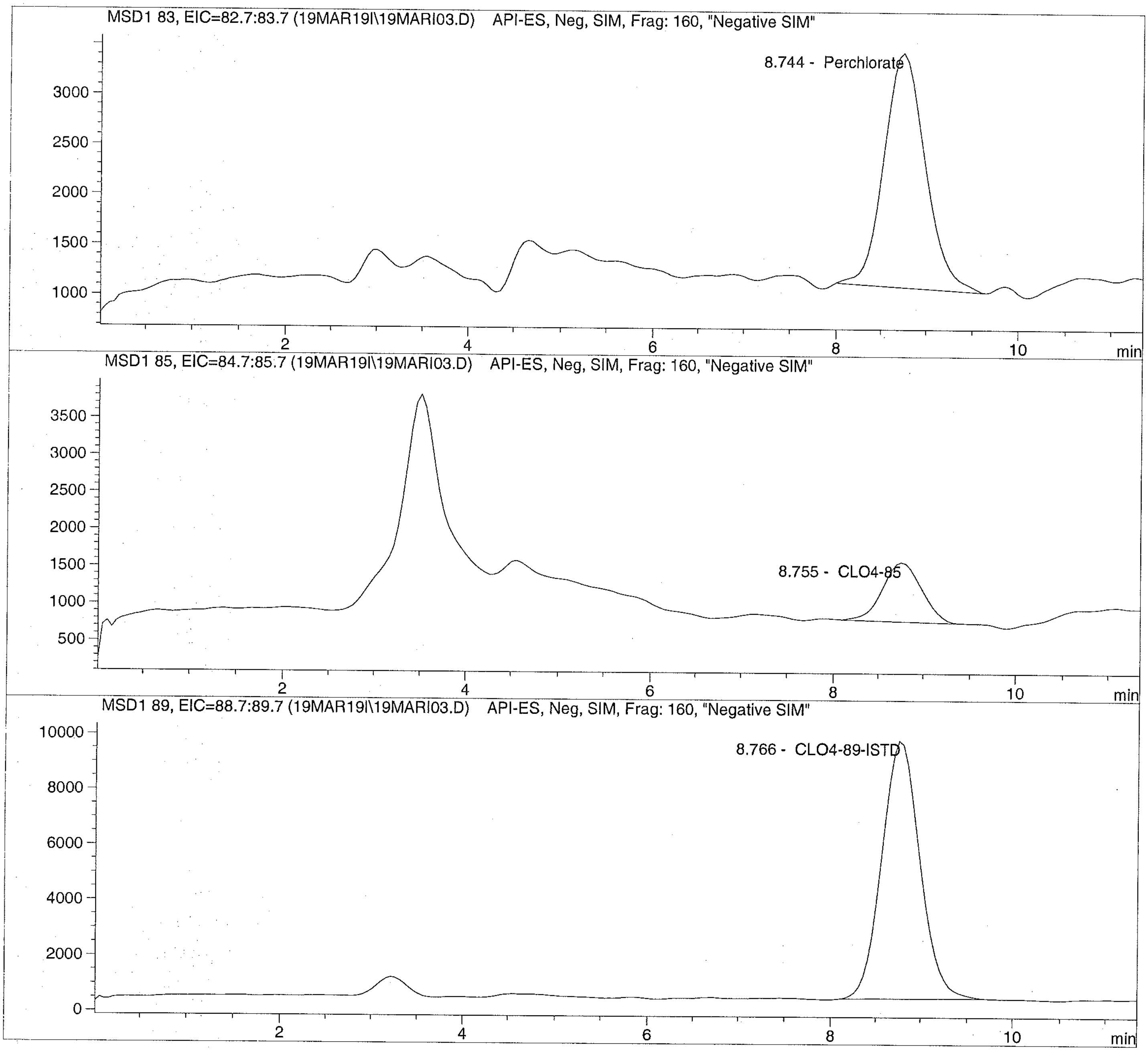
===

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

===



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 ***

10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
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April 12, 2019

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

Work Order: **HS19031511**

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

Dear Marcia,

ALS Environmental received 3 sample(s) on Mar 28, 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: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19031511

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19031511-01	LH18/24-SP650_032719	Water		27-Mar-2019 14:00	28-Mar-2019 08:30	☐
HS19031511-02	LH18/24-SP650_032719_BIX	Water		27-Mar-2019 14:00	28-Mar-2019 08:30	☐
HS19031511-03	Trip Blank -ALS-020119-75	Water		27-Mar-2019 00:00	28-Mar-2019 08:30	☐

ALS Houston, US Date: 12-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.

GCMS Semivolatiles by Method SW8270SIM

Batch ID: 139415

Sample ID: LH18/24-SP650_032719 (HS19031511-01)

- The surrogate recoveries could not be determined due to dilution below the calibration range.

GCMS Volatiles by Method SW8260

Batch ID: R335882

Sample ID: CCV

- 1,2-Dibromoethane, Bromoform and Dibromochloromethane exceeded %D limits for CCV. Samples are ND for these compounds.

Sample ID: HS19040036-36MS

- MS and MSD are for an unrelated sample

Metals by Method SW6020

Batch ID: 139323

Sample ID: HS19031584-01MS

- MS/MSD and DUPs are for an unrelated sample

Metals by Method SW7470

Batch ID: 139318

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

WetChemistry by Method E1664A

Batch ID: R336080

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

WetChemistry by Method SW9056

Batch ID: R335875

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

WetChemistry by Method E410.4

Batch ID: R335804

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

ALS Houston, US Date: 12-Apr-19

ANALYTICAL REPORT

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples — WorkOrder:HS19031511
Sample ID: LH18/24-SP650_032719 — Lab ID:HS19031511-01
Collection Date: 27-Mar-2019 14:00 — Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,2-Dichloroethane	**0.57**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	03-Apr-2019 17:41
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:41
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	03-Apr-2019 17:41
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	03-Apr-2019 17:41
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:41
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	03-Apr-2019 17:41
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	03-Apr-2019 17:41
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	03-Apr-2019 17:41
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41

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

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples		WorkOrder:HS19031511
Sample ID:	LH18/24-SP650_032719		Lab ID:HS19031511-01
Collection Date:	27-Mar-2019 14:00		Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
cis-1,2-Dichloroethene	**2.4**		**0.20**	**0.50**	**1.0**	**UG/L**	1	03-Apr-2019 17:41
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	03-Apr-2019 17:41
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	03-Apr-2019 17:41
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	03-Apr-2019 17:41
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:41
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Trichloroethene	**0.85**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	03-Apr-2019 17:41
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:41
Surr: 1,2-Dichloroethane-d4	*89.2*			**0**	*81-118*	*%REC*	*1*	*03-Apr-2019 17:41*
Surr: 4-Bromofluorobenzene	*99.6*			**0**	*85-114*	*%REC*	*1*	*03-Apr-2019 17:41*
Surr: Dibromofluoromethane	*91.3*			**0**	*80-119*	*%REC*	*1*	*03-Apr-2019 17:41*
Surr: Toluene-d8	*107*			**0**	*89-112*	*%REC*	*1*	*03-Apr-2019 17:41*
SEMIVOLATILES SIM		**Method:SW8270SIM**				Prep:SW3510 / 03-Apr-2019		Analyst: QX
1,4-Dioxane	**11**		**1.0**	**1.0**	**1.0**	**ug/L**	100	03-Apr-2019 14:53
Surr: 2-Fluorobiphenyl	*0*	*S*		0	*40-140*	*%REC*	*100*	*03-Apr-2019 14:53*
Surr: 4-Terphenyl-d14	*0*	*S*		0	*40-140*	*%REC*	*100*	*03-Apr-2019 14:53*
Surr: Nitrobenzene-d5	*0*	*S*		0	*40-140*	*%REC*	*100*	*03-Apr-2019 14:53*

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

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:	HS19031511
Sample ID:	LH18/24-SP650_032719	Lab ID:	HS19031511-01
Collection Date:	27-Mar-2019 14:00	Matrix:	Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
ICP-MS METALS BY SW6020A		**Method:SW6020**				Prep:SW3010A / 01-Apr-2019		Analyst: JHD
Aluminum	**0.0311**		**0.00180**	**0.00500**	**0.0100**	**mg/L**	1	03-Apr-2019 13:24
Antimony	**0.00101**	J	**0.000400**	**0.000500**	**0.00200**	**mg/L**	1	03-Apr-2019 13:24
Arsenic	**0.000860**	J	**0.000400**	**0.000500**	**0.00200**	**mg/L**	1	03-Apr-2019 13:24
Barium	**0.132**		**0.00190**	**0.00250**	**0.00400**	**mg/L**	1	03-Apr-2019 13:24
Beryllium	0.00250	U	0.000200	0.00250	0.00200	mg/L	1	03-Apr-2019 13:24
Cadmium	0.000500	U	0.000200	0.000500	0.00200	mg/L	1	03-Apr-2019 13:24
Calcium	**14.5**		**0.0340**	**0.0500**	**0.500**	**mg/L**	1	03-Apr-2019 13:24
Chromium	**0.00142**	J	**0.000400**	**0.000500**	**0.00400**	**mg/L**	1	03-Apr-2019 13:24
Cobalt	**0.00112**	J	**0.000200**	**0.000500**	**0.00500**	**mg/L**	1	03-Apr-2019 13:24
Iron	**0.125**	J	**0.0120**	**0.0500**	**0.200**	**mg/L**	1	03-Apr-2019 13:24
Lead	0.00100	U	0.000600	0.00100	0.00200	mg/L	1	03-Apr-2019 13:24
Magnesium	**12.9**		**0.0100**	**0.0500**	**0.200**	**mg/L**	1	03-Apr-2019 13:24
Manganese	**0.0678**		**0.000700**	**0.00100**	**0.00500**	**mg/L**	1	03-Apr-2019 13:24
Nickel	**0.00344**		**0.000600**	**0.00100**	**0.00200**	**mg/L**	1	03-Apr-2019 13:24
Potassium	**1.27**		**0.0180**	**0.0500**	**0.200**	**mg/L**	1	03-Apr-2019 13:24
Selenium	0.00250	U	0.00110	0.00250	0.00200	mg/L	1	03-Apr-2019 13:24
Silver	0.000500	U	0.000200	0.000500	0.00200	mg/L	1	03-Apr-2019 13:24
Sodium	**339**		**0.140**	**0.500**	**2.00**	**mg/L**	10	02-Apr-2019 16:04
Thallium	0.00100	U	0.000200	0.00100	0.00200	mg/L	1	03-Apr-2019 13:24
Vanadium	**0.00382**	J	**0.000600**	**0.00100**	**0.00500**	**mg/L**	1	03-Apr-2019 13:24
Zinc	**0.0363**		**0.00200**	**0.00250**	**0.00400**	**mg/L**	1	03-Apr-2019 13:24
MERCURY BY SW7470A		**Method:SW7470**				Prep:SW7470 / 01-Apr-2019		Analyst: FO
Mercury	0.000100	U	0.0000300	0.000100	0.000200	mg/L	1	01-Apr-2019 17:54
OIL & GREASE (HEM) BY E1664A		**Method:E1664A**						Analyst: KAH
Oil and Grease	**2.08**		**0.610**	**1.00**	**2.00**	**mg/L**	1	05-Apr-2019 14:45
CHEMICAL OXYGEN DEMAND BY E410.4		**Method:E410.4**						Analyst: AJH
Chemical Oxygen Demand	**21.0**		**5.00**	**5.00**	**15.0**	**mg/L**	1	02-Apr-2019 16:45
ANIONS BY SW9056A		**Method:SW9056**						Analyst: KMU
Chloride	**317**		**2.00**	**5.00**	**5.00**	**mg/L**	10	03-Apr-2019 05:57
Sulfate	**28.5**		**2.00**	**5.00**	**5.00**	**mg/L**	10	03-Apr-2019 05:57

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

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples		WorkOrder:HS19031511
Sample ID:	LH18/24-SP650_032719_BIX		Lab ID:HS19031511-02
Collection Date:	27-Mar-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	12-Apr-2019 18:22

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

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.	**ANALYTICAL REPORT**	
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	WorkOrder:	HS19031511
Sample ID:	Trip Blank -ALS-020119-75	Lab ID:	HS19031511-03
Collection Date:	27-Mar-2019 00:00	Matrix:	Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:17
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	03-Apr-2019 17:17
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	03-Apr-2019 17:17
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:17
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	03-Apr-2019 17:17
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	03-Apr-2019 17:17
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	03-Apr-2019 17:17
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17

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

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples		WorkOrder:HS19031511
Sample ID:	Trip Blank -ALS-020119-75		Lab ID:HS19031511-03
Collection Date:	27-Mar-2019 00:00		Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	03-Apr-2019 17:17
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	03-Apr-2019 17:17
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	03-Apr-2019 17:17
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	03-Apr-2019 17:17
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	03-Apr-2019 17:17
Surr: 1,2-Dichloroethane-d4	*88.6*			**0**	*81-118*	*%REC*	*1*	*03-Apr-2019 17:17*
Surr: 4-Bromofluorobenzene	*96.5*			**0**	*85-114*	*%REC*	*1*	*03-Apr-2019 17:17*
Surr: Dibromofluoromethane	*89.9*			**0**	*80-119*	*%REC*	*1*	*03-Apr-2019 17:17*
Surr: Toluene-d8	*108*			**0**	*89-112*	*%REC*	*1*	*03-Apr-2019 17:17*

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 Weekly Samples
WorkOrder: HS19031511

Batch ID: 139318 **Method:** MERCURY BY SW7470A **Prep:** HG_WPR

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19031511-01	1	10 (mL)	10 (mL)	1

Batch ID: 139323 **Method:** ICP-MS METALS BY SW6020A **Prep:** 3010A

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19031511-01	1	10	10 (mL)	1

Batch ID: 139415 **Method:** SEMIVOLATILES SIM **Prep:** 3510_B_SIM

SampID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19031511-01	1	1000	1 (mL)	0.001

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID 139318	**Test Name :** MERCURY BY SW7470A			**Matrix:** Water		
HS19031511-01	LH18/24-SP650_032719	27 Mar 2019 14:00		01 Apr 2019 11:00	01 Apr 2019 17:54	1
Batch ID 139323	**Test Name :** ICP-MS METALS BY SW6020A			**Matrix:** Water		
HS19031511-01	LH18/24-SP650_032719	27 Mar 2019 14:00		01 Apr 2019 12:30	03 Apr 2019 13:24	1
HS19031511-01	LH18/24-SP650_032719	27 Mar 2019 14:00		01 Apr 2019 12:30	02 Apr 2019 16:04	10
Batch ID 139415	**Test Name :** SEMIVOLATILES SIM			**Matrix:** Water		
HS19031511-01	LH18/24-SP650_032719	27 Mar 2019 14:00		03 Apr 2019 10:00	03 Apr 2019 14:53	100
Batch ID R335804	**Test Name :** CHEMICAL OXYGEN DEMAND BY E410.4			**Matrix:** Water		
HS19031511-01	LH18/24-SP650_032719	27 Mar 2019 14:00			02 Apr 2019 16:45	1
Batch ID R335875	**Test Name :** ANIONS BY SW9056A			**Matrix:** Water		
HS19031511-01	LH18/24-SP650_032719	27 Mar 2019 14:00			03 Apr 2019 05:57	10
Batch ID R335882	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C			**Matrix:** Water		
HS19031511-01	LH18/24-SP650_032719	27 Mar 2019 14:00			03 Apr 2019 17:41	1
HS19031511-03	Trip Blank -ALS-020119-75	27 Mar 2019 00:00			03 Apr 2019 17:17	1
Batch ID R336080	**Test Name :** OIL & GREASE (HEM) BY E1664A			**Matrix:** Water		
HS19031511-01	LH18/24-SP650_032719	27 Mar 2019 14:00			05 Apr 2019 14:45	1
Batch ID R336536	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			**Matrix:** Water		
HS19031511-02	LH18/24-SP650_032719_BIX	27 Mar 2019 14:00			12 Apr 2019 18:22	1

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: 139318 (0) **Instrument:** HG03 **Method:** MERCURY BY SW7470A

MBLK Sample ID: **MBLK-139318** Units: **mg/L** Analysis Date: **01-Apr-2019 17:33**
Client ID: Run ID: **HG03_335717** SeqNo: **5016992** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.000100	0.000200								U

LCS Sample ID: **LCS-139318** Units: **mg/L** Analysis Date: **01-Apr-2019 17:35**
Client ID: Run ID: **HG03_335717** SeqNo: **5016993** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00509	0.000200	0.005	0	102	80 - 120				

MS Sample ID: **HS19031507-01MS** Units: **mg/L** Analysis Date: **01-Apr-2019 17:38**
Client ID: Run ID: **HG03_335717** SeqNo: **5016995** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00514	0.000200	0.005	-0.000029	103	75 - 125				

MSD Sample ID: **HS19031507-01MSD** Units: **mg/L** Analysis Date: **01-Apr-2019 17:40**
Client ID: Run ID: **HG03_335717** SeqNo: **5016996** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00518	0.000200	0.005	-0.000029	104	75 - 125	0.00514	0.775	20	

The following samples were analyzed in this batch: HS19031511-01

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: 139323 (0) **Instrument:** ICPMS05 **Method:** ICP-MS METALS BY SW6020A

MBLK Sample ID: **MBLK-139323** Units: **mg/L** Analysis Date: **03-Apr-2019 13:13**
Client ID: Run ID: **ICPMS05_335865** SeqNo: **5020436** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.00500	0.0100								U
Antimony	0.000500	0.00200								U
Arsenic	0.000500	0.00200								U
Barium	0.00250	0.00400								U
Beryllium	0.00250	0.00200								U
Cadmium	0.000500	0.00200								U
Calcium	0.0500	0.500								U
Chromium	0.000500	0.00400								U
Cobalt	0.000500	0.00500								U
Iron	0.0500	0.200								U
Lead	0.00100	0.00200								U
Magnesium	0.0500	0.200								U
Manganese	0.00100	0.00500								U
Nickel	0.00100	0.00200								U
Potassium	0.0500	0.200								U
Selenium	0.00250	0.00200								U
Silver	0.000500	0.00200								U
Sodium	0.0500	0.200								U
Thallium	0.00100	0.00200								U
Vanadium	0.001347	0.00500								J
Zinc	0.00250	0.00400								U

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: 139323 (0) **Instrument:** ICPMS05 **Method:** ICP-MS METALS BY SW6020A

LCS Sample ID: **LCS-139323** Units: **mg/L** Analysis Date: **02-Apr-2019 15:47**
Client ID: Run ID: **ICPMS05_335757** SeqNo: **5018925** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1079	0.0100	0.1	0	108	80 - 120				
Antimony	0.05106	0.00200	0.05	0	102	80 - 120				
Arsenic	0.05071	0.00200	0.05	0	101	80 - 120				
Barium	0.05062	0.00400	0.05	0	101	80 - 120				
Beryllium	0.04871	0.00200	0.05	0	97.4	80 - 120				
Cadmium	0.05226	0.00200	0.05	0	105	80 - 120				
Calcium	5.088	0.500	5	0	102	80 - 120				
Chromium	0.05165	0.00400	0.05	0	103	80 - 120				
Cobalt	0.05122	0.00500	0.05	0	102	80 - 120				
Iron	5.174	0.200	5	0	103	80 - 120				
Lead	0.04996	0.00200	0.05	0	99.9	80 - 120				
Magnesium	4.996	0.200	5	0	99.9	80 - 120				
Manganese	0.05141	0.00500	0.05	0	103	80 - 120				
Nickel	0.05127	0.00200	0.05	0	103	80 - 120				
Potassium	4.971	0.200	5	0	99.4	80 - 120				
Selenium	0.05018	0.00200	0.05	0	100	80 - 120				
Silver	0.05235	0.00200	0.05	0	105	80 - 120				
Sodium	5.458	0.200	5	0	109	80 - 120				
Thallium	0.04811	0.00200	0.05	0	96.2	80 - 120				
Vanadium	0.05077	0.00500	0.05	0	102	80 - 120				
Zinc	0.05274	0.00400	0.05	0	105	80 - 120				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: 139323 (0) **Instrument:** ICPMS05 **Method:** ICP-MS METALS BY SW6020A

MS Sample ID: **HS19031584-01MS** Units: **mg/L** Analysis Date: **02-Apr-2019 15:53**
Client ID: Run ID: **ICPMS05_335757** SeqNo: **5018928** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.106	0.0100	0.1	0.004897	101	80 - 120				
Antimony	0.05139	0.00200	0.05	0.000336	102	80 - 120				
Arsenic	0.05303	0.00200	0.05	0.000014	106	80 - 120				
Barium	1.01	0.00400	0.05	0.9881	44.4	80 - 120				SO
Beryllium	0.04853	0.00200	0.05	0.000012	97.0	80 - 120				
Cadmium	0.04927	0.00200	0.05	0.000018	98.5	80 - 120				
Calcium	81.44	0.500	5	74.56	138	80 - 120				SO
Chromium	0.05181	0.00400	0.05	-0.00017	104	80 - 120				
Cobalt	0.0509	0.00500	0.05	0.000005	102	80 - 120				
Iron	5.334	0.200	5	0.2078	103	80 - 120				
Lead	0.04855	0.00200	0.05	0.000157	96.8	80 - 120				
Magnesium	28.82	0.200	5	23.36	109	80 - 120				O
Manganese	0.1757	0.00500	0.05	0.1227	106	80 - 120				
Nickel	0.05074	0.00200	0.05	0.000118	101	80 - 120				
Potassium	7.73	0.200	5	2.581	103	80 - 120				
Selenium	0.0507	0.00200	0.05	0.00072	100.0	80 - 120				
Silver	0.04762	0.00200	0.05	0.000047	95.1	80 - 120				
Sodium	360.5	0.200	5	354.5	119	80 - 120				EO
Thallium	0.04538	0.00200	0.05	0.000243	90.3	80 - 120				
Vanadium	0.05283	0.00500	0.05	0.000556	105	80 - 120				
Zinc	0.1307	0.00400	0.05	0.07703	107	80 - 120				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: 139323 (0) **Instrument:** ICPMS05 **Method:** ICP-MS METALS BY SW6020A

MSD Sample ID: **HS19031584-01MSD** Units: **mg/L** Analysis Date: **02-Apr-2019 15:56**
Client ID: Run ID: **ICPMS05_335757** SeqNo: **5018929** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.1071	0.0100	0.1	0.004897	102	80 - 120	0.106	1.01	20	
Antimony	0.05105	0.00200	0.05	0.000336	101	80 - 120	0.05139	0.658	20	
Arsenic	0.05169	0.00200	0.05	0.000014	103	80 - 120	0.05303	2.56	20	
Barium	1.007	0.00400	0.05	0.9881	37.2	80 - 120	1.01	0.356	20	SO
Beryllium	0.04992	0.00200	0.05	0.000012	99.8	80 - 120	0.04853	2.83	20	
Cadmium	0.05007	0.00200	0.05	0.000018	100	80 - 120	0.04927	1.62	20	
Calcium	78.73	0.500	5	74.56	83.3	80 - 120	81.44	3.38	20	O
Chromium	0.05081	0.00400	0.05	-0.00017	102	80 - 120	0.05181	1.95	20	
Cobalt	0.04989	0.00500	0.05	0.000005	99.8	80 - 120	0.0509	2	20	
Iron	5.239	0.200	5	0.2078	101	80 - 120	5.334	1.78	20	
Lead	0.04939	0.00200	0.05	0.000157	98.5	80 - 120	0.04855	1.72	20	
Magnesium	28.59	0.200	5	23.36	105	80 - 120	28.82	0.802	20	O
Manganese	0.1711	0.00500	0.05	0.1227	96.7	80 - 120	0.1757	2.64	20	
Nickel	0.04944	0.00200	0.05	0.000118	98.6	80 - 120	0.05074	2.59	20	
Potassium	7.883	0.200	5	2.581	106	80 - 120	7.73	1.95	20	
Selenium	0.05281	0.00200	0.05	0.00072	104	80 - 120	0.0507	4.08	20	
Silver	0.04711	0.00200	0.05	0.000047	94.1	80 - 120	0.04762	1.07	20	
Sodium	357.6	0.200	5	354.5	60.2	80 - 120	360.5	0.816	20	SEO
Thallium	0.04656	0.00200	0.05	0.000243	92.6	80 - 120	0.04538	2.57	20	
Vanadium	0.05292	0.00500	0.05	0.000556	105	80 - 120	0.05283	0.161	20	
Zinc	0.1301	0.00400	0.05	0.07703	106	80 - 120	0.1307	0.456	20	

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.	**QC BATCH REPORT NEW**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19031511	

Batch ID: 139323 (0) **Instrument:** ICPMS05 **Method:** ICP-MS METALS BY SW6020A

PDS Sample ID: **HS19031584-01PDS** Units: **mg/L** Analysis Date: **02-Apr-2019 15:58**

Client ID: Run ID: **ICPMS05_335757** SeqNo: **5018930** PrepDate: **01-Apr-2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.09986	0.0100	0.1	0.004897	95.0	75 - 125				
Antimony	0.08829	0.00200	0.1	0.000336	88.0	75 - 125				
Arsenic	0.0993	0.00200	0.1	0.000014	99.3	75 - 125				
Barium	1.062	0.00400	0.1	0.9881	74.1	75 - 125				SO
Beryllium	0.1001	0.00200	0.1	0.000012	100	75 - 125				
Cadmium	0.09637	0.00200	0.1	0.000018	96.4	75 - 125				
Calcium	80.82	0.500	10	74.56	62.6	75 - 125				SO
Chromium	0.09674	0.00400	0.1	-0.00017	96.9	75 - 125				
Cobalt	0.09603	0.00500	0.1	0.000005	96.0	75 - 125				
Iron	9.848	0.200	10	0.2078	96.4	75 - 125				
Lead	0.0916	0.00200	0.1	0.000157	91.4	75 - 125				
Magnesium	31.73	0.200	10	23.36	83.7	75 - 125				
Manganese	0.2125	0.00500	0.1	0.1227	89.8	75 - 125				
Nickel	0.09352	0.00200	0.1	0.000118	93.4	75 - 125				
Potassium	12.44	0.200	10	2.581	98.6	75 - 125				
Selenium	0.09928	0.00200	0.1	0.00072	98.6	75 - 125				
Silver	0.08785	0.00200	0.1	0.000047	87.8	75 - 125				
Thallium	0.08932	0.00200	0.1	0.000243	89.1	75 - 125				
Vanadium	0.09766	0.00500	0.1	0.000556	97.1	75 - 125				
Zinc	0.1737	0.00400	0.1	0.07703	96.7	75 - 125				

PDS Sample ID: **HS19031584-01PDS** Units: **mg/L** Analysis Date: **03-Apr-2019 13:20**

Client ID: Run ID: **ICPMS05_335865** SeqNo: **5020439** PrepDate: **01-Apr-2019** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sodium	430.6	2.00	100	334.6	96.0	75 - 125				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: 139323 (0) **Instrument:** ICPMS05 **Method:** ICP-MS METALS BY SW6020A

SD Sample ID: **HS19031584-01SD** Units: **mg/L** Analysis Date: **02-Apr-2019 15:51**
Client ID: Run ID: **ICPMS05_335757** SeqNo: **5018927** PrepDate: **01-Apr-2019** DF: **5**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Aluminum	0.009832	0.0500					0.004897	0	10	J
Antimony	0.00250	0.0100					0.000336	0	10	U
Arsenic	0.00250	0.0100					0.000014	0	10	U
Barium	0.9199	0.0200					0.9881	6.9	10	
Beryllium	0.0125	0.0100					0.000012	0	10	U
Cadmium	0.00250	0.0100					0.000018	0	10	U
Calcium	70.09	2.50					74.56	5.99	10	
Chromium	0.00250	0.0200					-0.00017	0	10	U
Cobalt	0.00250	0.0250					0.000005	0	10	U
Iron	0.2043	1.00					0.2078	0	10	J
Lead	0.00500	0.0100					0.000157	0	10	U
Magnesium	21.3	1.00					23.36	8.79	10	
Manganese	0.1188	0.0250					0.1227	3.19	10	
Nickel	0.00500	0.0100					0.000118	0	10	U
Potassium	2.471	1.00					2.581	4.24	10	
Selenium	0.0125	0.0100					0.00072	0	10	U
Silver	0.00250	0.0100					0.000047	0	10	U
Thallium	0.00500	0.0100					0.000243	0	10	U
Vanadium	0.005215	0.0250					0.000556	0	10	J
Zinc	0.07308	0.0200					0.07703	5.12	10	

SD Sample ID: **HS19031584-01SD** Units: **mg/L** Analysis Date: **03-Apr-2019 13:18**
Client ID: Run ID: **ICPMS05_335865** SeqNo: **5020438** PrepDate: **01-Apr-2019** DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Sodium	340.7	10.0					334.6	1.83	10	

The following samples were analyzed in this batch: HS19031511-01

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: 139415 (0) **Instrument:** SV-5 **Method:** SEMIVOLATILES SIM

MBLK Sample ID: **MBLK-139415** Units: **ug/L** Analysis Date: **03-Apr-2019 12:47**
Client ID: Run ID: **SV-5_335930** SeqNo: **5021779** PrepDate: **03-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	*0.09201*	*0*	*0.08*	*0*	*115*	*40 - 140*				
Surr: 4-Terphenyl-d14	*0.07352*	*0*	*0.08*	*0*	*91.9*	*40 - 140*				
Surr: Nitrobenzene-d5	*0.08203*	*0*	*0.08*	*0*	*103*	*40 - 140*				

LCS Sample ID: **LCS-139415** Units: **ug/L** Analysis Date: **03-Apr-2019 13:08**
Client ID: Run ID: **SV-5_335930** SeqNo: **5021780** PrepDate: **03-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	0.07995	0.010	0.08	0	99.9	40 - 140				
Surr: 2-Fluorobiphenyl	*0.08927*	*0*	*0.08*	*0*	*112*	*40 - 140*				
Surr: 4-Terphenyl-d14	*0.07072*	*0*	*0.08*	*0*	*88.4*	*40 - 140*				
Surr: Nitrobenzene-d5	*0.07169*	*0*	*0.08*	*0*	*89.6*	*40 - 140*				

LCSD Sample ID: **LCSD-139415** Units: **ug/L** Analysis Date: **03-Apr-2019 13:29**
Client ID: Run ID: **SV-5_335930** SeqNo: **5021781** PrepDate: **03-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	0.08058	0.010	0.08	0	101	40 - 140	0.07995	0.787	20	
Surr: 2-Fluorobiphenyl	*0.08169*	*0*	*0.08*	*0*	*102*	*40 - 140*	*0.08927*	*8.86*	*20*	
Surr: 4-Terphenyl-d14	*0.07017*	*0*	*0.08*	*0*	*87.7*	*40 - 140*	*0.07072*	*0.788*	*20*	
Surr: Nitrobenzene-d5	*0.07503*	*0*	*0.08*	*0*	*93.8*	*40 - 140*	*0.07169*	*4.56*	*20*	

The following samples were analyzed in this batch: HS19031511-01

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-190403** Units: **UG/L** Analysis Date: **03-Apr-2019 12:28**
Client ID: Run ID: **VOA6_335882** SeqNo: **5020560** 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	2.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U
Bromomethane	0.50	1.0								U

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MBLK Sample ID: **VBLKW-190403** Units: **UG/L** Analysis Date: **03-Apr-2019 12:28**
Client ID: Run ID: **VOA6_335882** SeqNo: **5020560** 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	0.50	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	*43.62*	*1.0*	*50*	*0*	*87.2*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49.43*	*1.0*	*50*	*0*	*98.9*	*85 - 114*				
Surr: Dibromofluoromethane	*45.1*	*1.0*	*50*	*0*	*90.2*	*80 - 119*				
Surr: Toluene-d8	*53*	*1.0*	*50*	*0*	*106*	*89 - 112*				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-190403** Units: **UG/L** Analysis Date: **03-Apr-2019 11:40**
Client ID: Run ID: **VOA6_335882** SeqNo: **5020559** 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	23.34	1.0	20	0	117	78 - 124				
1,1,1-Trichloroethane	19.93	1.0	20	0	99.7	74 - 131				
1,1,2,2-Tetrachloroethane	20.44	1.0	20	0	102	71 - 121				
1,1,2-Trichloroethane	22.06	1.0	20	0	110	80 - 119				
1,1-Dichloroethane	19.85	1.0	20	0	99.2	77 - 125				
1,1-Dichloroethene	19.49	1.0	20	0	97.4	71 - 131				
1,1-Dichloropropene	19.9	1.0	20	0	99.5	78 - 125				
1,2,3-Trichlorobenzene	21.21	1.0	20	0	106	69 - 129				
1,2,3-Trichloropropane	21.32	1.0	20	0	107	73 - 122				
1,2,4-Trichlorobenzene	21.68	1.0	20	0	108	69 - 130				
1,2,4-Trimethylbenzene	23.62	1.0	20	0	118	76 - 124				
1,2-Dibromo-3-chloropropane	21.63	1.0	20	0	108	62 - 128				
1,2-Dibromoethane	22.93	1.0	20	0	115	77 - 121				
1,2-Dichlorobenzene	21.63	1.0	20	0	108	80 - 119				
1,2-Dichloroethane	21.35	1.0	20	0	107	73 - 128				
1,2-Dichloropropane	20.9	1.0	20	0	104	78 - 122				
1,3,5-Trimethylbenzene	22.82	1.0	20	0	114	75 - 124				
1,3-Dichlorobenzene	21.78	1.0	20	0	109	80 - 119				
1,3-Dichloropropane	22.02	1.0	20	0	110	80 - 119				
1,4-Dichlorobenzene	21.6	1.0	20	0	108	79 - 118				
2,2-Dichloropropane	20.72	1.0	20	0	104	60 - 139				
2-Butanone	39.59	2.0	40	0	99.0	56 - 143				
2-Chlorotoluene	21.51	1.0	20	0	108	79 - 122				
2-Hexanone	42.13	2.0	40	0	105	57 - 139				
4-Chlorotoluene	21.85	1.0	20	0	109	78 - 122				
4-Isopropyltoluene	22.25	1.0	20	0	111	77 - 127				
4-Methyl-2-pentanone	41.02	2.0	40	0	103	67 - 130				
Acetone	36.89	2.0	40	0	92.2	39 - 160				
Benzene	21.72	1.0	20	0	109	79 - 120				
Bromobenzene	22.97	1.0	20	0	115	80 - 120				
Bromochloromethane	20.97	1.0	20	0	105	78 - 123				
Bromodichloromethane	22.16	1.0	20	0	111	79 - 125				
Bromoform	23.37	1.0	20	0	117	66 - 130				
Bromomethane	24.03	1.0	20	0	120	53 - 141				

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder:	HS19031511

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

LCS Sample ID: **VLCSW-190403** Units: **UG/L** Analysis Date: **03-Apr-2019 11:40**

Client ID: Run ID: **VOA6_335882** SeqNo: **5020559** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	37.4	2.0	40	0	93.5	64 - 133				
Carbon tetrachloride	22.65	1.0	20	0	113	72 - 136				
Chlorobenzene	21.88	1.0	20	0	109	82 - 118				
Chloroethane	18.95	1.0	20	0	94.7	60 - 138				
Chloroform	20.52	1.0	20	0	103	79 - 124				
Chloromethane	19.74	1.0	20	0	98.7	50 - 139				
cis-1,2-Dichloroethene	20.43	1.0	20	0	102	78 - 123				
cis-1,3-Dichloropropene	20.84	1.0	20	0	104	75 - 124				
Dibromochloromethane	22.56	1.0	20	0	113	74 - 126				
Dibromomethane	21.6	1.0	20	0	108	79 - 123				
Dichlorodifluoromethane	21.85	1.0	20	0	109	32 - 152				
Ethylbenzene	23.41	1.0	20	0	117	79 - 121				
Hexachlorobutadiene	23.54	1.0	20	0	118	66 - 134				
Isopropylbenzene	22.97	1.0	20	0	115	72 - 131				
m,p-Xylene	45.47	2.0	40	0	114	80 - 121				
Methylene chloride	20.82	2.0	20	0	104	74 - 124				
Naphthalene	21.06	1.0	20	0	105	61 - 128				
n-Butylbenzene	22.89	1.0	20	0	114	75 - 128				
n-Propylbenzene	21.9	1.0	20	0	109	76 - 126				
o-Xylene	22.22	1.0	20	0	111	78 - 122				
sec-Butylbenzene	21.56	1.0	20	0	108	77 - 126				
Styrene	23.58	1.0	20	0	118	78 - 123				
tert-Butylbenzene	21.9	1.0	20	0	109	78 - 124				
Tetrachloroethene	22.75	1.0	20	0	114	74 - 129				
Toluene	22.69	1.0	20	0	113	80 - 121				
trans-1,2-Dichloroethene	20.31	1.0	20	0	102	75 - 124				
trans-1,3-Dichloropropene	22.21	1.0	20	0	111	73 - 127				
Trichloroethene	20.76	1.0	20	0	104	79 - 123				
Trichlorofluoromethane	19.87	1.0	20	0	99.3	65 - 141				
Vinyl chloride	18.34	1.0	20	0	91.7	58 - 137				
Surr: 1,2-Dichloroethane-d4	*44.85*	*1.0*	*50*	*0*	*89.7*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49.44*	*1.0*	*50*	*0*	*98.9*	*85 - 114*				
Surr: Dibromofluoromethane	*46.66*	*1.0*	*50*	*0*	*93.3*	*80 - 119*				
Surr: Toluene-d8	*52.9*	*1.0*	*50*	*0*	*106*	*89 - 112*				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19040036-36MS** Units: **UG/L** Analysis Date: **03-Apr-2019 14:52**
Client ID: Run ID: **VOA6_335882** SeqNo: **5020790** PrepDate: DF: **1000**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	24370	1000	20000	0	122	78 - 124				
1,1,1-Trichloroethane	22280	1000	20000	0	111	74 - 131				
1,1,2,2-Tetrachloroethane	22750	1000	20000	0	114	71 - 121				
1,1,2-Trichloroethane	23590	1000	20000	0	118	80 - 119				
1,1-Dichloroethane	21090	1000	20000	0	105	77 - 125				
1,1-Dichloroethene	22220	1000	20000	0	111	71 - 131				
1,1-Dichloropropene	22920	1000	20000	0	115	78 - 125				
1,2,3-Trichlorobenzene	21690	1000	20000	0	108	69 - 129				
1,2,3-Trichloropropane	22780	1000	20000	0	114	73 - 122				
1,2,4-Trichlorobenzene	22700	1000	20000	0	114	69 - 130				
1,2,4-Trimethylbenzene	24950	1000	20000	0	125	76 - 124				S
1,2-Dibromo-3-chloropropane	23950	1000	20000	0	120	62 - 128				
1,2-Dibromoethane	23610	1000	20000	0	118	77 - 121				
1,2-Dichlorobenzene	23700	1000	20000	0	118	80 - 119				
1,2-Dichloroethane	23200	1000	20000	0	116	73 - 128				
1,2-Dichloropropane	21950	1000	20000	0	110	78 - 122				
1,3,5-Trimethylbenzene	24840	1000	20000	0	124	75 - 124				S
1,3-Dichlorobenzene	24090	1000	20000	0	120	80 - 119				S
1,3-Dichloropropane	23000	1000	20000	0	115	80 - 119				
1,4-Dichlorobenzene	23350	1000	20000	0	117	79 - 118				
2,2-Dichloropropane	22210	1000	20000	0	111	60 - 139				
2-Butanone	41410	2000	40000	0	104	56 - 143				
2-Chlorotoluene	23870	1000	20000	0	119	79 - 122				
2-Hexanone	44400	2000	40000	0	111	57 - 139				
4-Chlorotoluene	23820	1000	20000	0	119	78 - 122				
4-Isopropyltoluene	25150	1000	20000	0	126	77 - 127				
4-Methyl-2-pentanone	44310	2000	40000	0	111	67 - 130				
Acetone	39450	2000	40000	0	98.6	39 - 160				
Benzene	163700	1000	20000	136400	137	79 - 120				SO
Bromobenzene	24010	1000	20000	0	120	80 - 120				S
Bromochloromethane	20610	1000	20000	0	103	78 - 123				
Bromodichloromethane	22820	1000	20000	0	114	79 - 125				
Bromoform	23650	1000	20000	0	118	66 - 130				
Bromomethane	24600	1000	20000	0	123	53 - 141				

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder:	HS19031511

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MS Sample ID: **HS19040036-36MS** Units: **UG/L** Analysis Date: **03-Apr-2019 14:52**

Client ID: Run ID: **VOA6_335882** SeqNo: **5020790** PrepDate: DF: **1000**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	43460	2000	40000	0	109	64 - 133				
Carbon tetrachloride	25400	1000	20000	0	127	72 - 136				
Chlorobenzene	23430	1000	20000	0	117	82 - 118				
Chloroethane	20830	1000	20000	0	104	60 - 138				
Chloroform	21220	1000	20000	0	106	79 - 124				
Chloromethane	23190	1000	20000	0	116	50 - 139				
cis-1,2-Dichloroethene	21440	1000	20000	0	107	78 - 123				
cis-1,3-Dichloropropene	22680	1000	20000	0	113	75 - 124				
Dibromochloromethane	24100	1000	20000	0	120	74 - 126				
Dibromomethane	22210	1000	20000	0	111	79 - 123				
Dichlorodifluoromethane	22700	1000	20000	0	113	32 - 152				
Ethylbenzene	25690	1000	20000	1292	122	79 - 121				S
Hexachlorobutadiene	26030	1000	20000	0	130	66 - 134				
Isopropylbenzene	24720	1000	20000	0	124	72 - 131				
m,p-Xylene	53610	2000	40000	4701	122	80 - 121				S
Methylene chloride	22110	2000	20000	0	111	74 - 124				
Naphthalene	21950	1000	20000	0	110	61 - 128				
n-Butylbenzene	25170	1000	20000	0	126	75 - 128				
n-Propylbenzene	25030	1000	20000	0	125	76 - 126				
o-Xylene	26700	1000	20000	2345	122	78 - 122				
sec-Butylbenzene	24850	1000	20000	0	124	77 - 126				
Styrene	26250	1000	20000	1811	122	78 - 123				
tert-Butylbenzene	24760	1000	20000	0	124	78 - 124				
Tetrachloroethene	25340	1000	20000	0	127	74 - 129				
Toluene	52760	1000	20000	28020	124	80 - 121				S
trans-1,2-Dichloroethene	22170	1000	20000	0	111	75 - 124				
trans-1,3-Dichloropropene	22600	1000	20000	0	113	73 - 127				
Trichloroethene	24510	1000	20000	0	123	79 - 123				
Trichlorofluoromethane	23470	1000	20000	0	117	65 - 141				
Vinyl chloride	20510	1000	20000	0	103	58 - 137				
Surr: 1,2-Dichloroethane-d4	*43910*	*1000*	*50000*	*0*	*87.8*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49050*	*1000*	*50000*	*0*	*98.1*	*85 - 114*				
Surr: Dibromofluoromethane	*45590*	*1000*	*50000*	*0*	*91.2*	*80 - 119*				
Surr: Toluene-d8	*52160*	*1000*	*50000*	*0*	*104*	*89 - 112*				

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19040036-36MSD** Units: **UG/L** Analysis Date: **03-Apr-2019 15:16**
Client ID: Run ID: **VOA6_335882** SeqNo: **5020791** PrepDate: DF: **1000**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	24320	1000	20000	0	122	78 - 124	24370	0.228	20	
1,1,1-Trichloroethane	21690	1000	20000	0	108	74 - 131	22280	2.69	20	
1,1,2,2-Tetrachloroethane	22810	1000	20000	0	114	71 - 121	22750	0.276	20	
1,1,2-Trichloroethane	23280	1000	20000	0	116	80 - 119	23590	1.3	20	
1,1-Dichloroethane	20610	1000	20000	0	103	77 - 125	21090	2.28	20	
1,1-Dichloroethene	21230	1000	20000	0	106	71 - 131	22220	4.59	20	
1,1-Dichloropropene	22490	1000	20000	0	112	78 - 125	22920	1.87	20	
1,2,3-Trichlorobenzene	22690	1000	20000	0	113	69 - 129	21690	4.52	20	
1,2,3-Trichloropropane	23960	1000	20000	0	120	73 - 122	22780	5.05	20	
1,2,4-Trichlorobenzene	22750	1000	20000	0	114	69 - 130	22700	0.208	20	
1,2,4-Trimethylbenzene	24690	1000	20000	0	123	76 - 124	24950	1.03	20	
1,2-Dibromo-3-chloropropane	24840	1000	20000	0	124	62 - 128	23950	3.68	20	
1,2-Dibromoethane	23750	1000	20000	0	119	77 - 121	23610	0.569	20	
1,2-Dichlorobenzene	23560	1000	20000	0	118	80 - 119	23700	0.565	20	
1,2-Dichloroethane	23300	1000	20000	0	116	73 - 128	23200	0.421	20	
1,2-Dichloropropane	21950	1000	20000	0	110	78 - 122	21950	0.0278	20	
1,3,5-Trimethylbenzene	24400	1000	20000	0	122	75 - 124	24840	1.78	20	
1,3-Dichlorobenzene	23770	1000	20000	0	119	80 - 119	24090	1.35	20	
1,3-Dichloropropane	23040	1000	20000	0	115	80 - 119	23000	0.159	20	
1,4-Dichlorobenzene	23460	1000	20000	0	117	79 - 118	23350	0.488	20	
2,2-Dichloropropane	21530	1000	20000	0	108	60 - 139	22210	3.12	20	
2-Butanone	42690	2000	40000	0	107	56 - 143	41410	3.06	20	
2-Chlorotoluene	23450	1000	20000	0	117	79 - 122	23870	1.75	20	
2-Hexanone	45910	2000	40000	0	115	57 - 139	44400	3.33	20	
4-Chlorotoluene	23550	1000	20000	0	118	78 - 122	23820	1.15	20	
4-Isopropyltoluene	24580	1000	20000	0	123	77 - 127	25150	2.31	20	
4-Methyl-2-pentanone	45920	2000	40000	0	115	67 - 130	44310	3.58	20	
Acetone	43390	2000	40000	0	108	39 - 160	39450	9.5	20	
Benzene	161100	1000	20000	136400	123	79 - 120	163700	1.64	20	SO
Bromobenzene	23980	1000	20000	0	120	80 - 120	24010	0.139	20	
Bromochloromethane	20980	1000	20000	0	105	78 - 123	20610	1.77	20	
Bromodichloromethane	22510	1000	20000	0	113	79 - 125	22820	1.39	20	
Bromoform	24000	1000	20000	0	120	66 - 130	23650	1.45	20	
Bromomethane	22690	1000	20000	0	113	53 - 141	24600	8.06	20	

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: R335882 (0) **Instrument:** VOA6 **Method:** VOLATILES ORGANICS BY METHOD 8260C

MSD Sample ID: **HS19040036-36MSD** Units: **UG/L** Analysis Date: **03-Apr-2019 15:16**
Client ID: Run ID: **VOA6_335882** SeqNo: **5020791** PrepDate: DF: **1000**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	41860	2000	40000	0	105	64 - 133	43460	3.75	20	
Carbon tetrachloride	24790	1000	20000	0	124	72 - 136	25400	2.42	20	
Chlorobenzene	23190	1000	20000	0	116	82 - 118	23430	1.07	20	
Chloroethane	19980	1000	20000	0	99.9	60 - 138	20830	4.15	20	
Chloroform	20990	1000	20000	0	105	79 - 124	21220	1.06	20	
Chloromethane	21200	1000	20000	0	106	50 - 139	23190	8.96	20	
cis-1,2-Dichloroethene	20790	1000	20000	0	104	78 - 123	21440	3.08	20	
cis-1,3-Dichloropropene	22920	1000	20000	0	115	75 - 124	22680	1.02	20	
Dibromochloromethane	24120	1000	20000	0	121	74 - 126	24100	0.0892	20	
Dibromomethane	22680	1000	20000	0	113	79 - 123	22210	2.1	20	
Dichlorodifluoromethane	21730	1000	20000	0	109	32 - 152	22700	4.35	20	
Ethylbenzene	25210	1000	20000	1292	120	79 - 121	25690	1.92	20	
Hexachlorobutadiene	26760	1000	20000	0	134	66 - 134	26030	2.75	20	
Isopropylbenzene	24210	1000	20000	0	121	72 - 131	24720	2.07	20	
m,p-Xylene	52410	2000	40000	4701	119	80 - 121	53610	2.27	20	
Methylene chloride	21630	2000	20000	0	108	74 - 124	22110	2.19	20	
Naphthalene	23380	1000	20000	0	117	61 - 128	21950	6.3	20	
n-Butylbenzene	24790	1000	20000	0	124	75 - 128	25170	1.55	20	
n-Propylbenzene	24480	1000	20000	0	122	76 - 126	25030	2.2	20	
o-Xylene	26170	1000	20000	2345	119	78 - 122	26700	2.01	20	
sec-Butylbenzene	24340	1000	20000	0	122	77 - 126	24850	2.07	20	
Styrene	26210	1000	20000	1811	122	78 - 123	26250	0.147	20	
tert-Butylbenzene	24250	1000	20000	0	121	78 - 124	24760	2.09	20	
Tetrachloroethene	24480	1000	20000	0	122	74 - 129	25340	3.45	20	
Toluene	51510	1000	20000	28020	117	80 - 121	52760	2.38	20	
trans-1,2-Dichloroethene	21410	1000	20000	0	107	75 - 124	22170	3.5	20	
trans-1,3-Dichloropropene	23180	1000	20000	0	116	73 - 127	22600	2.52	20	
Trichloroethene	23240	1000	20000	0	116	79 - 123	24510	5.32	20	
Trichlorofluoromethane	23010	1000	20000	0	115	65 - 141	23470	1.98	20	
Vinyl chloride	19890	1000	20000	0	99.5	58 - 137	20510	3.06	20	
Surr: 1,2-Dichloroethane-d4	*43970*	*1000*	*50000*	*0*	*87.9*	*81 - 118*	*43910*	*0.129*	*20*	
Surr: 4-Bromofluorobenzene	*49970*	*1000*	*50000*	*0*	*99.9*	*85 - 114*	*49050*	*1.86*	*20*	
Surr: Dibromofluoromethane	*45550*	*1000*	*50000*	*0*	*91.1*	*80 - 119*	*45590*	*0.0906*	*20*	
Surr: Toluene-d8	*51790*	*1000*	*50000*	*0*	*104*	*89 - 112*	*52160*	*0.709*	*20*	

ALS Houston, US Date: 12-Apr-19

Client:	Bhate Environmental Associates, Inc.	**QC BATCH REPORT NEW**
Project:	LH18/24 Longhorn GW Treatment Plant Weekly Samples	
WorkOrder:	HS19031511	

Batch ID:	**R335882 (0)**	**Instrument:**	**VOA6**	**Method:**	**VOLATILES ORGANICS BY METHOD 8260C**

The following samples were analyzed in this batch: HS19031511-01 HS19031511-03

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: **R335804 (0)** **Instrument:** **WetChem_HS** **Method:** **CHEMICAL OXYGEN DEMAND BY E410.4**

MBLK Sample ID: **MBLK-R335804** Units: **mg/L** Analysis Date: **02-Apr-2019 16:45**
Client ID: Run ID: **WetChem_HS_335804** SeqNo: **5018767** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chemical Oxygen Demand	5.00	15.0								U

LCS Sample ID: **LCS-R335804** Units: **mg/L** Analysis Date: **02-Apr-2019 16:45**
Client ID: Run ID: **WetChem_HS_335804** SeqNo: **5018766** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chemical Oxygen Demand	97	15.0	100	0	97.0	85 - 115				

MS Sample ID: **HS19040002-01MS** Units: **mg/L** Analysis Date: **02-Apr-2019 16:45**
Client ID: Run ID: **WetChem_HS_335804** SeqNo: **5020059** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chemical Oxygen Demand	60	15.0	50	7	106	80 - 120				

MS Sample ID: **HS19031461-01MS** Units: **mg/L** Analysis Date: **02-Apr-2019 16:45**
Client ID: Run ID: **WetChem_HS_335804** SeqNo: **5018770** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chemical Oxygen Demand	94	15.0	50	37	114	80 - 120				

DUP Sample ID: **HS19040002-01DUP** Units: **mg/L** Analysis Date: **02-Apr-2019 16:45**
Client ID: Run ID: **WetChem_HS_335804** SeqNo: **5020060** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chemical Oxygen Demand	8	15.0					7	0	20	J

DUP Sample ID: **HS19031461-01DUP** Units: **mg/L** Analysis Date: **02-Apr-2019 16:45**
Client ID: Run ID: **WetChem_HS_335804** SeqNo: **5018771** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chemical Oxygen Demand	37	15.0					37	0	20	

The following samples were analyzed in this batch: HS19031511-01

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: R335875 (0) **Instrument:** ICS2100 **Method:** ANIONS BY SW9056A

MBLK Sample ID: **WBLKW2-040219** Units: **mg/L** Analysis Date: **03-Apr-2019 01:16**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020414** 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: **WLCSW2-040219** Units: **mg/L** Analysis Date: **03-Apr-2019 01:31**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020415** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	20.22	0.500	20	0	101	80 - 120				
Sulfate	19.98	0.500	20	0	99.9	80 - 120				

LCSD Sample ID: **WLCSDW2-040219** Units: **mg/L** Analysis Date: **03-Apr-2019 01:46**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020416** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	18.95	0.500	20	0	94.8	80 - 120	20.22	6.51	20	
Sulfate	18.67	0.500	20	0	93.3	80 - 120	19.98	6.79	20	

MS Sample ID: **HS19031013-07MS** Units: **mg/L** Analysis Date: **03-Apr-2019 04:28**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020427** PrepDate: DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1535	25.0	500	1090	89.1	80 - 120				
Sulfate	1565	25.0	500	1119	89.2	80 - 120				

MSD Sample ID: **HS19031013-07MSD** Units: **mg/L** Analysis Date: **03-Apr-2019 04:43**
Client ID: Run ID: **ICS2100_335875** SeqNo: **5020428** PrepDate: DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	1605	25.0	500	1090	103	80 - 120	1535	4.46	20	
Sulfate	1638	25.0	500	1119	104	80 - 120	1565	4.57	20	

The following samples were analyzed in this batch: HS19031511-01

ALS Houston, US Date: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: HS19031511

QC BATCH REPORT NEW

Batch ID: R336080 (0) **Instrument:** Balance1 **Method:** OIL & GREASE (HEM) BY E1664A

MBLK Sample ID: **WBLKW-040519** Units: **mg/L** Analysis Date: **05-Apr-2019 14:45**
Client ID: Run ID: **Balance1_336080** SeqNo: **5024526** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	1.00	2.00								U

LCS Sample ID: **WLCSW-040519** Units: **mg/L** Analysis Date: **05-Apr-2019 14:45**
Client ID: Run ID: **Balance1_336080** SeqNo: **5024528** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	38.8	2.00	40	0	97.0	78 - 114				

LCSD Sample ID: **WLCSDW-040519** Units: **mg/L** Analysis Date: **05-Apr-2019 14:45**
Client ID: Run ID: **Balance1_336080** SeqNo: **5024527** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	38.8	2.00	40	0	97.0	78 - 114	38.8	0	18	

MS Sample ID: **HS19031453-01MS** Units: **mg/L** Analysis Date: **05-Apr-2019 14:45**
Client ID: Run ID: **Balance1_336080** SeqNo: **5024506** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	39.58	2.00	40	1.25	95.8	78 - 114				

The following samples were analyzed in this batch: HS19031511-01

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
WorkOrder: **HS19031511**

QUALIFIERS, ACRONYMS, UNITS

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

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

Unit Reported	Description
mg/L	Milligrams per Liter

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
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: 12-Apr-19

Client: Bhate Environmental Associates, Inc.
Project: LH18/24 Longhorn GW Treatment Plant Weekly Samples
Work Order: HS19031511

SAMPLE TRACKING

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19031511-01	LH18/24-SP650_032719	Login	3/29/2019 10:44:05 AM	NDR	Sub
HS19031511-01	LH18/24-SP650_032719	Login	3/29/2019 10:44:05 AM	NDR	WET169
HS19031511-01	LH18/24-SP650_032719	Login	3/29/2019 10:44:05 AM	NDR	EXT125
HS19031511-01	LH18/24-SP650_032719	Login	3/29/2019 10:44:05 AM	NDR	WET169
HS19031511-01	LH18/24-SP650_032719	Login	3/29/2019 10:44:05 AM	NDR	WET169
HS19031511-01	LH18/24-SP650_032719	Login	3/29/2019 10:44:05 AM	NDR	MET012
HS19031511-01	LH18/24-SP650_032719	Login	3/29/2019 10:44:05 AM	NDR	VOA230
HS19031511-03	Trip Blank -ALS-020119-75	Login	3/29/2019 10:44:05 AM	NDR	VOA230

ALS Houston, US Date: 12-Apr-19

Sample Receipt Checklist

Client Name:	Bhate Environmental	Date/Time Received:	**28-Mar-2019 08:30**
Work Order:	HS19031511	Received by:	**PMG**

Checklist completed by: *Nilesh D. Ranchod* (eSignature) 29-Mar-2019 (Date)

Reviewed by: *RJ Modashia* (eSignature) 29-Mar-2019 (Date)

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

	Yes	No	Not Present / Other
Shipping container/cooler in good condition?	☑	☐	Not Present ☐
Custody seals intact on shipping container/cooler?	☑	☐	Not Present ☐
Custody seals intact on sample bottles?	☐	☐	Not Present ☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	☐	☐	Not Present ☑
Chain of custody present?	☑	☐	1 Page(s)
Chain of custody signed when relinquished and received?	☑	☐	COC IDs:N/A
Samplers name present on COC?	☐	☑	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature in compliance?	☑	☐	

Temperature(s)/Thermometer(s):	1.5c UC/C	IR25
Cooler(s)/Kit(s):	44581	
Date/Time sample(s) sent to storage:	03/28/2019 18:00	

	Yes	No	Other
Water - VOA vials have zero headspace?	☑	☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	☑	☐	N/A ☐
pH adjusted?	☐	☑	N/A ☐

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

HS19031511

Bhate Environmental Associates, Inc.
LH18/24 Longhorn GW Treatment Plant Weekly Sar

CHAIN OF CUSTODY

Name Of Lab Shipping To: ALS 10450 Stancliff Rd., Suite 210 Houston, Tx. 77099 ATTN: RJ Modashia
1

Project: BHATE
LONGHORN ARMY AMMN. PLANT (LHAAP)
GROUNDWATER TREATMENT PLANT (GWTP)
KARNACK, TEXAS

Project No. NWO1312.0150.016.0001

Job:
GROUNDWATER TREATMENT PLANT QUARTERLY EFFLUENT SAMPLES

Prepared By: Scott Beesinger

P. O. Number

Field Sample I.D.	Sample Matrix	Date / Time	MS / MSD	No. OF CONTAINERS	ROD Volatiles	Total Metals	Oil & Grease	Chemical Oxygen Demand	Chloride & Sulfate	1, 4 - DIOXANE	PERCHLORATE				Remarks (Preservatives, etc.)	Lab I.D.#
LH18/24-SP650_032719	Water	03/27/19 / 14:00		4	3		1								HCL	
LH18/24-SP650_032719	Water	03/27/19 / 14:00		1		1									HNO3	
LH18/24-SP650_032719	Water	03/27/19 / 14:00		2					1	1					NONE	
LH18/24-SP650_032719	Water	03/27/19 / 14:00		1				1							H2SO4	
LH18/24-SP650_032719_BIX	Water	03/27/19 / 14:00		1							1				NONE	
Trip Blank	Water	03/27/19		2	2										HCL	

Additional Remarks: **STANDARD TURN AROUND TIME**

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
Scott Beesinger	03/27/19	14:30		3/28/19	08:30						

For Lab Use Only

Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition

Remarks:

44551 ulc 1.5° +.25
clr/o.o°

(Word) S:\I-ccs\Forms\Chain of Custody - BiWeekly

ALS Environmental
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax +1 281 530 5887

44581

CUSTODY SEAL

Date: 3/27/19 Time: 1130
Name: Scott Beesinger
Company: Bhate

Seal Broken By: SM
Date: 03/28/19

44581 MAR 28 2019

Must Deliver Next Business Day
Time and Tempature Sensitive!

44581

ORIGIN ID:SGRA (303) 597-2450
SCOTT BEESINER
BHATE ENVIRONMENTAL ASSOCIATES
1203-B EAST GRAND AVE. PMB202

MARSHALL, TX 75670
UNITED STATES US

SHIP DATE: 06MAR19
ACTWGT: 1.00 LB MAN
CAD: 300130/CAFE3211
DIMS: 26x14x14 IN

TO CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON TX 77099
(281) 530-5656
REF: LHAAP-58-BO 64113-RJ

RMA:

FedEx Express

E

FedEx

TRK# 0221 4809 7831 3421

THU - 28 MAR 10:30A
PRIORITY OVERNIGHT

AB SGRA

77099
TX-US
IAH

FID 162785 27MAR19 GGGA 553C1/4603/8C0A

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. 50µL of an ^{18}O labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45µm Syringe filters.

Holding Times: Holding times were met for all analyses.

Dilutions: Field sample 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

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: **34-1909154**
Project ID: HS19031511
Purchase Order: HS19031511
Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_032719_BIX	1909154001	03/27/19	03/30/19	

ANALYTICAL REPORT

Workorder: 34-1909154
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **LH18/24-SP650_032719_BIX** Sampling Site: NA Collected: 03/27/2019
Lab ID: 1909154001 Media: 125 mL Nalgene Received: 03/30/2019
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 11:48 **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	2.3	1.0	2.0	4.0	1	J

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: alslt.lab@ALSGlobal.com
Web: www.alsslc.com

ANALYTICAL REPORT

Workorder: 34-1909154
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

Analysis Information

Workorder: 1909154

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 1909154

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

18698/# 2

Subcontract Chain of Custody

COC ID: 11014

1909154

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:	HS19031511
TSR:	Danielle Winnings

	LAB SAMPLE ID / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / DUE DATE
1.	**HS19031511-02**	**LH18/24-SP650_032719_BIX**	**Water**	**27 Mar 2019 14:00**
	SUB_Perch-6850			05 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. MAUMV	Date/Time:	3/29/19 18:00
Received By:	[signature]	Date/Time:	3/30/19 858
Cooler ID(s):	9174	Temperature(s):	2°

ALS

ALS Environmental
CHAIN-OF-CUSTODY

Project / Job / Task: HS19031511	Split:	Workorder ID: 1909154	Level: ENV_LVL4
Client: ALS Environmental (Houston)		Account: 8101	Type: 125Poly
Comments:			Preservatives: COOL

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	Requested Analysis: EPA 6850, DoD QSM
1	03/27/2019 14:00	LH18/24-SP650_032719_BIX	1909154001		Water	A	1	A
2								
3								
4								
5								
6								
7								
8								
9								
10								

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ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
Warath, Julie	03/30/2019 08:58	ALS Sample Receiving	Sample Login
Julie Warath	4/1/19 1330	LB	Storage
R.33.1	4.8.19/10.00	T.Bush	6850

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

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

Prepared / Analyzed by: ____ Date / Time: ____

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

Mon, 04/01/19 1:03 PM

ALSCOCV3.1

00935967

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Houston   Project/Task/Site: 1909154

Date/Time of Receipt: 3/30/19 858   Number of Coolers Received: 1

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

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

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 9276	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: Meredith Edwards (Signature)   Meredith Edwards (Printed Name)   3/30/19 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ 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: ______ (Printed Name)   Returned to Sample Receipt by: ______ (Signature)   Date: ______

CRIR.doc   Revised 01/01/2018

Must Deliver Next Business Day
Time and Tempature Sensitive!

ALS

Part # 159469-434 RIT2 EXP 11/19

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

SHIP DATE: 29MAR19
ACTWGT: 9.25 LB
CAD: 300130/CAFE3211
DIMS: 14x11x10 IN

BILL THIRD PARTY

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE

SALT LAKE CITY UT 84123
(801) 266-7700
REF: HS19031492/1508/1511 RJ

551C1/46D3/104C

FedEx
Express

E

J181118060501uv

TRK# 0201 4809 7832 2367

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO BTFA

84123
UT-US SLC

Batch Worklist

Batch: **ELMS/ 2233** Created: 4/9/2019 08:42 Instrument: LCMS04 HBN: 236356
Rule: EPA 6850, DoD QSM Water Analyst: T. Bosch Status: WP

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	5311		4/11/2019	4/10/2019
2	647199	LCS for HBN 236356 [ELMS/2233]				LCS	3		E6850Q413Q	5311		4/11/2019	4/10/2019
3	647197	ICS for HBN 236356 [ELMS/2233]				ICS	3		E6850..D3Q	5311		4/11/2019	4/10/2019
4	647198	LMB for HBN 236356 [ELMS/2233]				LMB	3		E6850Q413Q	5311		4/11/2019	4/10/2019
5	1909152001	LH18/24-SP650_032719_BIX				SAMPLE	3	1909152001-A	E6850Q41.3	5480	4/24/2019	4/11/2019	4/10/2019
6	647200	LH18/24-SP650...(1909152001MS)				MS	3		E6850Q413Q	5311		4/11/2019	4/10/2019
7	647201	LH18/24-SP65...(1909152001MSD)				MSD	3		E6850Q413Q	5311		4/11/2019	4/10/2019
8	1909153001	LH18-24-SP140_032719				SAMPLE	3	1909153001-A	E6850Q41.3	5480	4/24/2019	4/11/2019	4/10/2019
9	1909154001	LH18/24-SP650_032719_BIX				SAMPLE	3	1909154001-A	E6850Q41.3	5480	4/24/2019	4/11/2019	4/10/2019
10	1909947001	LH18/25-SP650_040419_BIX				SAMPLE	3	1909947001-A	E6850Q41.3	5480	5/2/2019	4/18/2019	4/10/2019
11	1909949001	HBW7_040119				SAMPLE	3	1909949001-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
12	1909949002	HBW7_040119-a				SAMPLE	3	1909949002-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
13	1909949003	HBW10_040119				SAMPLE	3	1909949003-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
14	1909949004	HBW1_040119				SAMPLE	3	1909949004-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
15	1909949005	GPW1_040119				SAMPLE	3	1909949005-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
16	1909949006	GPW3_040119				SAMPLE	3	1909949006-A	E6850Q41.3	5480	5/1/2019	4/18/2019	4/10/2019
17	647196	RLVS for HBN 236356 [ELMS/2233				RLVS	3		E685041C3Q	5311		4/11/2019	4/10/2019
18	647202	CCV for HBN 236356 [ELMS/2233]				CCV	3		E685041C3Q	5311		4/11/2019	4/10/2019

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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: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\236356-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\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.

Chromatography (GC, HPLC, LC/MS) Technical Review Criteria Batch(es)/SDG: ELMS: 2233 HBN: 236356 1909947 / 1909949 Sample Set IDs if Applicable: 1909152/1909153/1909154	Analyst Initials	Reviewer Initials
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
MFG: ALS/SLC
MFG Lot: TNB: 09/18/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/18/2018 02:09PM

Amount: 10 mL
Expires: 09/18/2019
Usable: Yes
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
MFG: ALS/SLC
MFG Lot: TNB: 09/18/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/18/2018 02:09PM

Amount: 10 mL
Expires: 09/18/2019
Usable: Yes
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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
Expires: 05/09/2019
Usable: Yes
Lab Lot: CLO4 QC INT 10.ug/mL

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

Composition

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

STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

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

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

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

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

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

Solvent: water (low TOC, < 50 ppb)

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

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

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

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

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

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

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

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

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

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

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

Daniel J. Lamendola
Director of QA/RA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

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*

GHS

Signal Word: None

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

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

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

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

For use in routine laboratory analysis.

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

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

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-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	8.907	21.31933
#*	647199 QC@4.0	Vial 72	1	Control	2	1.97600e5	9.094	3.67714
#*	647197 ICS@4.0	Vial 73	1	Control	3	1.49399e5	8.651	3.21517
#*	647198 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
#*	1909152001	Vial 75	1	Sample	5	9.15156e4	8.529	2.57433
#*	647200 91521MS	Vial 76	1	Sample	6	2.25049e5	8.454	6.17769
#*	647201 91521SD	Vial 77	1	Sample	7	2.49579e5	8.497	6.36091
#*	1909153001 1K	Vial 78	1	Sample	8	3.70174e5	9.061	6532.86203
#*	1909154001	Vial 79	1	Sample	9	7.79123e4	8.495	2.34023
#*	1909947001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
#*	1909949001	Vial 81	1	Sample	11	0.00000	0.000	0.00000
#*	1909949002	Vial 82	1	Sample	12	0.00000	0.000	0.00000
#*	1909949003	Vial 83	1	Sample	13	0.00000	0.000	0.00000
#*	1909949004	Vial 84	1	Sample	14	0.00000	0.000	0.00000
#*	1909949005	Vial 85	1	Sample	15	0.00000	0.000	0.00000
#*	1909949006	Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	647202 CCV@25	Vial 71	1	Control	17	1.08007e6	8.867	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	8.922	23.09461
#*	647199 QC@4.0	Vial 72	1	Control	2	7.01681e4	9.105	4.22460
#*	647197 ICS@4.0	Vial 73	1	Control	3	5.45965e4	8.666	3.77625
#*	647198 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
#*	1909152001	Vial 75	1	Sample	5	3.18275e4	8.549	2.84107
#*	647200 91521MS	Vial 76	1	Sample	6	7.61114e4	8.479	6.88356
#*	647201 91521SD	Vial 77	1	Sample	7	8.42686e4	8.512	7.08137
#*	1909153001 1K	Vial 78	1	Sample	8	1.21054e5	9.077	7051.77497
#*	1909154001	Vial 79	1	Sample	9	2.76117e4	8.519	2.61418
#*	1909947001	Vial 80	1	Sample	10	0.00000	0.000	0.00000
#*	1909949001	Vial 81	1	Sample	11	0.00000	0.000	0.00000
#*	1909949002	Vial 82	1	Sample	12	0.00000	0.000	0.00000
#*	1909949003	Vial 83	1	Sample	13	0.00000	0.000	0.00000
#*	1909949004	Vial 84	1	Sample	14	0.00000	0.000	0.00000
#*	1909949005	Vial 85	1	Sample	15	0.00000	0.000	0.00000
#*	1909949006	Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	647202 CCV@25	Vial 71	1	Control	17	3.36319e5	8.885	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	8.927	5.00000
#*	647199 QC@4.0	Vial 72	1	Control	2	1.77838e5	9.122	5.00000
#*	647197 ICS@4.0	Vial 73	1	Control	3	1.54931e5	8.667	5.00000
#*	647198 LMB	Vial 74	1	Control	4	1.76915e5	8.988	5.00000
#*	1909152001	Vial 75	1	Sample	5	1.20240e5	8.559	5.00000
#*	647200 91521MS	Vial 76	1	Sample	6	1.17757e5	8.476	5.00000
#*	647201 91521SD	Vial 77	1	Sample	7	1.26683e5	8.527	5.00000
#*	1909153001 1K	Vial 78	1	Sample	8	1.82758e5	9.082	5000.00000
#*	1909154001	Vial 79	1	Sample	9	1.13404e5	8.524	5.00000
#*	1909947001	Vial 80	1	Sample	10	1.15130e5	8.458	5.00000
#*	1909949001	Vial 81	1	Sample	11	1.14791e5	8.694	5.00000
#*	1909949002	Vial 82	1	Sample	12	1.24046e5	8.693	5.00000
#*	1909949003	Vial 83	1	Sample	13	1.23373e5	8.718	5.00000
#*	1909949004	Vial 84	1	Sample	14	1.20241e5	8.690	5.00000
#*	1909949005	Vial 85	1	Sample	15	1.27767e5	8.755	5.00000
#*	1909949006	Vial 86	1	Sample	16	1.23965e5	8.816	5.00000
*	647202 CCV@25	Vial 71	1	Control	17	1.46281e5	8.890	5.00000

*** End of Report ***

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\APR\10APR19D.S

Sequence Table:

Method and Injection Info Part:

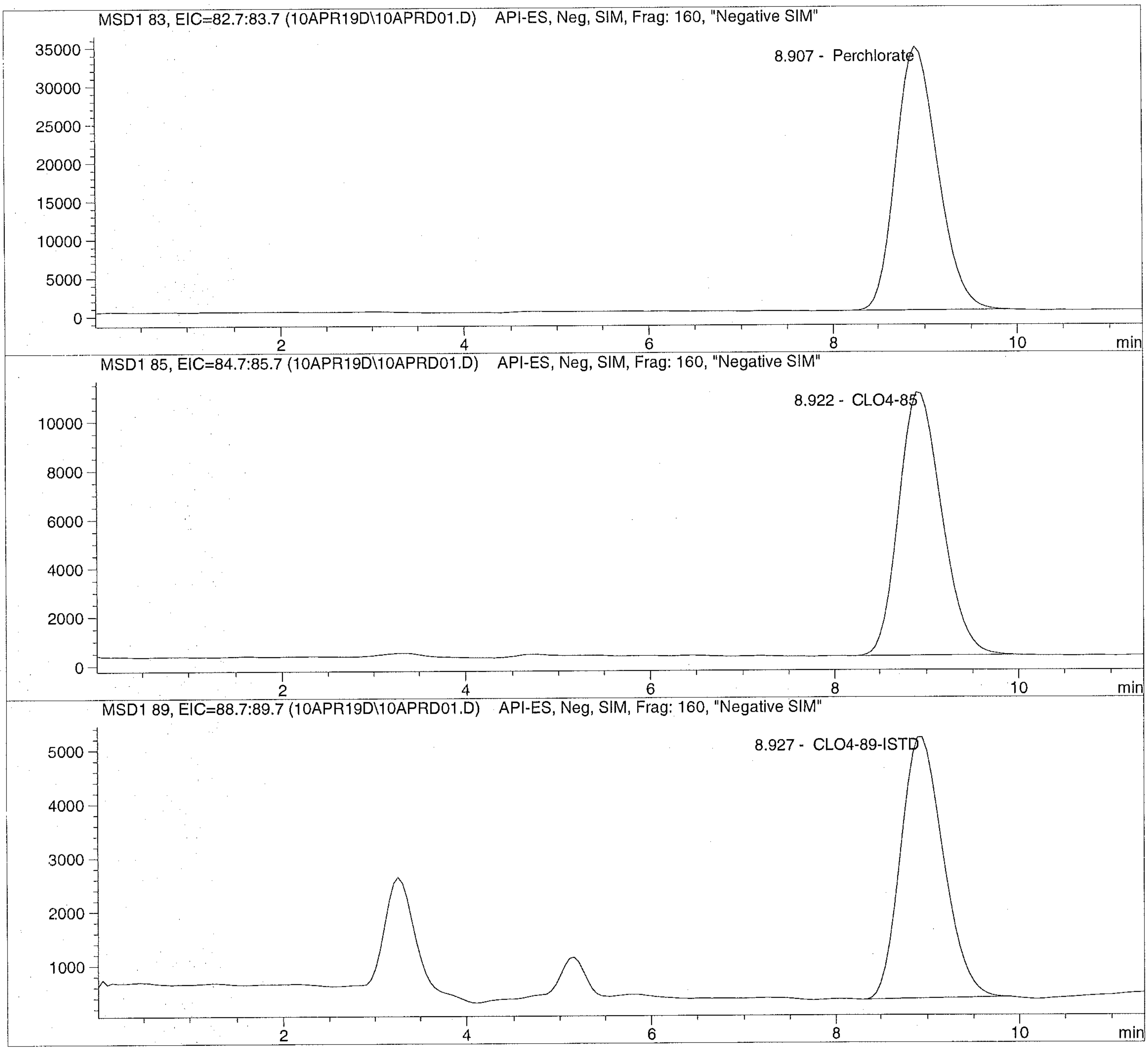
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	647195 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	647199 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	647197 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	647198 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1909152001	CLO4-AQN	1	Sample		
6	Vial 76	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		

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD01.D   Sample Name: 647195 CCV@25

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD01.D Sample Name: 647195 CCV@25

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 ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD02.D Sample Name: 647199 QC@4.0

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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

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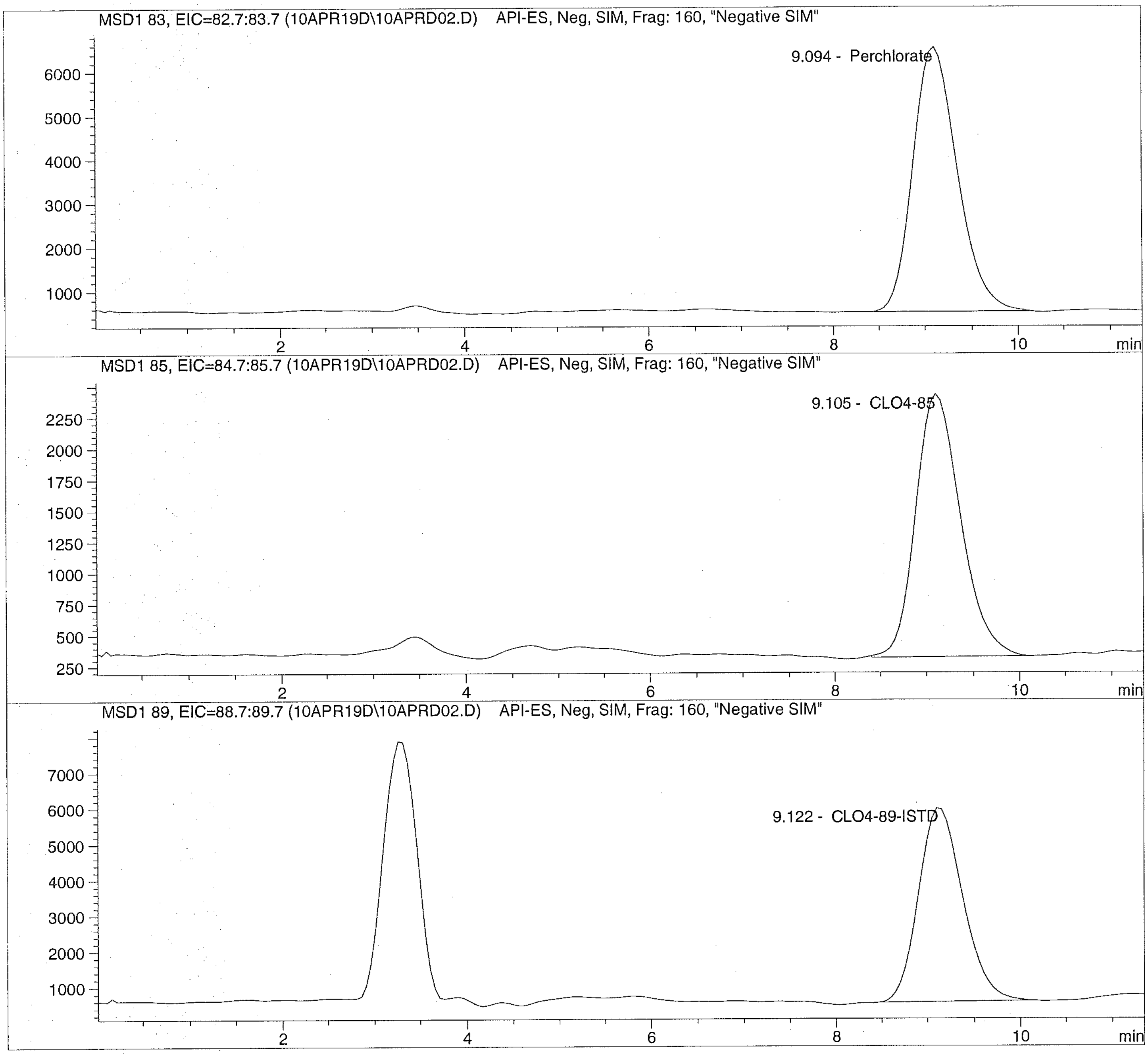


Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD02.D Sample Name: 647199 QC@4.0

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

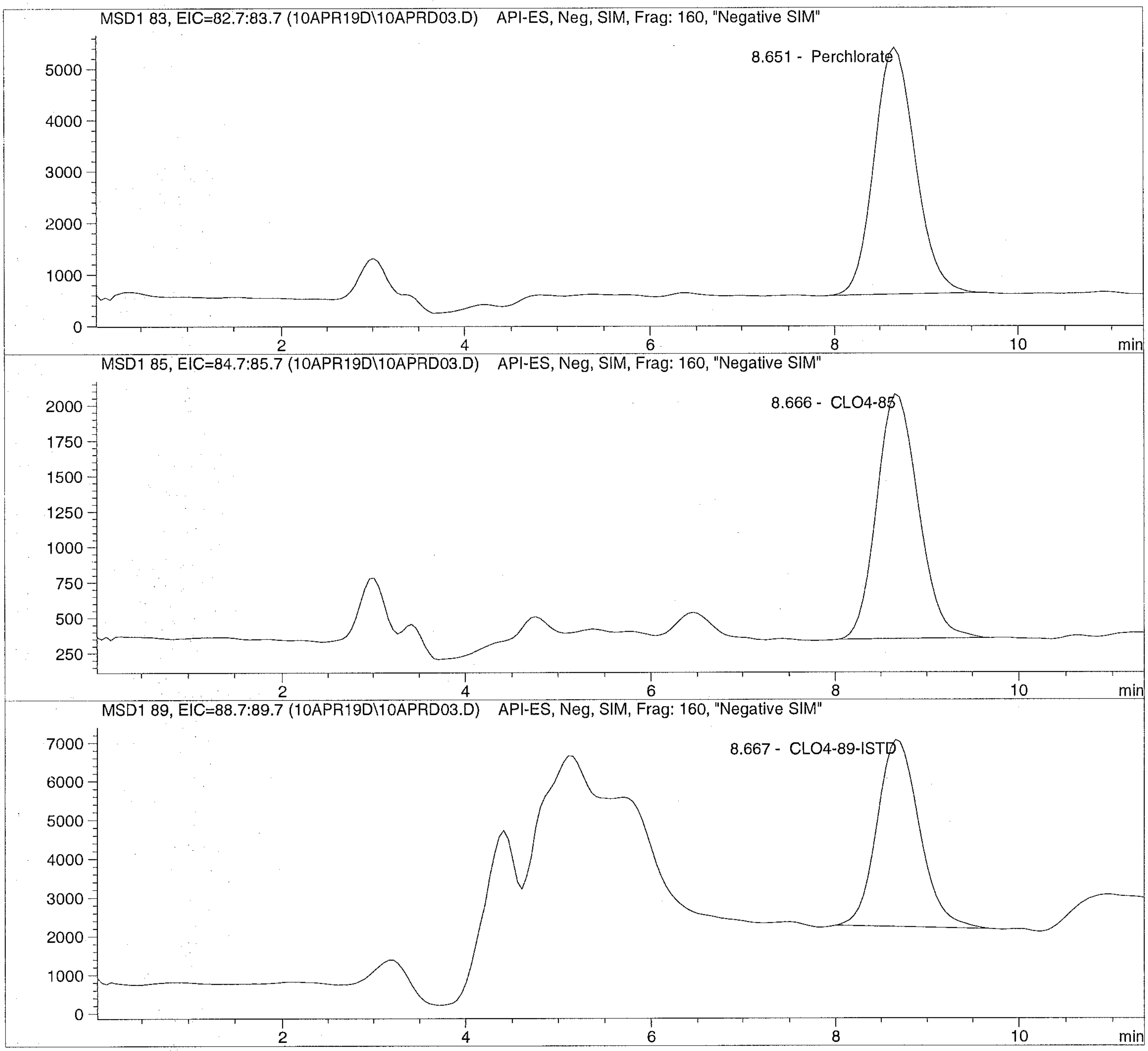
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD03.D   Sample Name: 647197 ICS@4.0

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD03.D Sample Name: 647197 ICS@4.0

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 ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD04.D   Sample Name: 647198   LMB

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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

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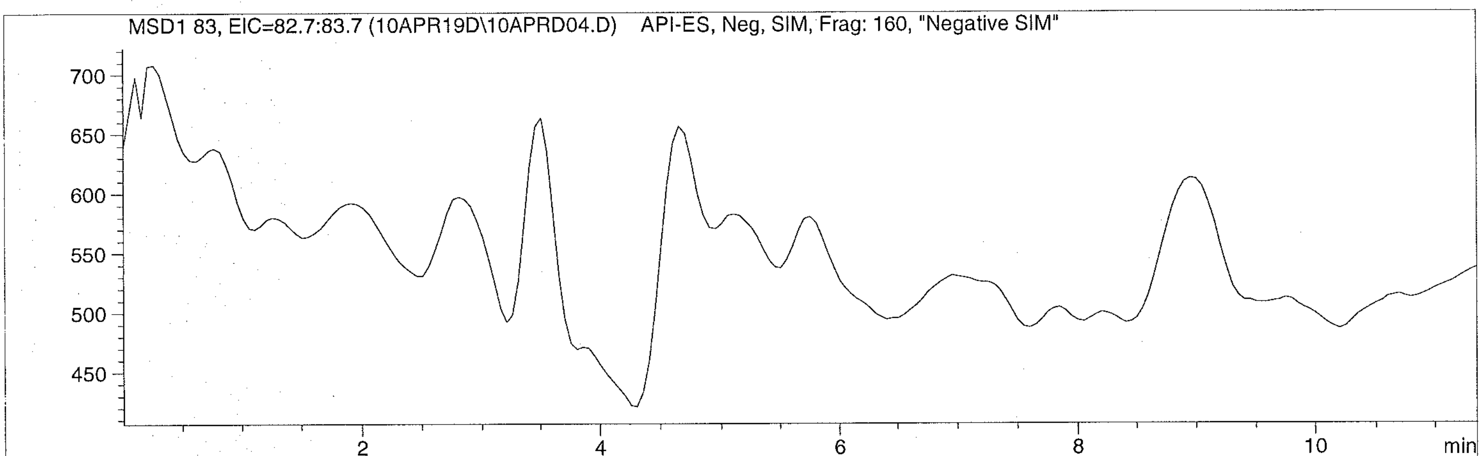
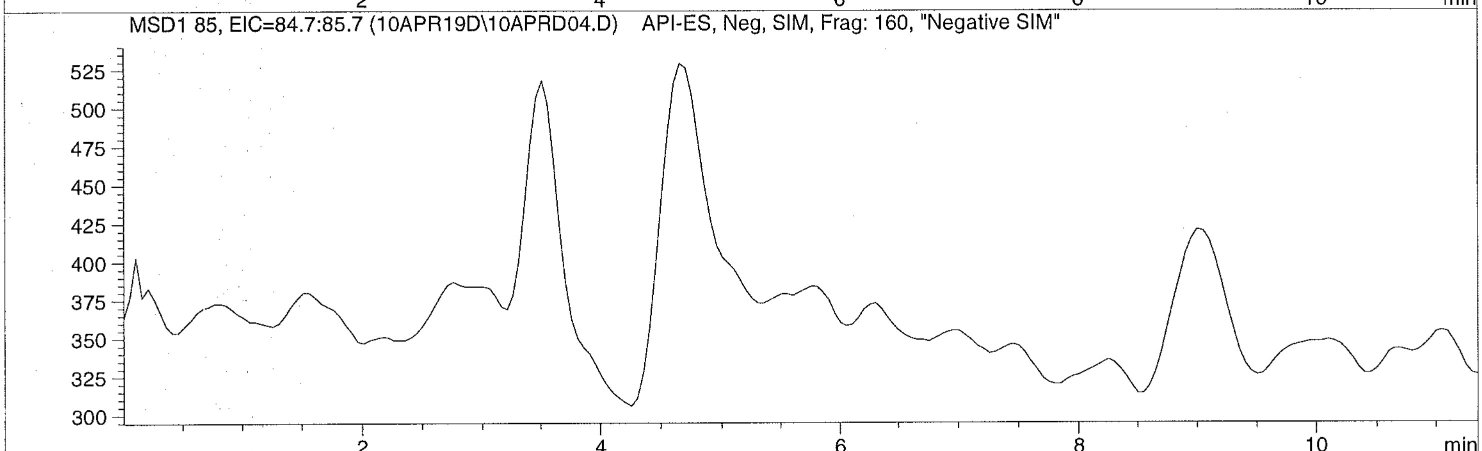
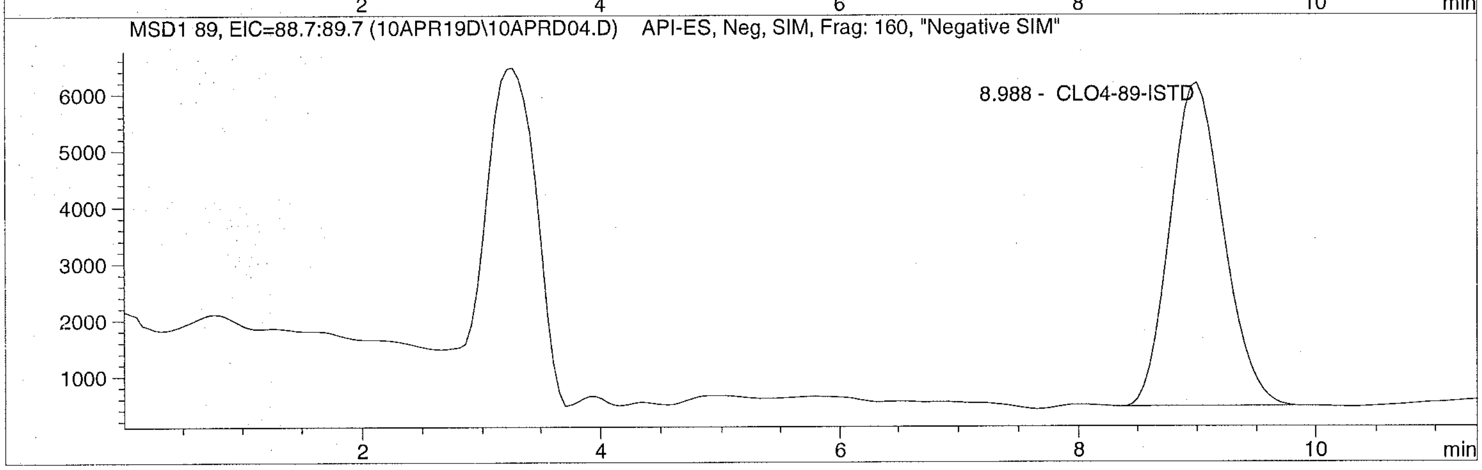






Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD04.D   Sample Name: 647198   LMB

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

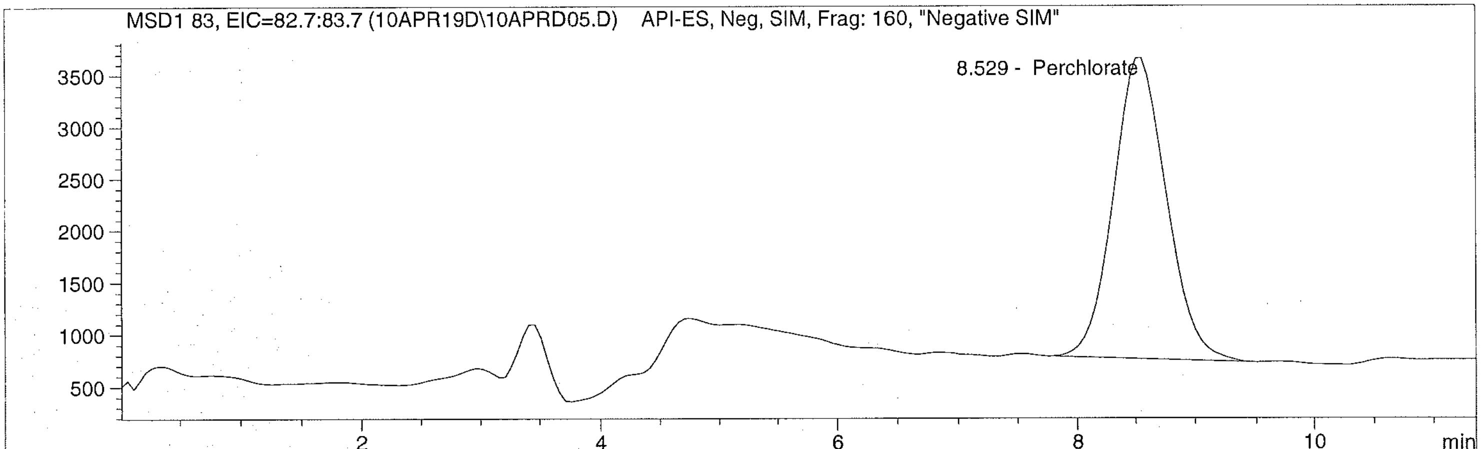
*** End of Report ***

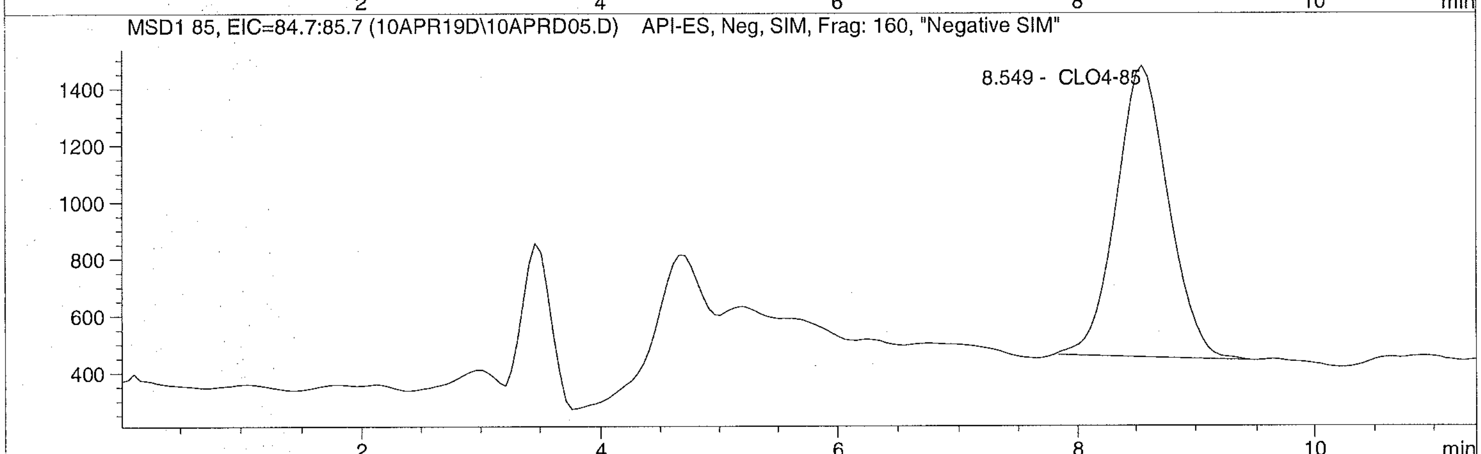
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD05.D Sample Name: 1909152001

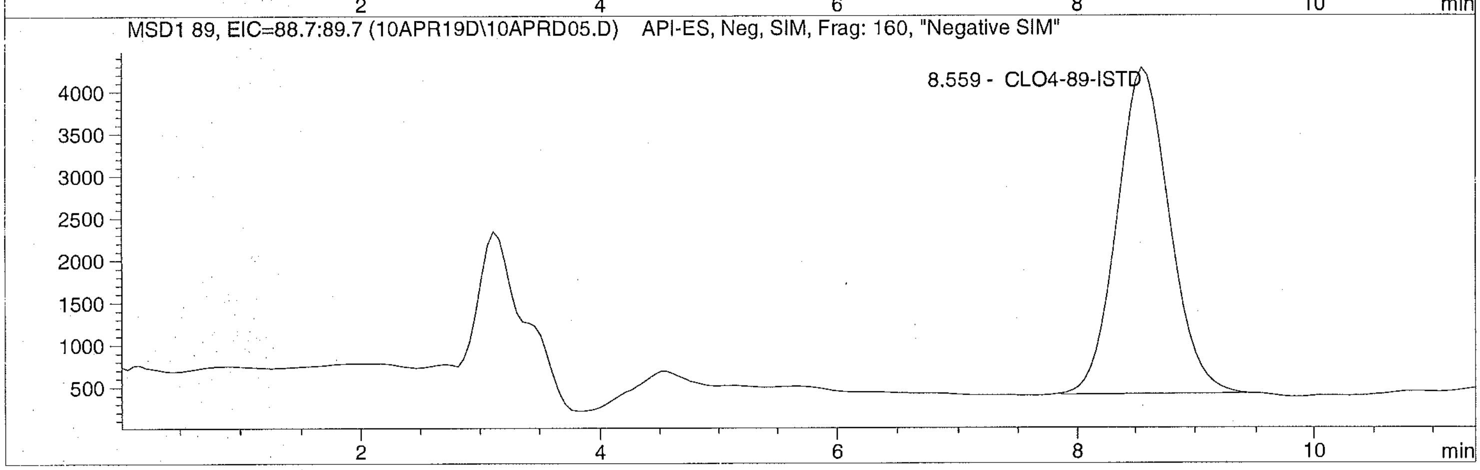
Injection Date:	4/10/2019 10:55:33	Seq Line:	5
Sample Name:	1909152001	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	30 µl

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

Perchlorate analysis







Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD05.D Sample Name: 1909152001

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 ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD06.D       Sample Name: 647200   91521MS
=====================================================================================
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
=====================================================================================
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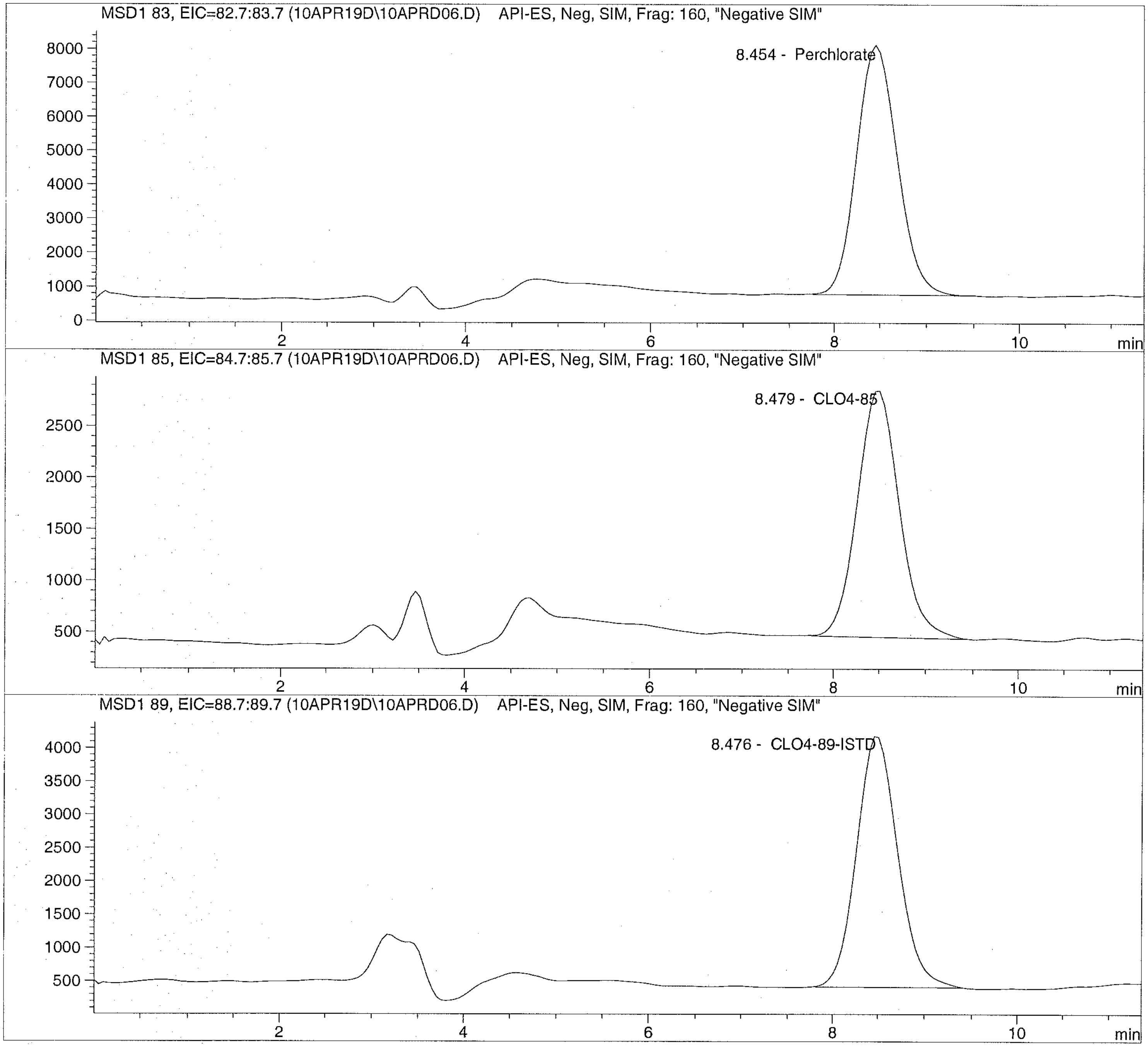


Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD06.D Sample Name: 647200 91521MS

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

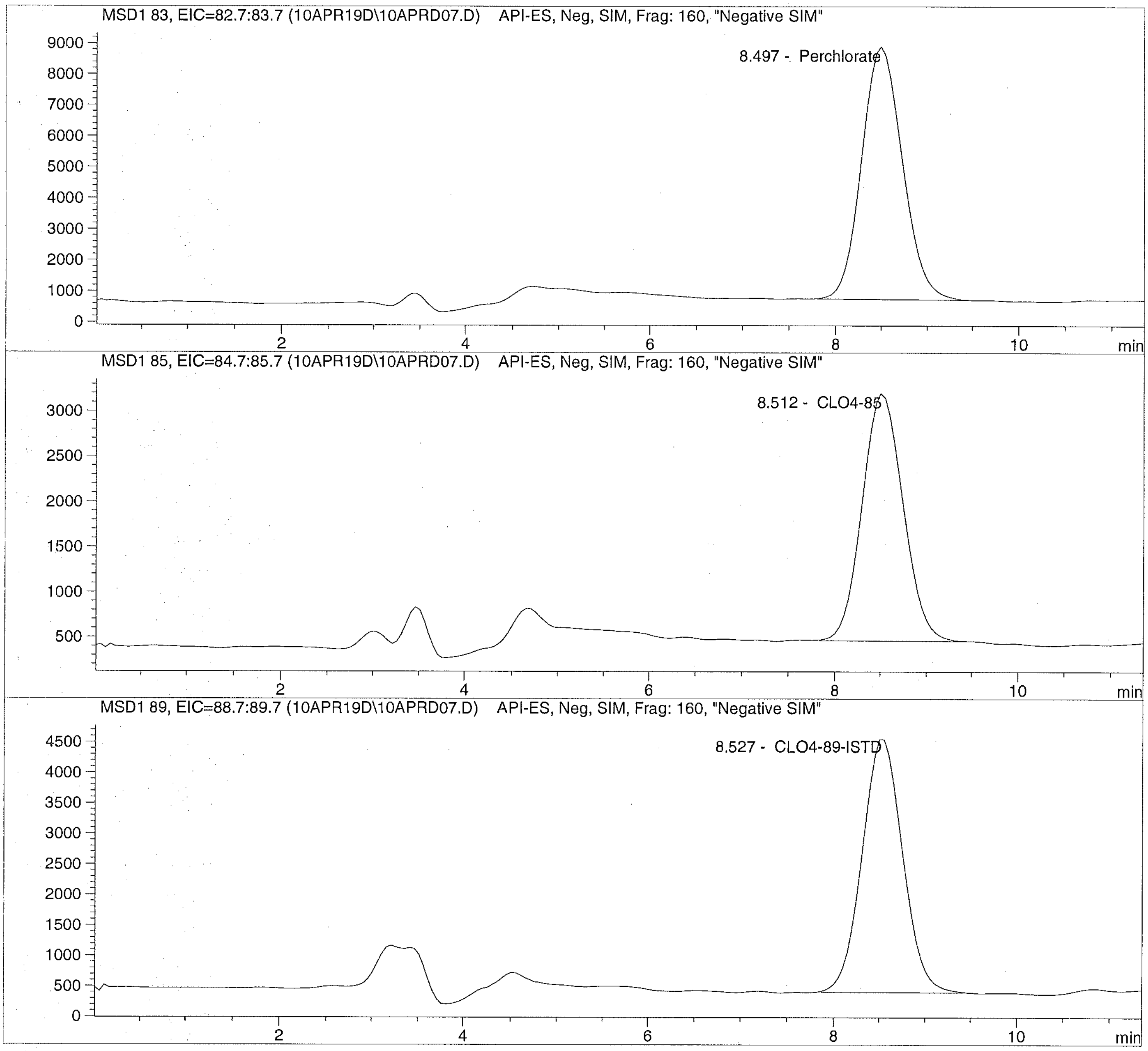
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD07.D   Sample Name: 647201   91521SD

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD07.D Sample Name: 647201 91521SD

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

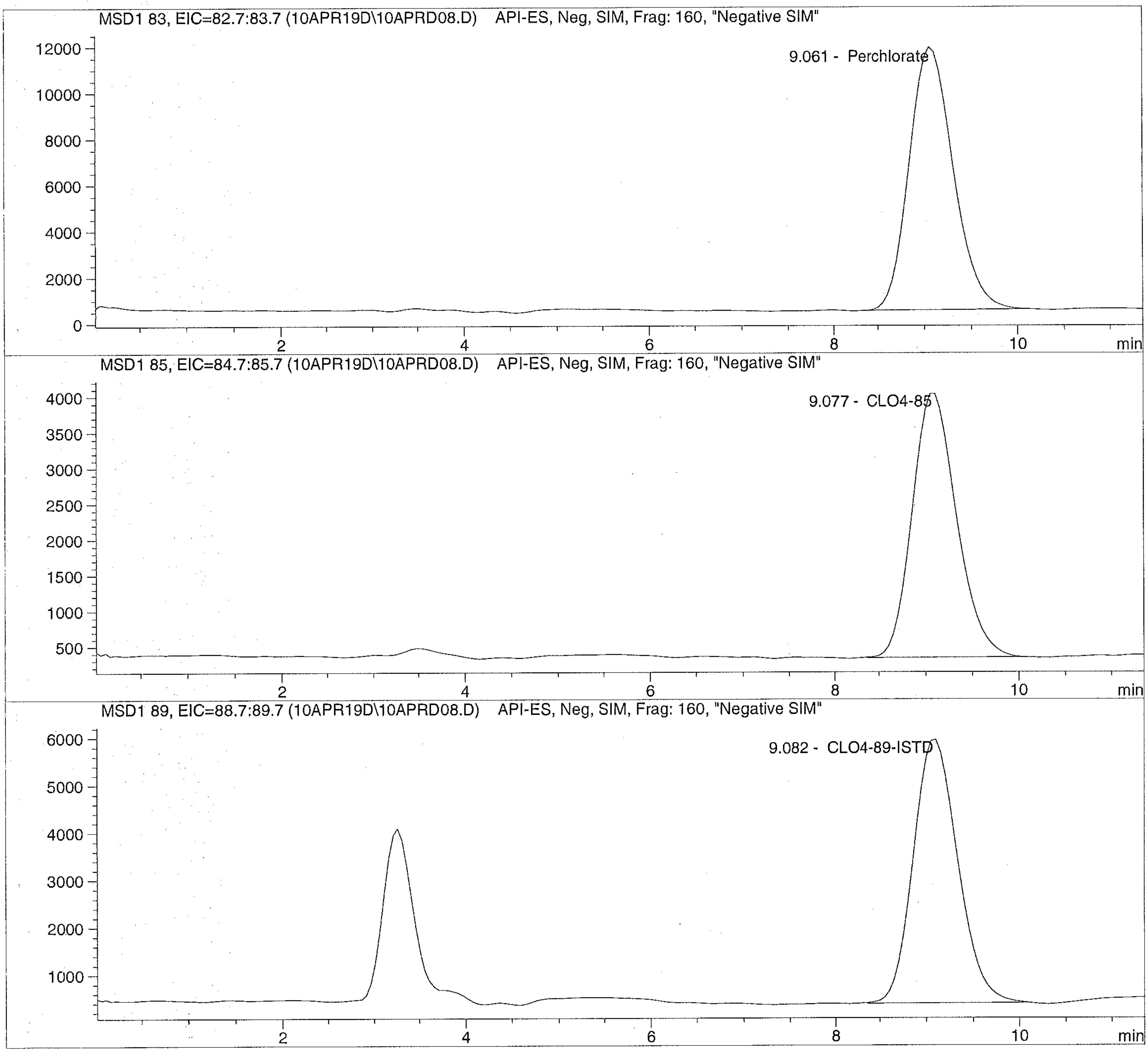
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.527	BBA	126683.1	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD08.D       Sample Name: 1909153001   1K
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD08.D   Sample Name: 1909153001   1K

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

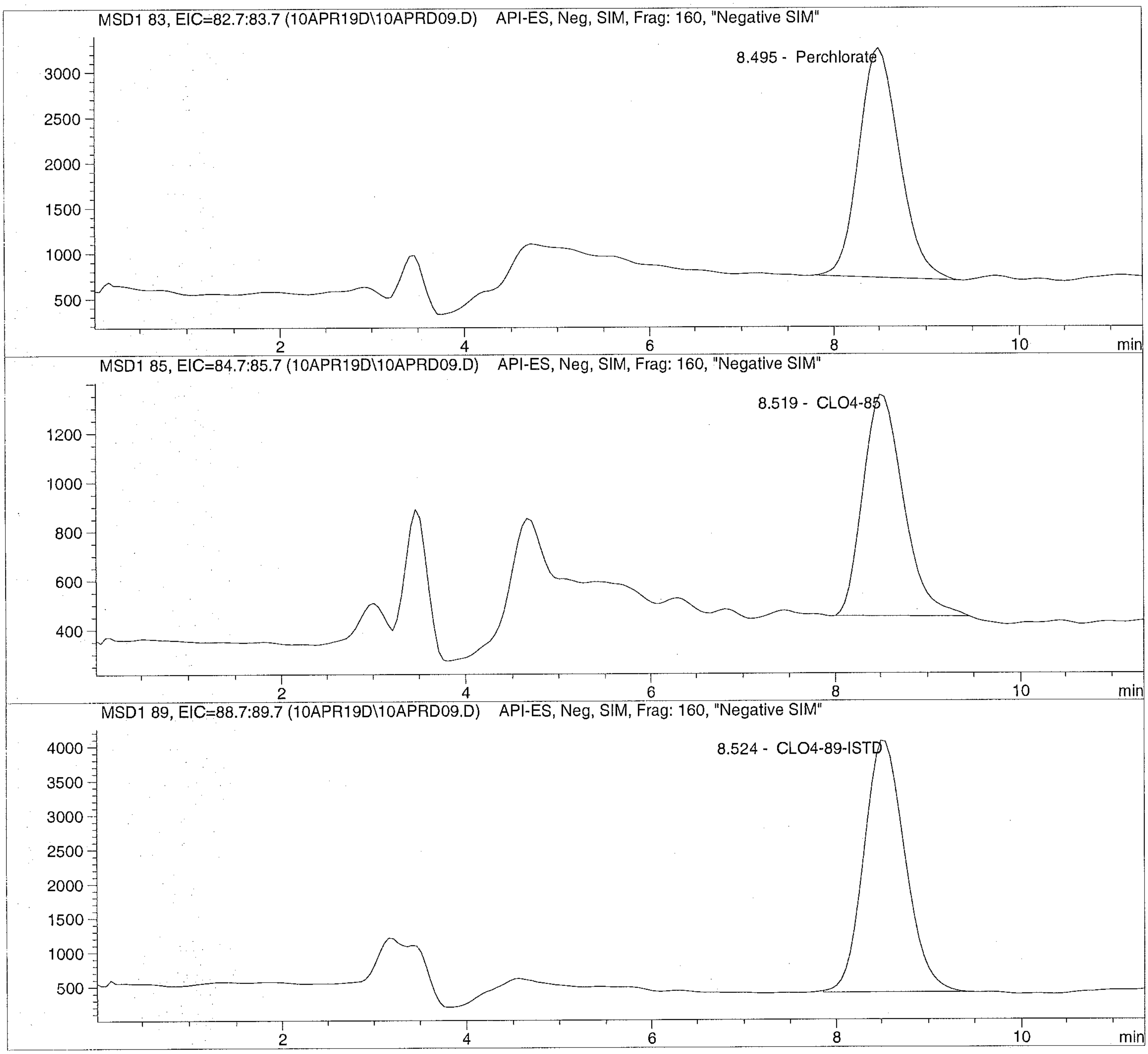
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD09.D Sample Name: 1909154001

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD09.D Sample Name: 1909154001

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

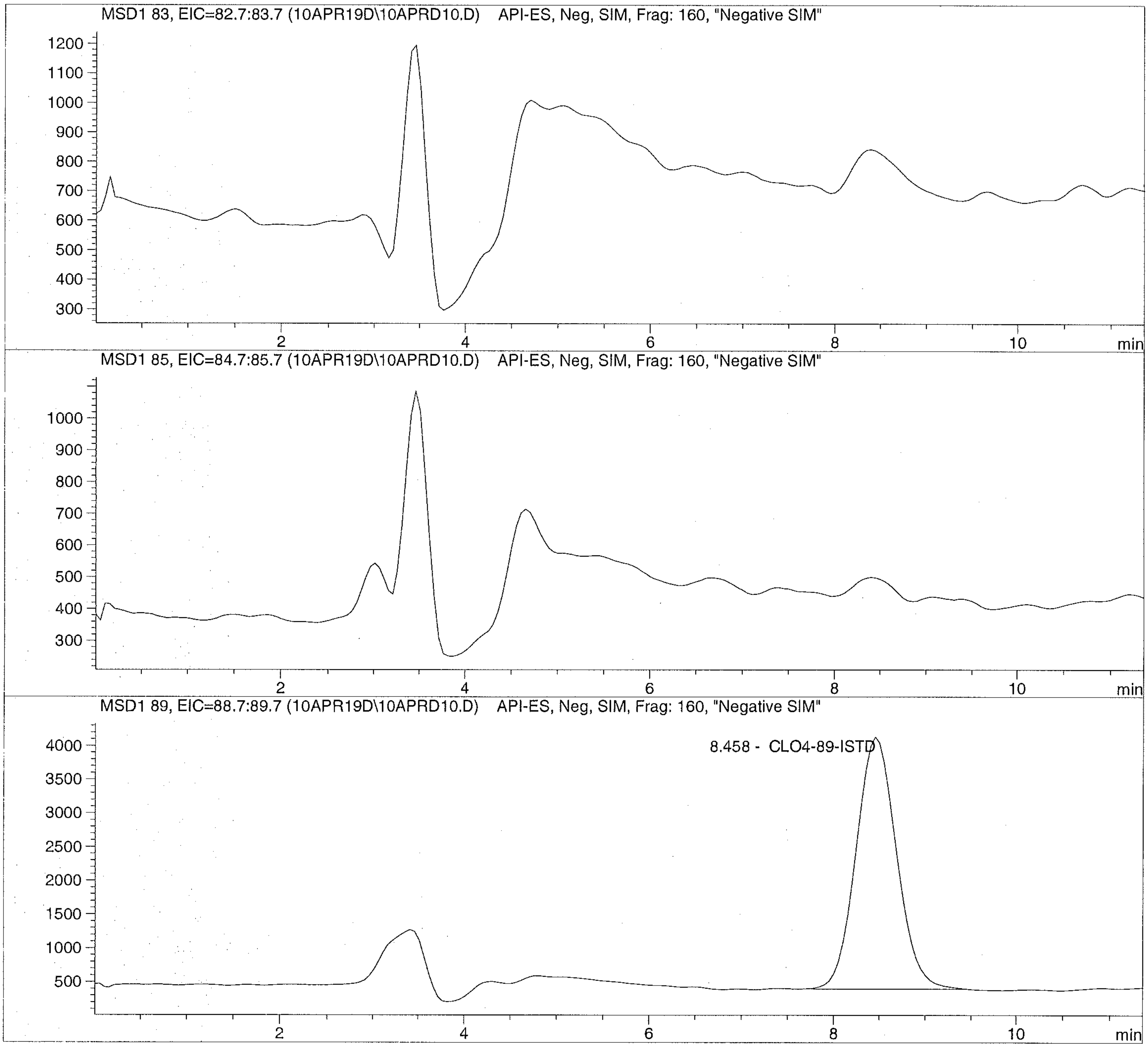
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.524	BBA	113404.4	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD10.D       Sample Name: 1909947001
=================================================================================
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
=================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD10.D Sample Name: 1909947001

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 ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD11.D   Sample Name: 1909949001

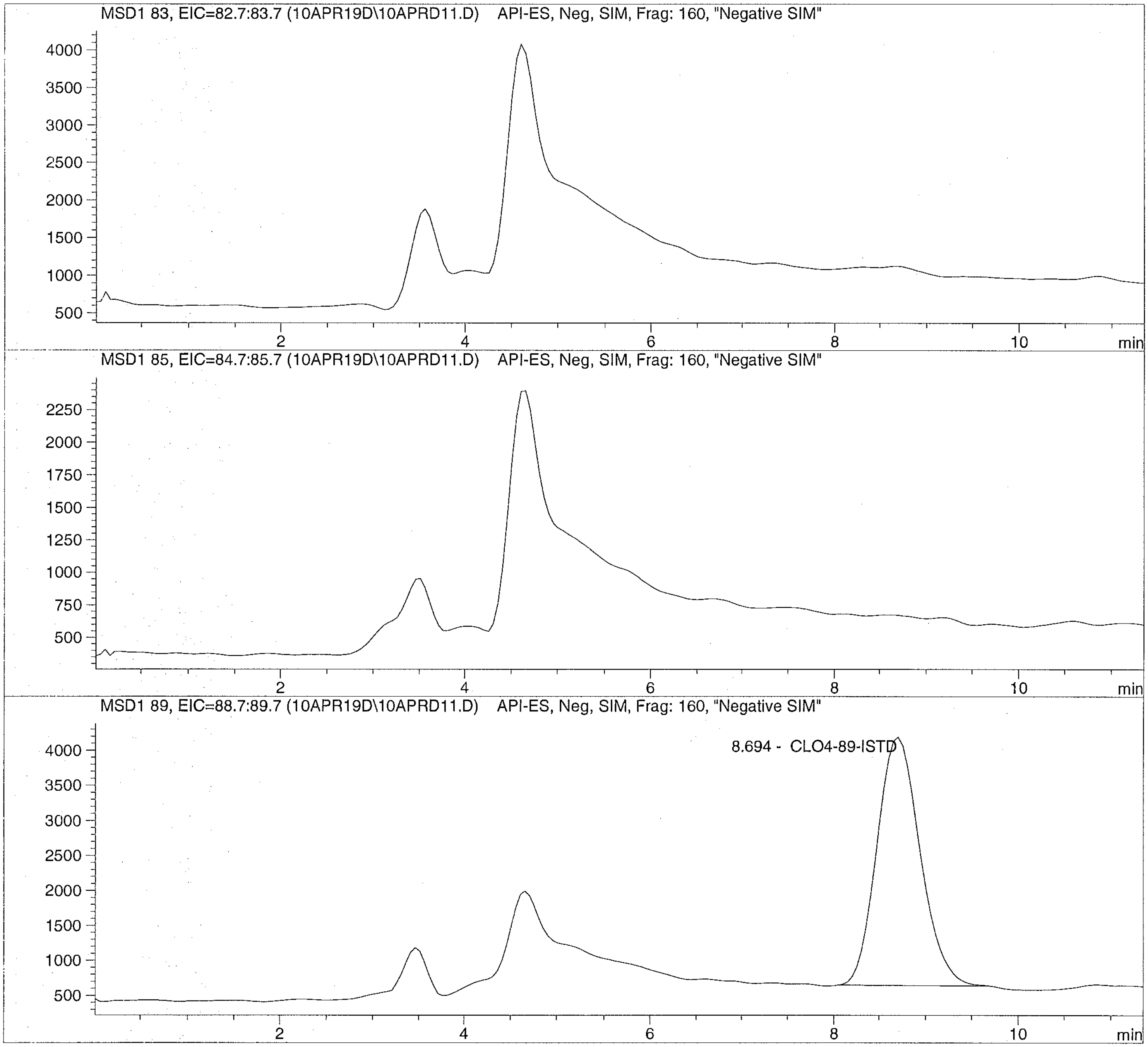
===

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

===



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD11.D   Sample Name: 1909949001

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

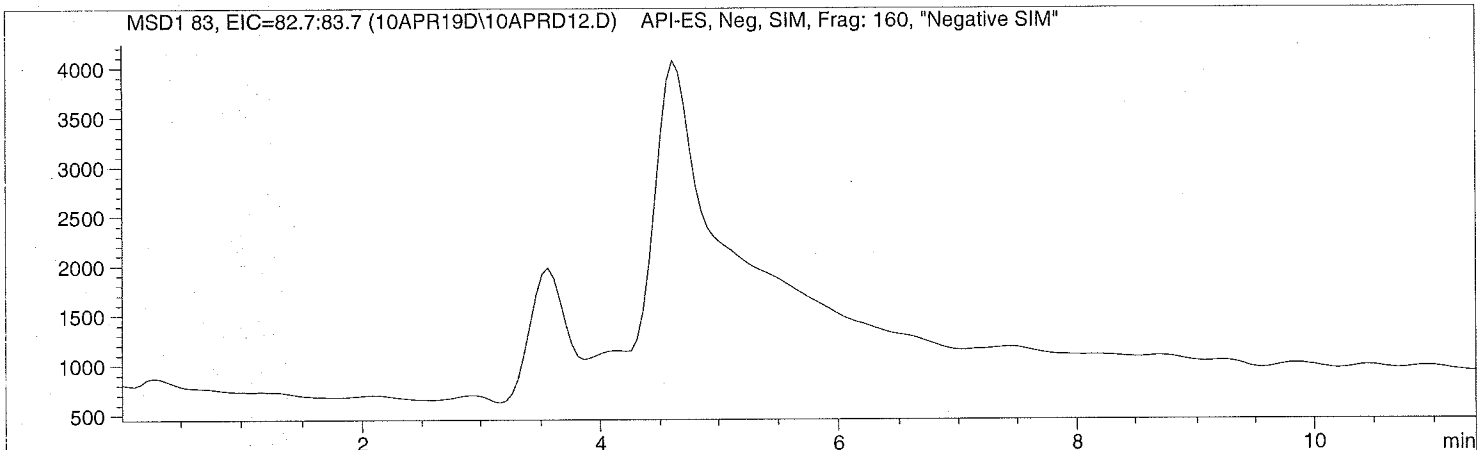
*** End of Report ***

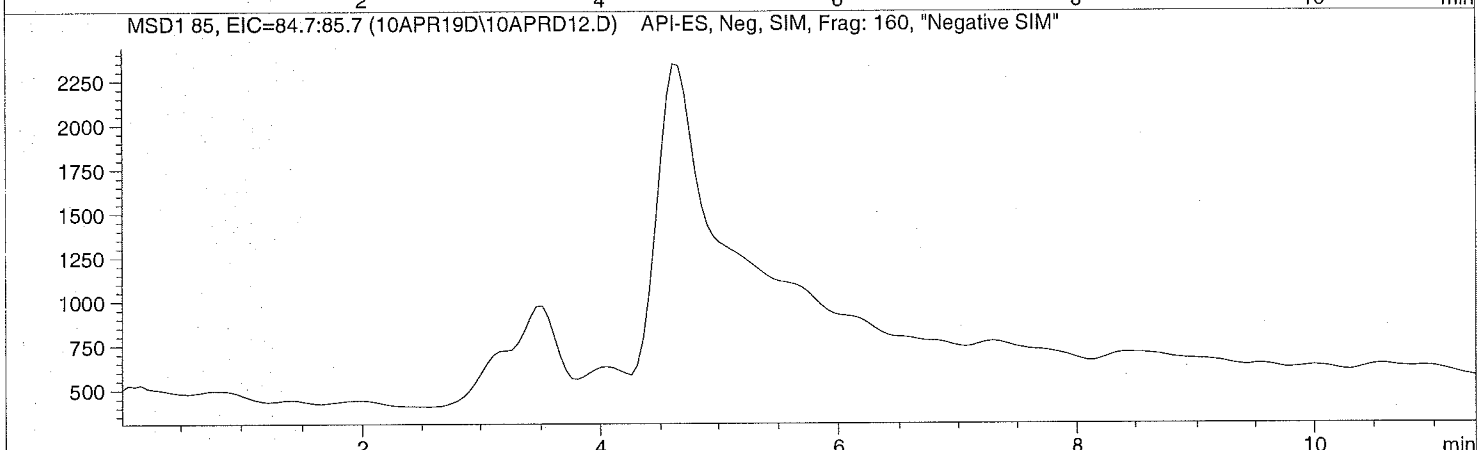
00936013

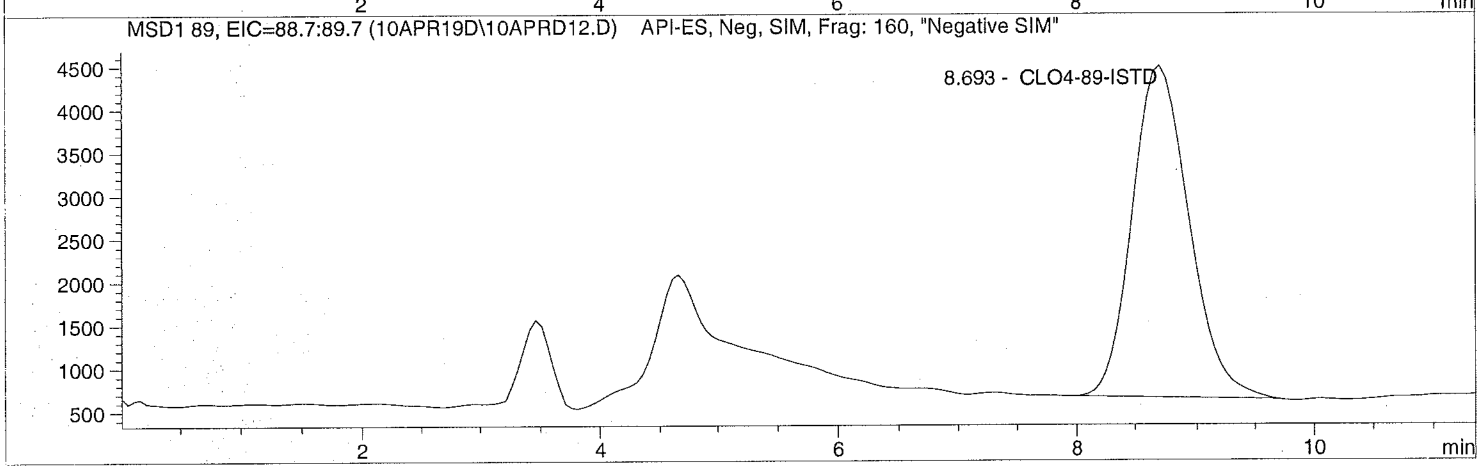
```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD12.D       Sample Name: 1909949002
=====================================================================================
Injection Date:     4/10/2019  12:28:41              Seq Line:            12
Sample Name:        1909949002                       Location:       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
=====================================================================================
```







Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD12.D   Sample Name: 1909949002

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 ***

00936015

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD13.D   Sample Name: 1909949003

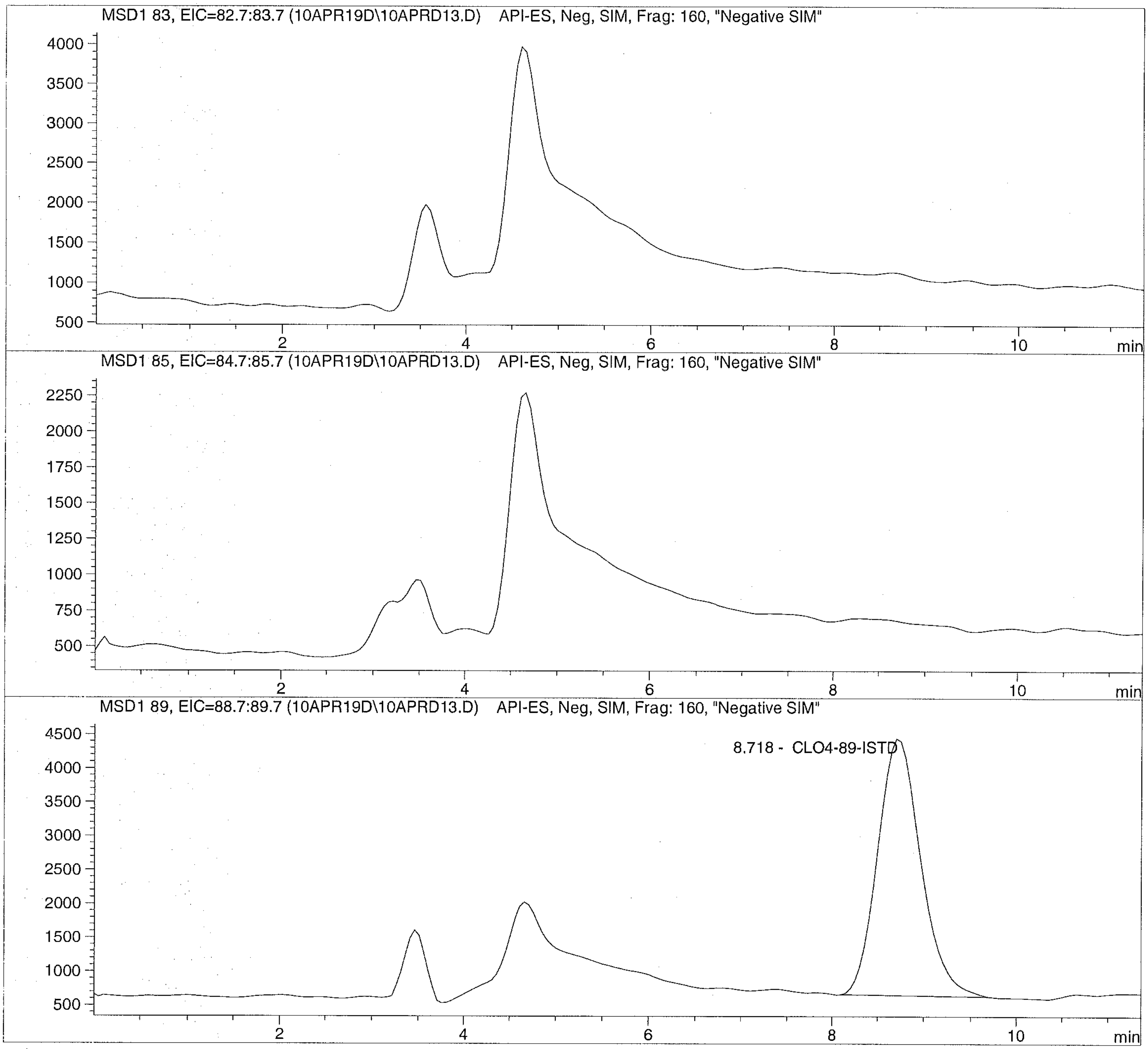
===

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

===



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD13.D   Sample Name: 1909949003

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

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

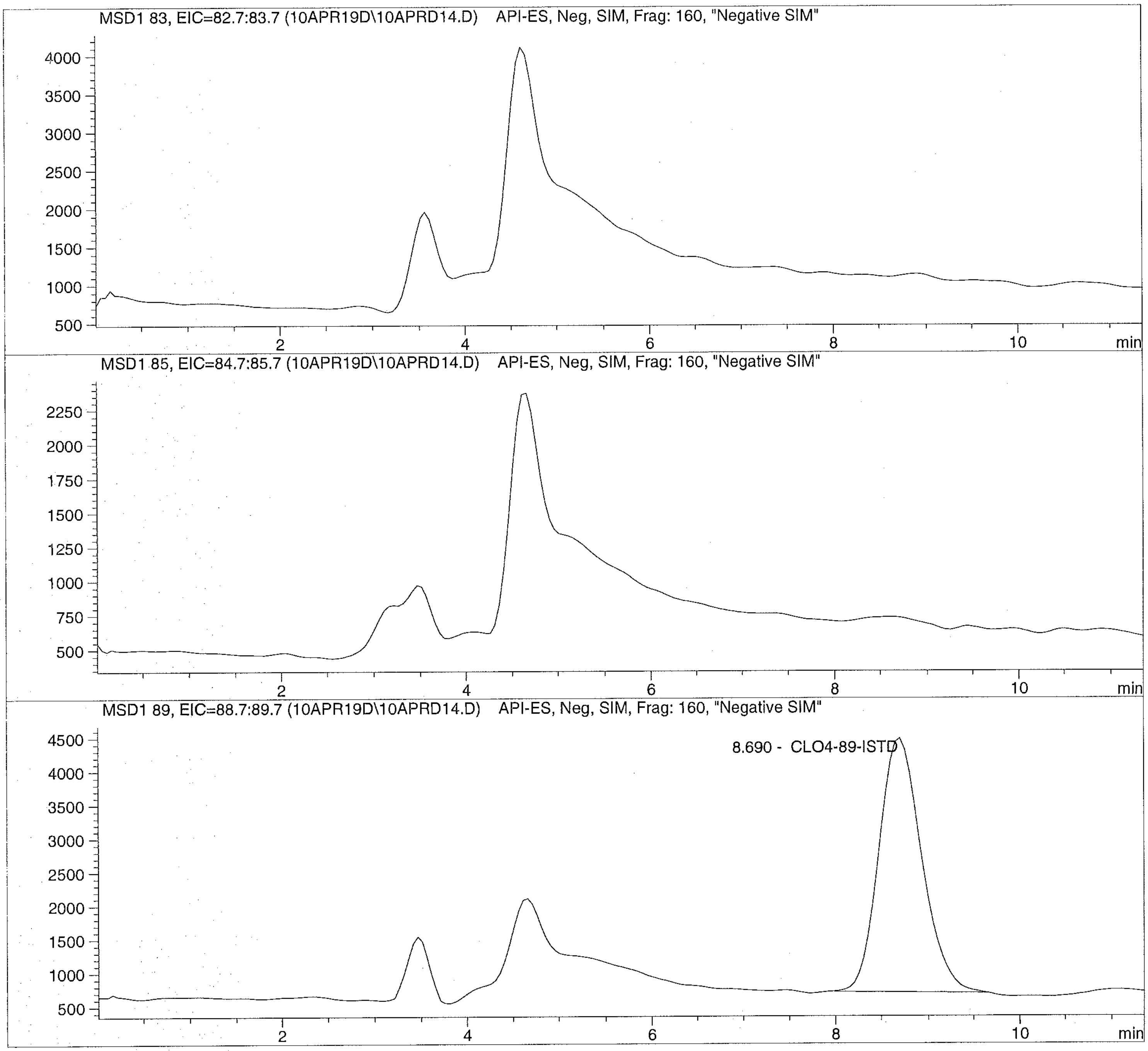
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD14.D   Sample Name: 1909949004

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



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD14.D   Sample Name: 1909949004

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

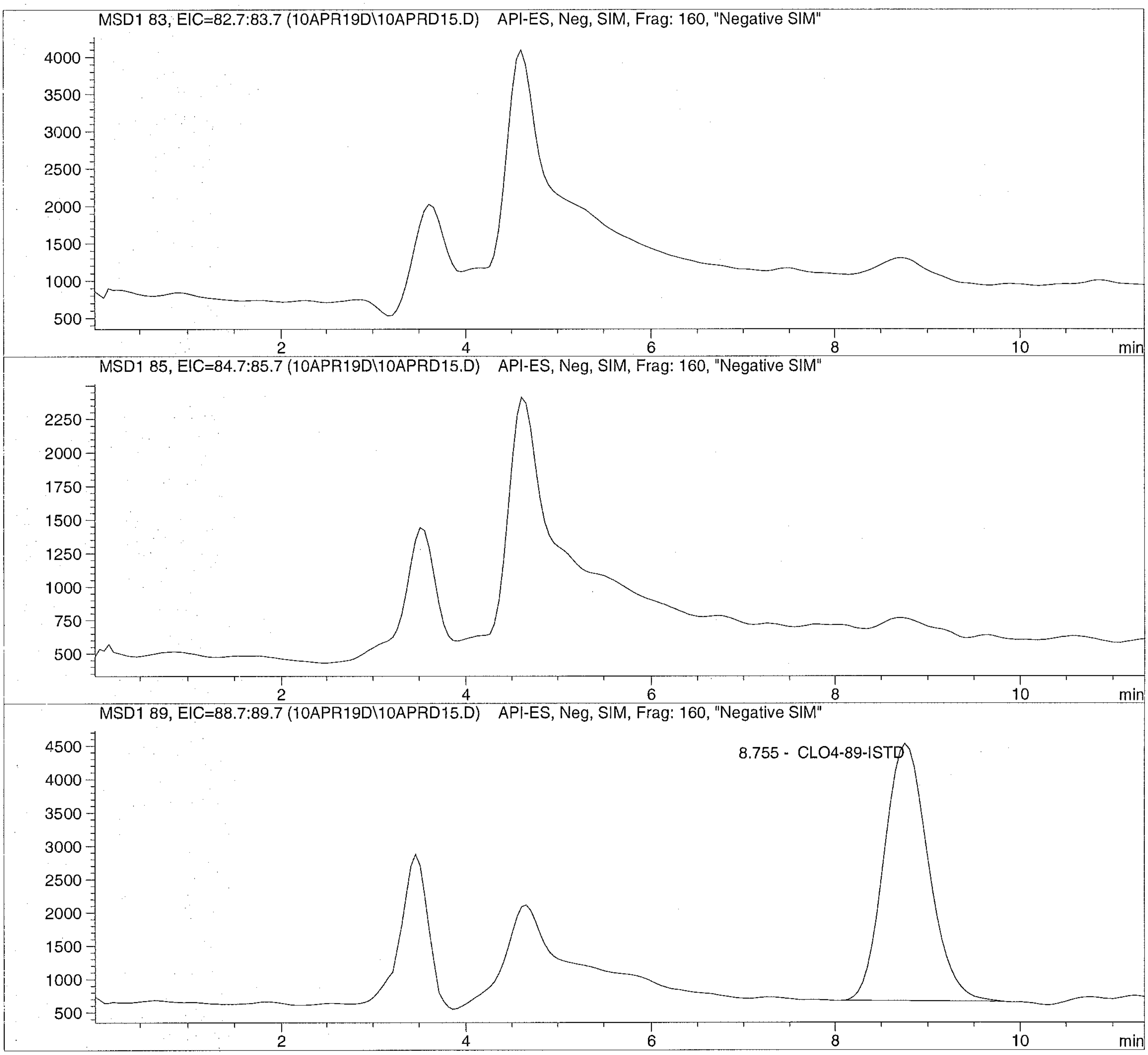
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.690	BBA	120241.5	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD15.D       Sample Name: 1909949005
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD15.D Sample Name: 1909949005

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

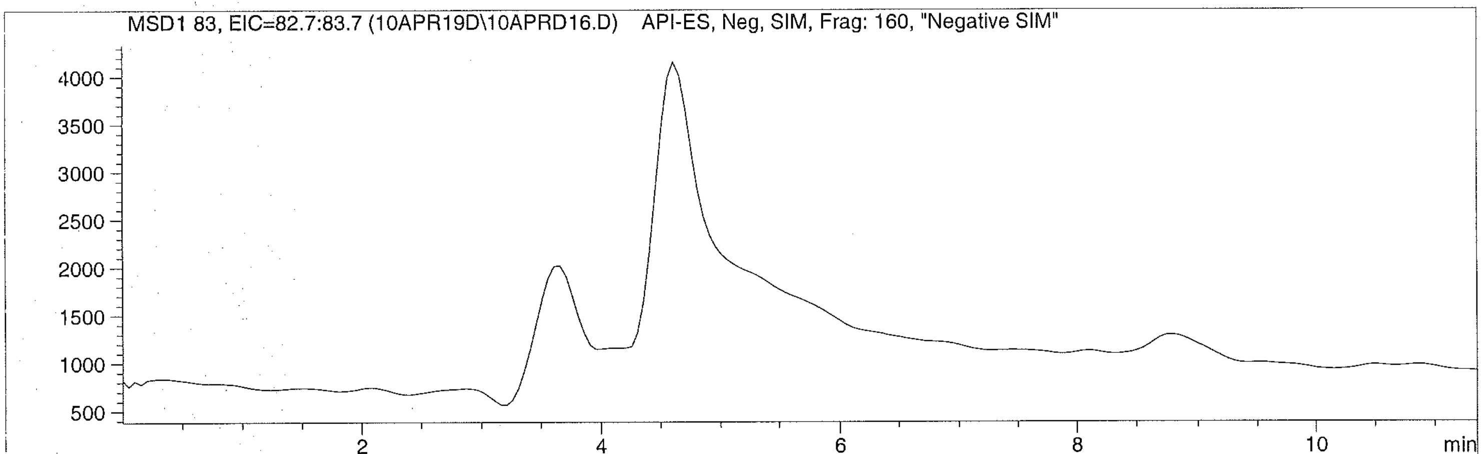
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	PBA	127767.0	5.0000	CLO4-89-ISTD

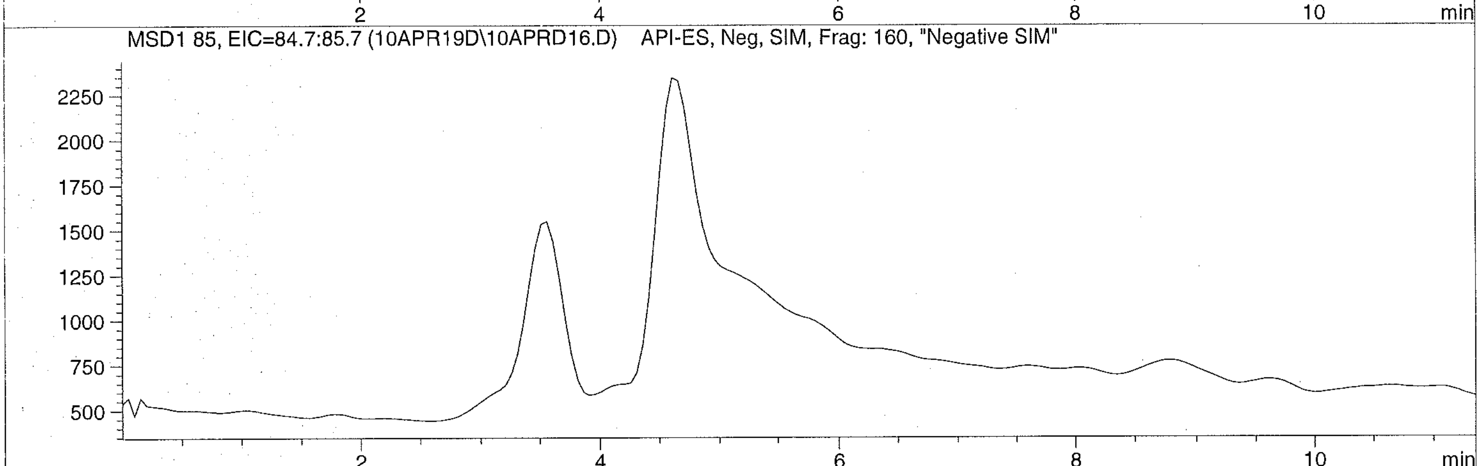
*** End of Report ***

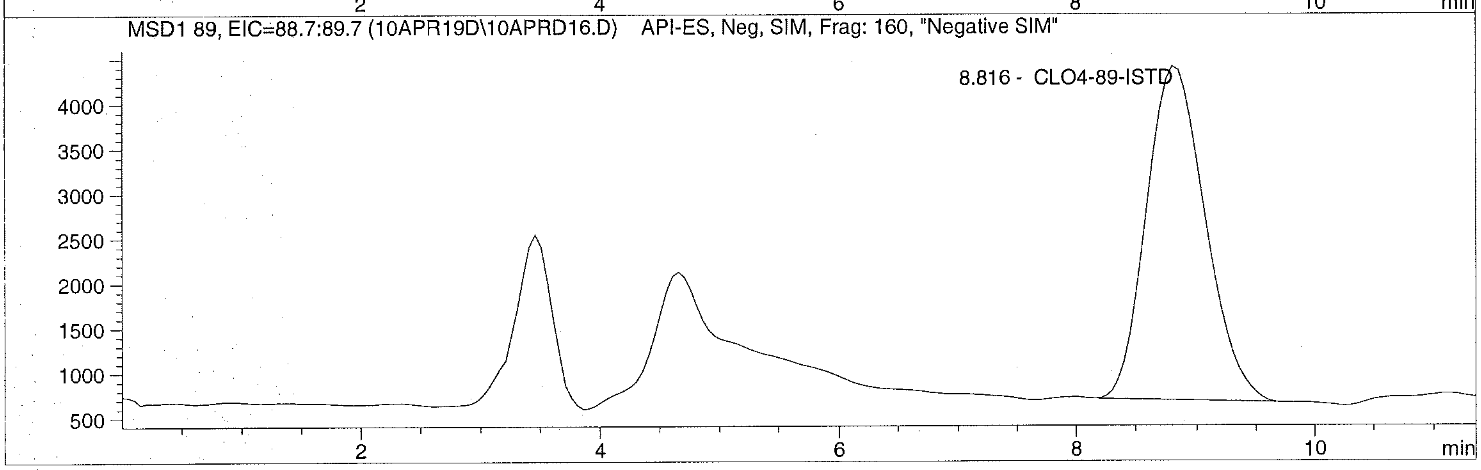
```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD16.D       Sample Name: 1909949006
=====================================================================================
Injection Date:    4/10/2019  13:21:46                Seq Line:          16
Sample Name:       1909949006                         Location:       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
=====================================================================================
```







Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD16.D Sample Name: 1909949006

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

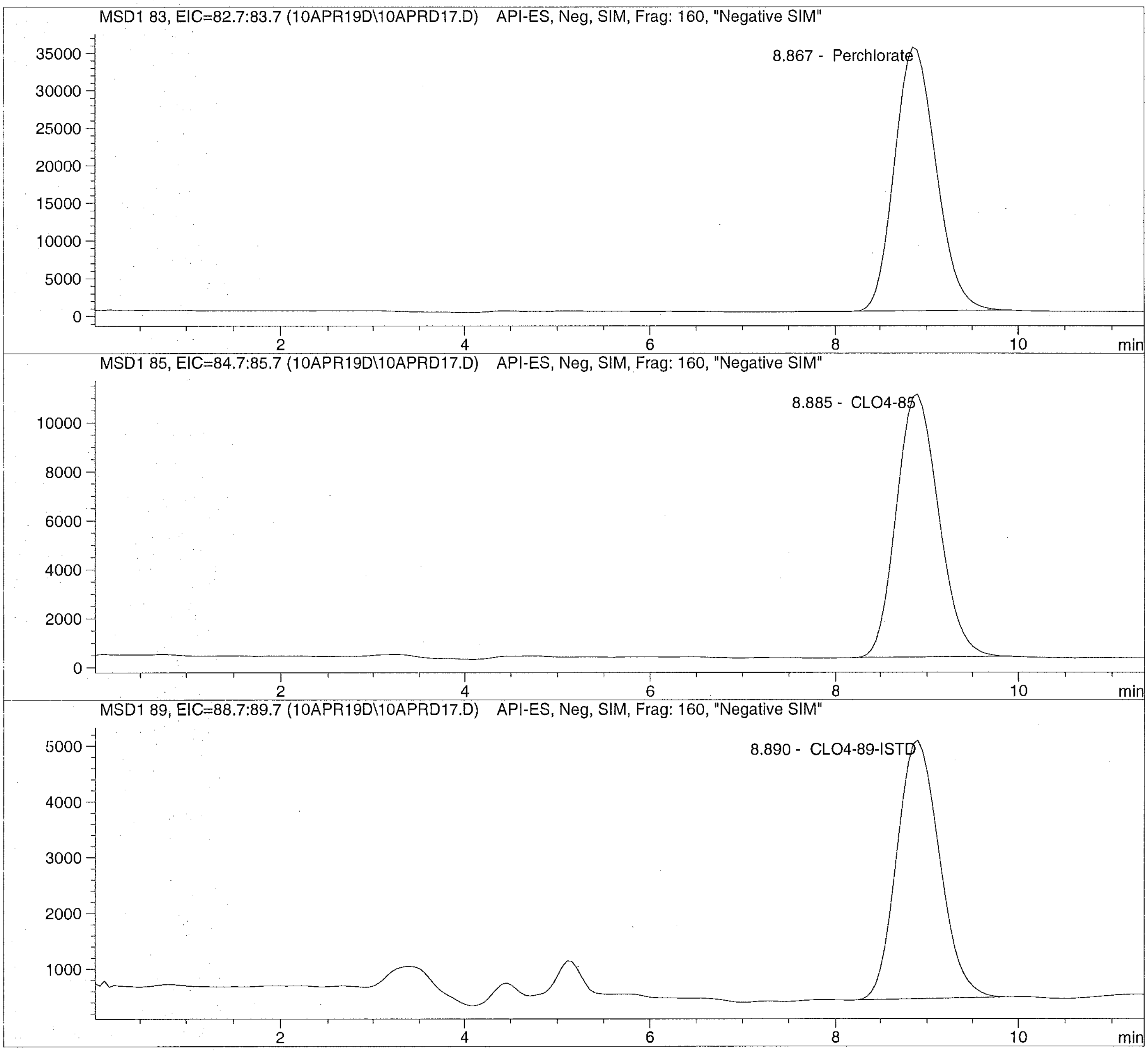
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.816	BBA	123964.7	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD17.D        Sample Name: 647202    CCV@25
=====================================================================================
Injection Date:     4/10/2019  13:35:04            Seq Line:          17
Sample Name:        647202    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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\10APR19D\10APRD17.D Sample Name: 647202 CCV@25

Injection Date:	4/10/2019 13:35:04	Seq Line:	17
Sample Name:	647202 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
8.867	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 [min]	Sig	Lvl	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:

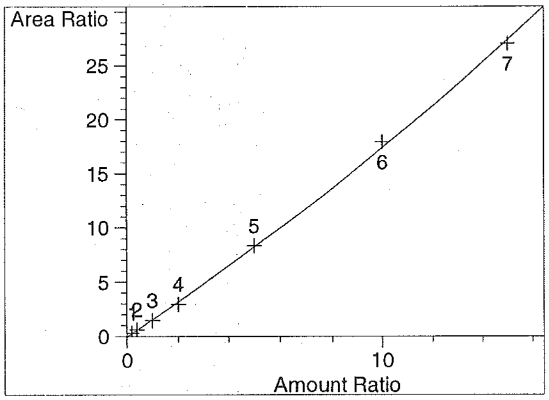
```
Compound: Perchlorate
  Time Window                 : From 6.654 min To 12.544 min
  Curve Type                  : Quadratic
  Origin                      : Ignored
  Calibration Level Weights:/
    Level 1                   : 1
    Level 2                   : 0.5
    Level 3                   : 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

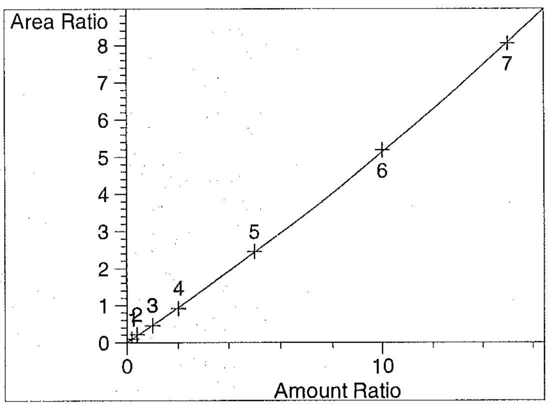
Compound: CLO4-89-ISTD
  Time Window                 : From 6.659 min To 12.466 min
  Curve Type                  : Linear
  Origin                      : Included
  Calibration Level Weights:/
    Level 1                   : 1
    Level 2                   : 1
    Level 3                   : 1
    Level 4                   : 1
    Level 5                   : 1
    Level 6                   : 1
    Level 7                   : 1
===================================================================
                          Peak Sum Table
===================================================================

***No Entries in table***
===================================================================
```

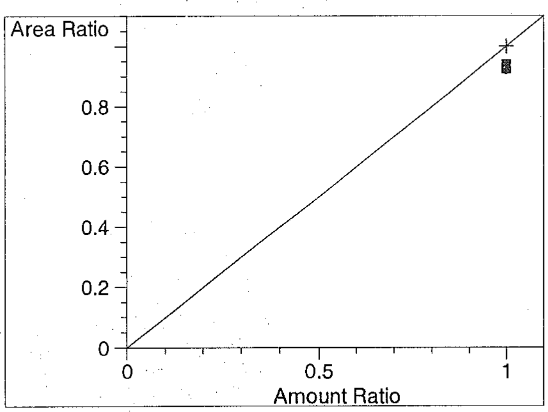
===
Calibration Curves
===



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	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:

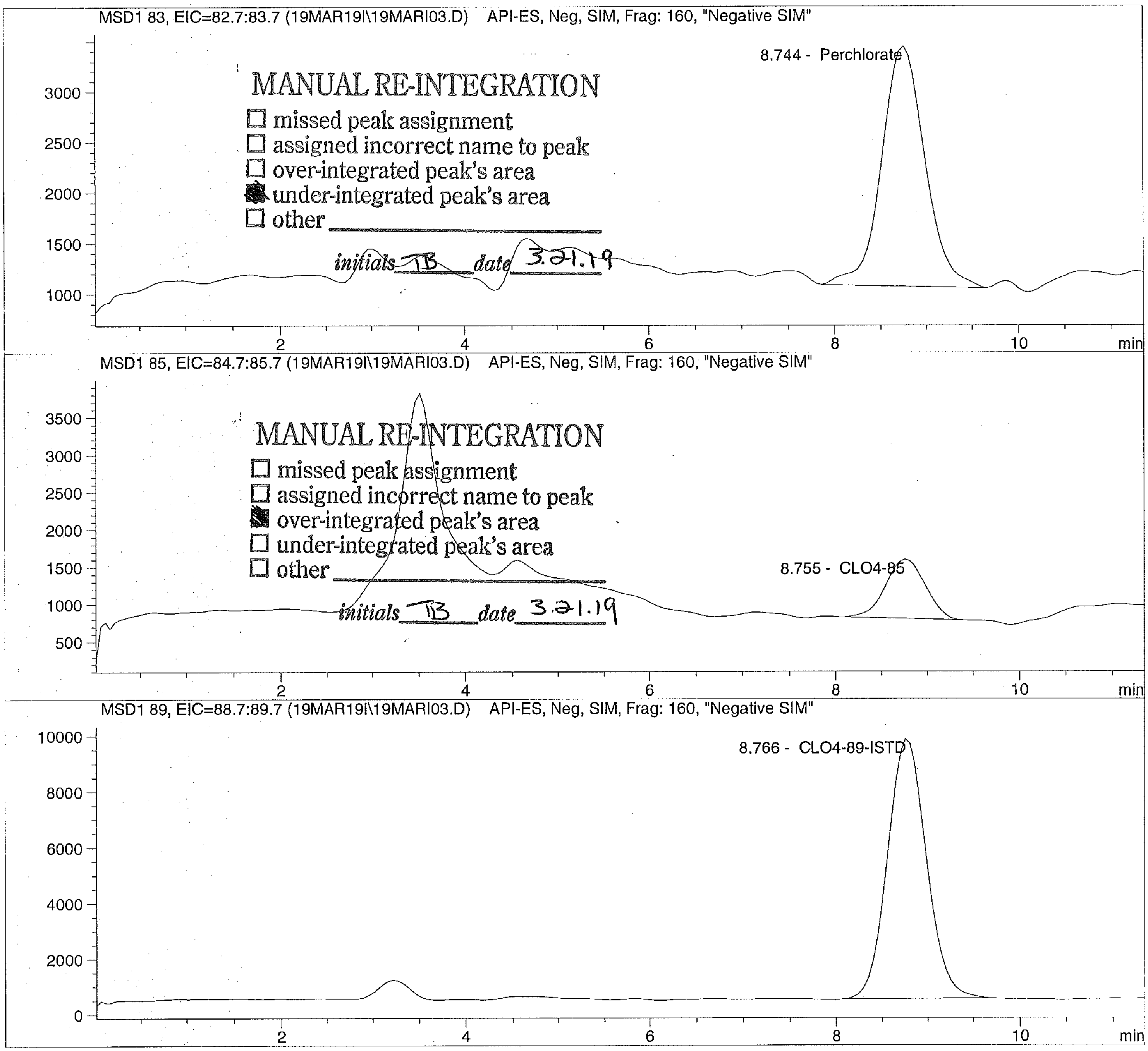
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	CLO4@ 5.0ug/L	CLO4-AQN	1	Ctrl Samp		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

00936031

```
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
======================================================================================
```



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

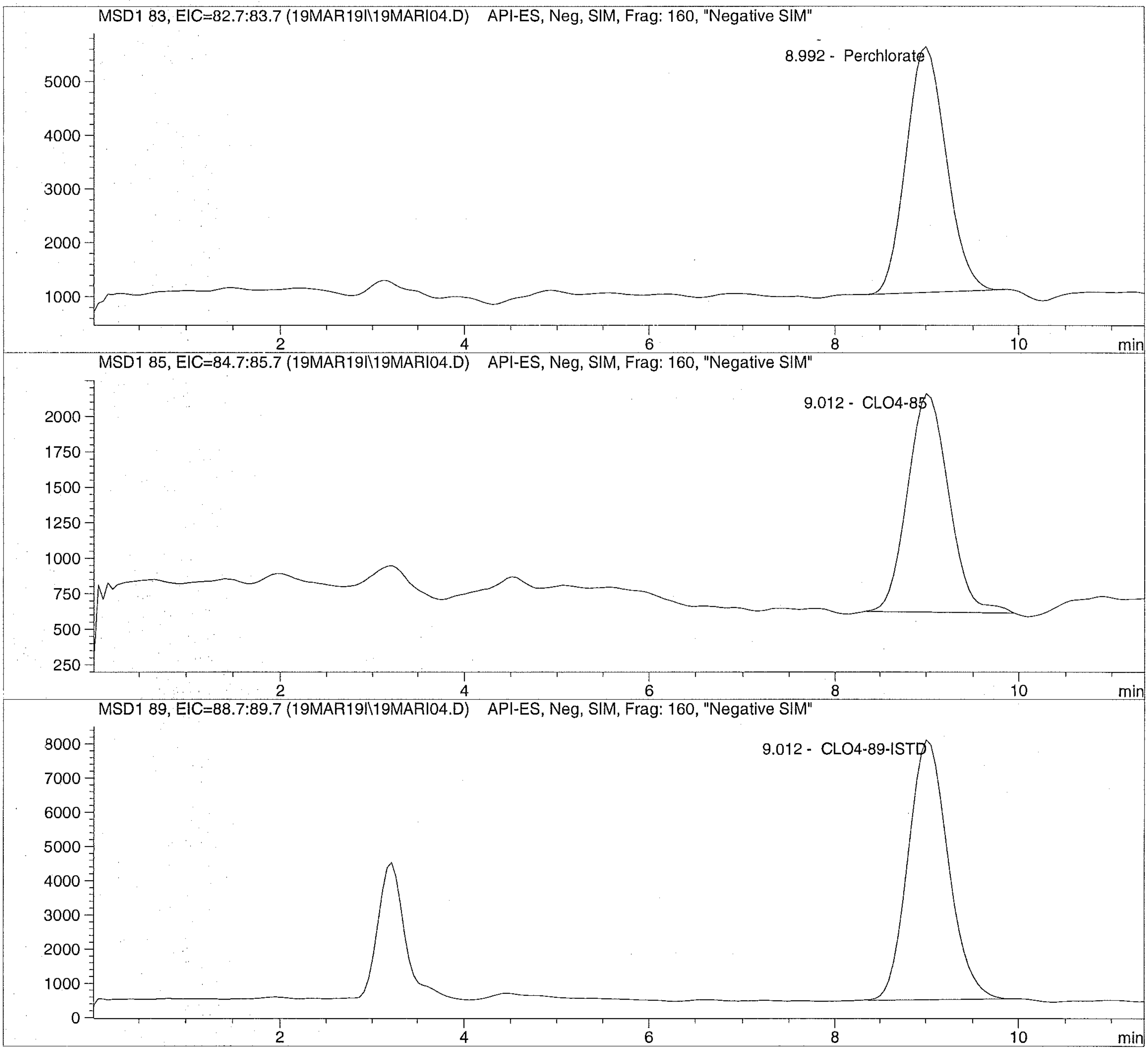
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D       Sample Name: CLO4@ 2.0ug/L
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI04.D Sample Name: CLO4@ 2.0ug/L

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

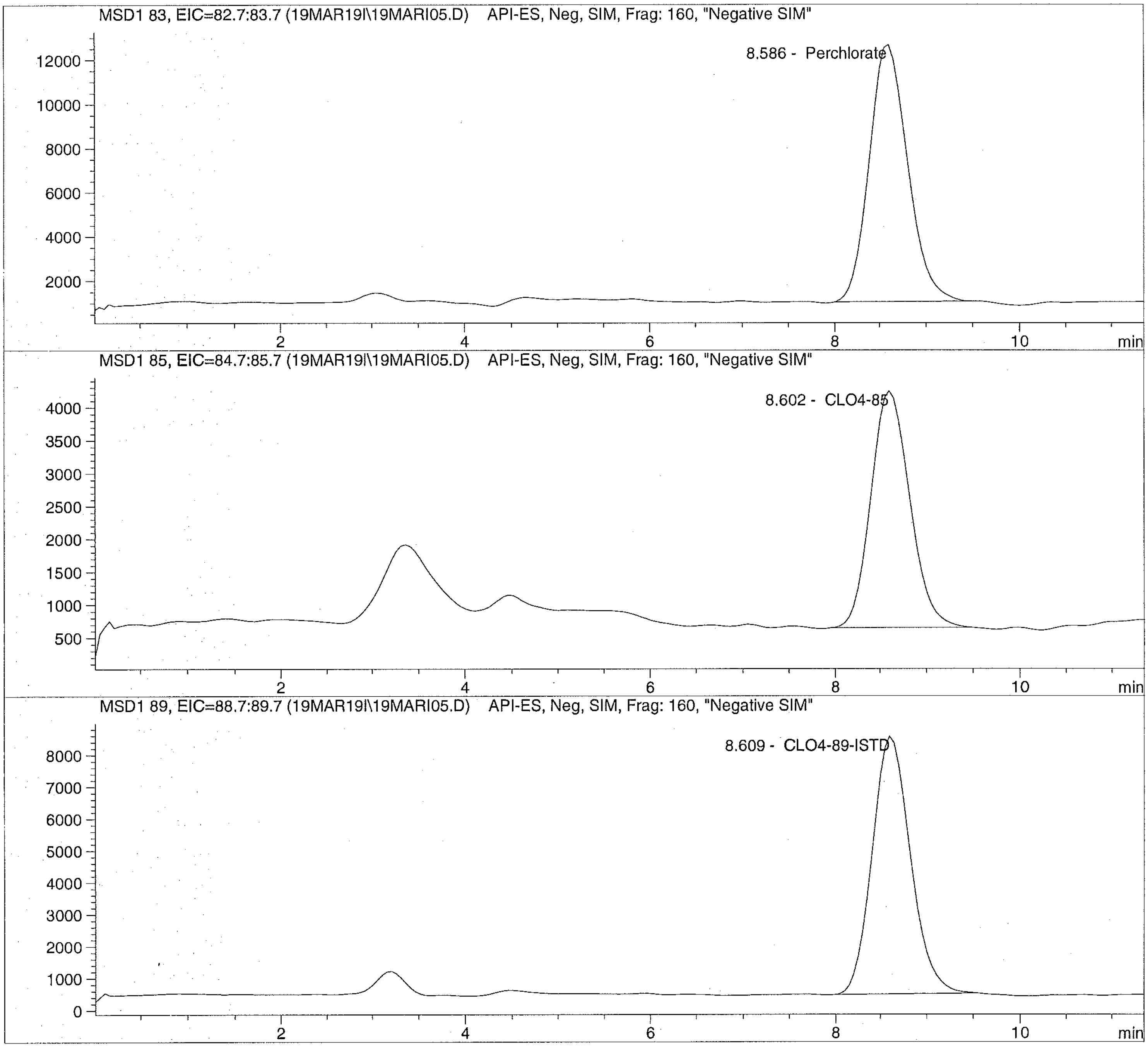
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

*** End of Report ***

```
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
=====================================================================================
```



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

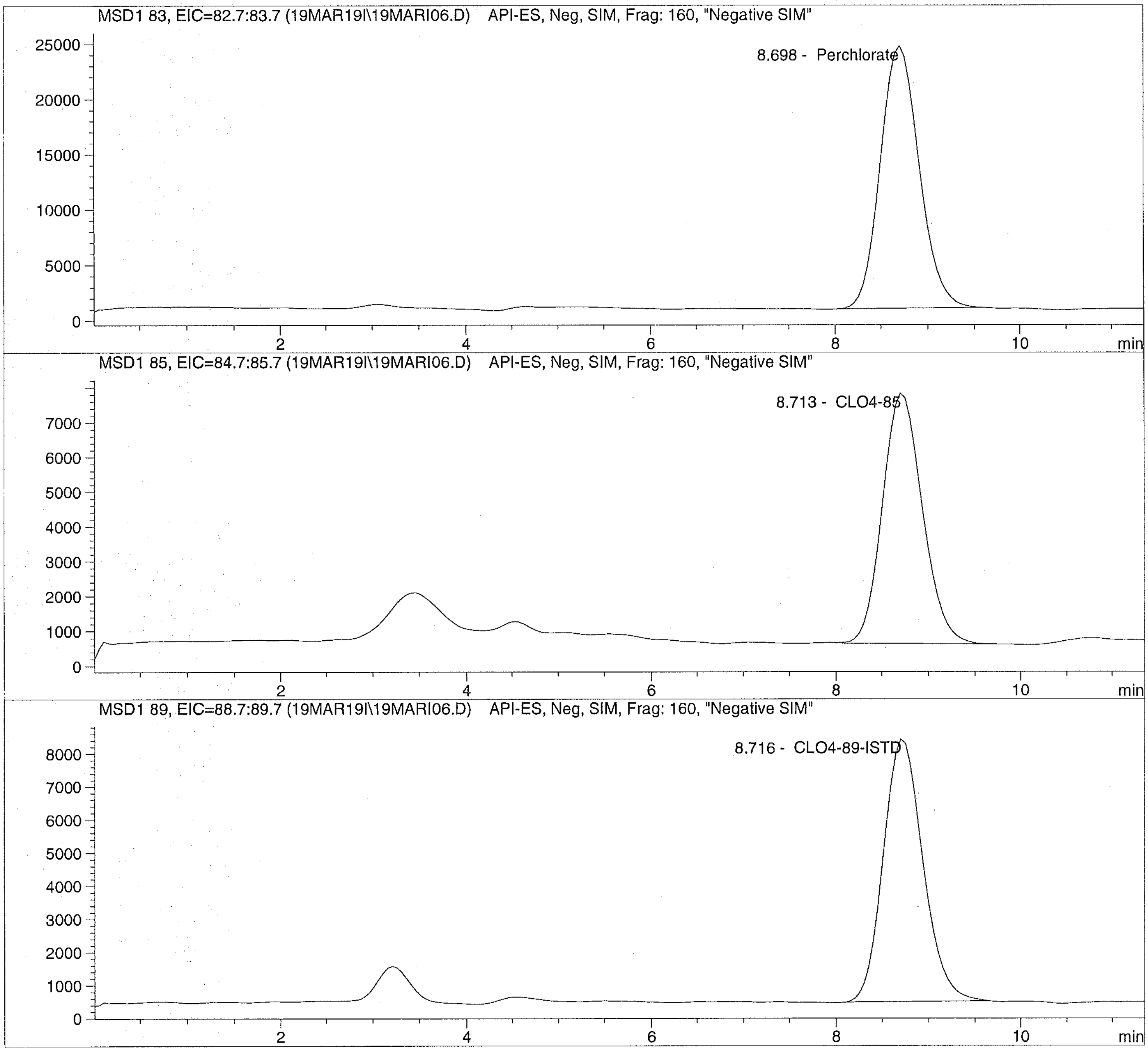
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

*** End of Report ***

```
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
=================================================================================
```



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

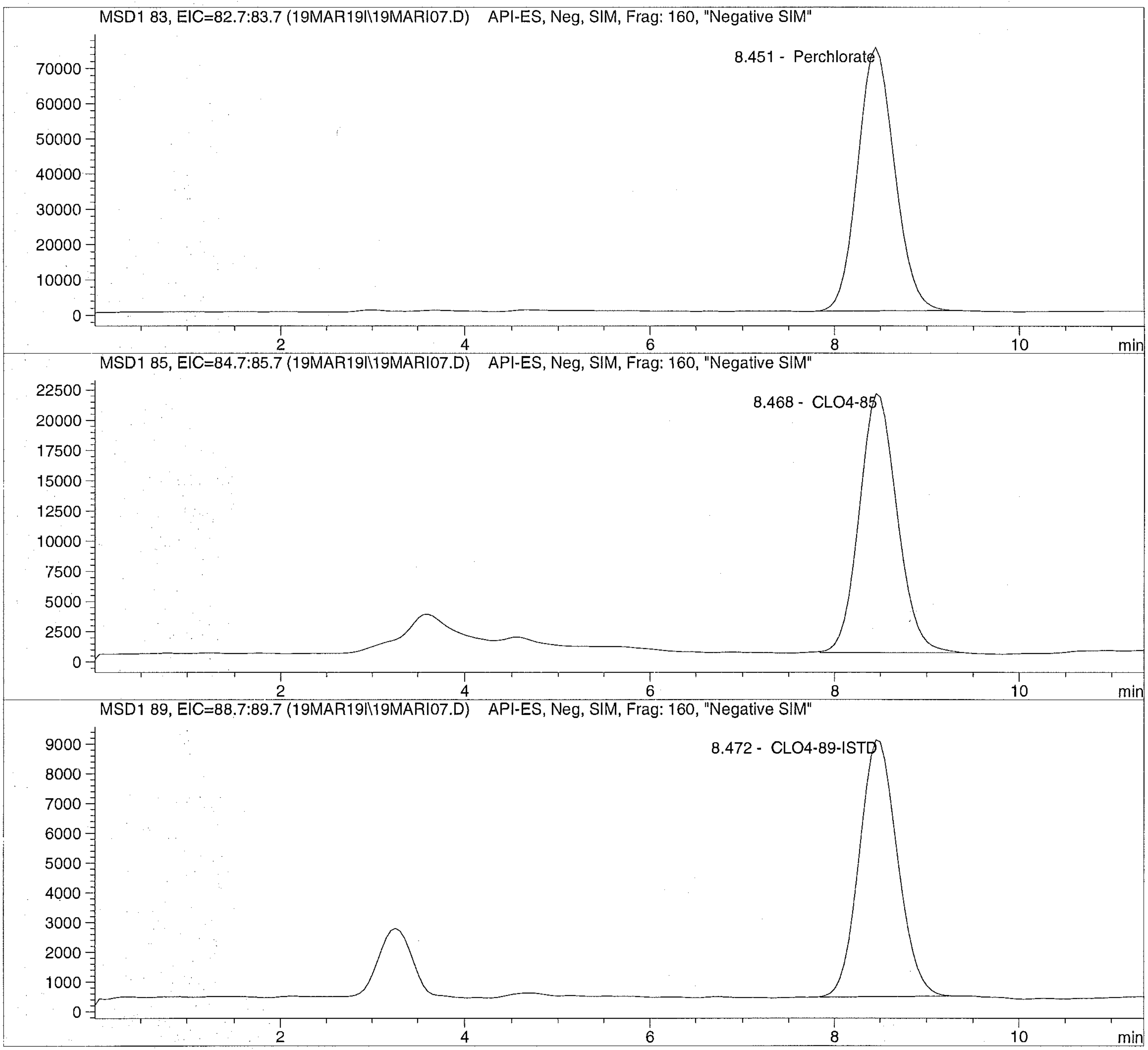
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D       Sample Name: CLO4@ 25.ug/L
=====================================================================================
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
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI07.D Sample Name: CLO4@ 25.ug/L

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

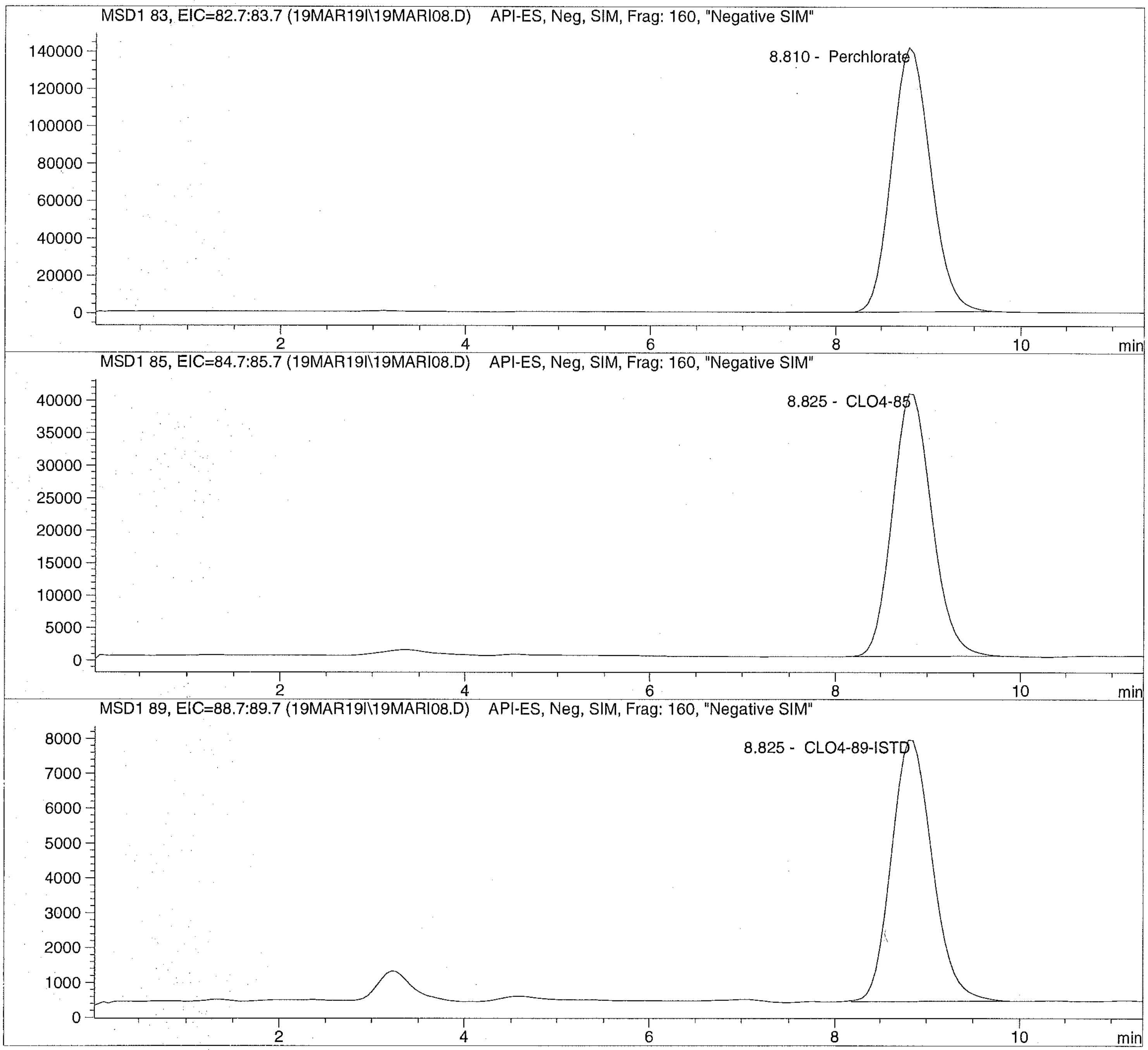
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

*** 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

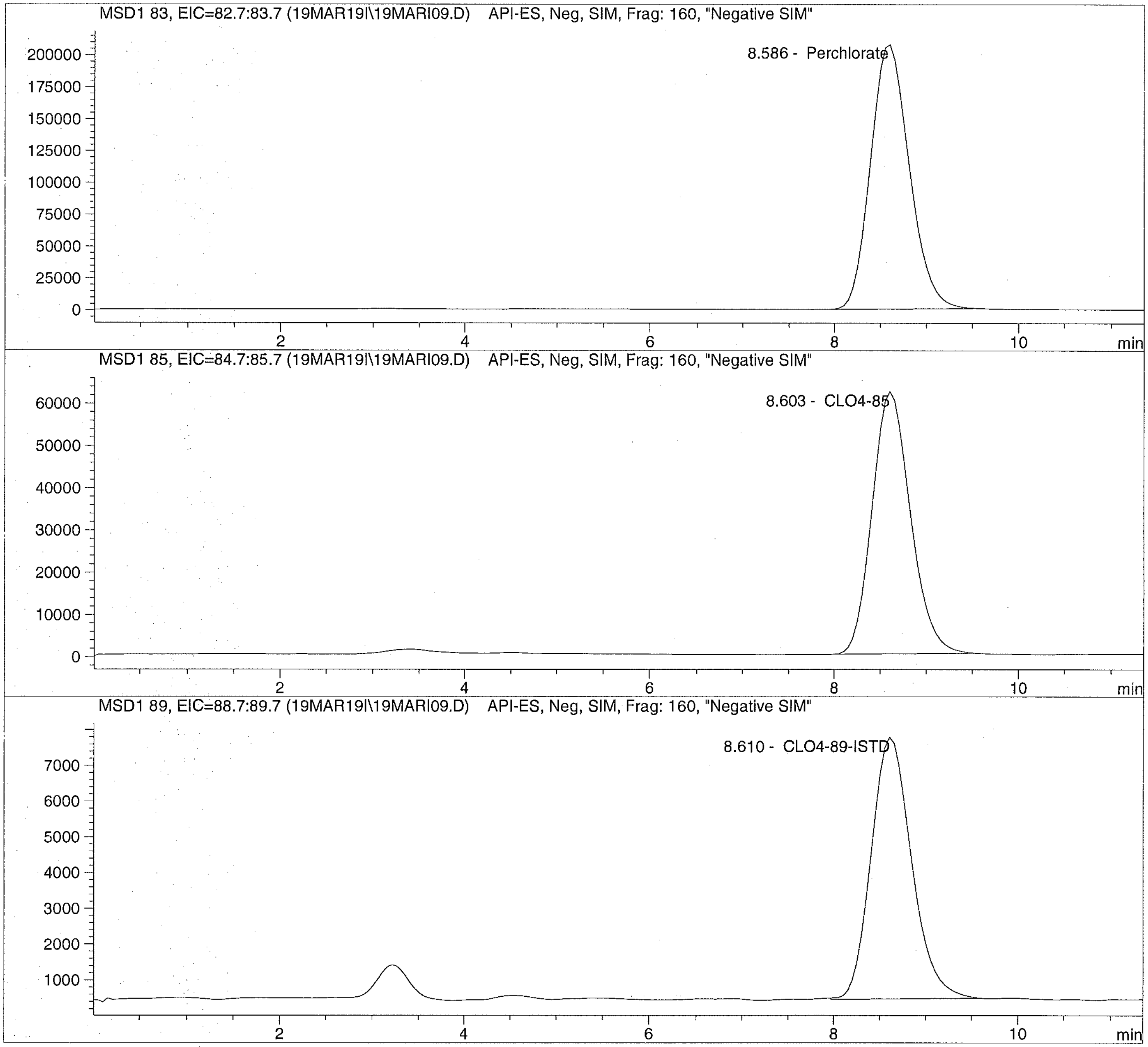
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

*** End of Report ***

```
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
=====================================================================================
```



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 ***

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D   Sample Name: ICAL Verf@10ug/L

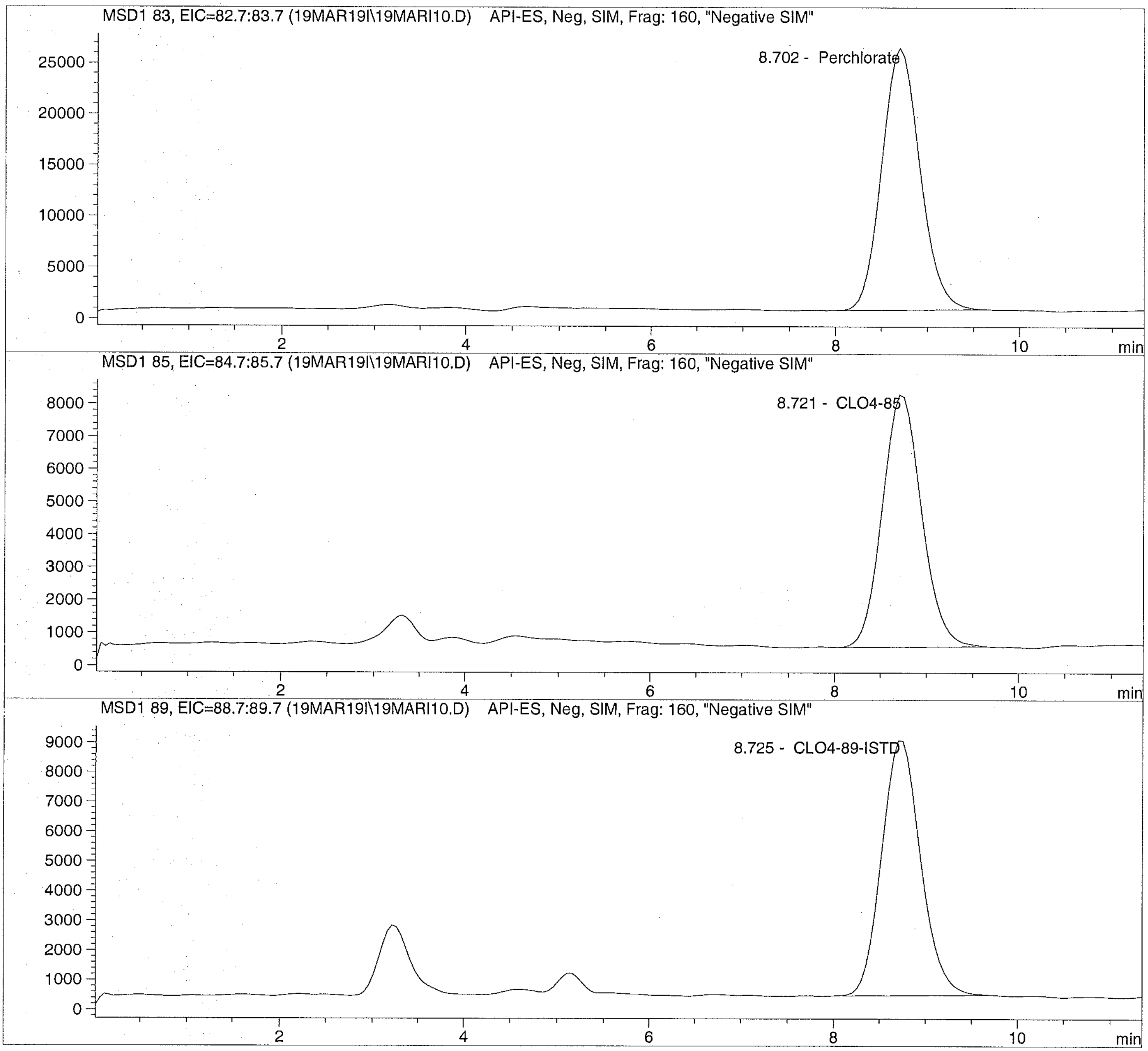
===

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

===



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

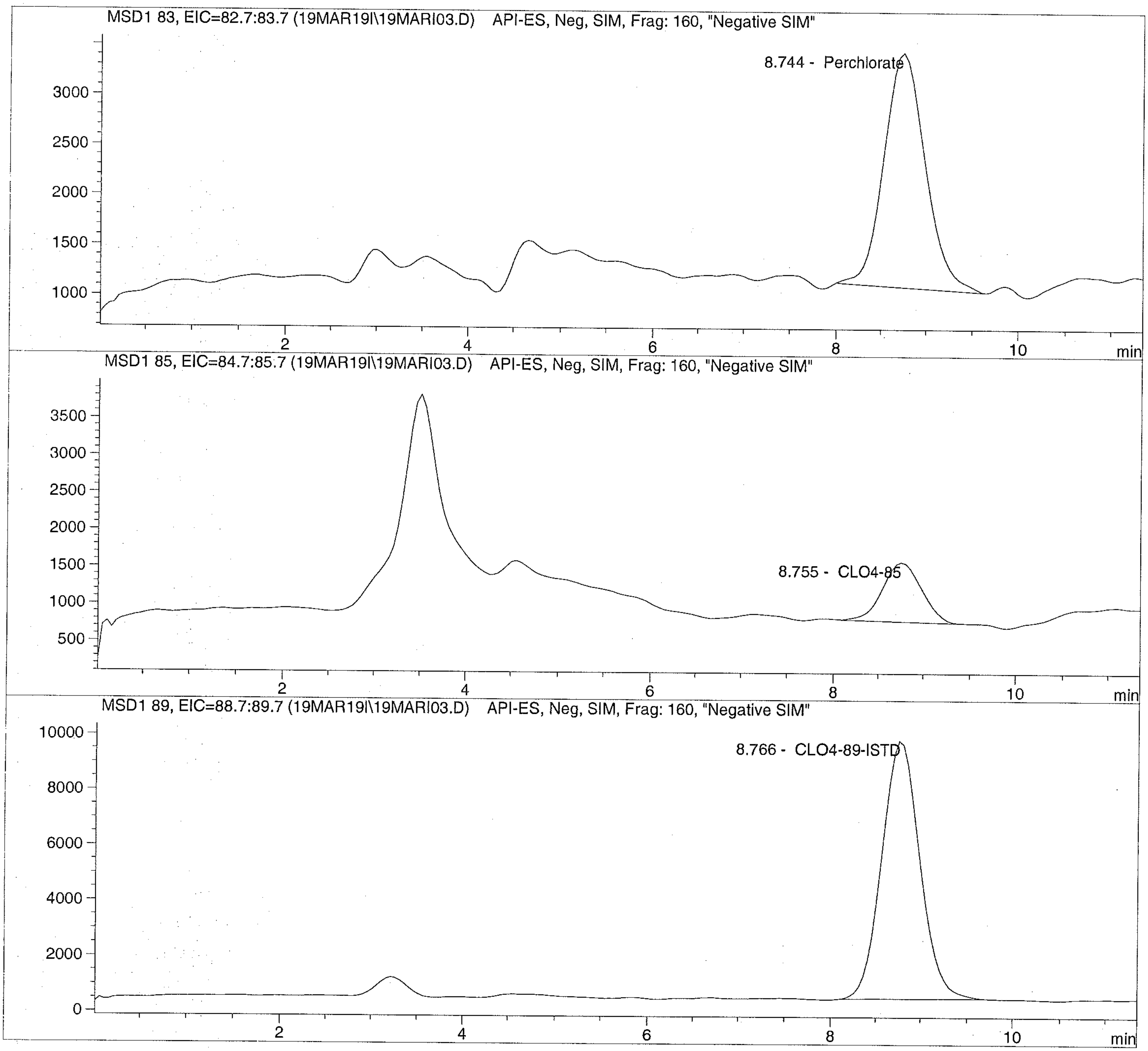
Unmodified

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



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI03.D   Sample Name: CLO4@ 1.0ug/L

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 ***

Appendix D
Laboratory Analytical Results for LHAAP-16 (Provided on CD Only)

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

March 08, 2019

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

Work Order: **HS19021428**

Laboratory Results for: **LHAAP Site 16**

Dear Marcia,

ALS Environmental received 9 sample(s) on Feb 27, 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

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
Work Order: HS19021428

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19021428-01	16EW01_022619	Water		26-Feb-2019 08:30	27-Feb-2019 09:10	☐
HS19021428-02	16EW05_022619	Water		26-Feb-2019 08:50	27-Feb-2019 09:10	☐
HS19021428-03	16EW05_022619_a	Water		26-Feb-2019 08:50	27-Feb-2019 09:10	☐
HS19021428-04	16EW02_022619	Water		26-Feb-2019 09:00	27-Feb-2019 09:10	☐
HS19021428-05	16EW06_022619	Water		26-Feb-2019 09:10	27-Feb-2019 09:10	☐
HS19021428-06	16EW03_022619	Water		26-Feb-2019 09:20	27-Feb-2019 09:10	☐
HS19021428-07	16EW07_022619	Water		26-Feb-2019 09:30	27-Feb-2019 09:10	☐
HS19021428-08	16EW04_022619	Water		26-Feb-2019 09:40	27-Feb-2019 09:10	☐
HS19021428-09	16EW08_022619	Water		26-Feb-2019 09:50	27-Feb-2019 09:10	☐

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
Work Order: HS19021428

CASE NARRATIVE

Work Order Comments

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

GCMS Volatiles by Method SW8260

Batch ID: R334128

Sample ID: 16EW01_022619 (HS19021428-01MS/MSD)

- MS and/or MSD recovered outside control limits for multiple compounds

Batch ID: R334221

Sample ID: 16EW08_022619 (HS19021428-09MSD)

- MSD recovered outside control limits for multiple compounds

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LHAAP Site 16		WorkOrder:HS19021428
Sample ID:	16EW01_022619		Lab ID:HS19021428-01
Collection Date:	26-Feb-2019 08:30		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	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,1,1-Trichloroethane	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,1,2,2-Tetrachloroethane	2.5	U	2.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,1,2-Trichloroethane	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,1-Dichloroethane	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,1-Dichloroethene	**14**		**1.0**	**2.5**	**5.0**	**UG/L**	5	06-Mar-2019 13:27
1,1-Dichloropropene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,2,3-Trichlorobenzene	2.5	U	2.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,2,3-Trichloropropane	2.5	U	2.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,2,4-Trichlorobenzene	2.5	U	2.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,2,4-Trimethylbenzene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,2-Dibromo-3-chloropropane	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,2-Dibromoethane	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,2-Dichlorobenzene	2.5	U	2.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,2-Dichloroethane	**12**		**1.0**	**2.5**	**5.0**	**UG/L**	5	06-Mar-2019 13:27
1,2-Dichloropropane	2.5	U	2.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,3,5-Trimethylbenzene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,3-Dichlorobenzene	2.5	U	2.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,3-Dichloropropane	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
1,4-Dichlorobenzene	2.5	U	2.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
2,2-Dichloropropane	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
2-Butanone	5.0	U	2.5	5.0	10	UG/L	5	06-Mar-2019 13:27
2-Chlorotoluene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
2-Hexanone	5.0	U	5.0	5.0	10	UG/L	5	06-Mar-2019 13:27
4-Chlorotoluene	2.5	U	2.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
4-Isopropyltoluene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
4-Methyl-2-pentanone	5.0	U	3.5	5.0	10	UG/L	5	06-Mar-2019 13:27
Acetone	10	U	2.0	10	10	UG/L	5	06-Mar-2019 13:27
Benzene	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Bromobenzene	2.5	U	2.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Bromochloromethane	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Bromodichloromethane	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Bromoform	2.5	U	2.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Bromomethane	2.5	U	2.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Carbon disulfide	5.0	U	3.0	5.0	10	UG/L	5	06-Mar-2019 13:27
Carbon tetrachloride	2.5	U	2.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Chlorobenzene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Chloroethane	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Chloroform	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27

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

ALS Houston, US

Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.	**ANALYTICAL REPORT**
Project:	LHAAP Site 16	WorkOrder:HS19021428
Sample ID:	16EW01_022619	Lab ID:HS19021428-01
Collection Date:	26-Feb-2019 08:30	Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloromethane	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
cis-1,2-Dichloroethene	**3,700**		**10**	**25**	**50**	**UG/L**	50	06-Mar-2019 13:03
cis-1,3-Dichloropropene	2.5	U	0.50	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Dibromochloromethane	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Dibromomethane	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Dichlorodifluoromethane	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Ethylbenzene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Hexachlorobutadiene	5.0	U	5.0	5.0	5.0	UG/L	5	06-Mar-2019 13:27
Isopropylbenzene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
m,p-Xylene	5.0	U	2.5	5.0	10	UG/L	5	06-Mar-2019 13:27
Methylene chloride	2.5	U	2.0	2.5	10	UG/L	5	06-Mar-2019 13:27
n-Butylbenzene	2.5	U	2.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
n-Propylbenzene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Naphthalene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
o-Xylene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
sec-Butylbenzene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Styrene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
tert-Butylbenzene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Tetrachloroethene	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Toluene	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
trans-1,2-Dichloroethene	**8.7**		**1.0**	**2.5**	**5.0**	**UG/L**	5	06-Mar-2019 13:27
trans-1,3-Dichloropropene	2.5	U	1.0	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Trichloroethene	**3,700**		**10**	**25**	**50**	**UG/L**	50	06-Mar-2019 13:03
Trichlorofluoromethane	2.5	U	1.5	2.5	5.0	UG/L	5	06-Mar-2019 13:27
Vinyl chloride	**45**		**1.0**	**2.5**	**5.0**	**UG/L**	5	06-Mar-2019 13:27
Surr: 1,2-Dichloroethane-d4	*81.5*			**0**	*81-118*	*%REC*	*50*	*06-Mar-2019 13:03*
Surr: 1,2-Dichloroethane-d4	*82.0*			**0**	*81-118*	*%REC*	*5*	*06-Mar-2019 13:27*
Surr: 4-Bromofluorobenzene	*99.9*			**0**	*85-114*	*%REC*	*50*	*06-Mar-2019 13:03*
Surr: 4-Bromofluorobenzene	*102*			**0**	*85-114*	*%REC*	*5*	*06-Mar-2019 13:27*
Surr: Dibromofluoromethane	*85.1*			**0**	*80-119*	*%REC*	*50*	*06-Mar-2019 13:03*
Surr: Dibromofluoromethane	*84.5*			**0**	*80-119*	*%REC*	*5*	*06-Mar-2019 13:27*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*50*	*06-Mar-2019 13:03*
Surr: Toluene-d8	*105*			**0**	*89-112*	*%REC*	*5*	*06-Mar-2019 13:27*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	07-Mar-2019 17:47

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LHAAP Site 16		WorkOrder:HS19021428
Sample ID:	16EW05_022619		Lab ID:HS19021428-02
Collection Date:	26-Feb-2019 08:50		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	06-Mar-2019 15:52
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,1-Dichloroethane	**1.4**		**0.20**	**0.50**	**1.0**	**UG/L**	1	06-Mar-2019 15:52
1,1-Dichloroethene	**6.0**		**0.20**	**0.50**	**1.0**	**UG/L**	1	06-Mar-2019 15:52
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,2-Dichloroethane	**6.0**		**0.20**	**0.50**	**1.0**	**UG/L**	1	06-Mar-2019 15:52
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 15:52
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 15:52
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	06-Mar-2019 15:52
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	06-Mar-2019 15:52
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 15:52
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	06-Mar-2019 15:52
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	06-Mar-2019 15:52
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	06-Mar-2019 15:52
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 15:52

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

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
Sample ID: 16EW05_022619
Collection Date: 26-Feb-2019 08:50

ANALYTICAL REPORT
WorkOrder:HS19021428
Lab ID:HS19021428-02
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	06-Mar-2019 15:52
cis-1,2-Dichloroethene	**1,000**		**5.0**	**12**	**25**	**UG/L**	25	06-Mar-2019 16:43
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	06-Mar-2019 15:52
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	06-Mar-2019 15:52
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	06-Mar-2019 15:52
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 15:52
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 15:52
trans-1,2-Dichloroethene	**3.7**		**0.20**	**0.50**	**1.0**	**UG/L**	1	06-Mar-2019 15:52
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Trichloroethene	**1,700**		**5.0**	**12**	**25**	**UG/L**	25	06-Mar-2019 16:43
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 15:52
Vinyl chloride	**260**		**5.0**	**12**	**25**	**UG/L**	25	06-Mar-2019 16:43
Surr: 1,2-Dichloroethane-d4	*101*			**0**	*81-118*	*%REC*	*25*	*06-Mar-2019 16:43*
Surr: 1,2-Dichloroethane-d4	*81.6*			**0**	*81-118*	*%REC*	*1*	*06-Mar-2019 15:52*
Surr: 4-Bromofluorobenzene	*99.0*			**0**	*85-114*	*%REC*	*1*	*06-Mar-2019 15:52*
Surr: 4-Bromofluorobenzene	*104*			**0**	*85-114*	*%REC*	*25*	*06-Mar-2019 16:43*
Surr: Dibromofluoromethane	*85.8*			**0**	*80-119*	*%REC*	*1*	*06-Mar-2019 15:52*
Surr: Dibromofluoromethane	*102*			**0**	*80-119*	*%REC*	*25*	*06-Mar-2019 16:43*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*1*	*06-Mar-2019 15:52*
Surr: Toluene-d8	*95.6*			**0**	*89-112*	*%REC*	*25*	*06-Mar-2019 16:43*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	07-Mar-2019 17:47

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LHAAP Site 16		WorkOrder:HS19021428
Sample ID:	16EW05_022619_a		Lab ID:HS19021428-03
Collection Date:	26-Feb-2019 08:50		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	06-Mar-2019 17:31
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,1-Dichloroethane	**1.4**		**0.20**	**0.50**	**1.0**	**UG/L**	1	06-Mar-2019 17:31
1,1-Dichloroethene	**6.5**		**0.20**	**0.50**	**1.0**	**UG/L**	1	06-Mar-2019 17:31
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,2-Dichloroethane	**6.4**		**0.20**	**0.50**	**1.0**	**UG/L**	1	06-Mar-2019 17:31
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 17:31
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 17:31
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	06-Mar-2019 17:31
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	06-Mar-2019 17:31
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 17:31
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	06-Mar-2019 17:31
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	06-Mar-2019 17:31
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	06-Mar-2019 17:31
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 17:31

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LHAAP Site 16		WorkOrder:HS19021428
Sample ID:	16EW05_022619_a		Lab ID:HS19021428-03
Collection Date:	26-Feb-2019 08:50		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	06-Mar-2019 17:31
cis-1,2-Dichloroethene	**1,200**		**5.0**	**12**	**25**	**UG/L**	25	06-Mar-2019 18:21
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	06-Mar-2019 17:31
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	06-Mar-2019 17:31
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	06-Mar-2019 17:31
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 17:31
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 17:31
trans-1,2-Dichloroethene	**3.9**		**0.20**	**0.50**	**1.0**	**UG/L**	1	06-Mar-2019 17:31
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Trichloroethene	**1,900**		**5.0**	**12**	**25**	**UG/L**	25	06-Mar-2019 18:21
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 17:31
Vinyl chloride	**420**		**5.0**	**12**	**25**	**UG/L**	25	06-Mar-2019 18:21
Surr: 1,2-Dichloroethane-d4	*86.2*			**0**	*81-118*	*%REC*	*1*	*06-Mar-2019 17:31*
Surr: 1,2-Dichloroethane-d4	*112*			**0**	*81-118*	*%REC*	*25*	*06-Mar-2019 18:21*
Surr: 4-Bromofluorobenzene	*98.8*			**0**	*85-114*	*%REC*	*1*	*06-Mar-2019 17:31*
Surr: 4-Bromofluorobenzene	*103*			**0**	*85-114*	*%REC*	*25*	*06-Mar-2019 18:21*
Surr: Dibromofluoromethane	*84.9*			**0**	*80-119*	*%REC*	*1*	*06-Mar-2019 17:31*
Surr: Dibromofluoromethane	*111*			**0**	*80-119*	*%REC*	*25*	*06-Mar-2019 18:21*
Surr: Toluene-d8	*95.8*			**0**	*89-112*	*%REC*	*25*	*06-Mar-2019 18:21*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*1*	*06-Mar-2019 17:31*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	07-Mar-2019 17:47

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

ALS Houston, US

Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.	**ANALYTICAL REPORT**	
Project:	LHAAP Site 16	WorkOrder:	HS19021428
Sample ID:	16EW02_022619	Lab ID:	HS19021428-04
Collection Date:	26-Feb-2019 09:00	Matrix:	Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
1,1,1,2-Tetrachloroethane	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
1,1,1-Trichloroethane	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56
1,1,2,2-Tetrachloroethane	25	U	25	25	50	UG/L	50	07-Mar-2019 15:56
1,1,2-Trichloroethane	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
1,1-Dichloroethane	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56
1,1-Dichloroethene	**86**		**10**	**25**	**50**	**UG/L**	50	07-Mar-2019 15:56
1,1-Dichloropropene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
1,2,3-Trichlorobenzene	25	U	20	25	50	UG/L	50	07-Mar-2019 15:56
1,2,3-Trichloropropane	25	U	25	25	50	UG/L	50	07-Mar-2019 15:56
1,2,4-Trichlorobenzene	25	U	25	25	50	UG/L	50	07-Mar-2019 15:56
1,2,4-Trimethylbenzene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
1,2-Dibromo-3-chloropropane	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56
1,2-Dibromoethane	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56
1,2-Dichlorobenzene	25	U	25	25	50	UG/L	50	07-Mar-2019 15:56
1,2-Dichloroethane	**34**	J	**10**	**25**	**50**	**UG/L**	50	07-Mar-2019 15:56
1,2-Dichloropropane	25	U	25	25	50	UG/L	50	07-Mar-2019 15:56
1,3,5-Trimethylbenzene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
1,3-Dichlorobenzene	25	U	20	25	50	UG/L	50	07-Mar-2019 15:56
1,3-Dichloropropane	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
1,4-Dichlorobenzene	25	U	20	25	50	UG/L	50	07-Mar-2019 15:56
2,2-Dichloropropane	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56
2-Butanone	50	U	25	50	100	UG/L	50	07-Mar-2019 15:56
2-Chlorotoluene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
2-Hexanone	50	U	50	50	100	UG/L	50	07-Mar-2019 15:56
4-Chlorotoluene	25	U	20	25	50	UG/L	50	07-Mar-2019 15:56
4-Isopropyltoluene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
4-Methyl-2-pentanone	50	U	35	50	100	UG/L	50	07-Mar-2019 15:56
Acetone	100	U	20	100	100	UG/L	50	07-Mar-2019 15:56
Benzene	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56
Bromobenzene	25	U	20	25	50	UG/L	50	07-Mar-2019 15:56
Bromochloromethane	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56
Bromodichloromethane	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56
Bromoform	25	U	20	25	50	UG/L	50	07-Mar-2019 15:56
Bromomethane	25	U	20	25	50	UG/L	50	07-Mar-2019 15:56
Carbon disulfide	50	U	30	50	100	UG/L	50	07-Mar-2019 15:56
Carbon tetrachloride	25	U	25	25	50	UG/L	50	07-Mar-2019 15:56
Chlorobenzene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
Chloroethane	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
Chloroform	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LHAAP Site 16		WorkOrder:HS19021428
Sample ID:	16EW02_022619		Lab ID:HS19021428-04
Collection Date:	26-Feb-2019 09:00		Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloromethane	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56
cis-1,2-Dichloroethene	**17,000**		**50**	**120**	**250**	**UG/L**	250	07-Mar-2019 19:57
cis-1,3-Dichloropropene	25	U	5.0	25	50	UG/L	50	07-Mar-2019 15:56
Dibromochloromethane	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
Dibromomethane	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56
Dichlorodifluoromethane	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
Ethylbenzene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
Hexachlorobutadiene	50	U	50	50	50	UG/L	50	07-Mar-2019 15:56
Isopropylbenzene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
m,p-Xylene	50	U	25	50	100	UG/L	50	07-Mar-2019 15:56
Methylene chloride	25	U	20	25	100	UG/L	50	07-Mar-2019 15:56
n-Butylbenzene	25	U	20	25	50	UG/L	50	07-Mar-2019 15:56
n-Propylbenzene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
Naphthalene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
o-Xylene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
sec-Butylbenzene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
Styrene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
tert-Butylbenzene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
Tetrachloroethene	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
Toluene	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56
trans-1,2-Dichloroethene	**24**	J	**10**	**25**	**50**	**UG/L**	50	07-Mar-2019 15:56
trans-1,3-Dichloropropene	25	U	10	25	50	UG/L	50	07-Mar-2019 15:56
Trichloroethene	**34,000**		**50**	**120**	**250**	**UG/L**	250	07-Mar-2019 19:57
Trichlorofluoromethane	25	U	15	25	50	UG/L	50	07-Mar-2019 15:56
Vinyl chloride	**51**		**10**	**25**	**50**	**UG/L**	50	07-Mar-2019 15:56
Surr: 1,2-Dichloroethane-d4	*84.7*			**0**	*81-118*	*%REC*	*50*	*07-Mar-2019 15:56*
Surr: 1,2-Dichloroethane-d4	*82.7*			**0**	*81-118*	*%REC*	*250*	*07-Mar-2019 19:57*
Surr: 4-Bromofluorobenzene	*99.7*			**0**	*85-114*	*%REC*	*50*	*07-Mar-2019 15:56*
Surr: 4-Bromofluorobenzene	*96.8*			**0**	*85-114*	*%REC*	*250*	*07-Mar-2019 19:57*
Surr: Dibromofluoromethane	*82.6*			**0**	*80-119*	*%REC*	*50*	*07-Mar-2019 15:56*
Surr: Dibromofluoromethane	*83.0*			**0**	*80-119*	*%REC*	*250*	*07-Mar-2019 19:57*
Surr: Toluene-d8	*107*			**0**	*89-112*	*%REC*	*50*	*07-Mar-2019 15:56*
Surr: Toluene-d8	*107*			**0**	*89-112*	*%REC*	*250*	*07-Mar-2019 19:57*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	07-Mar-2019 17:47

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LHAAP Site 16		WorkOrder:HS19021428
Sample ID:	16EW06_022619		Lab ID:HS19021428-05
Collection Date:	26-Feb-2019 09:10		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	06-Mar-2019 20:45
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,1-Dichloroethene	**0.95**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	06-Mar-2019 20:45
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,2-Dichloroethane	**0.56**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	06-Mar-2019 20:45
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 20:45
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	06-Mar-2019 20:45
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	06-Mar-2019 20:45
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 20:45
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	06-Mar-2019 20:45
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	06-Mar-2019 20:45
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	06-Mar-2019 20:45
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LHAAP Site 16		WorkOrder:HS19021428
Sample ID:	16EW06_022619		Lab ID:HS19021428-05
Collection Date:	26-Feb-2019 09:10		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	06-Mar-2019 20:45
cis-1,2-Dichloroethene	**180**		**0.20**	**0.50**	**1.0**	**UG/L**	1	06-Mar-2019 20:45
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	06-Mar-2019 20:45
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	06-Mar-2019 20:45
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	06-Mar-2019 20:45
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	06-Mar-2019 20:45
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Trichloroethene	**250**		**1.0**	**2.5**	**5.0**	**UG/L**	5	07-Mar-2019 17:57
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	06-Mar-2019 20:45
Surr: 1,2-Dichloroethane-d4	*82.9*			**0**	*81-118*	*%REC*	*1*	*06-Mar-2019 20:45*
Surr: 1,2-Dichloroethane-d4	*82.1*			**0**	*81-118*	*%REC*	*5*	*07-Mar-2019 17:57*
Surr: 4-Bromofluorobenzene	*99.0*			**0**	*85-114*	*%REC*	*1*	*06-Mar-2019 20:45*
Surr: 4-Bromofluorobenzene	*100.0*			**0**	*85-114*	*%REC*	*5*	*07-Mar-2019 17:57*
Surr: Dibromofluoromethane	*84.6*			**0**	*80-119*	*%REC*	*1*	*06-Mar-2019 20:45*
Surr: Dibromofluoromethane	*82.9*			**0**	*80-119*	*%REC*	*5*	*07-Mar-2019 17:57*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*1*	*06-Mar-2019 20:45*
Surr: Toluene-d8	*107*			**0**	*89-112*	*%REC*	*5*	*07-Mar-2019 17:57*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	07-Mar-2019 17:47

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LHAAP Site 16		WorkOrder:HS19021428
Sample ID:	16EW03_022619		Lab ID:HS19021428-06
Collection Date:	26-Feb-2019 09:20		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	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,1,1-Trichloroethane	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,1,2,2-Tetrachloroethane	5.0	U	5.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,1,2-Trichloroethane	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,1-Dichloroethane	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,1-Dichloroethene	**12**		**2.0**	**5.0**	**10**	**UG/L**	10	07-Mar-2019 15:08
1,1-Dichloropropene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,2,3-Trichlorobenzene	5.0	U	4.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,2,3-Trichloropropane	5.0	U	5.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,2,4-Trichlorobenzene	5.0	U	5.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,2,4-Trimethylbenzene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,2-Dibromo-3-chloropropane	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,2-Dibromoethane	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,2-Dichlorobenzene	5.0	U	5.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,2-Dichloroethane	**6.2**	J	**2.0**	**5.0**	**10**	**UG/L**	10	07-Mar-2019 15:08
1,2-Dichloropropane	5.0	U	5.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,3,5-Trimethylbenzene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,3-Dichlorobenzene	5.0	U	4.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,3-Dichloropropane	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
1,4-Dichlorobenzene	5.0	U	4.0	5.0	10	UG/L	10	07-Mar-2019 15:08
2,2-Dichloropropane	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
2-Butanone	10	U	5.0	10	20	UG/L	10	07-Mar-2019 15:08
2-Chlorotoluene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
2-Hexanone	10	U	10	10	20	UG/L	10	07-Mar-2019 15:08
4-Chlorotoluene	5.0	U	4.0	5.0	10	UG/L	10	07-Mar-2019 15:08
4-Isopropyltoluene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
4-Methyl-2-pentanone	10	U	7.0	10	20	UG/L	10	07-Mar-2019 15:08
Acetone	20	U	4.0	20	20	UG/L	10	07-Mar-2019 15:08
Benzene	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Bromobenzene	5.0	U	4.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Bromochloromethane	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Bromodichloromethane	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Bromoform	5.0	U	4.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Bromomethane	5.0	U	4.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Carbon disulfide	10	U	6.0	10	20	UG/L	10	07-Mar-2019 15:08
Carbon tetrachloride	5.0	U	5.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Chlorobenzene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Chloroethane	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Chloroform	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LHAAP Site 16		WorkOrder:HS19021428
Sample ID:	16EW03_022619		Lab ID:HS19021428-06
Collection Date:	26-Feb-2019 09:20		Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILES ORGANICS BY METHOD 8260C		**Method:SW8260**						Analyst: PC
Chloromethane	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
cis-1,2-Dichloroethene	**2,000**		**20**	**50**	**100**	**UG/L**	100	07-Mar-2019 19:09
cis-1,3-Dichloropropene	5.0	U	1.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Dibromochloromethane	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Dibromomethane	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Dichlorodifluoromethane	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Ethylbenzene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Hexachlorobutadiene	10	U	10	10	10	UG/L	10	07-Mar-2019 15:08
Isopropylbenzene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
m,p-Xylene	10	U	5.0	10	20	UG/L	10	07-Mar-2019 15:08
Methylene chloride	5.0	U	4.0	5.0	20	UG/L	10	07-Mar-2019 15:08
n-Butylbenzene	5.0	U	4.0	5.0	10	UG/L	10	07-Mar-2019 15:08
n-Propylbenzene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Naphthalene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
o-Xylene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
sec-Butylbenzene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Styrene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
tert-Butylbenzene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Tetrachloroethene	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Toluene	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
trans-1,2-Dichloroethene	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
trans-1,3-Dichloropropene	5.0	U	2.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Trichloroethene	**7,400**		**20**	**50**	**100**	**UG/L**	100	07-Mar-2019 19:09
Trichlorofluoromethane	5.0	U	3.0	5.0	10	UG/L	10	07-Mar-2019 15:08
Vinyl chloride	**7.5**	J	**2.0**	**5.0**	**10**	**UG/L**	10	07-Mar-2019 15:08
Surr: 1,2-Dichloroethane-d4	*85.6*			**0**	*81-118*	*%REC*	*10*	*07-Mar-2019 15:08*
Surr: 1,2-Dichloroethane-d4	*82.1*			**0**	*81-118*	*%REC*	*100*	*07-Mar-2019 19:09*
Surr: 4-Bromofluorobenzene	*100*			**0**	*85-114*	*%REC*	*100*	*07-Mar-2019 19:09*
Surr: 4-Bromofluorobenzene	*101*			**0**	*85-114*	*%REC*	*10*	*07-Mar-2019 15:08*
Surr: Dibromofluoromethane	*84.3*			**0**	*80-119*	*%REC*	*10*	*07-Mar-2019 15:08*
Surr: Dibromofluoromethane	*84.1*			**0**	*80-119*	*%REC*	*100*	*07-Mar-2019 19:09*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*10*	*07-Mar-2019 15:08*
Surr: Toluene-d8	*108*			**0**	*89-112*	*%REC*	*100*	*07-Mar-2019 19:09*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	07-Mar-2019 17:47

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LHAAP Site 16		WorkOrder:HS19021428
Sample ID:	16EW07_022619		Lab ID:HS19021428-07
Collection Date:	26-Feb-2019 09:30		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	07-Mar-2019 13:32
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,1-Dichloroethene	**1.7**		**0.20**	**0.50**	**1.0**	**UG/L**	1	07-Mar-2019 13:32
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 13:32
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	07-Mar-2019 13:32
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	07-Mar-2019 13:32
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 13:32
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	07-Mar-2019 13:32
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	07-Mar-2019 13:32
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	07-Mar-2019 13:32
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32

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

ALS Houston, US

Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LHAAP Site 16		WorkOrder:HS19021428
Sample ID:	16EW07_022619		Lab ID:HS19021428-07
Collection Date:	26-Feb-2019 09:30		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	07-Mar-2019 13:32
cis-1,2-Dichloroethene	**340**		**1.0**	**2.5**	**5.0**	**UG/L**	5	07-Mar-2019 18:21
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	07-Mar-2019 13:32
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	07-Mar-2019 13:32
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	07-Mar-2019 13:32
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 13:32
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32
trans-1,2-Dichloroethene	**0.84**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	07-Mar-2019 13:32
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Trichloroethene	**81**		**0.20**	**0.50**	**1.0**	**UG/L**	1	07-Mar-2019 13:32
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 13:32
Vinyl chloride	**25**		**0.20**	**0.50**	**1.0**	**UG/L**	1	07-Mar-2019 13:32
Surr: 1,2-Dichloroethane-d4	*82.3*			**0**	*81-118*	*%REC*	*1*	*07-Mar-2019 13:32*
Surr: 1,2-Dichloroethane-d4	*82.7*			**0**	*81-118*	*%REC*	*5*	*07-Mar-2019 18:21*
Surr: 4-Bromofluorobenzene	*99.3*			**0**	*85-114*	*%REC*	*1*	*07-Mar-2019 13:32*
Surr: 4-Bromofluorobenzene	*101*			**0**	*85-114*	*%REC*	*5*	*07-Mar-2019 18:21*
Surr: Dibromofluoromethane	*82.6*			**0**	*80-119*	*%REC*	*5*	*07-Mar-2019 18:21*
Surr: Dibromofluoromethane	*84.3*			**0**	*80-119*	*%REC*	*1*	*07-Mar-2019 13:32*
Surr: Toluene-d8	*107*			**0**	*89-112*	*%REC*	*1*	*07-Mar-2019 13:32*
Surr: Toluene-d8	*107*			**0**	*89-112*	*%REC*	*5*	*07-Mar-2019 18:21*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	07-Mar-2019 17:47

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.		**ANALYTICAL REPORT**
Project:	LHAAP Site 16		WorkOrder:HS19021428
Sample ID:	16EW04_022619		Lab ID:HS19021428-08
Collection Date:	26-Feb-2019 09:40		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	07-Mar-2019 14:20
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,1-Dichloroethene	**0.88**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	07-Mar-2019 14:20
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,2-Dichloroethane	**0.55**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	07-Mar-2019 14:20
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 14:20
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 14:20
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	07-Mar-2019 14:20
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	07-Mar-2019 14:20
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 14:20
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	07-Mar-2019 14:20
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	07-Mar-2019 14:20
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	07-Mar-2019 14:20
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 14:20

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.	**ANALYTICAL REPORT**
Project:	LHAAP Site 16	WorkOrder:HS19021428
Sample ID:	16EW04_022619	Lab ID:HS19021428-08
Collection Date:	26-Feb-2019 09:40	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	07-Mar-2019 14:20
cis-1,2-Dichloroethene	**260**		**5.0**	**12**	**25**	**UG/L**	25	07-Mar-2019 18:45
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	07-Mar-2019 14:20
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	07-Mar-2019 14:20
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	07-Mar-2019 14:20
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 14:20
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 14:20
trans-1,2-Dichloroethene	**0.72**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	07-Mar-2019 14:20
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Trichloroethene	**900**		**5.0**	**12**	**25**	**UG/L**	25	07-Mar-2019 18:45
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 14:20
Vinyl chloride	**0.47**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	07-Mar-2019 14:20
Surr: 1,2-Dichloroethane-d4	*81.3*			**0**	*81-118*	*%REC*	*1*	*07-Mar-2019 14:20*
Surr: 1,2-Dichloroethane-d4	*81.9*			**0**	*81-118*	*%REC*	*25*	*07-Mar-2019 18:45*
Surr: 4-Bromofluorobenzene	*99.5*			**0**	*85-114*	*%REC*	*25*	*07-Mar-2019 18:45*
Surr: 4-Bromofluorobenzene	*100*			**0**	*85-114*	*%REC*	*1*	*07-Mar-2019 14:20*
Surr: Dibromofluoromethane	*82.6*			**0**	*80-119*	*%REC*	*1*	*07-Mar-2019 14:20*
Surr: Dibromofluoromethane	*82.9*			**0**	*80-119*	*%REC*	*25*	*07-Mar-2019 18:45*
Surr: Toluene-d8	*108*			**0**	*89-112*	*%REC*	*25*	*07-Mar-2019 18:45*
Surr: Toluene-d8	*106*			**0**	*89-112*	*%REC*	*1*	*07-Mar-2019 14:20*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	07-Mar-2019 17:47

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.	**ANALYTICAL REPORT**
Project:	LHAAP Site 16	WorkOrder:HS19021428
Sample ID:	16EW08_022619	Lab ID:HS19021428-09
Collection Date:	26-Feb-2019 09:50	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	07-Mar-2019 12:44
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,1-Dichloroethene	**0.76**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	07-Mar-2019 12:44
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 12:44
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	07-Mar-2019 12:44
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	07-Mar-2019 12:44
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 12:44
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	07-Mar-2019 12:44
Acetone	2.0	U	0.40	2.0	2.0	UG/L	1	07-Mar-2019 12:44
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	07-Mar-2019 12:44
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44

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

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.	ANALYTICAL REPORT
Project:	LHAAP Site 16	WorkOrder:HS19021428
Sample ID:	16EW08_022619	Lab ID:HS19021428-09
Collection Date:	26-Feb-2019 09:50	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	07-Mar-2019 12:44
cis-1,2-Dichloroethene	**170**		**1.0**	**2.5**	**5.0**	**UG/L**	5	07-Mar-2019 16:44
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	07-Mar-2019 12:44
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	07-Mar-2019 12:44
Methylene chloride	0.50	U	0.40	0.50	2.0	UG/L	1	07-Mar-2019 12:44
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	07-Mar-2019 12:44
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44
trans-1,2-Dichloroethene	**0.64**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	07-Mar-2019 12:44
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Trichloroethene	**170**		**1.0**	**2.5**	**5.0**	**UG/L**	5	07-Mar-2019 16:44
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	07-Mar-2019 12:44
Vinyl chloride	**0.86**	J	**0.20**	**0.50**	**1.0**	**UG/L**	1	07-Mar-2019 12:44
Surr: 1,2-Dichloroethane-d4	*82.8*			**0**	*81-118*	*%REC*	*1*	*07-Mar-2019 12:44*
Surr: 1,2-Dichloroethane-d4	*81.7*			**0**	*81-118*	*%REC*	*5*	*07-Mar-2019 16:44*
Surr: 4-Bromofluorobenzene	*100*			**0**	*85-114*	*%REC*	*1*	*07-Mar-2019 12:44*
Surr: 4-Bromofluorobenzene	*97.1*			**0**	*85-114*	*%REC*	*5*	*07-Mar-2019 16:44*
Surr: Dibromofluoromethane	*83.3*			**0**	*80-119*	*%REC*	*5*	*07-Mar-2019 16:44*
Surr: Dibromofluoromethane	*84.2*			**0**	*80-119*	*%REC*	*1*	*07-Mar-2019 12:44*
Surr: Toluene-d8	*109*			**0**	*89-112*	*%REC*	*5*	*07-Mar-2019 16:44*
Surr: Toluene-d8	*108*			**0**	*89-112*	*%REC*	*1*	*07-Mar-2019 12:44*
SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)		**Method:NA**						Analyst: SUB
Subcontract Analysis	See Attached		0	0		NA	1	07-Mar-2019 17:47

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

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

DATES REPORT

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
Batch ID R334128	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C			**Matrix:** Water		
HS19021428-01	16EW01_022619	26 Feb 2019 08:30			06 Mar 2019 13:27	5
HS19021428-01	16EW01_022619	26 Feb 2019 08:30			06 Mar 2019 13:03	50
HS19021428-02	16EW05_022619	26 Feb 2019 08:50			06 Mar 2019 16:43	25
HS19021428-02	16EW05_022619	26 Feb 2019 08:50			06 Mar 2019 15:52	1
HS19021428-03	16EW05_022619_a	26 Feb 2019 08:50			06 Mar 2019 18:21	25
HS19021428-03	16EW05_022619_a	26 Feb 2019 08:50			06 Mar 2019 17:31	1
HS19021428-05	16EW06_022619	26 Feb 2019 09:10			06 Mar 2019 20:45	1
Batch ID R334176	**Test Name :** SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			**Matrix:** Water		
HS19021428-01	16EW01_022619	26 Feb 2019 08:30			07 Mar 2019 17:47	1
HS19021428-02	16EW05_022619	26 Feb 2019 08:50			07 Mar 2019 17:47	1
HS19021428-03	16EW05_022619_a	26 Feb 2019 08:50			07 Mar 2019 17:47	1
HS19021428-04	16EW02_022619	26 Feb 2019 09:00			07 Mar 2019 17:47	1
HS19021428-05	16EW06_022619	26 Feb 2019 09:10			07 Mar 2019 17:47	1
HS19021428-06	16EW03_022619	26 Feb 2019 09:20			07 Mar 2019 17:47	1
HS19021428-07	16EW07_022619	26 Feb 2019 09:30			07 Mar 2019 17:47	1
HS19021428-08	16EW04_022619	26 Feb 2019 09:40			07 Mar 2019 17:47	1
HS19021428-09	16EW08_022619	26 Feb 2019 09:50			07 Mar 2019 17:47	1
Batch ID R334221	**Test Name :** VOLATILES ORGANICS BY METHOD 8260C			**Matrix:** Water		
HS19021428-04	16EW02_022619	26 Feb 2019 09:00			07 Mar 2019 19:57	250
HS19021428-04	16EW02_022619	26 Feb 2019 09:00			07 Mar 2019 15:56	50
HS19021428-05	16EW06_022619	26 Feb 2019 09:10			07 Mar 2019 17:57	5
HS19021428-06	16EW03_022619	26 Feb 2019 09:20			07 Mar 2019 19:09	100
HS19021428-06	16EW03_022619	26 Feb 2019 09:20			07 Mar 2019 15:08	10
HS19021428-07	16EW07_022619	26 Feb 2019 09:30			07 Mar 2019 18:21	5
HS19021428-07	16EW07_022619	26 Feb 2019 09:30			07 Mar 2019 13:32	1
HS19021428-08	16EW04_022619	26 Feb 2019 09:40			07 Mar 2019 18:45	25
HS19021428-08	16EW04_022619	26 Feb 2019 09:40			07 Mar 2019 14:20	1
HS19021428-09	16EW08_022619	26 Feb 2019 09:50			07 Mar 2019 16:44	5
HS19021428-09	16EW08_022619	26 Feb 2019 09:50			07 Mar 2019 12:44	1

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334128 **Instrument:** VOA6 **Method:** SW8260

MBLK Sample ID: **VBLKW-190306** Units: **UG/L** Analysis Date: **06-Mar-2019 11:51**

Client ID: Run ID: **VOA6_334128** SeqNo: **4977685** 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	2.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U
Bromomethane	0.50	1.0								U

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334128 **Instrument:** VOA6 **Method:** SW8260

MBLK Sample ID: **VBLKW-190306** Units: **UG/L** Analysis Date: **06-Mar-2019 11:51**
Client ID: Run ID: **VOA6_334128** SeqNo: **4977685** 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	0.50	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	*41.51*	*1.0*	*50*	*0*	*83.0*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49.32*	*1.0*	*50*	*0*	*98.6*	*85 - 114*				
Surr: Dibromofluoromethane	*43.47*	*1.0*	*50*	*0*	*86.9*	*80 - 119*				
Surr: Toluene-d8	*53.24*	*1.0*	*50*	*0*	*106*	*89 - 112*				

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334128 **Instrument:** VOA6 **Method:** SW8260

LCS Sample ID: **VLCSW-190306** Units: **UG/L** Analysis Date: **06-Mar-2019 11:03**
Client ID: Run ID: **VOA6_334128** SeqNo: **4977684** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	20.28	1.0	20	0	101	78 - 124				
1,1,1-Trichloroethane	20.23	1.0	20	0	101	74 - 131				
1,1,2,2-Tetrachloroethane	19.2	1.0	20	0	96.0	71 - 121				
1,1,2-Trichloroethane	19.93	1.0	20	0	99.6	80 - 119				
1,1-Dichloroethane	19.67	1.0	20	0	98.3	77 - 125				
1,1-Dichloroethene	19.73	1.0	20	0	98.6	71 - 131				
1,1-Dichloropropene	19.78	1.0	20	0	98.9	78 - 125				
1,2,3-Trichlorobenzene	20.06	1.0	20	0	100	69 - 129				
1,2,3-Trichloropropane	18.96	1.0	20	0	94.8	73 - 122				
1,2,4-Trichlorobenzene	19.89	1.0	20	0	99.4	69 - 130				
1,2,4-Trimethylbenzene	19.37	1.0	20	0	96.8	76 - 124				
1,2-Dibromo-3-chloropropane	18.77	1.0	20	0	93.9	62 - 128				
1,2-Dibromoethane	20.52	1.0	20	0	103	77 - 121				
1,2-Dichlorobenzene	19.02	1.0	20	0	95.1	80 - 119				
1,2-Dichloroethane	20.54	1.0	20	0	103	73 - 128				
1,2-Dichloropropane	20.31	1.0	20	0	102	78 - 122				
1,3,5-Trimethylbenzene	19.43	1.0	20	0	97.1	75 - 124				
1,3-Dichlorobenzene	19.44	1.0	20	0	97.2	80 - 119				
1,3-Dichloropropane	20.12	1.0	20	0	101	80 - 119				
1,4-Dichlorobenzene	19.16	1.0	20	0	95.8	79 - 118				
2,2-Dichloropropane	19.96	1.0	20	0	99.8	60 - 139				
2-Butanone	42.82	2.0	40	0	107	56 - 143				
2-Chlorotoluene	19.13	1.0	20	0	95.7	79 - 122				
2-Hexanone	40.07	2.0	40	0	100	57 - 139				
4-Chlorotoluene	19.38	1.0	20	0	96.9	78 - 122				
4-Isopropyltoluene	19.42	1.0	20	0	97.1	77 - 127				
4-Methyl-2-pentanone	39.73	2.0	40	0	99.3	67 - 130				
Acetone	42.44	2.0	40	0	106	39 - 160				
Benzene	19.99	1.0	20	0	99.9	79 - 120				
Bromobenzene	19.33	1.0	20	0	96.6	80 - 120				
Bromochloromethane	19.66	1.0	20	0	98.3	78 - 123				
Bromodichloromethane	19.92	1.0	20	0	99.6	79 - 125				
Bromoform	20.37	1.0	20	0	102	66 - 130				
Bromomethane	24.28	1.0	20	0	121	53 - 141				

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334128 **Instrument:** VOA6 **Method:** SW8260

LCS Sample ID: **VLCSW-190306** Units: **UG/L** Analysis Date: **06-Mar-2019 11:03**
Client ID: Run ID: **VOA6_334128** SeqNo: **4977684** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	40.1	2.0	40	0	100	64 - 133				
Carbon tetrachloride	20.59	1.0	20	0	103	72 - 136				
Chlorobenzene	19.9	1.0	20	0	99.5	82 - 118				
Chloroethane	19.71	1.0	20	0	98.5	60 - 138				
Chloroform	19.55	1.0	20	0	97.7	79 - 124				
Chloromethane	20.54	1.0	20	0	103	50 - 139				
cis-1,2-Dichloroethene	19.71	1.0	20	0	98.6	78 - 123				
cis-1,3-Dichloropropene	20.44	1.0	20	0	102	75 - 124				
Dibromochloromethane	20.25	1.0	20	0	101	74 - 126				
Dibromomethane	20.09	1.0	20	0	100	79 - 123				
Dichlorodifluoromethane	20.24	1.0	20	0	101	32 - 152				
Ethylbenzene	20.01	1.0	20	0	100	79 - 121				
Hexachlorobutadiene	21.69	1.0	20	0	108	66 - 134				
Isopropylbenzene	19.97	1.0	20	0	99.8	72 - 131				
m,p-Xylene	40.08	2.0	40	0	100	80 - 121				
Methylene chloride	20.41	2.0	20	0	102	74 - 124				
Naphthalene	18.14	1.0	20	0	90.7	61 - 128				
n-Butylbenzene	19.01	1.0	20	0	95.0	75 - 128				
n-Propylbenzene	19.22	1.0	20	0	96.1	76 - 126				
o-Xylene	20.19	1.0	20	0	101	78 - 122				
sec-Butylbenzene	19	1.0	20	0	95.0	77 - 126				
Styrene	20.48	1.0	20	0	102	78 - 123				
tert-Butylbenzene	18.99	1.0	20	0	95.0	78 - 124				
Tetrachloroethene	19.96	1.0	20	0	99.8	74 - 129				
Toluene	19.89	1.0	20	0	99.5	80 - 121				
trans-1,2-Dichloroethene	20.32	1.0	20	0	102	75 - 124				
trans-1,3-Dichloropropene	20.39	1.0	20	0	102	73 - 127				
Trichloroethene	20.14	1.0	20	0	101	79 - 123				
Trichlorofluoromethane	19.72	1.0	20	0	98.6	65 - 141				
Vinyl chloride	19.12	1.0	20	0	95.6	58 - 137				
Surr: 1,2-Dichloroethane-d4	*50.81*	*1.0*	*50*	*0*	*102*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*51.81*	*1.0*	*50*	*0*	*104*	*85 - 114*				
Surr: Dibromofluoromethane	*51.53*	*1.0*	*50*	*0*	*103*	*80 - 119*				
Surr: Toluene-d8	*48.19*	*1.0*	*50*	*0*	*96.4*	*89 - 112*				

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334128 **Instrument:** VOA6 **Method:** SW8260

MS Sample ID: **HS19021428-01MS** Units: **UG/L** Analysis Date: **06-Mar-2019 14:39**
Client ID: **16EW01_022619** Run ID: **VOA6_334128** SeqNo: **4977690** PrepDate: DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	1131	50	1000	0	113	78 - 124				
1,1,1-Trichloroethane	987.3	50	1000	0	98.7	74 - 131				
1,1,2,2-Tetrachloroethane	1076	50	1000	0	108	71 - 121				
1,1,2-Trichloroethane	1111	50	1000	0	111	80 - 119				
1,1-Dichloroethane	940.2	50	1000	0	94.0	77 - 125				
1,1-Dichloroethene	1011	50	1000	0	101	71 - 131				
1,1-Dichloropropene	1112	50	1000	0	111	78 - 125				
1,2,3-Trichlorobenzene	1082	50	1000	0	108	69 - 129				
1,2,3-Trichloropropane	1033	50	1000	0	103	73 - 122				
1,2,4-Trichlorobenzene	1136	50	1000	0	114	69 - 130				
1,2,4-Trimethylbenzene	1203	50	1000	0	120	76 - 124				
1,2-Dibromo-3-chloropropane	1044	50	1000	0	104	62 - 128				
1,2-Dibromoethane	1119	50	1000	0	112	77 - 121				
1,2-Dichlorobenzene	1128	50	1000	0	113	80 - 119				
1,2-Dichloroethane	1026	50	1000	0	103	73 - 128				
1,2-Dichloropropane	1034	50	1000	0	103	78 - 122				
1,3,5-Trimethylbenzene	1243	50	1000	0	124	75 - 124				S
1,3-Dichlorobenzene	1180	50	1000	0	118	80 - 119				
1,3-Dichloropropane	1110	50	1000	0	111	80 - 119				
1,4-Dichlorobenzene	1153	50	1000	0	115	79 - 118				
2,2-Dichloropropane	1001	50	1000	0	100	60 - 139				
2-Butanone	1842	100	2000	0	92.1	56 - 143				
2-Chlorotoluene	1181	50	1000	0	118	79 - 122				
2-Hexanone	2034	100	2000	0	102	57 - 139				
4-Chlorotoluene	1190	50	1000	0	119	78 - 122				
4-Isopropyltoluene	1296	50	1000	0	130	77 - 127				S
4-Methyl-2-pentanone	2036	100	2000	0	102	67 - 130				
Acetone	1745	100	2000	0	87.3	39 - 160				
Benzene	1045	50	1000	0	104	79 - 120				
Bromobenzene	1145	50	1000	0	114	80 - 120				
Bromochloromethane	903.7	50	1000	0	90.4	78 - 123				
Bromodichloromethane	1027	50	1000	0	103	79 - 125				
Bromoform	1094	50	1000	0	109	66 - 130				
Bromomethane	1198	50	1000	0	120	53 - 141				

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334128 **Instrument:** VOA6 **Method:** SW8260

MS Sample ID: **HS19021428-01MS** Units: **UG/L** Analysis Date: **06-Mar-2019 14:39**

Client ID: **16EW01_022619** Run ID: **VOA6_334128** SeqNo: **4977690** PrepDate: DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	1925	100	2000	0	96.2	64 - 133				
Carbon tetrachloride	1169	50	1000	0	117	72 - 136				
Chlorobenzene	1159	50	1000	0	116	82 - 118				
Chloroethane	922.9	50	1000	0	92.3	60 - 138				
Chloroform	938.1	50	1000	0	93.8	79 - 124				
Chloromethane	804.4	50	1000	0	80.4	50 - 139				
cis-1,2-Dichloroethene	4602	50	1000	3749	85.3	78 - 123				
cis-1,3-Dichloropropene	1038	50	1000	0	104	75 - 124				
Dibromochloromethane	1148	50	1000	0	115	74 - 126				
Dibromomethane	1016	50	1000	0	102	79 - 123				
Dichlorodifluoromethane	668.3	50	1000	0	66.8	32 - 152				
Ethylbenzene	1202	50	1000	0	120	79 - 121				
Hexachlorobutadiene	1396	50	1000	0	140	66 - 134				S
Isopropylbenzene	1253	50	1000	0	125	72 - 131				
m,p-Xylene	2393	100	2000	0	120	80 - 121				
Methylene chloride	955.4	100	1000	0	95.5	74 - 124				
Naphthalene	970.7	50	1000	0	97.1	61 - 128				
n-Butylbenzene	1323	50	1000	0	132	75 - 128				S
n-Propylbenzene	1256	50	1000	0	126	76 - 126				
o-Xylene	1200	50	1000	0	120	78 - 122				
sec-Butylbenzene	1306	50	1000	0	131	77 - 126				S
Styrene	1164	50	1000	0	116	78 - 123				
tert-Butylbenzene	1270	50	1000	0	127	78 - 124				S
Tetrachloroethene	1293	50	1000	0	129	74 - 129				S
Toluene	1184	50	1000	0	118	80 - 121				
trans-1,2-Dichloroethene	997.2	50	1000	0	99.7	75 - 124				
trans-1,3-Dichloropropene	1039	50	1000	0	104	73 - 127				
Trichloroethene	4573	50	1000	3686	88.7	79 - 123				
Trichlorofluoromethane	1014	50	1000	0	101	65 - 141				
Vinyl chloride	865.2	50	1000	0	86.5	58 - 137				
Surr: 1,2-Dichloroethane-d4	*2074*	*50*	*2500*	*0*	*83.0*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*2472*	*50*	*2500*	*0*	*98.9*	*85 - 114*				
Surr: Dibromofluoromethane	*2130*	*50*	*2500*	*0*	*85.2*	*80 - 119*				
Surr: Toluene-d8	*2648*	*50*	*2500*	*0*	*106*	*89 - 112*				

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334128 **Instrument:** VOA6 **Method:** SW8260

MSD Sample ID: **HS19021428-01MSD** Units: **UG/L** Analysis Date: **06-Mar-2019 15:03**
Client ID: **16EW01_022619** Run ID: **VOA6_334128** SeqNo: **4977691** PrepDate: DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	1074	50	1000	0	107	78 - 124	1131	5.23	20	
1,1,1-Trichloroethane	1004	50	1000	0	100	74 - 131	987.3	1.64	20	
1,1,2,2-Tetrachloroethane	977.6	50	1000	0	97.8	71 - 121	1076	9.59	20	
1,1,2-Trichloroethane	1026	50	1000	0	103	80 - 119	1111	7.97	20	
1,1-Dichloroethane	918.7	50	1000	0	91.9	77 - 125	940.2	2.32	20	
1,1-Dichloroethene	1003	50	1000	0	100	71 - 131	1011	0.851	20	
1,1-Dichloropropene	1155	50	1000	0	116	78 - 125	1112	3.85	20	
1,2,3-Trichlorobenzene	1116	50	1000	0	112	69 - 129	1082	3.06	20	
1,2,3-Trichloropropane	947	50	1000	0	94.7	73 - 122	1033	8.7	20	
1,2,4-Trichlorobenzene	1120	50	1000	0	112	69 - 130	1136	1.43	20	
1,2,4-Trimethylbenzene	1139	50	1000	0	114	76 - 124	1203	5.47	20	
1,2-Dibromo-3-chloropropane	993.9	50	1000	0	99.4	62 - 128	1044	4.94	20	
1,2-Dibromoethane	1034	50	1000	0	103	77 - 121	1119	7.94	20	
1,2-Dichlorobenzene	1051	50	1000	0	105	80 - 119	1128	7.08	20	
1,2-Dichloroethane	1012	50	1000	0	101	73 - 128	1026	1.39	20	
1,2-Dichloropropane	1017	50	1000	0	102	78 - 122	1034	1.63	20	
1,3,5-Trimethylbenzene	1168	50	1000	0	117	75 - 124	1243	6.24	20	
1,3-Dichlorobenzene	1093	50	1000	0	109	80 - 119	1180	7.6	20	
1,3-Dichloropropane	1025	50	1000	0	102	80 - 119	1110	7.93	20	
1,4-Dichlorobenzene	1063	50	1000	0	106	79 - 118	1153	8.16	20	
2,2-Dichloropropane	982.5	50	1000	0	98.2	60 - 139	1001	1.83	20	
2-Butanone	1713	100	2000	0	85.7	56 - 143	1842	7.25	20	
2-Chlorotoluene	1102	50	1000	0	110	79 - 122	1181	6.9	20	
2-Hexanone	1939	100	2000	0	96.9	57 - 139	2034	4.78	20	
4-Chlorotoluene	1105	50	1000	0	110	78 - 122	1190	7.4	20	
4-Isopropyltoluene	1246	50	1000	0	125	77 - 127	1296	3.91	20	
4-Methyl-2-pentanone	1953	100	2000	0	97.6	67 - 130	2036	4.18	20	
Acetone	1701	100	2000	0	85.0	39 - 160	1745	2.58	20	
Benzene	1032	50	1000	0	103	79 - 120	1045	1.18	20	
Bromobenzene	1050	50	1000	0	105	80 - 120	1145	8.62	20	
Bromochloromethane	886.4	50	1000	0	88.6	78 - 123	903.7	1.92	20	
Bromodichloromethane	1012	50	1000	0	101	79 - 125	1027	1.47	20	
Bromoform	1026	50	1000	0	103	66 - 130	1094	6.41	20	
Bromomethane	1111	50	1000	0	111	53 - 141	1198	7.53	20	

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334128 **Instrument:** VOA6 **Method:** SW8260

MSD Sample ID: **HS19021428-01MSD** Units: **UG/L** Analysis Date: **06-Mar-2019 15:03**
Client ID: **16EW01_022619** Run ID: **VOA6_334128** SeqNo: **4977691** PrepDate: DF: **50**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	1914	100	2000	0	95.7	64 - 133	1925	0.566	20	
Carbon tetrachloride	1209	50	1000	0	121	72 - 136	1169	3.36	20	
Chlorobenzene	1092	50	1000	0	109	82 - 118	1159	5.98	20	
Chloroethane	929.6	50	1000	0	93.0	60 - 138	922.9	0.728	20	
Chloroform	908	50	1000	0	90.8	79 - 124	938.1	3.27	20	
Chloromethane	783	50	1000	0	78.3	50 - 139	804.4	2.7	20	
cis-1,2-Dichloroethene	4457	50	1000	3749	70.8	78 - 123	4602	3.18	20	S
cis-1,3-Dichloropropene	1021	50	1000	0	102	75 - 124	1038	1.73	20	
Dibromochloromethane	1059	50	1000	0	106	74 - 126	1148	8.06	20	
Dibromomethane	990.7	50	1000	0	99.1	79 - 123	1016	2.54	20	
Dichlorodifluoromethane	688.8	50	1000	0	68.9	32 - 152	668.3	3.02	20	
Ethylbenzene	1160	50	1000	0	116	79 - 121	1202	3.53	20	
Hexachlorobutadiene	1434	50	1000	0	143	66 - 134	1396	2.69	20	S
Isopropylbenzene	1231	50	1000	0	123	72 - 131	1253	1.82	20	
m,p-Xylene	2294	100	2000	0	115	80 - 121	2393	4.21	20	
Methylene chloride	914.4	100	1000	0	91.4	74 - 124	955.4	4.38	20	
Naphthalene	939.7	50	1000	0	94.0	61 - 128	970.7	3.25	20	
n-Butylbenzene	1292	50	1000	0	129	75 - 128	1323	2.38	20	S
n-Propylbenzene	1191	50	1000	0	119	76 - 126	1256	5.27	20	
o-Xylene	1141	50	1000	0	114	78 - 122	1200	5.07	20	
sec-Butylbenzene	1272	50	1000	0	127	77 - 126	1306	2.68	20	S
Styrene	1098	50	1000	0	110	78 - 123	1164	5.82	20	
tert-Butylbenzene	1210	50	1000	0	121	78 - 124	1270	4.84	20	
Tetrachloroethene	1247	50	1000	0	125	74 - 129	1293	3.64	20	
Toluene	1121	50	1000	0	112	80 - 121	1184	5.5	20	
trans-1,2-Dichloroethene	971.6	50	1000	0	97.2	75 - 124	997.2	2.59	20	
trans-1,3-Dichloropropene	1012	50	1000	0	101	73 - 127	1039	2.6	20	
Trichloroethene	4546	50	1000	3686	86.1	79 - 123	4573	0.581	20	
Trichlorofluoromethane	1013	50	1000	0	101	65 - 141	1014	0.0243	20	
Vinyl chloride	860.2	50	1000	0	86.0	58 - 137	865.2	0.586	20	
Surr: 1,2-Dichloroethane-d4	*2035*	*50*	*2500*	*0*	*81.4*	*81 - 118*	*2074*	*1.92*	*20*	
Surr: 4-Bromofluorobenzene	*2550*	*50*	*2500*	*0*	*102*	*85 - 114*	*2472*	*3.09*	*20*	
Surr: Dibromofluoromethane	*2117*	*50*	*2500*	*0*	*84.7*	*80 - 119*	*2130*	*0.579*	*20*	
Surr: Toluene-d8	*2586*	*50*	*2500*	*0*	*103*	*89 - 112*	*2648*	*2.39*	*20*	

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.	**QC BATCH REPORT**
Project:	LHAAP Site 16	
WorkOrder:	HS19021428	

Batch ID: R334128 **Instrument:** VOA6 **Method:** SW8260

The following samples were analyzed in this batch:

HS19021428-01	HS19021428-02	HS19021428-03	HS19021428-05

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334221 **Instrument:** VOA6 **Method:** SW8260

MBLK Sample ID: **VBLKW-190307** Units: **UG/L** Analysis Date: **07-Mar-2019 12:20**
Client ID: Run ID: **VOA6_334221** SeqNo: **4979743** 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	2.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U
Bromomethane	0.50	1.0								U

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.
Project:	LHAAP Site 16
WorkOrder:	HS19021428

QC BATCH REPORT

Batch ID: R334221 **Instrument:** VOA6 **Method:** SW8260

MBLK Sample ID: **VBLKW-190307** Units: **UG/L** Analysis Date: **07-Mar-2019 12:20**

Client ID: Run ID: **VOA6_334221** SeqNo: **4979743** 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	0.50	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	*41.41*	*1.0*	*50*	*0*	*82.8*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*49.94*	*1.0*	*50*	*0*	*99.9*	*85 - 114*				
Surr: Dibromofluoromethane	*41.97*	*1.0*	*50*	*0*	*83.9*	*80 - 119*				
Surr: Toluene-d8	*53.12*	*1.0*	*50*	*0*	*106*	*89 - 112*				

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334221 **Instrument:** VOA6 **Method:** SW8260

LCS Sample ID: **VLCSW-190307** Units: **UG/L** Analysis Date: **07-Mar-2019 11:32**
Client ID: Run ID: **VOA6_334221** SeqNo: **4979742** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	20.51	1.0	20	0	103	78 - 124				
1,1,1-Trichloroethane	20.24	1.0	20	0	101	74 - 131				
1,1,2,2-Tetrachloroethane	19.6	1.0	20	0	98.0	71 - 121				
1,1,2-Trichloroethane	20.01	1.0	20	0	100	80 - 119				
1,1-Dichloroethane	20.03	1.0	20	0	100	77 - 125				
1,1-Dichloroethene	20.46	1.0	20	0	102	71 - 131				
1,1-Dichloropropene	19.22	1.0	20	0	96.1	78 - 125				
1,2,3-Trichlorobenzene	22.11	1.0	20	0	111	69 - 129				
1,2,3-Trichloropropane	19.17	1.0	20	0	95.8	73 - 122				
1,2,4-Trichlorobenzene	21.49	1.0	20	0	107	69 - 130				
1,2,4-Trimethylbenzene	19.28	1.0	20	0	96.4	76 - 124				
1,2-Dibromo-3-chloropropane	21.13	1.0	20	0	106	62 - 128				
1,2-Dibromoethane	20.86	1.0	20	0	104	77 - 121				
1,2-Dichlorobenzene	19.47	1.0	20	0	97.4	80 - 119				
1,2-Dichloroethane	20.22	1.0	20	0	101	73 - 128				
1,2-Dichloropropane	20.51	1.0	20	0	103	78 - 122				
1,3,5-Trimethylbenzene	19.33	1.0	20	0	96.7	75 - 124				
1,3-Dichlorobenzene	19.5	1.0	20	0	97.5	80 - 119				
1,3-Dichloropropane	20.2	1.0	20	0	101	80 - 119				
1,4-Dichlorobenzene	19.35	1.0	20	0	96.7	79 - 118				
2,2-Dichloropropane	20.6	1.0	20	0	103	60 - 139				
2-Butanone	44.19	2.0	40	0	110	56 - 143				
2-Chlorotoluene	19.2	1.0	20	0	96.0	79 - 122				
2-Hexanone	39.94	2.0	40	0	99.9	57 - 139				
4-Chlorotoluene	19.4	1.0	20	0	97.0	78 - 122				
4-Isopropyltoluene	19.03	1.0	20	0	95.1	77 - 127				
4-Methyl-2-pentanone	39.79	2.0	40	0	99.5	67 - 130				
Acetone	43.92	2.0	40	0	110	39 - 160				
Benzene	20.1	1.0	20	0	100	79 - 120				
Bromobenzene	19.87	1.0	20	0	99.3	80 - 120				
Bromochloromethane	20.57	1.0	20	0	103	78 - 123				
Bromodichloromethane	20.81	1.0	20	0	104	79 - 125				
Bromoform	20.8	1.0	20	0	104	66 - 130				
Bromomethane	24.89	1.0	20	0	124	53 - 141				

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334221 **Instrument:** VOA6 **Method:** SW8260

LCS Sample ID: **VLCSW-190307** Units: **UG/L** Analysis Date: **07-Mar-2019 11:32**
Client ID: Run ID: **VOA6_334221** SeqNo: **4979742** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	41.71	2.0	40	0	104	64 - 133				
Carbon tetrachloride	20.37	1.0	20	0	102	72 - 136				
Chlorobenzene	20.04	1.0	20	0	100	82 - 118				
Chloroethane	20.16	1.0	20	0	101	60 - 138				
Chloroform	20.66	1.0	20	0	103	79 - 124				
Chloromethane	20.84	1.0	20	0	104	50 - 139				
cis-1,2-Dichloroethene	20.24	1.0	20	0	101	78 - 123				
cis-1,3-Dichloropropene	21.28	1.0	20	0	106	75 - 124				
Dibromochloromethane	21.15	1.0	20	0	106	74 - 126				
Dibromomethane	20.71	1.0	20	0	104	79 - 123				
Dichlorodifluoromethane	20.85	1.0	20	0	104	32 - 152				
Ethylbenzene	19.75	1.0	20	0	98.8	79 - 121				
Hexachlorobutadiene	21.73	1.0	20	0	109	66 - 134				
Isopropylbenzene	19.51	1.0	20	0	97.5	72 - 131				
m,p-Xylene	39.04	2.0	40	0	97.6	80 - 121				
Methylene chloride	21.08	2.0	20	0	105	74 - 124				
Naphthalene	20.19	1.0	20	0	101	61 - 128				
n-Butylbenzene	18.73	1.0	20	0	93.7	75 - 128				
n-Propylbenzene	18.86	1.0	20	0	94.3	76 - 126				
o-Xylene	20.35	1.0	20	0	102	78 - 122				
sec-Butylbenzene	18.7	1.0	20	0	93.5	77 - 126				
Styrene	20.57	1.0	20	0	103	78 - 123				
tert-Butylbenzene	18.73	1.0	20	0	93.7	78 - 124				
Tetrachloroethene	19.69	1.0	20	0	98.5	74 - 129				
Toluene	20.02	1.0	20	0	100	80 - 121				
trans-1,2-Dichloroethene	20.66	1.0	20	0	103	75 - 124				
trans-1,3-Dichloropropene	21.3	1.0	20	0	106	73 - 127				
Trichloroethene	20.61	1.0	20	0	103	79 - 123				
Trichlorofluoromethane	20.26	1.0	20	0	101	65 - 141				
Vinyl chloride	19.61	1.0	20	0	98.1	58 - 137				
Surr: 1,2-Dichloroethane-d4	*51.83*	*1.0*	*50*	*0*	*104*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*52.4*	*1.0*	*50*	*0*	*105*	*85 - 114*				
Surr: Dibromofluoromethane	*51.54*	*1.0*	*50*	*0*	*103*	*80 - 119*				
Surr: Toluene-d8	*47.67*	*1.0*	*50*	*0*	*95.3*	*89 - 112*				

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.	**QC BATCH REPORT**
Project:	LHAAP Site 16	
WorkOrder:	HS19021428	

Batch ID: R334221 **Instrument:** VOA6 **Method:** SW8260

MS Sample ID: **HS19021428-09MS** Units: **UG/L** Analysis Date: **07-Mar-2019 17:08**

Client ID: **16EW08_022619** Run ID: **VOA6_334221** SeqNo: **4979750** PrepDate: DF: **5**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	106.7	5.0	100	0	107	78 - 124				
1,1,1-Trichloroethane	92.75	5.0	100	0	92.8	74 - 131				
1,1,2,2-Tetrachloroethane	101.9	5.0	100	0	102	71 - 121				
1,1,2-Trichloroethane	106.8	5.0	100	0	107	80 - 119				
1,1-Dichloroethane	84.87	5.0	100	0	84.9	77 - 125				
1,1-Dichloroethene	89.03	5.0	100	0	89.0	71 - 131				
1,1-Dichloropropene	103.2	5.0	100	0	103	78 - 125				
1,2,3-Trichlorobenzene	119.4	5.0	100	0	119	69 - 129				
1,2,3-Trichloropropane	98.65	5.0	100	0	98.7	73 - 122				
1,2,4-Trichlorobenzene	117.3	5.0	100	0	117	69 - 130				
1,2,4-Trimethylbenzene	109.1	5.0	100	0	109	76 - 124				
1,2-Dibromo-3-chloropropane	105.8	5.0	100	0	106	62 - 128				
1,2-Dibromoethane	109.1	5.0	100	0	109	77 - 121				
1,2-Dichlorobenzene	105.2	5.0	100	0	105	80 - 119				
1,2-Dichloroethane	97.19	5.0	100	0	97.2	73 - 128				
1,2-Dichloropropane	98.98	5.0	100	0	99.0	78 - 122				
1,3,5-Trimethylbenzene	111	5.0	100	0	111	75 - 124				
1,3-Dichlorobenzene	105.6	5.0	100	0	106	80 - 119				
1,3-Dichloropropane	107.2	5.0	100	0	107	80 - 119				
1,4-Dichlorobenzene	103.7	5.0	100	0	104	79 - 118				
2,2-Dichloropropane	82.15	5.0	100	0	82.1	60 - 139				
2-Butanone	169.4	10	200	0	84.7	56 - 143				
2-Chlorotoluene	106.1	5.0	100	0	106	79 - 122				
2-Hexanone	211.6	10	200	0	106	57 - 139				
4-Chlorotoluene	106	5.0	100	0	106	78 - 122				
4-Isopropyltoluene	115.7	5.0	100	0	116	77 - 127				
4-Methyl-2-pentanone	212.7	10	200	0	106	67 - 130				
Acetone	169.1	10	200	0	84.6	39 - 160				
Benzene	100.6	5.0	100	0	101	79 - 120				
Bromobenzene	103.8	5.0	100	0	104	80 - 120				
Bromochloromethane	81.39	5.0	100	0	81.4	78 - 123				
Bromodichloromethane	99.73	5.0	100	0	99.7	79 - 125				
Bromoform	107.1	5.0	100	0	107	66 - 130				
Bromomethane	95.96	5.0	100	0	96.0	53 - 141				

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334221 **Instrument:** VOA6 **Method:** SW8260

MS Sample ID: **HS19021428-09MS** Units: **UG/L** Analysis Date: **07-Mar-2019 17:08**
Client ID: **16EW08_022619** Run ID: **VOA6_334221** SeqNo: **4979750** PrepDate: DF: **5**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	167.7	10	200	0	83.8	64 - 133				
Carbon tetrachloride	111	5.0	100	0	111	72 - 136				
Chlorobenzene	109	5.0	100	0	109	82 - 118				
Chloroethane	81.3	5.0	100	0	81.3	60 - 138				
Chloroform	85.71	5.0	100	0	85.7	79 - 124				
Chloromethane	79.48	5.0	100	0	79.5	50 - 139				
cis-1,2-Dichloroethene	246.8	5.0	100	168.2	78.7	78 - 123				
cis-1,3-Dichloropropene	99.04	5.0	100	0	99.0	75 - 124				
Dibromochloromethane	111.3	5.0	100	0	111	74 - 126				
Dibromomethane	100.6	5.0	100	0	101	79 - 123				
Dichlorodifluoromethane	56.25	5.0	100	0	56.3	32 - 152				
Ethylbenzene	113.9	5.0	100	0	114	79 - 121				
Hexachlorobutadiene	126	5.0	100	0	126	66 - 134				
Isopropylbenzene	117.8	5.0	100	0	118	72 - 131				
m,p-Xylene	223	10	200	0	112	80 - 121				
Methylene chloride	85.97	10	100	0	86.0	74 - 124				
Naphthalene	107.2	5.0	100	0	107	61 - 128				
n-Butylbenzene	115.1	5.0	100	0	115	75 - 128				
n-Propylbenzene	112.3	5.0	100	0	112	76 - 126				
o-Xylene	112.7	5.0	100	0	113	78 - 122				
sec-Butylbenzene	115.5	5.0	100	0	116	77 - 126				
Styrene	111.5	5.0	100	0	112	78 - 123				
tert-Butylbenzene	112.9	5.0	100	0	113	78 - 124				
Tetrachloroethene	119.9	5.0	100	0	120	74 - 129				
Toluene	111.6	5.0	100	0	112	80 - 121				
trans-1,2-Dichloroethene	86.72	5.0	100	0	86.7	75 - 124				
trans-1,3-Dichloropropene	99.31	5.0	100	0	99.3	73 - 127				
Trichloroethene	276.9	5.0	100	173	104	79 - 123				
Trichlorofluoromethane	88.99	5.0	100	0	89.0	65 - 141				
Vinyl chloride	75.65	5.0	100	0	75.6	58 - 137				
Surr: 1,2-Dichloroethane-d4	*206*	*5.0*	*250*	*0*	*82.4*	*81 - 118*				
Surr: 4-Bromofluorobenzene	*254*	*5.0*	*250*	*0*	*102*	*85 - 114*				
Surr: Dibromofluoromethane	*209*	*5.0*	*250*	*0*	*83.6*	*80 - 119*				
Surr: Toluene-d8	*263.5*	*5.0*	*250*	*0*	*105*	*89 - 112*				

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334221 **Instrument:** VOA6 **Method:** SW8260

MSD Sample ID: **HS19021428-09MSD** Units: **UG/L** Analysis Date: **07-Mar-2019 17:33**
Client ID: **16EW08_022619** Run ID: **VOA6_334221** SeqNo: **4979751** PrepDate: DF: **5**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	110.9	5.0	100	0	111	78 - 124	106.7	3.79	20	
1,1,1-Trichloroethane	100.6	5.0	100	0	101	74 - 131	92.75	8.16	20	
1,1,2,2-Tetrachloroethane	110.7	5.0	100	0	111	71 - 121	101.9	8.3	20	
1,1,2-Trichloroethane	109.3	5.0	100	0	109	80 - 119	106.8	2.28	20	
1,1-Dichloroethane	82.49	5.0	100	0	82.5	77 - 125	84.87	2.84	20	
1,1-Dichloroethene	94.43	5.0	100	0	94.4	71 - 131	89.03	5.89	20	
1,1-Dichloropropene	112.7	5.0	100	0	113	78 - 125	103.2	8.86	20	
1,2,3-Trichlorobenzene	138.7	5.0	100	0	139	69 - 129	119.4	15	20	S
1,2,3-Trichloropropane	104.7	5.0	100	0	105	73 - 122	98.65	5.92	20	
1,2,4-Trichlorobenzene	132.7	5.0	100	0	133	69 - 130	117.3	12.3	20	S
1,2,4-Trimethylbenzene	122.7	5.0	100	0	123	76 - 124	109.1	11.8	20	
1,2-Dibromo-3-chloropropane	119.4	5.0	100	0	119	62 - 128	105.8	12	20	
1,2-Dibromoethane	109.7	5.0	100	0	110	77 - 121	109.1	0.562	20	
1,2-Dichlorobenzene	116.2	5.0	100	0	116	80 - 119	105.2	9.86	20	
1,2-Dichloroethane	101.7	5.0	100	0	102	73 - 128	97.19	4.55	20	
1,2-Dichloropropane	101.4	5.0	100	0	101	78 - 122	98.98	2.38	20	
1,3,5-Trimethylbenzene	127.3	5.0	100	0	127	75 - 124	111	13.7	20	S
1,3-Dichlorobenzene	117.3	5.0	100	0	117	80 - 119	105.6	10.5	20	
1,3-Dichloropropane	110.2	5.0	100	0	110	80 - 119	107.2	2.79	20	
1,4-Dichlorobenzene	115.7	5.0	100	0	116	79 - 118	103.7	10.9	20	
2,2-Dichloropropane	91.55	5.0	100	0	91.6	60 - 139	82.15	10.8	20	
2-Butanone	179.3	10	200	0	89.7	56 - 143	169.4	5.7	20	
2-Chlorotoluene	118.3	5.0	100	0	118	79 - 122	106.1	10.9	20	
2-Hexanone	214.2	10	200	0	107	57 - 139	211.6	1.23	20	
4-Chlorotoluene	119.2	5.0	100	0	119	78 - 122	106	11.7	20	
4-Isopropyltoluene	133.6	5.0	100	0	134	77 - 127	115.7	14.4	20	S
4-Methyl-2-pentanone	214.5	10	200	0	107	67 - 130	212.7	0.815	20	
Acetone	173.4	10	200	0	86.7	39 - 160	169.1	2.47	20	
Benzene	104	5.0	100	0	104	79 - 120	100.6	3.38	20	
Bromobenzene	113.4	5.0	100	0	113	80 - 120	103.8	8.83	20	
Bromochloromethane	88.16	5.0	100	0	88.2	78 - 123	81.39	7.98	20	
Bromodichloromethane	101.3	5.0	100	0	101	79 - 125	99.73	1.53	20	
Bromoform	110.3	5.0	100	0	110	66 - 130	107.1	2.9	20	
Bromomethane	91.51	5.0	100	0	91.5	53 - 141	95.96	4.74	20	

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334221 **Instrument:** VOA6 **Method:** SW8260

MSD Sample ID: **HS19021428-09MSD** Units: **UG/L** Analysis Date: **07-Mar-2019 17:33**
Client ID: **16EW08_022619** Run ID: **VOA6_334221** SeqNo: **4979751** PrepDate: DF: **5**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	177.8	10	200	0	88.9	64 - 133	167.7	5.87	20	
Carbon tetrachloride	119.3	5.0	100	0	119	72 - 136	111	7.25	20	
Chlorobenzene	113.8	5.0	100	0	114	82 - 118	109	4.35	20	
Chloroethane	86.74	5.0	100	0	86.7	60 - 138	81.3	6.47	20	
Chloroform	89.46	5.0	100	0	89.5	79 - 124	85.71	4.28	20	
Chloromethane	78.81	5.0	100	0	78.8	50 - 139	79.48	0.851	20	
cis-1,2-Dichloroethene	265.7	5.0	100	168.2	97.5	78 - 123	246.8	7.37	20	
cis-1,3-Dichloropropene	100.7	5.0	100	0	101	75 - 124	99.04	1.67	20	
Dibromochloromethane	112.6	5.0	100	0	113	74 - 126	111.3	1.23	20	
Dibromomethane	100.7	5.0	100	0	101	79 - 123	100.6	0.0743	20	
Dichlorodifluoromethane	61.01	5.0	100	0	61.0	32 - 152	56.25	8.12	20	
Ethylbenzene	119.4	5.0	100	0	119	79 - 121	113.9	4.78	20	
Hexachlorobutadiene	155.1	5.0	100	0	155	66 - 134	126	20.7	20	SR
Isopropylbenzene	127	5.0	100	0	127	72 - 131	117.8	7.49	20	
m,p-Xylene	235.5	10	200	0	118	80 - 121	223	5.46	20	
Methylene chloride	85.24	10	100	0	85.2	74 - 124	85.97	0.853	20	
Naphthalene	119.8	5.0	100	0	120	61 - 128	107.2	11.1	20	
n-Butylbenzene	135.9	5.0	100	0	136	75 - 128	115.1	16.6	20	S
n-Propylbenzene	128.3	5.0	100	0	128	76 - 126	112.3	13.2	20	S
o-Xylene	117.5	5.0	100	0	117	78 - 122	112.7	4.16	20	
sec-Butylbenzene	135.3	5.0	100	0	135	77 - 126	115.5	15.8	20	S
Styrene	115.8	5.0	100	0	116	78 - 123	111.5	3.81	20	
tert-Butylbenzene	131.7	5.0	100	0	132	78 - 124	112.9	15.4	20	S
Tetrachloroethene	131.6	5.0	100	0	132	74 - 129	119.9	9.32	20	S
Toluene	118.5	5.0	100	0	118	80 - 121	111.6	5.95	20	
trans-1,2-Dichloroethene	90.99	5.0	100	0	91.0	75 - 124	86.72	4.8	20	
trans-1,3-Dichloropropene	98.7	5.0	100	0	98.7	73 - 127	99.31	0.62	20	
Trichloroethene	289.3	5.0	100	173	116	79 - 123	276.9	4.38	20	
Trichlorofluoromethane	98.03	5.0	100	0	98.0	65 - 141	88.99	9.66	20	
Vinyl chloride	79.57	5.0	100	0	79.6	58 - 137	75.65	5.06	20	
Surr: 1,2-Dichloroethane-d4	*207.5*	*5.0*	*250*	*0*	*83.0*	*81 - 118*	*206*	*0.759*	*20*	
Surr: 4-Bromofluorobenzene	*245*	*5.0*	*250*	*0*	*98.0*	*85 - 114*	*254*	*3.62*	*20*	
Surr: Dibromofluoromethane	*212.9*	*5.0*	*250*	*0*	*85.1*	*80 - 119*	*209*	*1.85*	*20*	
Surr: Toluene-d8	*264.6*	*5.0*	*250*	*0*	*106*	*89 - 112*	*263.5*	*0.388*	*20*	

ALS Houston, US Date: 08-Mar-19

Client: Bhate Environmental Associates, Inc.
Project: LHAAP Site 16
WorkOrder: HS19021428

QC BATCH REPORT

Batch ID: R334221 **Instrument:** VOA6 **Method:** SW8260

The following samples were analyzed in this batch:

HS19021428-04	HS19021428-05	HS19021428-06	HS19021428-07
HS19021428-08	HS19021428-09		

ALS Houston, US Date: 08-Mar-19

Client:	Bhate Environmental Associates, Inc.
Project:	LHAAP Site 16
WorkOrder:	**HS19021428**

QUALIFIERS, ACRONYMS, UNITS

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

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

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	88-0356	27-Mar-2019
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

ALS Houston, US Date: 08-Mar-19

Sample Receipt Checklist

Client Name:	Bhate Environmental	Date/Time Received:	**27-Feb-2019 09:10**
Work Order:	HS19021428	Received by:	**RPG**

Checklist completed by: *Jared R. Makan* (eSignature) 27-Feb-2019 (Date)

Reviewed by: *RJ Modashia* (eSignature) 28-Feb-2019 (Date)

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

	Yes	No	Not Present
Shipping container/cooler in good condition?	☑	☐	☐
Custody seals intact on shipping container/cooler?	☑	☐	☐
Custody seals intact on sample bottles?	☐	☐	☑
VOA/TX1005/TX1006 Solids in hermetically sealed vials?	☐	☐	☑
Chain of custody present?	☑	☐	1 Page(s)
Chain of custody signed when relinquished and received?	☑	☐	COC IDs:N/A
Samplers name present on COC?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature in compliance?	☑	☐	

Temperature(s)/Thermometer(s):	0.6c/0.6c UC/C	IR11
Cooler(s)/Kit(s):	44309	
Date/Time sample(s) sent to storage:	02/27/2019 15:20	

	Yes	No	
Water - VOA vials have zero headspace?	☑	☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	☐	☐	N/A ☑
pH adjusted?	☐	☐	N/A ☑

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:

00936095

Bhate

1608 13th Avenue South, Suite 300
Birmingham Alabama 35205
Tel: 205-918-4000
Fax: 205-918-4050

Chain of Custody and Analytical Request

Page: ______ of ______
Project/Phase No: NWO1312.0150
COC Number(1): ______
LIMS Number: ______

Facility/Base I.D.: LHAAP
Project/Site Name: LHAAP / Site 16
Client Name:
Collected by: Scott Beesinger

Field Sample ID (30 Characters Max)	ERPIMS LOCID (15 Characters Max)	Date Collected (dd-mmm-yyyy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	SA Code (1)	Sample Number (1)	Sample Matrix (4)	Number of containers	VOC	PERCHLORATE
EW01_022619		26 FEB 2019	0830	-	N		WG	4	X	X
EW01_022619_MS		26 FEB 2019	0830	-	MS		WG	4	X	X
EW01_022619_MSD		26 FEB 2019	0830	-	SD		WG	4	X	X
EW05_022619		26 FEB 2019	0850		N		WG	4	X	X
EW05_022619_FD		26 FEB 2019	0850		FD		WG	4	X	X
EW02_022619		26 FEB 2019	0900	-	N		WG	4	X	X
EW06_022619		26 FEB 2019	0910	-	N		WG	4	X	X
EW03_022619		26 FEB 2019	0920	-	N		WG	4	X	X
EW07_022619		26 FEB 2019	0930	-	N		WG	4	X	X
EW04_022619		26 FEB 2019	0940	-	N		WG	4	X	X
EW08_022619		26 FEB 2019	0950	-	N		WG	4	X	X

Sample Analysis Requested (5)

Quality Assurance Samples (6): Ambient Blank Lot Control Number | Equipment Blank Lot Control Number | Trip Blank Lot Control Number | Cooler ID

HS19021428
Bhate Environmental Associates, Inc.
LHAAP Site 16

COMMENTS:

Custody Transfers Prior to Receipt by Laboratory

Relinquished By (Signed)	Date	Time	Received by (Signed)	Date	Time
1. [signature]	2/26/19	1400	1. RG [signature]	2/27/19	09:10.
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: ______ Shipped
Method of Shipment: ______
Fed Ex ______ Airbill Number: ______ No.:
Analytical Lab: ALS 10450 Stancliff Rd. Suite 210 Houston TX 77099 (281) 530-5656
ATTN: SONIA WEST Lab Recipient: Delivery Date/Time:

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 (-t) Sample, FD = Field Duplicate (-a) Samples, FR = Field Replicate (-b) Samples, EB = Equipment Blank (-d) Samples, MS = Matrix Spike, SD = Matrix Spike Duplicate, AB = Ambient Blank (-e)
3.) Sample Number: Unique sample number collected from a particular location per day. (e.g. Groundwater sample collected from MW-1 on 10/10/99 = 01, if sampled again on 10/10/99 = 02, etc.)
4.) Matrix Codes: GS = Soil Gas, WG = Groundwater, WS = Surface Water, SO = Soil, SE = Sediment, SL = Sludge, SS = Surface Soil Samples, WQ = Aqueous Blank Samples (trip, equipment, ambient, etc), SQ = Soil Blanks
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 MW-1 on 10/10/99 will be designated 10109901 in the Equipment Blank Lot Control

44309

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00936096

ALS Environmental
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

44309

CUSTODY SEAL

Date: 2/26/19 Time: 1400
Name: Scott Beesinger
Company: BHATE

Seal Broken By: [illegible]
Date: 02/27/19

44309 FEB 2 7 2019

Must Deliver Next Business Day
Time and Tempature Sensitive!

44309

ORIGIN ID:SGRA (903) 930-6193
SCOTT BEESINER
BHATE ENVIRONMENTAL ASSOCIATES
1203-B EAST GRAND AVE. PMB202

MARSHALL, TX 75670
UNITED STATES US

SHIP DATE: 07AUG18
ACTWGT: 1.00 LB MAN
CAD: 300130/CAFE3111
DIMS: 26x14x14 IN

TO CLIENT SERVICES
ALS LABORATORY GROUP
10450 STANCLIFF ROAD
SUITE 210
HOUSTON TX 77099
(281) 530-5656
REF: LHAAP-58-RJ

RMA:

FedEx Express

E

FedEx
TRK# 0221 4380 9531 5094

WED - 27 FEB 10:30A
PRIORITY OVERNIGHT

AB SGRA

77099
TX-US
IAH

FID 162786 26FEB19 GGGA 553C2/8F30/0C0A

Case Narrative

Method: 6850
Analysis: Perchlorate
Analysis SOP: LC-MS-CLO4
ALS WO ID(s): 1905651; 1906112; 1906330; 1906332; 1906334

Client: ALS Laboratories (Houston, TX)
Matrix: Water
ELMS Batch (HBN): 2223 (233911)

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

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

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

Holding Times: Holding times were met for all analyses.

Dilutions: Field samples 1906112004/05 were re-analyzed and reported from 1:10 dilutions. Field sample 1906330001 was analyzed and reported from a 1:100 dilution. The reporting limits have been adjusted accordingly.

Method QC data: The method blank (LMB 642099) was less than 1/2 the CRDL. The recovery for the LCS (642100) was within acceptable parameters.

MS/MSD Analysis: MS/MSD was performed on samples 1906112002/03 (Client ID's: EW01_022619). 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, except for the following. The Matrix Spike and duplicate (MS/MSD) failed QC acceptance criteria for percent recoveries. The MS/MSD is reported for the clients' information only. The sample matrix may be inappropriate for the method selected.

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 – 642097) is reported from the analysis of the Laboratory Control Sample (LCS – 642100) at a level of 4.0µg/L. Sample 1906112007 failed the 50-150% method requirement for ISTD recovery. This sample was re-prepped, re-analyzed and reported. 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: 15FEBI04) along with datafiles 05MARD07-10.

Thomas Bosch	March 06, 2019
Analyst	Date

ANALYTICAL REPORT

Report Date: March 07, 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: **34-1906112**
Project ID: HS19021428
Purchase Order: HS19021428
Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
EW01_022619	1906112001	02/26/19	02/28/19	
EW05_022619	1906112004	02/26/19	02/28/19	
EW05_022619_FD	1906112005	02/26/19	02/28/19	
EW02_022619	1906112006	02/26/19	02/28/19	
EW06_022619	1906112007	02/26/19	02/28/19	
EW03_022619	1906112008	02/26/19	02/28/19	
EW07_022619	1906112009	02/26/19	02/28/19	
EW04_022619	1906112010	02/26/19	02/28/19	
EW08_022619	1906112011	02/26/19	02/28/19	

Client QC ID *	Lab ID	Collect Date	Receive Date	Sampling Site
EW01_022619MS	1906112002	02/26/19	02/28/19	
EW01_022619MSD	1906112003	02/26/19	02/28/19	

***Client QC is reported as part of the Quality Control results report, if requested.**

ANALYTICAL REPORT

Workorder: 34-1906112
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **EW01_022619** | Sampling Site: NA | Collected: 02/26/2019
Lab ID: 1906112001 | Media: 125 mL Nalgene | Received: 02/28/2019
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/2223 (HBN: 233911) | **Percent Solid:** NA
Analyzed: 03/05/2019 09:54 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**51**	1.0	2.0	4.0	1	

Sample ID: **EW05_022619** | Sampling Site: NA | Collected: 02/26/2019
Lab ID: 1906112004 | Media: 125 mL Nalgene | Received: 02/28/2019
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/2223 (HBN: 233911) | **Percent Solid:** NA
Analyzed: 03/05/2019 13:15 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**230**	10	20	40	10	

Sample ID: **EW05_022619_FD** | Sampling Site: NA | Collected: 02/26/2019
Lab ID: 1906112005 | Media: 125 mL Nalgene | Received: 02/28/2019
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/2223 (HBN: 233911) | **Percent Solid:** NA
Analyzed: 03/05/2019 13:28 | **Report Basis:** Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	**240**	10	20	40	10	

Sample ID: **EW02_022619** | Sampling Site: NA | Collected: 02/26/2019
Lab ID: 1906112006 | Media: 125 mL Nalgene | Received: 02/28/2019
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/2223 (HBN: 233911) | **Percent Solid:** NA
Analyzed: 03/05/2019 10:59 | **Report Basis:** Wet

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

ANALYTICAL REPORT

Workorder: 34-1906112
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **EW06_022619** | Sampling Site: NA | Collected: 02/26/2019
Lab ID: 1906112007 | Media: 125 mL Nalgene | Received: 02/28/2019
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/2223 (HBN: 233911) | **Percent Solid:** NA
Analyzed: 03/05/2019 13:41 | **Report Basis:** Wet

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

Sample ID: **EW03_022619** | Sampling Site: NA | Collected: 02/26/2019
Lab ID: 1906112008 | Media: 125 mL Nalgene | Received: 02/28/2019
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/2223 (HBN: 233911) | **Percent Solid:** NA
Analyzed: 03/05/2019 11:26 | **Report Basis:** Wet

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

Sample ID: **EW07_022619** | Sampling Site: NA | Collected: 02/26/2019
Lab ID: 1906112009 | Media: 125 mL Nalgene | Received: 02/28/2019
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/2223 (HBN: 233911) | **Percent Solid:** NA
Analyzed: 03/05/2019 11:39 | **Report Basis:** Wet

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

Sample ID: **EW04_022619** | Sampling Site: NA | Collected: 02/26/2019
Lab ID: 1906112010 | Media: 125 mL Nalgene | Received: 02/28/2019
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/2223 (HBN: 233911) | **Percent Solid:** NA
Analyzed: 03/05/2019 11:52 | **Report Basis:** Wet

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

ANALYTICAL REPORT

Workorder: 34-1906112
Client: ALS Environmental (Houston)
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **EW08_022619**	Sampling Site: NA	Collected: 02/26/2019
Lab ID: 1906112011	Media: 125 mL Nalgene	Received: 02/28/2019
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/2223 (HBN: 233911)	**Percent Solid:** NA
	Analyzed: 03/05/2019 12:05	**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: 233911)

Field samples 1906112004/05 were re-analyzed and reported from 1:10 dilutions. Field sample 1906330001 was analyzed and reported from a 1:100 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/ Thomas Bosch 03/06/2019 09:17	/S/ Stephen Brose 03/07/2019 11:04

Laboratory Contact Information

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960 W Levoy Drive
Salt Lake City, Utah 84123

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

ANALYTICAL REPORT

Workorder: 34-1906112
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

Analysis Information

Workorder: 1906112

Limits: Client SOW/Contract Specified
Basis: DoD QSM

Preparation: NA
Batch: NA
Prepared By: NA

Analysis: EPA 6850, DoD QSM
Batch: ELMS/2223 (HBN: 233911)
Analyzed By: Thomas Bosch

Blank

LMB: 642099
Analyzed: 03/05/2019 09:26
Units: ug/L

Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

Laboratory Control Sample

LCS: 642100
Analyzed: 03/05/2019 09:00
Dilution: 1
Units: ug/L

Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.11	4.00	103	78.8	123.8

Matrix Spike - Matrix Spike Duplicate

Sample: 1906112001
Analyzed: 03/05/2019 09:54
Dilution: 1
Units: ug/L

MS: 1906112002
Analyzed: 03/05/2019 10:07
Dilution: 1
Units: ug/L

MSD: 1906112003
Analyzed: 03/05/2019 10:20
Dilution: 1
Units: ug/L

Analyte	Sample Result	MS Result	MS Target	MS % Rec	MS QC Limits		MSD Result	MSD % Rec	RPD	MSD QC Limits	
Perchlorate	51.0	53.9	4	▲ 65.7	78.8	123.8	53.7	▲ 61.2	0.337	0.0	20.0

Continuing Calibration Verification

CCV: 642096
Analyzed: 03/05/2019 08:44
Units: ug/L
Criteria: ± 15%

CCV: 642101
Analyzed: 03/05/2019 12:18
Units: ug/L
Criteria: ± 15%

CCV: 642102
Analyzed: 03/05/2019 14:07
Units: ug/L
Criteria: ± 15%

Analyte	Result	Target	% Rec.	Result	Target	% Rec.	Result	Target	% Rec.
Perchlorate	25.0	25.0	100	25.0	25.0	100	24.5	25.0	97.8

Interference Check Sample

ICSA: 642098
Analyzed: 03/05/2019 09:13
Units: ug/L
Criteria: ± 30%

Analyte	Result	Target	% Rec.
Perchlorate	3.93	4.00	98.2

Comments

Field samples 1906112004/05 were re-analyzed and reported from 1:10 dilutions. Field sample 1906330001 was analyzed and reported from a 1:100 dilution. The reporting limits have been adjusted accordingly.

Quality Control Sample
Batch Report

Analysis Information

Workorder: **1906112**

Limits:	Client SOW/Contract Specified	**Preparation:**	NA	**Analysis:**	EPA 6850, DoD QSM
Basis:	DoD QSM	**Batch:**	NA	**Batch:**	ELMS/2223 (HBN: 233911)
		Prepared By:	NA	**Analyzed By:**	Thomas Bosch

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

Analyst	Peer Review
/S/ Thomas Bosch 03/06/2019 13:45	/S/ Stephen Brose 03/07/2019 11:04

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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00936106

W 1906112

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Subcontract Chain of Custody

COC ID: 10844

1906112

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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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: HS19021428
TSR: Danielle Winnings

	LAB SAMPLE ID / ANALYSIS REQUESTED	CLIENT SAMPLE ID	MATRIX	COLLECT DATE / DUE DATE	
1.	**HS19021428-01**	**EW01_022619**	**Water**	**26 Feb 2019 08:30**	MS/MSD
	SUB_Perch-6850			13 Mar 2019	
2.	**HS19021428-02**	**EW05_022619**	**Water**	**26 Feb 2019 08:50**	
	SUB_Perch-6850			13 Mar 2019	
3.	**HS19021428-03**	**EW05_022619_FD**	**Water**	**26 Feb 2019 08:50**	
	SUB_Perch-6850			13 Mar 2019	
4.	**HS19021428-04**	**EW02_022619**	**Water**	**26 Feb 2019 09:00**	
	SUB_Perch-6850			13 Mar 2019	
5.	**HS19021428-05**	**EW06_022619**	**Water**	**26 Feb 2019 09:10**	
	SUB_Perch-6850			13 Mar 2019	
6.	**HS19021428-06**	**EW03_022619**	**Water**	**26 Feb 2019 09:20**	
	SUB_Perch-6850			13 Mar 2019	
7.	**HS19021428-07**	**EW07_022619**	**Water**	**26 Feb 2019 09:30**	
	SUB_Perch-6850			13 Mar 2019	
8.	**HS19021428-08**	**EW04_022619**	**Water**	**26 Feb 2019 09:40**	
	SUB_Perch-6850			13 Mar 2019	
9.	**HS19021428-09**	**EW08_022619**	**Water**	**26 Feb 2019 09:50**	

Subcontract Chain of Custody

COC ID: 10844

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
SUB_Perch-6850			13 Mar 2019

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

HS19021428-01 MS/MSD

QC Level: DOD IV (DoD Data Package)

Relinquished By: J. [illegible] Date/Time: 2/27/19 18:00

Received By: [signature] Date/Time: 2/28/19 0925

Cooler ID(s): 9190 Temperature(s): 1.5°C

Cooler custody seal intact

ALS Environmental
CHAIN-OF-CUSTODY

Project / Job / Task: HS19021428 | **Split:** | **Workorder ID:** 1906112 | **Level:** ENV_LVL4

Client: ALS Environmental (Houston) | **Account:** 8101 | **Type:** 125Poly

Comments:

Preservatives: COOL

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	EPA 6850, DoD QSM
1	02/26/2019 08:30	EW01_022619	1906112001		Water	A	1	A
2	02/26/2019 08:30	EW01_022619MS	1906112002	MS	Water	A	1	A
3	02/26/2019 08:30	EW01_022619MSD	1906112003	MSD	Water	A	1	A
4	02/26/2019 08:50	EW05_022619	1906112004		Water	A	1	A
5	02/26/2019 08:50	EW05_022619_FD	1906112005	FLDDUP	Water	A	1	A
6	02/26/2019 09:00	EW02_022619	1906112006		Water	A	1	A
7	02/26/2019 09:10	EW06_022619	1906112007		Water	A	1	A
8	02/26/2019 09:20	EW03_022619	1906112008		Water	A	1	A
9	02/26/2019 09:30	EW07_022619	1906112009		Water	A	1	A
10	02/26/2019 09:40	EW04_022619	1906112010		Water	A	1	A

Requested Analysis

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
Warath, Julie	02/28/2019 09:25	ALS Sample Receiving	Sample Login
Julie Warath	3/1/19 1300	5C	storage
R-33-1	03.04.19/12:10	T.Bush	6850

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

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

Prepared / Analyzed by: ______ Date / Time: ______

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

Fri, 03/01/19 12:59 PM

ALSCOCV3.1

00936108

ALS Environmental

CHAIN-OF-CUSTODY

Project / Job / Task: HS19021428	Split:	Workorder ID: 1906112	Level: ENV_LVL4
Client: ALS Environmental (Houston)		Account: 8101	Type: 125Poly
Comments:			Preservatives: COOL

Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	Containers ID(s)	Containers Count	Requested Analysis: EPA 6850, DoD QSM
11	02/26/2019 09:50	EW08_022619	1906112011		Water	A	1	A
12								
13								
14								
15								
16								
17								
18								
19								
20								

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location
Warath, Julie	02/28/2019 09:25	ALS Sample Receiving	Sample Login
Julie Warath	3/1/19 1300	5C	Storage
R.33.1	03.04.19 / 12:10	T. Busch	6850

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

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

Prepared / Analyzed by: ______ Date / Time: ______

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

Fri, 03/01/19 12:59 PM

ALSCOCV3.1

00936109

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

1906112

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Environmental Project/Task/Site: DOD Perchlorate

Date/Time of Receipt: 2/28/19 0925 Number of Coolers Received: 1

Condition of Coolers: Acceptable/Unacceptable
Cooler Custody Seals: Present/Absent/NA
Intact/Broken/NA
Container Custody Seals: Present/Absent/NA
Intact/Broken/NA
Ice Present: Yes/No/NA
Frozen/Melted/NA

Temperature Control: Present/~~Not Included~~ J H 2/28
Location Temp Taken: Control/~~Between Samples~~
Are all temperatures within project specific guidelines? Yes/No/NA
VOA Headspace Present? Yes/No/NA

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

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 9190	1.5°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: [signature] Signature Jessica Helland Printed Name 2/28/19 Date

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ 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: ______ Printed Name Returned to Sample Receipt by: ______ Signature Date: ______

00936111

Must Deliver Next Business Day
Time and Tempature Sensitive!

ALS

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

SHIP DATE: 27FEB19
ACTWGT: 17.75 LB
CAD: 300130/CAFE3211
DIMS: 19x16x13 IN

BILL THIRD PARTY

551C2/0E3D/104C

TO SAMPLE RECEIVING
ALS ENVIRONMENTAL
960 W. LEVOY DRIVE

SALT LAKE CITY UT 84123
(801) 266-7700
REF: HS19021428 RJ

FedEx
Express

E

J181118060501uv

THU - 28 FEB 3:00P
STANDARD OVERNIGHT

TRK# 0201 4809 7831 1760

AX BTFA

84123
UT-US SLC

Batch Worklist

Batch: ELMS/ 2223 Created: 3/5/2019 08:21 Instrument: HBN: 233911

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

Workorder: 1905651 [ENV_LVL4]
Workorder: 1906112 [ENV_LVL4]
Workorder: 1906330 [ENV_LVL4]
Workorder: 1906332 [ENV_LVL4]
Workorder: 1906334 [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	642096	CCV for HBN 233911 [ELMS/2223]				CCV	3		E685041C3Q	5311		3/7/2019	
2	642097	RLVS for HBN 233911 [ELMS/2223				RLVS	3		E685041C3Q	5311		3/7/2019	
3	642098	ICS for HBN 233911 [ELMS/2223]				ICS	3		E6850..D3Q	5311		3/7/2019	
4	642099	LMB for HBN 233911 [ELMS/2223]				LMB	3		E6850Q413Q	5311		3/7/2019	
5	642100	LCS for HBN 233911 [ELMS/2223]				LCS	3		E6850Q413Q	5311		3/7/2019	
6	1905651001	HS19021158-02/LH18/24-SP650_02				SAMPLE	3	1905651001-A	E6850Q41.3	5480	3/21/2019	3/7/2019	
7	1906112001	EW01_022619				SAMPLE	3	1906112001-A	E6850Q41.3	5480	3/26/2019	3/13/2019	
8	1906112002	EW01_022619MS				MS	3	1906112002-A	E6850Q413Q	5480		3/7/2019	
9	1906112003	EW01_022619MSD				MSD	3	1906112003-A	E6850Q413Q	5480		3/7/2019	
10	1906112004	EW05_022619				SAMPLE	3	1906112004-A	E6850Q41.3	5480	3/26/2019	3/13/2019	
11	1906112005	EW05_022619_FD				FLDDUP	3	1906112005-A	E6850Q41.3	5480	3/26/2019	3/13/2019	
12	1906112006	EW02_022619				SAMPLE	3	1906112006-A	E6850Q41.3	5480	3/26/2019	3/13/2019	
13	1906112007	EW06_022619				SAMPLE	3	1906112007-A	E6850Q41.3	5480	3/26/2019	3/13/2019	
14	1906112008	EW03_022619				SAMPLE	3	1906112008-A	E6850Q41.3	5480	3/26/2019	3/13/2019	
15	1906112009	EW07_022619				SAMPLE	3	1906112009-A	E6850Q41.3	5480	3/26/2019	3/13/2019	
16	642101	CCV for HBN 233911 [ELMS/2223]				CCV	3		E685041C3Q	5311		3/7/2019	
17	1906112010	EW04_022619				SAMPLE	3	1906112010-A	E6850Q41.3	5480	3/26/2019	3/13/2019	
18	1906112011	EW08_022619				SAMPLE	3	1906112011-A	E6850Q41.3	5480	3/26/2019	3/13/2019	
19	1906330001	LH18/24-SP140_022819				SAMPLE	3	1906330001-A	E6850Q41.3	5480	3/28/2019	3/14/2019	
20	1906332001	LH18/24-SP650_022819_BIX				SAMPLE	3	1906332001-A	E6850Q41.3	5480	3/28/2019	3/14/2019	
21	1906334001	LH18-24-SP650_022819_BIX				SAMPLE	3	1906334001-A	E6850Q41.3	5480	3/28/2019	3/14/2019	
22	642102	CCV for HBN 233911 [ELMS/2223]				CCV	3		E685041C3Q	5311		3/7/2019	

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Analytical Documentation

ALS Work Order #'s & Sample #( )'s: 1905651 (001); 1906112 (001-11); 1906330 (001); 1906332 (001); 1906334 (001) ELMS Batch/HBN ID: 2223 (233911)
Prep Date: 03/04/2019 Analysis Date: 03/05/2019 Analyst: T. Bosch
Analyte: **Perchlorate** Matrix: **Water** Method: **6850**
Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\MAR\05MAR19D.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 02/15/2019, sequence 15FEB19D.s Offline Quantitation Method: CLO4-DP1.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: 3 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 642100; Target = 4.0µg/L. ASTM type II water was used for LMB 642099.

MS/MSD: The Matrix Spike and duplicate (MS/MSD) were performed on samples 1906112002/03 (Client ID's: EW01_022619). 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 1906112004/05 were re-analyzed and reported from 1:10 dilutions. Field sample 1906330001 was analyzed and reported from a 1:100 dilution. The reporting limits have been adjusted accordingly. Sample 1906112007 failed the 50-150% method requirement for ISTD recovery. This sample was re-prepped, re-analyzed and reported.
2) All QC, Blank, CCV, and MS/MSD results were within method parameters, except for the following. The Matrix Spike and duplicate (MS/MSD) failed QC acceptance criteria for percent recoveries. The MS/MSD 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\MAR\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\23911-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\HBN#
5) The Reporting Limit Verification Standard (RLVS – 642097) is reported from the analysis of the Laboratory Control Sample (LCS – 642100) 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: 15FEBI04) along with datafiles 05MARD07-10.

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

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

Chromatography (GC, HPLC, LC/MS) Technical Review Criteria Batch(es)/SDG: ELMS: 2223 HBN: 233911 Sample Set IDs if Applicable: 1905651/1906012/1906330/1906332/1906334	Analyst Initials	Reviewer Initials
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
MFG: ALS/SLC
MFG Lot: TNB: 09/18/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/18/2018 02:09PM

Amount: 10 mL
Expires: 09/18/2019
Usable: Yes
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
MFG: ALS/SLC
MFG Lot: TNB: 09/18/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 09/18/2018 02:09PM

Amount: 10 mL
Expires: 09/18/2019
Usable: Yes
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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
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
MFG: ALS/SLC
MFG Lot: TNB: 05/09/2018
Pipette ID: Not Provided

Created By: Thomas Bosch
Create Date: 05/09/2018 10:05AM

Amount: 10 mL
Expires: 05/09/2019
Usable: Yes
Lab Lot: CLO4 QC INT 10.ug/mL

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

Composition

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

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			

ALS

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

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

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

Product Number:	ICC-013	Lot Issue Date:	29-Feb 2016
Lot Number:	CP-0860	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.

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

ISO Guide 34 Reference Material

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

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

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

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

D. Lamendola
Daniel J. Lamendola
Director of QA/RA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER
ANAB ACCREDITED TESTING LABORATORY

125 Market Street
New Haven, CT 06513
USA

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

AccuStandard®

CERTIFICATE OF ANALYSIS

S 43659

AccuTrace™ Reference Standard

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

Signal Word: None

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

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

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

Certified By: Meigan O'Leary

Meigan O'Leary, Inorganic QC Manager

For use in routine laboratory analysis.

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

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

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-DP1.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
*	642096 CCV@25	Vial 71	1	Control	1	2.57589e6	8.017	25.04585
*	642100 QC@4.0	Vial 72	1	Control	2	4.23307e5	8.139	4.10749
*	642098 ICS@4.0	Vial 73	1	Control	3	3.17619e5	7.883	3.92708
*	642099 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1905651001	Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1906112001	Vial 76	1	Sample	6	7.71127e6	7.438	51.25151
*	1906112002 MS	Vial 77	1	Sample	7	8.02696e6	7.464	53.87972
*	1906112003 MSD	Vial 78	1	Sample	8	7.94242e6	7.442	53.69940
*	1906112004	Vial 79	1	Sample	9	2.33017e7	7.227	172.36522
*	1906112005	Vial 80	1	Sample	10	2.30991e7	7.229	180.38568
*	1906112006	Vial 81	1	Sample	11	0.00000	0.000	0.00000
*	1906112007	Vial 82	1	Sample	12	0.00000	0.000	0.00000
*	1906112008	Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1906112009	Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	1906112010	Vial 85	1	Sample	15	0.00000	0.000	0.00000
*	1906112011	Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	642101 CCV@25	Vial 71	1	Control	17	2.33611e6	8.114	25.01987
*	1906332001	Vial 88	1	Sample	19	0.00000	0.000	0.00000
*	1906334001	Vial 89	1	Sample	20	0.00000	0.000	0.00000
*	1906112004 10X	Vial 90	1	Sample	21	2.53126e6	7.736	226.48155
*	1906112005 10X	Vial 91	1	Sample	22	2.68237e6	7.739	241.03710
*	1906112007 RE	Vial 82	1	Sample	23	0.00000	0.000	0.00000
*	1906330001 100	Vial 92	1	Sample	24	3.77363e6	8.090	3708.65666
*	642102 CCV@25	Vial 71	1	Control	25	2.15787e6	8.144	24.45533

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	642096 CCV@25	Vial 71	1	Control	1	6.79028e5	8.036	25.15984
*	642100 QC@4.0	Vial 72	1	Control	2	1.27412e5	8.156	4.45187
*	642098 ICS@4.0	Vial 73	1	Control	3	9.68721e4	7.906	4.29888
*	642099 LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1905651001	Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1906112001	Vial 76	1	Sample	6	2.02786e6	7.452	51.10329
*	1906112002 MS	Vial 77	1	Sample	7	2.14637e6	7.478	54.46797
*	1906112003 MSD	Vial 78	1	Sample	8	2.10991e6	7.456	53.98100
*	1906112004	Vial 79	1	Sample	9	6.79668e6	7.243	180.45962
*	1906112005	Vial 80	1	Sample	10	6.82834e6	7.246	190.34382
*	1906112006	Vial 81	1	Sample	11	0.00000	0.000	0.00000
*	1906112007	Vial 82	1	Sample	12	0.00000	0.000	0.00000
*	1906112008	Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1906112009	Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	1906112010	Vial 85	1	Sample	15	0.00000	0.000	0.00000
*	1906112011	Vial 86	1	Sample	16	0.00000	0.000	0.00000
*	642101 CCV@25	Vial 71	1	Control	17	6.28961e5	8.128	25.63410
*	1906332001	Vial 88	1	Sample	19	0.00000	0.000	0.00000
*	1906334001	Vial 89	1	Sample	20	0.00000	0.000	0.00000
*	1906112004 10X	Vial 90	1	Sample	21	6.46870e5	7.754	220.91905
*	1906112005 10X	Vial 91	1	Sample	22	6.95643e5	7.756	238.44674
*	1906112007 RE	Vial 82	1	Sample	23	0.00000	0.000	0.00000
*	1906330001 100	Vial 92	1	Sample	24	1.01021e6	8.102	3771.67475
*	642102 CCV@25	Vial 71	1	Control	25	5.83711e5	8.160	25.16652

Batch Report: C:\HPCHEM\1\DATA\05MAR19D\05MAR19S.B

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	642096 CCV@25	Vial 71	1	Control	1	3.12207e5	8.043	5.00000
*	642100 QC@4.0	Vial 72	1	Control	2	3.41038e5	8.157	5.00000
*	642098 ICS@4.0	Vial 73	1	Control	3	2.68237e5	7.902	5.00000
*	642099 LMB	Vial 74	1	Control	4	3.53313e5	8.102	5.00000
*	1905651001	Vial 75	1	Sample	5	3.26356e5	7.780	5.00000
*	1906112001	Vial 76	1	Sample	6	4.26473e5	7.464	5.00000
*	1906112002 MS	Vial 77	1	Sample	7	4.19549e5	7.491	5.00000
*	1906112003 MSD	Vial 78	1	Sample	8	4.16709e5	7.467	5.00000
*	1906112004	Vial 79	1	Sample	9	2.95705e5	7.253	5.00000
*	1906112005	Vial 80	1	Sample	10	2.75946e5	7.263	5.00000
*	1906112006	Vial 81	1	Sample	11	3.73575e5	7.480	5.00000
*	1906112007	Vial 82	1	Sample	12	5.00533e5	7.256	5.00000
*	1906112008	Vial 83	1	Sample	13	4.65121e5	7.237	5.00000
*	1906112009	Vial 84	1	Sample	14	2.43675e5	7.672	5.00000
*	1906112010	Vial 85	1	Sample	15	2.51865e5	7.710	5.00000
*	1906112011	Vial 86	1	Sample	16	2.80792e5	7.876	5.00000
*	642101 CCV@25	Vial 71	1	Control	17	2.83460e5	8.140	5.00000
*	1906332001	Vial 88	1	Sample	19	2.64674e5	7.827	5.00000
*	1906334001	Vial 89	1	Sample	20	2.65662e5	7.808	5.00000
*	1906112004 10X	Vial 90	1	Sample	21	3.41608e5	7.756	50.00000
*	1906112005 10X	Vial 91	1	Sample	22	3.38724e5	7.764	50.00000
*	1906112007 RE	Vial 82	1	Sample	23	4.31135e5	7.332	5.00000
*	1906330001 100	Vial 92	1	Sample	24	2.98985e5	8.111	500.00000
*	642102 CCV@25	Vial 71	1	Control	25	2.68305e5	8.165	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

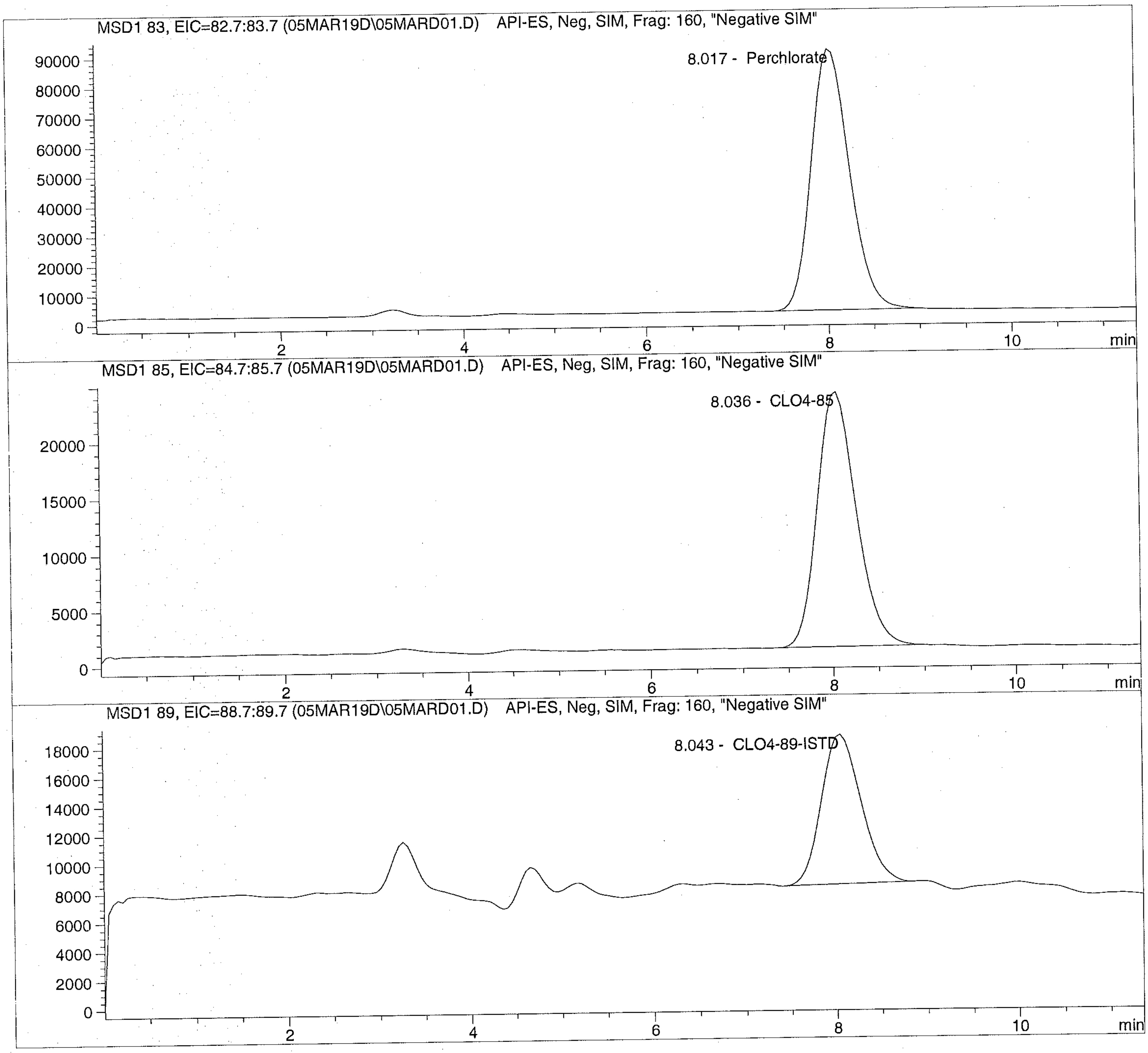
Line	Location	SampleName		Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	642096	CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	642100	QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	642098	ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	642099	LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1905651001		CLO4-AQN	1	Sample		
6	Vial 76	1906112001		CLO4-AQN	1	Sample		
7	Vial 77	1906112002	MS	CLO4-AQN	1	Sample		
8	Vial 78	1906112003	MSD	CLO4-AQN	1	Sample		
9	Vial 79	1906112004		CLO4-AQN	1	Sample		
10	Vial 80	1906112005		CLO4-AQN	1	Sample		
11	Vial 81	1906112006		CLO4-AQN	1	Sample		
12	Vial 82	1906112007		CLO4-AQN	1	Sample		
13	Vial 83	1906112008		CLO4-AQN	1	Sample		
14	Vial 84	1906112009		CLO4-AQN	1	Sample		
15	Vial 85	1906112010		CLO4-AQN	1	Sample		
16	Vial 86	1906112011		CLO4-AQN	1	Sample		
17	Vial 71	642101	CCV@25	CLO4-AQN	1	Ctrl Samp		
18	Vial 87	1906330001	1K	CLO4-AQN	1	Sample		
19	Vial 88	1906332001		CLO4-AQN	1	Sample		
20	Vial 89	1906334001		CLO4-AQN	1	Sample		
21	Vial 90	1906112004	10X	CLO4-AQN	1	Sample		
22	Vial 91	1906112005	10X	CLO4-AQN	1	Sample		
23	Vial 82	1906112007	RE	CLO4-AQN	1	Sample		
24	Vial 92	1906330001	100	CLO4-AQN	1	Sample		
25	Vial 71	642102	CCV@25	CLO4-AQN	1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD01.D Sample Name: 642096 CCV@25

Injection Date:	3/05/2019 08:44:45	Seq Line:	1
Sample Name:	642096 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD01.D Sample Name: 642096 CCV@25

Injection Date:	3/05/2019 08:44:45	Seq Line:	1
Sample Name:	642096 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
8.017	PBA	2575886.3	25.0459	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.036	PBA	679028.4	25.1598	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.043	PBA	312206.9	5.0000	CLO4-89-ISTD

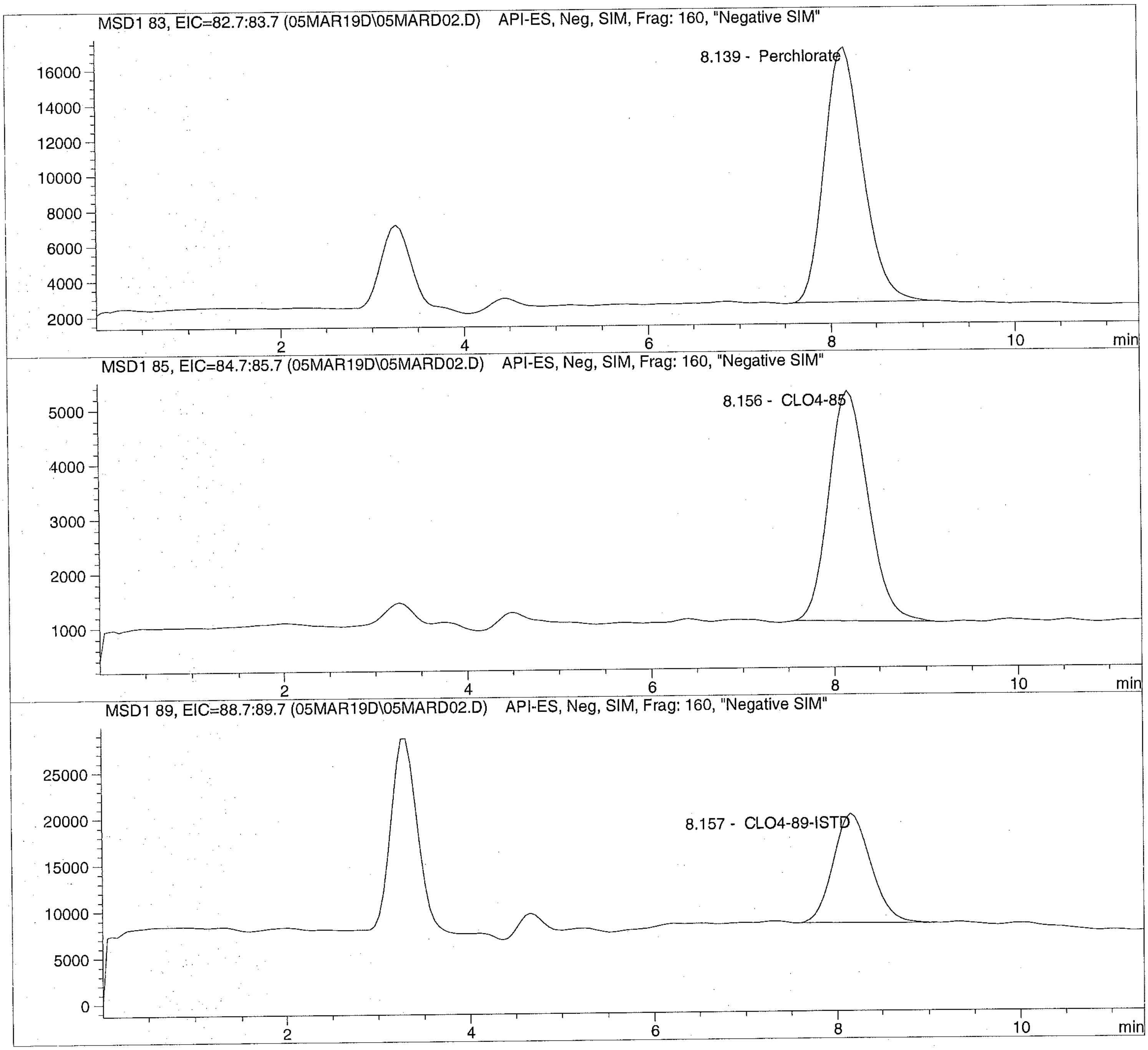
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD02.D   Sample Name: 642100   QC@4.0

Injection Date:	3/05/2019 09:00:30	Seq Line:	2
Sample Name:	642100 QC@4.0	Location:	Vial 72
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD02.D Sample Name: 642100 QC@4.0

===

Injection Date: 3/05/2019 09:00:30 Seq Line: 2
Sample Name: 642100 QC@4.0 Location: Vial 72
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

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Sample Information

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Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
8.139	PBA	423307.1	4.1075	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.156	PBA	127412.0	4.4519	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.157	PBA	341038.3	5.0000	CLO4-89-ISTD

===

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD03.D   Sample Name: 642098   ICS@4.0

===

Injection Date:	3/05/2019 09:13:34	Seq Line:	3
Sample Name:	642098 ICS@4.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

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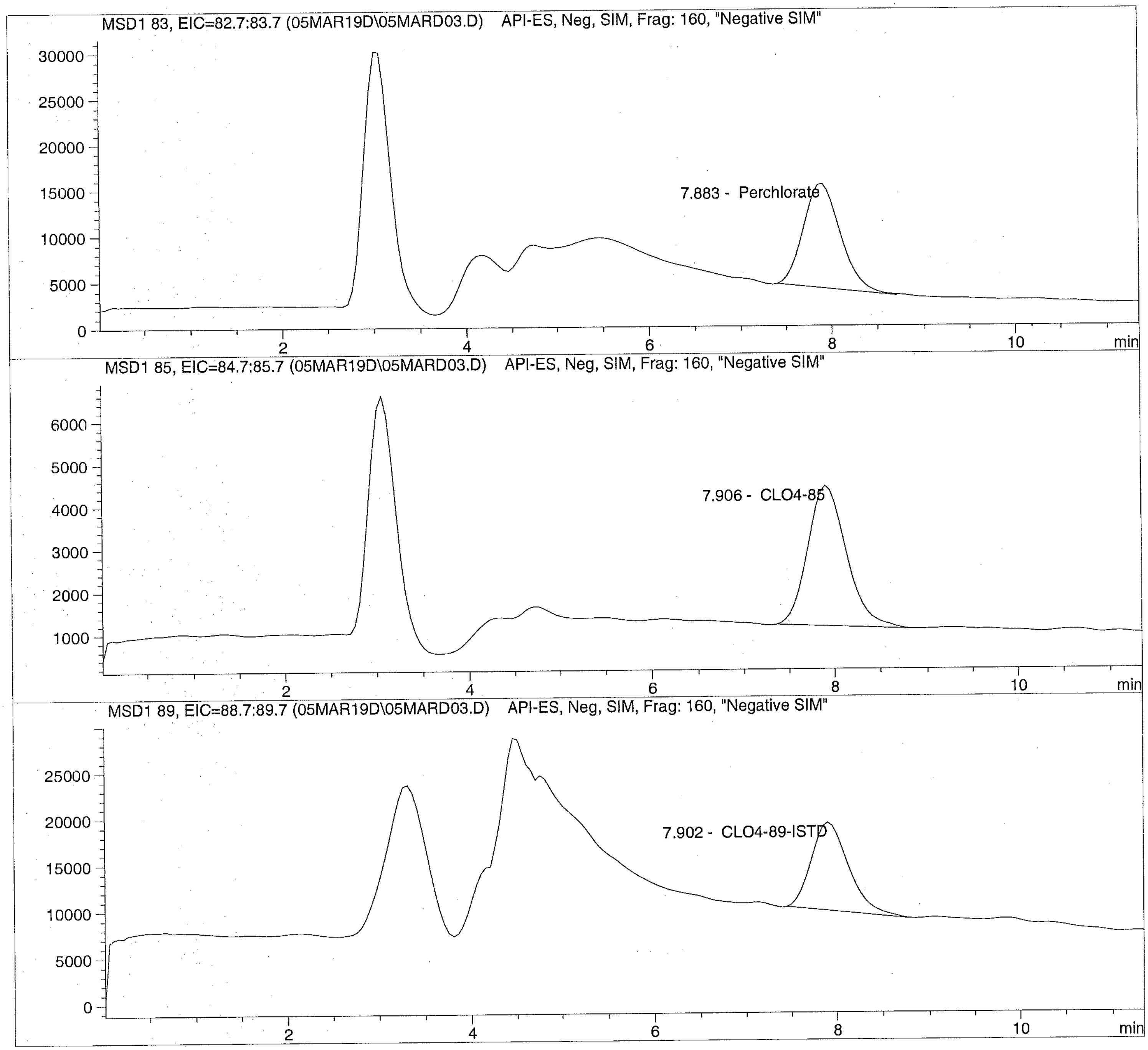

Injection Date:	3/05/2019 09:13:34	Seq Line:	3
Sample Name:	642098 ICS@4.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.883	PBA	317618.9	3.9271	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.906	PBA	96872.1	4.2989	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.902	PBA	268236.7	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD04.D   Sample Name: 642099   LMB

===

Injection Date:	3/05/2019 09:26:40	Seq Line:	4
Sample Name:	642099 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

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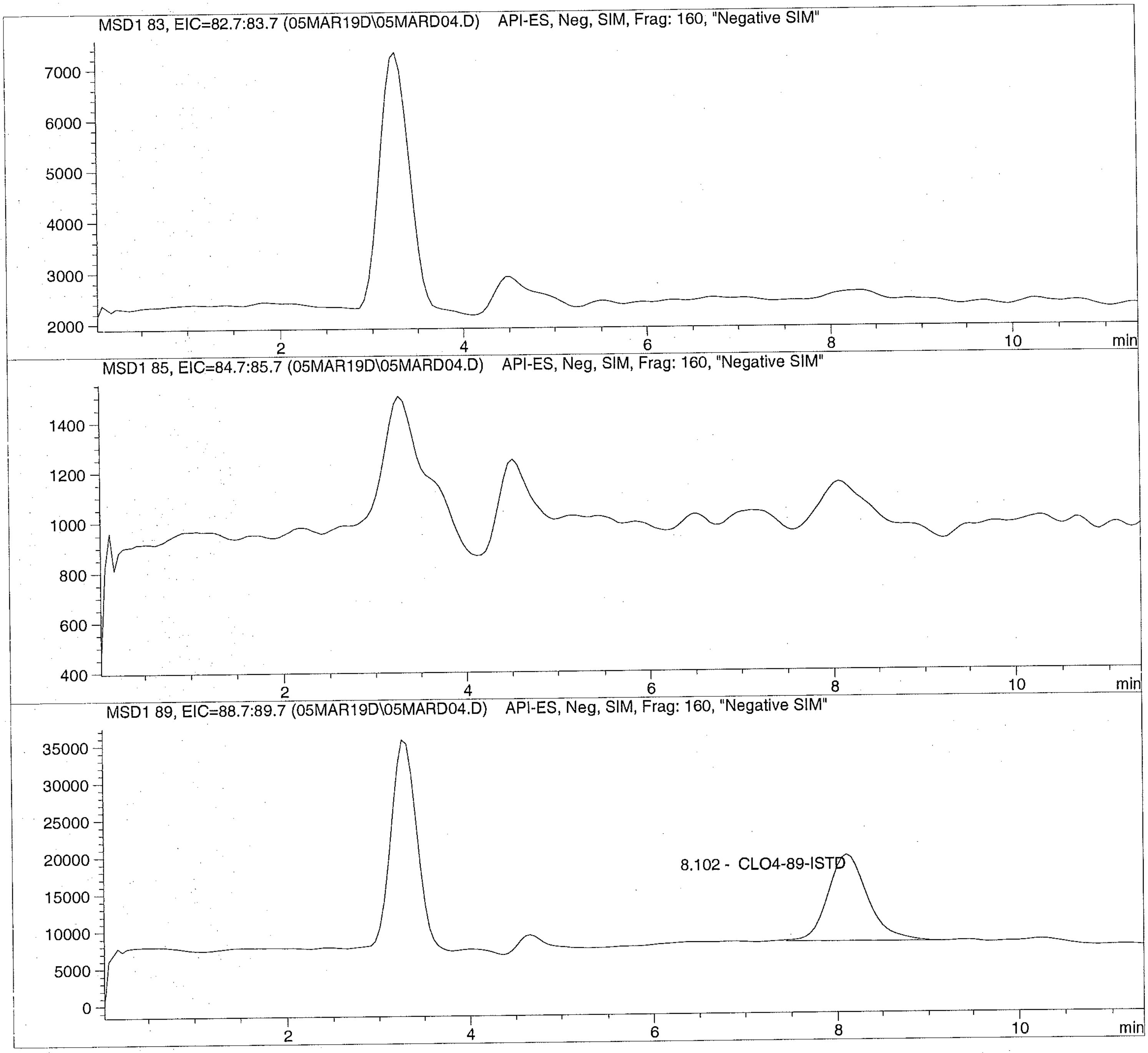


Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD04.D Sample Name: 642099 LMB

Injection Date:	3/05/2019 09:26:40	Seq Line:	4
Sample Name:	642099 LMB	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
8.102	BBA	353313.1	5.0000	CLO4-89-ISTD

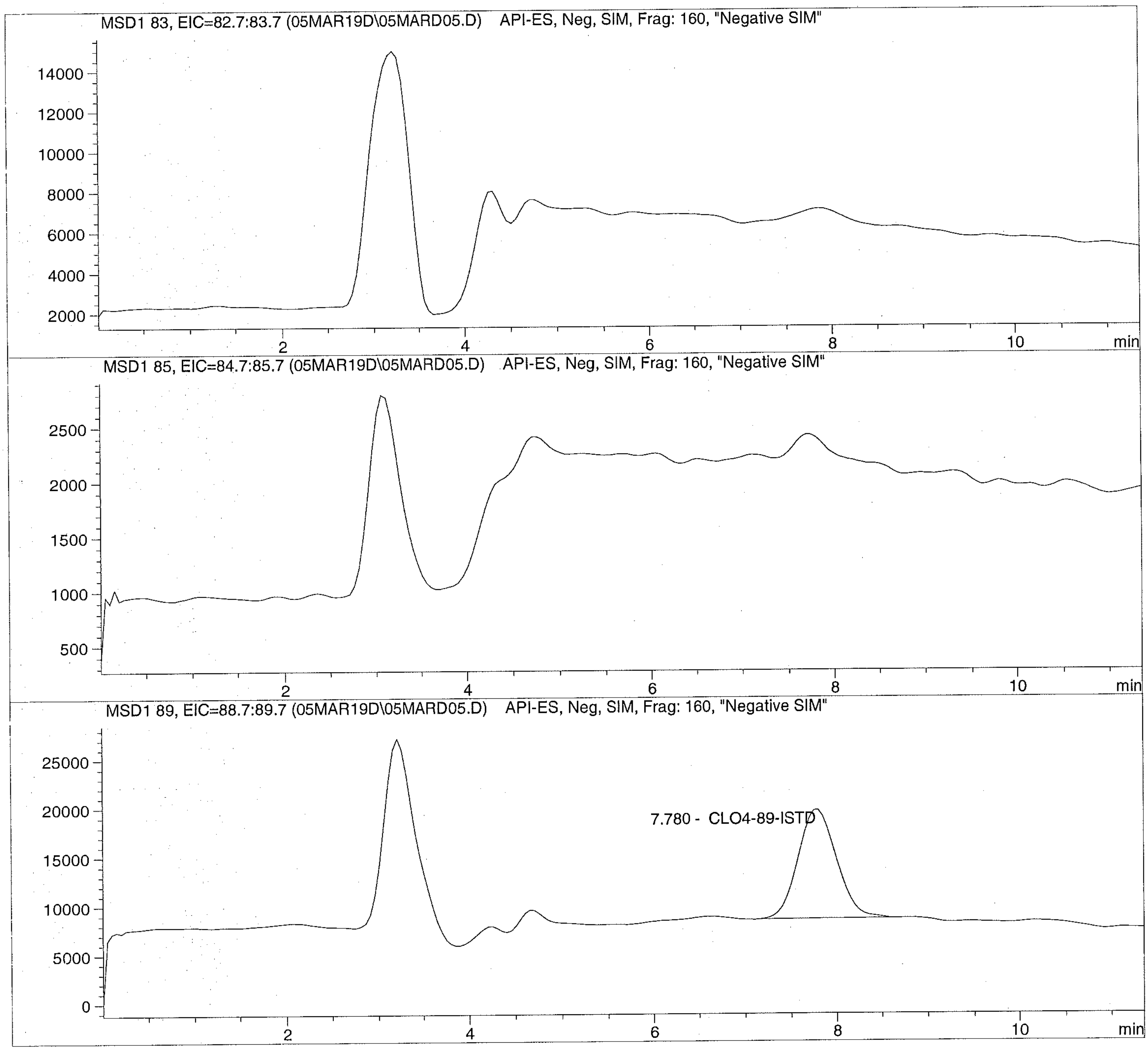
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD05.D   Sample Name: 1905651001

Injection Date:	3/05/2019 09:40:58	Seq Line:	5
Sample Name:	1905651001	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD05.D Sample Name: 1905651001

Injection Date:	3/05/2019 09:40:58	Seq Line:	5
Sample Name:	1905651001	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.780	PBA	326356.2	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD06.D   Sample Name: 1906112001

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Injection Date:	3/05/2019 09:54:04	Seq Line:	6
Sample Name:	1906112001	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

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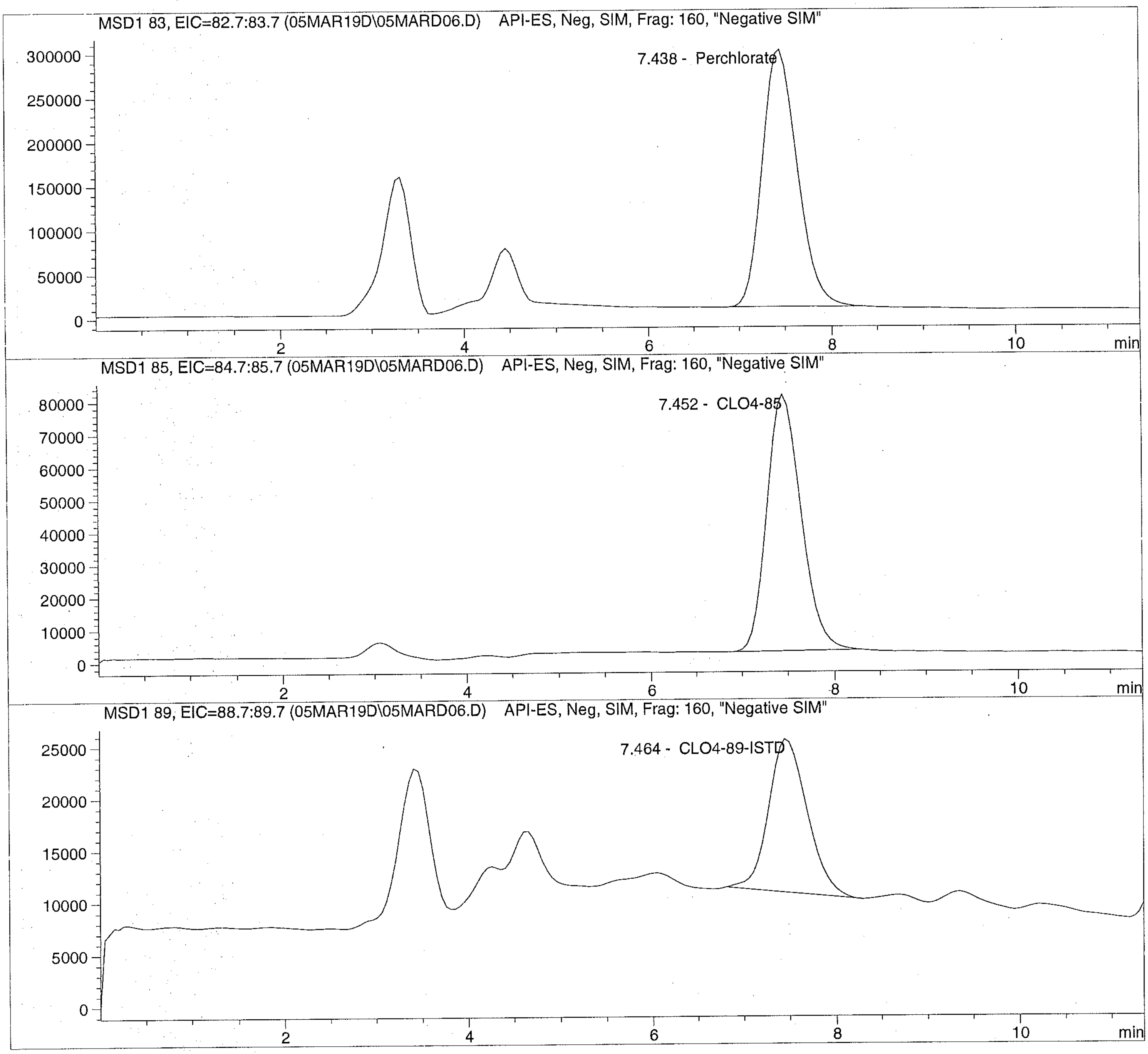


Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD06.D Sample Name: 1906112001

Injection Date:	3/05/2019 09:54:04	Seq Line:	6
Sample Name:	1906112001	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.438	PBA	7711270.5	51.2515	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.452	PBA	2027855.1	51.1033	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.464	PB	426473.5	5.0000	CLO4-89-ISTD

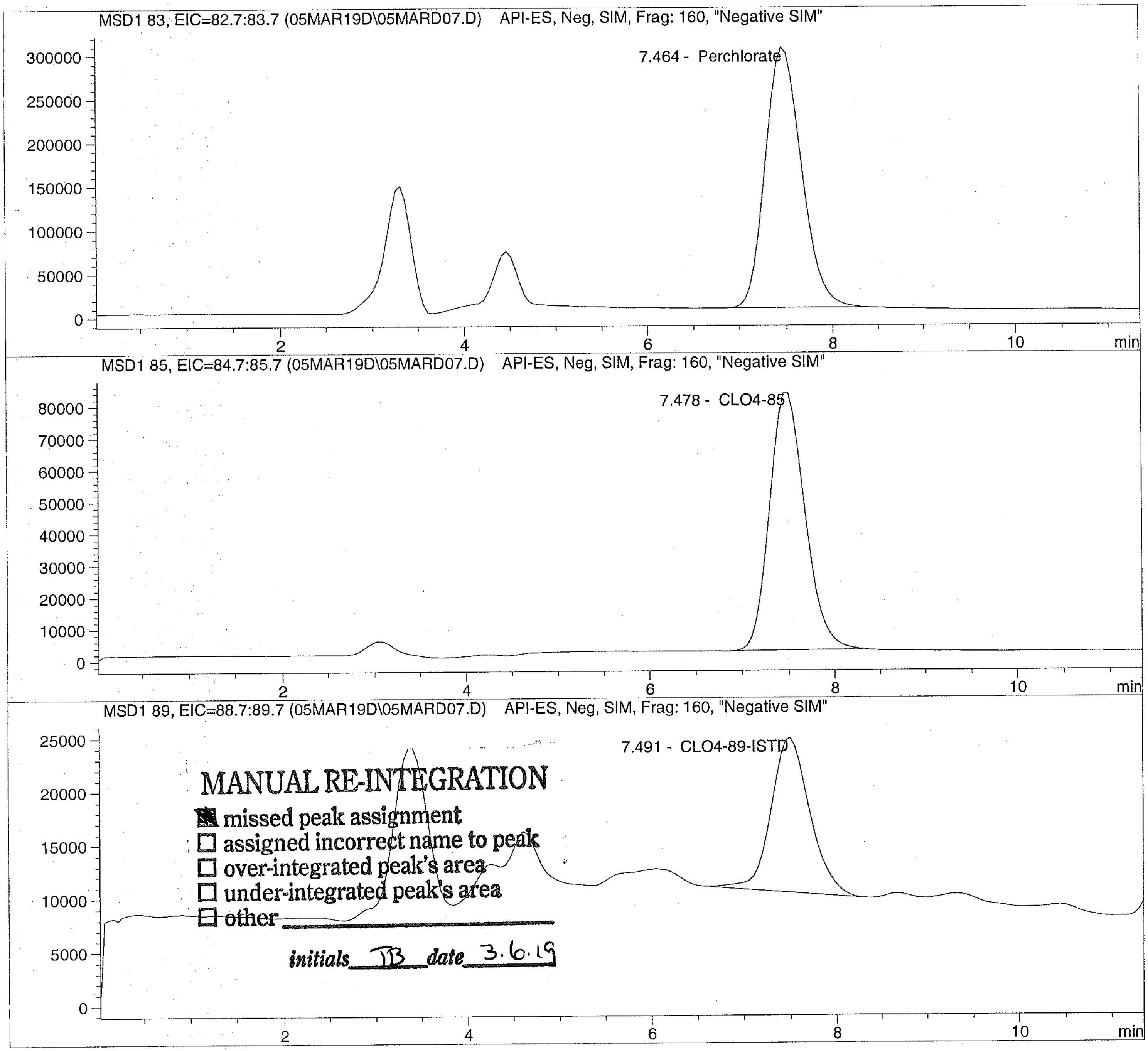
*** End of Report ***

00936146

```
Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD07.D        Sample Name: 1906112002    MS
=====================================================================================
Injection Date:     3/05/2019  10:07:11                Seq Line:                 7
Sample Name:        1906112002    MS                   Location:           Vial 77
Acq Operator:       TNB                                Inj. No.:                 1
                                                       Inj. Vol.:            20 µl

Acq. Method:        CLO4-AQN.M
Analysis Method:    C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:       2/19/2019  12:13:46

Perchlorate analysis
=====================================================================================
```



MANUAL RE-INTEGRATION

- ☒ missed peak assignment
- ☐ assigned incorrect name to peak
- ☐ over-integrated peak's area
- ☐ under-integrated peak's area
- ☐ other ____________

initials TB *date* 3.6.19

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD07.D   Sample Name: 1906112002   MS

Injection Date:	3/05/2019 10:07:11	Seq Line:	7
Sample Name:	1906112002 MS	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.464	PBA	8026959.0	53.8797	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.478	PBA	2146365.0	54.4680	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.491	MM	419549.0	5.0000	CLO4-89-ISTD

*** End of Report ***

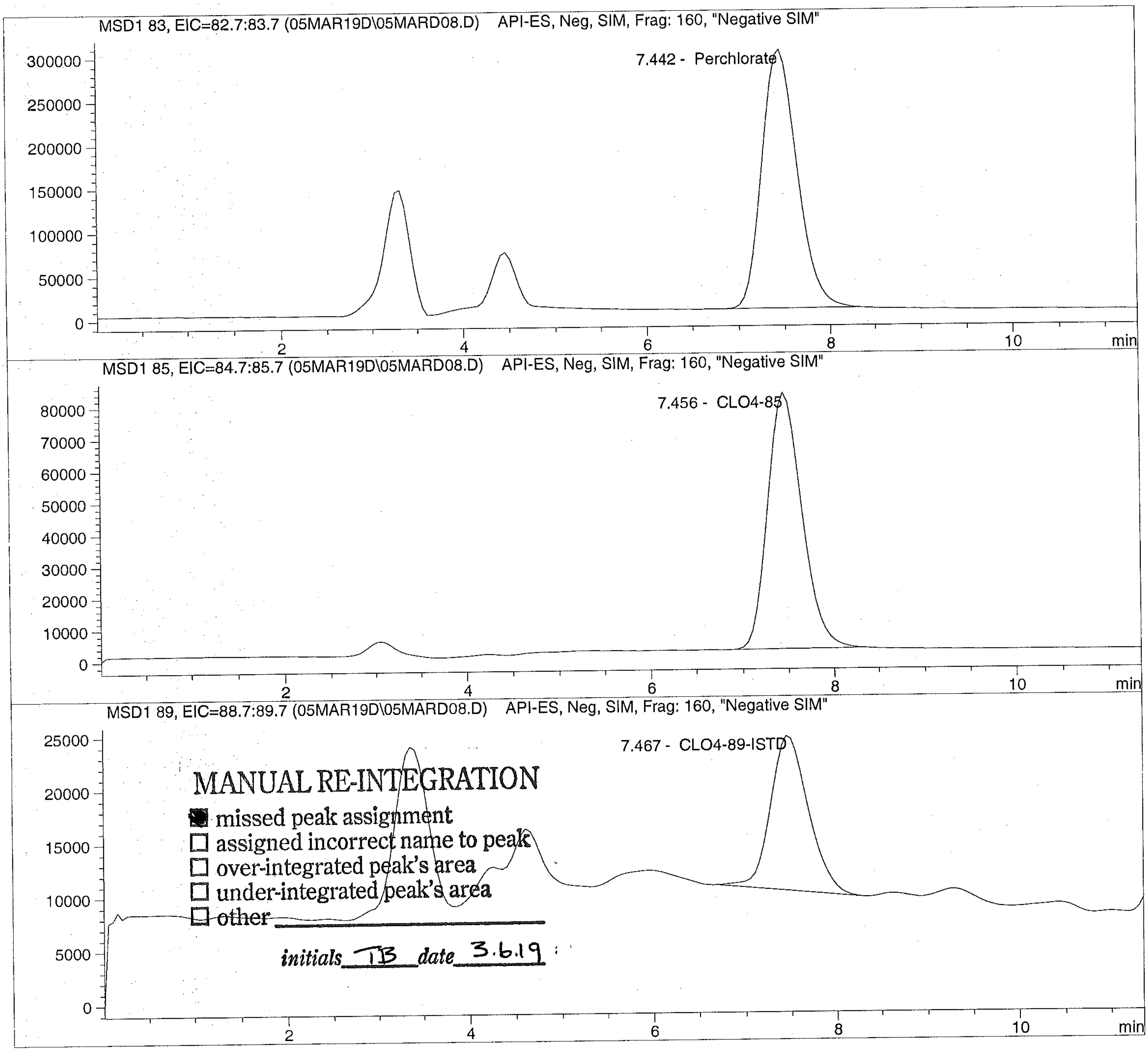
00936148

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD08.D   Sample Name: 1906112003   MSD

Injection Date:	3/05/2019 10:20:17	Seq Line:	8
Sample Name:	1906112003 MSD	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD08.D Sample Name: 1906112003 MSD

Injection Date: 3/05/2019 10:20:17 Seq Line: 8
Sample Name: 1906112003 MSD Location: Vial 78
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.442	PBA	7942422.5	53.6994	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.456	PBA	2109911.2	53.9810	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

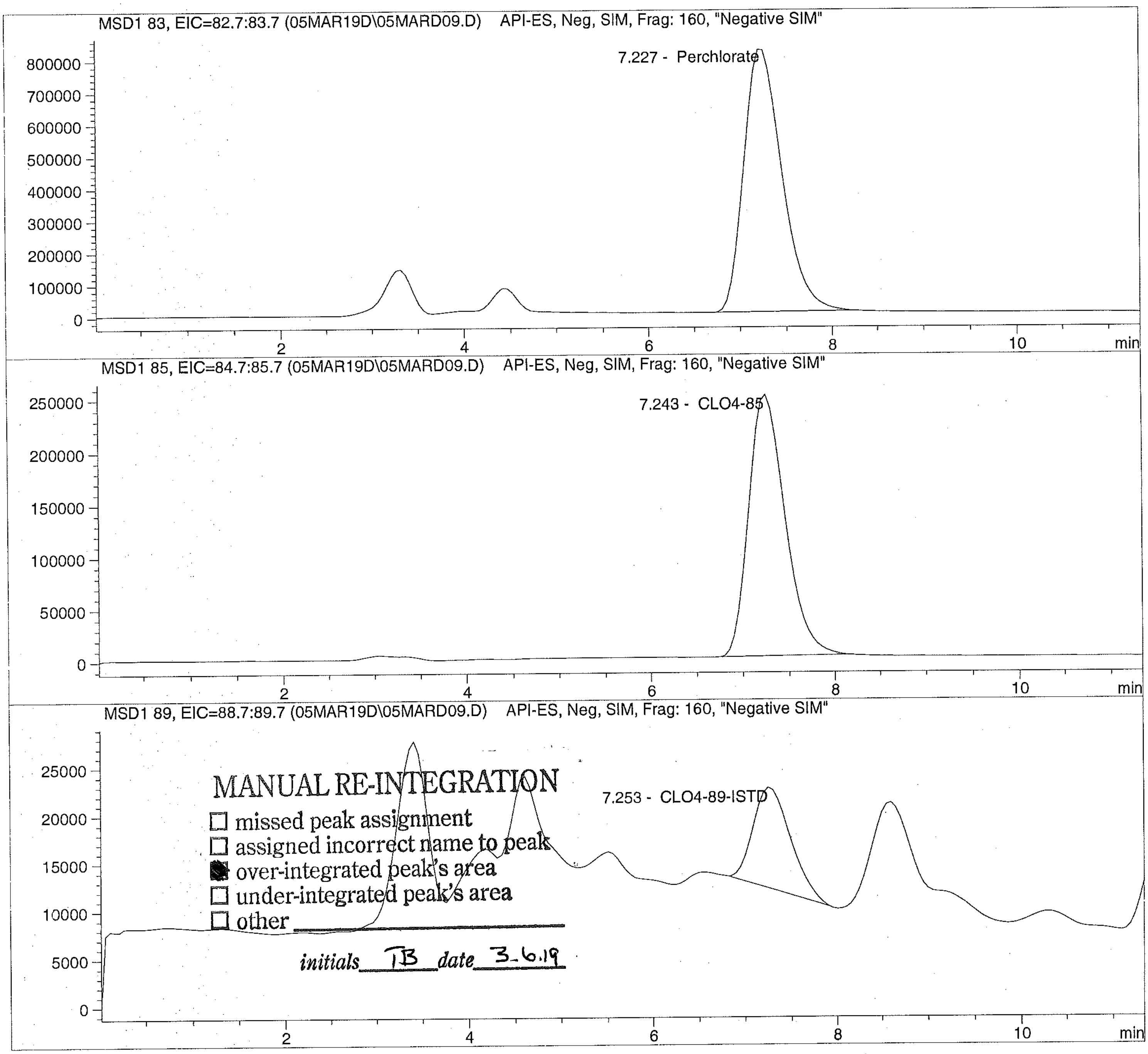
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.467	MM	416709.1	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD09.D        Sample Name: 1906112004
=====================================================================================
Injection Date:     3/05/2019   10:33:21               Seq Line:            9
Sample Name:        1906112004                         Location:      Vial 79
Acq Operator:       TNB                                Inj. No.:            1
                                                       Inj. Vol.:       20 µl

Acq. Method:        CLO4-AQN.M
Analysis Method:    C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:       2/19/2019   12:13:46

Perchlorate analysis
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD09.D Sample Name: 1906112004

Injection Date:	3/05/2019 10:33:21	Seq Line:	9
Sample Name:	1906112004	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.227	PBA	23301694.0	172.3652	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.243	PBA	6796677.5	180.4596	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

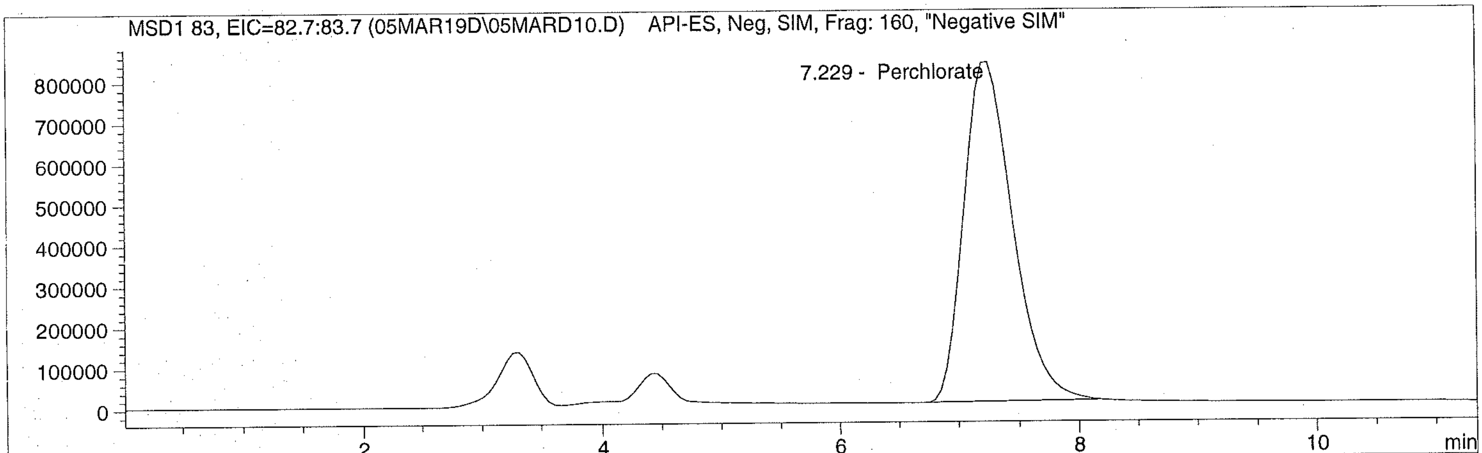
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.253	MM	295705.2	5.0000	CLO4-89-ISTD

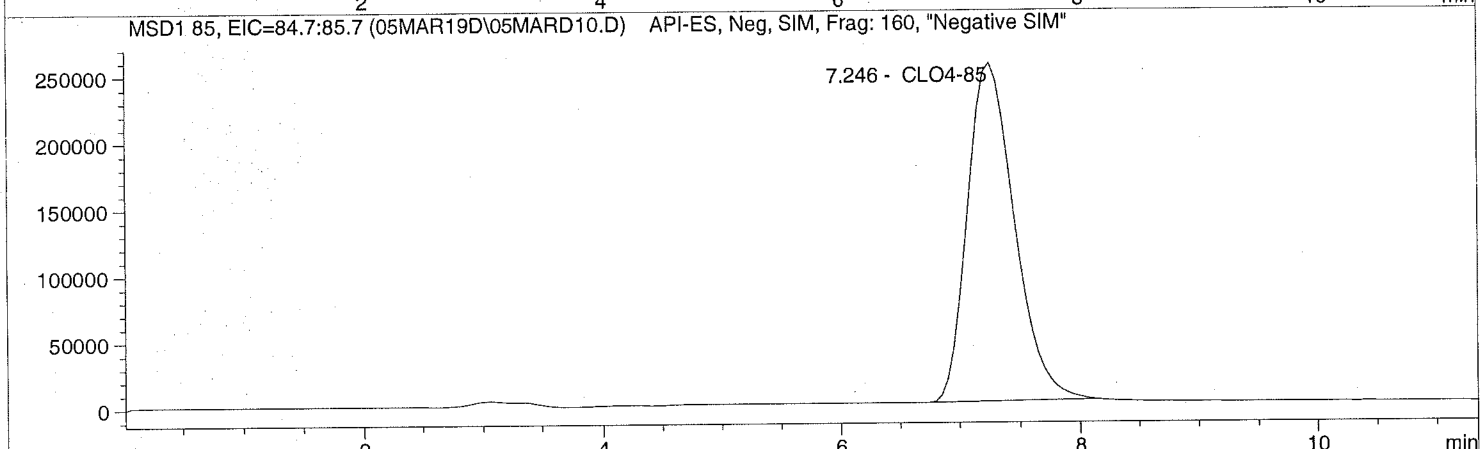
*** End of Report ***

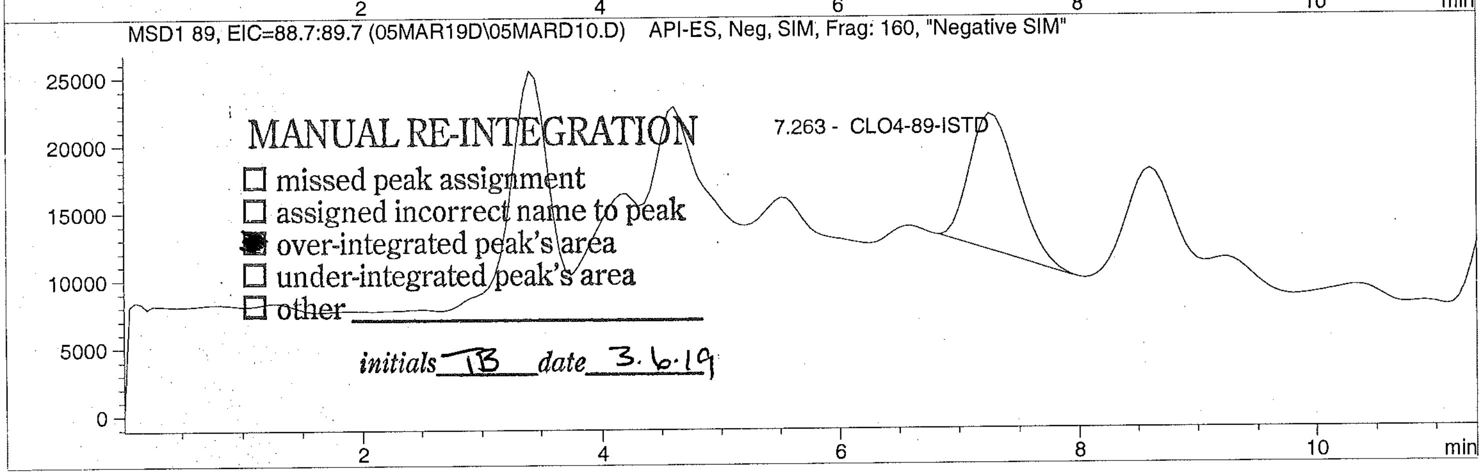
```
Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD10.D        Sample Name: 1906112005
=====================================================================================
Injection Date:    3/05/2019  10:46:26            Seq Line:          10
Sample Name:       1906112005                     Location:     Vial 80
Acq Operator:      TNB                            Inj. No.:           1
                                                  Inj. Vol.:       20 µl

Acq. Method:       CLO4-AQN.M
Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:      2/19/2019  12:13:46

Perchlorate analysis
=====================================================================================
```







MANUAL RE-INTEGRATION
- ☐ missed peak assignment
- ☐ assigned incorrect name to peak
- ☒ over-integrated peak's area
- ☐ under-integrated peak's area
- ☐ other ____________

initials TB *date* 3.6.19

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD10.D Sample Name: 1906112005

===

Injection Date: 3/05/2019 10:46:26 Seq Line: 10
Sample Name: 1906112005 Location: Vial 80
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

===

Sample Information

===

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.229	PBA	23099082.0	180.3857	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.246	PBA	6828341.5	190.3438	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.263	MM	275946.4	5.0000	CLO4-89-ISTD

===

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD11.D Sample Name: 1906112006

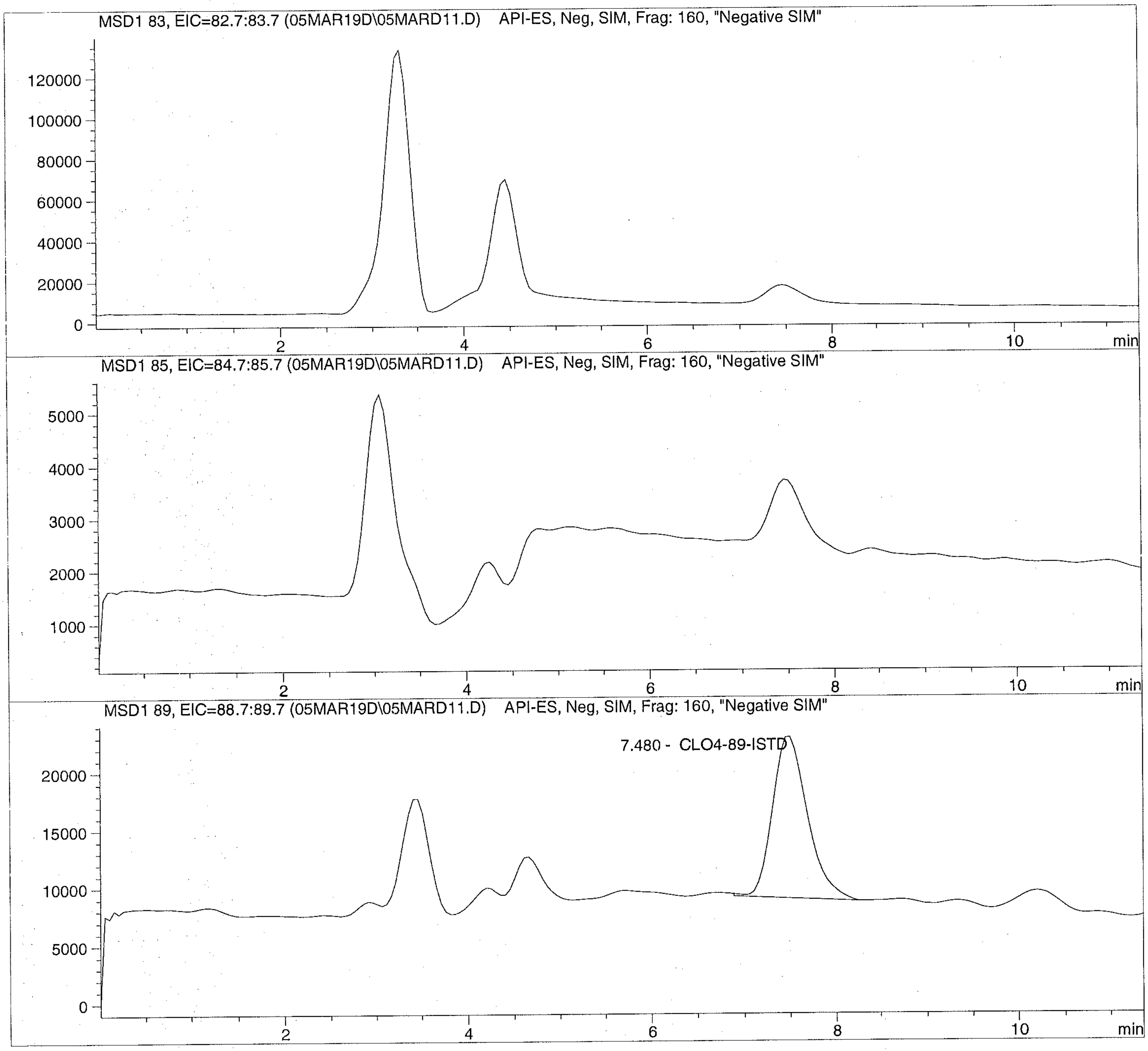
==

Injection Date:	3/05/2019 10:59:36	Seq Line:	11
Sample Name:	1906112006	Location:	Vial 81
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

==



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD11.D Sample Name: 1906112006

==

Injection Date:	3/05/2019 10:59:36	Seq Line:	11
Sample Name:	1906112006	Location:	Vial 81
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

==

Sample Information

==

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.480	BBA	373575.4	5.0000	CLO4-89-ISTD

==

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD12.D Sample Name: 1906112007

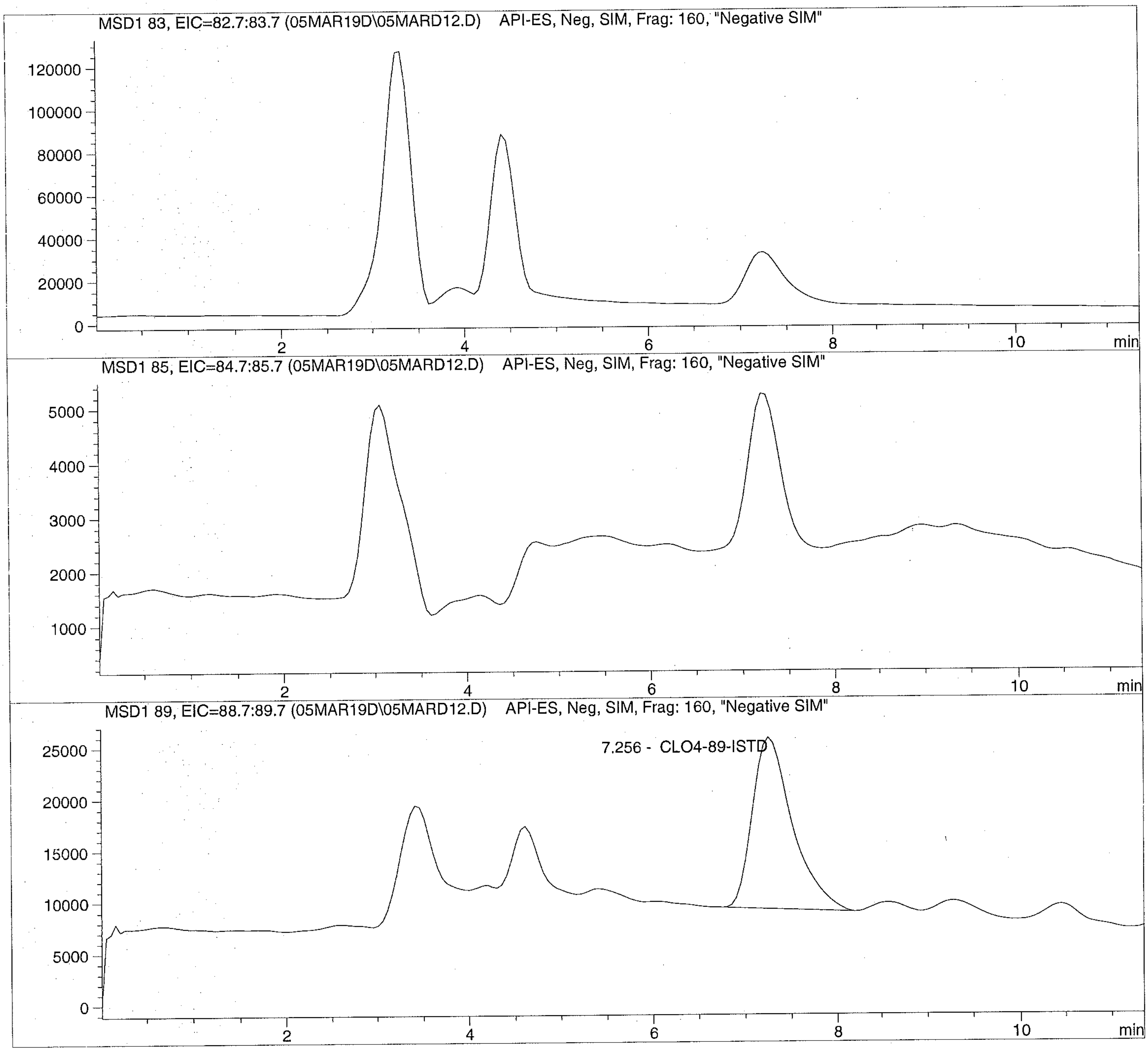
===

Injection Date:	3/05/2019 11:12:28	Seq Line:	12
Sample Name:	1906112007	Location:	Vial 82
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

===



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD12.D   Sample Name: 1906112007

===

Injection Date: 3/05/2019 11:12:28   Seq Line: 12
Sample Name: 1906112007   Location: Vial 82
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

===

Sample Information

===

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.256	PB	500532.9	5.0000	CLO4-89-ISTD

===

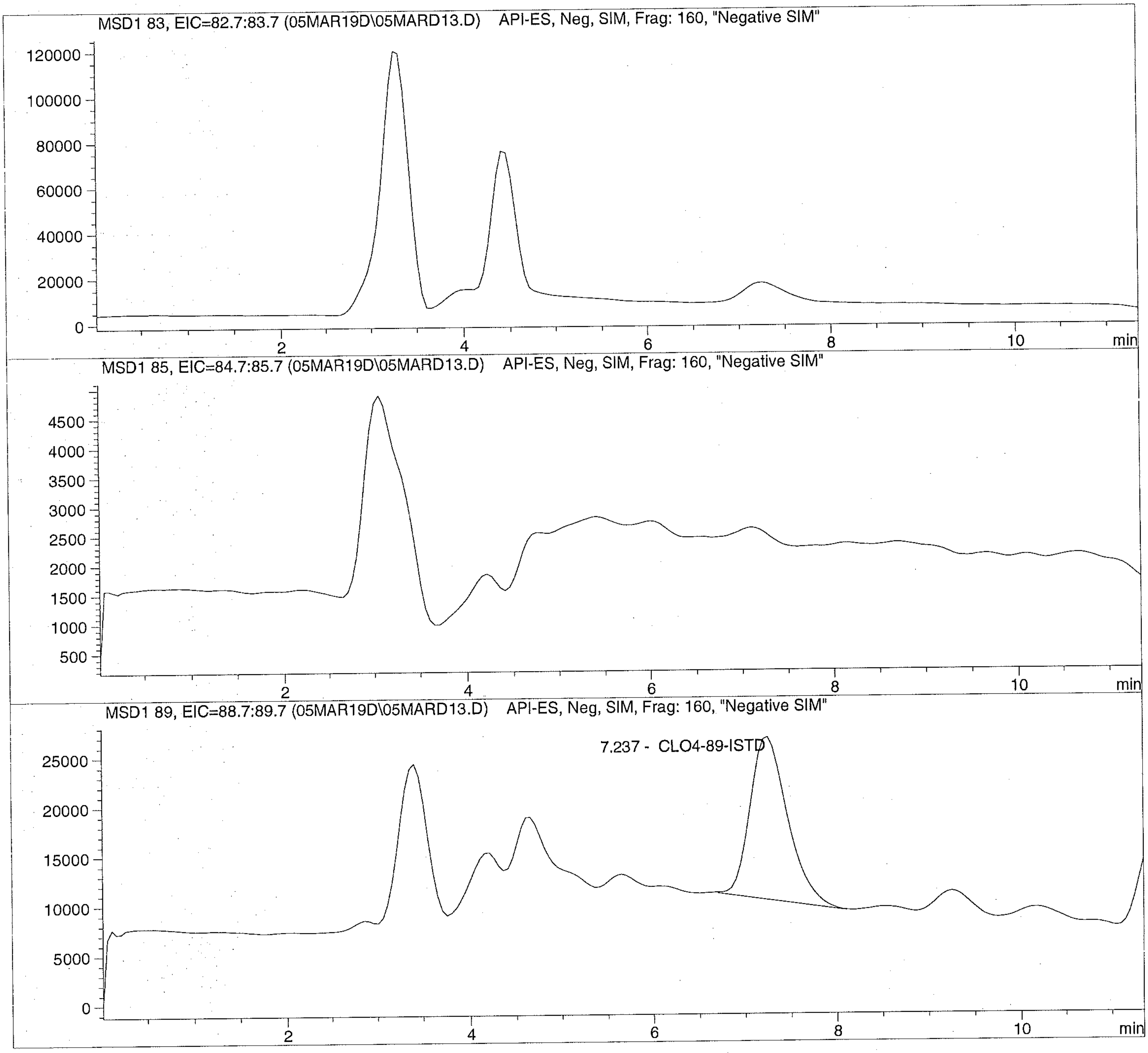
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD13.D Sample Name: 1906112008

Injection Date:	3/05/2019 11:26:23	Seq Line:	13
Sample Name:	1906112008	Location:	Vial 83
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD13.D Sample Name: 1906112008

Injection Date:	3/05/2019 11:26:23	Seq Line:	13
Sample Name:	1906112008	Location:	Vial 83
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 μl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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

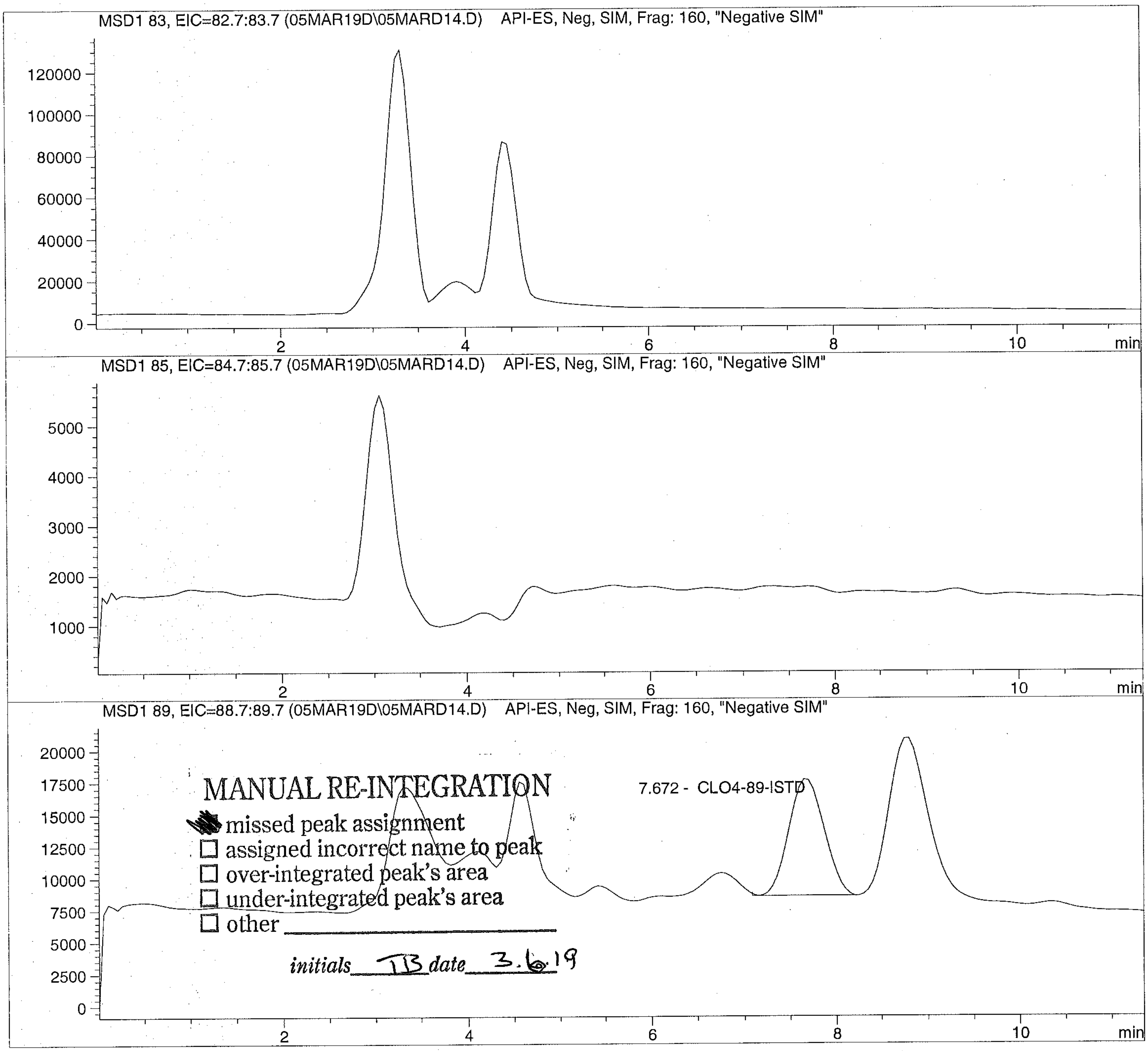
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.237	BBA	465121.2	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD14.D        Sample Name: 1906112009
=================================================================================
Injection Date:    3/05/2019  11:39:24              Seq Line:          14
Sample Name:       1906112009                       Location:       Vial 84
Acq Operator:      TNB                              Inj. No.:            1
                                                    Inj. Vol.:       20 µl

Acq. Method:       CLO4-AQN.M
Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:      2/19/2019  12:13:46

Perchlorate analysis
=================================================================================
```



MANUAL RE-INTEGRATION
- ☒ missed peak assignment
- ☐ assigned incorrect name to peak
- ☐ over-integrated peak's area
- ☐ under-integrated peak's area
- ☐ other ____________

initials TJB *date* 3.6.19

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD14.D Sample Name: 1906112009

Injection Date:	3/05/2019 11:39:24	Seq Line:	14
Sample Name:	1906112009	Location:	Vial 84
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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

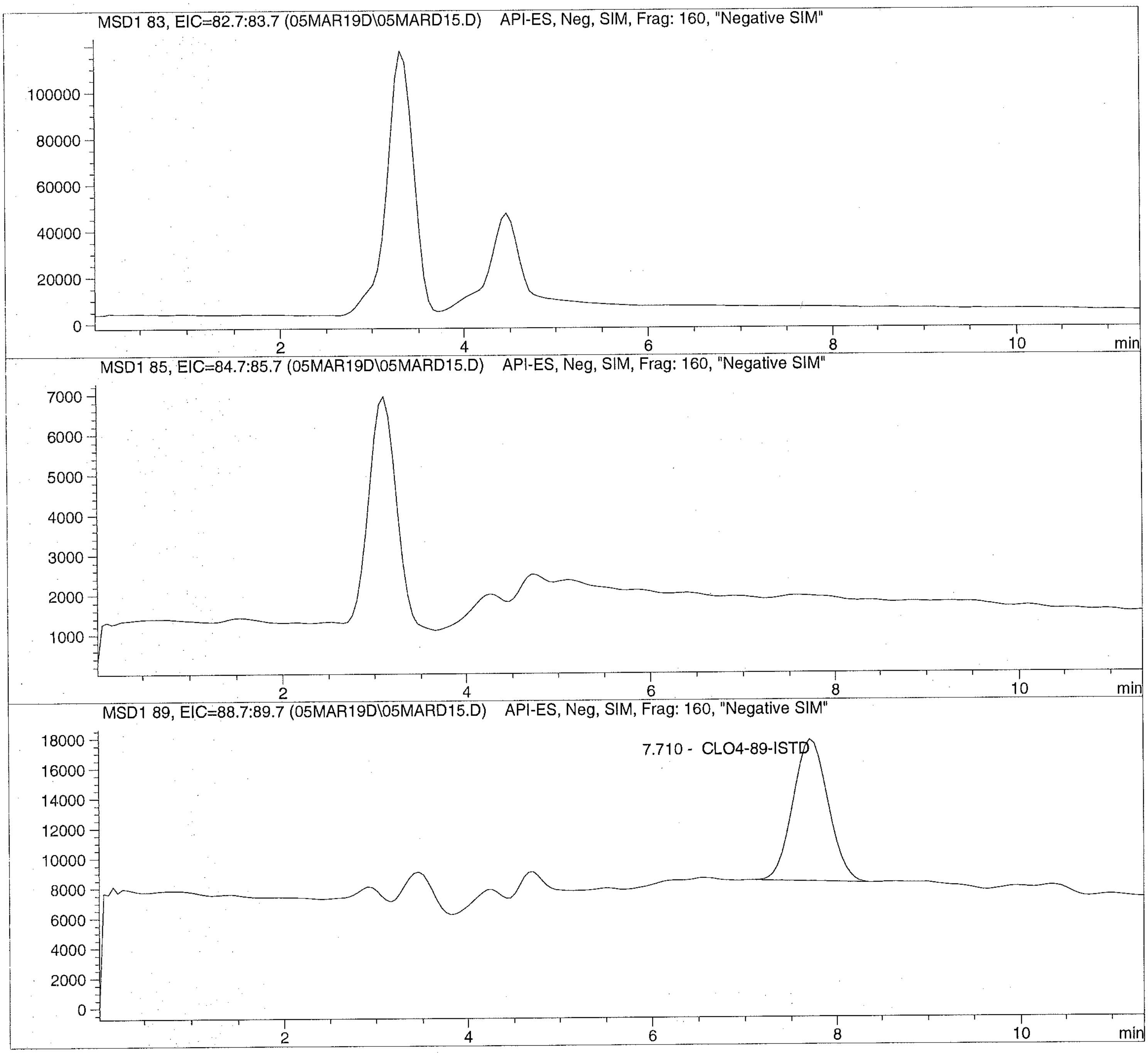
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.672	BB	243675.3	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD15.D          Sample Name: 1906112010
=====================================================================================
Injection Date:     3/05/2019   11:52:27              Seq Line:              15
Sample Name:        1906112010                        Location:         Vial 85
Acq Operator:       TNB                               Inj. No.:               1
                                                      Inj. Vol.:          20 µl

Acq. Method:        CLO4-AQN.M
Analysis Method:    C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:       2/19/2019   12:13:46

Perchlorate analysis
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD15.D Sample Name: 1906112010

Injection Date:	3/05/2019 11:52:27	Seq Line:	15
Sample Name:	1906112010	Location:	Vial 85
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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

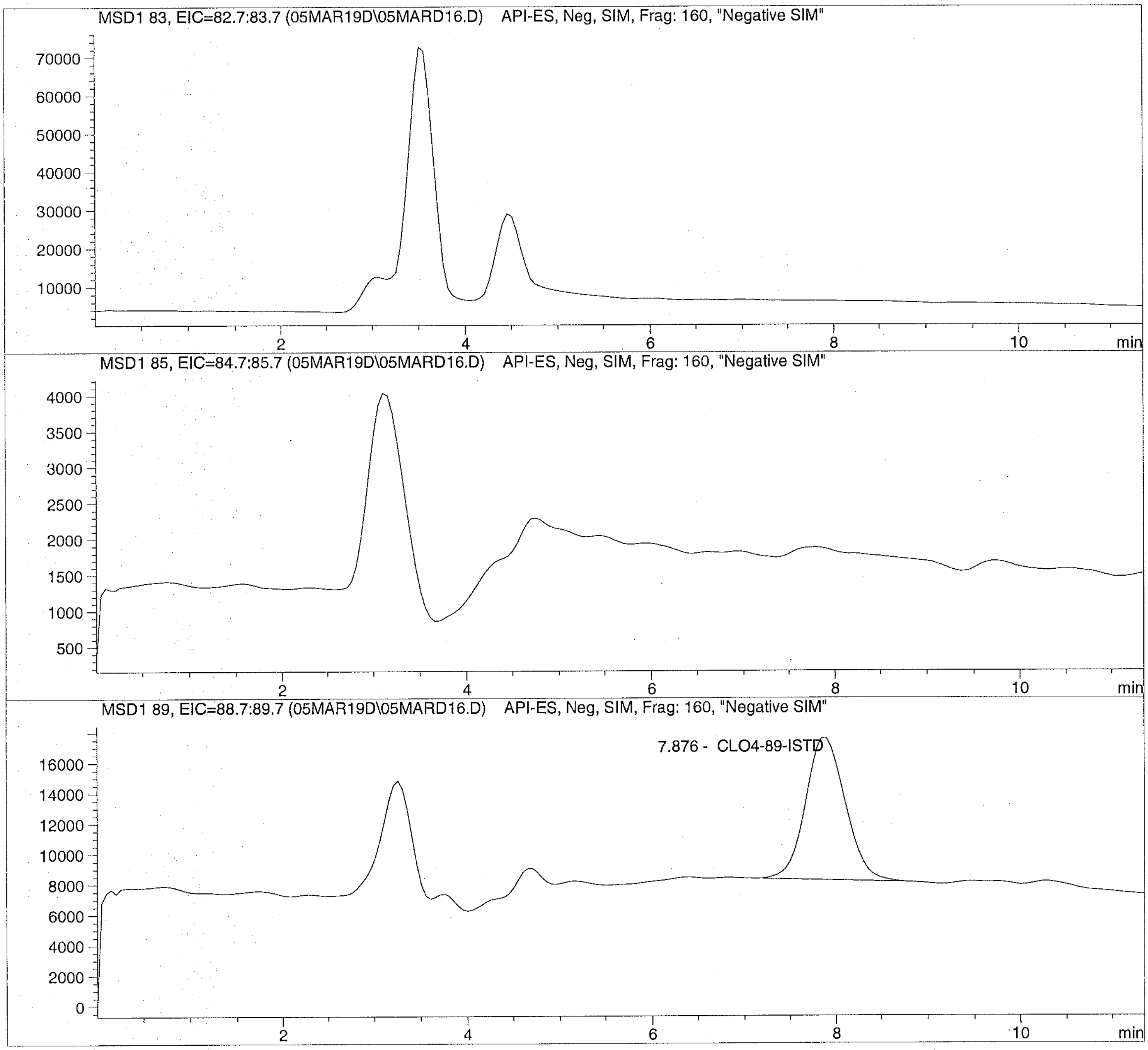
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.710	BBA	251865.4	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD16.D        Sample Name: 1906112011
=====================================================================================
Injection Date:     3/05/2019  12:05:39                  Seq Line:          16
Sample Name:        1906112011                           Location:       Vial 86
Acq Operator:       TNB                                  Inj. No.:           1
                                                         Inj. Vol.:      20 µl

Acq. Method:        CLO4-AQN.M
Analysis Method:    C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:       2/19/2019  12:13:46

Perchlorate analysis
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD16.D Sample Name: 1906112011

Injection Date:	3/05/2019 12:05:39	Seq Line:	16
Sample Name:	1906112011	Location:	Vial 86
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.876	BBA	280792.2	5.0000	CLO4-89-ISTD

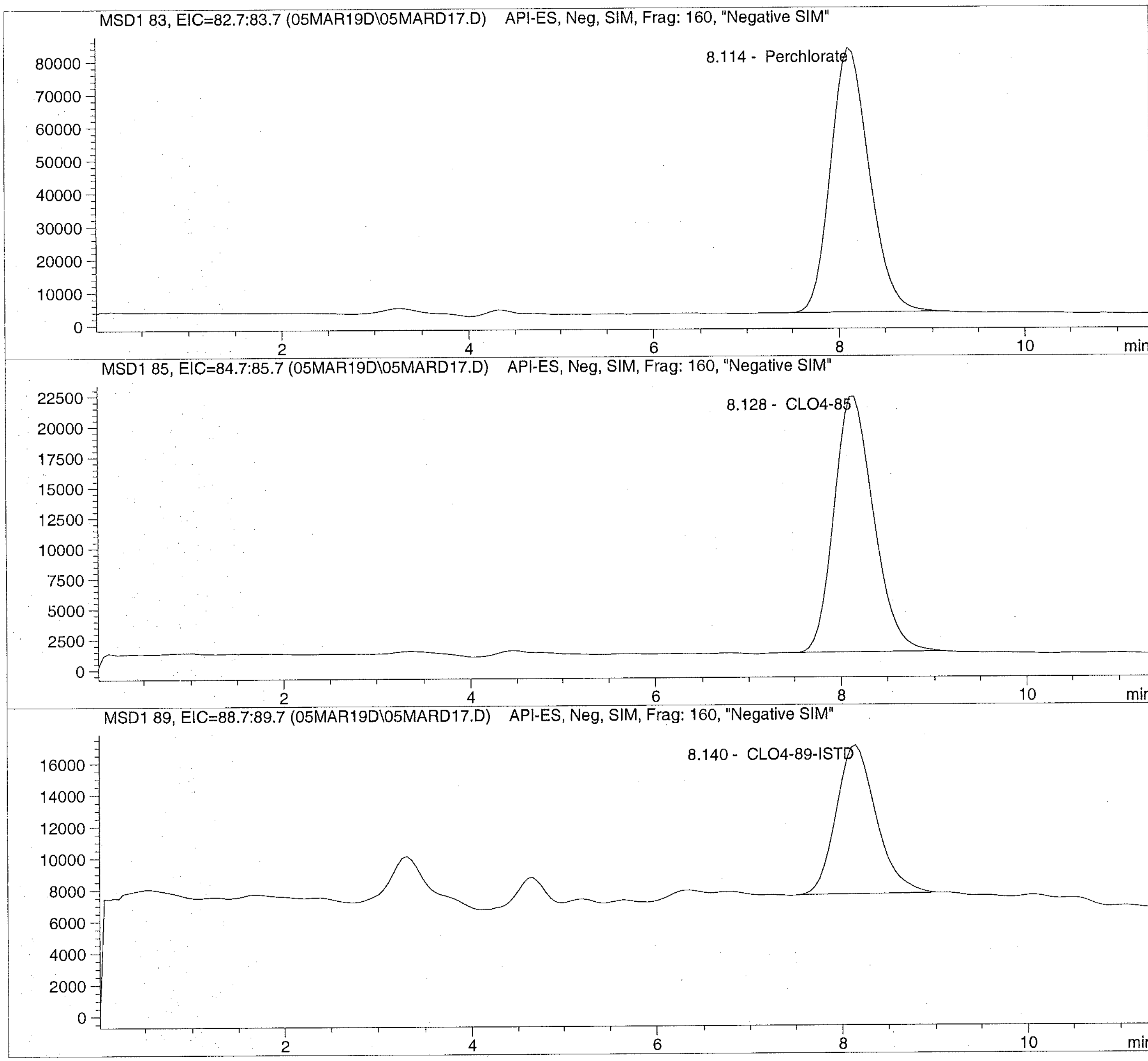
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD17.D   Sample Name: 642101   CCV@25

Injection Date:	3/05/2019 12:18:41	Seq Line:	17
Sample Name:	642101 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD17.D   Sample Name: 642101 CCV@25

Injection Date:	3/05/2019 12:18:41	Seq Line:	17
Sample Name:	642101 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Tue, 19. Feb. 2019,09:07:33 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
8.114	PBA	2336112.7	25.0199	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.128	PBA	628961.2	25.6341	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.140	PBA	283460.4	5.0000	CLO4-89-ISTD

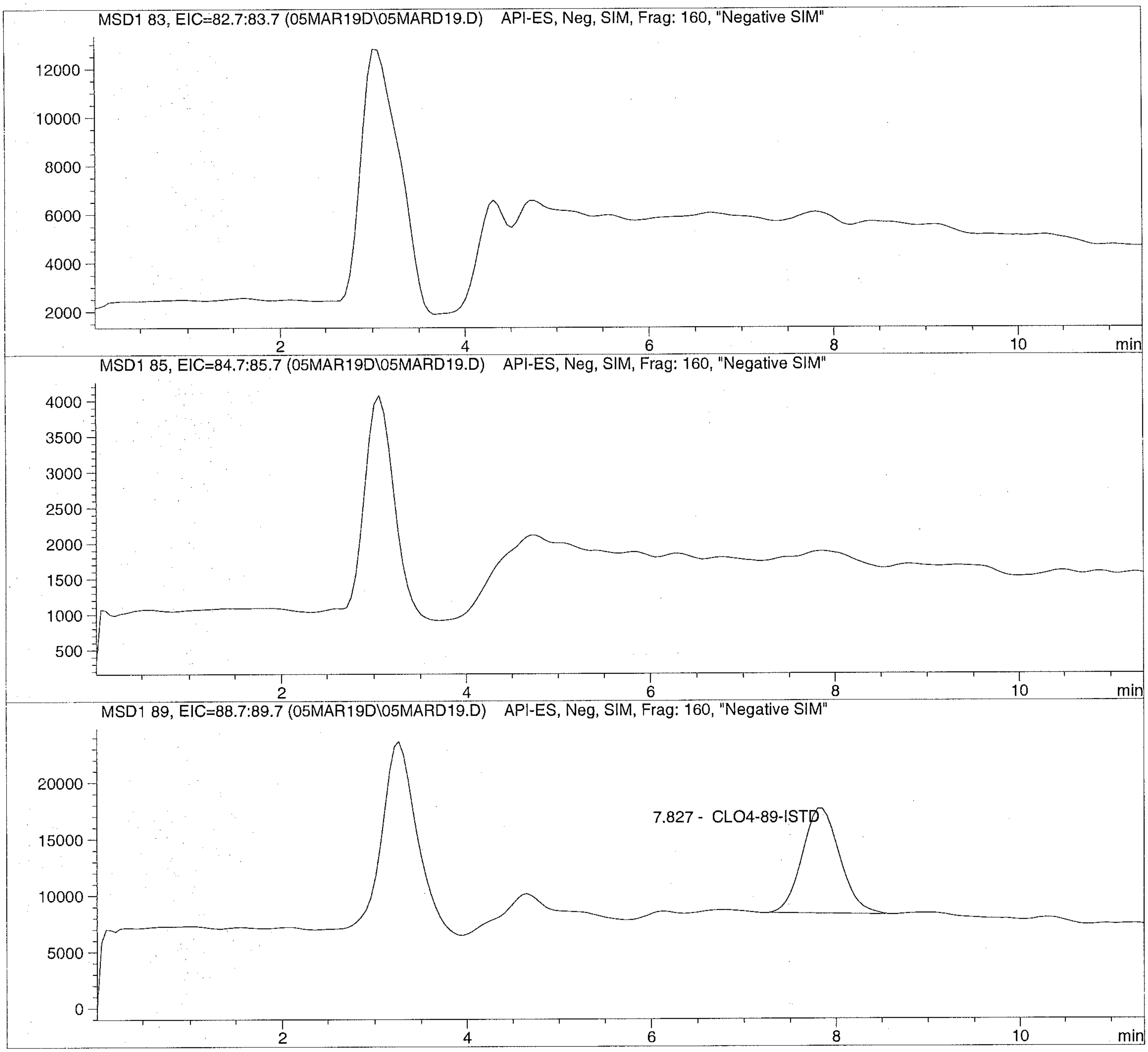
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD19.D   Sample Name: 1906332001

Injection Date:	3/05/2019 12:49:07	Seq Line:	19
Sample Name:	1906332001	Location:	Vial 88
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD19.D Sample Name: 1906332001

Injection Date:	3/05/2019 12:49:07	Seq Line:	19
Sample Name:	1906332001	Location:	Vial 88
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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

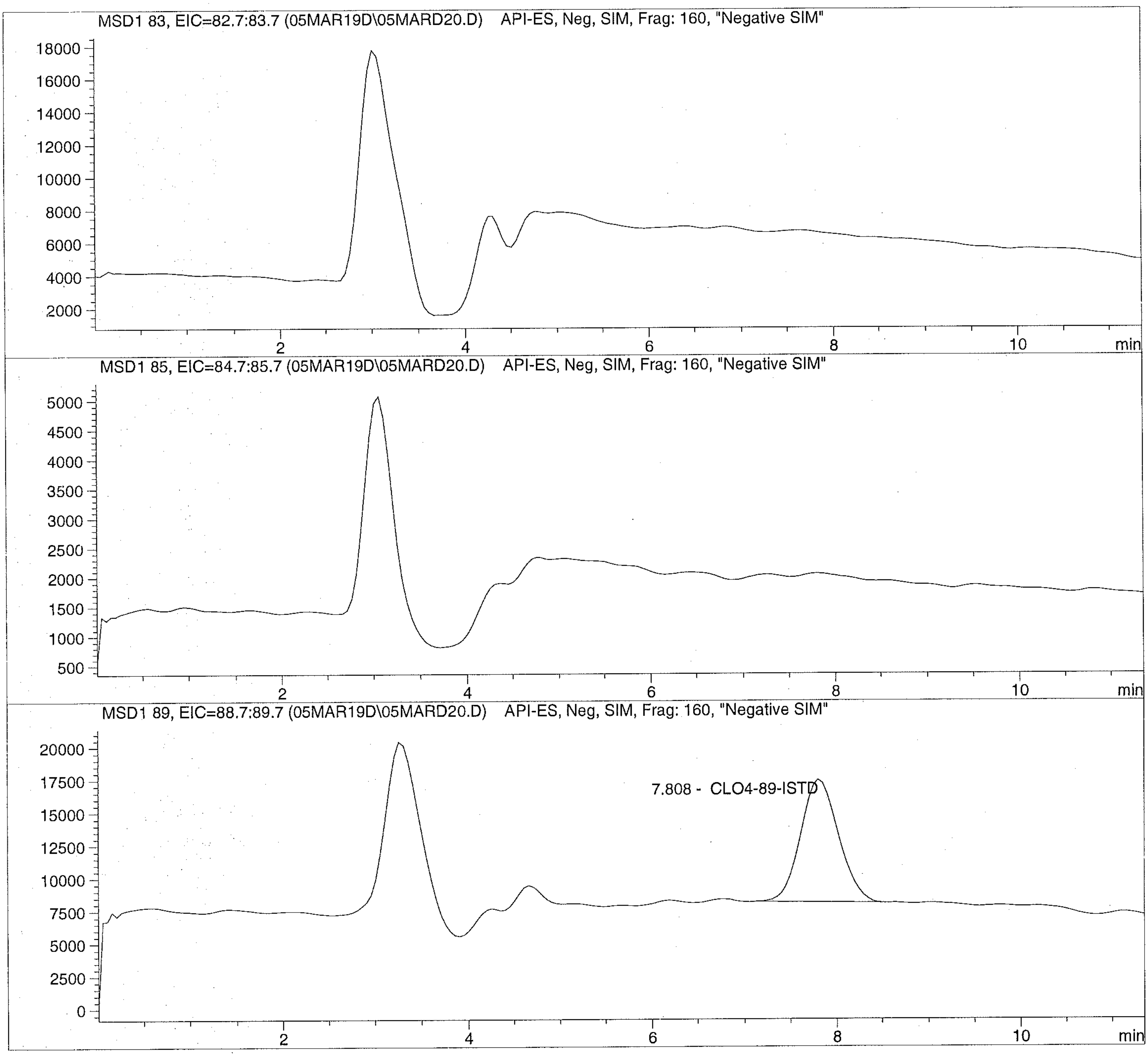
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.827	PBA	264674.3	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD20.D        Sample Name: 1906334001
=====================================================================================
Injection Date:    3/05/2019  13:02:15            Seq Line:          20
Sample Name:       1906334001                     Location:      Vial 89
Acq Operator:      TNB                            Inj. No.:           1
                                                  Inj. Vol.:       20 µl

Acq. Method:       CLO4-AQN.M
Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:      2/19/2019  12:13:46

Perchlorate analysis
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD20.D   Sample Name: 1906334001

===

Injection Date: 3/05/2019 13:02:15   Seq Line: 20
Sample Name: 1906334001   Location: Vial 89
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

===

Sample Information

===

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.808	PBA	265662.0	5.0000	CLO4-89-ISTD

===

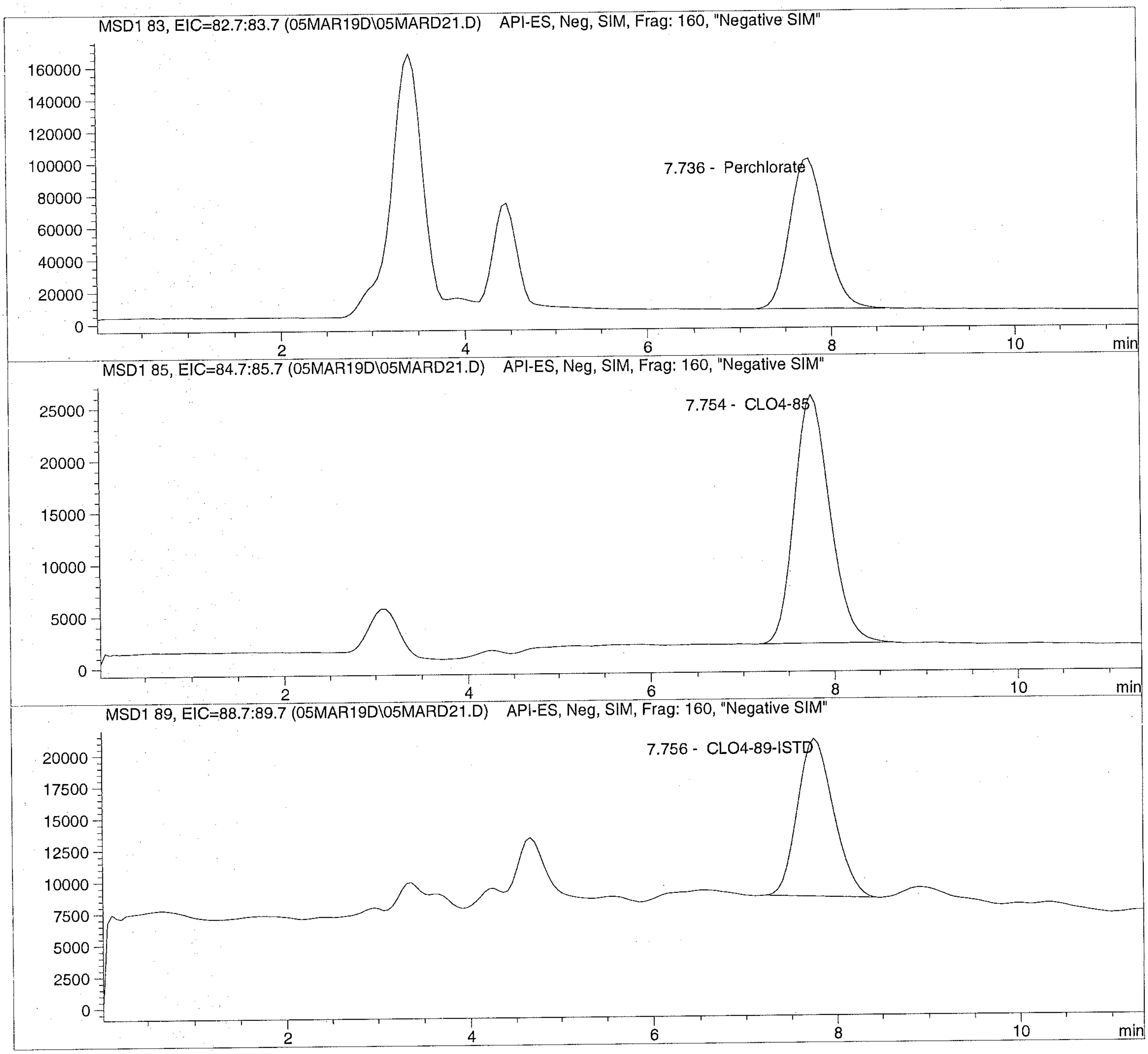
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD21.D   Sample Name: 1906112004   10X

Injection Date:	3/05/2019 13:15:18	Seq Line:	21
Sample Name:	1906112004 10X	Location:	Vial 90
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD21.D Sample Name: 1906112004 10X

Injection Date:	3/05/2019 13:15:18	Seq Line:	21
Sample Name:	1906112004 10X	Location:	Vial 90
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.736	PBA	2531259.3	226.4815	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.754	PBA	646870.4	220.9191	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.756	PB	341607.9	50.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD22.D   Sample Name: 1906112005   10X

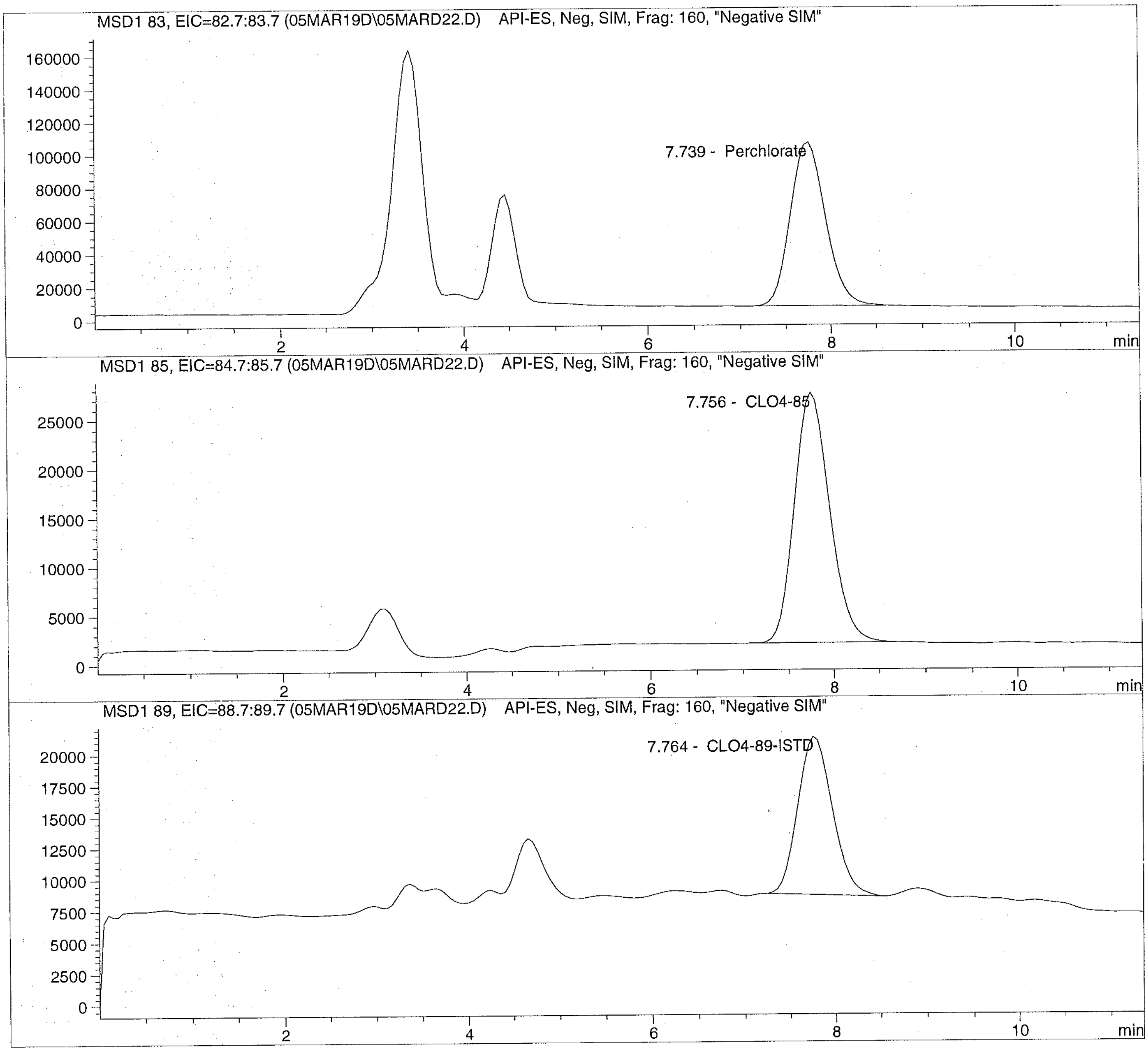
===

Injection Date:	3/05/2019 13:28:32	Seq Line:	22
Sample Name:	1906112005 10X	Location:	Vial 91
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

===



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD22.D Sample Name: 1906112005 10X

Injection Date:	3/05/2019 13:28:32	Seq Line:	22
Sample Name:	1906112005 10X	Location:	Vial 91
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 μl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.739	PBA	2682370.5	241.0371	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.756	BBA	695643.1	238.4467	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.764	PB	338724.1	50.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD23.D   Sample Name: 1906112007   RE

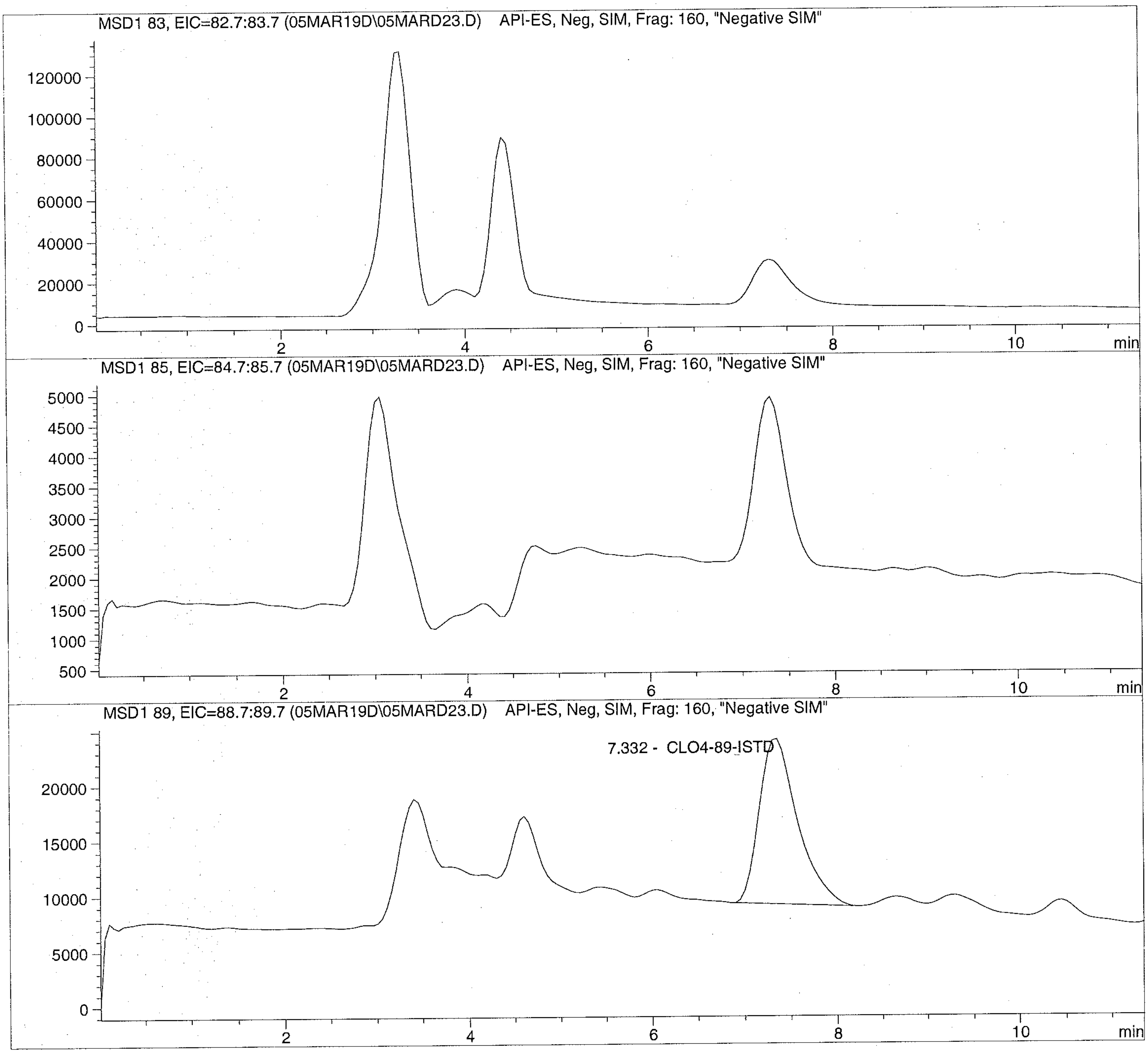
===

Injection Date:	3/05/2019 13:41:34	Seq Line:	23
Sample Name:	1906112007 RE	Location:	Vial 82
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

===



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD23.D Sample Name: 1906112007 RE

Injection Date:	3/05/2019 13:41:34	Seq Line:	23
Sample Name:	1906112007 RE	Location:	Vial 82
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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

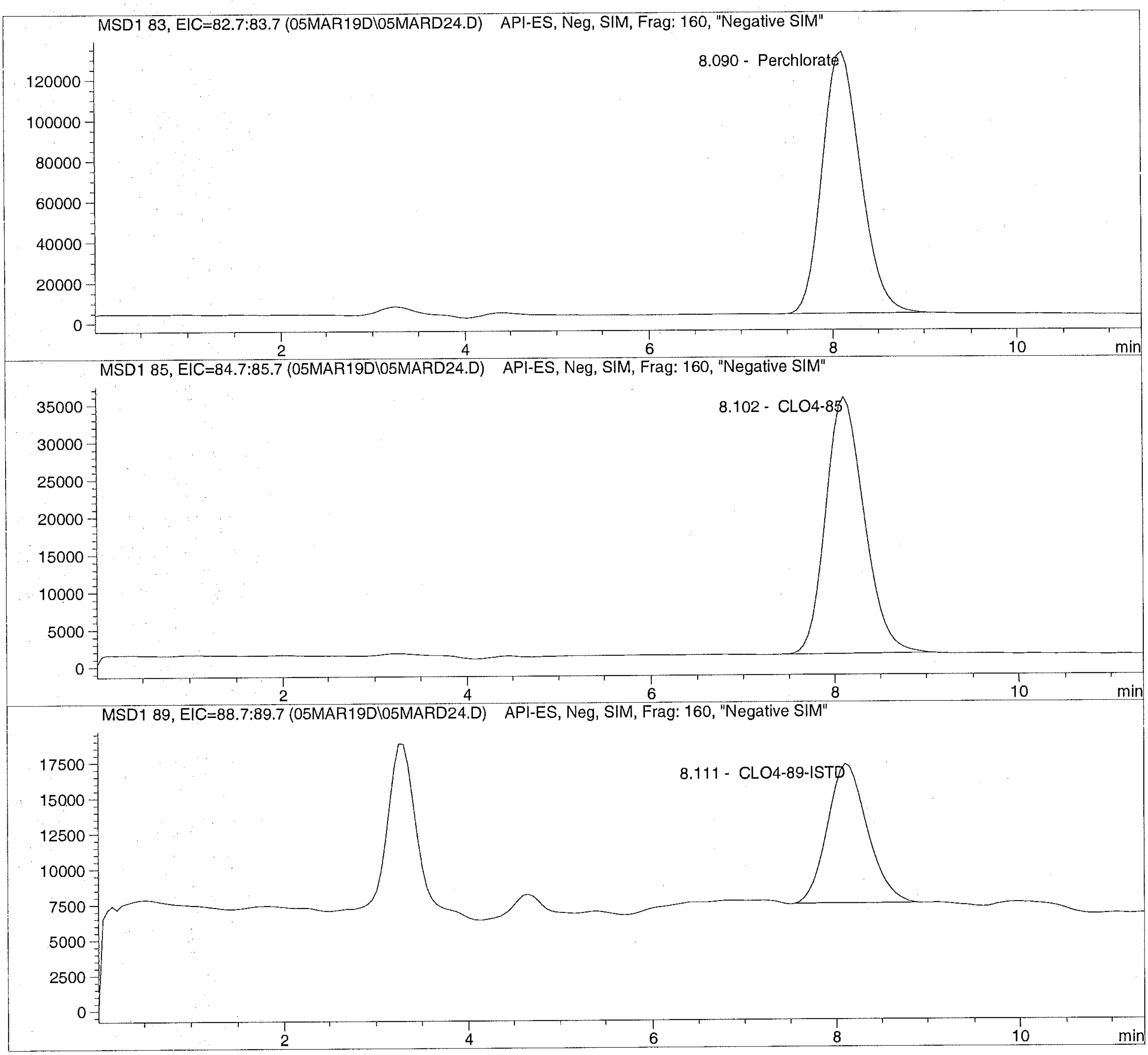
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.332	PB	431134.6	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD24.D        Sample Name: 1906330001    100
==========================================================================================
Injection Date:     3/05/2019  13:54:34                Seq Line:              24
Sample Name:        1906330001    100                  Location:          Vial 92
Acq Operator:       TNB                                Inj. No.:               1
                                                       Inj. Vol.:          20 µl

Acq. Method:        CLO4-AQN.M
Analysis Method:    C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:       2/19/2019  12:13:46

Perchlorate analysis
==========================================================================================
```



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD24.D   Sample Name: 1906330001 100

Injection Date: 3/05/2019 13:54:34   Seq Line: 24
Sample Name: 1906330001 100   Location: Vial 92
Acq Operator: TNB   Inj. No.: 1
Inj. Vol.: 20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
8.090	PBA	3773628.7	3708.6567	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.102	PBA	1010205.2	3771.6748	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.111	PBA	298984.6	500.0000	CLO4-89-ISTD

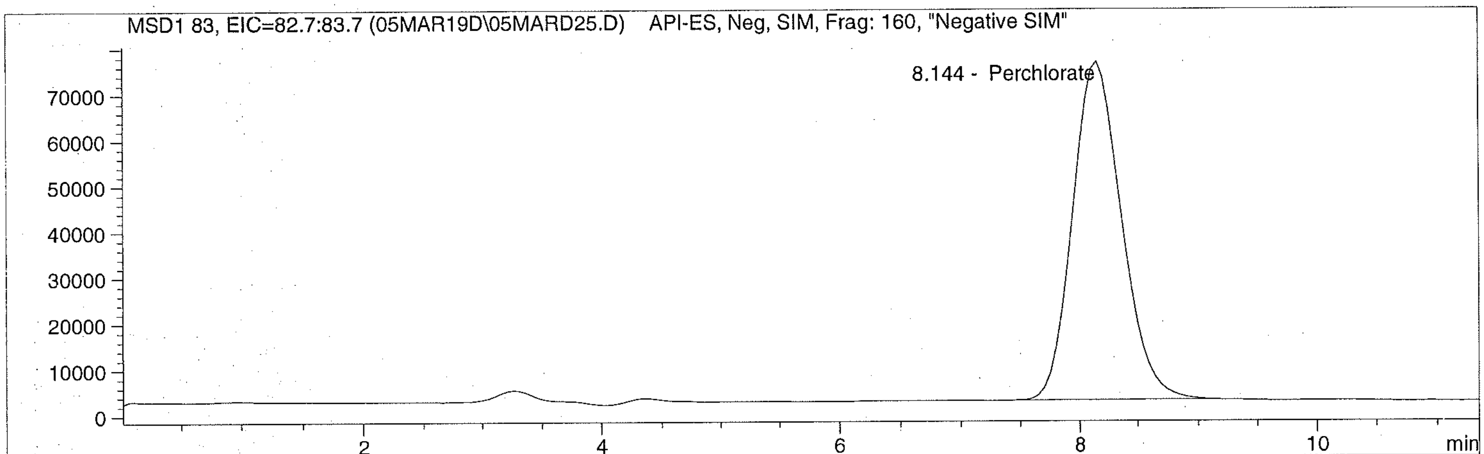
*** End of Report ***

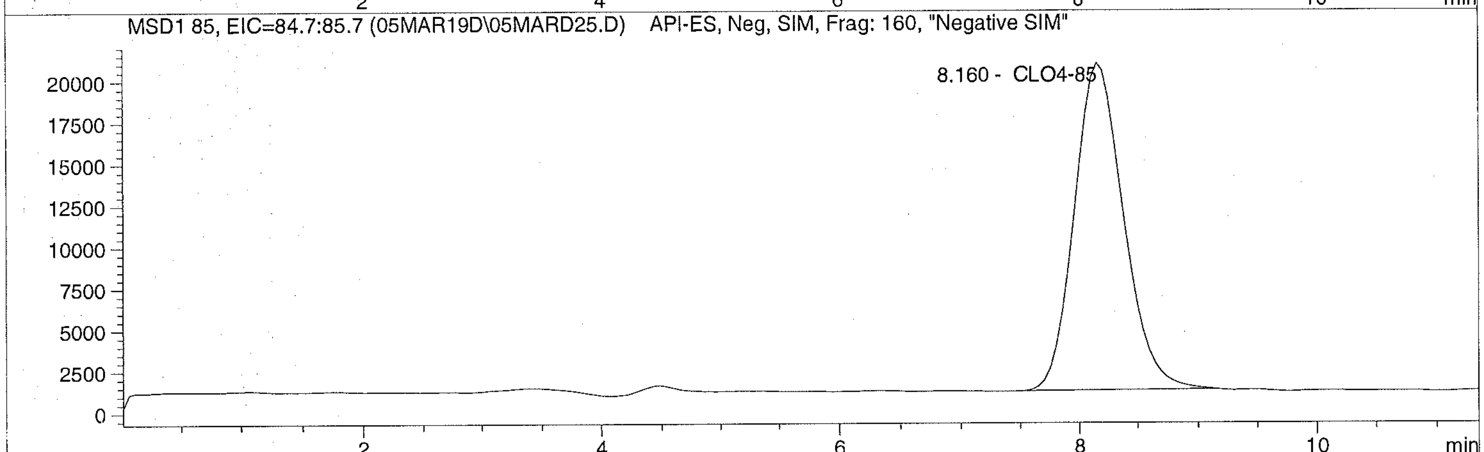
Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD25.D Sample Name: 642102 CCV@25

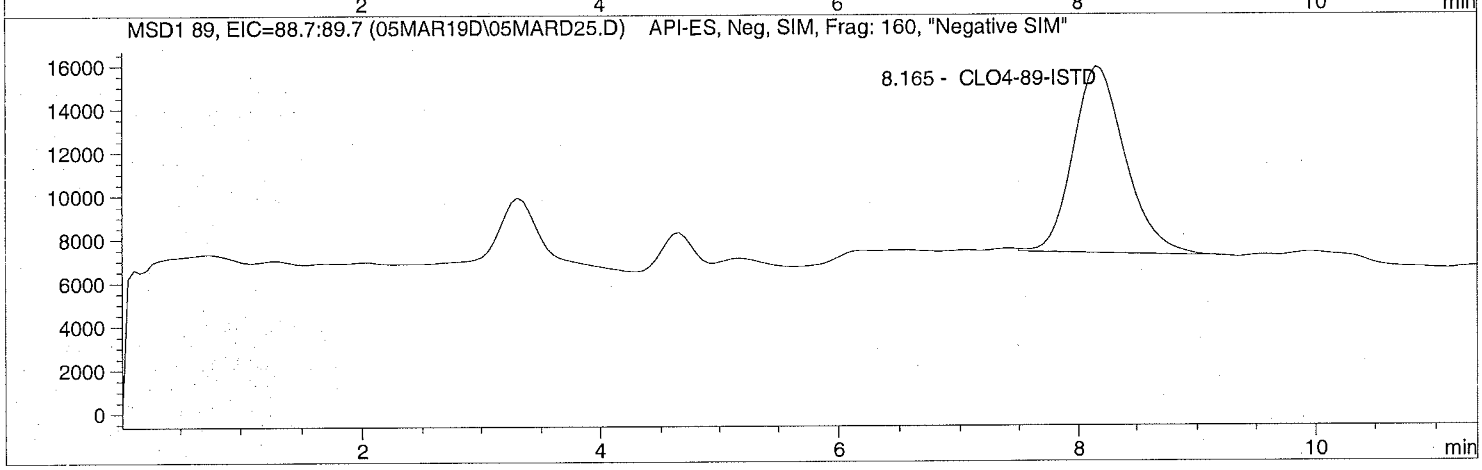
Injection Date:	3/05/2019 14:07:36	Seq Line:	25
Sample Name:	642102 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis







Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD25.D   Sample Name: 642102   CCV@25

Injection Date:	3/05/2019 14:07:36	Seq Line:	25
Sample Name:	642102 CCV@25	Location:	Vial 71
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
8.144	PBA	2157871.5	24.4553	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.160	PBA	583711.5	25.1665	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.165	BBA	268305.4	5.0000	CLO4-89-ISTD

*** End of Report ***

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

Initial Calibration

Batch Report: C:\HPCHEM\1\DATA\15FEB19I\15FEB19D.B

Batch Review Method:
C:\HPCHEM\1\METHODS\CLO4-DP1.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	8.94006e4	7.889	9.89924e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.97443e5	8.114	2.26028
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	4.79370e5	7.828	4.65688
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	9.30136e5	7.904	9.14998
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.81067e6	7.793	25.52636
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	5.66830e6	7.976	51.07439
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	8.69624e6	7.886	74.30603
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	1.01141e6	7.988	9.46019

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	3.26121e4	7.914	9.98836e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	5.53134e4	8.127	2.11360
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.39247e5	7.842	4.91261
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.54396e5	7.923	9.39034
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	7.35969e5	7.811	25.48268
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.47152e6	7.993	50.35774
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.32809e6	7.900	74.72233
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.81230e5	8.007	9.87858

#*	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	3.41443e5	7.900	5.00000
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.99651e5	8.132	5.00000
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.38646e5	7.853	5.00000
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	3.25154e5	7.925	5.00000
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	3.33799e5	7.819	5.00000
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	3.14712e5	7.999	5.00000
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	3.13909e5	7.908	5.00000
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	3.41503e5	8.005	5.00000

*** End of Report ***

Sequence Table:

Method and Injection Info Part:

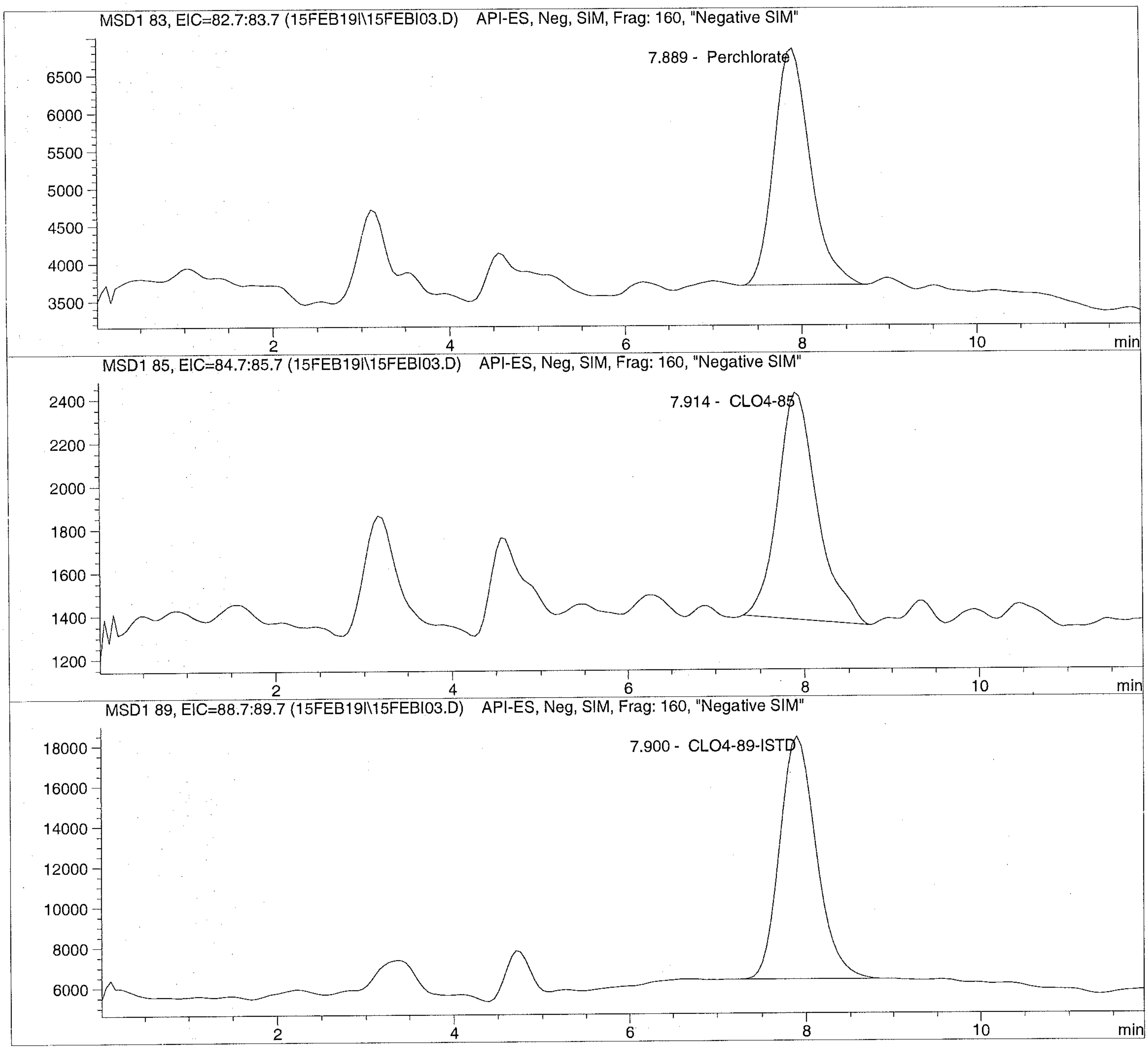
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	CLO4@ .20ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	CLO4@ 5.0ug/L	CLO4-AQN	1	Ctrl Samp		
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		

Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI03.D   Sample Name: CLO4@ 1.0ug/L

Injection Date:	2/15/2019 09:51:42	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:09:20

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI03.D Sample Name: CLO4@ 1.0ug/L

Injection Date:	2/15/2019 09:51:42	Seq Line:	3
Sample Name:	CLO4@ 1.0ug/L	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:09:20

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 1.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.889	PBA	89400.6	0.9899	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.914	BBA	32612.1	0.9988	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

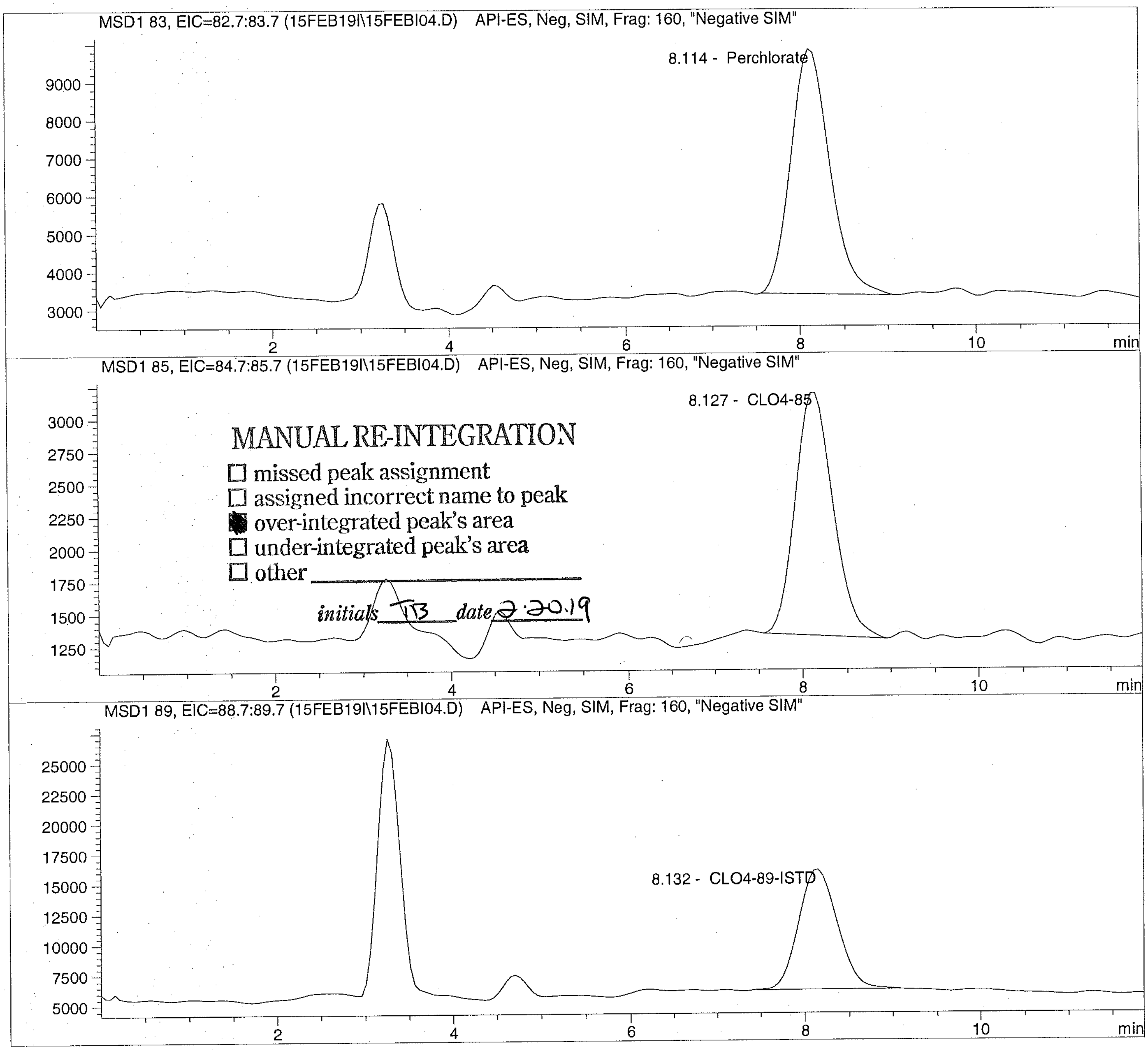
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.900	BBA	341443.2	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI04.D        Sample Name: CLO4@ 2.0ug/L
=====================================================================================
Injection Date:    2/15/2019   10:05:24              Seq Line:            4
Sample Name:       CLO4@ 2.0ug/L                     Location:      Vial 74
Acq Operator:      TNB                               Inj. No.:            1
                                                     Inj. Vol.:       25 µl

Acq. Method:       CLO4-AQN.M
Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:      2/19/2019   09:09:20

Perchlorate analysis
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI04.D Sample Name: CLO4@ 2.0ug/L

Injection Date:	2/15/2019 10:05:24	Seq Line:	4
Sample Name:	CLO4@ 2.0ug/L	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:09:20

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 am
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
8.114	PBA	197442.9	2.2603	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.127	MM	55313.4	2.1136	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

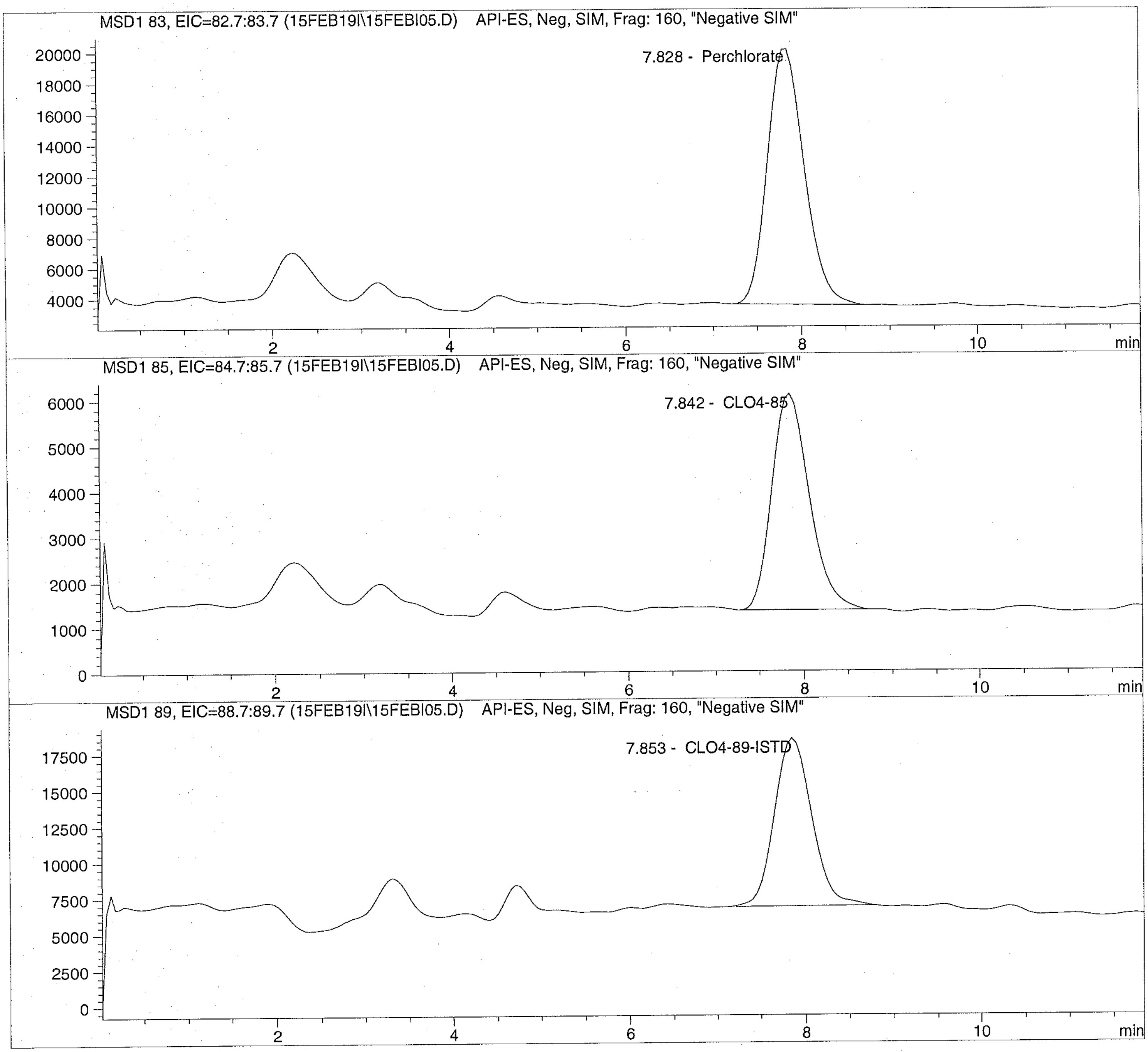
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.132	BBA	299650.6	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI05.D        Sample Name: CLO4@ 5.0ug/L
=================================================================================
Injection Date:    2/15/2019   11:42:56             Seq Line:            5
Sample Name:       CLO4@ 5.0ug/L                    Location:      Vial 75
Acq Operator:      TNB                              Inj. No.:            1
                                                    Inj. Vol.:        25 µl

Acq. Method:       CLO4-AQN.M
Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:      2/19/2019   09:09:20

Perchlorate analysis
=================================================================================
```



Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI05.D Sample Name: CLO4@ 5.0ug/L

Injection Date:	2/15/2019 11:42:56	Seq Line:	5
Sample Name:	CLO4@ 5.0ug/L	Location:	Vial 75
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:09:20

Perchlorate analysis

Sample Information

Sorted By:	Signal
Calib. Data Modified:	Tue, 19. Feb. 2019,09:07:33 am
Multiplier:	1.000000
Dilution:	1.000000
Sample Amount:	5.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.828	PBA	479370.4	4.6569	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.842	PBA	139246.9	4.9126	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

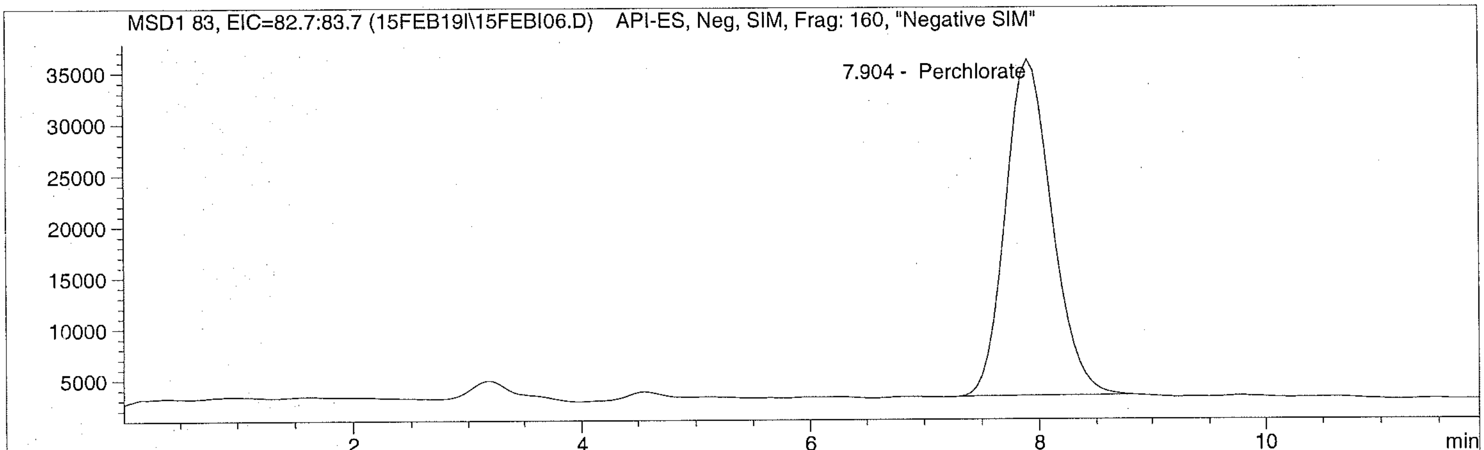
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.853	PBA	338646.3	5.0000	CLO4-89-ISTD

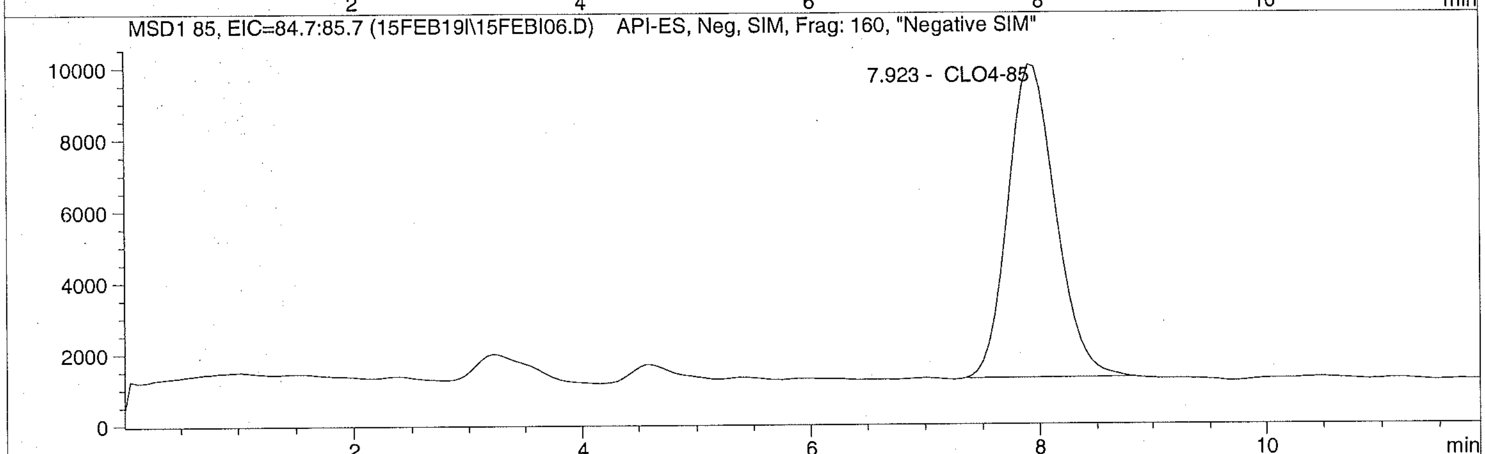
*** End of Report ***

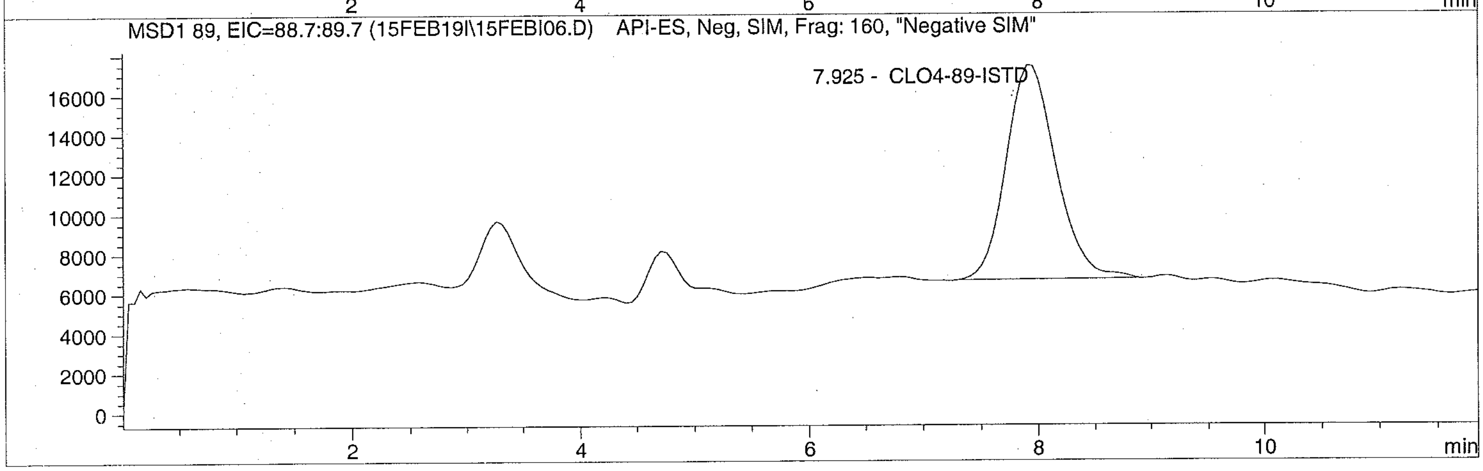
```
Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI06.D       Sample Name: CLO4@ 10.ug/L
=====================================================================================
Injection Date:    2/15/2019   11:56:38            Seq Line:              6
Sample Name:       CLO4@ 10.ug/L                   Location:        Vial 76
Acq Operator:      TNB                             Inj. No.:              1
                                                   Inj. Vol.:         25 µl

Acq. Method:       CLO4-AQN.M
Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:      2/19/2019   09:09:20

Perchlorate analysis
=====================================================================================
```







Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI06.D   Sample Name: CLO4@ 10.ug/L

Injection Date:	2/15/2019 11:56:38	Seq Line:	6
Sample Name:	CLO4@ 10.ug/L	Location:	Vial 76
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:09:20

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 10.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.904	PBA	930135.8	9.1500	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.923	BBA	254395.6	9.3903	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

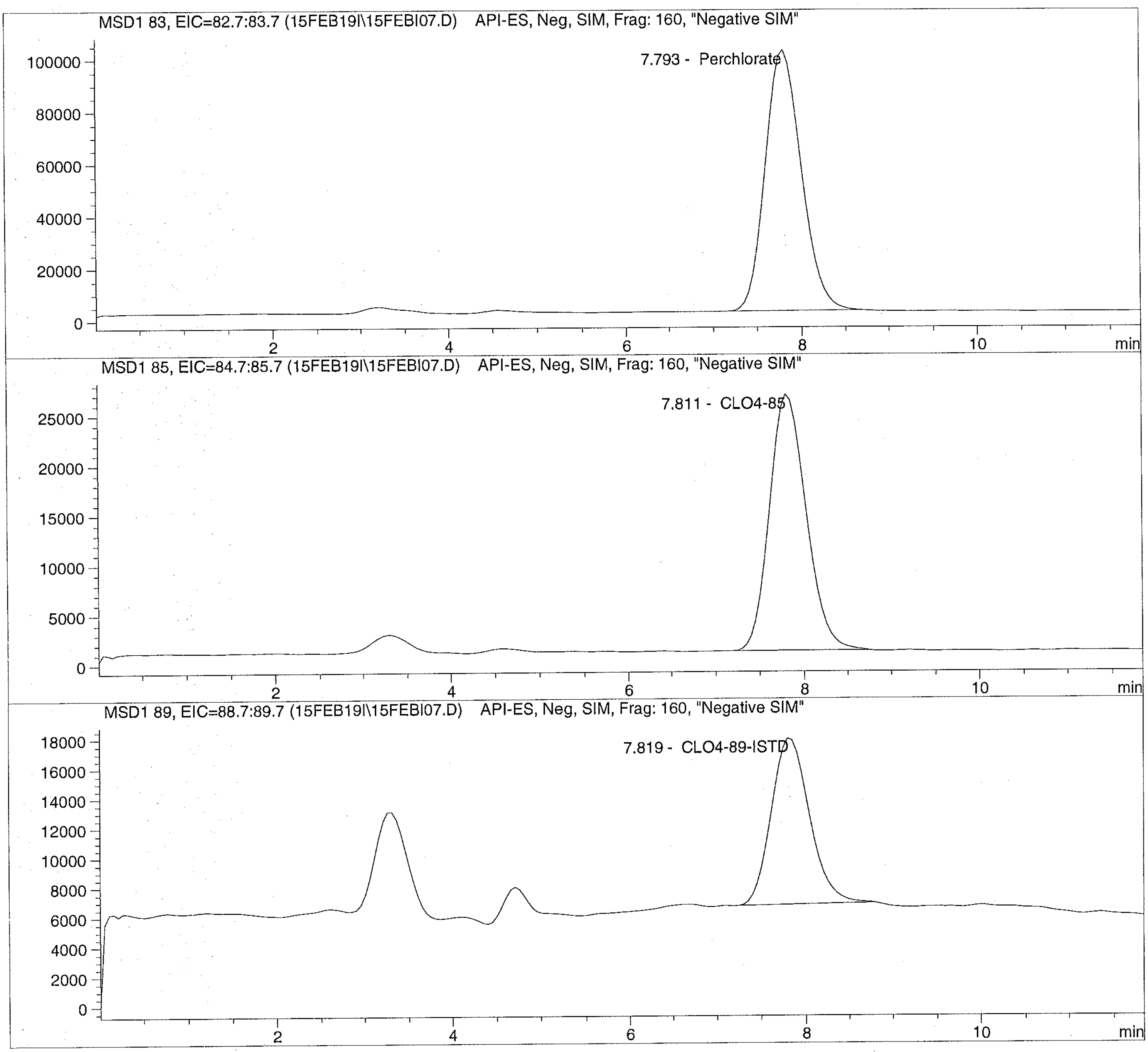
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.925	PBA	325154.4	5.0000	CLO4-89-ISTD

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI07.D        Sample Name: CLO4@ 25.ug/L
=====================================================================================
Injection Date:    2/15/2019  12:10:22              Seq Line:             7
Sample Name:       CLO4@ 25.ug/L                    Location:       Vial 77
Acq Operator:      TNB                              Inj. No.:             1
                                                    Inj. Vol.:        25 µl

Acq. Method:       CLO4-AQN.M
Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:      2/19/2019  09:09:20

Perchlorate analysis
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI07.D Sample Name: CLO4@ 25.ug/L

===

Injection Date:	2/15/2019 12:10:22	Seq Line:	7
Sample Name:	CLO4@ 25.ug/L	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:09:20

Perchlorate analysis

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Sample Information

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Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.793	PBA	2810669.2	25.5264	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.811	BBA	735968.9	25.4827	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.819	PBA	333799.0	5.0000	CLO4-89-ISTD

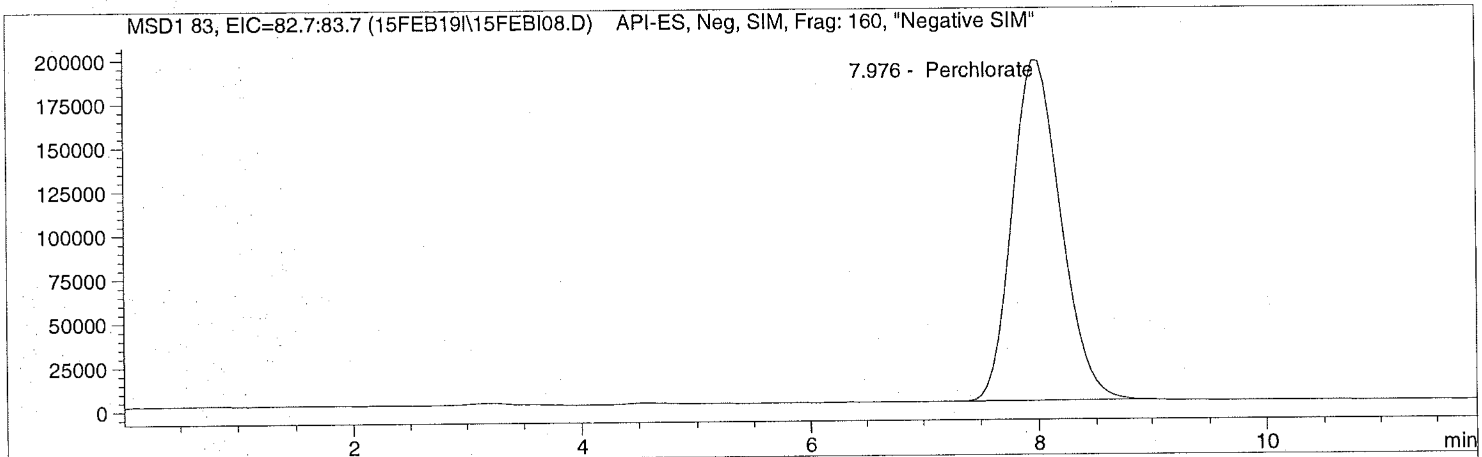
===

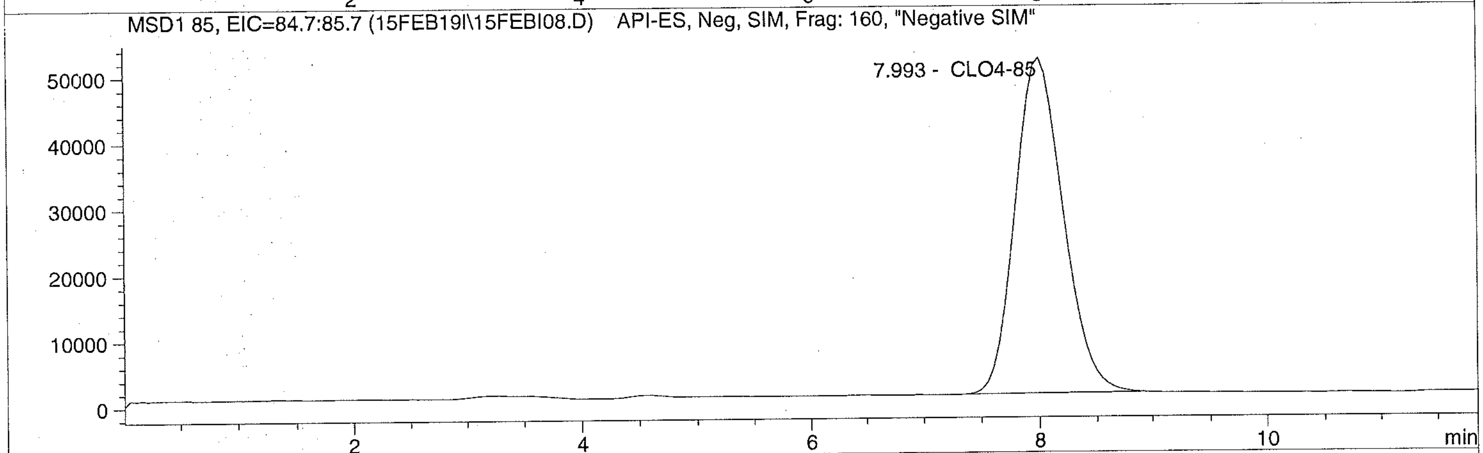
*** End of Report ***

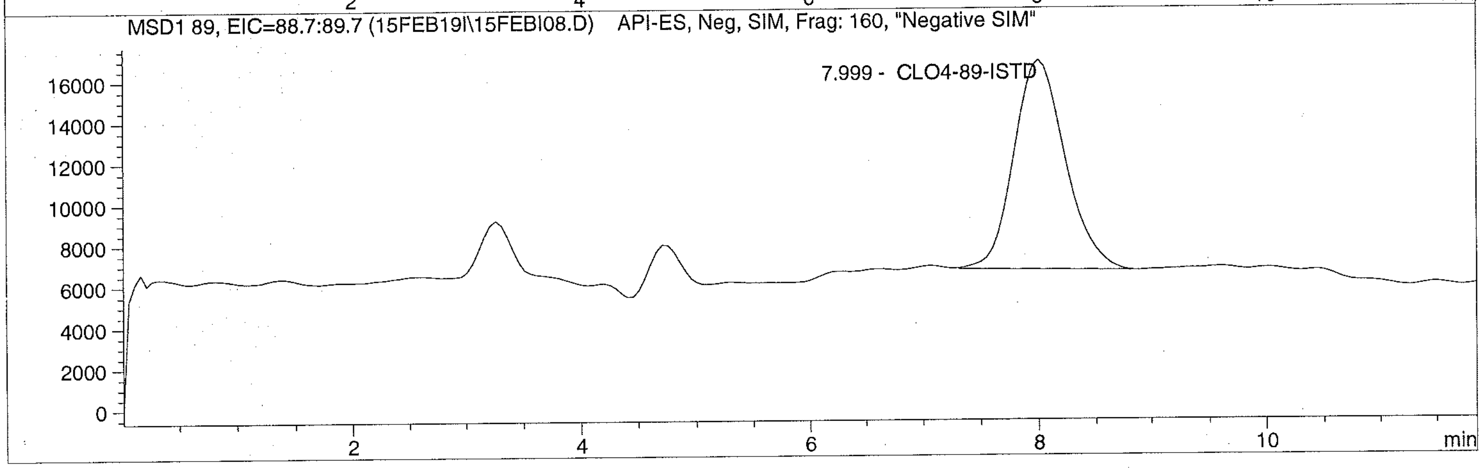
```
Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI08.D        Sample Name: CLO4@ 50.ug/L
=====================================================================================
Injection Date:    2/15/2019  12:24:06              Seq Line:           8
Sample Name:       CLO4@ 50.ug/L                    Location:       Vial 78
Acq Operator:      TNB                              Inj. No.:           1
                                                    Inj. Vol.:        25 µl

Acq. Method:       CLO4-AQN.M
Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:      2/19/2019  09:09:20

Perchlorate analysis
=====================================================================================
```







Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI08.D   Sample Name: CLO4@ 50.ug/L

Injection Date:	2/15/2019 12:24:06	Seq Line:	8
Sample Name:	CLO4@ 50.ug/L	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:09:20

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 50.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.976	PBA	5668301.5	51.0744	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.993	PBA	1471522.9	50.3577	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.999	BBA	314711.8	5.0000	CLO4-89-ISTD

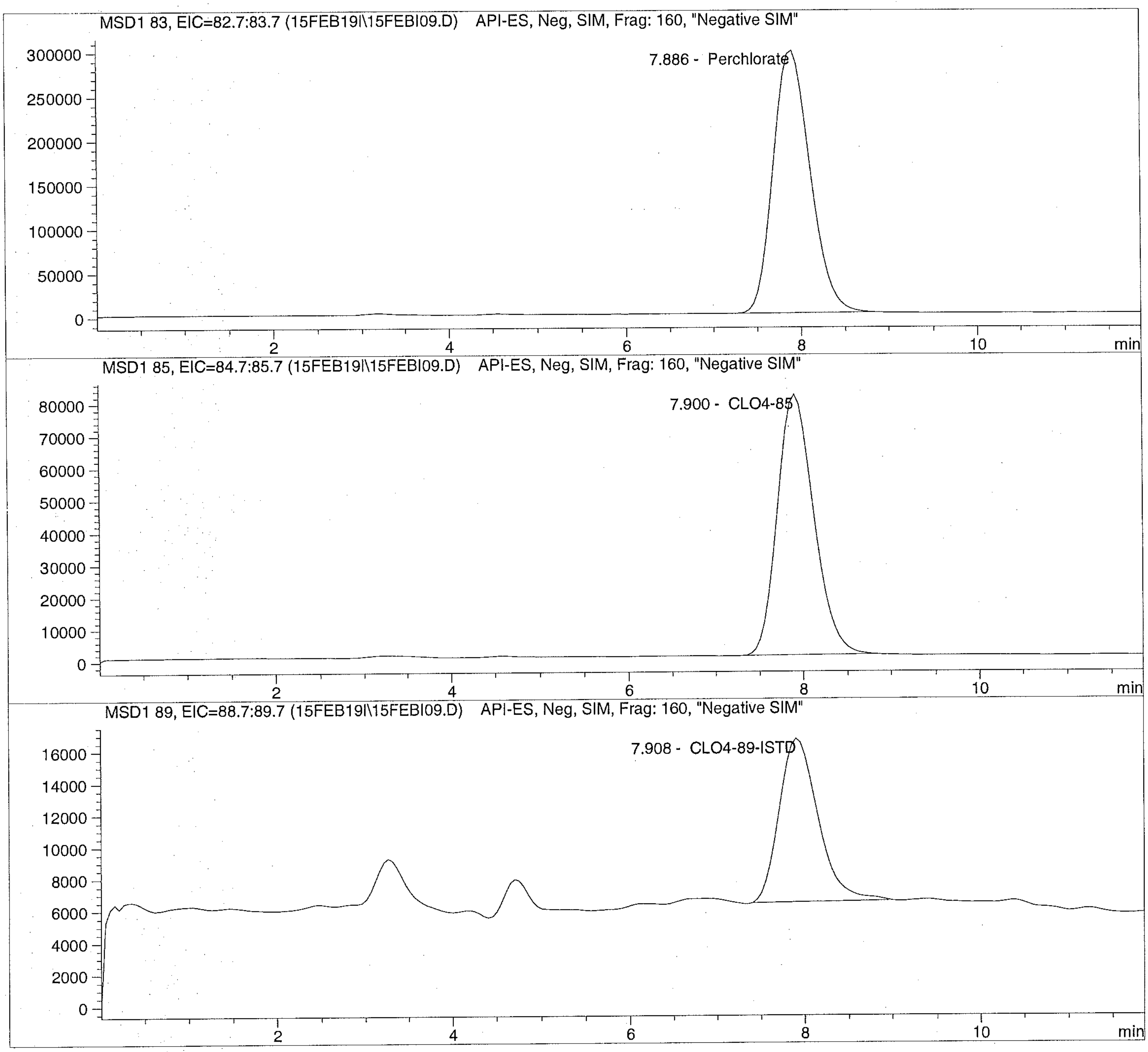
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI09.D   Sample Name: CLO4@ 75.ug/L

Injection Date:	2/15/2019 12:37:48	Seq Line:	9
Sample Name:	CLO4@ 75.ug/L	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:09:20

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI09.D Sample Name: CLO4@ 75.ug/L

Injection Date:	2/15/2019 12:37:48	Seq Line:	9
Sample Name:	CLO4@ 75.ug/L	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:09:20

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 75.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.886	PBA	8696239.0	74.3060	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.900	PBA	2328089.5	74.7223	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.908	PBA	313908.9	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI10.D   Sample Name: ICAL Verf@10ug/L

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Injection Date:	2/15/2019 12:51:29	Seq Line:	10
Sample Name:	ICAL Verf@10ug/L	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:09:20

Perchlorate analysis

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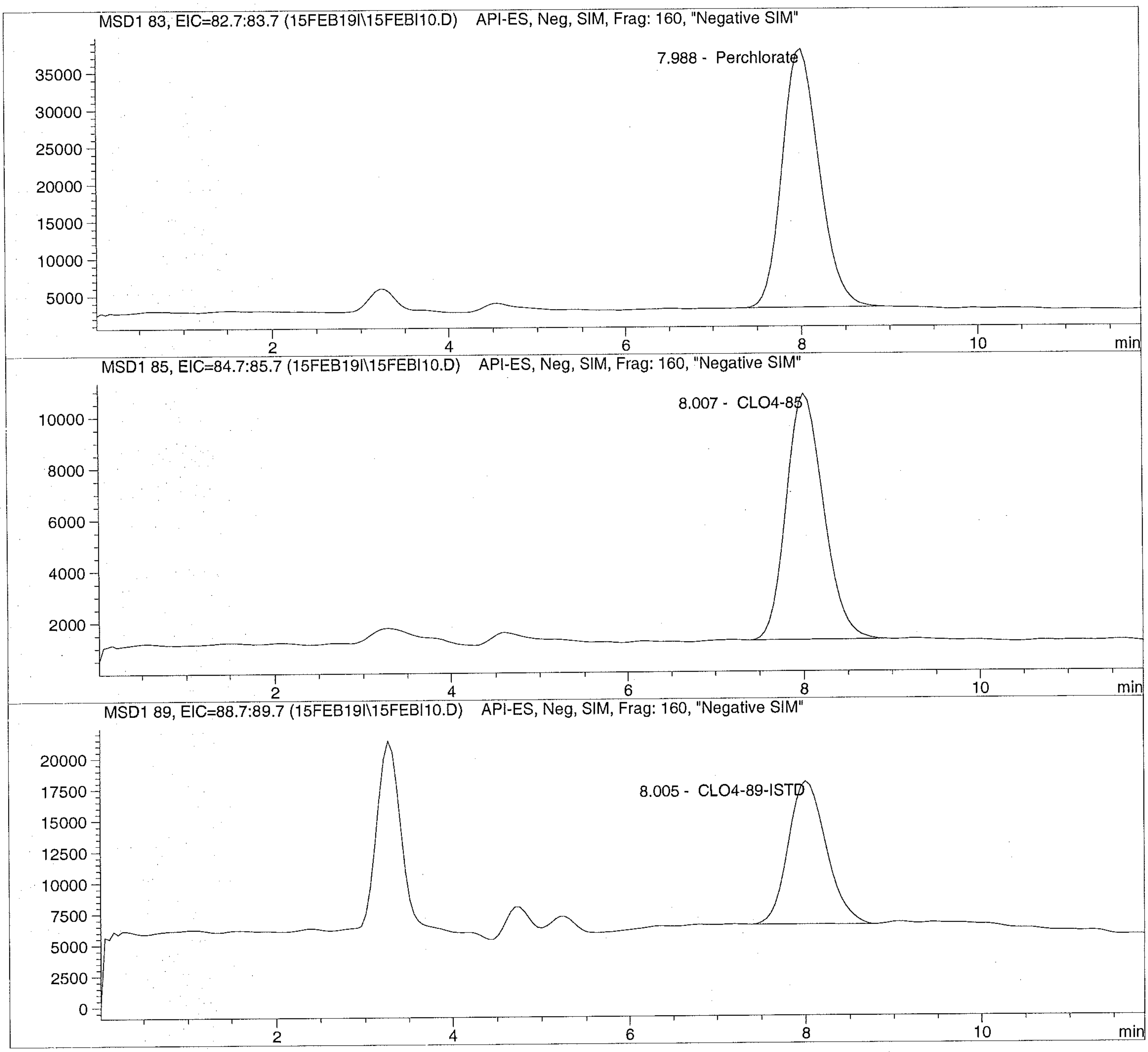


Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI10.D Sample Name: ICAL Verf@10ug/L

Injection Date:	2/15/2019 12:51:29	Seq Line:	10
Sample Name:	ICAL Verf@10ug/L	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:09:20

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 10.000

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.988	BBA	1011409.8	9.4602	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.007	BBA	281229.9	9.8786	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.005	BBA	341503.2	5.0000	CLO4-89-ISTD

*** End of Report ***

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Raw Data

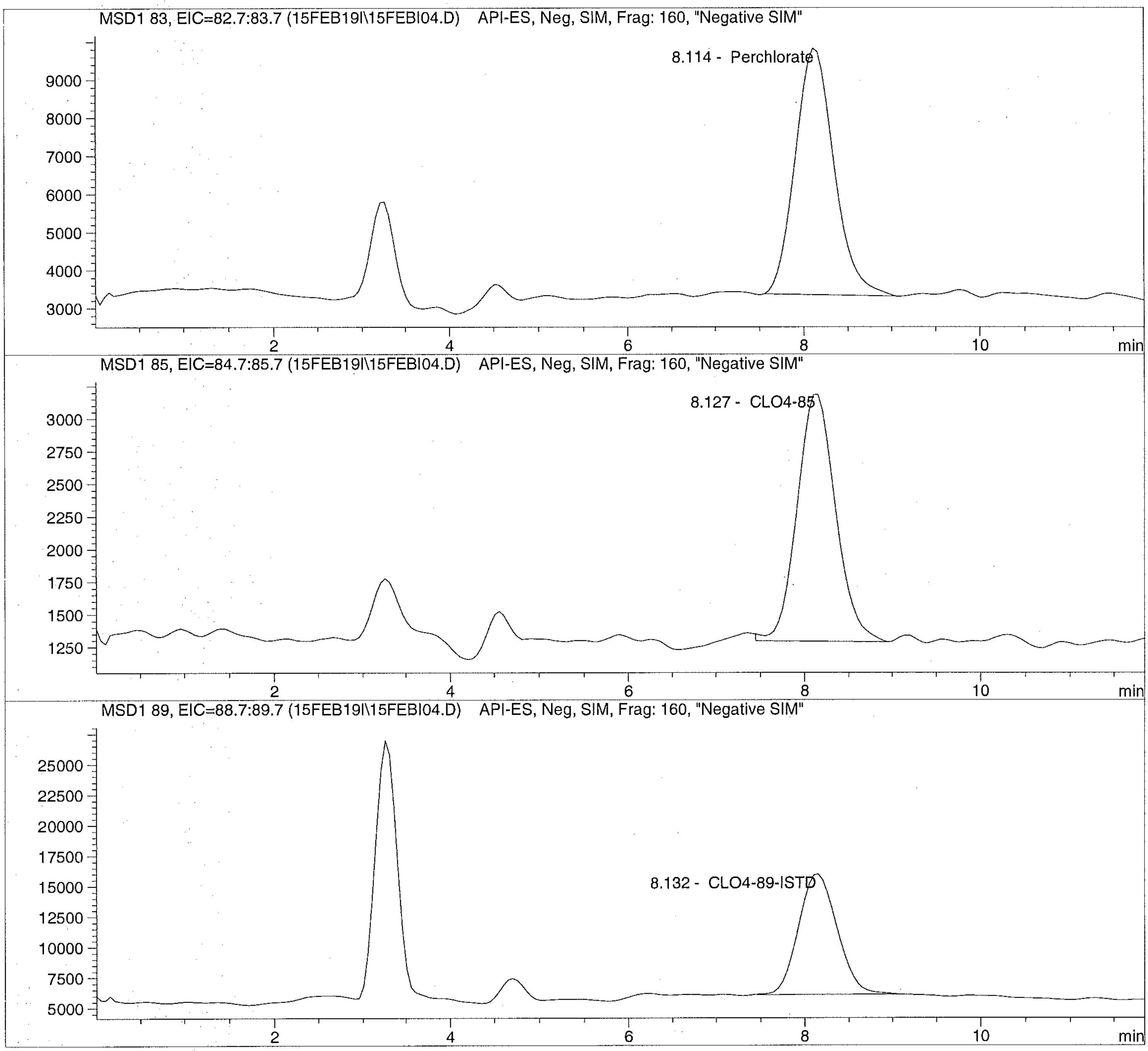
Unmodified

Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI04.D Sample Name: CLO4@ 2.0ug/L

Injection Date:	2/15/2019 10:05:24	Seq Line:	4
Sample Name:	CLO4@ 2.0ug/L	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:12:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\15FEB19I\15FEBI04.D Sample Name: CLO4@ 2.0ug/L

Injection Date:	2/15/2019 10:05:24	Seq Line:	4
Sample Name:	CLO4@ 2.0ug/L	Location:	Vial 74
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	25 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 09:12:36

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 am
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
8.114	PBA	197442.9	2.2603	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.127	BBA	57206.1	2.1923	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.132	BBA	299650.6	5.0000	CLO4-89-ISTD

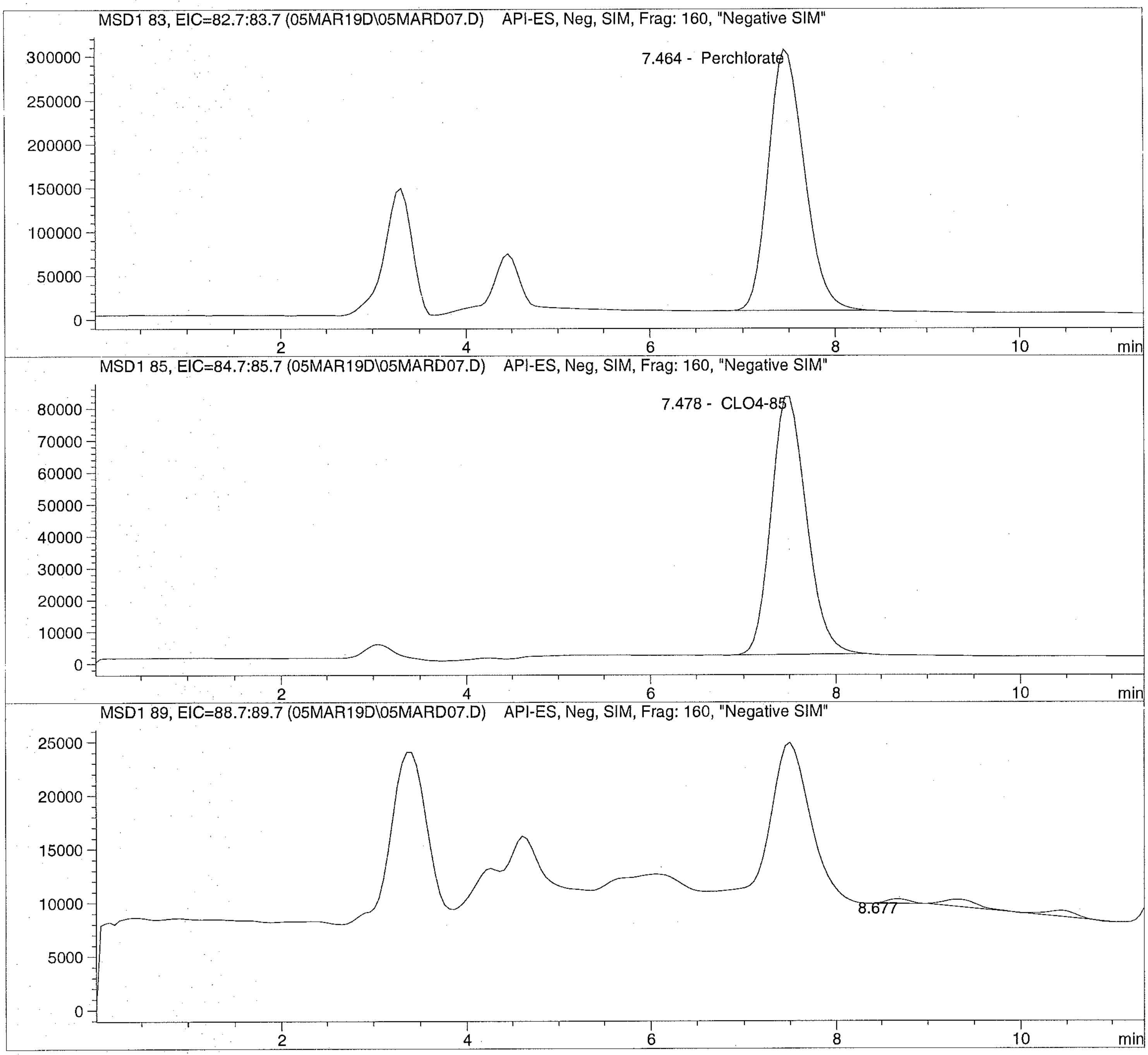
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD07.D   Sample Name: 1906112002 MS

Injection Date:	3/05/2019 10:07:11	Seq Line:	7
Sample Name:	1906112002 MS	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD07.D Sample Name: 1906112002 MS

Injection Date:	3/05/2019 10:07:11	Seq Line:	7
Sample Name:	1906112002 MS	Location:	Vial 77
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.464	PBA	8026959.0	419.8794	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.478	PBA	2146365.0	402.6179	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.677	BB	7208.6	0.0000	
9.316	VBA	28561.1	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD08.D   Sample Name: 1906112003   MSD

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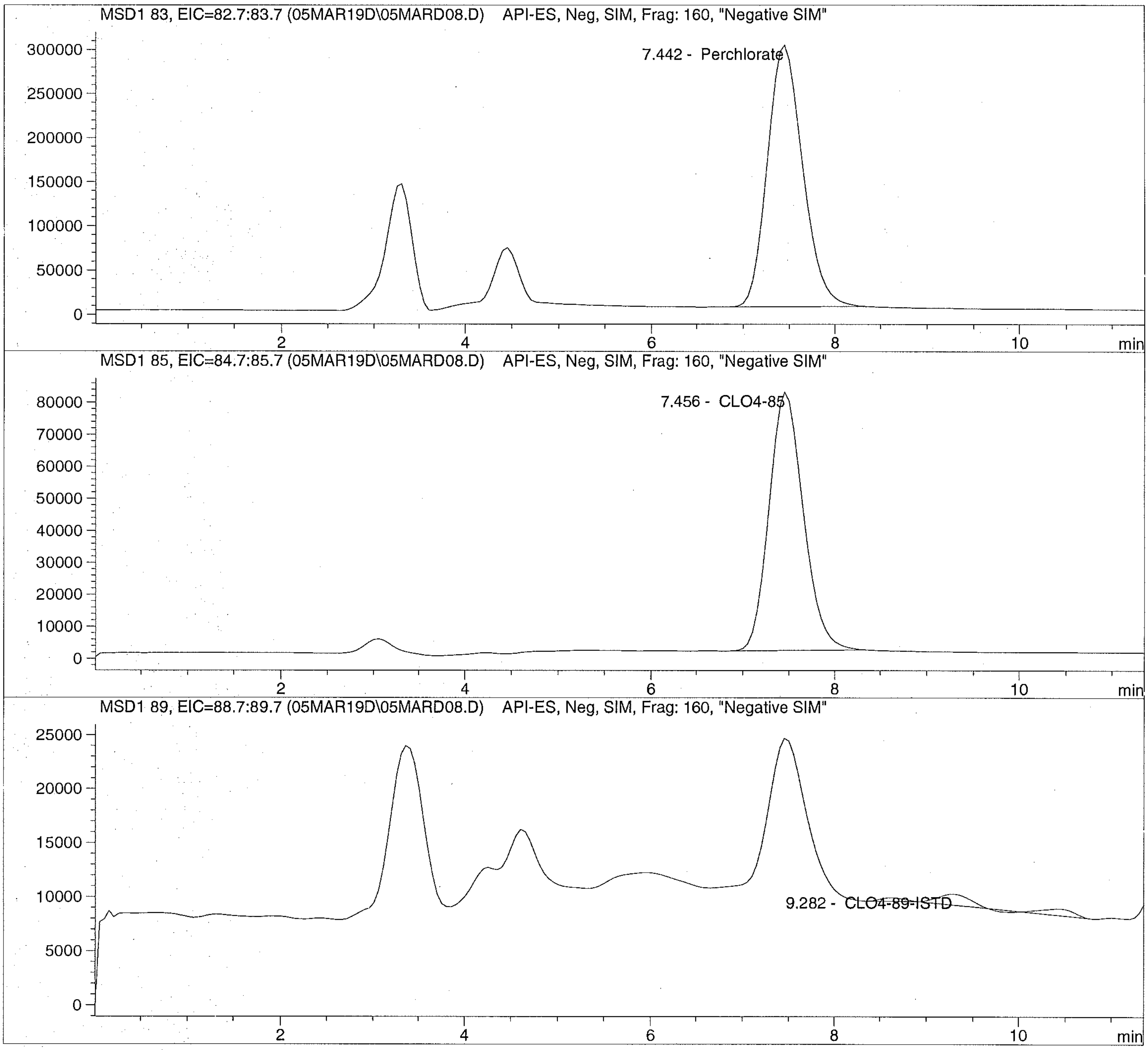
Injection Date:	3/05/2019 10:20:17	Seq Line:	8
Sample Name:	1906112003 MSD	Location:	Vial 78
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

===



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD08.D Sample Name: 1906112003 MSD

Injection Date: 3/05/2019 10:20:17 Seq Line: 8
Sample Name: 1906112003 MSD Location: Vial 78
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.442	PBA	7942422.5	359.0996	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.456	PBA	2109911.2	344.2233	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.621	VB	5769.9	0.0000	
9.282	VBA	35831.6	5.0000	CLO4-89-ISTD

*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD09.D   Sample Name: 1906112004

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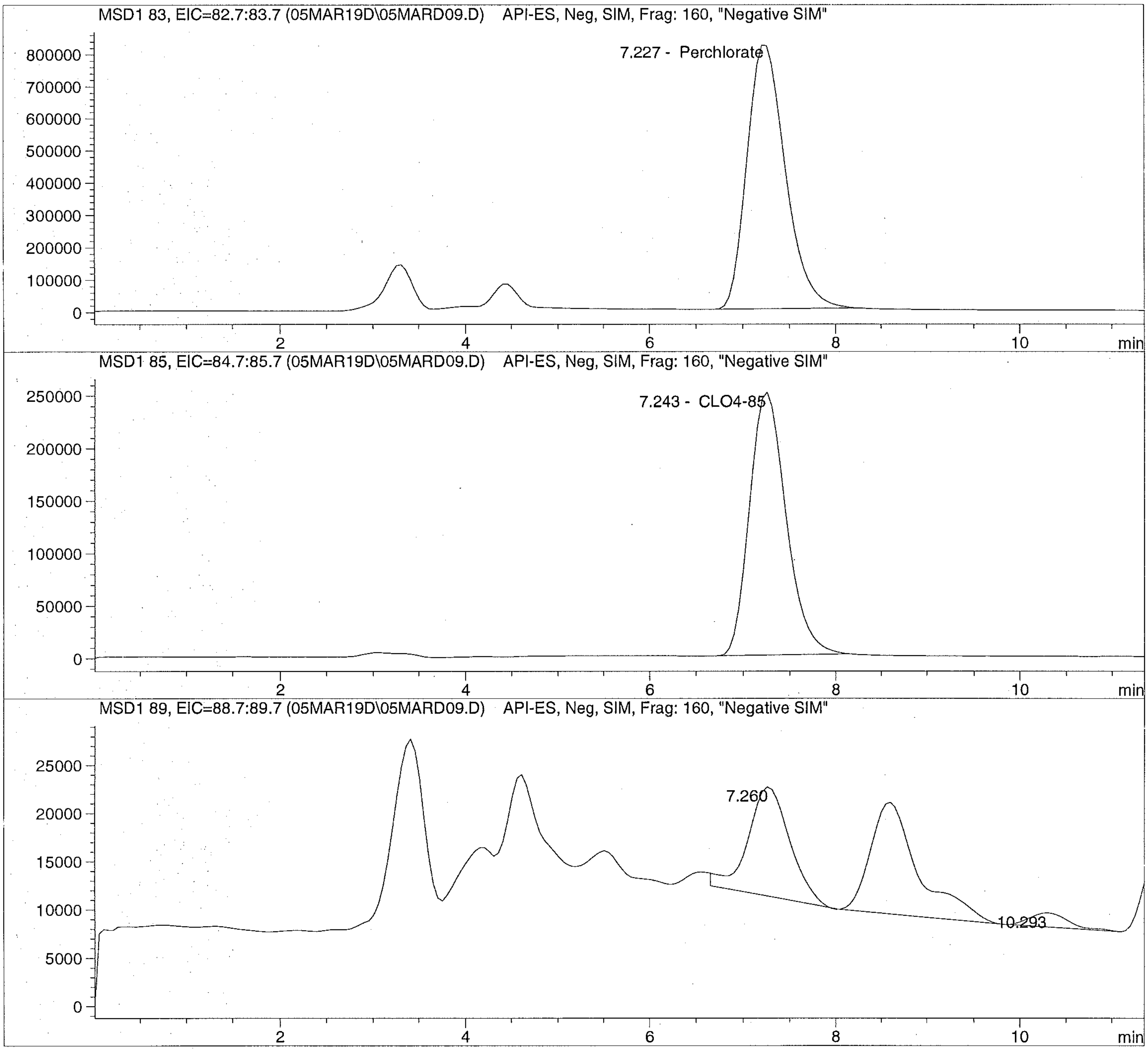
Injection Date:	3/05/2019 10:33:21	Seq Line:	9
Sample Name:	1906112004	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

===



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD09.D Sample Name: 1906112004

Injection Date:	3/05/2019 10:33:21	Seq Line:	9
Sample Name:	1906112004	Location:	Vial 79
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.227	PBA	23301694.0	131.1742	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.243	PBA	6796677.5	138.8050	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

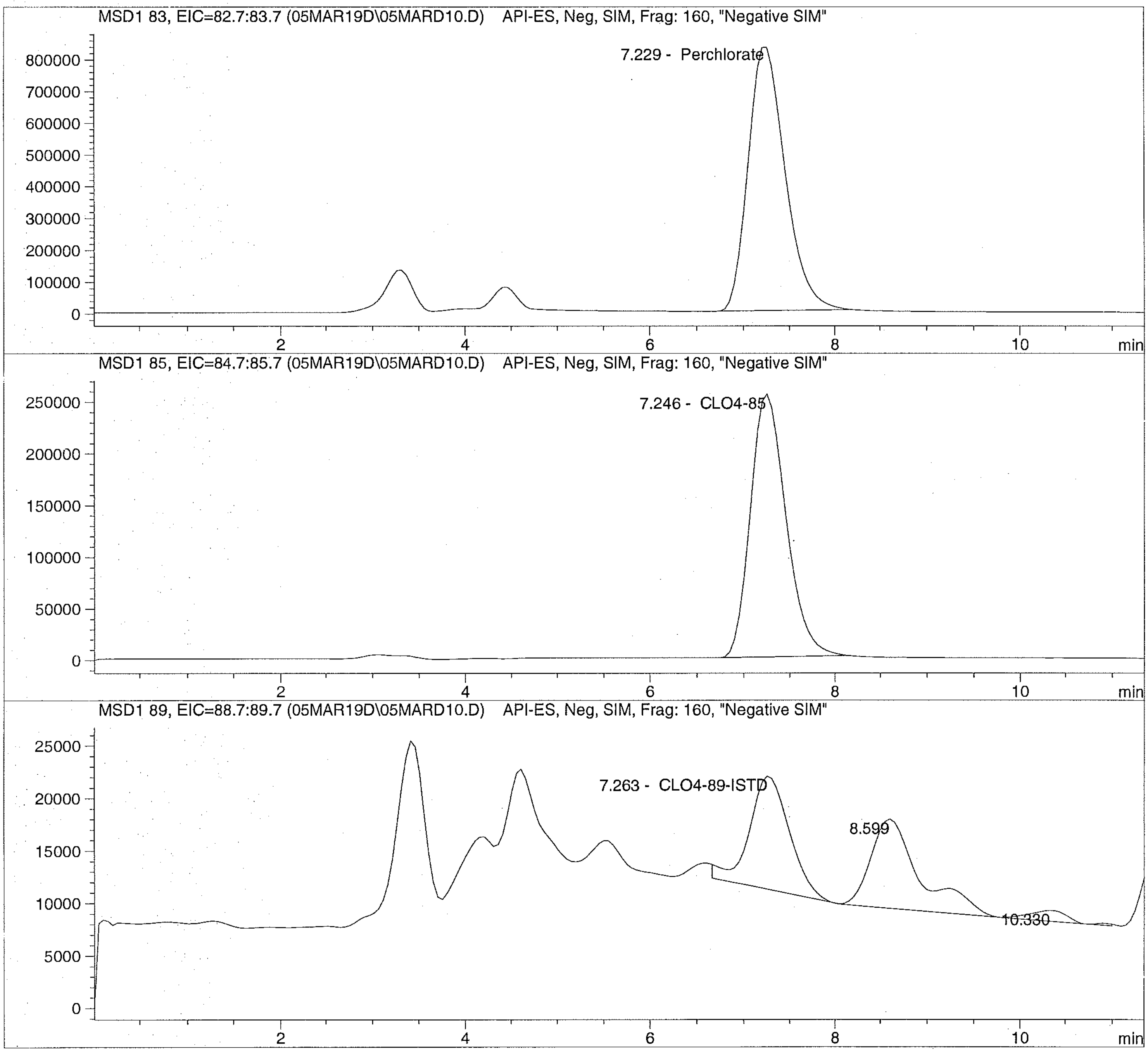
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.260	BB	352149.7	0.0000	
8.589	VBA	421141.9	5.0000	CLO4-89-ISTD
10.293	BBA	41603.7	0.0000	

*** End of Report ***

```
Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD10.D       Sample Name: 1906112005
=====================================================================================
Injection Date:   3/05/2019  10:46:26             Seq Line:           10
Sample Name:      1906112005                      Location:      Vial 80
Acq Operator:     TNB                             Inj. No.:            1
                                                  Inj. Vol.:        20 µl

Acq. Method:      CLO4-AQN.M
Analysis Method:  C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed:     2/19/2019  12:13:46

Perchlorate analysis
=====================================================================================
```



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD10.D Sample Name: 1906112005

Injection Date:	3/05/2019 10:46:26	Seq Line:	10
Sample Name:	1906112005	Location:	Vial 80
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.229	PBA	23099082.0	159.0418	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.246	PBA	6828341.5	168.6882	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.263	BB	325841.0	5.0000	CLO4-89-ISTD
8.599	VB	308921.9	0.0000	
10.330	VBA	30210.3	0.0000	

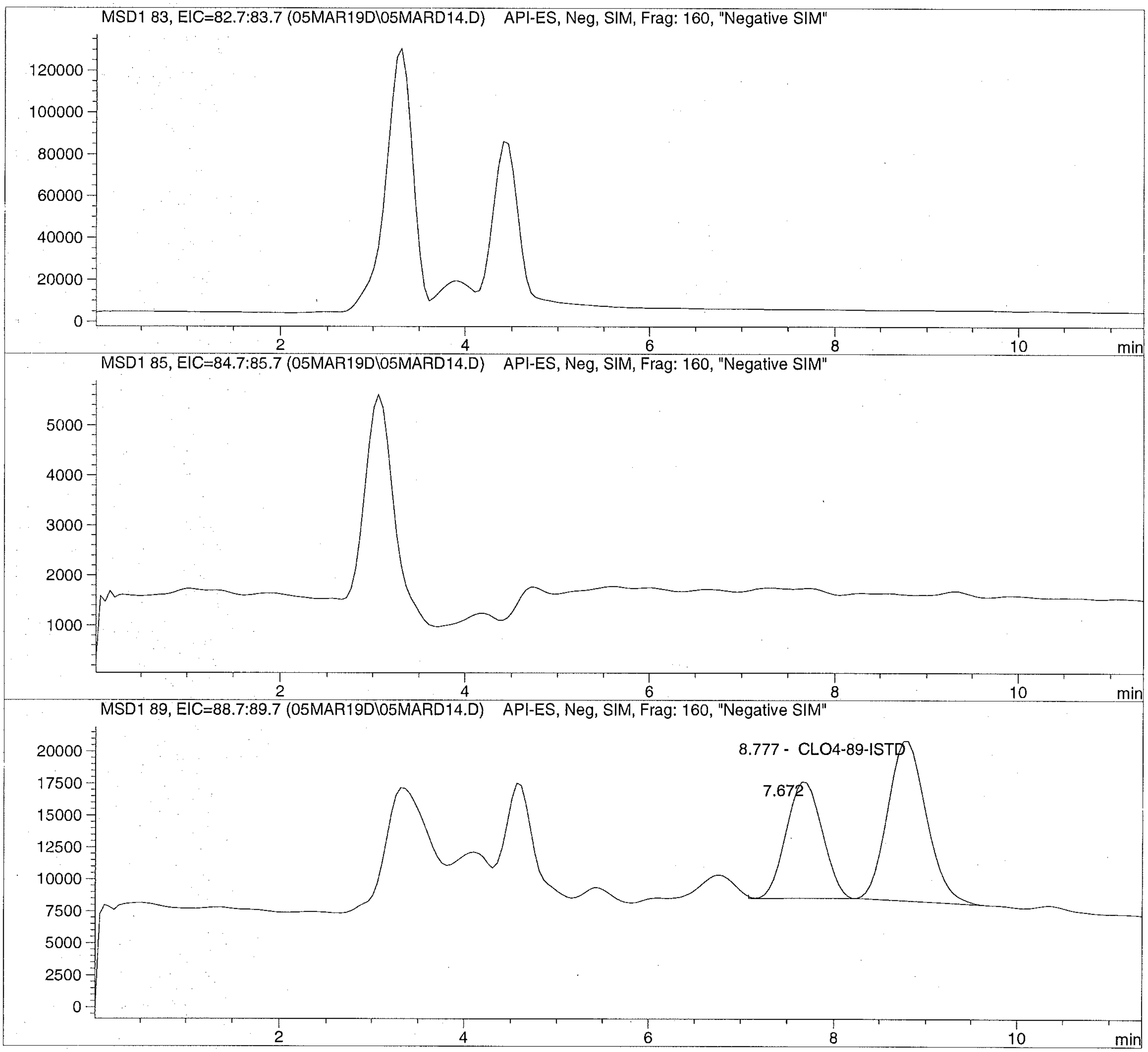
*** End of Report ***

Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD14.D   Sample Name: 1906112009

Injection Date:	3/05/2019 11:39:24	Seq Line:	14
Sample Name:	1906112009	Location:	Vial 84
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\05MAR19D\05MARD14.D   Sample Name: 1906112009

Injection Date:	3/05/2019 11:39:24	Seq Line:	14
Sample Name:	1906112009	Location:	Vial 84
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	20 µl

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP1.M
Last Changed: 2/19/2019 12:13:46

Perchlorate analysis

Sample Information

Sorted By: Signal
Calib. Data Modified: Tue, 19. Feb. 2019,09:07:33 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
7.672	BB	243675.3	0.0000	
8.777	VBA	362717.3	5.0000	CLO4-89-ISTD

*** End of Report ***

APPENDIX E
QUALITY CONTROL SUMMARY REPORT

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00936216

QUARTERLY CONTROL SUMMARY REPORT
1st QUARTER (JANUARY - MARCH) 2019
GROUNDWATER TREATMENT PLANT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

May 2019

Prepared For:

Longhorn Army Ammunition Plant
Karnack, Texas

Under Contract To:

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

Contract Number: W9128F-13-D-0012
Task Order Number: W912BV17F0150

Prepared By:

bhate

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Birmingham, Alabama 35205
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Table of Contents

Tables

1 INTRODUCTION

Bhate reviewed 17 data packages from ALS Environmental, Houston, Texas. Groundwater samples were collected from February 21, 2019, through March 27, 2019, at the Groundwater Treatment Plant (GWTP) and Site LHAAP-16 at Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. No samples were collected during the month of January due to mechanical issues at the GWTP. Data were reviewed for conformance to the requirements of the following guidance documents: *USEPA Contract Laboratory Program* [CLP] *National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA, January 2017); *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (USEPA, January 2017); and the *Final Basewide Uniform Federal Policy* [UFP] – *Quality Assurance Project Plan* [QAPP] *Longhorn Army Ammunition Plant* which is in Appendix C of the *Final Installation-Wide Work Plan for Longhorn Army Ammunition Plant Karnack, Texas* (Bhate, May 2018).

1.1 Intended Use of Data

The objective of sampling at the GWTP is to monitor effluent streams to confirm compliance with discharge limits.

Analyses performed include:

- SW6850 – Perchlorate
- E350.3/SM4500 NH3 – Nitrogen, Ammonia
- E365.3/SM4500 P – Orthophosphate
- E415.1/SM5310 – Total Organic Carbon
- SW8260C – Volatile Organic Compounds (VOCs)
- SW8270D Selected Ion Monitoring (SIM) - 1,4-Dioxane
- SW6020A/7470A – Metals
- SW9056A – Chloride (Cl) and Sulfate (SO_4)
- SW7196A – Hexavalent Chromium
- E410.4 – Chemical Oxygen Demand
- E1664A – Oil and Grease
- TO-15 – Volatiles in Air

Table 1 lists the sample identification numbers (IDs) and their associated laboratory package.

Table 2 lists qualified results with the qualification flag and reason code.

The following narrative is a brief synopsis of data that required qualification due to quality control discrepancies.

1.2 Preservation and Holding Times

Sample identification data were evaluated for agreement with the chain-of-custody (COC). All samples were received in appropriate containers, within the proper temperature range, in good condition, and within the required hold time.

1.3 Calibrations

All analytes reported must be present in the initial and continuing calibration. The calibrations must meet the acceptance criteria specified in Worksheet 24 (Analytical Instrument Calibration) of the QAPP. All results reported must be within the calibration range. Samples were diluted, if necessary, to bring analyte responses within the calibration range.

1.3.1 Continuing Calibration Verifications (CCV)

The calibrations must meet the following criteria otherwise the compound is qualified J or UJ: The continuing calibration verification (CCV) criteria are 20 percent difference (%D) for VOCs and Semi-Volatile Organic Compounds (SVOCs) and 50% for closing CCVs. Metals and general chemistry - 10%D; perchlorate - 15%D; and volatiles in air - 30%D.

The CCV for benzene and toluene was exceeded for the bi-weekly sample LH18/24-SP650_032119. The CCV for 1,2-dibromoethane, bromoform, and dibromochloromethane were also outside control limits for quarterly influent sample LH18/24-SP140_032719. These compounds were qualified as estimated non-detects and flagged “UJ”.

1.4 Blanks

If the analyte result for an associated sample was less than 5X (10X for common laboratory contaminants) the analyte concentration in the blank, that result was qualified “UB” and considered an artifact of blank contamination. Where the sample result for the affected analyte was non-detect or greater than 5X the amount in the blank, no qualifier was applied.

1.4.1 SW6020A

The method blank for quarterly effluent and influent samples LH18/24-SP650_032719 and LH18/24-SP140_032719, respectively reported a low level detection of vanadium. Since the sample results were < 5X the blank result, they were considered artifacts of blank contamination and flagged “UB”.

1.5 Surrogates

Surrogates were evaluated using limits defined by each method in the project-specific QAPP Worksheet 28.

1.5.1 SW8270D SIM

The monthly effluent sample LH18/24-SP650_031419 reported 2-fluorobiphenyl (193%) above QC limits. 1,4-Dioxane was considered as estimated and flagged “J”.

1.6 Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

LCS/LCSD recoveries were evaluated using limits defined in the project-specific QAPP Worksheet 15.

All sample recoveries were within control limits.

1.7 Matrix Spike (MS)/Matrix Spike Duplicate Sample (MSD)

MS/MSD recoveries were evaluated using limits defined in Worksheet 15 of the project-specific QAPP. When sample results were greater than 4X the spike amount, control limits were not applicable and require no qualification. Furthermore, if a MS/MSD analyses was performed on a batched (unrelated) sample, no qualification was made to the sample data.

1.7.1 SW6850

Site LHAAP-16 reported the MS and MSD recoveries of perchlorate below control limits. This compound was qualified as estimated, "J", in the sample used for the spike analysis (16EW01_022619).

1.7.2 SW8260C

Site LHAAP-16 reported the MSD recovery of cis-1,2-dichloroethene below control limits. This compound was qualified as estimated, "J", in the sample used for the spike analysis (16EW01_022619).

1.7.3 SW6850

The MS/MSD recoveries for GWTP sample LH18/24-SP650_032719_BIX were above control limits. The perchlorate result was considered estimated and flagged "J".

1.8 Internal Standards

If the percent recovery (%R) for an internal standard in a sample is not within the limit, the associated sample is qualified for those analytes associated with the internal standard(s) outside of the limit.

Internal standards were within acceptance criteria for the associated compounds.

1.9 Field Precision

Precision is the measure of variability of individual sample measurements. Evaluation of field duplicates for precision was done using the relative percent difference (RPD) calculation. The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. Field duplicate RPD limits were set at <30% for groundwater and air matrices.

1.9.1 SW8260C

The LHAAP-16 RPD, between 16EW05_022619 and its duplicate, was exceeded for vinyl chloride. This compound was qualified as estimated, "J", in both sample and duplicate.

2 DATA USABILITY SUMMARY

The data are usable for the intended purposes of the project (see Table 3). The data quality objectives have been met for the project.

Table 1: Field Sample Identification and Laboratory Packages

Client Sample ID	Lab Package	SW6850	E350.3	E365.3	E415.1	SW8270D SIM	SW8260C	SW6020A	SW9056A	SW7196A	E410.4	E1664A	TO-15
GWTP Samples													
LH18/24-SP650_022119/BIX	HS19021158	X	X	X	X								
LH18/24-SP650_022119	HS19021165						X		X				
LH18/24-SP650_022819/BIX	HS19030014	X	X	X	X								
LH18/24-SP650_022819/BIX	HS19030012	X				X	X	X		X			
LH18/24-SP140_022819	HS19030011	X						X		X			
LH18/24-SP650_030619/BIX	HS19030298	X	X	X	X								
LH18/24-SP650_030619	HS19030301						X		X				
LH18/24-SP650_031419/BIX	HS19030761	X				X	X	X		X			
LH18/24-SP650_031419/BIX	HS19030749	X	X	X	X								
LH18/24-SP140_031419	HS19030763	X						X		X			
LH18/24-SP650_032119/BIX	HS19031160	X	X	X	X								
LH18/24-SP650_032119	HS19031189						X		X				
LH18/24-SP650_032719/BIX	HS19031492	X	X	X	X								
LH18/24-SP140_032719	HS19031508	X				X	X	X	X		X	X	
LH18/24-SP650_032719/BIX	HS19031511	X				X	X	X	X		X	X	
Air Samples													
LH18/24-Air_022719_Stripper	P1901179												X
LH18/24-Air_022719_Stripper_a	P1901179												X
LH18/24-Air_022719_GWTP	P1901179												X
LH18/24-Air_022719_Downwind	P1901179												X
LHAAP-16													
16EW01_022619	HS19021428	X					X						
16EW02_022619	HS19021428	X					X						
16EW03_022619	HS19021428	X					X						
16EW04_022619	HS19021428	X					X						
16EW05_022619	HS19021428	X					X						
16EW05_022619_a	HS19021428	X					X						
16EW06_022619	HS19021428	X					X						
16EW07_022619	HS19021428	X					X						
16EW08_022619	HS19021428	X					X						

Notes:
MW – Monitoring Well
SM – Standard Method
SW-846 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.
E – U.S. Environmental Protection Agency Method
HS – Houston
BIX – before Ion exchange (perchlorate analysis)

Table 2: Qualified Analytical Data

Client Sample ID Laboratory	Laboratory Package	Analyte Name	Data Validation Qualifier	Reason for Qualification
GWTP				
LH18/24-SP650_031419	HS19030761	1,4-Dioxane	3.1 J	Surr >
LH18/24-SP650_032119	HS19031189	Benzene Toluene	0.50 UJ 0.50 UJ	CCV >
LH18/24-SP650_032719_BIX	HS19031492	Perchlorate	2.6 J	MS/MSD >
LH18/24-SP650_032719	HS19031511	Vanadium	0.00382 UB	MB
LH18/24-SP140_032719	HS19031508	Vanadium 1,2-Dibromoethane Bromoform Dibromochloromethane	0.00237 UB 5.0 UJ 5.0 UJ 5.0 UJ	MB CCV CCV CCV
LHAAP-16				
16EW01_022619	HS19021428	Perchlorate cis-1,2-Dichloroethene	51 J 3,700 J	MS/MSD < MSD <
16EW05_022619	HS19021428	Vinyl chloride	260 J	Dup RPD
16EW05_022619_a	HS19021428	Vinyl chloride	420 J	Dup RPD

Notes:
ID – identification
J – Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
UJ – The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
UB – considered an artifact of blank contamination
MS/MSD </>– Matrix spike/duplicate recovery below/above control limits
Dup RPD – the relative percent difference between sample and duplicate was outside control limits
MB – Method blank contamination
CCV – continuing calibration verification outside control limits
HS - Houston

Table 3: Completeness by Method

Method	No. of Rejected Results	% Completeness
SW6850	0	100
E350.3/SM4500 NH3	0	100
E365.3/SM4500 P	0	100
E415.1/SM5310	0	100
SW8270D	0	100
SW8260C	0	100
SW6020A	0	100
SW9056A	0	100
SW7196A	0	100
E410.4	0	100
E1664A	0	100
TO-15	0	100

APPENDIX F
AIR MONITORING ANALYTICAL LABORATORY REPORTS
(PROVIDED ON CD ONLY)

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Simi Valley, CA 93065
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www.alsglobal.com

LABORATORY REPORT

March 25, 2019

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

RE: LHAAP GWTP / NW01312.0150

Dear Marcia:

Enclosed are the results of the samples submitted to our laboratory on March 5, 2019. For your reference, these analyses have been assigned our service request number P1901179.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

By Michael Conejo at 9:24 am, Mar 25, 2019

Michael Conejo
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
www.alsglobal.com

Client: Bhate Environmental Associates, Inc. Service Request No: P1901179
Project: LHAAP GWTP / NW01312.0150

CASE NARRATIVE

The samples were received intact under chain of custody on March 5, 2019 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for volatile organic compounds and in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. For projects requiring DoD QSM 5.1 compliance canisters were cleaned to <1/2 the MRL. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Alaska DEC	http://dec.alaska.gov/eh/lab.aspx	17-019
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/page/la-lab-accreditation	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml	2018027
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1521096
New Jersey DEP (NELAP)	http://www.nj.gov/dep/enforcement/oqa.html	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-006
Pennsylvania DEP	http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html	T104704413-18-9
Utah DOH (NELAP)	http://health.utah.gov/lab/lab_cert_env	CA016272018-9
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Bhate Environmental Associates, Inc. Service Request: P1901179
Project ID: LHAAP GWTP / NW01312.0150

Date Received: 3/5/2019
Time Received: 09:20

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-15 - VOC Cans
LH18/24-Air_022719_Stripper	P1901179-001	Air	2/27/2019	14:00	AS00629	-0.03	3.53	X
LH18/24-Air_022719_Stripper_a	P1901179-002	Air	2/27/2019	14:00	AS00210	-0.15	3.90	X
LH18/24-Air_022719_GWTP	P1901179-003	Air	2/27/2019	14:15	AS01007	-0.47	3.56	X
LH18/24-Air_022719_Downwind	P1901179-004	Air	2/28/2019	06:30	AS01290	1.24	3.77	X

Air - Chain of Custody Record & Analytical Service Request

ALS
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

ALS Project No. P1901179

ALS Contact:

Company Name & Address (Reporting Information): BHATE ENVIRONMENTAL, 445 UNION BLVD. STE. 129, LAKEWOOD, CO. 80228

Project Name: LHAAP-GWTP

Project Number: NW01312.0150

Project Manager: Kim Nemmers

P.O. # / Billing Information:

Phone: 720-463-3905

Fax: 303-597-2449

Email Address for Result Reporting: molive@bhate.com

Sampler (Print & Sign): Scott Bessinger

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method: TO-15		Comments e.g. Actual Preservative or specific instructions
LH18/24-AIR_022719_STRIPPER	1	2/27/19	1400	AS00829		-28	0	6L	X		
LH18/24-AIR_022719_STRIPPER_A	2	2/27/19	1400	AS00210		-30	0	6L	X		
LH18/24-AIR_022719_GWTP	3	2/27/19	1415	AS01007	SFC00196	-28	-3	6L	X		
LH18/24-AIR_022719_DOWNWIND	4	2/28/19	0630	AS01290	SFC00225	-28	-4	6L	X		

Report Tier Levels - please select
Tier I - Results (Default if not specified) ____
Tier II (Results + QC Summaries) X
Tier III (Results + QC & Calibration Summaries) ____
Tier IV (Data Validation Package) 10% Surcharge ____

EDD required Yes / No
Type: ______ Units: ______

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Scott Bessinger	2/28/19	0645			
			[signature]	3/1/19	0920

Cooler / Blank Temperature ____ °C

00936229

ALS Environmental
Sample Acceptance Check Form

Client: Bhate Environmental Associates, Inc. Work order: P1901179
Project: LHAAP GWTP / NW01312.0150
Sample(s) received on: 3/5/19 Date opened: 3/5/19 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? ______ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1901179-001.01	6.0 L Silonite Can					
P1901179-002.01	6.0 L Silonite Can					
P1901179-003.01	6.0 L Silonite Can					
P1901179-004.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_Stripper** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-001

Test Code: EPA TO-15 Date Collected: 2/27/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.010 Liter(s)
Test Notes:
Container ID: AS00629

Initial Pressure (psig): -0.03 Final Pressure (psig): 3.53

Container Dilution Factor: 1.24

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	64	ND	37	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	64	ND	13	
74-87-3	Chloromethane	ND	62	ND	30	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	63	ND	9.1	
75-01-4	Vinyl Chloride	ND	66	ND	26	
106-99-0	1,3-Butadiene	ND	64	ND	29	
74-83-9	Bromomethane	ND	62	ND	16	
75-00-3	Chloroethane	ND	63	ND	24	
64-17-5	Ethanol	ND	630	ND	340	
75-05-8	Acetonitrile	ND	64	ND	38	
107-02-8	Acrolein	ND	120	ND	54	
67-64-1	Acetone	ND	670	ND	280	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	66	ND	12	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	260	ND	110	
107-13-1	Acrylonitrile	ND	64	ND	30	
75-35-4	1,1-Dichloroethene	ND	67	ND	17	
75-09-2	Methylene Chloride	**580**	67	**170**	19	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	66	ND	21	
76-13-1	Trichlorotrifluoroethane (CFC 113)	**1,800**	66	**240**	8.6	
75-15-0	Carbon Disulfide	ND	140	ND	44	
156-60-5	trans-1,2-Dichloroethene	ND	66	ND	17	
75-34-3	1,1-Dichloroethane	ND	64	ND	16	
1634-04-4	Methyl tert-Butyl Ether	ND	67	ND	19	
108-05-4	Vinyl Acetate	ND	660	ND	190	
78-93-3	2-Butanone (MEK)	ND	120	ND	42	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_Stripper** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-001

Test Code: EPA TO-15 Date Collected: 2/27/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.010 Liter(s)
Test Notes:
Container ID: AS00629

Initial Pressure (psig): -0.03 Final Pressure (psig): 3.53

Container Dilution Factor: 1.24

CAS #	Compound	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	**Data Qualifier**
156-59-2	cis-1,2-Dichloroethene	**2,700**	66	**690**	17	
141-78-6	Ethyl Acetate	ND	140	ND	38	
110-54-3	n-Hexane	ND	67	ND	19	
67-66-3	Chloroform	ND	67	ND	14	
109-99-9	Tetrahydrofuran (THF)	ND	66	ND	22	
107-06-2	1,2-Dichloroethane	**140**	66	**34**	16	
71-55-6	1,1,1-Trichloroethane	ND	67	ND	12	
71-43-2	Benzene	ND	64	ND	20	
56-23-5	Carbon Tetrachloride	ND	64	ND	10	
110-82-7	Cyclohexane	ND	120	ND	36	
78-87-5	1,2-Dichloropropane	ND	67	ND	14	
75-27-4	Bromodichloromethane	ND	66	ND	9.8	
79-01-6	Trichloroethene	**11,000**	66	**2,100**	12	
123-91-1	1,4-Dioxane	ND	66	ND	18	
80-62-6	Methyl Methacrylate	ND	140	ND	33	
142-82-5	n-Heptane	ND	67	ND	16	
10061-01-5	cis-1,3-Dichloropropene	ND	69	ND	15	
108-10-1	4-Methyl-2-pentanone	ND	66	ND	16	
10061-02-6	trans-1,3-Dichloropropene	ND	66	ND	14	
79-00-5	1,1,2-Trichloroethane	ND	67	ND	12	
108-88-3	Toluene	ND	66	ND	17	
591-78-6	2-Hexanone	ND	67	ND	16	
124-48-1	Dibromochloromethane	ND	67	ND	7.9	
106-93-4	1,2-Dibromoethane	ND	67	ND	8.7	
123-86-4	n-Butyl Acetate	ND	67	ND	14	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_Stripper** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-001

Test Code: EPA TO-15 Date Collected: 2/27/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.010 Liter(s)
Test Notes:
Container ID: AS00629

Initial Pressure (psig): -0.03 Final Pressure (psig): 3.53

Container Dilution Factor: 1.24

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	67	ND	14	
127-18-4	Tetrachloroethene	ND	66	ND	9.7	
108-90-7	Chlorobenzene	ND	66	ND	14	
100-41-4	Ethylbenzene	ND	64	ND	15	
179601-23-1	m,p-Xylenes	ND	140	ND	31	
75-25-2	Bromoform	ND	66	ND	6.4	
100-42-5	Styrene	ND	66	ND	15	
95-47-6	o-Xylene	ND	66	ND	15	
111-84-2	n-Nonane	ND	67	ND	13	
79-34-5	1,1,2,2-Tetrachloroethane	ND	66	ND	9.6	
98-82-8	Cumene	ND	66	ND	13	
80-56-8	alpha-Pinene	ND	64	ND	12	
103-65-1	n-Propylbenzene	ND	67	ND	14	
622-96-8	4-Ethyltoluene	ND	66	ND	13	
108-67-8	1,3,5-Trimethylbenzene	ND	66	ND	13	
95-63-6	1,2,4-Trimethylbenzene	ND	66	ND	13	
100-44-7	Benzyl Chloride	ND	140	ND	26	
541-73-1	1,3-Dichlorobenzene	ND	67	ND	11	
106-46-7	1,4-Dichlorobenzene	ND	67	ND	11	
95-50-1	1,2-Dichlorobenzene	ND	67	ND	11	
5989-27-5	d-Limonene	ND	63	ND	11	
96-12-8	1,2-Dibromo-3-chloropropane	ND	64	ND	6.7	
120-82-1	1,2,4-Trichlorobenzene	ND	66	ND	8.9	
91-20-3	Naphthalene	ND	63	ND	12	
87-68-3	Hexachlorobutadiene	ND	66	ND	6.2	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_Stripper_a** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-002

Test Code: EPA TO-15 Date Collected: 2/27/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.010 Liter(s)
Test Notes:
Container ID: AS00210

Initial Pressure (psig): -0.15 Final Pressure (psig): 3.90

Container Dilution Factor: 1.28

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	67	ND	39	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	67	ND	13	
74-87-3	Chloromethane	ND	64	ND	31	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	65	ND	9.3	
75-01-4	Vinyl Chloride	ND	68	ND	27	
106-99-0	1,3-Butadiene	ND	67	ND	30	
74-83-9	Bromomethane	ND	64	ND	16	
75-00-3	Chloroethane	ND	65	ND	25	
64-17-5	Ethanol	ND	650	ND	350	
75-05-8	Acetonitrile	ND	67	ND	40	
107-02-8	Acrolein	ND	130	ND	56	
67-64-1	Acetone	ND	690	ND	290	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	68	ND	12	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	270	ND	110	
107-13-1	Acrylonitrile	ND	67	ND	31	
75-35-4	1,1-Dichloroethene	ND	69	ND	17	
75-09-2	Methylene Chloride	**630**	69	**180**	20	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	68	ND	22	
76-13-1	Trichlorotrifluoroethane (CFC 113)	**1,900**	68	**240**	8.9	
75-15-0	Carbon Disulfide	ND	140	ND	45	
156-60-5	trans-1,2-Dichloroethene	ND	68	ND	17	
75-34-3	1,1-Dichloroethane	ND	67	ND	16	
1634-04-4	Methyl tert-Butyl Ether	ND	69	ND	19	
108-05-4	Vinyl Acetate	ND	680	ND	190	
78-93-3	2-Butanone (MEK)	ND	130	ND	43	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_Stripper_a** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-002

Test Code: EPA TO-15 Date Collected: 2/27/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.010 Liter(s)
Test Notes:
Container ID: AS00210

Initial Pressure (psig): -0.15 Final Pressure (psig): 3.90

Container Dilution Factor: 1.28

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	**2,800**	68	**710**	17	
141-78-6	Ethyl Acetate	ND	140	ND	39	
110-54-3	n-Hexane	ND	69	ND	20	
67-66-3	Chloroform	ND	69	ND	14	
109-99-9	Tetrahydrofuran (THF)	ND	68	ND	23	
107-06-2	1,2-Dichloroethane	**140**	68	**35**	17	
71-55-6	1,1,1-Trichloroethane	ND	69	ND	13	
71-43-2	Benzene	ND	67	ND	21	
56-23-5	Carbon Tetrachloride	ND	67	ND	11	
110-82-7	Cyclohexane	ND	130	ND	37	
78-87-5	1,2-Dichloropropane	ND	69	ND	15	
75-27-4	Bromodichloromethane	ND	68	ND	10	
79-01-6	Trichloroethene	**12,000**	68	**2,200**	13	
123-91-1	1,4-Dioxane	ND	68	ND	19	
80-62-6	Methyl Methacrylate	ND	140	ND	34	
142-82-5	n-Heptane	ND	69	ND	17	
10061-01-5	cis-1,3-Dichloropropene	ND	72	ND	16	
108-10-1	4-Methyl-2-pentanone	ND	68	ND	17	
10061-02-6	trans-1,3-Dichloropropene	ND	68	ND	15	
79-00-5	1,1,2-Trichloroethane	ND	69	ND	13	
108-88-3	Toluene	ND	68	ND	18	
591-78-6	2-Hexanone	ND	69	ND	17	
124-48-1	Dibromochloromethane	ND	69	ND	8.1	
106-93-4	1,2-Dibromoethane	ND	69	ND	9.0	
123-86-4	n-Butyl Acetate	ND	69	ND	15	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_Stripper_a** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-002

Test Code: EPA TO-15 Date Collected: 2/27/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.010 Liter(s)
Test Notes:
Container ID: AS00210

Initial Pressure (psig): -0.15 Final Pressure (psig): 3.90

Container Dilution Factor: 1.28

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	69	ND	15	
127-18-4	Tetrachloroethene	ND	68	ND	10	
108-90-7	Chlorobenzene	ND	68	ND	15	
100-41-4	Ethylbenzene	ND	67	ND	15	
179601-23-1	m,p-Xylenes	ND	140	ND	32	
75-25-2	Bromoform	ND	68	ND	6.6	
100-42-5	Styrene	ND	68	ND	16	
95-47-6	o-Xylene	ND	68	ND	16	
111-84-2	n-Nonane	ND	69	ND	13	
79-34-5	1,1,2,2-Tetrachloroethane	ND	68	ND	9.9	
98-82-8	Cumene	ND	68	ND	14	
80-56-8	alpha-Pinene	ND	67	ND	12	
103-65-1	n-Propylbenzene	ND	69	ND	14	
622-96-8	4-Ethyltoluene	ND	68	ND	14	
108-67-8	1,3,5-Trimethylbenzene	ND	68	ND	14	
95-63-6	1,2,4-Trimethylbenzene	ND	68	ND	14	
100-44-7	Benzyl Chloride	ND	140	ND	27	
541-73-1	1,3-Dichlorobenzene	ND	69	ND	12	
106-46-7	1,4-Dichlorobenzene	ND	69	ND	12	
95-50-1	1,2-Dichlorobenzene	ND	69	ND	12	
5989-27-5	d-Limonene	ND	65	ND	12	
96-12-8	1,2-Dibromo-3-chloropropane	ND	67	ND	6.9	
120-82-1	1,2,4-Trichlorobenzene	ND	68	ND	9.1	
91-20-3	Naphthalene	ND	65	ND	12	
87-68-3	Hexachlorobutadiene	ND	68	ND	6.4	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS
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Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_GWTP** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-003

Test Code: EPA TO-15 Date Collected: 2/27/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS01007

Initial Pressure (psig): -0.47 Final Pressure (psig): 3.56

Container Dilution Factor: 1.28

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.67	ND	0.39	
75-71-8	Dichlorodifluoromethane (CFC 12)	**2.5**	0.67	**0.52**	0.13	
74-87-3	Chloromethane	ND	0.64	ND	0.31	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.65	ND	0.093	
75-01-4	Vinyl Chloride	ND	0.68	ND	0.27	
106-99-0	1,3-Butadiene	ND	0.67	ND	0.30	
74-83-9	Bromomethane	ND	0.64	ND	0.16	
75-00-3	Chloroethane	ND	0.65	ND	0.25	
64-17-5	Ethanol	ND	6.5	ND	3.5	
75-05-8	Acetonitrile	ND	0.67	ND	0.40	
107-02-8	Acrolein	ND	1.3	ND	0.56	
67-64-1	Acetone	**9.0**	6.9	**3.8**	2.9	
75-69-4	Trichlorofluoromethane (CFC 11)	**1.4**	0.68	**0.24**	0.12	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	2.7	ND	1.1	
107-13-1	Acrylonitrile	ND	0.67	ND	0.31	
75-35-4	1,1-Dichloroethene	ND	0.69	ND	0.17	
75-09-2	Methylene Chloride	**2.8**	0.69	**0.82**	0.20	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.68	ND	0.22	
76-13-1	Trichlorotrifluoroethane (CFC 113)	**19**	0.68	**2.5**	0.089	
75-15-0	Carbon Disulfide	ND	1.4	ND	0.45	
156-60-5	trans-1,2-Dichloroethene	ND	0.68	ND	0.17	
75-34-3	1,1-Dichloroethane	ND	0.67	ND	0.16	
1634-04-4	Methyl tert-Butyl Ether	ND	0.69	ND	0.19	
108-05-4	Vinyl Acetate	ND	6.8	ND	1.9	
78-93-3	2-Butanone (MEK)	**1.5**	1.3	**0.52**	0.43	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_GWTP** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-003

Test Code: EPA TO-15 Date Collected: 2/27/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS01007

Initial Pressure (psig): -0.47 Final Pressure (psig): 3.56

Container Dilution Factor: 1.28

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	**12**	0.68	**3.1**	0.17	
141-78-6	Ethyl Acetate	**5.7**	1.4	**1.6**	0.39	
110-54-3	n-Hexane	**1.0**	0.69	**0.29**	0.20	
67-66-3	Chloroform	ND	0.69	ND	0.14	
109-99-9	Tetrahydrofuran (THF)	ND	0.68	ND	0.23	
107-06-2	1,2-Dichloroethane	ND	0.68	ND	0.17	
71-55-6	1,1,1-Trichloroethane	ND	0.69	ND	0.13	
71-43-2	Benzene	**0.80**	0.67	**0.25**	0.21	
56-23-5	Carbon Tetrachloride	ND	0.67	ND	0.11	
110-82-7	Cyclohexane	ND	1.3	ND	0.37	
78-87-5	1,2-Dichloropropane	ND	0.69	ND	0.15	
75-27-4	Bromodichloromethane	ND	0.68	ND	0.10	
79-01-6	Trichloroethene	**55**	0.68	**10**	0.13	
123-91-1	1,4-Dioxane	ND	0.68	ND	0.19	
80-62-6	Methyl Methacrylate	ND	1.4	ND	0.34	
142-82-5	n-Heptane	ND	0.69	ND	0.17	
10061-01-5	cis-1,3-Dichloropropene	ND	0.72	ND	0.16	
108-10-1	4-Methyl-2-pentanone	ND	0.68	ND	0.17	
10061-02-6	trans-1,3-Dichloropropene	ND	0.68	ND	0.15	
79-00-5	1,1,2-Trichloroethane	ND	0.69	ND	0.13	
108-88-3	Toluene	**1.2**	0.68	**0.31**	0.18	
591-78-6	2-Hexanone	ND	0.69	ND	0.17	
124-48-1	Dibromochloromethane	ND	0.69	ND	0.081	
106-93-4	1,2-Dibromoethane	ND	0.69	ND	0.090	
123-86-4	n-Butyl Acetate	ND	0.69	ND	0.15	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_GWTP** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-003

Test Code: EPA TO-15 Date Collected: 2/27/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS01007

Initial Pressure (psig): -0.47 Final Pressure (psig): 3.56

Container Dilution Factor: 1.28

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.69	ND	0.15	
127-18-4	Tetrachloroethene	ND	0.68	ND	0.10	
108-90-7	Chlorobenzene	ND	0.68	ND	0.15	
100-41-4	Ethylbenzene	ND	0.67	ND	0.15	
179601-23-1	m,p-Xylenes	ND	1.4	ND	0.32	
75-25-2	Bromoform	ND	0.68	ND	0.066	
100-42-5	Styrene	ND	0.68	ND	0.16	
95-47-6	o-Xylene	ND	0.68	ND	0.16	
111-84-2	n-Nonane	ND	0.69	ND	0.13	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.68	ND	0.099	
98-82-8	Cumene	ND	0.68	ND	0.14	
80-56-8	alpha-Pinene	ND	0.67	ND	0.12	
103-65-1	n-Propylbenzene	ND	0.69	ND	0.14	
622-96-8	4-Ethyltoluene	ND	0.68	ND	0.14	
108-67-8	1,3,5-Trimethylbenzene	ND	0.68	ND	0.14	
95-63-6	1,2,4-Trimethylbenzene	ND	0.68	ND	0.14	
100-44-7	Benzyl Chloride	ND	1.4	ND	0.27	
541-73-1	1,3-Dichlorobenzene	ND	0.69	ND	0.12	
106-46-7	1,4-Dichlorobenzene	ND	0.69	ND	0.12	
95-50-1	1,2-Dichlorobenzene	ND	0.69	ND	0.12	
5989-27-5	d-Limonene	ND	0.65	ND	0.12	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.67	ND	0.069	
120-82-1	1,2,4-Trichlorobenzene	ND	0.68	ND	0.091	
91-20-3	Naphthalene	ND	0.65	ND	0.12	
87-68-3	Hexachlorobutadiene	ND	0.68	ND	0.064	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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RESULTS OF ANALYSIS

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Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_Downwind** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-004

Test Code: EPA TO-15 Date Collected: 2/28/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS01290

Initial Pressure (psig): 1.24 Final Pressure (psig): 3.77

Container Dilution Factor: 1.16

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.60	ND	0.35	
75-71-8	Dichlorodifluoromethane (CFC 12)	**2.6**	0.60	**0.52**	0.12	
74-87-3	Chloromethane	ND	0.58	ND	0.28	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.59	ND	0.085	
75-01-4	Vinyl Chloride	ND	0.61	ND	0.24	
106-99-0	1,3-Butadiene	ND	0.60	ND	0.27	
74-83-9	Bromomethane	ND	0.58	ND	0.15	
75-00-3	Chloroethane	ND	0.59	ND	0.22	
64-17-5	Ethanol	ND	5.9	ND	3.1	
75-05-8	Acetonitrile	ND	0.60	ND	0.36	
107-02-8	Acrolein	ND	1.2	ND	0.51	
67-64-1	Acetone	ND	6.3	ND	2.6	
75-69-4	Trichlorofluoromethane (CFC 11)	**1.3**	0.61	**0.24**	0.11	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	2.4	ND	0.99	
107-13-1	Acrylonitrile	ND	0.60	ND	0.28	
75-35-4	1,1-Dichloroethene	ND	0.63	ND	0.16	
75-09-2	Methylene Chloride	**1.4**	0.63	**0.40**	0.18	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.61	ND	0.20	
76-13-1	Trichlorotrifluoroethane (CFC 113)	**7.0**	0.61	**0.91**	0.080	
75-15-0	Carbon Disulfide	ND	1.3	ND	0.41	
156-60-5	trans-1,2-Dichloroethene	ND	0.61	ND	0.16	
75-34-3	1,1-Dichloroethane	ND	0.60	ND	0.15	
1634-04-4	Methyl tert-Butyl Ether	ND	0.63	ND	0.17	
108-05-4	Vinyl Acetate	ND	6.1	ND	1.7	
78-93-3	2-Butanone (MEK)	ND	1.2	ND	0.39	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client:	**Bhate Environmental Associates, Inc.**		
Client Sample ID:	**LH18/24-Air_022719_Downwind**	ALS Project ID:	P1901179
Client Project ID:	**LHAAP GWTP / NW01312.0150**	ALS Sample ID:	P1901179-004
Test Code:	EPA TO-15	Date Collected:	2/28/19
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13	Date Received:	3/5/19
Analyst:	Wida Ang	Date Analyzed:	3/11/19
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	1.00 Liter(s)
Test Notes:			
Container ID:	AS01290		

Initial Pressure (psig): 1.24 Final Pressure (psig): 3.77

Container Dilution Factor: 1.16

CAS #	Compound	**Result µg/m³**	MRL µg/m³	**Result ppbV**	MRL ppbV	**Data Qualifier**
156-59-2	cis-1,2-Dichloroethene	**0.64**	0.61	**0.16**	0.16	
141-78-6	Ethyl Acetate	**2.7**	1.3	**0.76**	0.35	
110-54-3	n-Hexane	**0.83**	0.63	**0.23**	0.18	
67-66-3	Chloroform	ND	0.63	ND	0.13	
109-99-9	Tetrahydrofuran (THF)	ND	0.61	ND	0.21	
107-06-2	1,2-Dichloroethane	ND	0.61	ND	0.15	
71-55-6	1,1,1-Trichloroethane	ND	0.63	ND	0.11	
71-43-2	Benzene	**0.69**	0.60	**0.22**	0.19	
56-23-5	Carbon Tetrachloride	ND	0.60	ND	0.096	
110-82-7	Cyclohexane	ND	1.2	ND	0.34	
78-87-5	1,2-Dichloropropane	ND	0.63	ND	0.14	
75-27-4	Bromodichloromethane	ND	0.61	ND	0.092	
79-01-6	Trichloroethene	**2.1**	0.61	**0.39**	0.11	
123-91-1	1,4-Dioxane	ND	0.61	ND	0.17	
80-62-6	Methyl Methacrylate	ND	1.3	ND	0.31	
142-82-5	n-Heptane	ND	0.63	ND	0.15	
10061-01-5	cis-1,3-Dichloropropene	ND	0.65	ND	0.14	
108-10-1	4-Methyl-2-pentanone	ND	0.61	ND	0.15	
10061-02-6	trans-1,3-Dichloropropene	ND	0.61	ND	0.14	
79-00-5	1,1,2-Trichloroethane	ND	0.63	ND	0.11	
108-88-3	Toluene	**0.76**	0.61	**0.20**	0.16	
591-78-6	2-Hexanone	ND	0.63	ND	0.15	
124-48-1	Dibromochloromethane	ND	0.63	ND	0.074	
106-93-4	1,2-Dibromoethane	ND	0.63	ND	0.082	
123-86-4	n-Butyl Acetate	ND	0.63	ND	0.13	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_Downwind** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-004

Test Code: EPA TO-15 Date Collected: 2/28/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS01290

Initial Pressure (psig): 1.24 Final Pressure (psig): 3.77

Container Dilution Factor: 1.16

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.63	ND	0.13	
127-18-4	Tetrachloroethene	ND	0.61	ND	0.091	
108-90-7	Chlorobenzene	ND	0.61	ND	0.13	
100-41-4	Ethylbenzene	ND	0.60	ND	0.14	
179601-23-1	m,p-Xylenes	ND	1.3	ND	0.29	
75-25-2	Bromoform	ND	0.61	ND	0.059	
100-42-5	Styrene	ND	0.61	ND	0.14	
95-47-6	o-Xylene	ND	0.61	ND	0.14	
111-84-2	n-Nonane	ND	0.63	ND	0.12	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.61	ND	0.090	
98-82-8	Cumene	ND	0.61	ND	0.13	
80-56-8	alpha-Pinene	ND	0.60	ND	0.11	
103-65-1	n-Propylbenzene	ND	0.63	ND	0.13	
622-96-8	4-Ethyltoluene	ND	0.61	ND	0.13	
108-67-8	1,3,5-Trimethylbenzene	ND	0.61	ND	0.13	
95-63-6	1,2,4-Trimethylbenzene	ND	0.61	ND	0.13	
100-44-7	Benzyl Chloride	ND	1.3	ND	0.25	
541-73-1	1,3-Dichlorobenzene	ND	0.63	ND	0.10	
106-46-7	1,4-Dichlorobenzene	ND	0.63	ND	0.10	
95-50-1	1,2-Dichlorobenzene	ND	0.63	ND	0.10	
5989-27-5	d-Limonene	ND	0.59	ND	0.11	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.60	ND	0.062	
120-82-1	1,2,4-Trichlorobenzene	ND	0.61	ND	0.083	
91-20-3	Naphthalene	ND	0.59	ND	0.11	
87-68-3	Hexachlorobutadiene	ND	0.61	ND	0.058	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P190311-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.52	ND	0.30	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.52	ND	0.11	
74-87-3	Chloromethane	ND	0.50	ND	0.24	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.51	ND	0.073	
75-01-4	Vinyl Chloride	ND	0.53	ND	0.21	
106-99-0	1,3-Butadiene	ND	0.52	ND	0.24	
74-83-9	Bromomethane	ND	0.50	ND	0.13	
75-00-3	Chloroethane	ND	0.51	ND	0.19	
64-17-5	Ethanol	ND	5.1	ND	2.7	
75-05-8	Acetonitrile	ND	0.52	ND	0.31	
107-02-8	Acrolein	ND	1.0	ND	0.44	
67-64-1	Acetone	ND	5.4	ND	2.3	
75-69-4	Trichlorofluoromethane (CFC 11)	ND	0.53	ND	0.094	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	2.1	ND	0.85	
107-13-1	Acrylonitrile	ND	0.52	ND	0.24	
75-35-4	1,1-Dichloroethene	ND	0.54	ND	0.14	
75-09-2	Methylene Chloride	ND	0.54	ND	0.16	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.53	ND	0.17	
76-13-1	Trichlorotrifluoroethane (CFC 113)	ND	0.53	ND	0.069	
75-15-0	Carbon Disulfide	ND	1.1	ND	0.35	
156-60-5	trans-1,2-Dichloroethene	ND	0.53	ND	0.13	
75-34-3	1,1-Dichloroethane	ND	0.52	ND	0.13	
1634-04-4	Methyl tert-Butyl Ether	ND	0.54	ND	0.15	
108-05-4	Vinyl Acetate	ND	5.3	ND	1.5	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P190311-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.53	ND	0.13	
141-78-6	Ethyl Acetate	ND	1.1	ND	0.31	
110-54-3	n-Hexane	ND	0.54	ND	0.15	
67-66-3	Chloroform	ND	0.54	ND	0.11	
109-99-9	Tetrahydrofuran (THF)	ND	0.53	ND	0.18	
107-06-2	1,2-Dichloroethane	ND	0.53	ND	0.13	
71-55-6	1,1,1-Trichloroethane	ND	0.54	ND	0.099	
71-43-2	Benzene	ND	0.52	ND	0.16	
56-23-5	Carbon Tetrachloride	ND	0.52	ND	0.083	
110-82-7	Cyclohexane	ND	1.0	ND	0.29	
78-87-5	1,2-Dichloropropane	ND	0.54	ND	0.12	
75-27-4	Bromodichloromethane	ND	0.53	ND	0.079	
79-01-6	Trichloroethene	ND	0.53	ND	0.099	
123-91-1	1,4-Dioxane	ND	0.53	ND	0.15	
80-62-6	Methyl Methacrylate	ND	1.1	ND	0.27	
142-82-5	n-Heptane	ND	0.54	ND	0.13	
10061-01-5	cis-1,3-Dichloropropene	ND	0.56	ND	0.12	
108-10-1	4-Methyl-2-pentanone	ND	0.53	ND	0.13	
10061-02-6	trans-1,3-Dichloropropene	ND	0.53	ND	0.12	
79-00-5	1,1,2-Trichloroethane	ND	0.54	ND	0.099	
108-88-3	Toluene	ND	0.53	ND	0.14	
591-78-6	2-Hexanone	ND	0.54	ND	0.13	
124-48-1	Dibromochloromethane	ND	0.54	ND	0.063	
106-93-4	1,2-Dibromoethane	ND	0.54	ND	0.070	
123-86-4	n-Butyl Acetate	ND	0.54	ND	0.11	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS
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Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P190311-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.54	ND	0.12	
127-18-4	Tetrachloroethene	ND	0.53	ND	0.078	
108-90-7	Chlorobenzene	ND	0.53	ND	0.12	
100-41-4	Ethylbenzene	ND	0.52	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.1	ND	0.25	
75-25-2	Bromoform	ND	0.53	ND	0.051	
100-42-5	Styrene	ND	0.53	ND	0.12	
95-47-6	o-Xylene	ND	0.53	ND	0.12	
111-84-2	n-Nonane	ND	0.54	ND	0.10	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.53	ND	0.077	
98-82-8	Cumene	ND	0.53	ND	0.11	
80-56-8	alpha-Pinene	ND	0.52	ND	0.093	
103-65-1	n-Propylbenzene	ND	0.54	ND	0.11	
622-96-8	4-Ethyltoluene	ND	0.53	ND	0.11	
108-67-8	1,3,5-Trimethylbenzene	ND	0.53	ND	0.11	
95-63-6	1,2,4-Trimethylbenzene	ND	0.53	ND	0.11	
100-44-7	Benzyl Chloride	ND	1.1	ND	0.21	
541-73-1	1,3-Dichlorobenzene	ND	0.54	ND	0.090	
106-46-7	1,4-Dichlorobenzene	ND	0.54	ND	0.090	
95-50-1	1,2-Dichlorobenzene	ND	0.54	ND	0.090	
5989-27-5	d-Limonene	ND	0.51	ND	0.092	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.52	ND	0.054	
120-82-1	1,2,4-Trichlorobenzene	ND	0.53	ND	0.071	
91-20-3	Naphthalene	ND	0.51	ND	0.097	
87-68-3	Hexachlorobutadiene	ND	0.53	ND	0.050	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS
Page 1 of 1

Client: **Bhate Environmental Associates, Inc.**
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Project ID: P1901179

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date(s) Collected: 2/27 - 2/28/19
Analyst: Wida Ang Date(s) Received: 3/5/19
Sample Type: 6.0 L Silonite Canister(s) Date(s) Analyzed: 3/11/19
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P190311-MB	**112**	**96**	**99**	70-130	
Lab Control Sample	P190311-LCS	**108**	**94**	**99**	70-130	
LH18/24-Air_022719_Stripper	P1901179-001	**112**	**95**	**98**	70-130	
LH18/24-Air_022719_Stripper_a	P1901179-002	**113**	**94**	**98**	70-130	
LH18/24-Air_022719_Stripper_a	P1901179-002DUP	**114**	**94**	**98**	70-130	
LH18/24-Air_022719_GWTP	P1901179-003	**112**	**94**	**98**	70-130	
LH18/24-Air_022719_Downwind	P1901179-004	**112**	**94**	**98**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P190311-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
115-07-1	Propene	211	**215**	**102**	53-112	
75-71-8	Dichlorodifluoromethane (CFC 12)	210	**210**	**100**	62-103	
74-87-3	Chloromethane	211	**234**	**111**	51-121	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	211	**206**	**98**	56-111	
75-01-4	Vinyl Chloride	214	**236**	**110**	57-117	
106-99-0	1,3-Butadiene	210	**243**	**116**	53-134	
74-83-9	Bromomethane	212	**217**	**102**	65-110	
75-00-3	Chloroethane	214	**218**	**102**	64-111	
64-17-5	Ethanol	1,020	**1080**	**106**	57-124	
75-05-8	Acetonitrile	206	**227**	**110**	57-126	
107-02-8	Acrolein	205	**234**	**114**	62-121	
67-64-1	Acetone	1,060	**1030**	**97**	60-113	
75-69-4	Trichlorofluoromethane (CFC 11)	211	**211**	**100**	63-104	
67-63-0	2-Propanol (Isopropyl Alcohol)	413	**449**	**109**	60-124	
107-13-1	Acrylonitrile	207	**259**	**125**	66-125	
75-35-4	1,1-Dichloroethene	218	**218**	**100**	68-107	
75-09-2	Methylene Chloride	217	**228**	**105**	66-105	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	216	**245**	**113**	63-127	
76-13-1	Trichlorotrifluoroethane (CFC 113)	216	**204**	**94**	59-109	
75-15-0	Carbon Disulfide	218	**203**	**93**	67-109	
156-60-5	trans-1,2-Dichloroethene	214	**242**	**113**	70-115	
75-34-3	1,1-Dichloroethane	216	**218**	**101**	66-106	
1634-04-4	Methyl tert-Butyl Ether	214	**217**	**101**	67-109	
108-05-4	Vinyl Acetate	1,060	**1140**	**108**	68-136	
78-93-3	2-Butanone (MEK)	208	**218**	**105**	71-116	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client:	**Bhate Environmental Associates, Inc.**		
Client Sample ID:	**Lab Control Sample**	ALS Project ID:	P1901179
Client Project ID:	**LHAAP GWTP / NW01312.0150**	ALS Sample ID:	P190311-LCS

Test Code:	EPA TO-15	Date Collected:	NA
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13	Date Received:	NA
Analyst:	Wida Ang	Date Analyzed:	3/11/19
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	0.125 Liter(s)
Test Notes:			

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	211	**225**	**107**	67-110	
141-78-6	Ethyl Acetate	436	**463**	**106**	64-127	
110-54-3	n-Hexane	216	**209**	**97**	60-115	
67-66-3	Chloroform	217	**218**	**100**	66-105	
109-99-9	Tetrahydrofuran (THF)	216	**210**	**97**	65-110	
107-06-2	1,2-Dichloroethane	215	**231**	**107**	60-110	
71-55-6	1,1,1-Trichloroethane	215	**215**	**100**	64-108	
71-43-2	Benzene	211	**202**	**96**	67-106	
56-23-5	Carbon Tetrachloride	212	**218**	**103**	64-112	
110-82-7	Cyclohexane	416	**405**	**97**	67-110	
78-87-5	1,2-Dichloropropane	216	**218**	**101**	66-112	
75-27-4	Bromodichloromethane	215	**229**	**107**	67-113	
79-01-6	Trichloroethene	213	**208**	**98**	66-108	
123-91-1	1,4-Dioxane	214	**216**	**101**	70-116	
80-62-6	Methyl Methacrylate	431	**463**	**107**	73-118	
142-82-5	n-Heptane	215	**213**	**99**	66-110	
10061-01-5	cis-1,3-Dichloropropene	214	**225**	**105**	75-120	
108-10-1	4-Methyl-2-pentanone	209	**229**	**110**	65-124	
10061-02-6	trans-1,3-Dichloropropene	213	**233**	**109**	77-123	
79-00-5	1,1,2-Trichloroethane	215	**218**	**101**	68-112	
108-88-3	Toluene	212	**174**	**82**	62-111	
591-78-6	2-Hexanone	214	**225**	**105**	59-128	
124-48-1	Dibromochloromethane	213	**214**	**100**	67-123	
106-93-4	1,2-Dibromoethane	216	**214**	**99**	66-122	
123-86-4	n-Butyl Acetate	219	**218**	**100**	64-128	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P190311-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
111-65-9	n-Octane	217	**194**	**89**	65-114	
127-18-4	Tetrachloroethene	213	**182**	**85**	55-120	
108-90-7	Chlorobenzene	215	**184**	**86**	61-114	
100-41-4	Ethylbenzene	212	**182**	**86**	64-113	
179601-23-1	m,p-Xylenes	426	**368**	**86**	64-114	
75-25-2	Bromoform	213	**216**	**101**	65-132	
100-42-5	Styrene	212	**199**	**94**	67-124	
95-47-6	o-Xylene	214	**184**	**86**	65-114	
111-84-2	n-Nonane	215	**198**	**92**	64-117	
79-34-5	1,1,2,2-Tetrachloroethane	214	**194**	**91**	66-119	
98-82-8	Cumene	214	**180**	**84**	61-116	
80-56-8	alpha-Pinene	211	**195**	**92**	65-120	
103-65-1	n-Propylbenzene	218	**188**	**86**	63-117	
622-96-8	4-Ethyltoluene	214	**189**	**88**	63-124	
108-67-8	1,3,5-Trimethylbenzene	214	**175**	**82**	60-117	
95-63-6	1,2,4-Trimethylbenzene	215	**185**	**86**	61-122	
100-44-7	Benzyl Chloride	217	**219**	**101**	77-142	
541-73-1	1,3-Dichlorobenzene	216	**189**	**88**	61-125	
106-46-7	1,4-Dichlorobenzene	216	**183**	**85**	59-123	
95-50-1	1,2-Dichlorobenzene	216	**189**	**88**	61-126	
5989-27-5	d-Limonene	211	**206**	**98**	66-124	
96-12-8	1,2-Dibromo-3-chloropropane	209	**195**	**93**	67-138	
120-82-1	1,2,4-Trichlorobenzene	214	**195**	**91**	62-141	
91-20-3	Naphthalene	203	**208**	**102**	62-145	
87-68-3	Hexachlorobutadiene	209	**162**	**78**	49-131	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Page 1 of 3

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_Stripper_a** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-002DUP

Test Code: EPA TO-15 Date Collected: 2/27/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.010 Liter(s)
Test Notes:
Container ID: AS00210

Initial Pressure (psig): -0.15 Final Pressure (psig): 3.90

Container Dilution Factor: 1.28

Compound	Sample Result µg/m³	Sample Result ppbV	Duplicate Sample Result µg/m³	Duplicate Sample Result ppbV	Average µg/m³	% RPD	RPD Limit	Data Qualifier
Propene	ND	ND	ND	ND	-	-	25	
Dichlorodifluoromethane (CFC 12)	ND	ND	ND	ND	-	-	25	
Chloromethane	ND	ND	ND	ND	-	-	25	
1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	ND	ND	ND	-	-	25	
Vinyl Chloride	ND	ND	ND	ND	-	-	25	
1,3-Butadiene	ND	ND	ND	ND	-	-	25	
Bromomethane	ND	ND	ND	ND	-	-	25	
Chloroethane	ND	ND	ND	ND	-	-	25	
Ethanol	ND	ND	ND	ND	-	-	25	
Acetonitrile	ND	ND	ND	ND	-	-	25	
Acrolein	ND	ND	ND	ND	-	-	25	
Acetone	ND	ND	ND	ND	-	-	25	
Trichlorofluoromethane	ND	ND	ND	ND	-	-	25	
2-Propanol (Isopropyl Alcohol)	ND	ND	ND	ND	-	-	25	
Acrylonitrile	ND	ND	ND	ND	-	-	25	
1,1-Dichloroethene	ND	ND	ND	ND	-	-	25	
Methylene Chloride	632	182	606	174	619	**4**	25	
3-Chloro-1-propene (Allyl Chloride)	ND	ND	ND	ND	-	-	25	
Trichlorotrifluoroethane	1,870	244	1,900	248	1885	**2**	25	
Carbon Disulfide	ND	ND	ND	ND	-	-	25	
trans-1,2-Dichloroethene	ND	ND	ND	ND	-	-	25	
1,1-Dichloroethane	ND	ND	ND	ND	-	-	25	
Methyl tert-Butyl Ether	ND	ND	ND	ND	-	-	25	
Vinyl Acetate	ND	ND	ND	ND	-	-	25	
2-Butanone (MEK)	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Page 2 of 3

Client: **Bhate Environmental Associates, Inc.**
Client Sample ID: **LH18/24-Air_022719_Stripper_a** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150** ALS Sample ID: P1901179-002DUP

Test Code: EPA TO-15 Date Collected: 2/27/19
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 3/5/19
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.010 Liter(s)
Test Notes:
Container ID: AS00210

Initial Pressure (psig): -0.15 Final Pressure (psig): 3.90

Container Dilution Factor: 1.28

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	**Duplicate Sample Result ppbV**	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
cis-1,2-Dichloroethene	2,830	714	2,900	731	2865	**2**	25	
Ethyl Acetate	ND	ND	ND	ND	-	-	25	
n-Hexane	ND	ND	ND	ND	-	-	25	
Chloroform	ND	ND	ND	ND	-	-	25	
Tetrahydrofuran (THF)	ND	ND	ND	ND	-	-	25	
1,2-Dichloroethane	142	35.1	143	35.2	142.5	**0.7**	25	
1,1,1-Trichloroethane	ND	ND	ND	ND	-	-	25	
Benzene	ND	ND	ND	ND	-	-	25	
Carbon Tetrachloride	ND	ND	ND	ND	-	-	25	
Cyclohexane	ND	ND	ND	ND	-	-	25	
1,2-Dichloropropane	ND	ND	ND	ND	-	-	25	
Bromodichloromethane	ND	ND	ND	ND	-	-	25	
Trichloroethene	11,700	2,170	11,900	2,220	11800	**2**	25	
1,4-Dioxane	ND	ND	ND	ND	-	-	25	
Methyl Methacrylate	ND	ND	ND	ND	-	-	25	
n-Heptane	ND	ND	ND	ND	-	-	25	
cis-1,3-Dichloropropene	ND	ND	ND	ND	-	-	25	
4-Methyl-2-pentanone	ND	ND	ND	ND	-	-	25	
trans-1,3-Dichloropropene	ND	ND	ND	ND	-	-	25	
1,1,2-Trichloroethane	ND	ND	ND	ND	-	-	25	
Toluene	ND	ND	ND	ND	-	-	25	
2-Hexanone	ND	ND	ND	ND	-	-	25	
Dibromochloromethane	ND	ND	ND	ND	-	-	25	
1,2-Dibromoethane	ND	ND	ND	ND	-	-	25	
n-Butyl Acetate	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Page 3 of 3

Client:	**Bhate Environmental Associates, Inc.**		
Client Sample ID:	**LH18/24-Air_022719_Stripper_a**	ALS Project ID:	P1901179
Client Project ID:	**LHAAP GWTP / NW01312.0150**	ALS Sample ID:	P1901179-002DUP
Test Code:	EPA TO-15	Date Collected:	2/27/19
Instrument ID:	Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13	Date Received:	3/5/19
Analyst:	Wida Ang	Date Analyzed:	3/11/19
Sample Type:	6.0 L Silonite Canister	Volume(s) Analyzed:	0.010 Liter(s)
Test Notes:			
Container ID:	AS00210		

Initial Pressure (psig): -0.15 Final Pressure (psig): 3.90

Container Dilution Factor: 1.28

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	**Duplicate Sample Result ppbV**	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
n-Octane	ND	ND	ND	ND	-	-	25	
Tetrachloroethene	ND	ND	ND	ND	-	-	25	
Chlorobenzene	ND	ND	ND	ND	-	-	25	
Ethylbenzene	ND	ND	ND	ND	-	-	25	
m,p-Xylenes	ND	ND	ND	ND	-	-	25	
Bromoform	ND	ND	ND	ND	-	-	25	
Styrene	ND	ND	ND	ND	-	-	25	
o-Xylene	ND	ND	ND	ND	-	-	25	
n-Nonane	ND	ND	ND	ND	-	-	25	
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	-	-	25	
Cumene	ND	ND	ND	ND	-	-	25	
alpha-Pinene	ND	ND	ND	ND	-	-	25	
n-Propylbenzene	ND	ND	ND	ND	-	-	25	
4-Ethyltoluene	ND	ND	ND	ND	-	-	25	
1,3,5-Trimethylbenzene	ND	ND	ND	ND	-	-	25	
1,2,4-Trimethylbenzene	ND	ND	ND	ND	-	-	25	
Benzyl Chloride	ND	ND	ND	ND	-	-	25	
1,3-Dichlorobenzene	ND	ND	ND	ND	-	-	25	
1,4-Dichlorobenzene	ND	ND	ND	ND	-	-	25	
1,2-Dichlorobenzene	ND	ND	ND	ND	-	-	25	
d-Limonene	ND	ND	ND	ND	-	-	25	
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	-	-	25	
1,2,4-Trichlorobenzene	ND	ND	ND	ND	-	-	25	
Naphthalene	ND	ND	ND	ND	-	-	25	
Hexachlorobutadiene	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS
Page 1 of 1

Client: **Bhate Environmental Associates, Inc.** ALS Project ID: P1901179
Client Project ID: **LHAAP GWTP / NW01312.0150**

Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Lab File ID: 03111901.D
Analyst: Wida Ang Date Analyzed: 3/11/19
Sample Type: 6.0 L Silonite Canister(s) Time Analyzed: 06:51
Test Notes:

		IS1 (BCM)				IS2 (DFB)				IS3 (CBZ)			
		AREA	**#**	**RT**	**#**	**AREA**	**#**	**RT**	**#**	**AREA**	**#**	**RT**	**#**
	24 Hour Standard	106667		10.98		447071		13.10		192180		17.42	
	Upper Limit	149334		11.31		625899		13.43		269052		17.75	
	Lower Limit	64000		10.65		268243		12.77		115308		17.09	
	Client Sample ID												
01	Method Blank	90918		10.97		407856		13.10		175696		17.42	
02	Lab Control Sample	100369		10.98		428145		13.11		184579		17.43	
03	LH18/24-Air_022719_Stripper	95258		10.96		409116		13.10		177684		17.42	
04	LH18/24-Air_022719_Stripper_a	93387		10.96		405288		13.10		175195		17.42	
05	LH18/24-Air_022719_Stripper_a (Lab Dup)	88966		10.97		384241		13.10		167241		17.42	
06	LH18/24-Air_022719_GWTP	93047		10.97		409377		13.10		180111		17.42	
07	LH18/24-Air_022719_Downwind	93346		10.96		407063		13.10		179457		17.42	
08													
09													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area
AREA LOWER LIMIT = 60% of internal standard area
RT UPPER LIMIT = 0.33 minutes of internal standard RT
RT LOWER LIMIT = 0.33 minutes of internal standard RT

# Column used to flag values outside QC limits with an I.
I = Internal standard not within the specified limits.

00936254

```
Data File : I:\MS13\DATA\2019_03\11\03111914.D          Vial: 3
Acq On    : 11 Mar 2019  14:37                       Operator: WA
Sample    : P1901179-001 (10mL)                      Inst    : MS13
Misc      : S31-02211904

Quant Time: Mar 14 11:05:30 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

WA 3/14/19

```
 Internal Standards                R.T. QIon  Response  Conc Units Dev(Min)
---------------------------------------------------------------------------
  1) Bromochloromethane (IS1)     10.96  130     95258   12.500 ng     -0.03
 37) 1,4-Difluorobenzene (IS2)    13.10  114    409116   12.500 ng     -0.01
 56) Chlorobenzene-d5 (IS3)       17.42   82    177684   12.500 ng      0.00

 System Monitoring Compounds
 33) 1,2-Dichloroethane-d4(...    11.82   65    113684   13.997 ng     -0.02
  Spiked Amount     12.500   Range  70 - 130    Recovery   =  112.00%
 57) Toluene-d8 (SS2)             15.54   98    450131   11.830 ng      0.00
  Spiked Amount     12.500   Range  70 - 130    Recovery   =   94.64%
 73) Bromofluorobenzene (SS3)     18.83  174    168136   12.273 ng      0.00
  Spiked Amount     12.500   Range  70 - 130    Recovery   =   98.16%

 Target Compounds                                                    Qvalue
  2) Propene                       0.00   42         0      N.D.
  3) Dichlorodifluoromethan...     4.19   85       117      N.D.
  4) Chloromethane                 0.00   50         0      N.D.
  5) 1,2-Dichloro-1,1,2,2-t...     0.00  135         0      N.D.
  6) Vinyl Chloride                4.88   62      4957    0.470 ng        84
  7) 1,3-Butadiene                 0.00   54         0      N.D.
  8) Bromomethane                  0.00   94         0      N.D.
  9) Chloroethane                  0.00   64         0      N.D.
 10) Ethanol                       0.00   45         0      N.D.
 11) Acetonitrile                  0.00   41         0      N.D.
 12) Acrolein                      0.00   56         0      N.D.
 13) Acetone                       6.94   58      1870      N.D.
 14) Trichlorofluoromethane        0.00  101         0      N.D.
 15) 2-Propanol (Isopropanol)      0.00   45         0      N.D.
 16) Acrylonitrile                 0.00   53         0      N.D.
 17) 1,1-Dichloroethene            8.03   96      4083    0.516 ng        96
 18) 2-Methyl-2-Propanol (t...     0.00   59         0      N.D.
 19) Methylene Chloride            8.24   84     35520    4.667 ng       100
 20) 3-Chloro-1-propene (Al...     0.00   41         0      N.D. d
 21) Trichlorotrifluoroethane      8.66  151    122516   14.632 ng        98
 22) Carbon Disulfide              8.55   76      1242      N.D.
 23) trans-1,2-Dichloroethene      0.00   61         0      N.D.
 24) 1,1-Dichloroethane            9.77   63      1589      N.D.
 25) Methyl tert-Butyl Ether       0.00   73         0      N.D.
 26) Vinyl Acetate                 0.00   86         0      N.D.
 27) 2-Butanone (MEK)              0.00   72         0      N.D.
 28) cis-1,2-Dichloroethene       10.79   61    211966   22.114 ng        96
 29) Diisopropyl Ether             0.00   87         0      N.D.
 30) Ethyl Acetate                11.13   61       236      N.D.
 31) n-Hexane                      0.00   57         0      N.D.
 32) Chloroform                   11.14   83      2156      N.D.
 34) Tetrahydrofuran (THF)         0.00   72         0      N.D.
 35) Ethyl tert-Butyl Ether        0.00   87         0      N.D.
 36) 1,2-Dichloroethane           11.95   62      8843    1.124 ng        94
 38) 1,1,1-Trichloroethane         0.00   97         0      N.D.
 39) Isopropyl Acetate             0.00   61         0      N.D.
 40) 1-Butanol                     0.00   56         0      N.D.
 41) Benzene                      12.71   78      1076      N.D.
 42) Carbon Tetrachloride         12.86  117       632      N.D.
 43) Cyclohexane                   0.00   84         0      N.D.
 44) tert-Amyl Methyl Ether        0.00   73         0      N.D.
 45) 1,2-Dichloropropane           0.00   63         0      N.D.
 46) Bromodichloromethane          0.00   83         0      N.D. d
 47) Trichloroethene              13.80  130    904294   92.605 ng        99
 48) 1,4-Dioxane                   0.00   88         0      N.D.
 49) 2,2,4-Trimethylpentane...     0.00   57         0      N.D.
 50) Methyl Methacrylate           0.00  100         0      N.D. d
```

Data File : I:\MS13\DATA\2019_03\11\03111914.D Vial: 3
Acq On : 11 Mar 2019 14:37 Operator: WA
Sample : P1901179-001 (10mL) Inst : MS13
Misc : S31-02211904

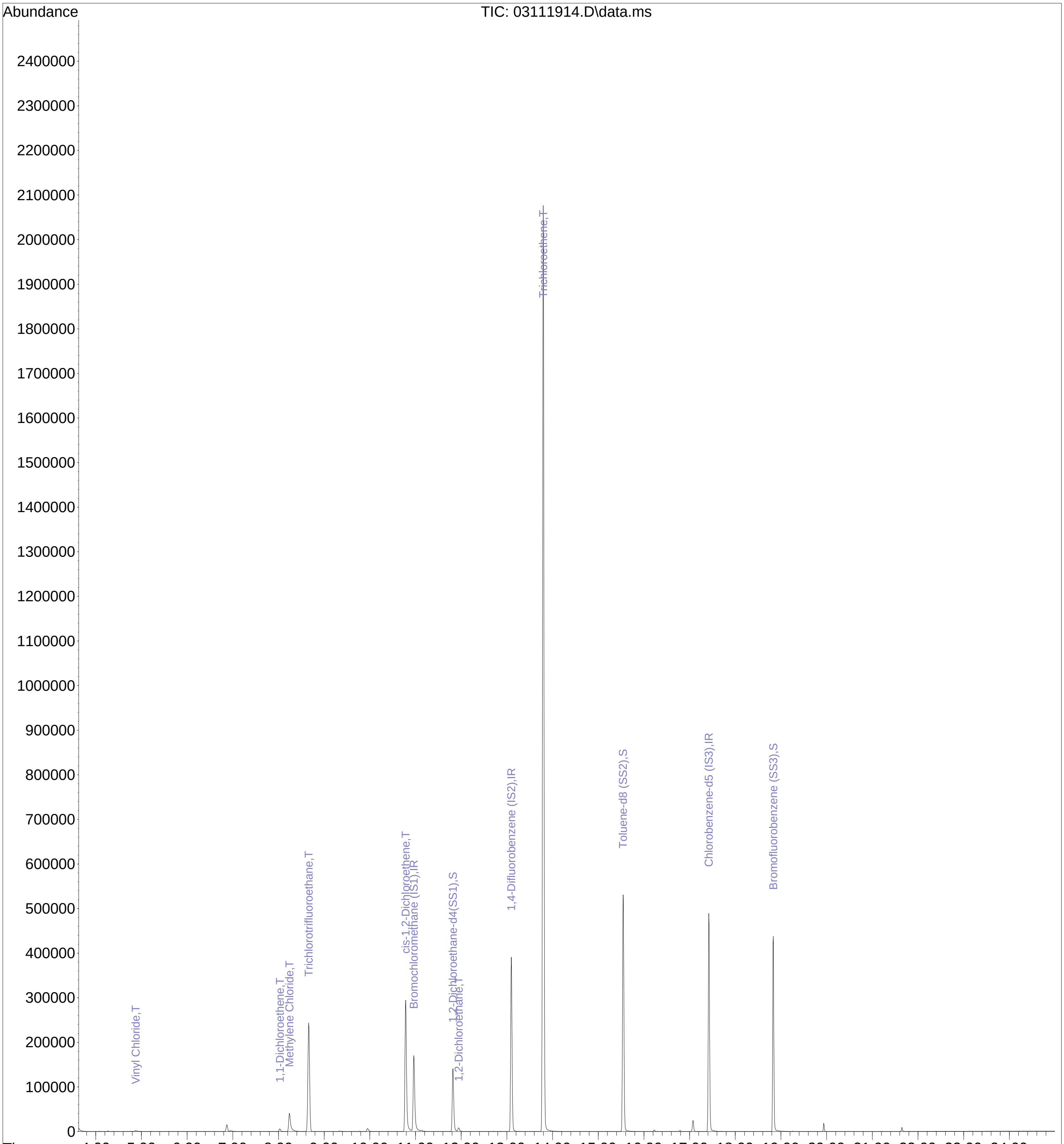
Quant Time: Mar 14 11:05:30 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.66	91	537	N.D.	
59) 2-Hexanone	0.00	43	0	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	0.00	43	0	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	16.80	166	1091	N.D.	
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	0.00	91	0	N.D.	
67) m- & p-Xylenes	0.00	91	0	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	0.00	91	0	N.D.	
71) n-Nonane	0.00	43	0	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	0.00	105	0	N.D.	
75) alpha-Pinene	0.00	93	0	N.D.	
76) n-Propylbenzene	0.00	91	0	N.D.	
77) 3-Ethyltoluene	0.00	105	0	N.D.	
78) 4-Ethyltoluene	0.00	105	0	N.D.	
79) 1,3,5-Trimethylbenzene	0.00	105	0	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	0.00	105	0	N.D.	
82) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.	
83) n-Decane	0.00	57	0	N.D.	
84) Benzyl Chloride	0.00	91	0	N.D.	
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	0.00	105	0	N.D.	
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D.	
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	0.00	68	0	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	0.00	57	0	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	0.00	128	0	N.D.	
96) n-Dodecane	0.00	57	0	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D.	
99) tert-Butylbenzene	19.94	119	312	N.D.	
100) n-Butylbenzene	0.00	91	0	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS13\DATA\2019_03\11\03111914.D Vial: 3
Acq On : 11 Mar 2019 14:37 Operator: WA
Sample : P1901179-001 (10mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:05:30 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M



00936257

Data File : I:\MS13\DATA\2019_03\11\03111914.D Vial: 3
Acq On : 11 Mar 2019 14:37 Operator: WA
Sample : P1901179-001 (10mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:05:30 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

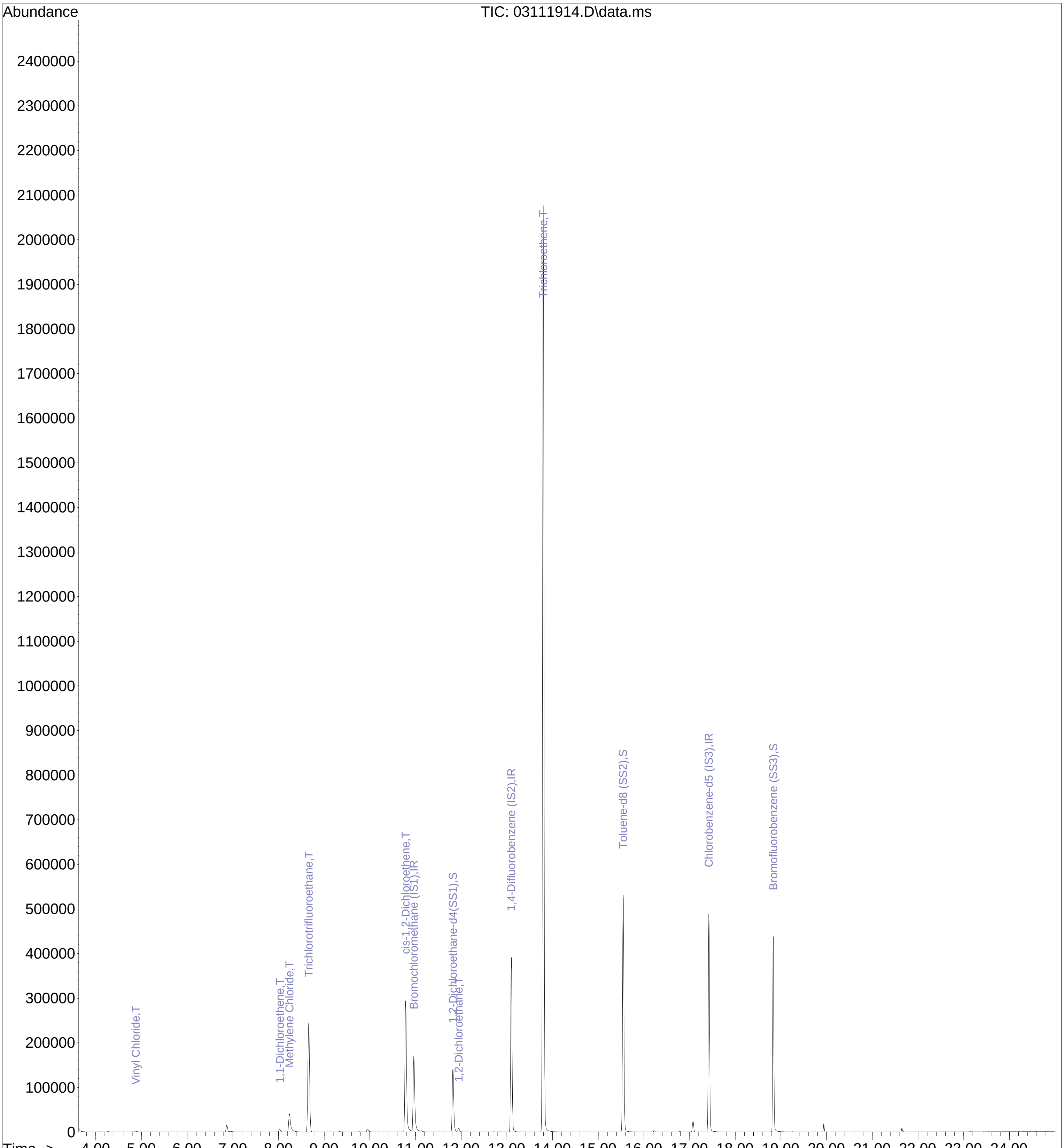
WA 3/14/19

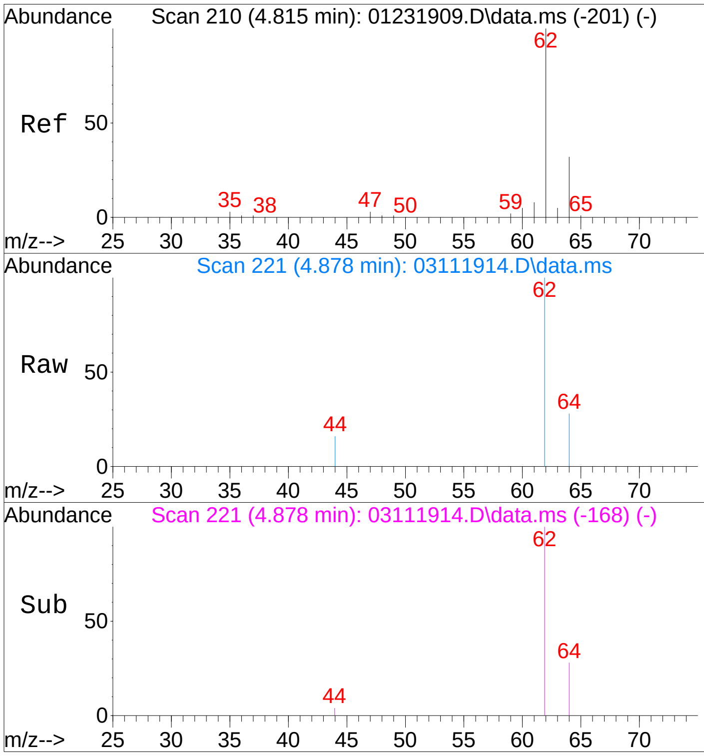
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	10.96	130	95258	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.10	114	409116	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.42	82	177684	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	11.82	65	113684	13.997	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 112.00%			
57) Toluene-d8 (SS2)	15.54	98	450131	11.830	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.64%			
73) Bromofluorobenzene (SS3)	18.83	174	168136	12.273	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.16%			
Target Compounds						Qvalue
6) Vinyl Chloride	4.88	62	4957	0.470	ng	84
17) 1,1-Dichloroethene	8.03	96	4083	0.516	ng	96
19) Methylene Chloride	8.24	84	35520	4.667	ng	100
21) Trichlorotrifluoroethane	8.66	151	122516	14.632	ng	98
28) cis-1,2-Dichloroethene	10.79	61	211966	22.114	ng	96
36) 1,2-Dichloroethane	11.95	62	8843	1.124	ng	94
47) Trichloroethene	13.80	130	904294	92.605	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS13\DATA\2019_03\11\03111914.D Vial: 3
Acq On : 11 Mar 2019 14:37 Operator: WA
Sample : P1901179-001 (10mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:05:30 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

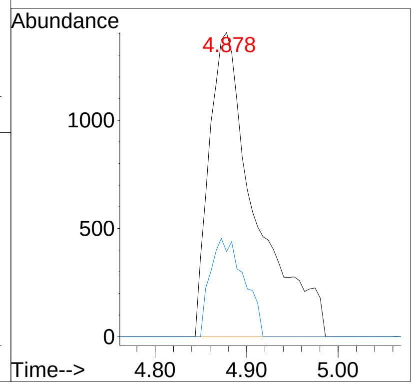


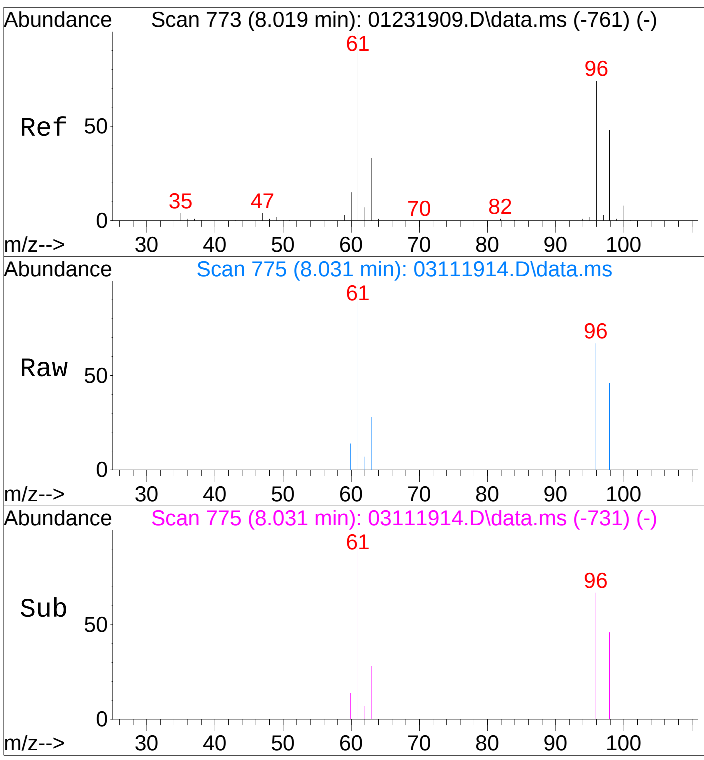


#6
Vinyl Chloride
Concen: 0.47 ng
RT: 4.88 min Scan# 221
Delta R.T. 0.051 min
Lab File: 03111914.D
Acq: 11 Mar 2019 14:37

Tgt Ion: 62 Resp: 4957

Ion	Ratio	Lower	Upper
62	100		
64	23.5	12.4	52.4

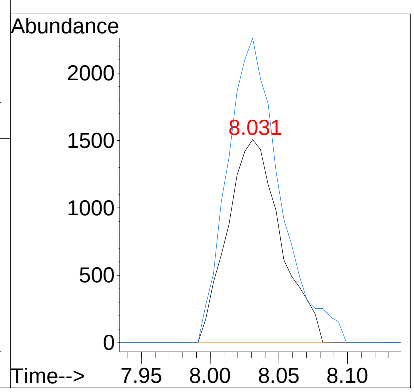


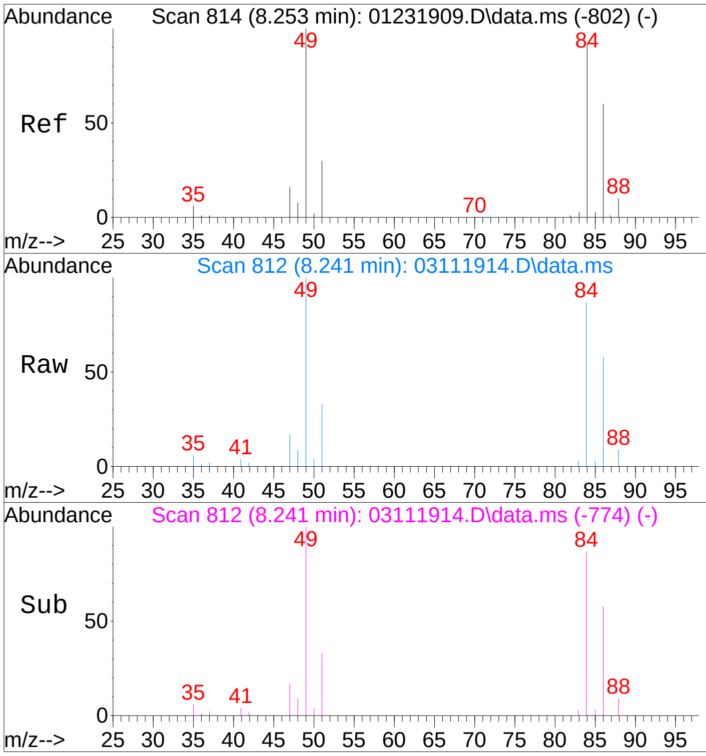


#17
1,1-Dichloroethene
Concen: 0.52 ng
RT: 8.03 min Scan# 775
Delta R.T. 0.000 min
Lab File: 03111914.D
Acq: 11 Mar 2019 14:37

Tgt Ion: 96 Resp: 4083

Ion	Ratio	Lower	Upper
96	100		
61	148.3	132.9	172.9

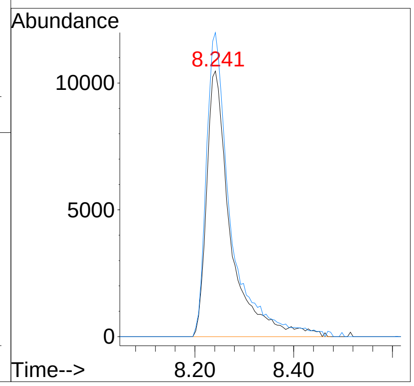


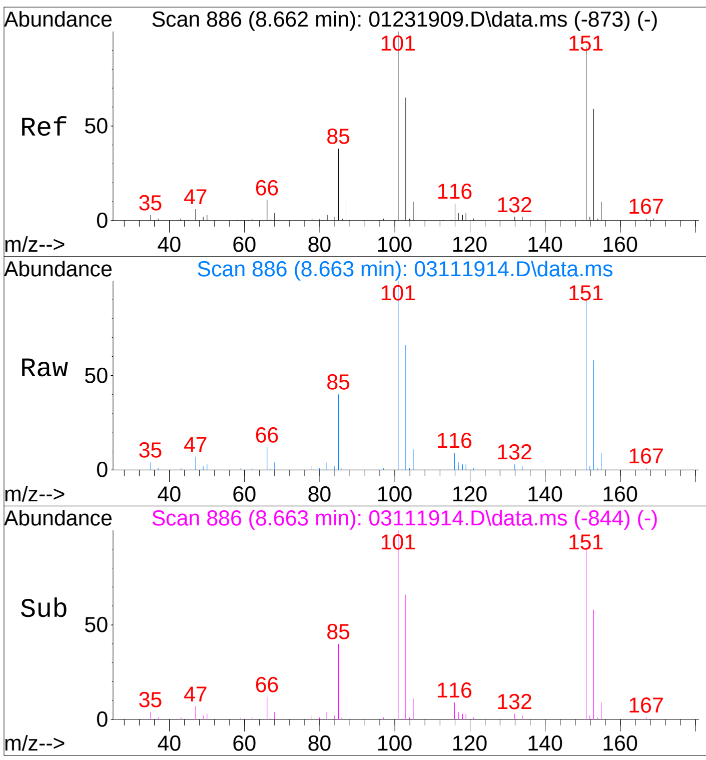


#19
Methylene Chloride
Concen: 4.67 ng
RT: 8.24 min Scan# 812
Delta R.T. -0.034 min
Lab File: 03111914.D
Acq: 11 Mar 2019 14:37

Tgt Ion: 84 Resp: 35520

Ion	Ratio	Lower	Upper
84	100		
49	115.6	90.3	140.3

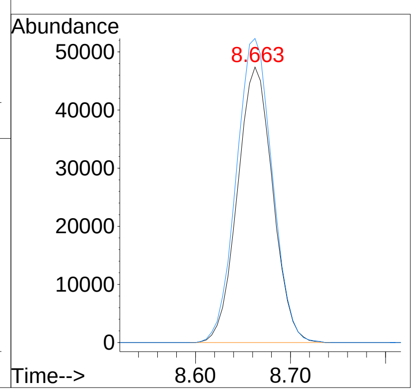


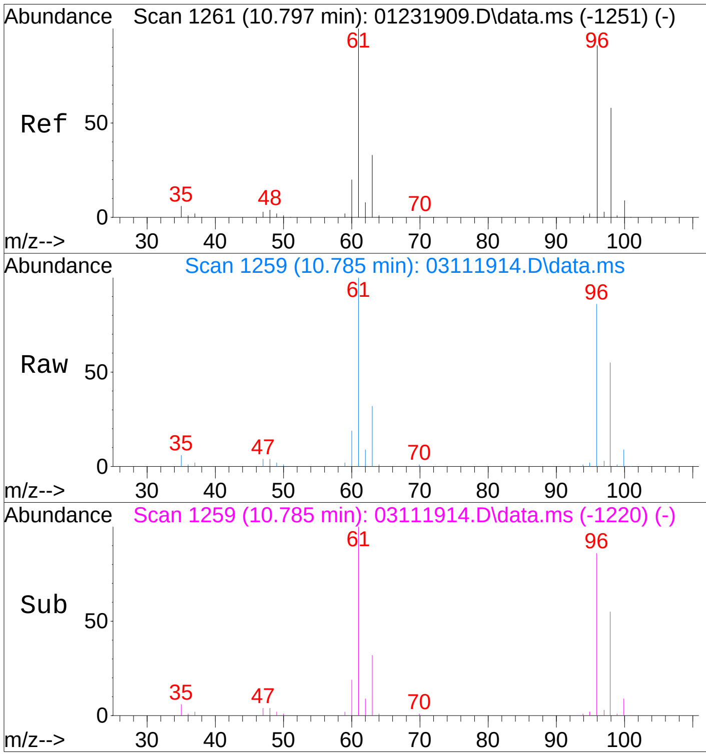


#21
Trichlorotrifluoroethane
Concen: 14.63 ng
RT: 8.66 min Scan# 886
Delta R.T. -0.011 min
Lab File: 03111914.D
Acq: 11 Mar 2019 14:37

Tgt Ion:151 Resp: 122516

Ion	Ratio	Lower	Upper
151	100		
101	112.6	95.1	135.1

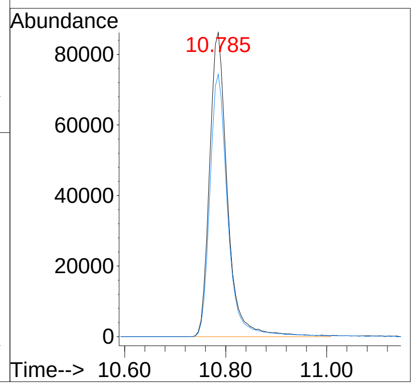


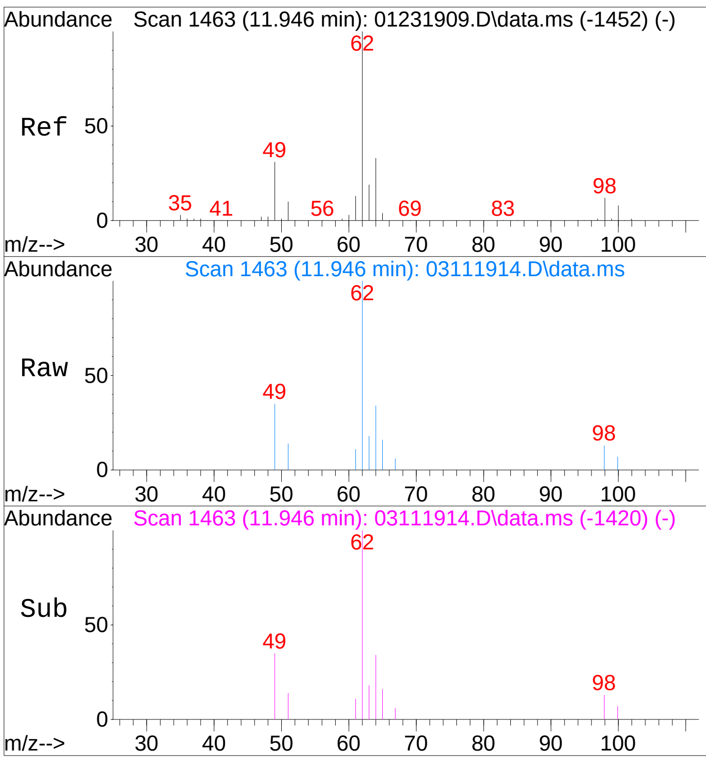


#28
cis-1,2-Dichloroethene
Concen: 22.11 ng
RT: 10.79 min Scan# 1259
Delta R.T. -0.028 min
Lab File: 03111914.D
Acq: 11 Mar 2019 14:37

Tgt Ion: 61 Resp: 211966

Ion	Ratio	Lower	Upper
61	100		
96	86.6	63.3	103.3

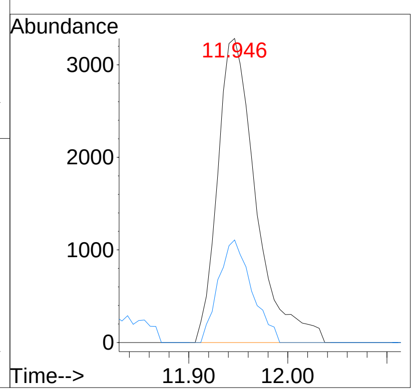


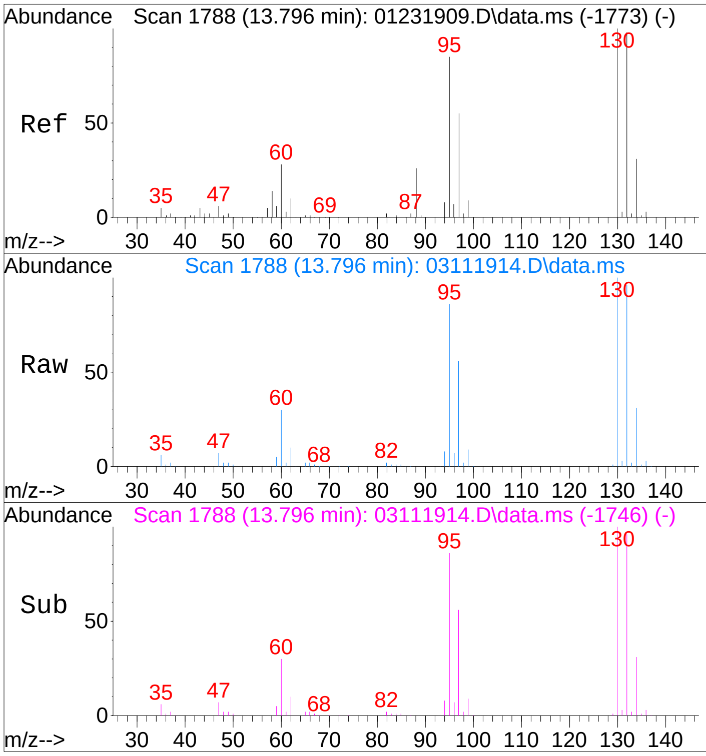


#36
1,2-Dichloroethane
Concen: 1.12 ng
RT: 11.95 min Scan# 1463
Delta R.T. -0.006 min
Lab File: 03111914.D
Acq: 11 Mar 2019 14:37

Tgt Ion: 62 Resp: 8843

Ion	Ratio	Lower	Upper
62	100		
64	29.4	12.6	52.6

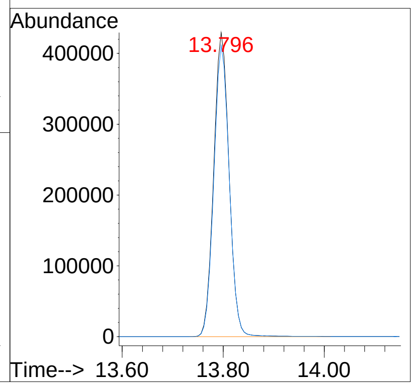




#47
Trichloroethene
Concen: 92.60 ng
RT: 13.80 min Scan# 1788
Delta R.T. -0.011 min
Lab File: 03111914.D
Acq: 11 Mar 2019 14:37

Tgt Ion:130 Resp: 904294

Ion	Ratio	Lower	Upper
130	100		
132	96.2	76.7	116.7



00936263

Data File : I:\MS13\DATA\2019_03\11\03111915.D Vial: 3
Acq On : 11 Mar 2019 15:20 Operator: WA
Sample : P1901179-002 (10mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:07:53 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 3/14/19

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	10.96	130	93387	12.500 ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.10	114	405288	12.500 ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.42	82	175195	12.500 ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	11.82	65	112078	14.076 ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 112.64%		
57) Toluene-d8 (SS2)	15.54	98	442470	11.794 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.32%		
73) Bromofluorobenzene (SS3)	18.83	174	165126	12.224 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.76%		

Target Compounds	R.T.	QIon	Response	Conc Units	Qvalue
2) Propene	4.02	42	3124	N.D.	
3) Dichlorodifluoromethan...	4.16	85	699	N.D.	
4) Chloromethane	0.00	50	0	N.D.	
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.	
6) Vinyl Chloride	4.87	62	4432	N.D.	
7) 1,3-Butadiene	5.02	54	801	N.D.	
8) Bromomethane	0.00	94	0	N.D.	
9) Chloroethane	0.00	64	0	N.D.	
10) Ethanol	0.00	45	0	N.D. d	
11) Acetonitrile	0.00	41	0	N.D.	
12) Acrolein	0.00	56	0	N.D.	
13) Acetone	6.92	58	3637	0.618 ng	93
14) Trichlorofluoromethane	0.00	101	0	N.D.	
15) 2-Propanol (Isopropanol)	7.50	45	62	N.D.	
16) Acrylonitrile	0.00	53	0	N.D.	
17) 1,1-Dichloroethene	8.03	96	4181	0.538 ng	90
18) 2-Methyl-2-Propanol (t...	8.39	59	53	N.D.	
19) Methylene Chloride	8.24	84	36847	4.938 ng	100
20) 3-Chloro-1-propene (Al...	8.24	41	1131	N.D.	
21) Trichlorotrifluoroethane	8.66	151	119725	14.586 ng	98
22) Carbon Disulfide	8.54	76	2387	N.D.	
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.	
24) 1,1-Dichloroethane	9.77	63	1561	N.D.	
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.	
26) Vinyl Acetate	0.00	86	0	N.D.	
27) 2-Butanone (MEK)	0.00	72	0	N.D.	
28) cis-1,2-Dichloroethene	10.78	61	207802	22.114 ng	98
29) Diisopropyl Ether	0.00	87	0	N.D.	
30) Ethyl Acetate	0.00	61	0	N.D.	
31) n-Hexane	11.09	57	430	N.D.	
32) Chloroform	11.13	83	2122	N.D.	
34) Tetrahydrofuran (THF)	11.64	72	193	N.D.	
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.	
36) 1,2-Dichloroethane	11.94	62	8571	1.111 ng	95
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.	
39) Isopropyl Acetate	0.00	61	0	N.D.	
40) 1-Butanol	0.00	56	0	N.D.	
41) Benzene	12.71	78	2576	N.D.	
42) Carbon Tetrachloride	12.85	117	593	N.D.	
43) Cyclohexane	12.99	84	185	N.D.	
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.	
45) 1,2-Dichloropropane	0.00	63	0	N.D.	
46) Bromodichloromethane	0.00	83	0	N.D. d	
47) Trichloroethene	13.80	130	880723	91.043 ng	100
48) 1,4-Dioxane	0.00	88	0	N.D.	
49) 2,2,4-Trimethylpentane...	13.86	57	945	N.D.	
50) Methyl Methacrylate	0.00	100	0	N.D. d	

00936264

Data File : I:\MS13\DATA\2019_03\11\03111915.D Vial: 3
Acq On : 11 Mar 2019 15:20 Operator: WA
Sample : P1901179-002 (10mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:07:53 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.65	91	9407	N.D.	
59) 2-Hexanone	16.05	43	164	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	16.65	43	316	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	16.79	166	1180	N.D.	
65) Chlorobenzene	17.47	112	205	N.D.	
66) Ethylbenzene	17.84	91	3597	N.D.	
67) m- & p-Xylenes	17.99	91	6088	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	18.42	91	2201	N.D.	
71) n-Nonane	18.63	43	1097	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	18.96	105	499	N.D.	
75) alpha-Pinene	19.31	93	4899	N.D.	
76) n-Propylbenzene	19.38	91	2876	N.D.	
77) 3-Ethyltoluene	19.50	105	1336	N.D.	
78) 4-Ethyltoluene	19.54	105	631	N.D.	
79) 1,3,5-Trimethylbenzene	19.61	105	735	N.D.	
80) alpha-Methylstyrene	19.94	118	281	N.D.	
81) 2-Ethyltoluene	19.78	105	516	N.D.	
82) 1,2,4-Trimethylbenzene	19.98	105	1383	N.D.	
83) n-Decane	20.06	57	1241	N.D.	
84) Benzyl Chloride	20.29	91	113	N.D.	
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	20.35	105	332	N.D.	
88) 4-Isopropyltoluene (p-...	20.35	119	1688	N.D.	
89) 1,2,3-Trimethylbenzene	20.35	105	332	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.48	68	1222	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.17	57	465	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	0.00	128	0	N.D.	
96) n-Dodecane	0.00	57	0	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D.	
99) tert-Butylbenzene	19.94	119	514	N.D.	
100) n-Butylbenzene	20.53	91	177	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

00936265

```
Data File : I:\MS13\DATA\2019_03\11\03111915.D          Vial: 3
Acq On    : 11 Mar 2019  15:20                      Operator: WA
Sample    : P1901179-002 (10mL)                     Inst    : MS13
Misc      : S31-02211904

Quant Time: Mar 14 11:07:53 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
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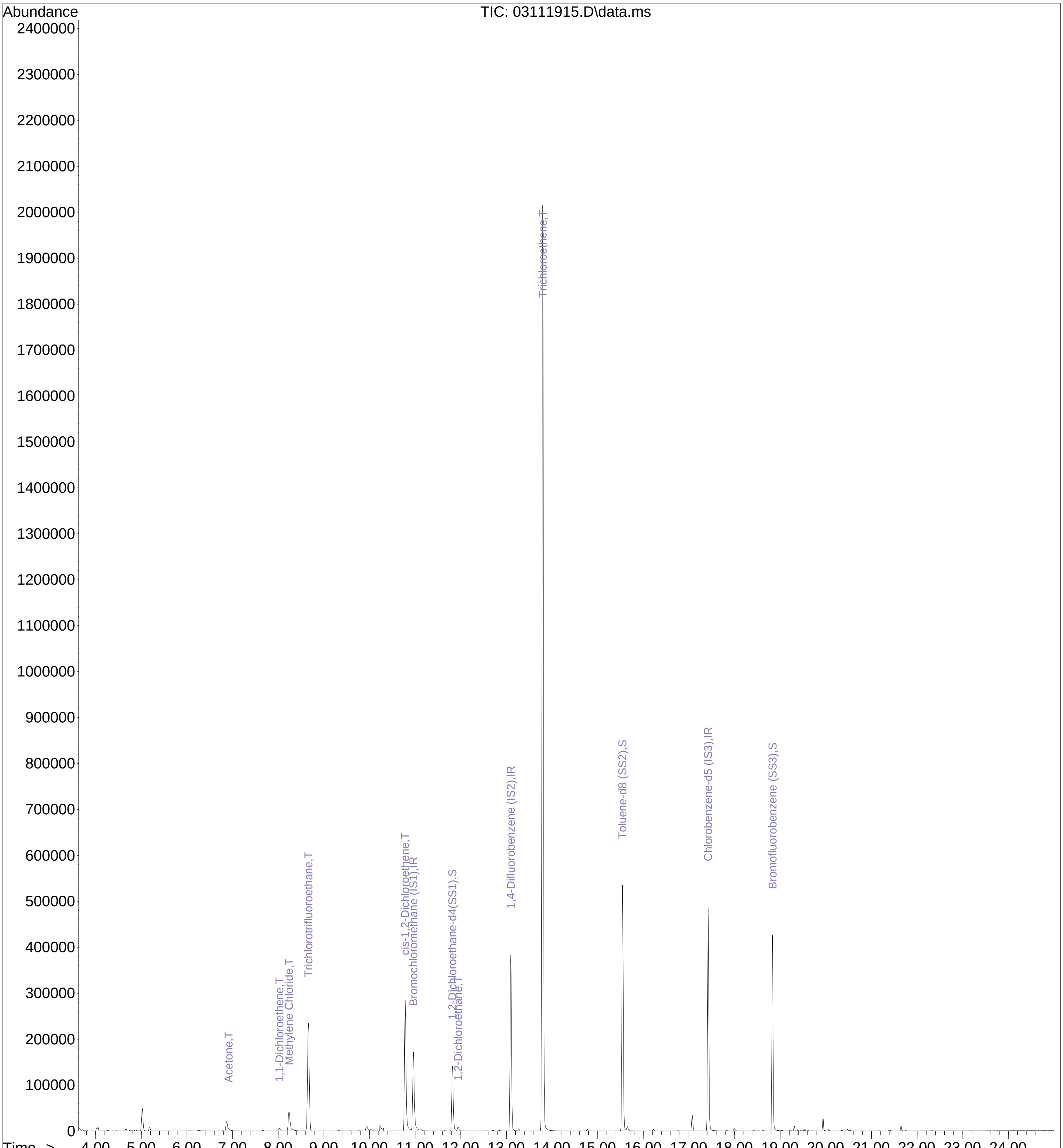


00936266

Data File : I:\MS13\DATA\2019_03\11\03111915.D Vial: 3
Acq On : 11 Mar 2019 15:20 Operator: WA
Sample : P1901179-002 (10mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:07:53 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

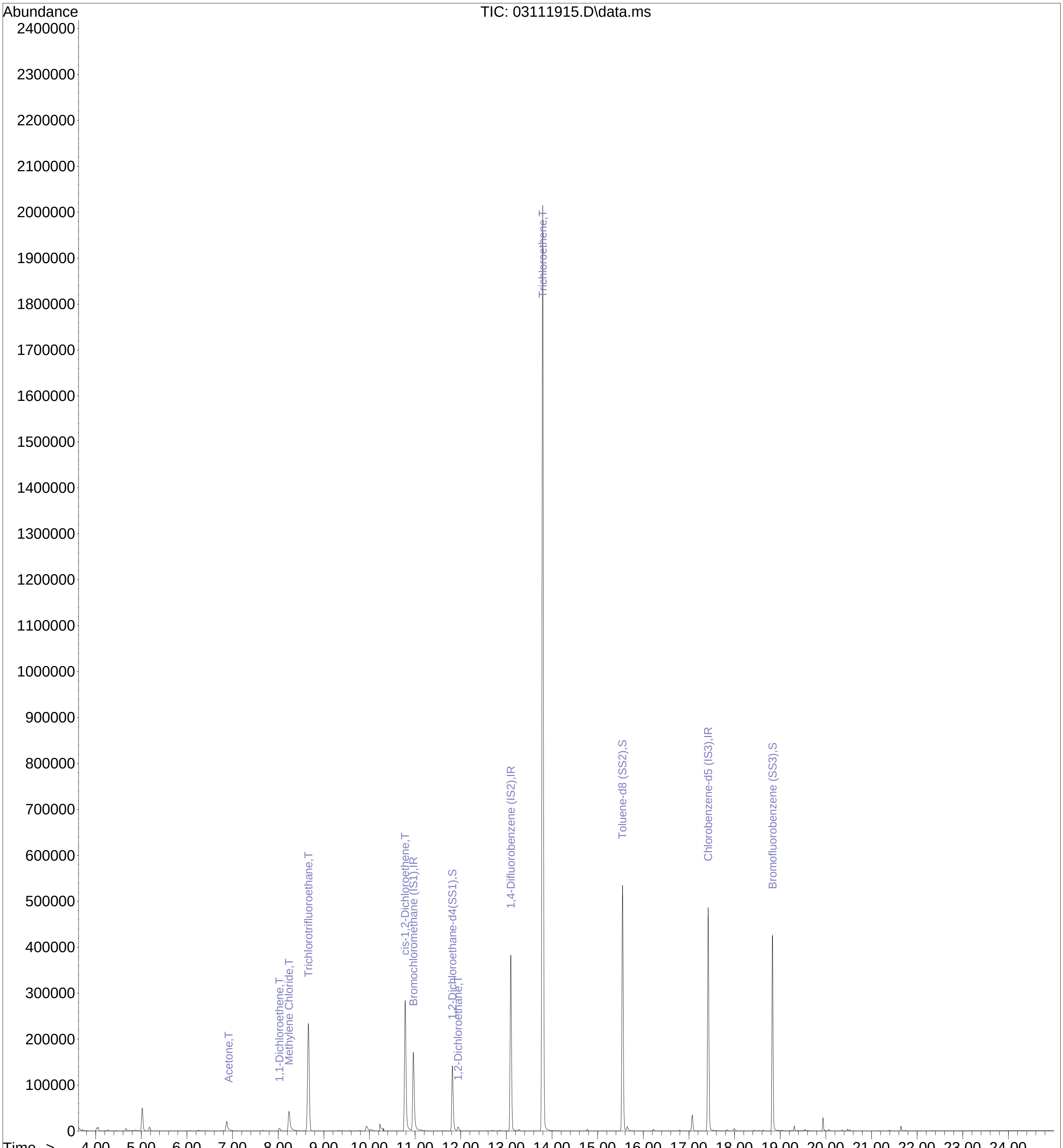
WA 3/14/19

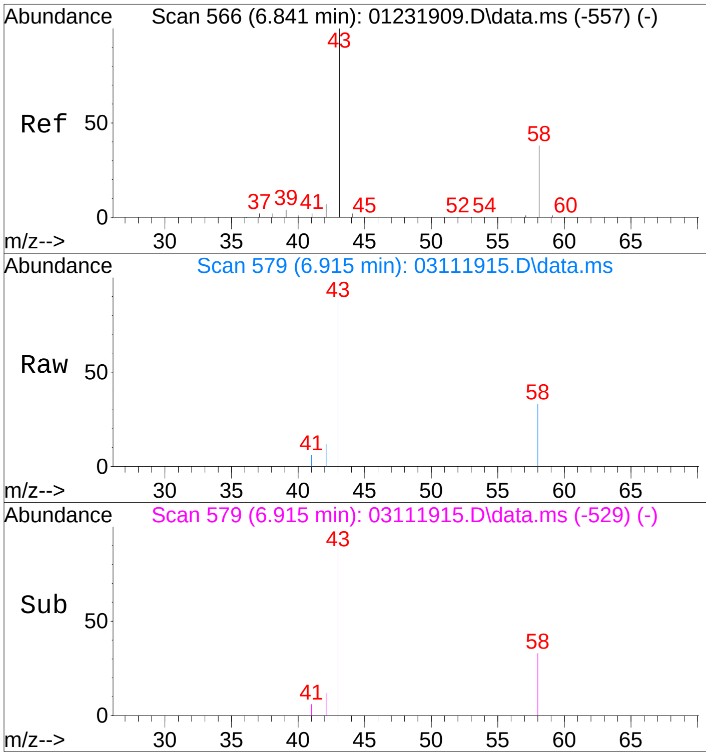
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	10.96	130	93387	12.500 ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.10	114	405288	12.500 ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.42	82	175195	12.500 ng	0.00
System Monitoring Compounds					
33) 1,2-Dichloroethane-d4(...	11.82	65	112078	14.076 ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 112.64%		
57) Toluene-d8 (SS2)	15.54	98	442470	11.794 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.32%		
73) Bromofluorobenzene (SS3)	18.83	174	165126	12.224 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.76%		
Target Compounds					Qvalue
13) Acetone	6.92	58	3637	0.618 ng	93
17) 1,1-Dichloroethene	8.03	96	4181	0.538 ng	90
19) Methylene Chloride	8.24	84	36847	4.938 ng	100
21) Trichlorotrifluoroethane	8.66	151	119725	14.586 ng	98
28) cis-1,2-Dichloroethene	10.78	61	207802	22.114 ng	98
36) 1,2-Dichloroethane	11.94	62	8571	1.111 ng	95
47) Trichloroethene	13.80	130	880723	91.043 ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS13\DATA\2019_03\11\03111915.D Vial: 3
Acq On : 11 Mar 2019 15:20 Operator: WA
Sample : P1901179-002 (10mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:07:53 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

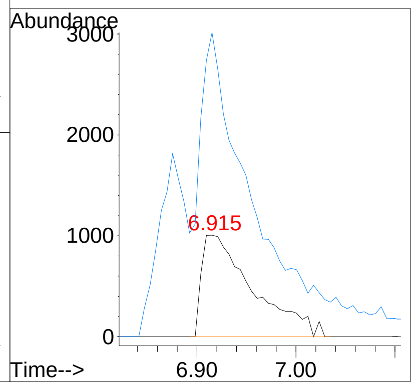


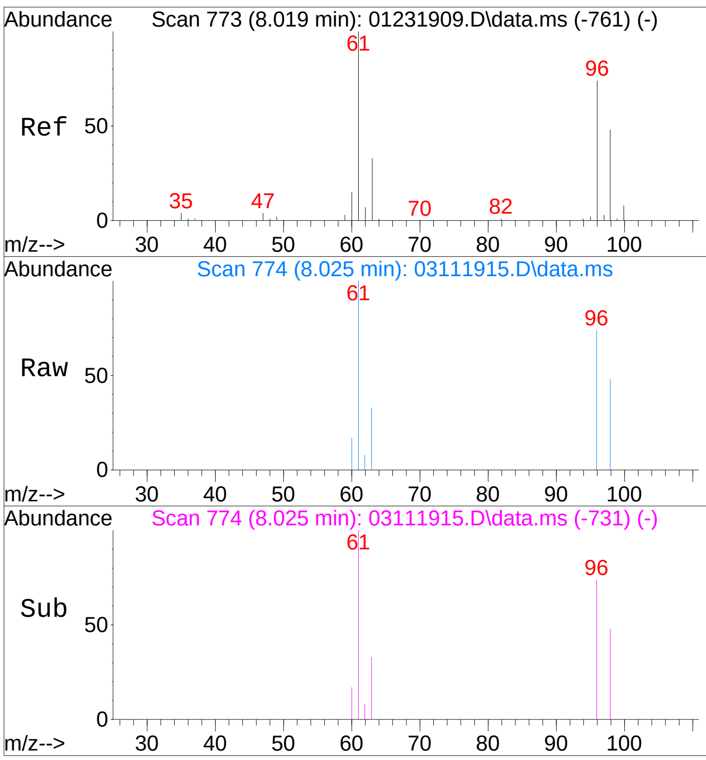


#13
Acetone
Concen: 0.62 ng
RT: 6.92 min   Scan# 579
Delta R.T.   0.034 min
Lab File: 03111915.D
Acq: 11 Mar 2019 15:20

Tgt Ion: 58 Resp: 3637

Ion	Ratio	Lower	Upper
58	100		
43	287.3	271.8	331.8

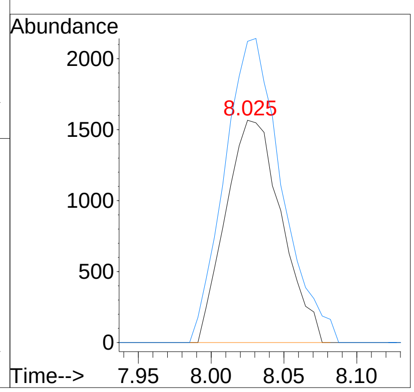


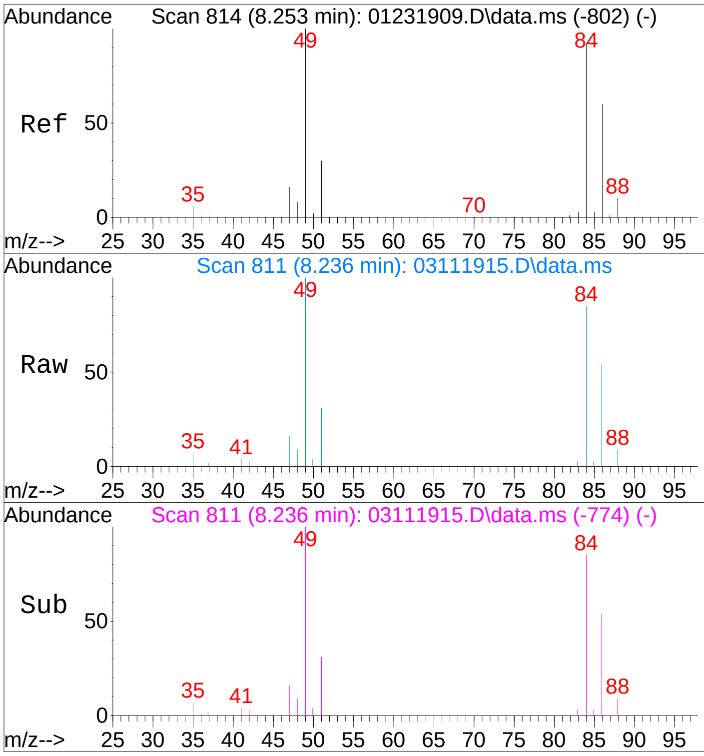


#17
1,1-Dichloroethene
Concen: 0.54 ng
RT: 8.03 min   Scan# 774
Delta R.T.   -0.006 min
Lab File: 03111915.D
Acq: 11 Mar 2019 15:20

Tgt Ion: 96 Resp: 4181

Ion	Ratio	Lower	Upper
96	100		
61	140.4	132.9	172.9

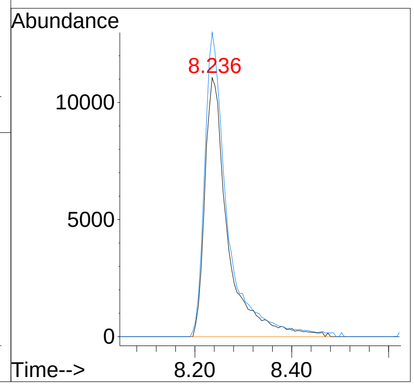


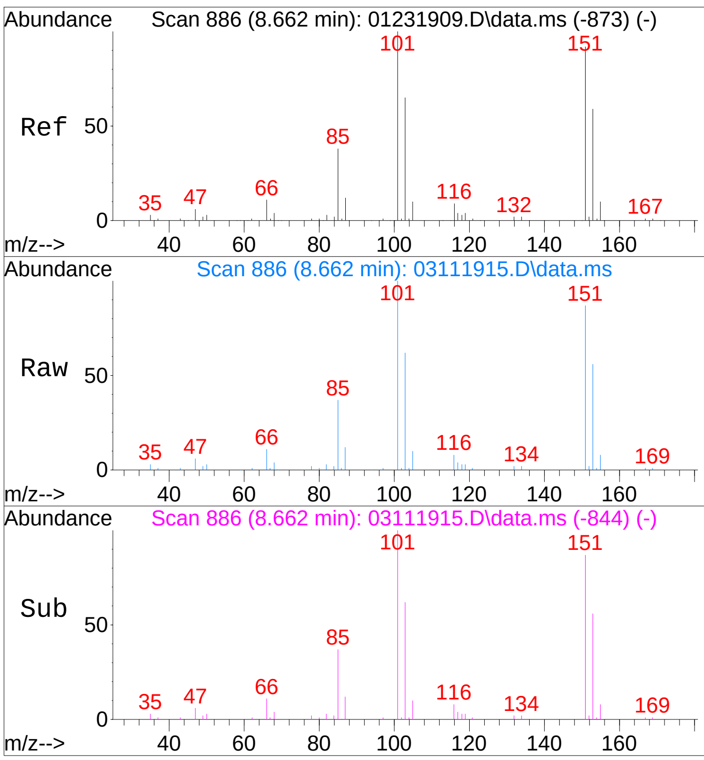


#19
Methylene Chloride
Concen: 4.94 ng
RT: 8.24 min Scan# 811
Delta R.T. -0.040 min
Lab File: 03111915.D
Acq: 11 Mar 2019 15:20

Tgt Ion: 84 Resp: 36847

Ion	Ratio	Lower	Upper
84	100		
49	115.7	90.3	140.3

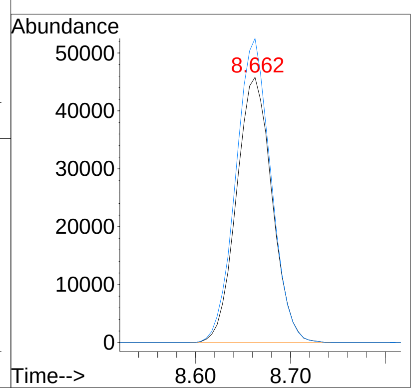


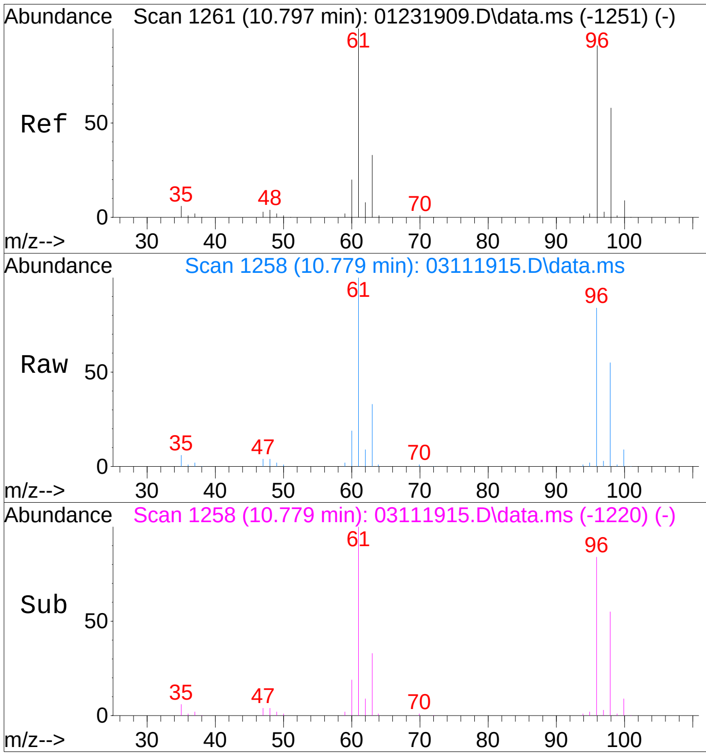


#21
Trichlorotrifluoroethane
Concen: 14.59 ng
RT: 8.66 min Scan# 886
Delta R.T. -0.012 min
Lab File: 03111915.D
Acq: 11 Mar 2019 15:20

Tgt Ion:151 Resp: 119725

Ion	Ratio	Lower	Upper
151	100		
101	112.6	95.1	135.1

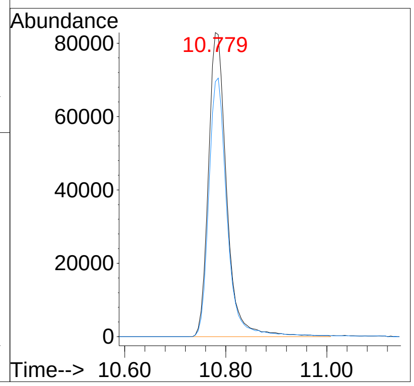


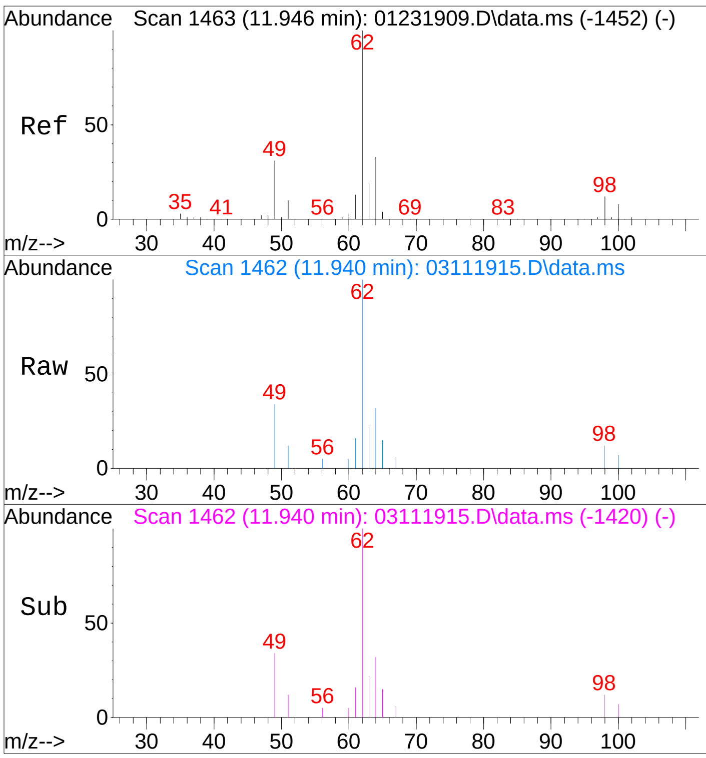


#28
cis-1,2-Dichloroethene
Concen: 22.11 ng
RT: 10.78 min Scan# 1258
Delta R.T. -0.034 min
Lab File: 03111915.D
Acq: 11 Mar 2019 15:20

Tgt Ion: 61 Resp: 207802

Ion	Ratio	Lower	Upper
61	100		
96	85.3	63.3	103.3

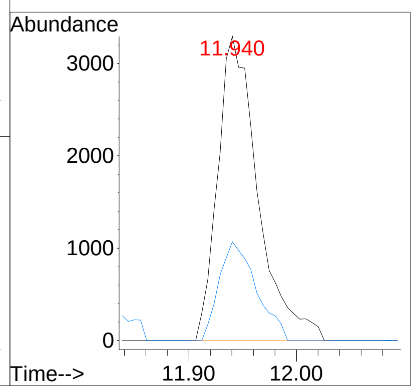


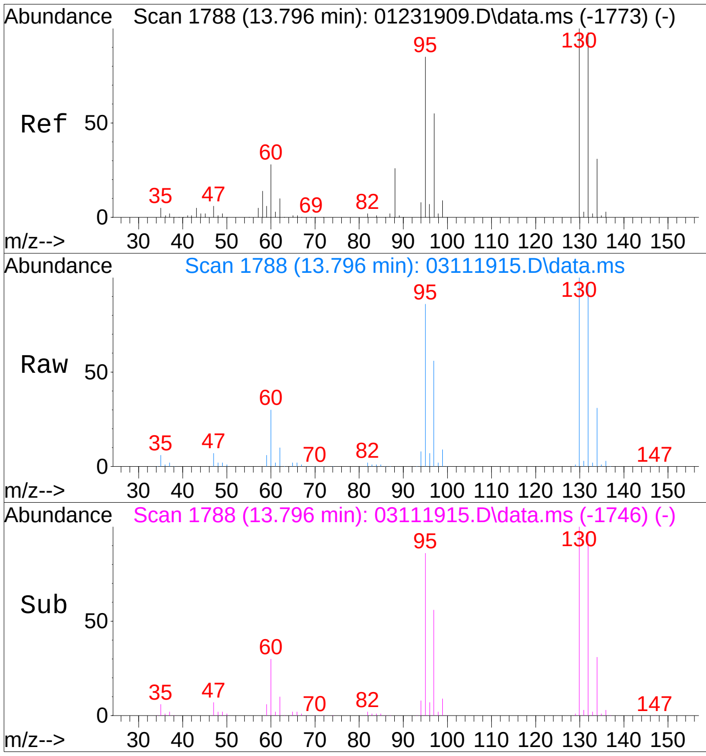


#36
1,2-Dichloroethane
Concen: 1.11 ng
RT: 11.94 min Scan# 1462
Delta R.T. -0.012 min
Lab File: 03111915.D
Acq: 11 Mar 2019 15:20

Tgt Ion: 62 Resp: 8571

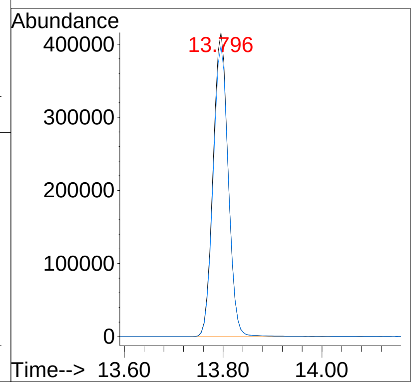
Ion	Ratio	Lower	Upper
62	100		
64	30.0	12.6	52.6






```
#47
Trichloroethene
Concen:   91.04 ng
RT:  13.80 min  Scan# 1788
Delta R.T.  -0.011 min
Lab File:   03111915.D
Acq: 11 Mar 2019  15:20

Tgt Ion:130 Resp:  880723
Ion  Ratio  Lower  Upper
130  100
132   96.3   76.7  116.7
```



00936272

```
Data File : I:\MS13\DATA\2019_03\11\03111921.D          Vial: 1
Acq On    : 11 Mar 2019  18:42                      Operator: WA
Sample    : P1901179-003 (1000mL)                   Inst    : MS13
Misc      : S31-02211904

Quant Time: Mar 14 11:09:24 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

WA 3/14/19

```
 Internal Standards                R.T. QIon  Response  Conc Units Dev(Min)
-----------------------------------------------------------------------------
  1) Bromochloromethane (IS1)     10.97  130    93047   12.500 ng     -0.02
 37) 1,4-Difluorobenzene (IS2)    13.10  114   409377   12.500 ng     -0.01
 56) Chlorobenzene-d5 (IS3)       17.42   82   180111   12.500 ng      0.00

 System Monitoring Compounds
 33) 1,2-Dichloroethane-d4(...    11.82   65   110943   13.984 ng     -0.02
  Spiked Amount     12.500   Range  70 - 130    Recovery   =  111.84%
 57) Toluene-d8 (SS2)             15.54   98   450833   11.689 ng      0.00
  Spiked Amount     12.500   Range  70 - 130    Recovery   =   93.52%
 73) Bromofluorobenzene (SS3)     18.83  174   169718   12.221 ng      0.00
  Spiked Amount     12.500   Range  70 - 130    Recovery   =   97.76%

 Target Compounds                                                   Qvalue
  2) Propene                       0.00   42        0      N.D. d
  3) Dichlorodifluoromethan...     4.15   85    27542    1.991 ng        99
  4) Chloromethane                 4.45   50     3587      N.D.
  5) 1,2-Dichloro-1,1,2,2-t...     4.68  135      701      N.D.
  6) Vinyl Chloride                4.85   62     3197      N.D.
  7) 1,3-Butadiene                 0.00   54        0      N.D.
  8) Bromomethane                  0.00   94        0      N.D.
  9) Chloroethane                  0.00   64        0      N.D.
 10) Ethanol                       6.21   45    15665    2.838 ng        98
 11) Acetonitrile                  6.54   41     1992      N.D.
 12) Acrolein                      6.69   56      774      N.D.
 13) Acetone                       6.86   58    41157    7.018 ng        86
 14) Trichlorofluoromethane        7.07  101    12455    1.075 ng       100
 15) 2-Propanol (Isopropanol)      7.42   45     4246      N.D.
 16) Acrylonitrile                 7.66   53      225      N.D.
 17) 1,1-Dichloroethene            8.03   96     2510      N.D.
 18) 2-Methyl-2-Propanol (t...     8.33   59      647      N.D.
 19) Methylene Chloride            8.24   84    16541    2.225 ng        97
 20) 3-Chloro-1-propene (Al...     8.24   41      523      N.D.
 21) Trichlorotrifluoroethane      8.66  151   122773   15.012 ng        98
 22) Carbon Disulfide              8.53   76    18566    0.611 ng        91
 23) trans-1,2-Dichloroethene      0.00   61        0      N.D.
 24) 1,1-Dichloroethane            9.77   63      627      N.D.
 25) Methyl tert-Butyl Ether       9.93   73      356      N.D.
 26) Vinyl Acetate                 0.00   86        0      N.D. d
 27) 2-Butanone (MEK)             10.32   72     6464    1.202 ng   #    69
 28) cis-1,2-Dichloroethene       10.79   61    88520    9.455 ng        96
 29) Diisopropyl Ether            11.13   87      109      N.D.
 30) Ethyl Acetate                11.12   61    11883    4.464 ng        86
 31) n-Hexane                     11.08   57    10028    0.812 ng   #   100
 32) Chloroform                   11.13   83     1697      N.D.
 34) Tetrahydrofuran (THF)        11.62   72     1862      N.D.
 35) Ethyl tert-Butyl Ether        0.00   87        0      N.D.
 36) 1,2-Dichloroethane           11.95   62     3715    0.483 ng        97
 38) 1,1,1-Trichloroethane         0.00   97        0      N.D.
 39) Isopropyl Acetate             0.00   61        0      N.D.
 40) 1-Butanol                     0.00   56        0      N.D. d
 41) Benzene                      12.70   78    21228    0.628 ng        98
 42) Carbon Tetrachloride         12.86  117     4001      N.D.
 43) Cyclohexane                  12.99   84     3145      N.D.
 44) tert-Amyl Methyl Ether       13.46   73      183      N.D.
 45) 1,2-Dichloropropane           0.00   63        0      N.D.
 46) Bromodichloromethane         13.80   83     4188      N.D.
 47) Trichloroethene              13.80  130   420086   42.992 ng       100
 48) 1,4-Dioxane                  13.84   88      456      N.D.
 49) 2,2,4-Trimethylpentane...    13.86   57     4992      N.D.
 50) Methyl Methacrylate          14.13  100      848      N.D.
```

Data File : I:\MS13\DATA\2019_03\11\03111921.D Vial: 1
Acq On : 11 Mar 2019 18:42 Operator: WA
Sample : P1901179-003 (1000mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:09:24 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

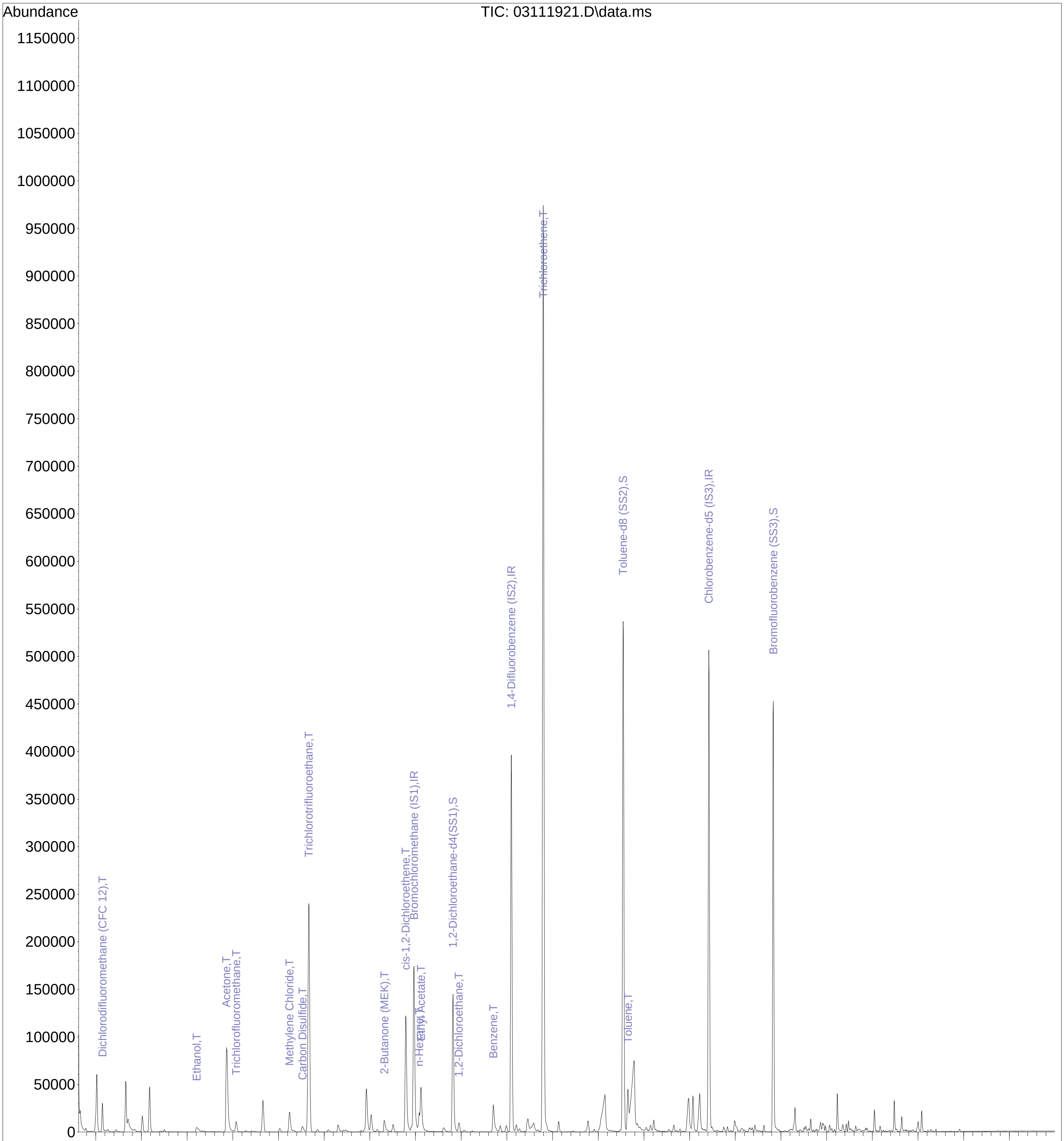
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.13	71	3089	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	14.73	58	395	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.65	91	37664	0.919 ng	100
59) 2-Hexanone	15.92	43	1969	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	16.54	43	2949	N.D.	
63) n-Octane	16.65	57	1378	N.D.	
64) Tetrachloroethene	16.79	166	1285	N.D.	
65) Chlorobenzene	17.47	112	435	N.D.	
66) Ethylbenzene	17.83	91	4884	N.D.	
67) m- & p-Xylenes	17.99	91	10875	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.33	104	2348	N.D.	
70) o-Xylene	18.43	91	4136	N.D.	
71) n-Nonane	18.63	43	3326	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	18.96	105	931	N.D.	
75) alpha-Pinene	19.31	93	9761	N.D.	
76) n-Propylbenzene	19.41	91	2393	N.D.	
77) 3-Ethyltoluene	19.50	105	3024	N.D.	
78) 4-Ethyltoluene	19.54	105	1887	N.D.	
79) 1,3,5-Trimethylbenzene	19.61	105	1372	N.D.	
80) alpha-Methylstyrene	19.75	118	606	N.D.	
81) 2-Ethyltoluene	19.78	105	1417	N.D.	
82) 1,2,4-Trimethylbenzene	19.97	105	3248	N.D.	
83) n-Decane	20.06	57	3329	N.D.	
84) Benzyl Chloride	20.10	91	865	N.D.	
85) 1,3-Dichlorobenzene	20.11	146	682	N.D.	
86) 1,4-Dichlorobenzene	20.17	146	1208	N.D.	
87) sec-Butylbenzene	20.22	105	604	N.D.	
88) 4-Isopropyltoluene (p-...	20.35	119	3260	N.D.	
89) 1,2,3-Trimethylbenzene	20.35	105	1323	N.D.	
90) 1,2-Dichlorobenzene	20.47	146	692	N.D.	
91) d-Limonene	20.48	68	2429	N.D.	
92) 1,2-Dibromo-3-Chloropr...	20.86	157	457	N.D.	
93) n-Undecane	21.17	57	2469	N.D.	
94) 1,2,4-Trichlorobenzene	21.98	180	1896	N.D.	
95) Naphthalene	22.08	128	11945	N.D.	
96) n-Dodecane	22.08	57	3644	N.D.	
97) Hexachlorobutadiene	22.39	225	861	N.D.	
98) Cyclohexanone	18.14	55	1964	N.D.	
99) tert-Butylbenzene	19.97	119	662	N.D.	
100) n-Butylbenzene	20.72	91	1555	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

00936274

```
Data File : I:\MS13\DATA\2019_03\11\03111921.D          Vial: 1
Acq On    : 11 Mar 2019  18:42                       Operator: WA
Sample    : P1901179-003 (1000mL)                    Inst    : MS13
Misc      : S31-02211904

Quant Time: Mar 14 11:09:24 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```



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Data File : I:\MS13\DATA\2019_03\11\03111921.D          Vial: 1
Acq On    : 11 Mar 2019  18:42                      Operator: WA
Sample    : P1901179-003 (1000mL)                   Inst    : MS13
Misc      : S31-02211904

Quant Time: Mar 14 11:09:24 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

WA 3/14/19

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	10.97	130	93047	12.500 ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.10	114	409377	12.500 ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.42	82	180111	12.500 ng	0.00

System Monitoring Compounds

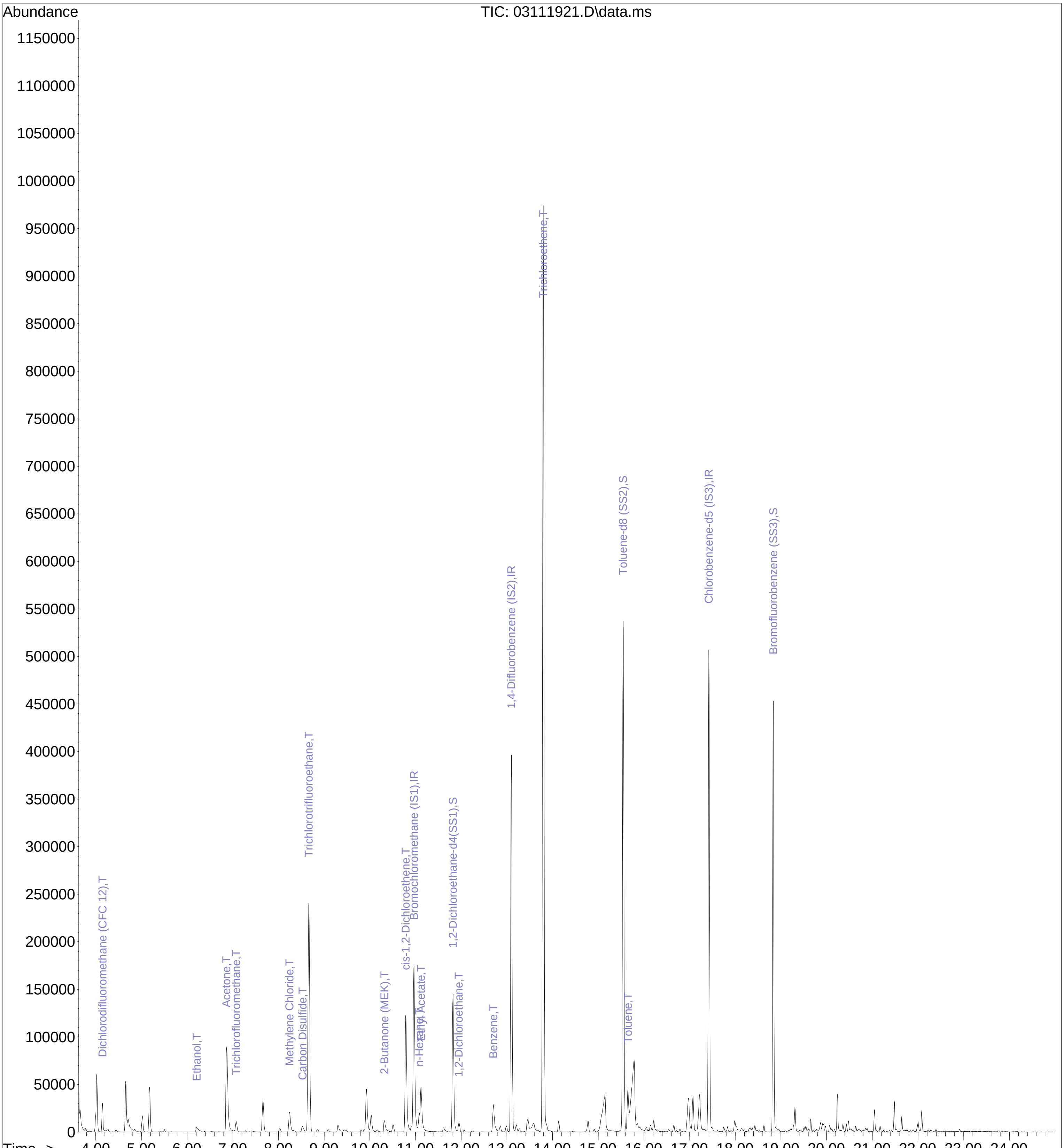
33) 1,2-Dichloroethane-d4(...	11.82	65	110943	13.984 ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 111.84%		
57) Toluene-d8 (SS2)	15.54	98	450833	11.689 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 93.52%		
73) Bromofluorobenzene (SS3)	18.83	174	169718	12.221 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.76%		

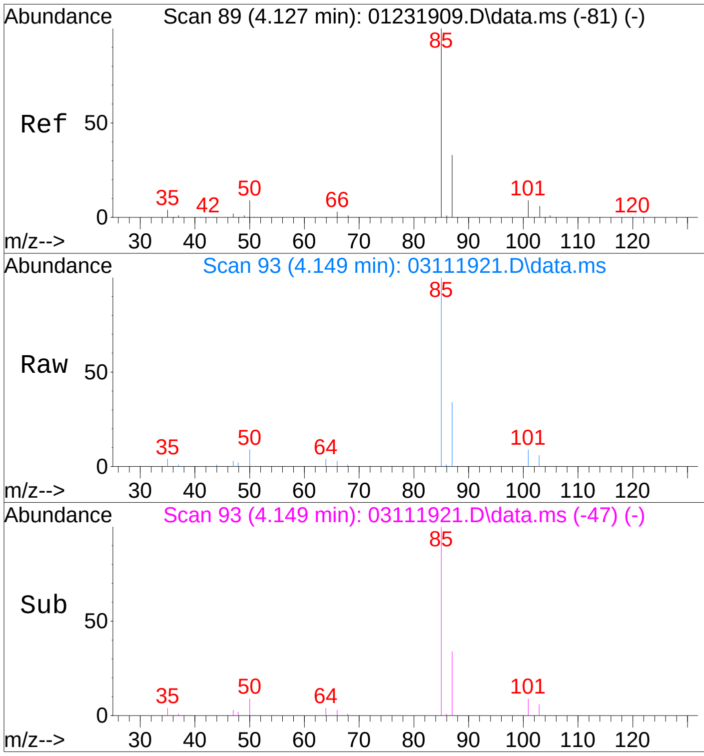
Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
3) Dichlorodifluoromethan...	4.15	85	27542	1.991 ng		99
10) Ethanol	6.21	45	15665	2.838 ng		98
13) Acetone	6.86	58	41157	7.018 ng		86
14) Trichlorofluoromethane	7.07	101	12455	1.075 ng		100
19) Methylene Chloride	8.24	84	16541	2.225 ng		97
21) Trichlorotrifluoroethane	8.66	151	122773	15.012 ng		98
22) Carbon Disulfide	8.53	76	18566	0.611 ng		91
27) 2-Butanone (MEK)	10.32	72	6464	1.202 ng	#	69
28) cis-1,2-Dichloroethene	10.79	61	88520	9.455 ng		96
30) Ethyl Acetate	11.12	61	11883	4.464 ng		86
31) n-Hexane	11.08	57	10028	0.812 ng	#	100
36) 1,2-Dichloroethane	11.95	62	3715	0.483 ng		97
41) Benzene	12.70	78	21228	0.628 ng		98
47) Trichloroethene	13.80	130	420086	42.992 ng		100
58) Toluene	15.65	91	37664	0.919 ng		100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

```
Data File : I:\MS13\DATA\2019_03\11\03111921.D          Vial: 1
Acq On    : 11 Mar 2019  18:42                      Operator: WA
Sample    : P1901179-003 (1000mL)                   Inst    : MS13
Misc      : S31-02211904

Quant Time: Mar 14 11:09:24 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

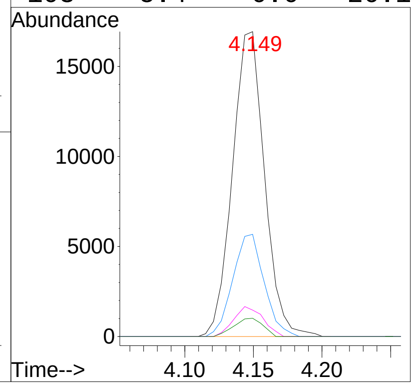


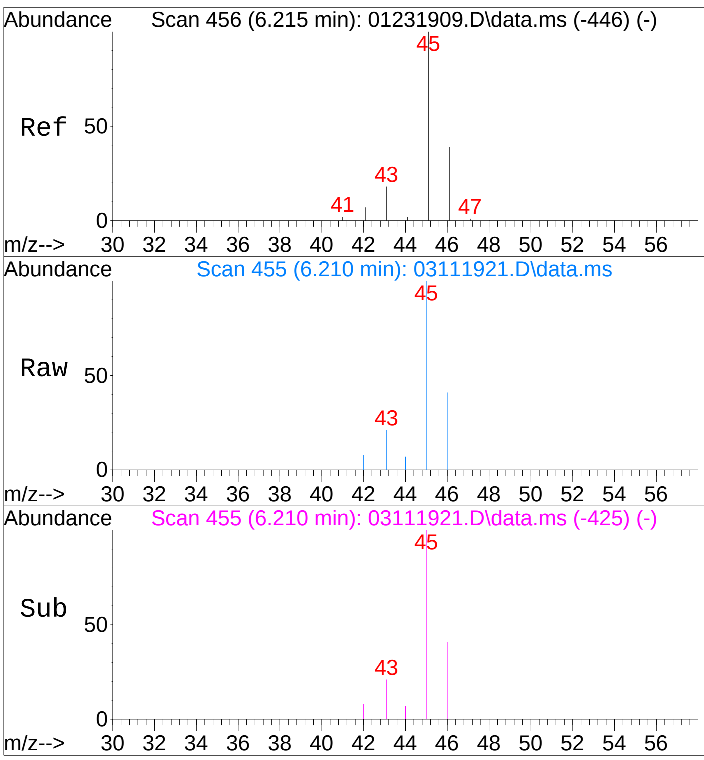


#3
Dichlorodifluoromethane (CFC 12)
Concen: 1.99 ng
RT: 4.15 min Scan# 93
Delta R.T. 0.011 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion: 85 Resp: 27542

Ion	Ratio	Lower	Upper
85	100		
87	32.7	12.6	52.6
101	9.0	0.0	29.5
103	5.4	0.0	26.1

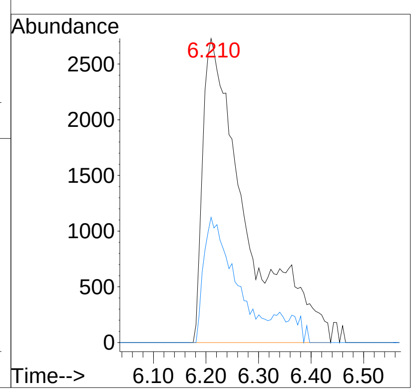


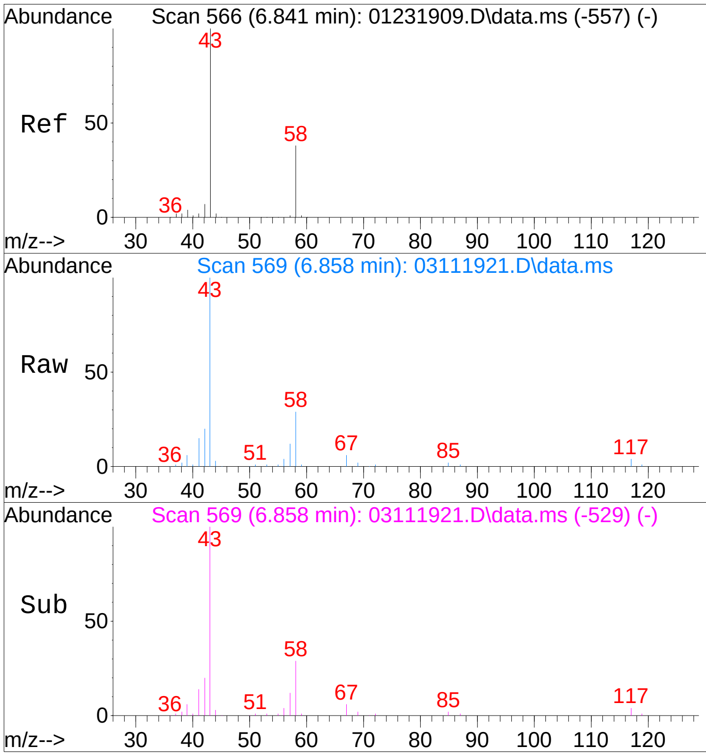


#10
Ethanol
Concen: 2.84 ng
RT: 6.21 min Scan# 455
Delta R.T. -0.080 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion: 45 Resp: 15665

Ion	Ratio	Lower	Upper
45	100		
46	35.7	16.8	56.8

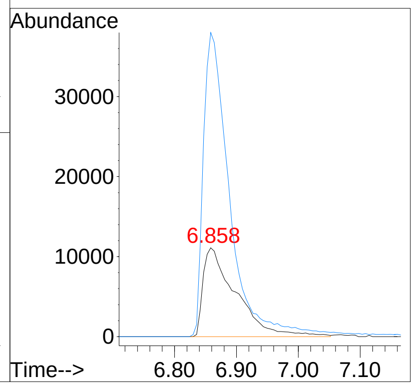


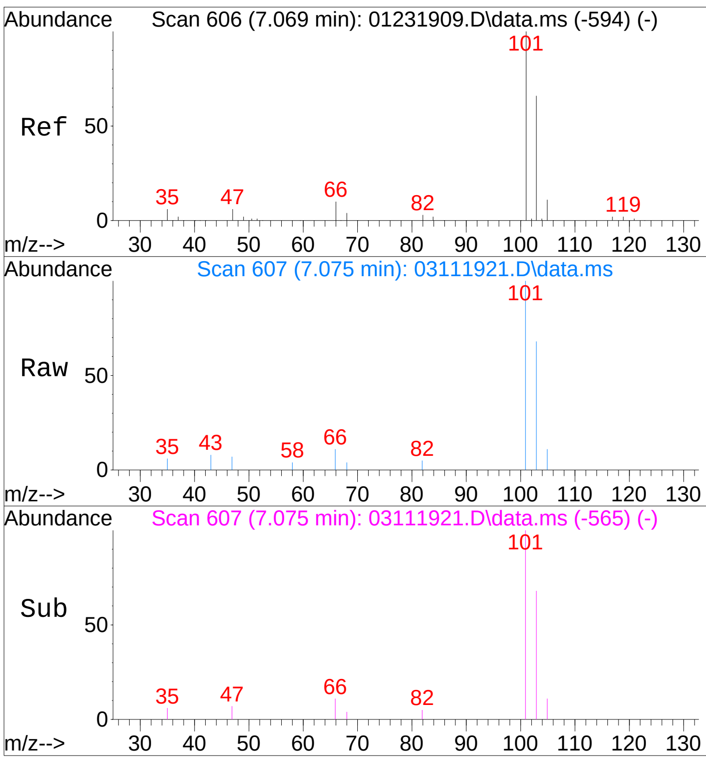


#13
Acetone
Concen: 7.02 ng
RT: 6.86 min Scan# 569
Delta R.T. -0.023 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion: 58 Resp: 41157

Ion	Ratio	Lower	Upper
58	100		
43	275.0	271.8	331.8

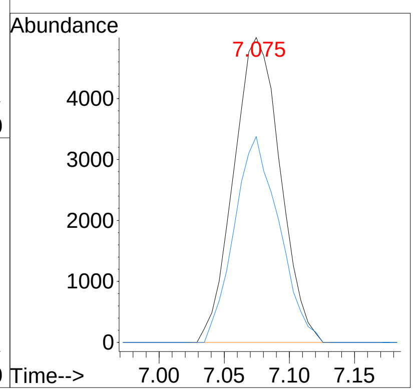


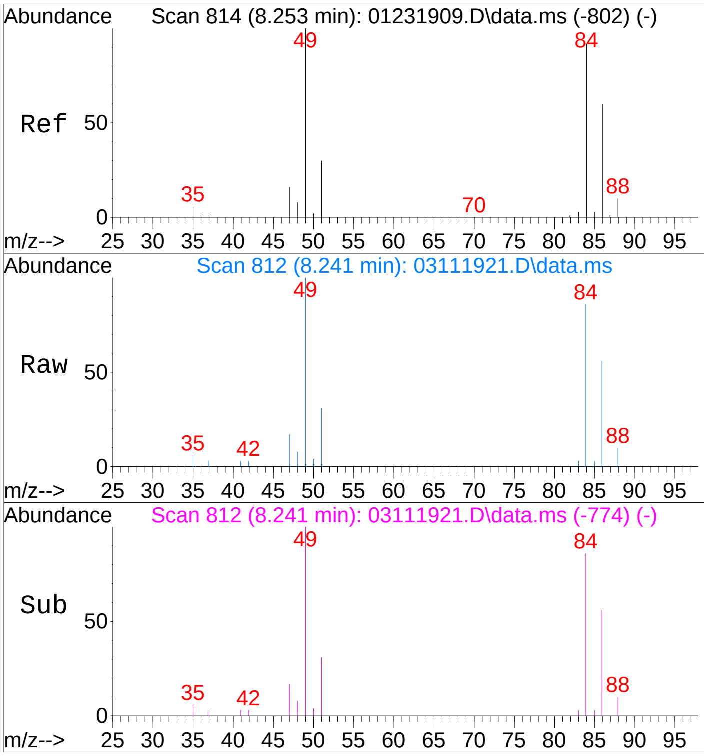


#14
Trichlorofluoromethane
Concen: 1.07 ng
RT: 7.07 min Scan# 607
Delta R.T. -0.012 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion:101 Resp: 12455

Ion	Ratio	Lower	Upper
101	100		
103	64.9	44.6	84.6

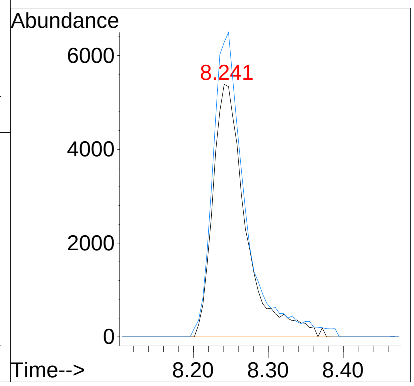


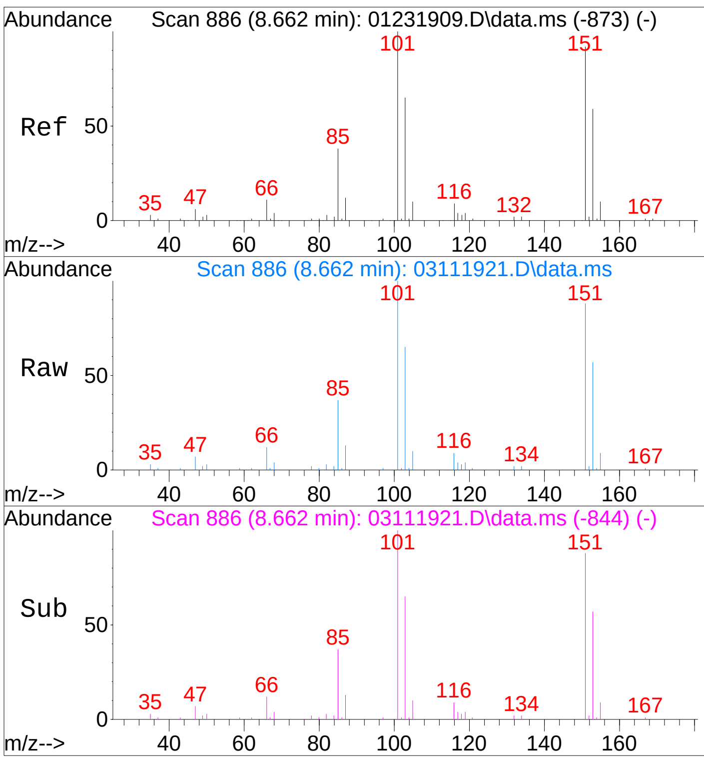


#19
Methylene Chloride
Concen: 2.22 ng
RT: 8.24 min Scan# 812
Delta R.T. -0.034 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion: 84 Resp: 16541

Ion	Ratio	Lower	Upper
84	100		
49	119.0	90.3	140.3

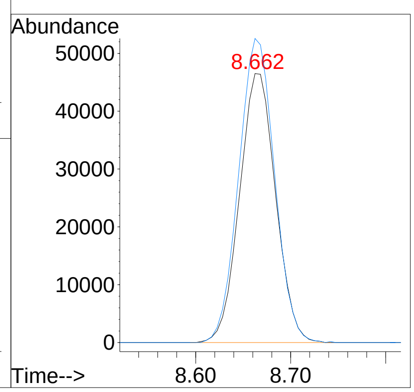


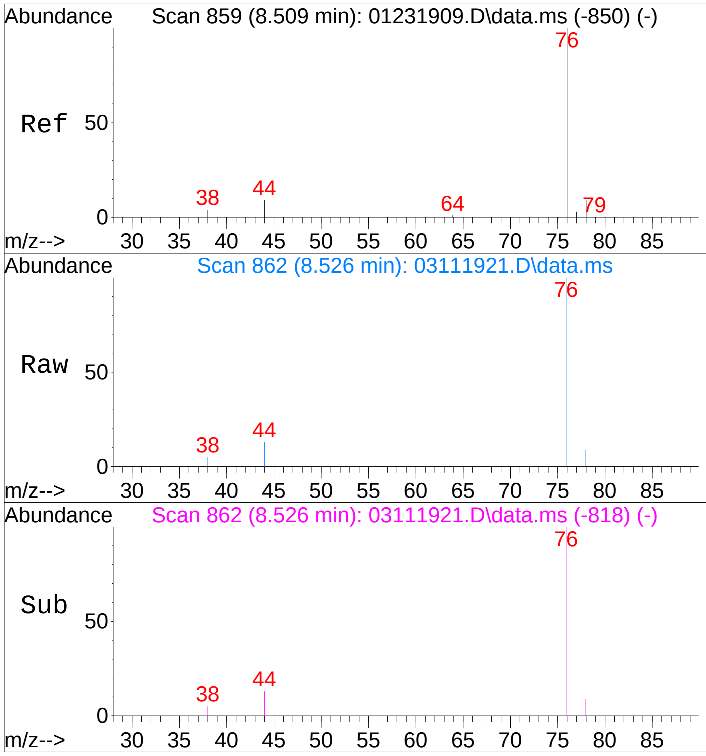


#21
Trichlorotrifluoroethane
Concen: 15.01 ng
RT: 8.66 min Scan# 886
Delta R.T. -0.012 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion:151 Resp: 122773

Ion	Ratio	Lower	Upper
151	100		
101	112.4	95.1	135.1

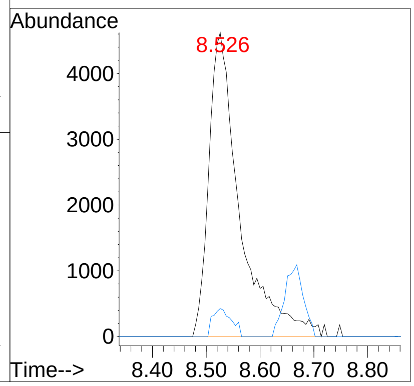


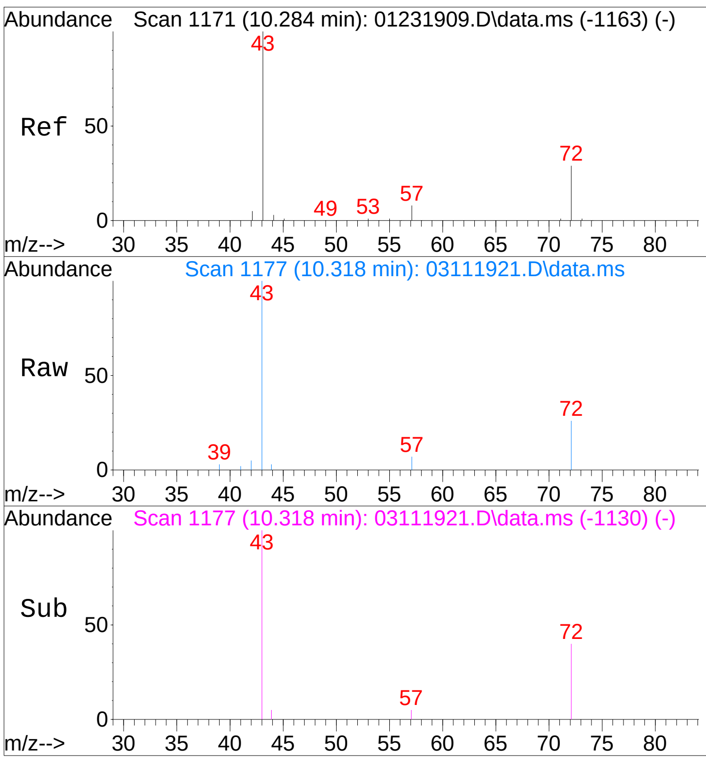


#22
Carbon Disulfide
Concen: 0.61 ng
RT: 8.53 min Scan# 862
Delta R.T. -0.000 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion: 76 Resp: 18566

Ion	Ratio	Lower	Upper
76	100		
78	5.6	0.0	29.0

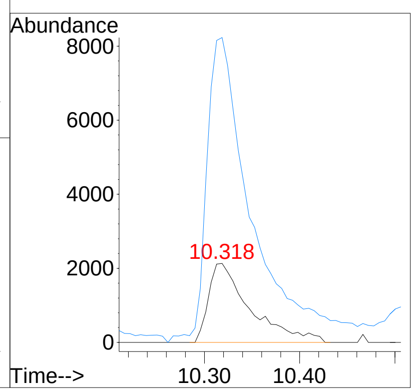


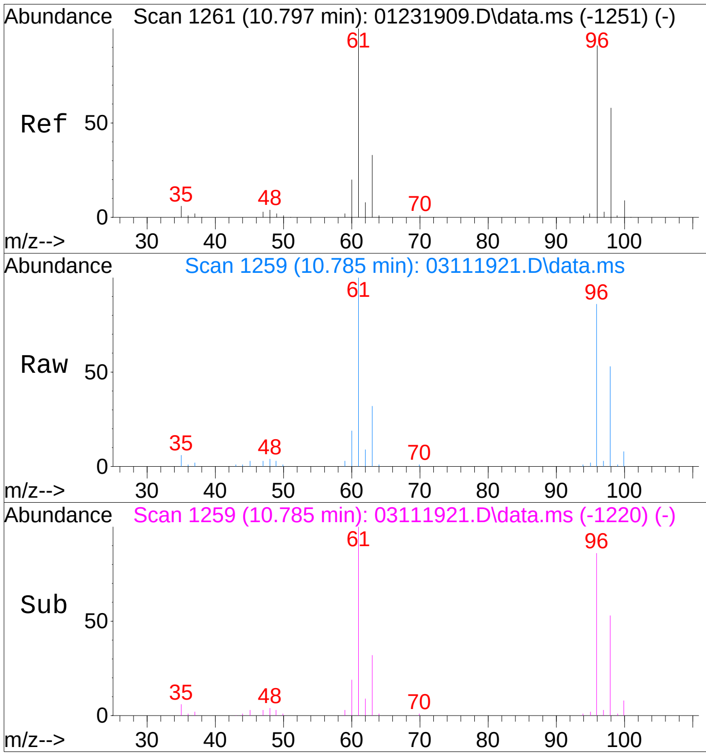


#27
2-Butanone (MEK)
Concen: 1.20 ng
RT: 10.32 min Scan# 1177
Delta R.T. 0.016 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion: 72 Resp: 6464

Ion	Ratio	Lower	Upper
72	100		
43	431.1	343.2	383.2#

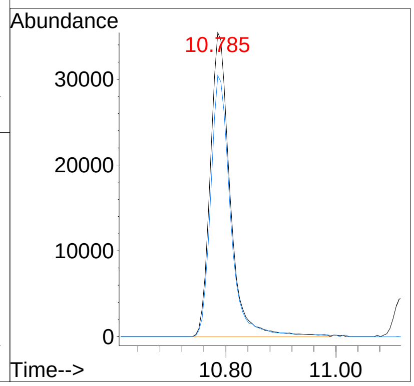


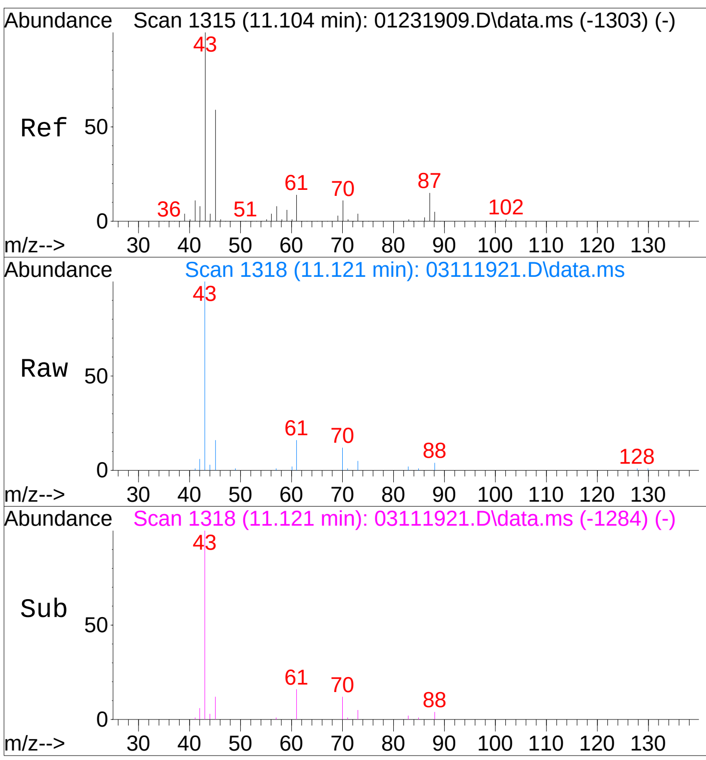


#28
cis-1,2-Dichloroethene
Concen: 9.45 ng
RT: 10.79 min Scan# 1259
Delta R.T. -0.029 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion: 61 Resp: 88520

Ion	Ratio	Lower	Upper
61	100		
96	86.6	63.3	103.3

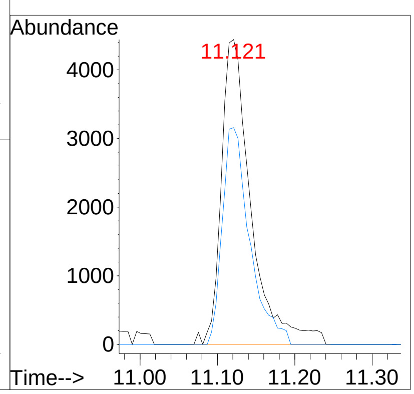


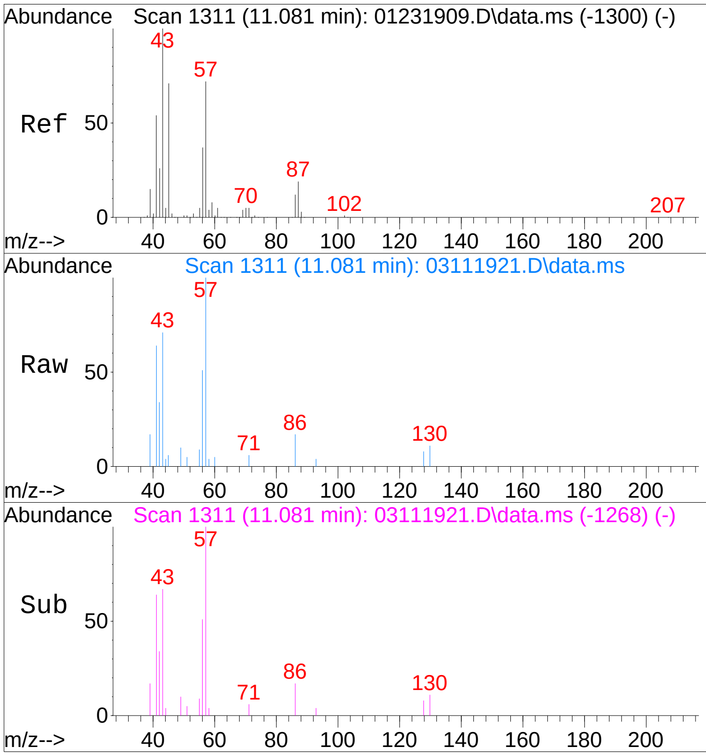


#30
Ethyl Acetate
Concen: 4.46 ng
RT: 11.12 min Scan# 1318
Delta R.T. -0.006 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion: 61 Resp: 11883

Ion	Ratio	Lower	Upper
61	100		
70	65.7	57.7	97.7

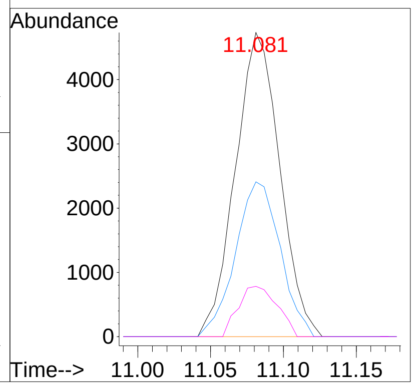


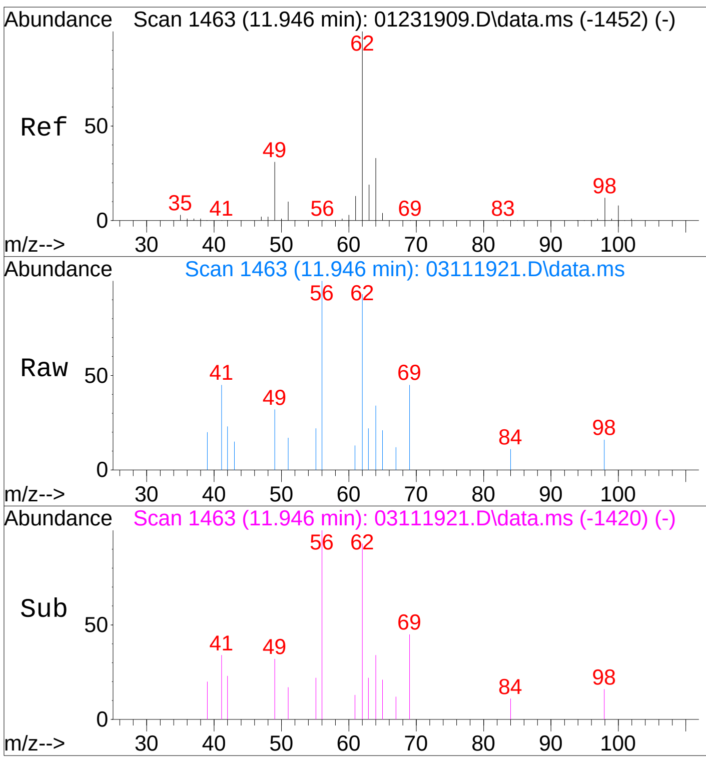


#31
n-Hexane
Concen: 0.81 ng
RT: 11.08 min   Scan# 1311
Delta R.T. -0.006 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion: 57 Resp: 10028

Ion	Ratio	Lower	Upper
57	100		
56	51.2	0.0	0.0#
86	14.6	0.0	0.0#

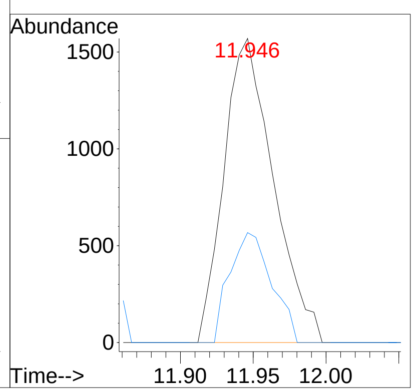


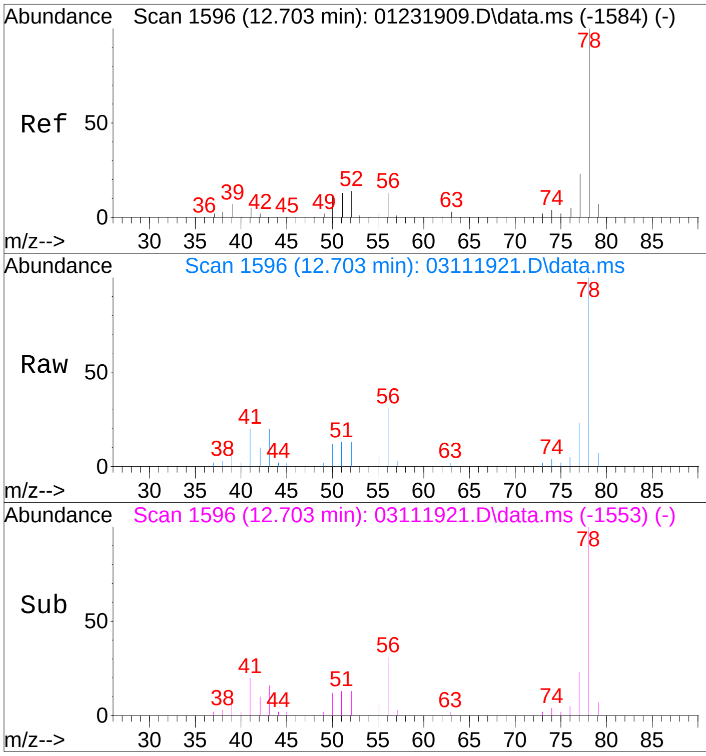


#36
1,2-Dichloroethane
Concen: 0.48 ng
RT: 11.95 min   Scan# 1463
Delta R.T. -0.006 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion: 62 Resp: 3715

Ion	Ratio	Lower	Upper
62	100		
64	30.7	12.6	52.6

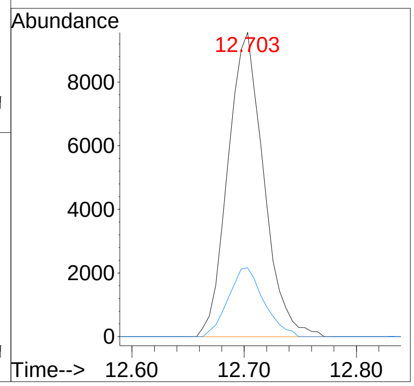


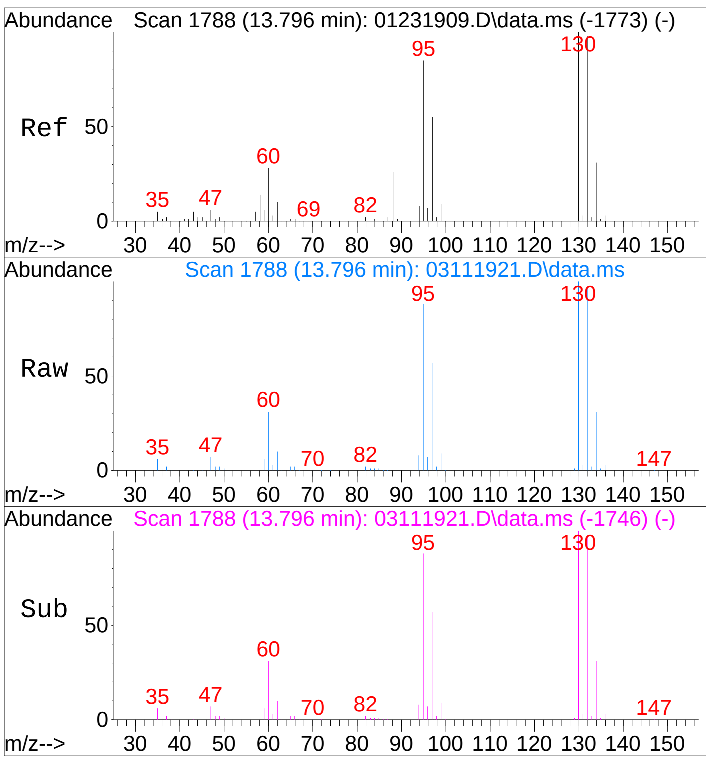


#41
Benzene
Concen: 0.63 ng
RT: 12.70 min Scan# 1596
Delta R.T. -0.006 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion: 78 Resp: 21228

Ion	Ratio	Lower	Upper
78	100		
77	22.5	3.5	43.5

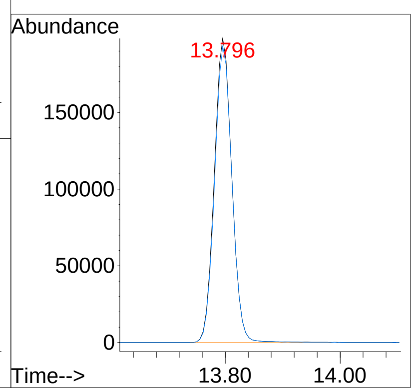


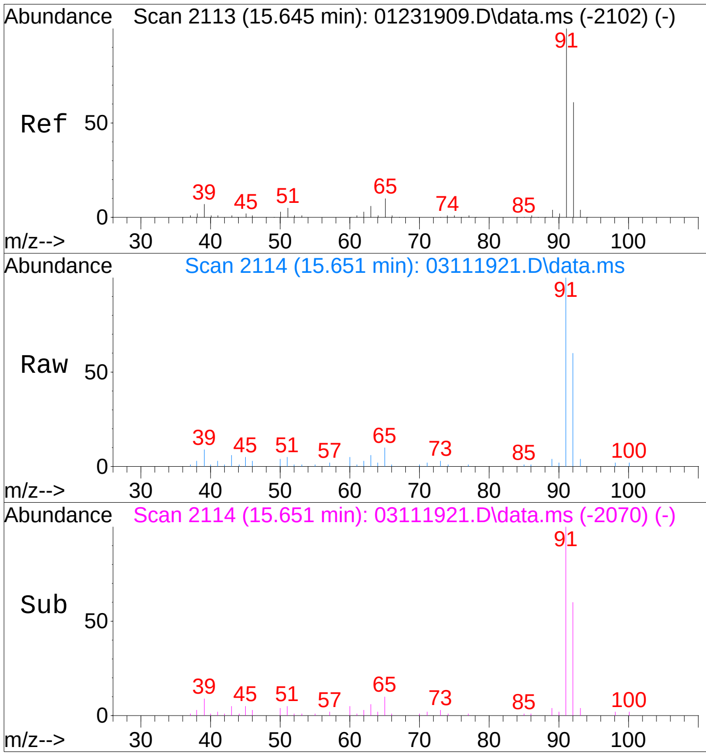


#47
Trichloroethene
Concen: 42.99 ng
RT: 13.80 min Scan# 1788
Delta R.T. -0.012 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion:130 Resp: 420086

Ion	Ratio	Lower	Upper
130	100		
132	96.9	76.7	116.7

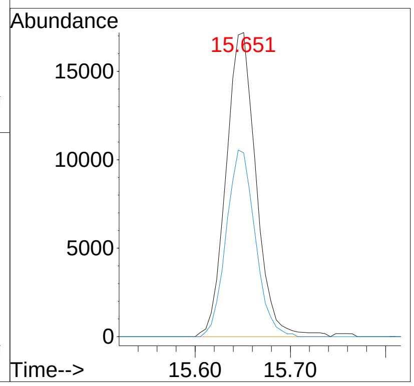




#58
Toluene
Concen: 0.92 ng
RT: 15.65 min Scan# 2114
Delta R.T. -0.000 min
Lab File: 03111921.D
Acq: 11 Mar 2019 18:42

Tgt Ion: 91 Resp: 37664

Ion	Ratio	Lower	Upper
91	100		
92	59.2	39.5	79.5



Quantitation Report (QT Reviewed)

00936285

```
Data File : I:\MS13\DATA\2019_03\11\03111922.D          Vial: 5
Acq On    : 11 Mar 2019  19:15                      Operator: WA
Sample    : P1901179-004 (1000mL)                   Inst    : MS13
Misc      : S31-02211904

Quant Time: Mar 14 11:10:04 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

WA 3/14/19

```
 Internal Standards               R.T. QIon  Response  Conc Units Dev(Min)
---------------------------------------------------------------------------
  1) Bromochloromethane (IS1)   10.96  130    93346   12.500 ng     -0.03
 37) 1,4-Difluorobenzene (IS2)  13.10  114   407063   12.500 ng     -0.01
 56) Chlorobenzene-d5 (IS3)     17.42   82   179457   12.500 ng      0.00

 System Monitoring Compounds
 33) 1,2-Dichloroethane-d4(...  11.82   65   111465   14.005 ng     -0.02
  Spiked Amount     12.500   Range  70 - 130    Recovery   =  112.08%
 57) Toluene-d8 (SS2)           15.54   98   449465   11.696 ng      0.00
  Spiked Amount     12.500   Range  70 - 130    Recovery   =   93.60%
 73) Bromofluorobenzene (SS3)   18.83  174   169599   12.257 ng      0.00
  Spiked Amount     12.500   Range  70 - 130    Recovery   =   98.08%

 Target Compounds                                                 Qvalue
  2) Propene                     0.00   42        0      N.D. d
  3) Dichlorodifluoromethan...   4.14   85    31011    2.235 ng        98
  4) Chloromethane               4.43   50     3311      N.D.
  5) 1,2-Dichloro-1,1,2,2-t...   4.68  135      801      N.D.
  6) Vinyl Chloride              0.00   62        0      N.D.
  7) 1,3-Butadiene               0.00   54        0      N.D.
  8) Bromomethane                0.00   94        0      N.D.
  9) Chloroethane                0.00   64        0      N.D.
 10) Ethanol                     6.23   45     6211    1.122 ng        79
 11) Acetonitrile                6.51   41       65      N.D.
 12) Acrolein                    6.69   56       60      N.D.
 13) Acetone                     6.86   58    23740    4.035 ng   #    74
 14) Trichlorofluoromethane      7.07  101    13262    1.141 ng        99
 15) 2-Propanol (Isopropanol)    7.42   45     2710      N.D.
 16) Acrylonitrile               7.66   53       61      N.D.
 17) 1,1-Dichloroethene          0.00   96        0      N.D.
 18) 2-Methyl-2-Propanol (t...   8.34   59      675      N.D.
 19) Methylene Chloride          8.25   84     9009    1.208 ng        95
 20) 3-Chloro-1-propene (Al...   0.00   41        0      N.D.
 21) Trichlorotrifluoroethane    8.66  151    49381    6.019 ng        97
 22) Carbon Disulfide            8.53   76     2046      N.D.
 23) trans-1,2-Dichloroethene    0.00   61        0      N.D.
 24) 1,1-Dichloroethane          0.00   63        0      N.D.
 25) Methyl tert-Butyl Ether     0.00   73        0      N.D.
 26) Vinyl Acetate              10.03   86      768      N.D.
 27) 2-Butanone (MEK)           10.34   72     1507      N.D.
 28) cis-1,2-Dichloroethene     10.80   61     5209    0.555 ng        97
 29) Diisopropyl Ether           0.00   87        0      N.D.
 30) Ethyl Acetate              11.13   61     6320    2.366 ng        88
 31) n-Hexane                   11.08   57     8837    0.713 ng   #   100
 32) Chloroform                 11.13   83      853      N.D.
 34) Tetrahydrofuran (THF)      11.64   72      478      N.D.
 35) Ethyl tert-Butyl Ether      0.00   87        0      N.D.
 36) 1,2-Dichloroethane         11.94   62      598      N.D.
 38) 1,1,1-Trichloroethane       0.00   97        0      N.D.
 39) Isopropyl Acetate           0.00   61        0      N.D.
 40) 1-Butanol                  12.74   56     1513      N.D.
 41) Benzene                    12.70   78    19912    0.592 ng        98
 42) Carbon Tetrachloride       12.86  117     3770      N.D.
 43) Cyclohexane                12.99   84     2850      N.D.
 44) tert-Amyl Methyl Ether      0.00   73        0      N.D.
 45) 1,2-Dichloropropane         0.00   63        0      N.D.
 46) Bromodichloromethane        0.00   83        0      N.D.
 47) Trichloroethene            13.80  130    17610    1.812 ng       100
 48) 1,4-Dioxane                 0.00   88        0      N.D.
 49) 2,2,4-Trimethylpentane...  13.86   57     2408      N.D.
 50) Methyl Methacrylate        14.14  100      644      N.D.
```

00936286

```
Data File : I:\MS13\DATA\2019_03\11\03111922.D          Vial: 5
Acq On    : 11 Mar 2019  19:15                      Operator: WA
Sample    : P1901179-004 (1000mL)                   Inst    : MS13
Misc      : S31-02211904

Quant Time: Mar 14 11:10:04 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.14	71	2616	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.65	91	26877	0.658 ng	99
59) 2-Hexanone	15.90	43	1527	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	16.54	43	1758	N.D.	
63) n-Octane	16.66	57	1309	N.D.	
64) Tetrachloroethene	16.79	166	557	N.D.	
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	17.83	91	2885	N.D.	
67) m- & p-Xylenes	17.99	91	6109	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.34	104	1242	N.D.	
70) o-Xylene	18.43	91	2615	N.D.	
71) n-Nonane	18.63	43	2470	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	18.96	105	405	N.D.	
75) alpha-Pinene	19.30	93	10401	0.471 ng #	55
76) n-Propylbenzene	19.41	91	863	N.D.	
77) 3-Ethyltoluene	19.50	105	1577	N.D.	
78) 4-Ethyltoluene	19.54	105	637	N.D.	
79) 1,3,5-Trimethylbenzene	19.61	105	562	N.D.	
80) alpha-Methylstyrene	19.75	118	306	N.D.	
81) 2-Ethyltoluene	19.78	105	698	N.D.	
82) 1,2,4-Trimethylbenzene	19.97	105	1535	N.D.	
83) n-Decane	20.07	57	3245	N.D.	
84) Benzyl Chloride	19.91	91	658	N.D.	
85) 1,3-Dichlorobenzene	20.18	146	319	N.D.	
86) 1,4-Dichlorobenzene	20.18	146	319	N.D.	
87) sec-Butylbenzene	20.21	105	113	N.D.	
88) 4-Isopropyltoluene (p-...	20.35	119	1972	N.D.	
89) 1,2,3-Trimethylbenzene	20.35	105	528	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.48	68	1748	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.17	57	1342	N.D.	
94) 1,2,4-Trichlorobenzene	21.99	180	384	N.D.	
95) Naphthalene	22.09	128	3238	N.D.	
96) n-Dodecane	22.08	57	1726	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	18.14	55	1522	N.D.	
99) tert-Butylbenzene	19.97	119	193	N.D.	
100) n-Butylbenzene	20.70	91	687	N.D.	

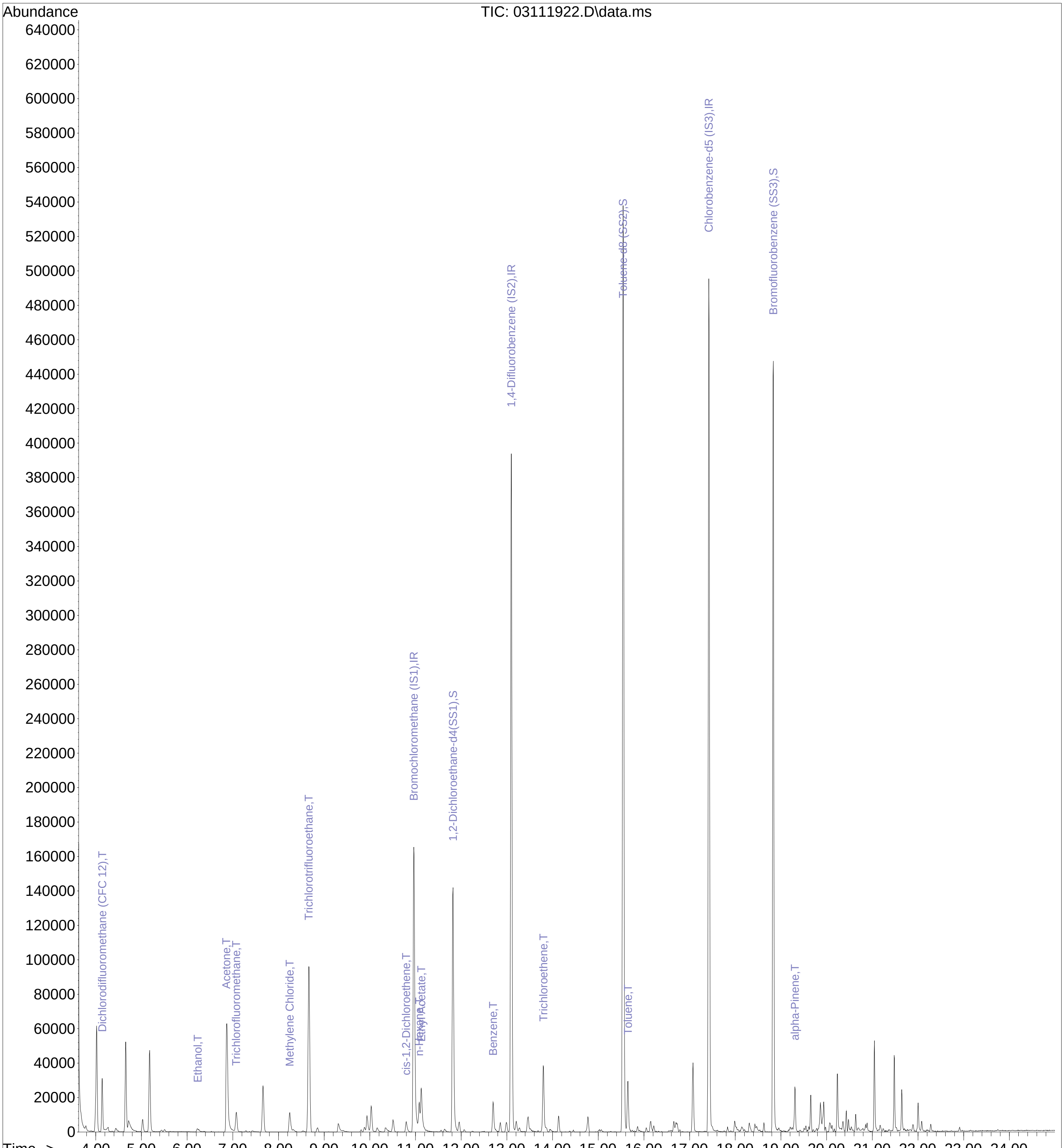
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

00936287

Data File : I:\MS13\DATA\2019_03\11\03111922.D Vial: 5
Acq On : 11 Mar 2019 19:15 Operator: WA
Sample : P1901179-004 (1000mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:10:04 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M



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Data File : I:\MS13\DATA\2019_03\11\03111922.D          Vial: 5
Acq On    : 11 Mar 2019  19:15                       Operator: WA
Sample    : P1901179-004 (1000mL)                    Inst    : MS13
Misc      : S31-02211904

Quant Time: Mar 14 11:10:04 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

WA 3/14/19

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	10.96	130	93346	12.500	ng	-0.03
37) 1,4-Difluorobenzene (IS2)	13.10	114	407063	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.42	82	179457	12.500	ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	11.82	65	111465	14.005	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 112.08%			
57) Toluene-d8 (SS2)	15.54	98	449465	11.696	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 93.60%			
73) Bromofluorobenzene (SS3)	18.83	174	169599	12.257	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.08%			

Target Compounds	R.T.	QIon	Response	Conc	Units		Qvalue
3) Dichlorodifluoromethan...	4.14	85	31011	2.235	ng		98
10) Ethanol	6.23	45	6211	1.122	ng		79
13) Acetone	6.86	58	23740	4.035	ng	#	74
14) Trichlorofluoromethane	7.07	101	13262	1.141	ng		99
19) Methylene Chloride	8.25	84	9009	1.208	ng		95
21) Trichlorotrifluoroethane	8.66	151	49381	6.019	ng		97
28) cis-1,2-Dichloroethene	10.80	61	5209	0.555	ng		97
30) Ethyl Acetate	11.13	61	6320	2.366	ng		88
31) n-Hexane	11.08	57	8837	0.713	ng	#	100
41) Benzene	12.70	78	19912	0.592	ng		98
47) Trichloroethene	13.80	130	17610	1.812	ng		100
58) Toluene	15.65	91	26877	0.658	ng		99
75) alpha-Pinene	19.30	93	10401	0.471	ng	#	55

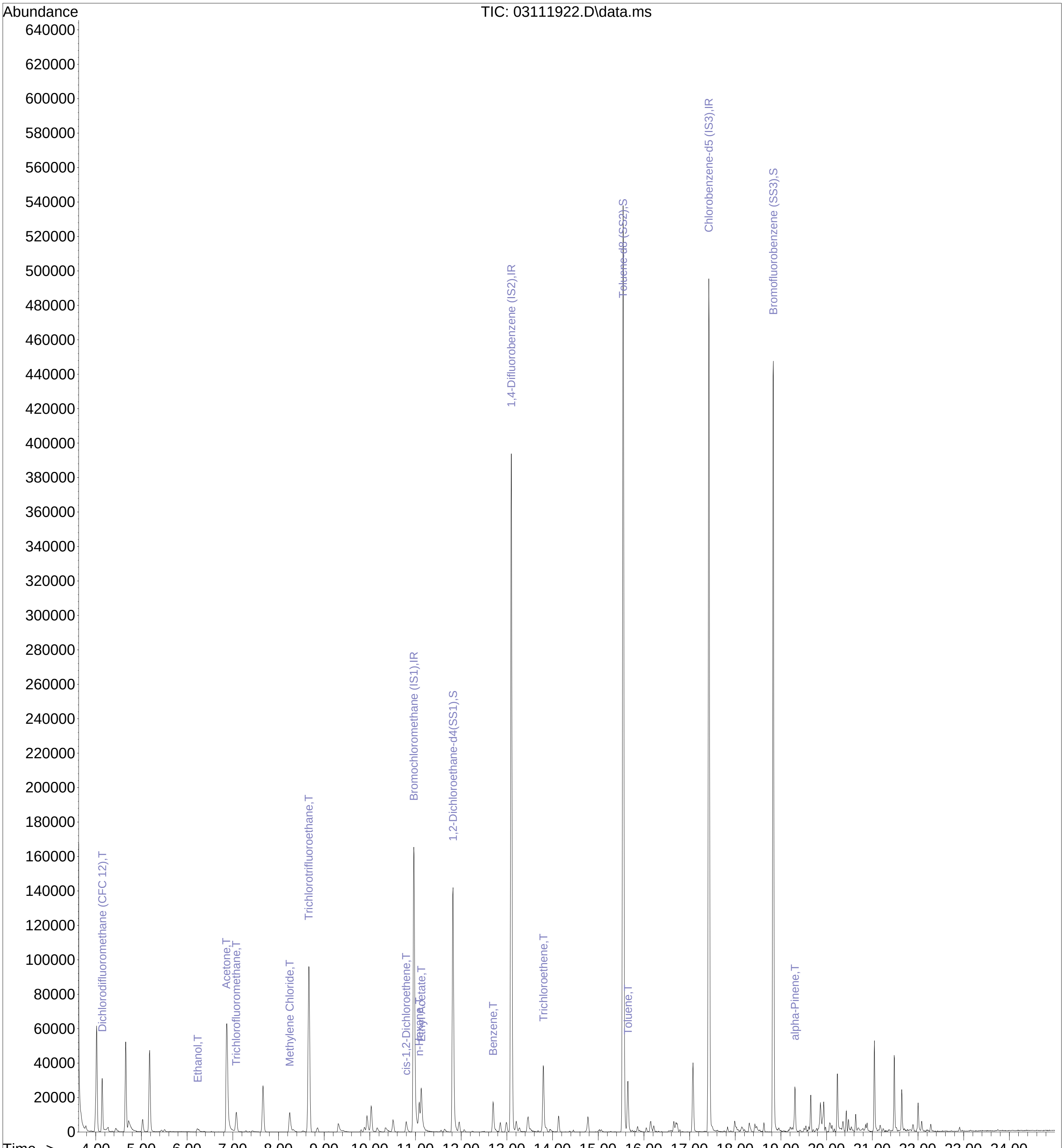
(#) = qualifier out of range (m) = manual integration (+) = signals summed

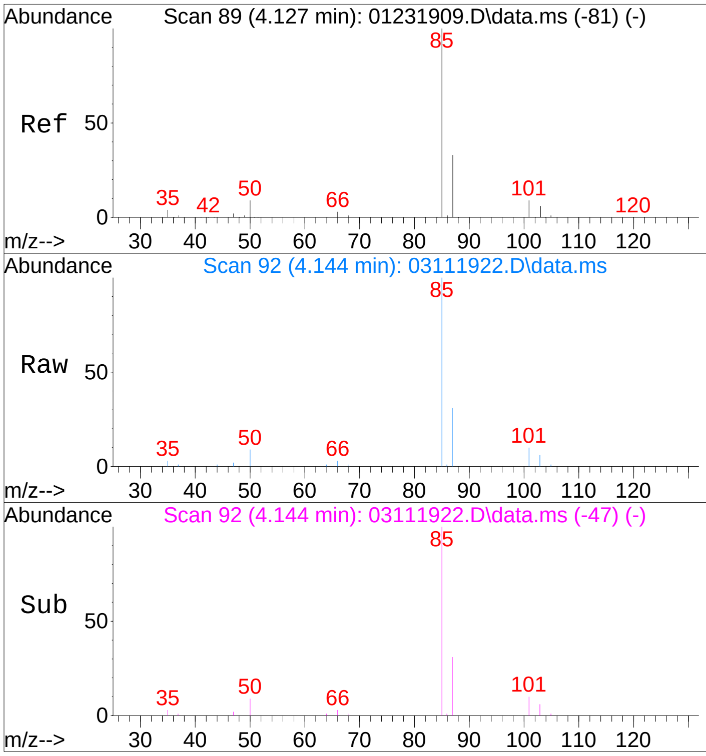
Quantitation Report (QT Reviewed)

00936289

Data File : I:\MS13\DATA\2019_03\11\03111922.D Vial: 5
Acq On : 11 Mar 2019 19:15 Operator: WA
Sample : P1901179-004 (1000mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:10:04 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

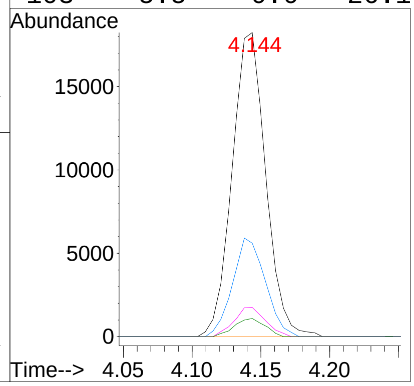


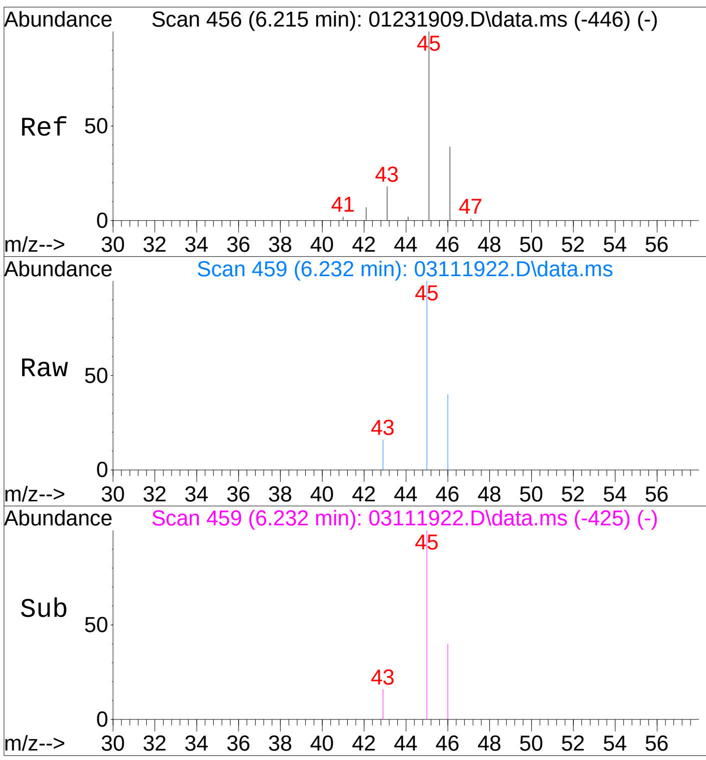


#3
Dichlorodifluoromethane (CFC 12)
Concen: 2.23 ng
RT: 4.14 min Scan# 92
Delta R.T. 0.005 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

Tgt Ion: 85 Resp: 31011

Ion	Ratio	Lower	Upper
85	100		
87	31.6	12.6	52.6
101	9.0	0.0	29.5
103	5.5	0.0	26.1

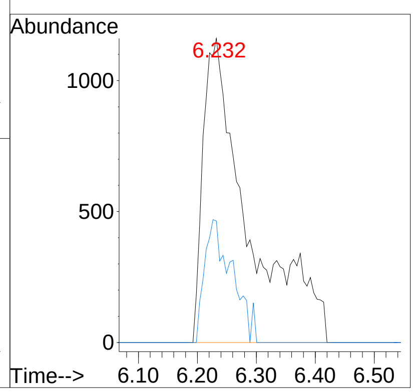


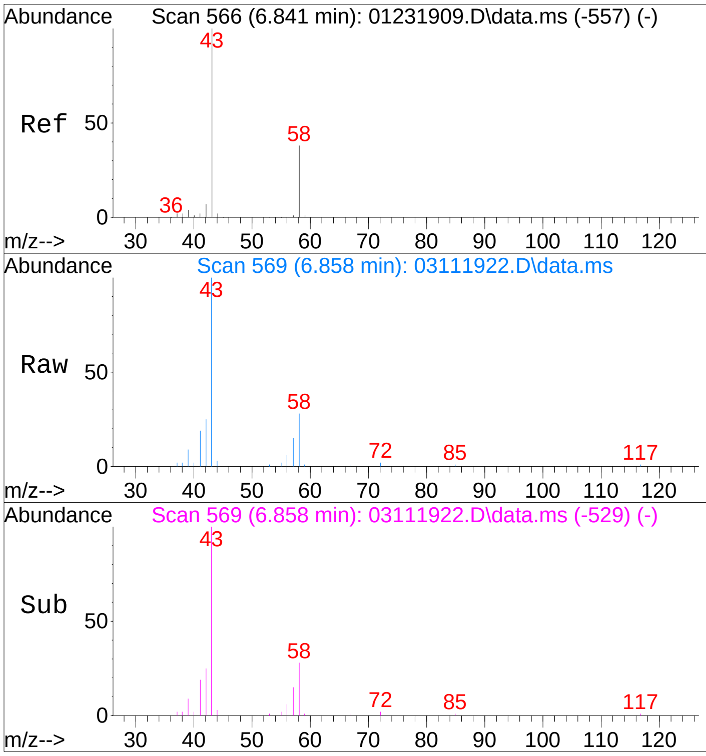


#10
Ethanol
Concen: 1.12 ng
RT: 6.23 min Scan# 459
Delta R.T. -0.057 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

Tgt Ion: 45 Resp: 6211

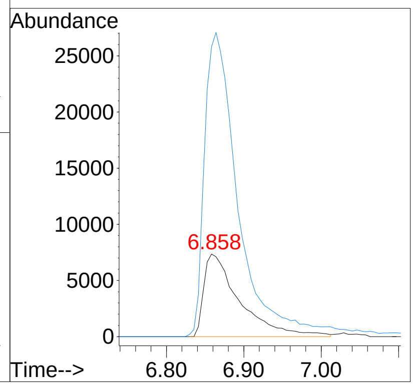
Ion	Ratio	Lower	Upper
45	100		
46	24.6	16.8	56.8

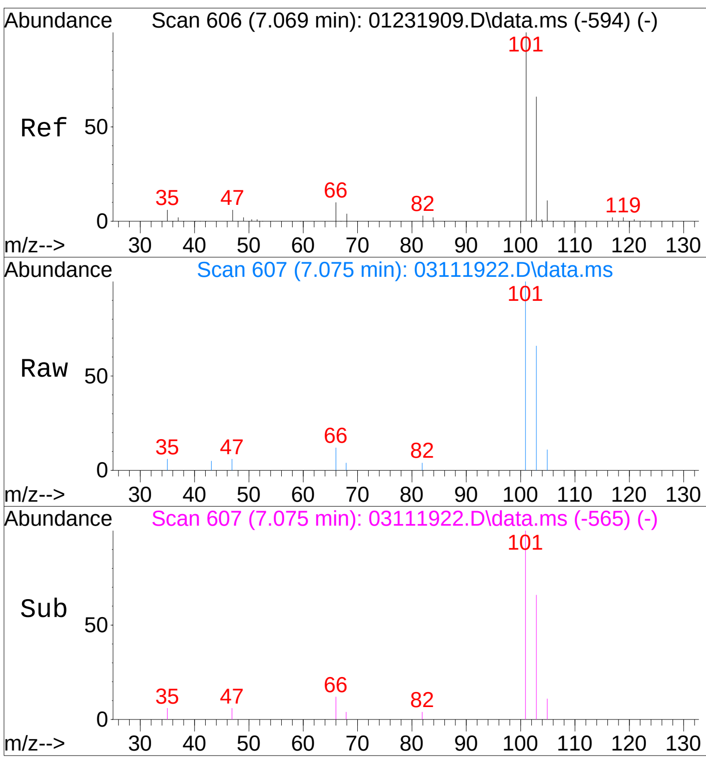




#13
Acetone
Concen: 4.04 ng
RT: 6.86 min   Scan# 569
Delta R.T.   -0.023 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

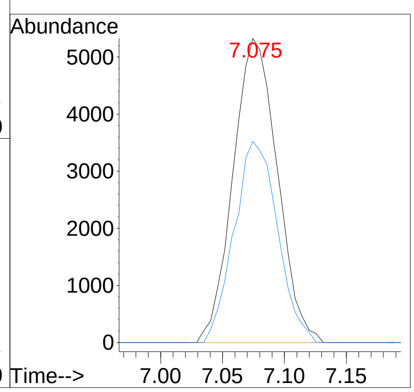
Tgt Ion: 58	Resp:		23740
Ion	Ratio	Lower	Upper
58	100		
43	352.5	271.8	331.8#

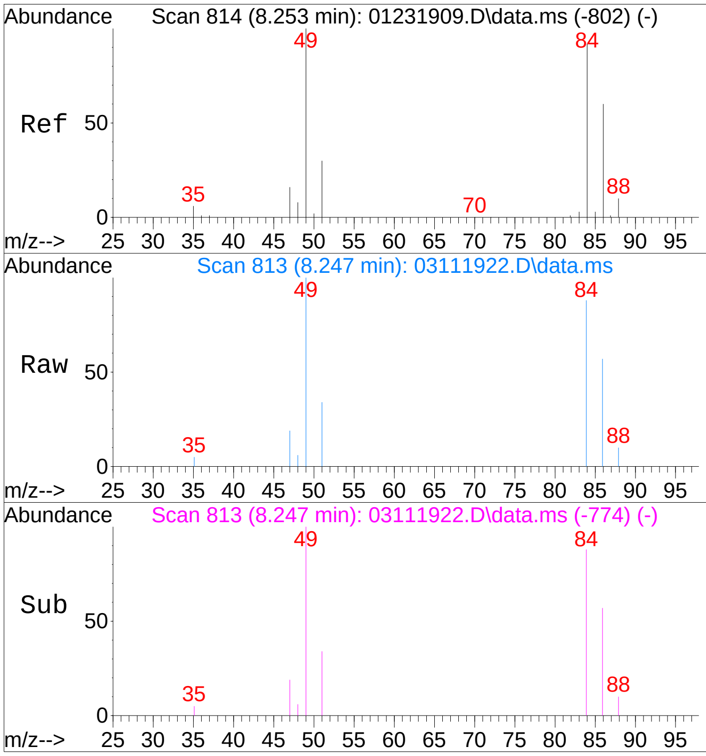




#14
Trichlorofluoromethane
Concen: 1.14 ng
RT: 7.07 min   Scan# 607
Delta R.T.   -0.012 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

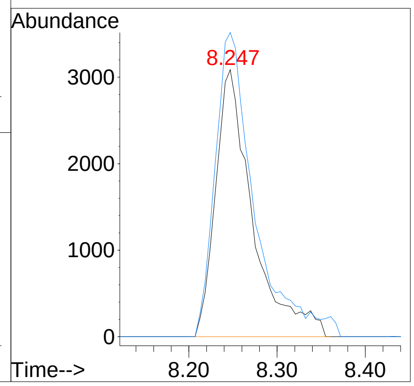
Tgt Ion:101	Resp:		13262
Ion	Ratio	Lower	Upper
101	100		
103	65.0	44.6	84.6

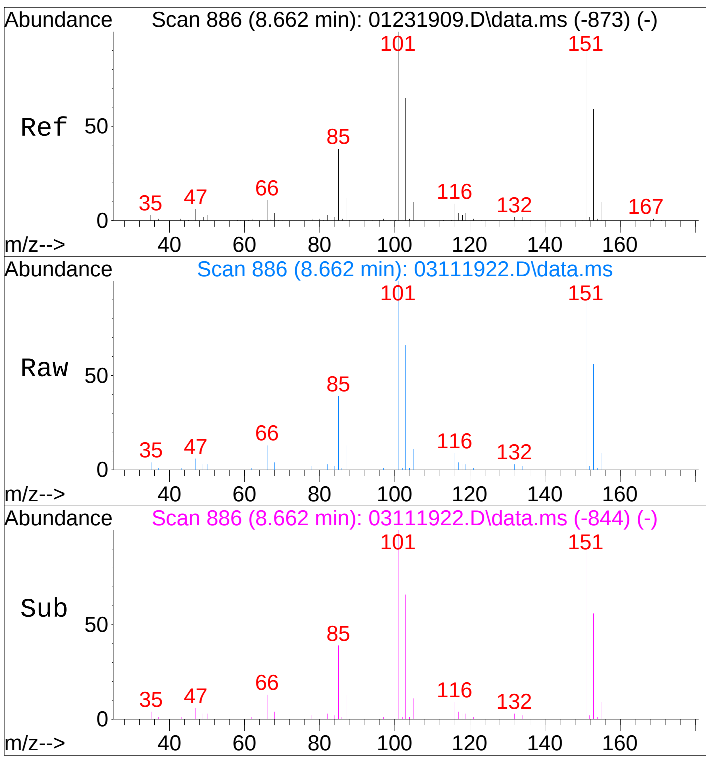




#19
Methylene Chloride
Concen: 1.21 ng
RT: 8.25 min Scan# 813
Delta R.T. -0.029 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

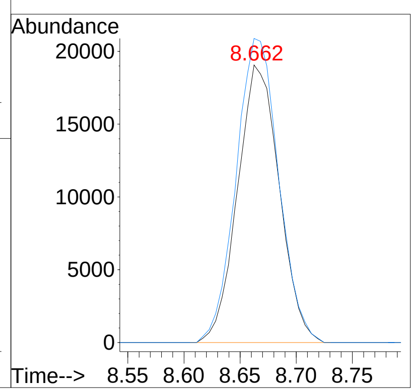
Tgt Ion: 84	Resp:	9009	
Ion	Ratio	Lower	Upper
84	100		
49	120.7	90.3	140.3

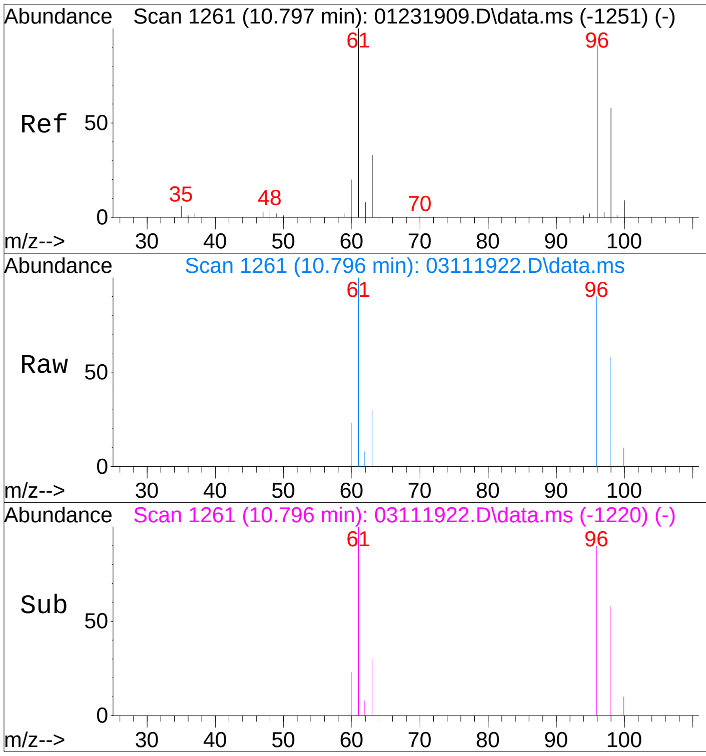




#21
Trichlorotrifluoroethane
Concen: 6.02 ng
RT: 8.66 min Scan# 886
Delta R.T. -0.012 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

Tgt Ion:151	Resp:	49381	
Ion	Ratio	Lower	Upper
151	100		
101	111.8	95.1	135.1

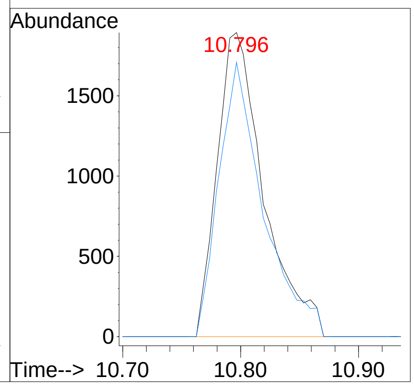


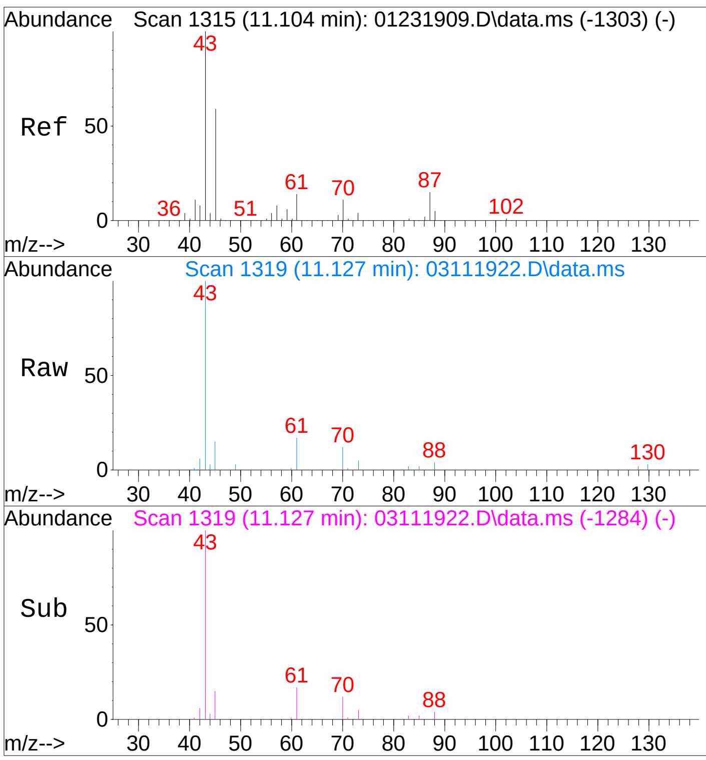


#28
cis-1,2-Dichloroethene
Concen: 0.55 ng
RT: 10.80 min Scan# 1261
Delta R.T. -0.017 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

Tgt Ion: 61 Resp: 5209

Ion	Ratio	Lower	Upper
61	100		
96	85.7	63.3	103.3

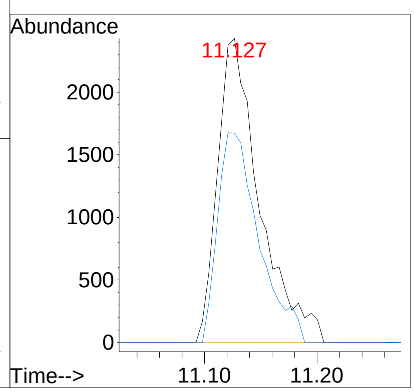


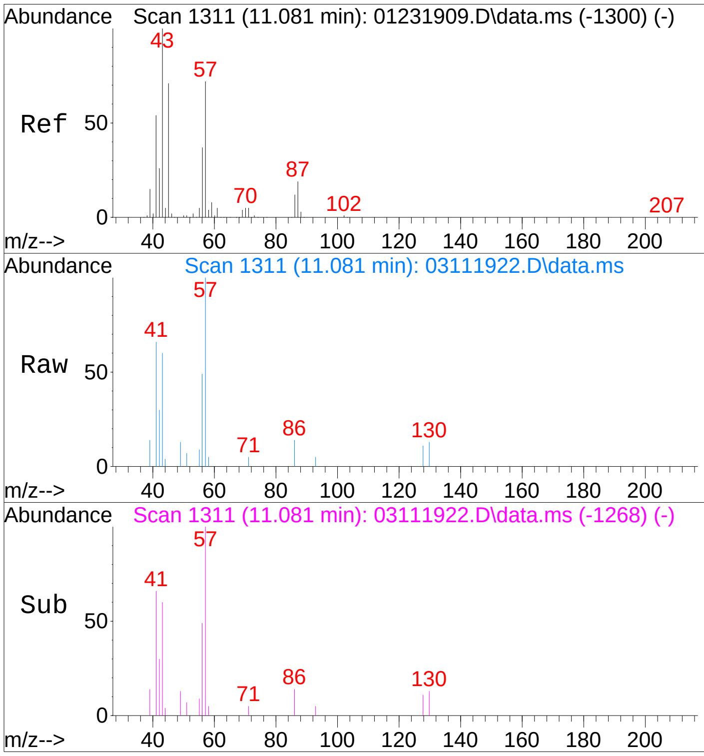


#30
Ethyl Acetate
Concen: 2.37 ng
RT: 11.13 min Scan# 1319
Delta R.T. -0.000 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

Tgt Ion: 61 Resp: 6320

Ion	Ratio	Lower	Upper
61	100		
70	67.6	57.7	97.7

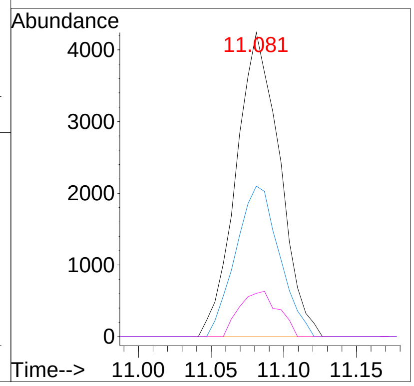


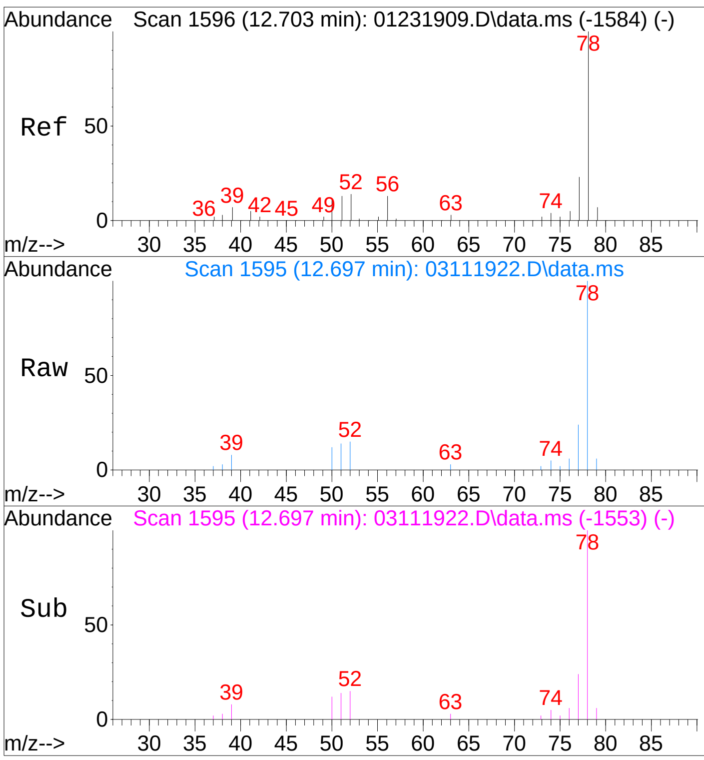


#31
n-Hexane
Concen: 0.71 ng
RT: 11.08 min Scan# 1311
Delta R.T. -0.006 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

Tgt Ion: 57 Resp: 8837

Ion	Ratio	Lower	Upper
57	100		
56	49.7	0.0	0.0#
86	13.4	0.0	0.0#

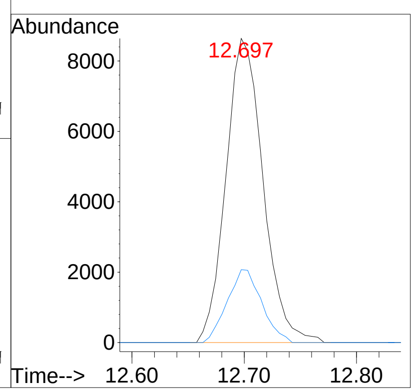


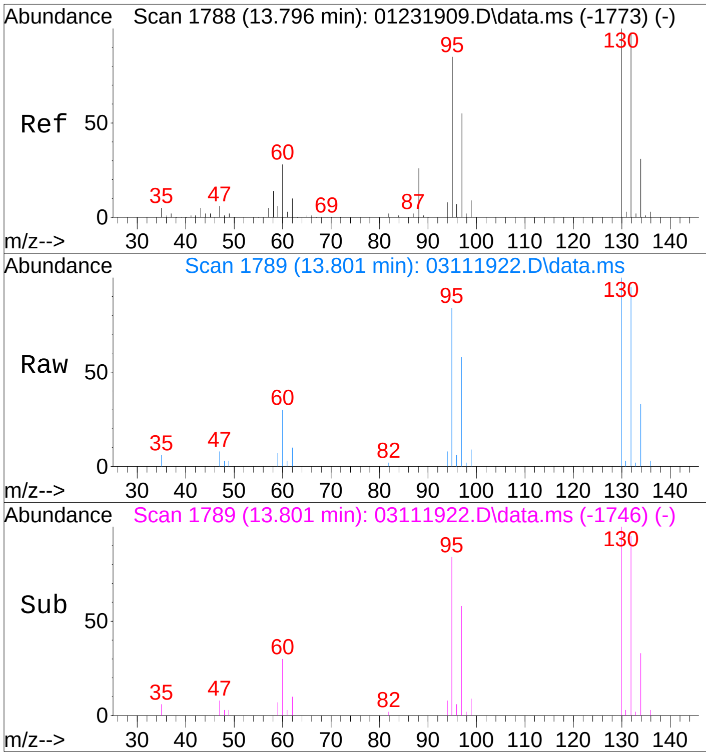


#41
Benzene
Concen: 0.59 ng
RT: 12.70 min Scan# 1595
Delta R.T. -0.012 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

Tgt Ion: 78 Resp: 19912

Ion	Ratio	Lower	Upper
78	100		
77	22.3	3.5	43.5

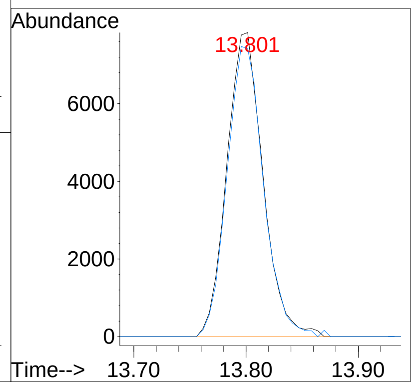


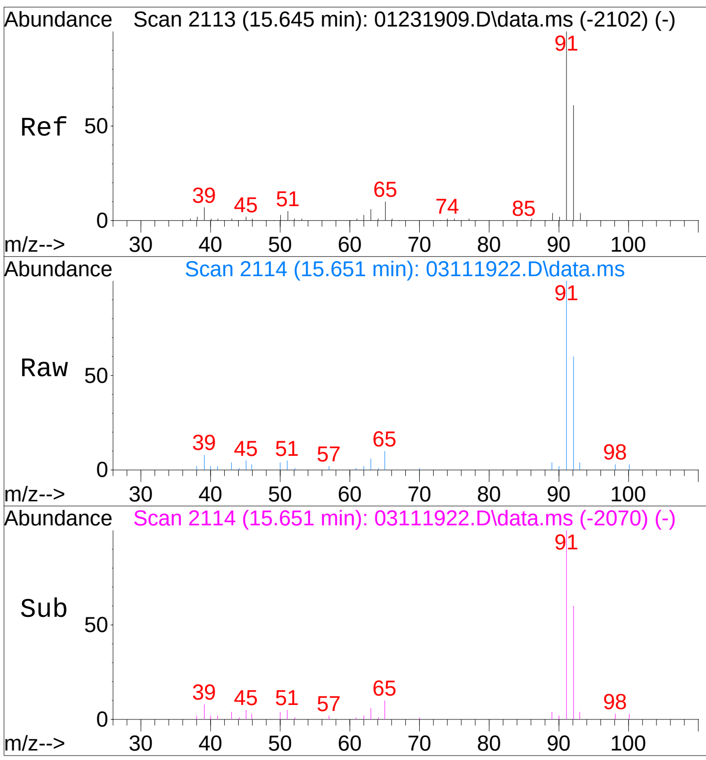


#47
Trichloroethene
Concen: 1.81 ng
RT: 13.80 min Scan# 1789
Delta R.T. -0.006 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

Tgt Ion:130 Resp: 17610

Ion	Ratio	Lower	Upper
130	100		
132	96.3	76.7	116.7

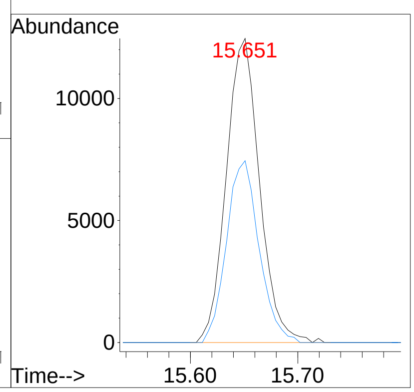


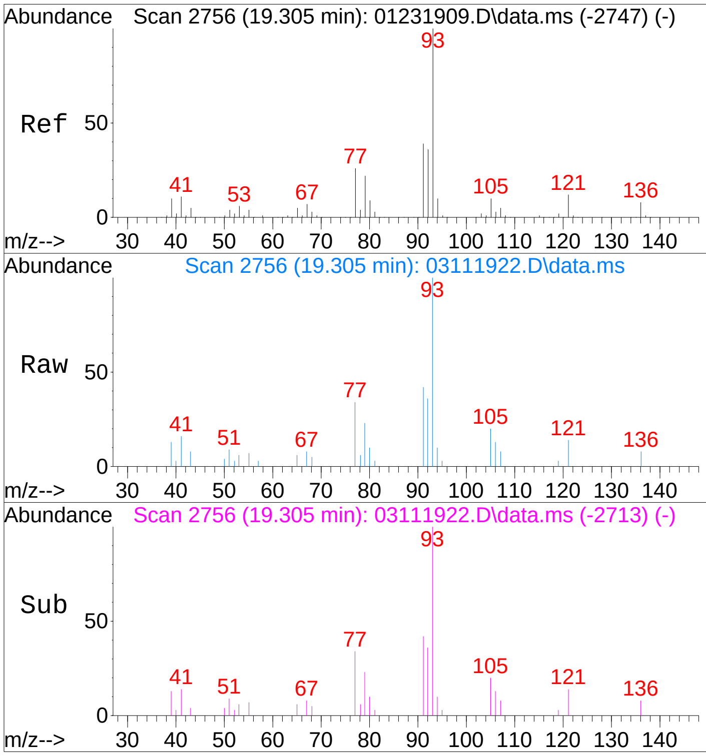


#58
Toluene
Concen: 0.66 ng
RT: 15.65 min Scan# 2114
Delta R.T. -0.000 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

Tgt Ion: 91 Resp: 26877

Ion	Ratio	Lower	Upper
91	100		
92	58.6	39.5	79.5

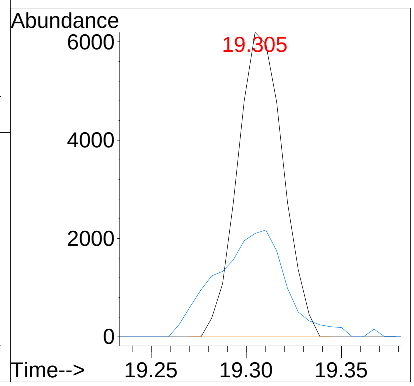




#75
alpha-Pinene
Concen: 0.47 ng
RT: 19.30 min Scan# 2756
Delta R.T. -0.006 min
Lab File: 03111922.D
Acq: 11 Mar 2019 19:15

Tgt Ion: 93 Resp: 10401

Ion	Ratio	Lower	Upper
93	100		
77	53.8	9.6	49.6#



```
Data File : I:\MS13\DATA\2019_03\11\03111903.D          Vial: 2
Acq On    : 11 Mar 2019   7:57                      Operator: WA
Sample    : MB R13031119_1000mL                     Inst    : MS13
Misc      : S31-02211904_AC00880

Quant Time: Mar 11 08:20:41 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration                                    WA 3/11/19
DataAcq Meth:TO15.M

 Internal Standards                    R.T. QIon  Response  Conc Units Dev(Min)
 ---------------------------------------------------------------------------
   1) Bromochloromethane (IS1)   10.97  130    90918   12.500 ng     -0.02
  37) 1,4-Difluorobenzene (IS2)  13.10  114   407856   12.500 ng     -0.01
  56) Chlorobenzene-d5 (IS3)     17.42   82   175696   12.500 ng      0.00

 System Monitoring Compounds
  33) 1,2-Dichloroethane-d4(...  11.82   65   108894   14.047 ng     -0.02
   Spiked Amount     12.500   Range  70 - 130    Recovery   =  112.40%
  57) Toluene-d8 (SS2)           15.54   98   452700   12.032 ng      0.00
   Spiked Amount     12.500   Range  70 - 130    Recovery   =   96.24%
  73) Bromofluorobenzene (SS3)   18.83  174   166974   12.326 ng      0.00
   Spiked Amount     12.500   Range  70 - 130    Recovery   =   98.64%

 Target Compounds                                                     Qvalue
   2) Propene                     0.00   42        0      N.D.
   3) Dichlorodifluoromethan...   0.00   85        0      N.D.
   4) Chloromethane               0.00   50        0      N.D.
   5) 1,2-Dichloro-1,1,2,2-t...   0.00  135        0      N.D.
   6) Vinyl Chloride              0.00   62        0      N.D.
   7) 1,3-Butadiene               0.00   54        0      N.D.
   8) Bromomethane                0.00   94        0      N.D.
   9) Chloroethane                0.00   64        0      N.D.
  10) Ethanol                     0.00   45        0      N.D.
  11) Acetonitrile                0.00   41        0      N.D.
  12) Acrolein                    0.00   56        0      N.D.
  13) Acetone                     6.93   58     4163    0.727 ng   #    58
  14) Trichlorofluoromethane      0.00  101        0      N.D.
  15) 2-Propanol (Isopropanol)    0.00   45        0      N.D.
  16) Acrylonitrile               0.00   53        0      N.D.
  17) 1,1-Dichloroethene          0.00   96        0      N.D.
  18) 2-Methyl-2-Propanol (t...   0.00   59        0      N.D.
  19) Methylene Chloride          0.00   84        0      N.D.
  20) 3-Chloro-1-propene (Al...   0.00   41        0      N.D.
  21) Trichlorotrifluoroethane    0.00  151        0      N.D.
  22) Carbon Disulfide            0.00   76        0      N.D. d
  23) trans-1,2-Dichloroethene    0.00   61        0      N.D.
  24) 1,1-Dichloroethane          0.00   63        0      N.D.
  25) Methyl tert-Butyl Ether     0.00   73        0      N.D.
  26) Vinyl Acetate               0.00   86        0      N.D.
  27) 2-Butanone (MEK)           10.18   72      367    0.070 ng   #    87
  28) cis-1,2-Dichloroethene      0.00   61        0      N.D.
  29) Diisopropyl Ether           0.00   87        0      N.D.
  30) Ethyl Acetate               0.00   61        0      N.D.
  31) n-Hexane                    0.00   57        0      N.D.
  32) Chloroform                  0.00   83        0      N.D.
  34) Tetrahydrofuran (THF)       0.00   72        0      N.D.
  35) Ethyl tert-Butyl Ether      0.00   87        0      N.D.
  36) 1,2-Dichloroethane          0.00   62        0      N.D.
  38) 1,1,1-Trichloroethane       0.00   97        0      N.D.
  39) Isopropyl Acetate           0.00   61        0      N.D.
  40) 1-Butanol                   0.00   56        0      N.D.
  41) Benzene                     0.00   78        0      N.D. d
  42) Carbon Tetrachloride        0.00  117        0      N.D.
  43) Cyclohexane                 0.00   84        0      N.D.
  44) tert-Amyl Methyl Ether      0.00   73        0      N.D.
  45) 1,2-Dichloropropane         0.00   63        0      N.D.
  46) Bromodichloromethane        0.00   83        0      N.D.
  47) Trichloroethene             0.00  130        0      N.D.
  48) 1,4-Dioxane                 0.00   88        0      N.D.
  49) 2,2,4-Trimethylpentane...   0.00   57        0      N.D.
  50) Methyl Methacrylate         0.00  100        0      N.D.
```

00936298

Data File : I:\MS13\DATA\2019_03\11\03111903.D Vial: 2
Acq On : 11 Mar 2019 7:57 Operator: WA
Sample : MB R13031119_1000mL Inst : MS13
Misc : S31-02211904_AC00880

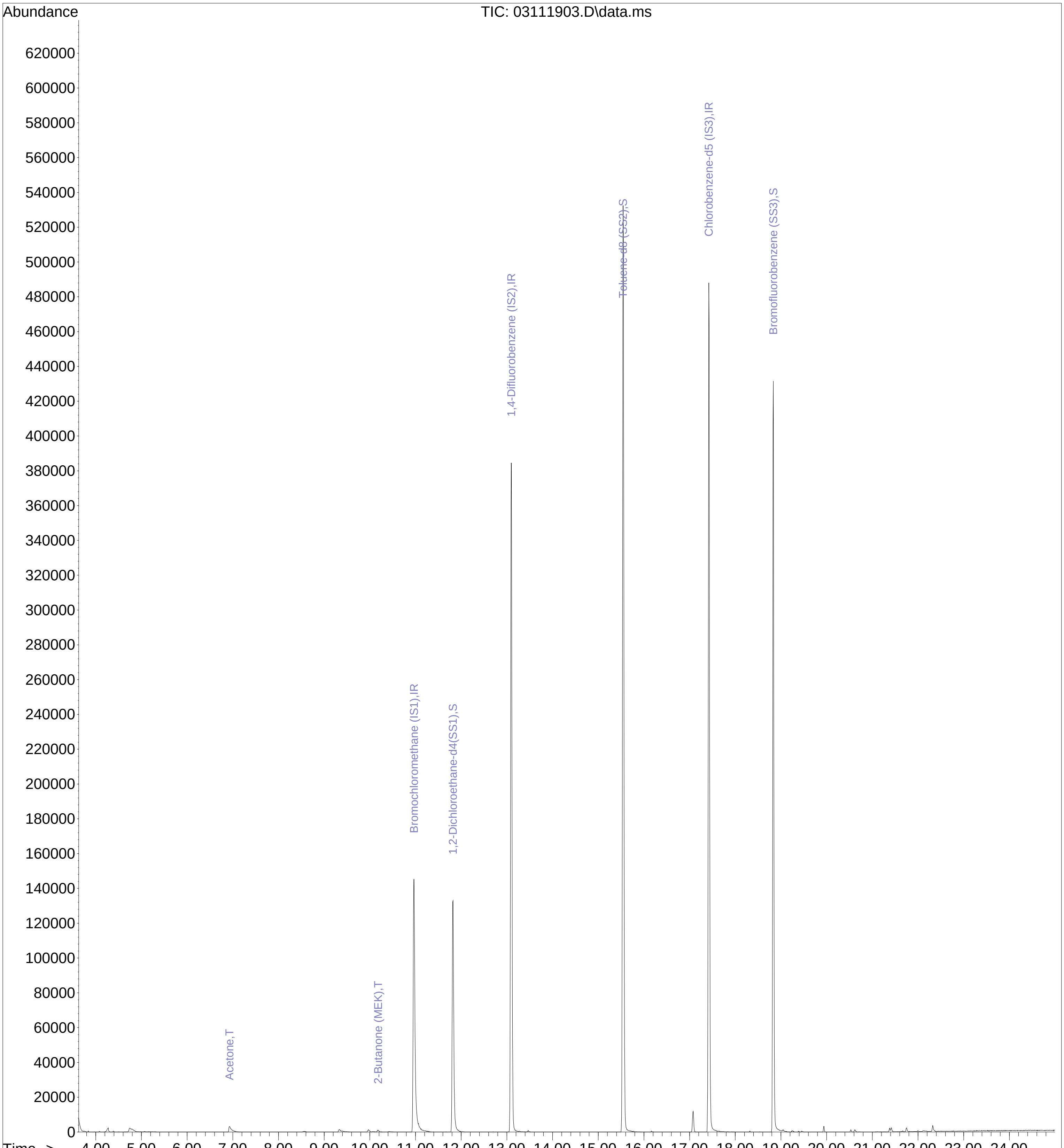
Quant Time: Mar 11 08:20:41 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	0.00	91	0	N.D.	
59) 2-Hexanone	0.00	43	0	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	0.00	43	0	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	0.00	166	0	N.D.	
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	0.00	91	0	N.D.	
67) m- & p-Xylenes	0.00	91	0	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	0.00	91	0	N.D.	
71) n-Nonane	0.00	43	0	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	0.00	105	0	N.D. d	
75) alpha-Pinene	0.00	93	0	N.D.	
76) n-Propylbenzene	0.00	91	0	N.D. d	
77) 3-Ethyltoluene	0.00	105	0	N.D.	
78) 4-Ethyltoluene	0.00	105	0	N.D.	
79) 1,3,5-Trimethylbenzene	0.00	105	0	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	0.00	105	0	N.D.	
82) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.	
83) n-Decane	0.00	57	0	N.D.	
84) Benzyl Chloride	0.00	91	0	N.D.	
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	0.00	105	0	N.D.	
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D.	
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	0.00	68	0	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	0.00	57	0	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D. d	
95) Naphthalene	0.00	128	0	N.D. d	
96) n-Dodecane	0.00	57	0	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D.	
99) tert-Butylbenzene	0.00	119	0	N.D.	
100) n-Butylbenzene	0.00	91	0	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS13\DATA\2019_03\11\03111903.D   Vial: 2
Acq On : 11 Mar 2019 7:57   Operator: WA
Sample : MB R13031119_1000mL   Inst : MS13
Misc : S31-02211904_AC00880

Quant Time: Mar 11 08:20:41 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data File : I:\MS13\DATA\2019_03\11\03111904.D Vial: 2
Acq On : 11 Mar 2019 8:31 Operator: WA
Sample : LCS R13031119_25ng Inst : MS13
Misc : S31-02211904/S31-03051901

Quant Time: Mar 11 10:35:42 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 3/11/19

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	10.98	130	100369	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	13.11	114	428145	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.43	82	184579	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.83	65	115998	13.555	ng		0.00
Spiked Amount 12.500	Range 70 - 130			Recovery = 108.40%			
57) Toluene-d8 (SS2)	15.55	98	466873	11.812	ng		0.00
Spiked Amount 12.500	Range 70 - 130			Recovery = 94.48%			
73) Bromofluorobenzene (SS3)	18.83	174	176829	12.425	ng		0.00
Spiked Amount 12.500	Range 70 - 130			Recovery = 99.44%			
Target Compounds							Qvalue
2) Propene	3.98	42	234695	26.874	ng		95
3) Dichlorodifluoromethan...	4.13	85	392578	26.312	ng		100
4) Chloromethane	4.41	50	339019	29.268	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.67	135	247818	25.772	ng		100
6) Vinyl Chloride	4.82	62	327551	29.496	ng		100
7) 1,3-Butadiene	5.08	54	253702	30.370	ng		95
8) Bromomethane	5.51	94	216300	27.146	ng		99
9) Chloroethane	5.83	64	166872	27.303	ng		100
10) Ethanol	6.23	45	802859	134.853	ng		98
11) Acetonitrile	6.47	41	408383	28.348	ng		97
12) Acrolein	6.64	56	143986	29.261	ng		97
13) Acetone	6.85	58	817566	129.244	ng		86
14) Trichlorofluoromethane	7.07	101	329048	26.318	ng		99
15) 2-Propanol (Isopropanol)	7.35	45	1080771	56.103	ng		94
16) Acrylonitrile	7.60	53	298473	32.363	ng		98
17) 1,1-Dichloroethene	8.03	96	226949	27.196	ng		91
18) 2-Methyl-2-Propanol (t...	8.21	59	1068317	56.418	ng		96
19) Methylene Chloride	8.26	84	229024	28.559	ng		99
20) 3-Chloro-1-propene (Al...	8.41	41	329515	30.661	ng		95
21) Trichlorotrifluoroethane	8.67	151	224430	25.439	ng		97
22) Carbon Disulfide	8.51	76	831106	25.372	ng		99
23) trans-1,2-Dichloroethene	9.53	61	295699	30.281	ng		97
24) 1,1-Dichloroethane	9.78	63	377827	27.198	ng		100
25) Methyl tert-Butyl Ether	9.88	73	643597	27.122	ng		97
26) Vinyl Acetate	10.05	86	290762	142.887	ng	#	91
27) 2-Butanone (MEK)	10.29	72	158062	27.258	ng		100
28) cis-1,2-Dichloroethene	10.80	61	284545	28.175	ng		97
29) Diisopropyl Ether	11.10	87	223687	27.480	ng	#	69
30) Ethyl Acetate	11.11	61	166282	57.903	ng		100
31) n-Hexane	11.09	57	348093	26.115	ng	#	100
32) Chloroform	11.15	83	355762	27.244	ng		99
34) Tetrahydrofuran (THF)	11.55	72	154139	26.192	ng		94
35) Ethyl tert-Butyl Ether	11.70	87	266924	26.407	ng		98
36) 1,2-Dichloroethane	11.95	62	238941	28.825	ng		100
38) 1,1,1-Trichloroethane	12.23	97	303572	26.857	ng		98
39) Isopropyl Acetate	12.66	61	285422	52.564	ng	#	87
40) 1-Butanol	12.69	56	438762	59.338	ng	#	70
41) Benzene	12.70	78	891348	25.211	ng		99
42) Carbon Tetrachloride	12.86	117	283947	27.300	ng		99
43) Cyclohexane	12.99	84	703825	50.663	ng		96
44) tert-Amyl Methyl Ether	13.35	73	623967	27.040	ng		97
45) 1,2-Dichloropropane	13.56	63	219857	27.189	ng		100
46) Bromodichloromethane	13.75	83	280525	28.661	ng		99
47) Trichloroethene	13.80	130	265311	25.962	ng		99
48) 1,4-Dioxane	13.78	88	192767	27.061	ng		97
49) 2,2,4-Trimethylpentane...	13.87	57	898702	25.842	ng		91
50) Methyl Methacrylate	14.01	100	197910	57.896	ng		96

```
Data File : I:\MS13\DATA\2019_03\11\03111904.D          Vial: 2
Acq On    : 11 Mar 2019   8:31                      Operator: WA
Sample    : LCS R13031119_25ng                      Inst    : MS13
Misc      : S31-02211904/S31-03051901

Quant Time: Mar 11 10:35:42 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

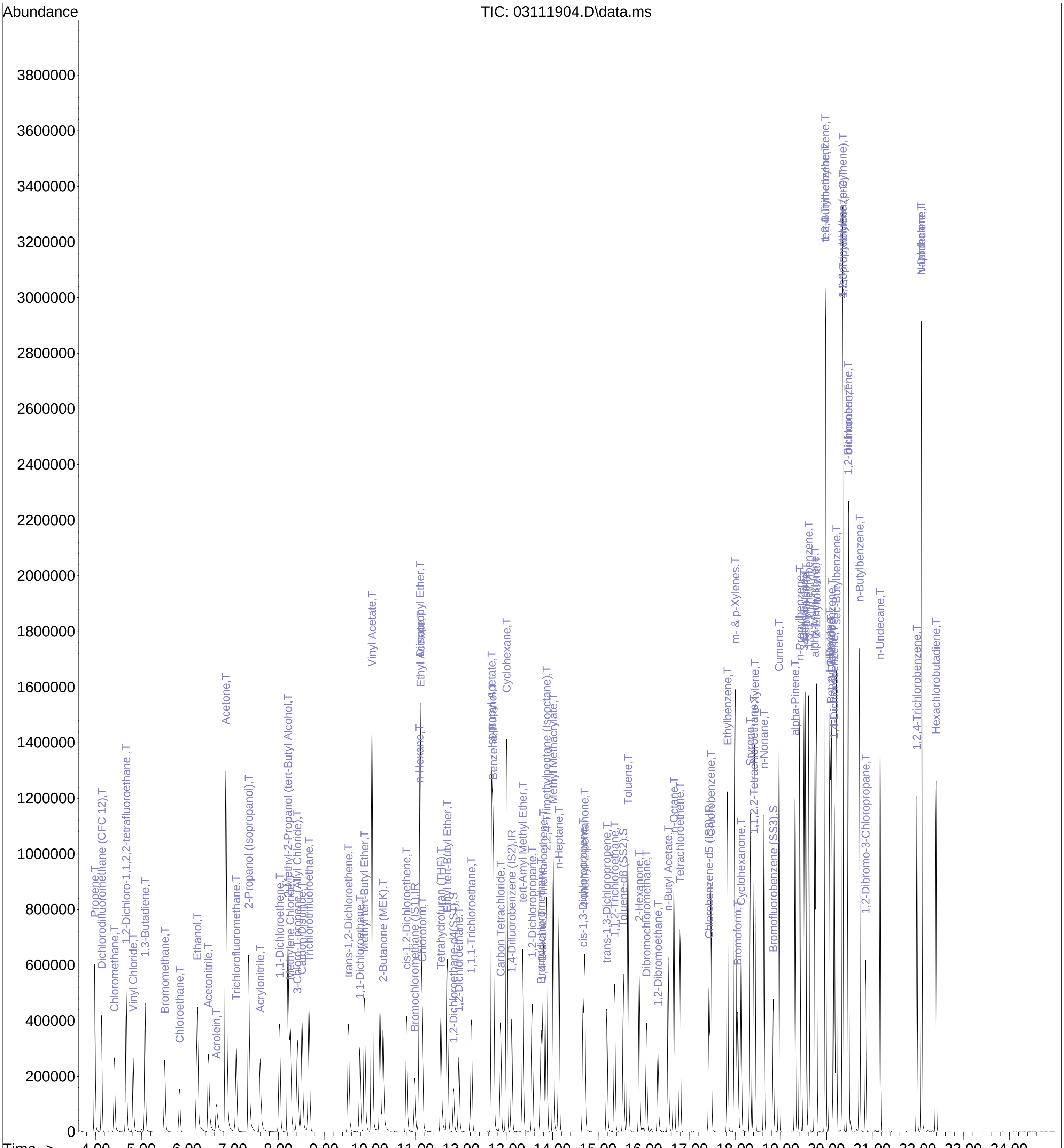
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.14	71	226505	26.580 ng	98
52) cis-1,3-Dichloropropene	14.67	75	359699	28.064 ng	100
53) 4-Methyl-2-pentanone	14.70	58	208089	28.563 ng	96
54) trans-1,3-Dichloropropene	15.18	75	314165	29.176 ng	100
55) 1,1,2-Trichloroethane	15.36	97	223513	27.203 ng	100
58) Toluene	15.65	91	915747	21.796 ng	99
59) 2-Hexanone	15.90	43	464734	28.149 ng	97
60) Dibromochloromethane	16.06	129	273371	26.707 ng	99
61) 1,2-Dibromoethane	16.31	107	254598	26.766 ng	100
62) n-Butyl Acetate	16.53	43	522898	27.292 ng	96
63) n-Octane	16.66	57	187215	24.250 ng	94
64) Tetrachloroethene	16.79	166	292558	22.752 ng	99
65) Chlorobenzene	17.47	112	640926	22.999 ng	100
66) Ethylbenzene	17.83	91	1025978	22.688 ng	97
67) m- & p-Xylenes	18.00	91	1607738	46.056 ng	100
68) Bromoform	18.05	173	252507	27.005 ng	99
69) Styrene	18.33	104	679796	24.912 ng	97
70) o-Xylene	18.43	91	800404	23.006 ng	98
71) n-Nonane	18.63	43	419987	24.697 ng	97
72) 1,1,2,2-Tetrachloroethane	18.41	83	395928	24.287 ng	100
74) Cumene	18.96	105	1067103	22.478 ng	100
75) alpha-Pinene	19.31	93	553597	24.360 ng	95
76) n-Propylbenzene	19.41	91	1252898	23.530 ng	99
77) 3-Ethyltoluene	19.50	105	1038302	23.011 ng	100
78) 4-Ethyltoluene	19.54	105	1063624	23.590 ng	100
79) 1,3,5-Trimethylbenzene	19.61	105	866239	21.889 ng	97
80) alpha-Methylstyrene	19.74	118	511886	26.204 ng	91
81) 2-Ethyltoluene	19.78	105	1054886	22.465 ng	99
82) 1,2,4-Trimethylbenzene	19.97	105	888629	23.147 ng	97
83) n-Decane	20.07	57	464807	24.880 ng	99
84) Benzyl Chloride	20.09	91	769286	27.400 ng	99
85) 1,3-Dichlorobenzene	20.11	146	569627	23.645 ng	100
86) 1,4-Dichlorobenzene	20.16	146	577843	22.849 ng	100
87) sec-Butylbenzene	20.22	105	1201166	22.538 ng	99
88) 4-Isopropyltoluene (p-...	20.35	119	1152722	23.172 ng	98
89) 1,2,3-Trimethylbenzene	20.35	105	915013	24.093 ng	97
90) 1,2-Dichlorobenzene	20.47	146	554361	23.576 ng	100
91) d-Limonene	20.48	68	345822	25.808 ng	94
92) 1,2-Dibromo-3-Chloropr...	20.85	157	207368	24.394 ng	90
93) n-Undecane	21.17	57	482071	27.983 ng	97
94) 1,2,4-Trichlorobenzene	21.97	180	436960	24.409 ng	100
95) Naphthalene	22.08	128	1268288	25.971 ng	100
96) n-Dodecane	22.08	57	461035	28.615 ng	98
97) Hexachlorobutadiene	22.39	225	269812	20.273 ng	100
98) Cyclohexanone	18.13	55	303795	23.876 ng	96
99) tert-Butylbenzene	19.97	119	895814	22.888 ng	100
100) n-Butylbenzene	20.72	91	932245	23.873 ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

00936302

Data File : I:\MS13\DATA\2019_03\11\03111904.D Vial: 2
Acq On : 11 Mar 2019 8:31 Operator: WA
Sample : LCS R13031119_25ng Inst : MS13
Misc : S31-02211904/S31-03051901

Quant Time: Mar 11 10:35:42 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M



00936303

Data File : I:\MS13\DATA\2019_03\11\03111916.D Vial: 3
Acq On : 11 Mar 2019 15:53 Operator: WA
Sample : P1901179-002dup (10mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:07:10 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 3/14/19

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	10.97	130	88966	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.10	114	384241	12.500	ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.42	82	167241	12.500	ng	0.00

System Monitoring Compounds

	R.T.	QIon	Response	Conc	Units	Dev(Min)
33) 1,2-Dichloroethane-d4(...	11.82	65	107717	14.201	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 113.60%			
57) Toluene-d8 (SS2)	15.55	98	421843	11.779	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.24%			
73) Bromofluorobenzene (SS3)	18.83	174	157571	12.220	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.76%			

Target Compounds	R.T.	QIon	Response	Conc	Units	Qvalue
2) Propene	0.00	42	0	N.D.		
3) Dichlorodifluoromethan...	0.00	85	0	N.D.		
4) Chloromethane	0.00	50	0	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.		
6) Vinyl Chloride	4.87	62	4636	0.471	ng	85
7) 1,3-Butadiene	0.00	54	0	N.D.		
8) Bromomethane	0.00	94	0	N.D.		
9) Chloroethane	0.00	64	0	N.D.		
10) Ethanol	0.00	45	0	N.D.		
11) Acetonitrile	0.00	41	0	N.D.		
12) Acrolein	0.00	56	0	N.D.		
13) Acetone	6.95	58	2085	N.D.		
14) Trichlorofluoromethane	0.00	101	0	N.D.		
15) 2-Propanol (Isopropanol)	0.00	45	0	N.D.		
16) Acrylonitrile	0.00	53	0	N.D.		
17) 1,1-Dichloroethene	8.03	96	3747	0.507	ng	94
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.		
19) Methylene Chloride	8.24	84	33648	4.734	ng	98
20) 3-Chloro-1-propene (Al...	8.24	41	973	N.D.		
21) Trichlorotrifluoroethane	8.66	151	116096	14.846	ng	98
22) Carbon Disulfide	8.55	76	1652	N.D.		
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.		
24) 1,1-Dichloroethane	9.77	63	1414	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	0.00	86	0	N.D.		
27) 2-Butanone (MEK)	0.00	72	0	N.D.		
28) cis-1,2-Dichloroethene	10.79	61	202748	22.649	ng	98
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	11.09	61	285	N.D.		
31) n-Hexane	0.00	57	0	N.D.		
32) Chloroform	11.13	83	2083	N.D.		
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	11.95	62	8186	1.114	ng	97
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	0.00	56	0	N.D.		
41) Benzene	12.71	78	958	N.D.		
42) Carbon Tetrachloride	12.85	117	588	N.D.		
43) Cyclohexane	0.00	84	0	N.D.		
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.		
45) 1,2-Dichloropropane	0.00	63	0	N.D.		
46) Bromodichloromethane	0.00	83	0	N.D. d		
47) Trichloroethene	13.80	130	854020	93.118	ng	100
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.		
50) Methyl Methacrylate	0.00	100	0	N.D. d		

Data File : I:\MS13\DATA\2019_03\11\03111916.D Vial: 3
Acq On : 11 Mar 2019 15:53 Operator: WA
Sample : P1901179-002dup (10mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:07:10 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

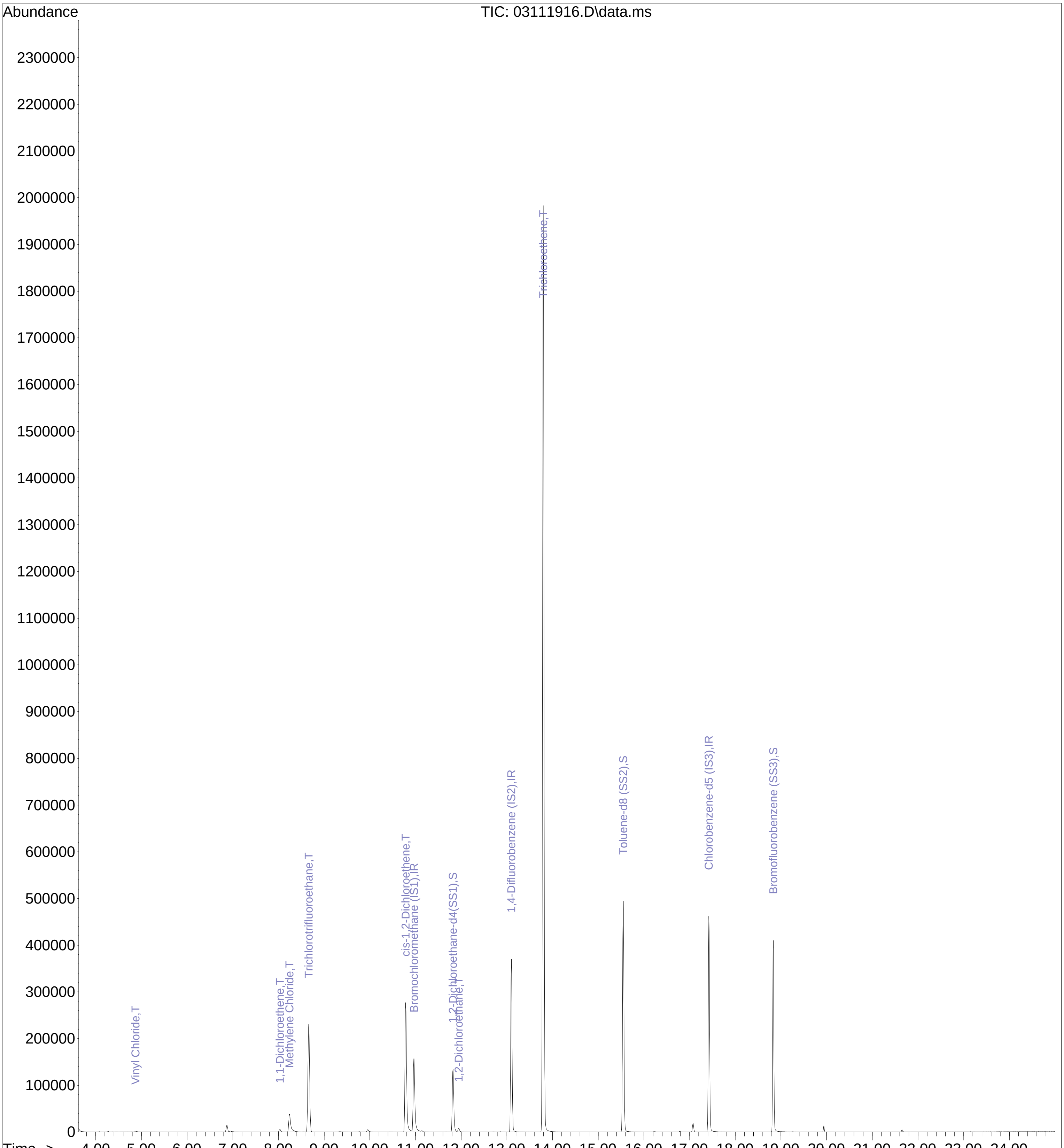
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.66	91	518	N.D.	
59) 2-Hexanone	0.00	43	0	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	0.00	43	0	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	16.79	166	1013	N.D.	
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	0.00	91	0	N.D.	
67) m- & p-Xylenes	0.00	91	0	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	0.00	91	0	N.D.	
71) n-Nonane	0.00	43	0	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	0.00	105	0	N.D.	
75) alpha-Pinene	0.00	93	0	N.D.	
76) n-Propylbenzene	0.00	91	0	N.D.	
77) 3-Ethyltoluene	0.00	105	0	N.D.	
78) 4-Ethyltoluene	0.00	105	0	N.D.	
79) 1,3,5-Trimethylbenzene	0.00	105	0	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	0.00	105	0	N.D.	
82) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.	
83) n-Decane	0.00	57	0	N.D.	
84) Benzyl Chloride	0.00	91	0	N.D.	
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	0.00	105	0	N.D.	
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D.	
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	0.00	68	0	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	0.00	57	0	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	0.00	128	0	N.D.	
96) n-Dodecane	0.00	57	0	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D.	
99) tert-Butylbenzene	19.94	119	201	N.D.	
100) n-Butylbenzene	0.00	91	0	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2019_03\11\03111916.D Vial: 3
Acq On : 11 Mar 2019 15:53 Operator: WA
Sample : P1901179-002dup (10mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:07:10 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M



00936306

Data File : I:\MS13\DATA\2019_03\11\03111916.D Vial: 3
Acq On : 11 Mar 2019 15:53 Operator: WA
Sample : P1901179-002dup (10mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:07:10 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 3/14/19

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	10.97	130	88966	12.500 ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.10	114	384241	12.500 ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.42	82	167241	12.500 ng	0.00
System Monitoring Compounds					
33) 1,2-Dichloroethane-d4(...	11.82	65	107717	14.201 ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 113.60%		
57) Toluene-d8 (SS2)	15.55	98	421843	11.779 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.24%		
73) Bromofluorobenzene (SS3)	18.83	174	157571	12.220 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.76%		
Target Compounds					Qvalue
6) Vinyl Chloride	4.87	62	4636	0.471 ng	85
17) 1,1-Dichloroethene	8.03	96	3747	0.507 ng	94
19) Methylene Chloride	8.24	84	33648	4.734 ng	98
21) Trichlorotrifluoroethane	8.66	151	116096	14.846 ng	98
28) cis-1,2-Dichloroethene	10.79	61	202748	22.649 ng	98
36) 1,2-Dichloroethane	11.95	62	8186	1.114 ng	97
47) Trichloroethene	13.80	130	854020	93.118 ng	100

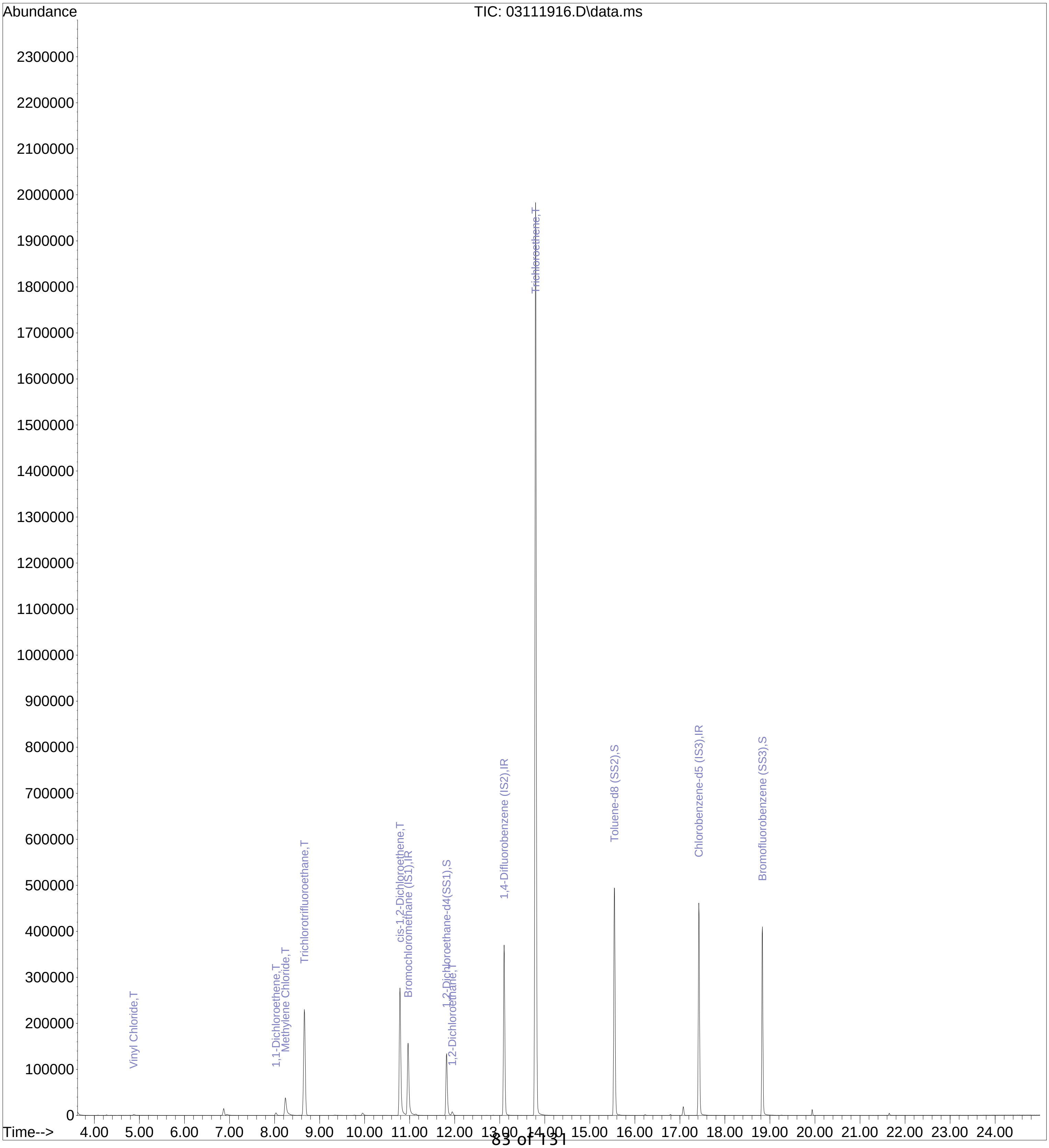
(#) = qualifier out of range (m) = manual integration (+) = signals summed

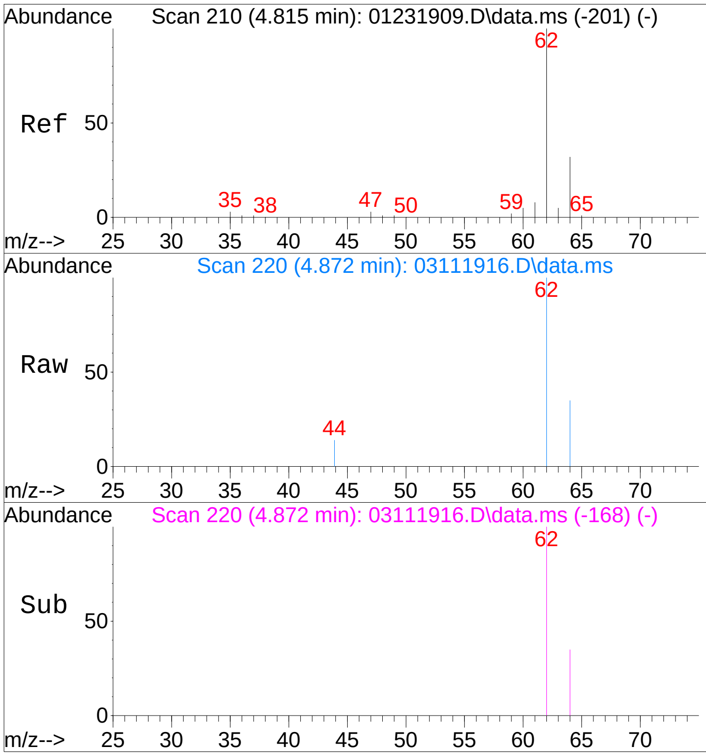
Quantitation Report (QT Reviewed)

00936307

Data File : I:\MS13\DATA\2019_03\11\03111916.D Vial: 3
Acq On : 11 Mar 2019 15:53 Operator: WA
Sample : P1901179-002dup (10mL) Inst : MS13
Misc : S31-02211904

Quant Time: Mar 14 11:07:10 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

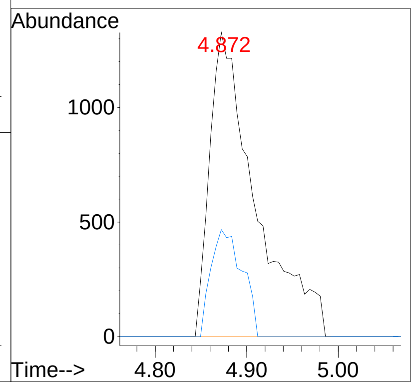


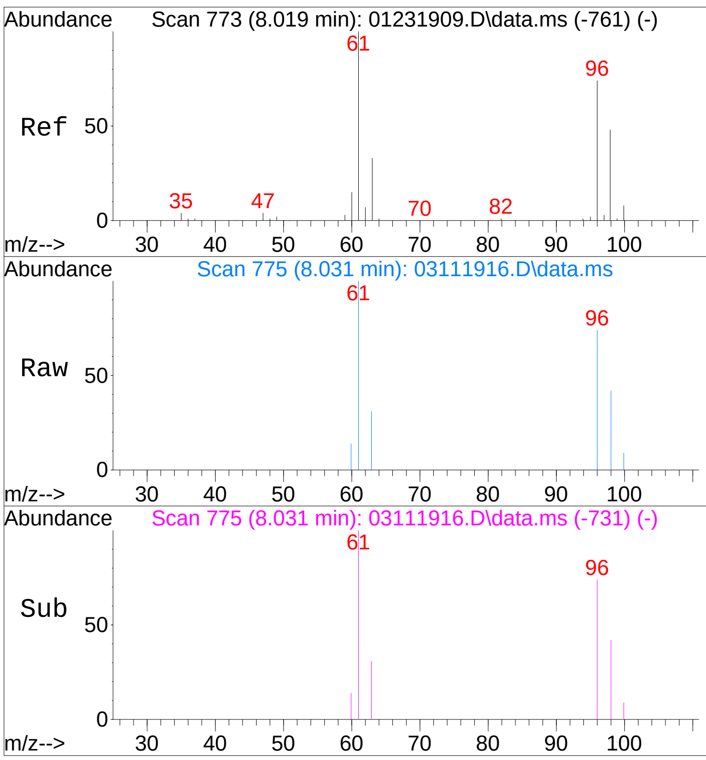


#6
Vinyl Chloride
Concen: 0.47 ng
RT: 4.87 min Scan# 220
Delta R.T. 0.045 min
Lab File: 03111916.D
Acq: 11 Mar 2019 15:53

Tgt Ion: 62 Resp: 4636

Ion	Ratio	Lower	Upper
62	100		
64	24.0	12.4	52.4

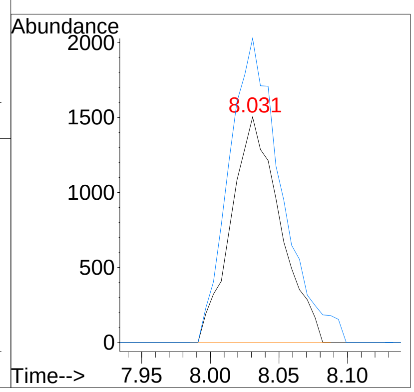


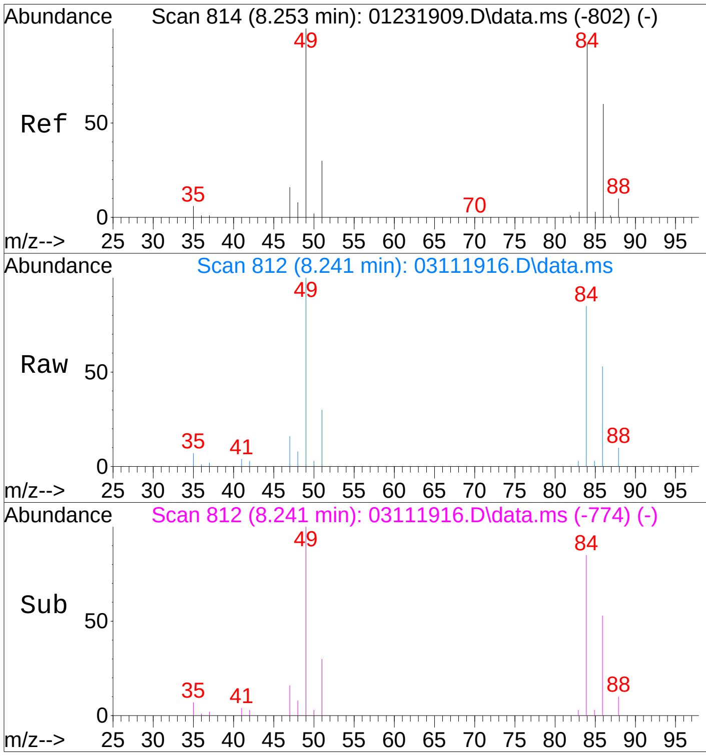


#17
1,1-Dichloroethene
Concen: 0.51 ng
RT: 8.03 min Scan# 775
Delta R.T. -0.000 min
Lab File: 03111916.D
Acq: 11 Mar 2019 15:53

Tgt Ion: 96 Resp: 3747

Ion	Ratio	Lower	Upper
96	100		
61	144.7	132.9	172.9

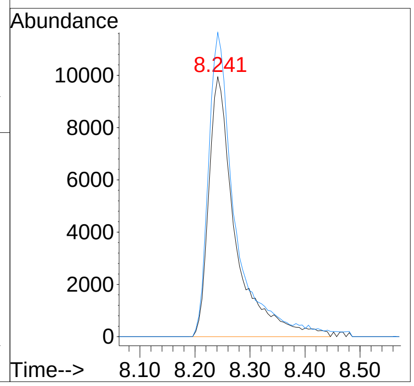


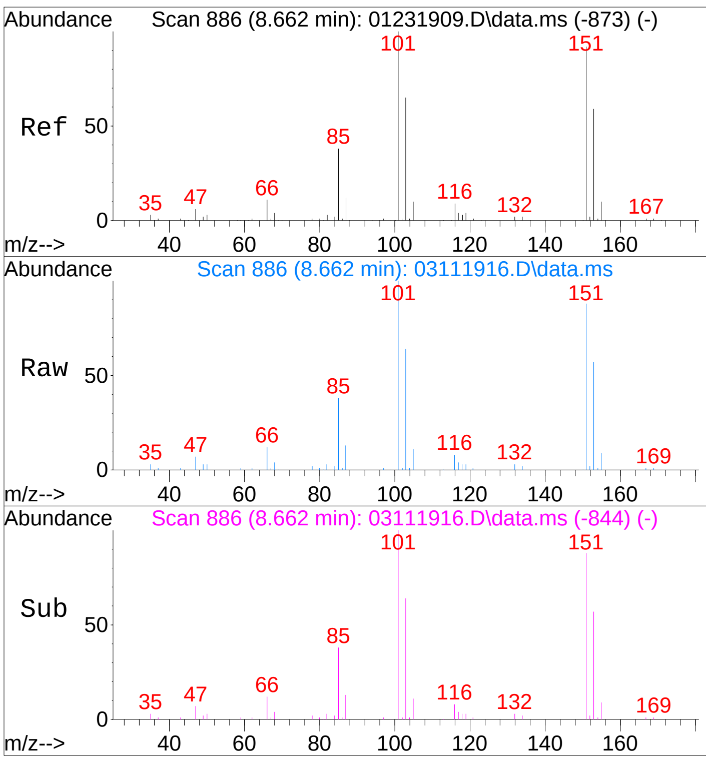


#19
Methylene Chloride
Concen: 4.73 ng
RT: 8.24 min Scan# 812
Delta R.T. -0.034 min
Lab File: 03111916.D
Acq: 11 Mar 2019 15:53

Tgt Ion: 84 Resp: 33648

Ion	Ratio	Lower	Upper
84	100		
49	117.8	90.3	140.3

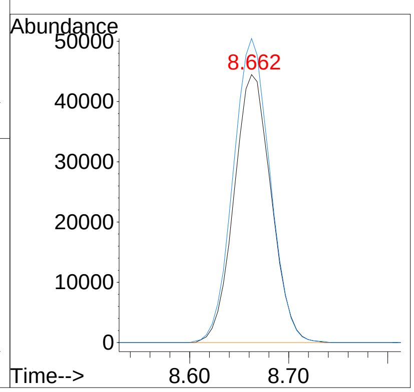


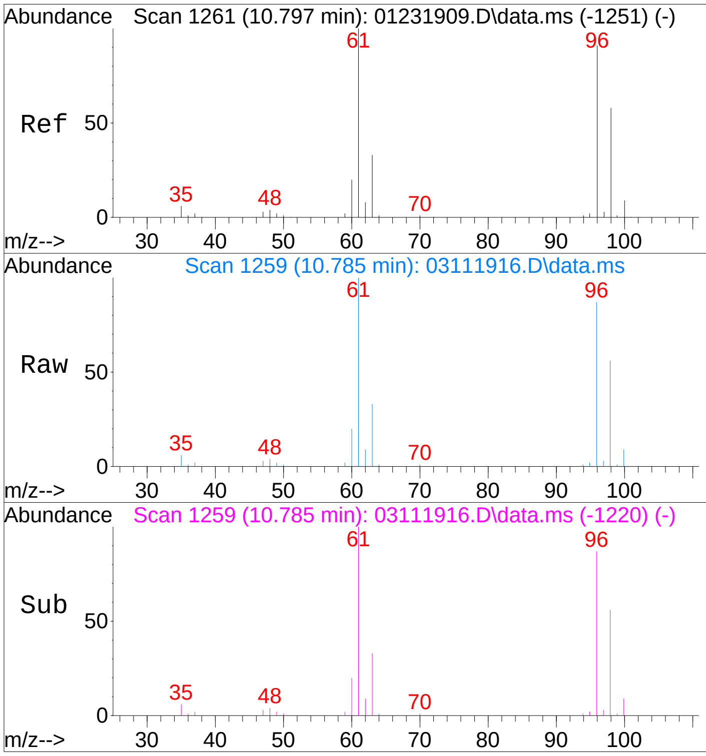


#21
Trichlorotrifluoroethane
Concen: 14.85 ng
RT: 8.66 min Scan# 886
Delta R.T. -0.011 min
Lab File: 03111916.D
Acq: 11 Mar 2019 15:53

Tgt Ion:151 Resp: 116096

Ion	Ratio	Lower	Upper
151	100		
101	112.6	95.1	135.1

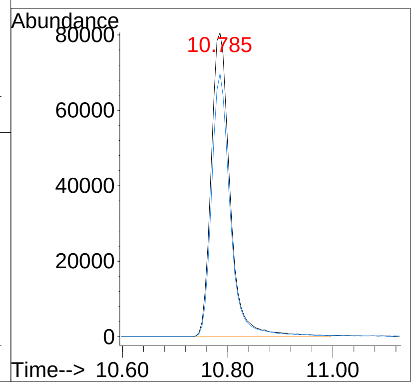


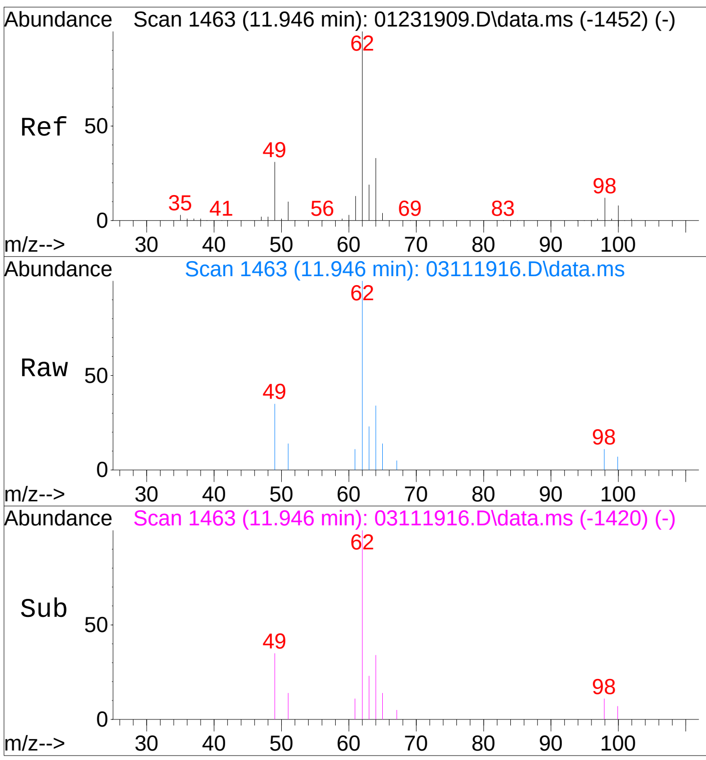


#28
cis-1,2-Dichloroethene
Concen: 22.65 ng
RT: 10.79 min Scan# 1259
Delta R.T. -0.029 min
Lab File: 03111916.D
Acq: 11 Mar 2019 15:53

Tgt Ion: 61 Resp: 202748

Ion	Ratio	Lower	Upper
61	100		
96	85.3	63.3	103.3

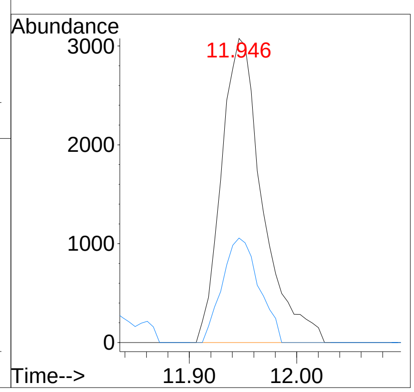


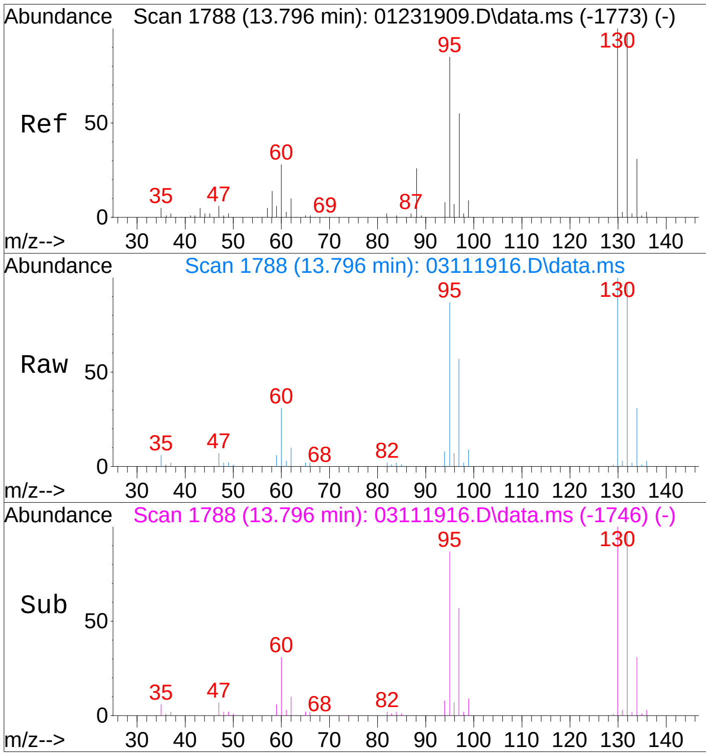


#36
1,2-Dichloroethane
Concen: 1.11 ng
RT: 11.95 min Scan# 1463
Delta R.T. -0.006 min
Lab File: 03111916.D
Acq: 11 Mar 2019 15:53

Tgt Ion: 62 Resp: 8186

Ion	Ratio	Lower	Upper
62	100		
64	30.8	12.6	52.6

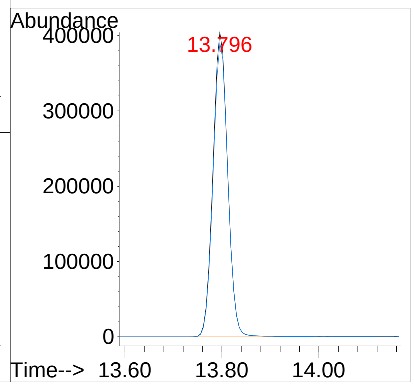




#47
Trichloroethene
Concen: 93.12 ng
RT: 13.80 min Scan# 1788
Delta R.T. -0.011 min
Lab File: 03111916.D
Acq: 11 Mar 2019 15:53

Tgt Ion:130 Resp: 854020

Ion	Ratio	Lower	Upper
130	100		
132	96.6	76.7	116.7



Response Factor Report MS13

Method Path : I:\MS13\METHODS\
Method File : R13012319.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Wed Jan 23 11:21:29 2019
Response Via : Initial Calibration

Calibration Files
0.1 =01231906.D 0.2 =01231907.D 0.5 =01231904.D 1.0 =01231905.D 5.0 =01231908.D 25 =01231909.D 50 =01231910.D
100 =01231911.D

		Compound	0.1	0.2	0.5	1.0	5.0	25	50	100	Avg	%RSD
1)	IR	Bromochloromethane...	----------			ISTD	----------					
2)	T	Propene	1.086	1.026	1.144	1.076	1.116	1.075	1.030	1.147	1.088	4.25
3)	T	Dichlorodifluo...	1.809	1.904	1.983	1.928	1.929	1.844	1.767	1.701	1.858	5.11
4)	T	Chloromethane	1.367	1.297	1.705	1.481	1.555	1.501	1.434	1.201	1.443	10.85
5)	T	1,2-Dichloro-1...	1.133	1.207	1.294	1.236	1.216	1.182	1.162	1.150	1.198	4.37
6)	T	Vinyl Chloride	1.155	1.181	1.541	1.425	1.493	1.456	1.420	1.394	1.383	10.16
7)	T	1,3-Butadiene	0.839	0.766	1.099	1.063	1.193	1.139	1.130	1.094	1.040	14.71
8)	T	Bromomethane	0.974	0.896	1.022	1.000	1.047	1.027	0.990	0.981	0.992	4.64
9)	T	Chloroethane		0.661	0.806	0.783	0.799	0.786	0.755	0.739	0.761	6.58
10)	T	Ethanol	0.911	0.684	0.807	0.723	0.751	0.725	0.683	0.649	0.741	11.27
11)	T	Acetonitrile			1.720	1.655	1.785	1.902	1.857	1.846	1.794	5.19
12)	T	Acrolein			0.478	0.578	0.638	0.674	0.656	0.654	0.613	12.08
13)	T	Acetone	0.982	0.849	0.832	0.785	0.777	0.745	0.696	0.636	0.788	13.31
14)	T	Trichlorofluor...	1.578	1.534	1.687	1.609	1.592	1.510	1.479	1.468	1.557	4.73
15)	T	2-Propanol (Is...	2.391	2.376	2.589	2.458	2.558	2.520	2.371	1.931	2.399	8.63
16)	T	Acrylonitrile			0.607	0.939	1.196	1.397	1.378	1.374	1.149	27.66
17)	T	1,1-Dichloroet...	0.916	0.965	1.102	1.059	1.091	1.081	1.057	1.042	1.039	6.27
18)	T	2-Methyl-2-Pro...	2.156	2.284	2.524	2.464	2.470	2.451	2.336	2.181	2.358	5.95
19)	T	Methylene Chlo...	0.813	0.834	1.045	1.041	1.089	1.092	1.059	1.016	0.999	11.11
20)	T	3-Chloro-1-pro...	1.150	1.232	1.363	1.307	1.435	1.433	1.410	1.377	1.338	7.65
21)	T	Trichlorotrifl...	1.080	1.074	1.186	1.111	1.119	1.090	1.067	1.062	1.099	3.70
22)	T	Carbon Disulfide		4.632	4.512	4.217	3.870	3.906	3.766	3.653	4.079	9.31
23)	T	trans-1,2-Dich...	0.797	0.909	1.278	1.306	1.364	1.394	1.357	1.323	1.216	18.81
24)	T	1,1-Dichloroet...	1.655	1.724	1.814	1.782	1.815	1.738	1.683	1.631	1.730	4.07
25)	T	Methyl tert-Bu...	2.784	2.946	3.175	3.042	3.063	2.981	2.866	2.785	2.955	4.70
26)	T	Vinyl Acetate			0.227	0.242	0.266	0.276	0.263	0.247	0.253	7.11
27)	T	2-Butanone (MEK)			0.655	0.676	0.731	0.772	0.757	0.743	0.722	6.47
28)	T	cis-1,2-Dichlo...	0.980	1.145	1.394	1.307	1.349	1.337	1.291	1.259	1.258	10.69
29)	T	Diisopropyl Ether	0.828	1.007	1.104	1.080	1.089	1.048	1.001	0.953	1.014	8.96
30)	T	Ethyl Acetate			0.354	0.361	0.386	0.376	0.352	0.317	0.358	6.66
31)	T	n-Hexane	1.711	1.805	1.894	1.762	1.738	1.540	1.477	1.354	1.660	11.07
32)	T	Chloroform	1.574	1.527	1.735	1.661	1.672	1.656	1.611	1.575	1.626	4.12
33)	S	1,2-Dichloroet...	1.071	1.072	1.080	1.077	1.066	1.048	1.051	1.061	1.066	1.09
34)	T	Tetrahydrofura...	0.744	0.728	0.765	0.749	0.745	0.731	0.707	0.695	0.733	3.15
35)	T	Ethyl tert-But...	1.153	1.191	1.333	1.335	1.301	1.285	1.248	1.225	1.259	5.27
36)	T	1,2-Dichloroet...	0.877	0.970	1.089	1.066	1.085	1.092	1.051	1.028	1.032	7.24
37)	IR	1,4-Difluorobenzen...	----------			ISTD	----------					
38)	T	1,1,1-Trichlor...	0.312	0.333	0.341	0.331	0.341	0.340	0.328	0.315	0.330	3.42
39)	T	Isopropyl Acetate	0.156	0.166	0.173	0.164	0.164	0.160	0.149	0.135	0.159	7.45
40)	T	1-Butanol	0.226	0.166	0.225	0.207	0.226	0.243	0.227	0.207	0.216	10.78
41)	T	Benzene	1.172	1.072	1.088	1.054	1.046	1.017	0.954	0.856	1.032	9.16
42)	T	Carbon Tetrach...	0.273	0.287	0.314	0.310	0.310	0.321	0.311	0.302	0.304	5.24

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Method Path : I:\MS13\METHODS\
Method File : R13012319.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

43)	T	Cyclohexane	0.426	0.420	0.439	0.416	0.413	0.403	0.380	0.348	0.406	7.13
44)	T	tert-Amyl Meth...	0.678	0.651	0.721	0.679	0.685	0.690	0.660	0.625	0.674	4.29
45)	T	1,2-Dichloropr...	0.231	0.230	0.253	0.241	0.245	0.241	0.230	0.218	0.236	4.61
46)	T	Bromodichlorom...	0.259	0.263	0.291	0.282	0.299	0.307	0.298	0.287	0.286	6.04
47)	T	Trichloroethene	0.276	0.295	0.318	0.297	0.306	0.308	0.299	0.288	0.298	4.31
48)	T	1,4-Dioxane	0.174	0.209	0.215	0.213	0.219	0.219	0.212	0.203	0.208	7.11
49)	T	2,2,4-Trimethy...	1.112	1.075	1.125	1.030	1.029	0.979	0.925	0.847	1.015	9.36
50)	T	Methyl Methacr...	0.066	0.083	0.103	0.104	0.110	0.115	0.112	0.106	0.100	16.93
51)	T	n-Heptane	0.253	0.254	0.268	0.250	0.257	0.248	0.238	0.223	0.249	5.39
52)	T	cis-1,3-Dichlo...			0.351	0.354	0.379	0.402	0.388	0.370	0.374	5.29
53)	T	4-Methyl-2-pen...	0.190	0.198	0.219	0.223	0.218	0.230	0.218	0.206	0.213	6.41
54)	T	trans-1,3-Dich...			0.265	0.263	0.325	0.355	0.345	0.333	0.314	12.77
55)	T	1,1,2-Trichlor...	0.212	0.228	0.255	0.243	0.251	0.252	0.244	0.235	0.240	6.04
56)	IR	Chlorobenzene-d5 (...	----------------ISTD--------------------									
57)	S	Toluene-d8 (SS2)	2.709	2.667	2.686	2.684	2.659	2.667	2.697	2.647	2.677	0.78
58)	T	Toluene	3.569	3.054	3.117	2.710	2.713	2.647	2.581	2.371	2.845	13.36
59)	T	2-Hexanone	1.016	0.984	1.177	1.131	1.162	1.212	1.175	1.087	1.118	7.34
60)	T	Dibromochlorom...	0.567	0.610	0.682	0.676	0.736	0.771	0.764	0.740	0.693	10.69
61)	T	1,2-Dibromoethane	0.500	0.541	0.666	0.643	0.687	0.721	0.710	0.684	0.644	12.51
62)	T	n-Butyl Acetate	1.351	1.230	1.328	1.275	1.299	1.371	1.315	1.212	1.298	4.33
63)	T	n-Octane	0.639	0.526	0.539	0.516	0.521	0.507	0.488	0.446	0.523	10.53
64)	T	Tetrachloroethene	0.899	0.856	0.899	0.866	0.877	0.872	0.862	0.836	0.871	2.46
65)	T	Chlorobenzene	2.099	1.980	1.951	1.847	1.858	1.871	1.804	1.687	1.887	6.56
66)	T	Ethylbenzene	3.471	3.201	3.189	2.987	3.071	3.034	2.893	2.653	3.062	7.86
67)	T	m- & p-Xylenes	2.904	2.484	2.444	2.292	2.308	2.288	2.200	1.993	2.364	11.20
68)	T	Bromoform	0.510	0.516	0.587	0.587	0.669	0.737	0.736	0.724	0.633	15.11
69)	T	Styrene	1.735	1.728	1.842	1.740	1.943	2.016	1.956	1.824	1.848	6.08
70)	T	o-Xylene	2.815	2.470	2.499	2.262	2.304	2.281	2.196	2.020	2.356	10.14
71)	T	n-Nonane	1.296	1.341	1.217	1.136	1.168	1.110	1.035	0.910	1.152	12.08
72)	T	1,1,2,2-Tetrac...	1.151	1.109	1.120	1.089	1.120	1.137	1.092	1.014	1.104	3.80
73)	S	Bromofluoroben...	0.951	0.952	0.964	0.966	0.975	0.968	0.971	0.963	0.964	0.89
74)	T	Cumene	4.039	3.577	3.252	3.091	3.121	3.070	2.928	2.641	3.215	13.24
75)	T	alpha-Pinene	1.583	1.666	1.507	1.443	1.553	1.590	1.545	1.425	1.539	5.17
76)	T	n-Propylbenzene	4.309	3.923	3.746	3.483	3.571	3.520	3.335	2.961	3.606	11.13
77)	T	3-Ethyltoluene	3.393	3.262	3.058	2.956	3.092	3.023	3.040	2.621	3.056	7.40
78)	T	4-Ethyltoluene	3.821	3.378	3.085	2.892	2.962	3.011	2.714	2.565	3.053	12.89
79)	T	1,3,5-Trimethy...	3.551	3.021	2.644	2.458	2.558	2.529	2.437	2.241	2.680	15.54
80)	T	alpha-Methylst...	1.239	1.204	1.192	1.141	1.458	1.514	1.472	1.364	1.323	11.07
81)	T	2-Ethyltoluene	4.069	3.458	3.397	2.986	3.033	3.007	2.883	2.606	3.180	14.17
82)	T	1,2,4-Trimethy...	3.299	2.774	2.702	2.437	2.554	2.535	2.395	2.102	2.600	13.41
83)	T	n-Decane	1.426	1.437	1.289	1.214	1.301	1.262	1.176	1.016	1.265	10.76
84)	T	Benzyl Chloride			1.612	1.503	1.912	2.206	2.171	2.005	1.901	15.22
85)	T	1,3-Dichlorobe...	1.822	1.622	1.645	1.478	1.603	1.674	1.651	1.557	1.631	6.06
86)	T	1,4-Dichlorobe...	2.044	1.716	1.776	1.575	1.653	1.699	1.670	1.568	1.713	8.82
87)	T	sec-Butylbenzene	4.377	4.182	3.654	3.422	3.532	3.473	3.303	2.930	3.609	12.97
88)	T	4-Isopropyltol...	3.963	3.909	3.479	3.234	3.401	3.315	3.076	2.574	3.369	13.26
89)	T	1,2,3-Trimethy...	3.027	2.856	2.585	2.417	2.580	2.563	2.431	2.117	2.572	10.79
90)	T	1,2-Dichlorobe...	1.866	1.629	1.643	1.471	1.553	1.601	1.552	1.425	1.592	8.38
91)	T	d-Limonene	0.921	0.995	0.823	0.795	0.987	1.001	0.938	0.799	0.907	9.79
92)	T	1,2-Dibromo-3-...	0.588	0.498	0.569	0.501	0.584	0.630	0.626	0.609	0.576	8.91
93)	T	n-Undecane	1.106	1.062	1.086	1.030	1.352	1.349	1.256	1.092	1.167	11.25
94)	T	1,2,4-Trichlor...	1.429	0.899	1.295	0.974	1.227	1.320	1.301	1.254	1.212	14.95

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00936313

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 Method Path : I:\MS13\METHODS\
 Method File : R13012319.M
 Title      : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
 95) T   Naphthalene             2.338 3.658 2.347 3.720 4.006 3.800 3.281 3.307   20.98
 96) T   n-Dodecane                    1.159 0.696 1.263 1.298 1.178 0.952 1.091   20.92
 97) T   Hexachlorobuta... 1.262 0.980 0.893 0.755 0.816 0.834 0.840 0.829 0.901   17.74
 98) T   Cyclohexanone     1.010 0.860 0.896 0.836 0.762 0.872 0.854 0.802 0.862    8.50
 99) T   tert-Butylbenzene 3.242 3.109 2.704 2.543 2.601 2.548 2.391 2.067 2.651   14.23
100) T   n-Butylbenzene    2.961 2.833 2.655 2.498 2.706 2.682 2.550 2.272 2.645    7.96
 ----------------------------------------------------------------------------
 (#) = Out of Range
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00936315

WJH 1/29/19

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S31-01221902 (2ng/L)
20ng/L Std. ID: S31-01161906
200ng/L Std. ID: S31-01161903

Dilution Factors:		5	50	250	1000	Working STD Conc.(ng/L):	4	4	20	20	200	200	200	200
	Source Std.	Primary Working Standards				Injection (L):	0.025	0.050	0.025	0.050	0.025	0.125	0.25	0.50
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	ICAL Points:	0.1ng	0.2ng	0.5ng	1ng	5ng	25ng	50ng	100ng
Propene	1.031	206.2	20.62	4.124	1.031		0.1031	0.2062	0.5155	1.031	5.155	25.775	51.55	103.1
Dichlorodifluoromethane	1.045	209.0	20.90	4.180	1.045		0.1045	0.2090	0.5225	1.045	5.225	26.125	52.25	104.5
Chloromethane	1.008	201.6	20.16	4.032	1.008		0.1008	0.2016	0.5040	1.008	5.040	25.200	50.40	100.8
Freon-114	1.028	205.6	20.56	4.112	1.028		0.1028	0.2056	0.5140	1.028	5.140	25.700	51.40	102.8
Vinyl Chloride	1.051	210.2	21.02	4.204	1.051		0.1051	0.2102	0.5255	1.051	5.255	26.275	52.55	105.1
1,3-Butadiene	1.049	209.8	20.98	4.196	1.049		0.1049	0.2098	0.5245	1.049	5.245	26.225	52.45	104.9
Bromomethane	1.009	201.8	20.18	4.036	1.009		0.1009	0.2018	0.5045	1.009	5.045	25.225	50.45	100.9
Chloroethane	1.022	204.4	20.44	4.088	1.022		0.1022	0.2044	0.5110	1.022	5.110	25.550	51.10	102.2
Ethanol	5.140	1028.0	102.80	20.560	5.140		0.5140	1.0280	2.5700	5.140	25.700	128.500	257.00	514.0
Acetonitrile	1.033	206.6	20.66	4.132	1.033		0.1033	0.2066	0.5165	1.033	5.165	25.825	51.65	103.3
Acrolein	1.028	205.6	20.56	4.112	1.028		0.1028	0.2056	0.5140	1.028	5.140	25.700	51.40	102.8
Acetone	5.370	1074.0	107.40	21.480	5.370		0.5370	1.0740	2.6850	5.370	26.850	134.250	268.50	537.0
Trichlorofluoromethane	1.060	212.0	21.20	4.240	1.060		0.1060	0.2120	0.5300	1.060	5.300	26.500	53.00	106.0
Isopropanol	2.063	412.6	41.26	8.252	2.063		0.2063	0.4126	1.0315	2.063	10.315	51.575	103.15	206.3
Acrylonitrile	1.034	206.8	20.68	4.136	1.034		0.1034	0.2068	0.5170	1.034	5.170	25.850	51.70	103.4
1,1-Dichloroethene	1.074	214.8	21.48	4.296	1.074		0.1074	0.2148	0.5370	1.074	5.370	26.850	53.70	107.4
tert-Butanol	2.144	428.8	42.88	8.576	2.144		0.2144	0.4288	1.0720	2.144	10.720	53.600	107.20	214.4
Methylene Chloride	1.070	214.0	21.40	4.280	1.070		0.1070	0.2140	0.5350	1.070	5.350	26.750	53.50	107.0
Allyl Chloride	1.067	213.4	21.34	4.268	1.067		0.1067	0.2134	0.5335	1.067	5.335	26.675	53.35	106.7
Trichlorotrifluoroethane	1.065	213.0	21.30	4.260	1.065		0.1065	0.2130	0.5325	1.065	5.325	26.625	53.25	106.5
Carbon Disulfide	1.075	215.0	21.50	4.300	1.075		0.1075	0.2150	0.5375	1.075	5.375	26.875	53.75	107.5
trans-1,2-Dichloroethene	1.062	212.4	21.24	4.248	1.062		0.1062	0.2124	0.5310	1.062	5.310	26.550	53.10	106.2
1,1-Dichloroethane	1.030	206.0	20.60	4.120	1.030		0.1030	0.2060	0.5150	1.030	5.150	25.750	51.50	103.0
Methyl tert-Butyl Ether	1.089	217.8	21.78	4.356	1.089		0.1089	0.2178	0.5445	1.089	5.445	27.225	54.45	108.9
Vinyl Acetate	5.252	1050.4	105.04	21.008	5.252		0.5252	1.0504	2.6260	5.252	26.260	131.300	262.60	525.2
2-Butanone	1.027	205.4	20.54	4.108	1.027		0.1027	0.2054	0.5135	1.027	5.135	25.675	51.35	102.7
cis-1,2-Dichloroethene	1.054	210.8	21.08	4.216	1.054		0.1054	0.2108	0.5270	1.054	5.270	26.350	52.70	105.4
Diisopropyl Ether	1.081	216.2	21.62	4.324	1.081		0.1081	0.2162	0.5405	1.081	5.405	27.025	54.05	108.1
Ethyl Acetate	2.166	433.2	43.32	8.664	2.166		0.2166	0.4332	1.0830	2.166	10.830	54.150	108.30	216.6
n-Hexane	1.082	216.4	21.64	4.328	1.082		0.1082	0.2164	0.5410	1.082	5.410	27.050	54.10	108.2
Chloroform	1.077	215.4	21.54	4.308	1.077		0.1077	0.2154	0.5385	1.077	5.385	26.925	53.85	107.7
Tetrahydrofuran	1.068	213.6	21.36	4.272	1.068		0.1068	0.2136	0.5340	1.068	5.340	26.700	53.40	106.8
Ethyl tert-Butyl Ether	1.060	212.0	21.20	4.240	1.060		0.1060	0.2120	0.5300	1.060	5.300	26.500	53.00	106.0
1,2-Dichloroethane	1.061	212.2	21.22	4.244	1.061		0.1061	0.2122	0.5305	1.061	5.305	26.525	53.05	106.1
1,1,1-Trichloroethane	1.081	216.2	21.62	4.324	1.081		0.1081	0.2162	0.5405	1.081	5.405	27.025	54.05	108.1
Isopropyl Acetate	2.066	413.2	41.32	8.264	2.066		0.2066	0.4132	1.0330	2.066	10.330	51.650	103.30	206.6
1-Butanol	2.067	413.4	41.34	8.268	2.067		0.2067	0.4134	1.0335	2.067	10.335	51.675	103.35	206.7
Benzene	1.033	206.6	20.66	4.132	1.033		0.1033	0.2066	0.5165	1.033	5.165	25.825	51.65	103.3
Carbon Tetrachloride	1.036	207.2	20.72	4.144	1.036		0.1036	0.2072	0.5180	1.036	5.180	25.900	51.80	103.6
Cyclohexane	2.087	417.4	41.74	8.348	2.087		0.2087	0.4174	1.0435	2.087	10.435	52.175	104.35	208.7
tert-Amyl Methyl Ether	1.074	214.8	21.48	4.296	1.074		0.1074	0.2148	0.5370	1.074	5.370	26.850	53.70	107.4
1,2-Dichloropropane	1.073	214.6	21.46	4.292	1.073		0.1073	0.2146	0.5365	1.073	5.365	26.825	53.65	107.3
Bromodichloromethane	1.068	213.6	21.36	4.272	1.068		0.1068	0.2136	0.5340	1.068	5.340	26.700	53.40	106.8
Trichloroethene	1.062	212.4	21.24	4.248	1.062		0.1062	0.2124	0.5310	1.062	5.310	26.550	53.10	106.2
1,4-Dioxane	1.064	212.8	21.28	4.256	1.064		0.1064	0.2128	0.5320	1.064	5.320	26.600	53.20	106.4
Isooctane	1.061	212.2	21.22	4.244	1.061		0.1061	0.2122	0.5305	1.061	5.305	26.525	53.05	106.1
Methyl Methacrylate	2.135	427.0	42.70	8.540	2.135		0.2135	0.4270	1.0675	2.135	10.675	53.375	106.75	213.5
n-Heptane	1.076	215.2	21.52	4.304	1.076		0.1076	0.2152	0.5380	1.076	5.380	26.900	53.80	107.6

00936316

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S31-01221902 (2ng/L)
20ng/L Std. ID: S31-01161906
200ng/L Std. ID: S31-01161903

Dilution Factors:		5	50	250	1000	Working STD Conc.(ng/L):	4	4	20	20	200	200	200	200
	Source Std.	Primary Working Standards				Injection (L):	0.025	0.050	0.025	0.050	0.025	0.125	0.25	0.50
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	ICAL Points:	0.1ng	0.2ng	0.5ng	1ng	5ng	25ng	50ng	100ng
cis-1,3-Dichloropropene	1.120	224.0	22.40	4.480	1.120		0.1120	0.2240	0.5600	1.120	5.600	28.000	56.00	112.0
4-Methyl-2-pentanone	1.060	212.0	21.20	4.240	1.060		0.1060	0.2120	0.5300	1.060	5.300	26.500	53.00	106.0
trans-1,3-Dichloropropene	1.055	211.0	21.10	4.220	1.055		0.1055	0.2110	0.5275	1.055	5.275	26.375	52.75	105.5
1,1,2-Trichloroethane	1.076	215.2	21.52	4.304	1.076		0.1076	0.2152	0.5380	1.076	5.380	26.900	53.80	107.6
Toluene	1.052	210.4	21.04	4.208	1.052		0.1052	0.2104	0.5260	1.052	5.260	26.300	52.60	105.2
2-Hexanone	1.074	214.8	21.48	4.296	1.074		0.1074	0.2148	0.5370	1.074	5.370	26.850	53.70	107.4
Dibromochloromethane	1.075	215.0	21.50	4.300	1.075		0.1075	0.2150	0.5375	1.075	5.375	26.875	53.75	107.5
1,2-Dibromoethane	1.076	215.2	21.52	4.304	1.076		0.1076	0.2152	0.5380	1.076	5.380	26.900	53.80	107.6
n-Butyl Acetate	1.085	217.0	21.70	4.340	1.085		0.1085	0.2170	0.5425	1.085	5.425	27.125	54.25	108.5
n-Octane	1.076	215.2	21.52	4.304	1.076		0.1076	0.2152	0.5380	1.076	5.380	26.900	53.80	107.6
Tetrachloroethene	1.058	211.6	21.16	4.232	1.058		0.1058	0.2116	0.5290	1.058	5.290	26.450	52.90	105.8
Chlorobenzene	1.066	213.2	21.32	4.264	1.066		0.1066	0.2132	0.5330	1.066	5.330	26.650	53.30	106.6
Ethylbenzene	1.033	206.6	20.66	4.132	1.033		0.1033	0.2066	0.5165	1.033	5.165	25.825	51.65	103.3
m-&p-Xylene	2.123	424.6	42.46	8.492	2.123		0.2123	0.4246	1.0615	2.123	10.615	53.075	106.15	212.3
Bromoform	1.063	212.6	21.26	4.252	1.063		0.1063	0.2126	0.5315	1.063	5.315	26.575	53.15	106.3
Styrene	1.060	212.0	21.20	4.240	1.060		0.1060	0.2120	0.5300	1.060	5.300	26.500	53.00	106.0
o-Xylene	1.062	212.4	21.24	4.248	1.062		0.1062	0.2124	0.5310	1.062	5.310	26.550	53.10	106.2
n-Nonane	1.071	214.2	21.42	4.284	1.071		0.1071	0.2142	0.5355	1.071	5.355	26.775	53.55	107.1
1,1,2,2-Tetrachloroethane	1.064	212.8	21.28	4.256	1.064		0.1064	0.2128	0.5320	1.064	5.320	26.600	53.20	106.4
Cumene	1.057	211.4	21.14	4.228	1.057		0.1057	0.2114	0.5285	1.057	5.285	26.425	52.85	105.7
alpha-Pinene	1.035	207.0	20.70	4.140	1.035		0.1035	0.2070	0.5175	1.035	5.175	25.875	51.75	103.5
n-Propylbenzene	1.076	215.2	21.52	4.304	1.076		0.1076	0.2152	0.5380	1.076	5.380	26.900	53.80	107.6
3-Ethyltoluene	1.062	212.4	21.24	4.248	1.062		0.1062	0.2124	0.5310	1.062	5.310	26.550	53.10	106.2
4-Ethyltoluene	1.061	212.2	21.22	4.244	1.061		0.1061	0.2122	0.5305	1.061	5.305	26.525	53.05	106.1
1,3,5-Trimethylbenzene	1.057	211.4	21.14	4.228	1.057		0.1057	0.2114	0.5285	1.057	5.285	26.425	52.85	105.7
alpha-Methylstyrene	1.058	211.6	21.16	4.232	1.058		0.1058	0.2116	0.5290	1.058	5.290	26.450	52.90	105.8
2-Ethyltoluene	1.072	214.4	21.44	4.288	1.072		0.1072	0.2144	0.5360	1.072	5.360	26.800	53.60	107.2
1,2,4-Trimethylbenzene	1.068	213.6	21.36	4.272	1.068		0.1068	0.2136	0.5340	1.068	5.340	26.700	53.40	106.8
n-Decane	1.076	215.2	21.52	4.304	1.076		0.1076	0.2152	0.5380	1.076	5.380	26.900	53.80	107.6
Benzyl Chloride	1.051	210.2	21.02	4.204	1.051		0.1051	0.2102	0.5255	1.051	5.255	26.275	52.55	105.1
1,3-Dichlorobenzene	1.080	216.0	21.60	4.320	1.080		0.1080	0.2160	0.5400	1.080	5.400	27.000	54.00	108.0
1,4-Dichlorobenzene	1.081	216.2	21.62	4.324	1.081		0.1081	0.2162	0.5405	1.081	5.405	27.025	54.05	108.1
sec-Butylbenzene	1.063	212.6	21.26	4.252	1.063		0.1063	0.2126	0.5315	1.063	5.315	26.575	53.15	106.3
p-Isopropyltoluene	1.042	208.4	20.84	4.168	1.042		0.1042	0.2084	0.5210	1.042	5.210	26.050	52.10	104.2
1,2,3-Trimethylbenzene	1.042	208.4	20.84	4.168	1.042		0.1042	0.2084	0.5210	1.042	5.210	26.050	52.10	104.2
1,2-Dichlorobenzene	1.089	217.8	21.78	4.356	1.089		0.1089	0.2178	0.5445	1.089	5.445	27.225	54.45	108.9
d-Limonene	1.010	202.0	20.20	4.040	1.010		0.1010	0.2020	0.5050	1.010	5.050	25.250	50.50	101.0
1,2-Dibromo-3-chloropropane	1.042	208.4	20.84	4.168	1.042		0.1042	0.2084	0.5210	1.042	5.210	26.050	52.10	104.2
n-Undecane	1.057	211.4	21.14	4.228	1.057		0.1057	0.2114	0.5285	1.057	5.285	26.425	52.85	105.7
1,2,4-Trichlorobenzene	1.064	212.8	21.28	4.256	1.064		0.1064	0.2128	0.5320	1.064	5.320	26.600	53.20	106.4
Naphthalene	1.025	205.0	20.50	4.100	1.025		0.1025	0.2050	0.5125	1.025	5.125	25.625	51.25	102.5
n-Dodecane	1.031	206.2	20.62	4.124	1.031		0.1031	0.2062	0.5155	1.031	5.155	25.775	51.55	103.1
Hexachloro-1,3-butadiene	1.053	210.6	21.06	4.212	1.053		0.1053	0.2106	0.5265	1.053	5.265	26.325	52.65	105.3
Methacrylonitrile	1.041	208.2	20.82	4.164	1.041		0.1041	0.2082	0.5205	1.041	5.205	26.025	52.05	104.1
Cyclohexanone	0.982	196.4	19.64	3.928	0.982		0.0982	0.1964	0.4910	0.982	4.910	24.550	49.10	98.2
tert-Butylbenzene	1.067	213.4	21.34	4.268	1.067		0.1067	0.2134	0.5335	1.067	5.335	26.675	53.35	106.7
n-Butylbenzene	1.064	212.8	21.28	4.256	1.064		0.1064	0.2128	0.5320	1.064	5.320	26.600	53.20	106.4

00936317

Method   : I:\MS13\METHODS\R13012319.M (RTE Integrator)
Title   : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.1	0	13	I:\MS13\DATA\2019_01\23\01231906.D
2	0.2	0	13	I:\MS13\DATA\2019_01\23\01231907.D
3	0.5	1	13	I:\MS13\DATA\2019_01\23\01231904.D
4	1.0	1	13	I:\MS13\DATA\2019_01\23\01231905.D
5	5.0	5	13	I:\MS13\DATA\2019_01\23\01231908.D
6	25	26	13	I:\MS13\DATA\2019_01\23\01231909.D
7	50	52	13	I:\MS13\DATA\2019_01\23\01231910.D
8	100	103	13	I:\MS13\DATA\2019_01\23\01231911.D

WOA 1/23/19

#	ID	Update Time	Quant Time	Acquisition Time
1	0.1	Jan 23 11:19 2019	Jan 23 10:33 2019	23 Jan 2019 8:07
2	0.2	Jan 23 11:20 2019	Jan 23 10:34 2019	23 Jan 2019 8:40
3	0.5	Jan 23 11:20 2019	Jan 23 10:31 2019	23 Jan 2019 6:01
4	1.0	Jan 23 11:20 2019	Jan 23 10:39 2019	23 Jan 2019 6:35
5	5.0	Jan 23 11:20 2019	Jan 23 10:31 2019	23 Jan 2019 9:13
6	25	Jan 23 11:21 2019	Jan 23 10:31 2019	23 Jan 2019 9:46
7	50	Jan 23 11:21 2019	Jan 23 10:54 2019	23 Jan 2019 10:20
8	100	Jan 23 11:21 2019	Jan 23 11:18 2019	23 Jan 2019 10:53

R13012319.M   Wed Jan 23 13:58:22 2019

00936318

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Data File : I:\MS13\DATA\2019_01\23\01231906.D          Vial: 14
Acq On    : 23 Jan 2019   8:07                      Operator: WA
Sample    : 0.1ng TO-15 ICAL Std                    Inst    : MS13
Misc      : S31-01231908/S31-01221902 (2/20)

Quant Time: Jan 23 10:33:34 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
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WA 1/23/19

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	10.96	130	133128	12.500 ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.09	114	584644	12.500 ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.42	82	230658	12.500 ng	0.00

System Monitoring Compounds

33) 1,2-Dichloroethane-d4(...	11.81	65	142619	12.206 ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.68%		
57) Toluene-d8 (SS2)	15.54	98	624855	13.133 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 105.04%		
73) Bromofluorobenzene (SS3)	18.83	174	219273	11.184 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 89.44%		

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
2) Propene	4.04	42	1193	0.095 ng		89
3) Dichlorodifluoromethan...	4.18	85	2013	0.090 ng	#	92
4) Chloromethane	4.47	50	1467	0.086 ng		80
5) 1,2-Dichloro-1,1,2,2-t...	4.70	135	1241	0.087 ng		86
6) Vinyl Chloride	4.88	62	1293	0.078 ng		69
7) 1,3-Butadiene	5.12	54	937	0.077 ng		94
8) Bromomethane	5.55	94	1047	0.091 ng		92
9) Chloroethane	0.00	64	0	N.D. d		
10) Ethanol	6.24	45	4985	0.593 ng		79
11) Acetonitrile	6.60	41	970	0.046 ng	#	42
12) Acrolein	0.00	56	0	N.D.		
13) Acetone	6.90	58	5619	0.595 ng	#	83
14) Trichlorofluoromethane	7.09	101	1782	0.095 ng		96
15) 2-Propanol (Isopropanol)	7.44	45	5253	0.186 ng		85
16) Acrylonitrile	0.00	53	0	N.D.		
17) 1,1-Dichloroethene	8.03	96	1048	0.084 ng		99
18) 2-Methyl-2-Propanol (t...	8.32	59	4924	0.173 ng	#	77
19) Methylene Chloride	8.25	84	927	0.074 ng		100
20) 3-Chloro-1-propene (Al...	8.42	41	1307	0.082 ng	#	54
21) Trichlorotrifluoroethane	8.67	151	1225	0.093 ng		98
22) Carbon Disulfide	8.53	76	7486	0.162 ng		79
23) trans-1,2-Dichloroethene	9.53	61	902	0.061 ng		99
24) 1,1-Dichloroethane	9.76	63	1815	0.088 ng		83
25) Methyl tert-Butyl Ether	9.97	73	3229	0.091 ng		89
26) Vinyl Acetate	10.07	86	465	0.156 ng	#	1
27) 2-Butanone (MEK)	0.00	72	0	N.D.		
28) cis-1,2-Dichloroethene	10.79	61	1100	0.072 ng		79
29) Diisopropyl Ether	11.14	87	953	0.078 ng	#	51
30) Ethyl Acetate	11.17	61	189	0.047 ng	#	11
31) n-Hexane	11.08	57	1972	0.098 ng	#	100
32) Chloroform	11.13	83	1805	0.092 ng		96
34) Tetrahydrofuran (THF)	11.64	72	846	0.095 ng	#	87
35) Ethyl tert-Butyl Ether	11.74	87	1302	0.087 ng		94
36) 1,2-Dichloroethane	11.94	62	991	0.079 ng	#	42
38) 1,1,1-Trichloroethane	12.21	97	1576	0.092 ng		94
39) Isopropyl Acetate	12.69	61	1511	0.191 ng	#	68
40) 1-Butanol	12.75	56	2184	0.199 ng		87
41) Benzene	12.70	78	5663	0.107 ng		93
42) Carbon Tetrachloride	12.85	117	1323	0.085 ng		97
43) Cyclohexane	12.99	84	4162	0.200 ng		92
44) tert-Amyl Methyl Ether	13.37	73	3404	0.098 ng		89
45) 1,2-Dichloropropane	13.55	63	1158	0.095 ng		90
46) Bromodichloromethane	13.74	83	1295	0.088 ng		94
47) Trichloroethene	13.80	130	1371	0.090 ng		100
48) 1,4-Dioxane	13.84	88	865	0.081 ng	#	66
49) 2,2,4-Trimethylpentane...	13.86	57	5519	0.104 ng		87
50) Methyl Methacrylate	14.03	100	656	0.123 ng	#	55

00936319

Data File : I:\MS13\DATA\2019_01\23\01231906.D Vial: 14
Acq On : 23 Jan 2019 8:07 Operator: WA
Sample : 0.1ng TO-15 ICAL Std Inst : MS13
Misc : S31-01231908/S31-01221902 (2/20)

Quant Time: Jan 23 10:33:34 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

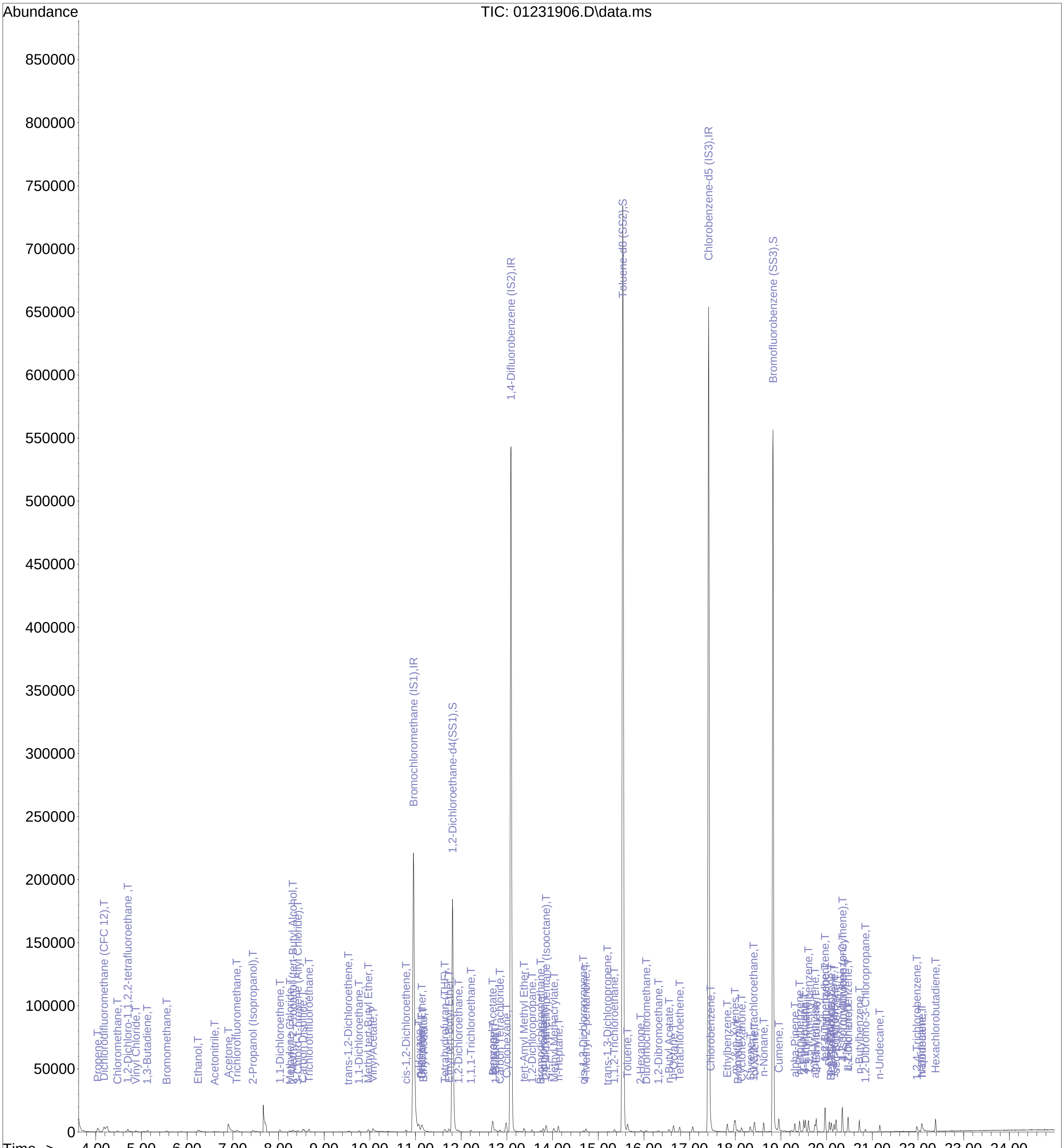
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
51) n-Heptane	14.13	71	1274	0.098 ng		96
52) cis-1,3-Dichloropropene	14.67	75	1281	0.068 ng		76
53) 4-Methyl-2-pentanone	14.73	58	940	0.085 ng		80
54) trans-1,3-Dichloropropene	15.20	75	438	0.027 ng	#	43
55) 1,1,2-Trichloroethane	15.35	97	1066	0.085 ng		98
58) Toluene	15.64	91	6928	0.129 ng		88
59) 2-Hexanone	15.92	43	2014	0.093 ng		91
60) Dibromochloromethane	16.05	129	1124	0.083 ng		94
61) 1,2-Dibromoethane	16.32	107	993	0.080 ng		97
62) n-Butyl Acetate	16.55	43	2705	0.108 ng		88
63) n-Octane	16.65	57	1269	0.128 ng	#	78
64) Tetrachloroethene	16.78	166	1755	0.104 ng		96
65) Chlorobenzene	17.46	112	4129	0.114 ng		97
66) Ethylbenzene	17.83	91	6617	0.113 ng		96
67) m- & p-Xylenes	18.00	91	11376	0.254 ng		92
68) Bromoform	18.06	173	1000	0.076 ng		79
69) Styrene	18.33	104	3393	0.096 ng		96
70) o-Xylene	18.42	91	5517	0.123 ng		98
71) n-Nonane	18.62	43	2562	0.114 ng		99
72) 1,1,2,2-Tetrachloroethane	18.40	83	2260	0.105 ng		100
74) Cumene	18.95	105	7878	0.129 ng		99
75) alpha-Pinene	19.30	93	3024	0.102 ng		98
76) n-Propylbenzene	19.41	91	8556	0.123 ng		97
77) 3-Ethyltoluene	19.50	105	6650	0.111 ng		98
78) 4-Ethyltoluene	19.54	105	7480	0.129 ng		99
79) 1,3,5-Trimethylbenzene	19.60	105	6926	0.136 ng		92
80) alpha-Methylstyrene	19.74	118	2418	0.096 ng	#	83
81) 2-Ethyltoluene	19.77	105	8049	0.133 ng		95
82) 1,2,4-Trimethylbenzene	19.96	105	6501	0.132 ng		97
83) n-Decane	20.06	57	2832	0.116 ng		96
84) Benzyl Chloride	20.09	91	2863	0.079 ng		80
85) 1,3-Dichlorobenzene	20.10	146	3631	0.116 ng		99
86) 1,4-Dichlorobenzene	20.16	146	4078	0.125 ng		95
87) sec-Butylbenzene	20.20	105	8586	0.124 ng		98
88) 4-Isopropyltoluene (p-...	20.35	119	7620	0.117 ng		96
89) 1,2,3-Trimethylbenzene	20.35	105	5820	0.117 ng		97
90) 1,2-Dichlorobenzene	20.47	146	3749	0.122 ng		95
91) d-Limonene	20.47	68	1717	0.098 ng		99
92) 1,2-Dibromo-3-Chloropr...	20.85	157	1130	0.103 ng		88
93) n-Undecane	21.16	57	2158	0.097 ng		94
94) 1,2,4-Trichlorobenzene	21.97	180	2805	0.131 ng	#	94
95) Naphthalene	22.08	128	11176	0.191 ng		82
96) n-Dodecane	22.09	57	1465	0.076 ng		81
97) Hexachlorobutadiene	22.38	225	2453	0.148 ng		94
98) Cyclohexanone	18.14	55	1831	0.108 ng		90
99) tert-Butylbenzene	19.96	119	6384	0.125 ng		100
100) n-Butylbenzene	20.72	91	5814	0.115 ng		99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

00936320

```
Data File : I:\MS13\DATA\2019_01\23\01231906.D          Vial: 14
Acq On    : 23 Jan 2019   8:07                        Operator: WA
Sample    : 0.1ng TO-15 ICAL Std                      Inst    : MS13
Misc      : S31-01231908/S31-01221902 (2/20)

Quant Time: Jan 23 10:33:34 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```



00936321

Data File : I:\MS13\DATA\2019_01\23\01231907.D Vial: 14
Acq On : 23 Jan 2019 8:40 Operator: WA
Sample : 0.2ng TO-15 ICAL Std Inst : MS13
Misc : S31-01231908/S31-01221902 (2/20)

Quant Time: Jan 23 10:34:52 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 1/23/19

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	10.96	130	127975	12.500 ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.09	114	556534	12.500 ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.42	82	222857	12.500 ng	0.00

System Monitoring Compounds

	R.T.	QIon	Response	Conc Units	Dev(Min)
33) 1,2-Dichloroethane-d4(...	11.82	65	137251	12.219 ng	-0.01
Spiked Amount 12.500 Range 70 - 130 Recovery = 97.76%					
57) Toluene-d8 (SS2)	15.54	98	594339	12.929 ng	0.00
Spiked Amount 12.500 Range 70 - 130 Recovery = 103.44%					
73) Bromofluorobenzene (SS3)	18.83	174	212177	11.201 ng	0.00
Spiked Amount 12.500 Range 70 - 130 Recovery = 89.60%					

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
2) Propene	4.02	42	2166	0.180 ng		89
3) Dichlorodifluoromethan...	4.17	85	4073	0.190 ng	#	96
4) Chloromethane	4.46	50	2677	0.163 ng		88
5) 1,2-Dichloro-1,1,2,2-t...	4.69	135	2540	0.184 ng		92
6) Vinyl Chloride	4.86	62	2541	0.159 ng		93
7) 1,3-Butadiene	5.12	54	1645	0.141 ng		95
8) Bromomethane	5.54	94	1852	0.168 ng		91
9) Chloroethane	5.86	64	1383	0.159 ng		87
10) Ethanol	6.22	45	7199	0.892 ng		86
11) Acetonitrile	6.52	41	2519	0.125 ng		90
12) Acrolein	0.00	56	0	N.D. d		
13) Acetone	6.88	58	9332	1.028 ng		87
14) Trichlorofluoromethane	7.09	101	3329	0.185 ng		96
15) 2-Propanol (Isopropanol)	7.40	45	10035	0.370 ng		92
16) Acrylonitrile	0.00	53	0	N.D.		
17) 1,1-Dichloroethene	8.04	96	2122	0.176 ng		86
18) 2-Methyl-2-Propanol (t...	8.28	59	10027	0.367 ng		87
19) Methylene Chloride	8.25	84	1827	0.152 ng		91
20) 3-Chloro-1-propene (Al...	8.41	41	2691	0.176 ng		72
21) Trichlorotrifluoroethane	8.67	151	2342	0.185 ng		96
22) Carbon Disulfide	8.53	76	10196	0.229 ng		92
23) trans-1,2-Dichloroethene	9.54	61	1977	0.140 ng		85
24) 1,1-Dichloroethane	9.76	63	3636	0.184 ng		95
25) Methyl tert-Butyl Ether	9.94	73	6568	0.192 ng		96
26) Vinyl Acetate	10.06	86	1473	0.514 ng	#	1
27) 2-Butanone (MEK)	10.38	72	624	0.077 ng	#	1
28) cis-1,2-Dichloroethene	10.79	61	2471	0.169 ng		90
29) Diisopropyl Ether	11.13	87	2229	0.191 ng		94
30) Ethyl Acetate	11.14	61	994	0.256 ng		96
31) n-Hexane	11.08	57	3998	0.207 ng	#	100
32) Chloroform	11.13	83	3368	0.179 ng		95
34) Tetrahydrofuran (THF)	11.63	72	1591	0.187 ng	#	84
35) Ethyl tert-Butyl Ether	11.72	87	2584	0.180 ng		93
36) 1,2-Dichloroethane	11.94	62	2108	0.175 ng		88
38) 1,1,1-Trichloroethane	12.21	97	3203	0.197 ng		91
39) Isopropyl Acetate	12.68	61	3060	0.407 ng		95
40) 1-Butanol	12.74	56	3053	0.292 ng		99
41) Benzene	12.70	78	9863	0.196 ng		98
42) Carbon Tetrachloride	12.85	117	2651	0.178 ng		100
43) Cyclohexane	12.99	84	7799	0.394 ng		98
44) tert-Amyl Methyl Ether	13.37	73	6226	0.188 ng		97
45) 1,2-Dichloropropane	13.55	63	2196	0.189 ng		96
46) Bromodichloromethane	13.74	83	2497	0.177 ng		98
47) Trichloroethene	13.80	130	2785	0.191 ng		96
48) 1,4-Dioxane	13.82	88	1983	0.196 ng		78
49) 2,2,4-Trimethylpentane...	13.86	57	10156	0.201 ng		89
50) Methyl Methacrylate	14.02	100	1574	0.310 ng		92

00936322

Data File : I:\MS13\DATA\2019_01\23\01231907.D   Vial: 14
Acq On   : 23 Jan 2019   8:40   Operator: WA
Sample   : 0.2ng TO-15 ICAL Std   Inst   : MS13
Misc   : S31-01231908/S31-01221902 (2/20)

Quant Time: Jan 23 10:34:52 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.13	71	2430	0.197 ng	100
52) cis-1,3-Dichloropropene	14.67	75	2723	0.151 ng	95
53) 4-Methyl-2-pentanone	14.73	58	1867	0.178 ng	93
54) trans-1,3-Dichloropropene	15.21	75	1375	0.091 ng	74
55) 1,1,2-Trichloroethane	15.36	97	2184	0.182 ng	99
58) Toluene	15.64	91	11456	0.221 ng	98
59) 2-Hexanone	15.92	43	3767	0.180 ng	97
60) Dibromochloromethane	16.06	129	2339	0.179 ng	93
61) 1,2-Dibromoethane	16.31	107	2077	0.172 ng	98
62) n-Butyl Acetate	16.54	43	4757	0.197 ng	95
63) n-Octane	16.65	57	2019	0.210 ng	97
64) Tetrachloroethene	16.78	166	3229	0.198 ng	94
65) Chlorobenzene	17.46	112	7527	0.215 ng	97
66) Ethylbenzene	17.83	91	11792	0.209 ng	96
67) m- & p-Xylenes	18.00	91	18801	0.434 ng	99
68) Bromoform	18.05	173	1957	0.155 ng	88
69) Styrene	18.33	104	6533	0.192 ng	93
70) o-Xylene	18.42	91	9354	0.215 ng	98
71) n-Nonane	18.62	43	5123	0.237 ng	95
72) 1,1,2,2-Tetrachloroethane	18.41	83	4209	0.202 ng	97
74) Cumene	18.95	105	13483	0.228 ng	99
75) alpha-Pinene	19.30	93	6149	0.214 ng	98
76) n-Propylbenzene	19.41	91	15052	0.224 ng	96
77) 3-Ethyltoluene	19.50	105	12352	0.214 ng	98
78) 4-Ethyltoluene	19.54	105	12780	0.228 ng	99
79) 1,3,5-Trimethylbenzene	19.61	105	11386	0.232 ng	99
80) alpha-Methylstyrene	19.74	118	4544	0.187 ng	82
81) 2-Ethyltoluene	19.77	105	13219	0.226 ng	99
82) 1,2,4-Trimethylbenzene	19.96	105	10564	0.222 ng	96
83) n-Decane	20.06	57	5512	0.235 ng	96
84) Benzyl Chloride	20.08	91	4457	0.128 ng	93
85) 1,3-Dichlorobenzene	20.11	146	6246	0.206 ng	99
86) 1,4-Dichlorobenzene	20.16	146	6614	0.209 ng	99
87) sec-Butylbenzene	20.20	105	15852	0.236 ng	97
88) 4-Isopropyltoluene (p-...	20.35	119	14524	0.230 ng	98
89) 1,2,3-Trimethylbenzene	20.34	105	10612	0.221 ng	95
90) 1,2-Dichlorobenzene	20.47	146	6325	0.213 ng	98
91) d-Limonene	20.47	68	3584	0.213 ng	92
92) 1,2-Dibromo-3-Chloropr...	20.85	157	1852	0.174 ng	92
93) n-Undecane	21.16	57	4003	0.187 ng	97
94) 1,2,4-Trichlorobenzene	21.97	180	3412	0.164 ng	97
95) Naphthalene	22.08	128	8545	0.151 ng	85
96) n-Dodecane	22.08	57	1808	0.097 ng	85
97) Hexachlorobutadiene	22.38	225	3681	0.230 ng	99
98) Cyclohexanone	18.14	55	3011	0.183 ng	95
99) tert-Butylbenzene	19.96	119	11829	0.240 ng	98
100) n-Butylbenzene	20.72	91	10747	0.219 ng	97

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

00936323

```
Data File : I:\MS13\DATA\2019_01\23\01231907.D          Vial: 14
Acq On    : 23 Jan 2019   8:40                       Operator: WA
Sample    : 0.2ng TO-15 ICAL Std                     Inst    : MS13
Misc      : S31-01231908/S31-01221902 (2/20)

Quant Time: Jan 23 10:34:52 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
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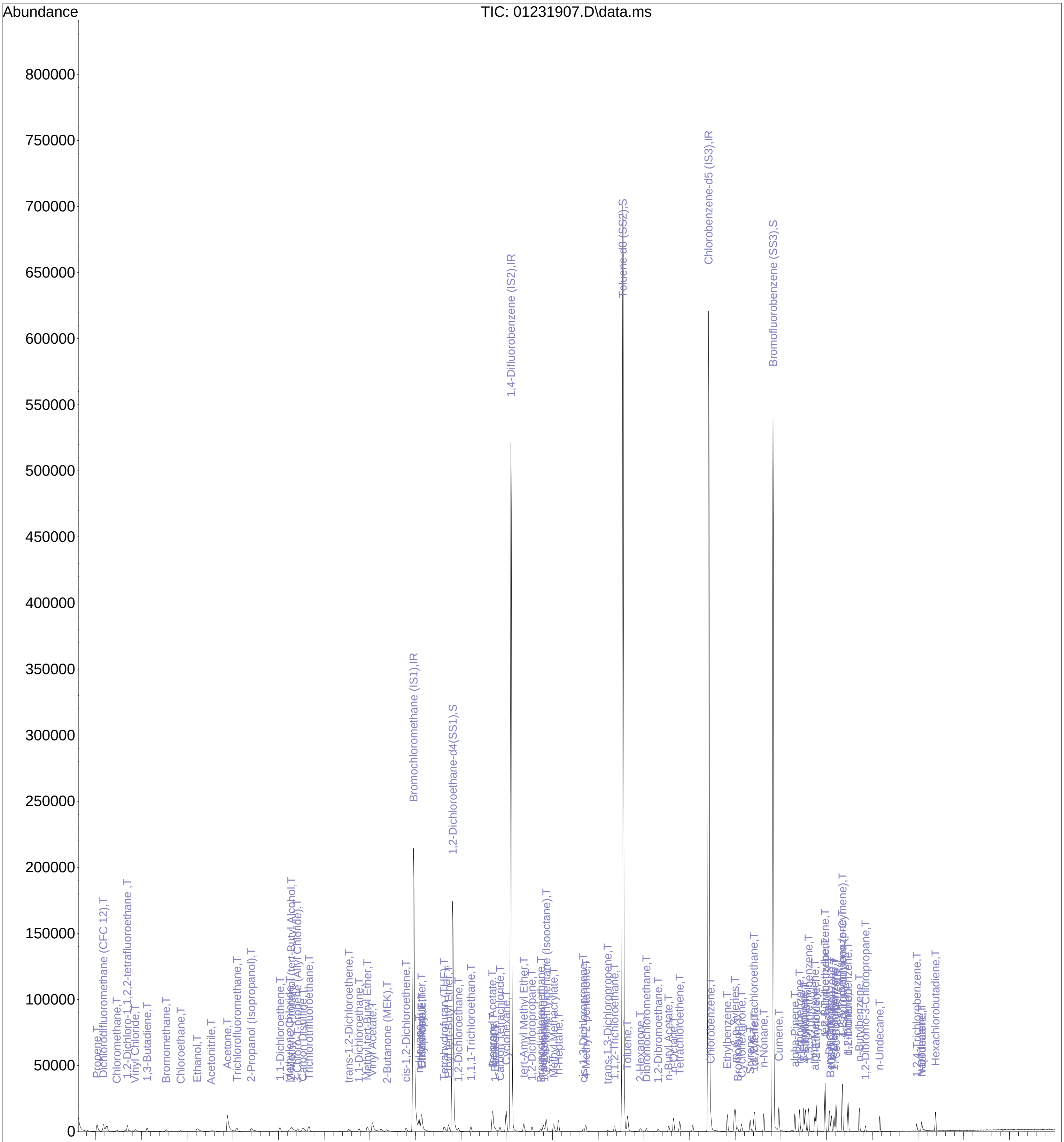

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Data File : I:\MS13\DATA\2019_01\23\01231904.D          Vial: 15
Acq On    : 23 Jan 2019   6:01                       Operator: WA
Sample    : 0.5ng R13012319 ICAL Std                 Inst    : MS13
Misc      : S31-01231908/S31-01161906 (2/14)

Quant Time: Jan 23 10:31:37 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

WA 1/23/19

```
 Internal Standards                R.T. QIon  Response  Conc Units Dev(Min)
----------------------------------------------------------------------------
  1) Bromochloromethane (IS1)    10.96  130   131127   12.500 ng     -0.02
 37) 1,4-Difluorobenzene (IS2)   13.09  114   573396   12.500 ng     -0.01
 56) Chlorobenzene-d5 (IS3)      17.42   82   228390   12.500 ng      0.00

 System Monitoring Compounds
 33) 1,2-Dichloroethane-d4(...   11.82   65   141581   12.302 ng     -0.01
  Spiked Amount     12.500   Range  70 - 130    Recovery   =   98.40%
 57) Toluene-d8 (SS2)            15.54   98   613470   13.022 ng      0.00
  Spiked Amount     12.500   Range  70 - 130    Recovery   =  104.16%
 73) Bromofluorobenzene (SS3)    18.83  174   220128   11.339 ng      0.00
  Spiked Amount     12.500   Range  70 - 130    Recovery   =   90.72%

 Target Compounds                                                    Qvalue
  2) Propene                      4.02   42     6188    0.502 ng         95
  3) Dichlorodifluoromethan...    4.16   85    10871    0.494 ng         98
  4) Chloromethane                4.45   50     9013    0.535 ng         93
  5) 1,2-Dichloro-1,1,2,2-t...    4.68  135     6979    0.495 ng         97
  6) Vinyl Chloride               4.85   62     8493    0.518 ng         94
  7) 1,3-Butadiene                5.11   54     6048    0.504 ng         91
  8) Bromomethane                 5.53   94     5409    0.478 ng         96
  9) Chloroethane                 5.85   64     4318    0.486 ng         97
 10) Ethanol                      6.19   45    21756    2.630 ng         98
 11) Acetonitrile                 6.55   41     9317    0.452 ng         94
 12) Acrolein                     6.69   56     2575    0.364 ng   #     69
 13) Acetone                      6.86   58    23437    2.519 ng         85
 14) Trichlorofluoromethane       7.09  101     9377    0.508 ng         98
 15) 2-Propanol (Isopropanol)     7.36   45    28011    1.008 ng        100
 16) Acrylonitrile                7.66   53     3291    0.250 ng         89
 17) 1,1-Dichloroethene           8.03   96     6206    0.504 ng         86
 18) 2-Methyl-2-Propanol (t...    8.24   59    28382    1.015 ng         93
 19) Methylene Chloride           8.25   84     5865    0.478 ng         99
 20) 3-Chloro-1-propene (Al...    8.41   41     7627    0.487 ng         88
 21) Trichlorotrifluoroethane     8.67  151     6625    0.510 ng         97
 22) Carbon Disulfide             8.53   76    25443    0.557 ng         97
 23) trans-1,2-Dichloroethene     9.53   61     7120    0.491 ng         96
 24) 1,1-Dichloroethane           9.76   63     9802    0.483 ng        100
 25) Methyl tert-Butyl Ether      9.92   73    18137    0.519 ng         98
 26) Vinyl Acetate               10.04   86     6248    2.129 ng   #     73
 27) 2-Butanone (MEK)            10.33   72     3527    0.423 ng         93
 28) cis-1,2-Dichloroethene      10.79   61     7706    0.514 ng         94
 29) Diisopropyl Ether           11.12   87     6258    0.523 ng   #     94
 30) Ethyl Acetate               11.13   61     4017    1.010 ng         99
 31) n-Hexane                    11.08   57    10750    0.542 ng   #    100
 32) Chloroform                  11.13   83     9799    0.507 ng         97
 34) Tetrahydrofuran (THF)       11.60   72     4287    0.491 ng         92
 35) Ethyl tert-Butyl Ether      11.71   87     7410    0.505 ng         98
 36) 1,2-Dichloroethane          11.94   62     6063    0.490 ng        100
 38) 1,1,1-Trichloroethane       12.21   97     8450    0.505 ng         95
 39) Isopropyl Acetate           12.67   61     8208    1.061 ng   #     86
 40) 1-Butanol                   12.72   56    10664    0.990 ng         96
 41) Benzene                     12.69   78    25778    0.498 ng         98
 42) Carbon Tetrachloride        12.85  117     7473    0.488 ng         99
 43) Cyclohexane                 12.98   84    20992    1.030 ng         96
 44) tert-Amyl Methyl Ether      13.36   73    17772    0.520 ng         97
 45) 1,2-Dichloropropane         13.55   63     6221    0.519 ng         97
 46) Bromodichloromethane        13.74   83     7128    0.491 ng        100
 47) Trichloroethene             13.80  130     7746    0.516 ng         96
 48) 1,4-Dioxane                 13.81   88     5254    0.503 ng         97
 49) 2,2,4-Trimethylpentane...   13.86   57    27384    0.526 ng         88
 50) Methyl Methacrylate         14.02  100     5039    0.962 ng         94
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00936325

Data File : I:\MS13\DATA\2019_01\23\01231904.D Vial: 15
Acq On : 23 Jan 2019 6:01 Operator: WA
Sample : 0.5ng R13012319 ICAL Std Inst : MS13
Misc : S31-01231908/S31-01161906 (2/14)

Quant Time: Jan 23 10:31:37 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

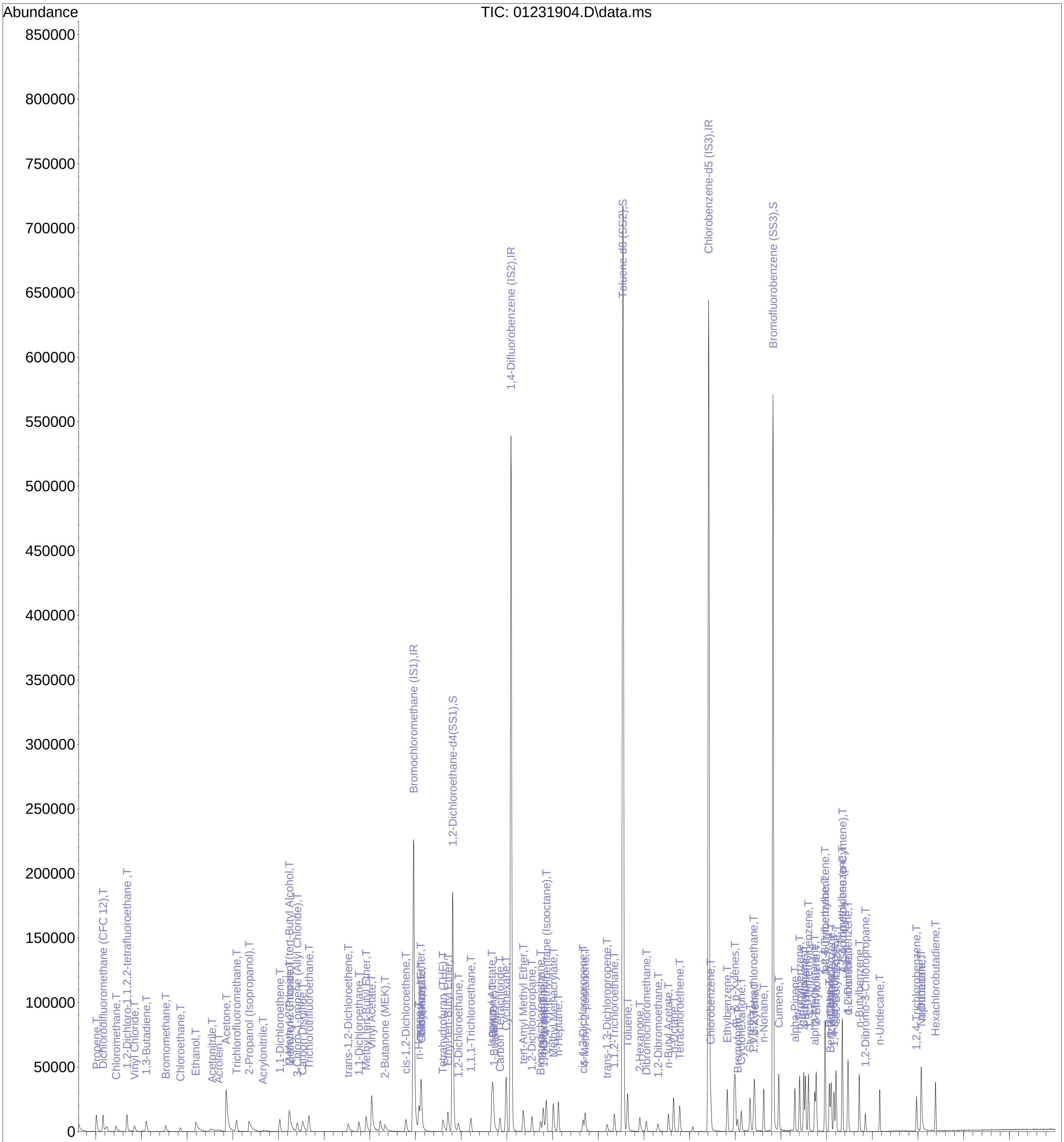
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.13	71	6608	0.519 ng	97
52) cis-1,3-Dichloropropene	14.67	75	9016	0.485 ng	98
53) 4-Methyl-2-pentanone	14.71	58	5334	0.495 ng	94
54) trans-1,3-Dichloropropene	15.19	75	6421	0.410 ng	89
55) 1,1,2-Trichloroethane	15.35	97	6286	0.510 ng	96
58) Toluene	15.65	91	29958	0.563 ng	94
59) 2-Hexanone	15.91	43	11552	0.540 ng	99
60) Dibromochloromethane	16.06	129	6694	0.500 ng	98
61) 1,2-Dibromoethane	16.31	107	6547	0.530 ng	98
62) n-Butyl Acetate	16.53	43	13162	0.533 ng	97
63) n-Octane	16.65	57	5295	0.538 ng	98
64) Tetrachloroethene	16.78	166	8693	0.520 ng	97
65) Chlorobenzene	17.46	112	18999	0.529 ng	100
66) Ethylbenzene	17.82	91	30091	0.520 ng	96
67) m- & p-Xylenes	17.99	91	47400	1.068 ng	100
68) Bromoform	18.05	173	5699	0.439 ng	96
69) Styrene	18.32	104	17838	0.510 ng	95
70) o-Xylene	18.42	91	24248	0.545 ng	100
71) n-Nonane	18.62	43	11903	0.536 ng	96
72) 1,1,2,2-Tetrachloroethane	18.40	83	10891	0.510 ng	99
74) Cumene	18.95	105	31404	0.518 ng	97
75) alpha-Pinene	19.30	93	14253	0.484 ng	96
76) n-Propylbenzene	19.41	91	36823	0.535 ng	98
77) 3-Ethyltoluene	19.50	105	29671	0.501 ng	97
78) 4-Ethyltoluene	19.54	105	29904	0.521 ng	97
79) 1,3,5-Trimethylbenzene	19.60	105	25536	0.507 ng	96
80) alpha-Methylstyrene	19.74	118	11519	0.461 ng	86
81) 2-Ethyltoluene	19.77	105	33268	0.554 ng	97
82) 1,2,4-Trimethylbenzene	19.96	105	26360	0.540 ng	98
83) n-Decane	20.06	57	12669	0.526 ng	97
84) Benzyl Chloride	20.08	91	15479	0.434 ng	92
85) 1,3-Dichlorobenzene	20.10	146	16227	0.521 ng	98
86) 1,4-Dichlorobenzene	20.16	146	17542	0.542 ng	99
87) sec-Butylbenzene	20.20	105	35482	0.516 ng	98
88) 4-Isopropyltoluene (p-...	20.35	119	33120	0.512 ng	99
89) 1,2,3-Trimethylbenzene	20.34	105	24606	0.500 ng	96
90) 1,2-Dichlorobenzene	20.47	146	16347	0.537 ng	100
91) d-Limonene	20.47	68	7596	0.440 ng	96
92) 1,2-Dibromo-3-Chloropr...	20.85	157	5415	0.497 ng	92
93) n-Undecane	21.17	57	10484	0.478 ng	97
94) 1,2,4-Trichlorobenzene	21.97	180	12589	0.592 ng	98
95) Naphthalene	22.08	128	34258	0.592 ng	96
96) n-Dodecane	22.07	57	10916	0.574 ng	94
97) Hexachlorobutadiene	22.38	225	8594	0.523 ng	99
98) Cyclohexanone	18.13	55	8038	0.477 ng	95
99) tert-Butylbenzene	19.96	119	26354	0.522 ng	99
100) n-Butylbenzene	20.72	91	25806	0.514 ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report   (QT Reviewed)

Data File : I:\MS13\DATA\2019_01\23\01231904.D   Vial: 15
Acq On   : 23 Jan 2019   6:01   Operator: WA
Sample   : 0.5ng R13012319 ICAL Std   Inst   : MS13
Misc   : S31-01231908/S31-01161906 (2/14)

Quant Time: Jan 23 10:31:37 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

00936327

Data File : I:\MS13\DATA\2019_01\23\01231905.D Vial: 15
Acq On : 23 Jan 2019 6:35 Operator: WA
Sample : 1.0ng R13012319 ICAL Std Inst : MS13
Misc : S31-01231908/S31-01161906 (2/14)

Quant Time: Jan 23 10:39:30 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 1/23/19

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	10.96	130	131496	12.500 ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.09	114	571699	12.500 ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.42	82	228613	12.500 ng	0.00

System Monitoring Compounds

	R.T.	QIon	Response	Conc Units	Dev(Min)
33) 1,2-Dichloroethane-d4(...	11.82	65	141593	12.268 ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.16%		
57) Toluene-d8 (SS2)	15.54	98	613490	13.010 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.08%		
73) Bromofluorobenzene (SS3)	18.83	174	220895	11.367 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 90.96%		

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
2) Propene	4.01	42	11670	0.945 ng		93
3) Dichlorodifluorometh an...	4.16	85	21192	0.961 ng		99
4) Chloromethane	4.43	50	15705	0.929 ng		98
5) 1,2-Dichloro-1,1,2,2-t...	4.68	135	13367	0.945 ng		98
6) Vinyl Chloride	4.84	62	15750	0.958 ng		99
7) 1,3-Butadiene	5.09	54	11730	0.975 ng		95
8) Bromomethane	5.52	94	10617	0.936 ng		98
9) Chloroethane	5.85	64	8417	0.945 ng		94
10) Ethanol	6.18	45	39097	4.712 ng		99
11) Acetonitrile	6.49	41	17982	0.871 ng		98
12) Acrolein	6.66	56	6251	0.880 ng		84
13) Acetone	6.84	58	44350	4.754 ng	#	83
14) Trichlorofluoromethane	7.08	101	17946	0.969 ng		99
15) 2-Propanol (Isopropanol)	7.34	45	53344	1.914 ng		99
16) Acrylonitrile	7.63	53	10218	0.774 ng		95
17) 1,1-Dichloroethene	8.03	96	11968	0.968 ng		86
18) 2-Methyl-2-Propanol (t...	8.21	59	55574	1.981 ng		95
19) Methylene Chloride	8.24	84	11720	0.952 ng		97
20) 3-Chloro-1-propene (Al...	8.41	41	14670	0.934 ng		92
21) Trichlorotrifluoroethane	8.67	151	12451	0.955 ng		96
22) Carbon Disulfide	8.53	76	47691	1.042 ng		98
23) trans-1,2-Dichloroethene	9.52	61	14596	1.004 ng		97
24) 1,1-Dichloroethane	9.77	63	19304	0.949 ng		98
25) Methyl tert-Butyl Ether	9.91	73	34852	0.994 ng		100
26) Vinyl Acetate	10.04	86	13368	4.543 ng	#	83
27) 2-Butanone (MEK)	10.31	72	7298	0.873 ng	#	85
28) cis-1,2-Dichloroethene	10.79	61	14491	0.964 ng		94
29) Diisopropyl Ether	11.11	87	12277	1.023 ng	#	71
30) Ethyl Acetate	11.12	61	8220	2.061 ng		97
31) n-Hexane	11.08	57	20050	1.009 ng	#	100
32) Chloroform	11.13	83	18816	0.971 ng		97
34) Tetrahydrofuran (THF)	11.59	72	8419	0.961 ng		91
35) Ethyl tert-Butyl Ether	11.70	87	14886	1.011 ng		96
36) 1,2-Dichloroethane	11.93	62	11902	0.960 ng		99
38) 1,1,1-Trichloroethane	12.21	97	16351	0.980 ng		97
39) Isopropyl Acetate	12.67	61	15466	2.004 ng	#	91
40) 1-Butanol	12.70	56	19560	1.822 ng	#	63
41) Benzene	12.70	78	49801	0.965 ng		98
42) Carbon Tetrachloride	12.85	117	14697	0.962 ng		98
43) Cyclohexane	12.99	84	39673	1.952 ng		96
44) tert-Amyl Methyl Ether	13.35	73	33347	0.979 ng		98
45) 1,2-Dichloropropane	13.55	63	11849	0.992 ng		99
46) Bromodichloromethane	13.74	83	13766	0.951 ng		98
47) Trichloroethene	13.80	130	14446	0.965 ng		99
48) 1,4-Dioxane	13.80	88	10388	0.998 ng		98
49) 2,2,4-Trimethylpentane...	13.86	57	49978	0.963 ng		89
50) Methyl Methacrylate	14.01	100	10158	1.945 ng		99

00936328

Data File : I:\MS13\DATA\2019_01\23\01231905.D   Vial: 15
Acq On   : 23 Jan 2019   6:35   Operator: WA
Sample   : 1.0ng R13012319 ICAL Std   Inst   : MS13
Misc   : S31-01231908/S31-01161906 (2/14)

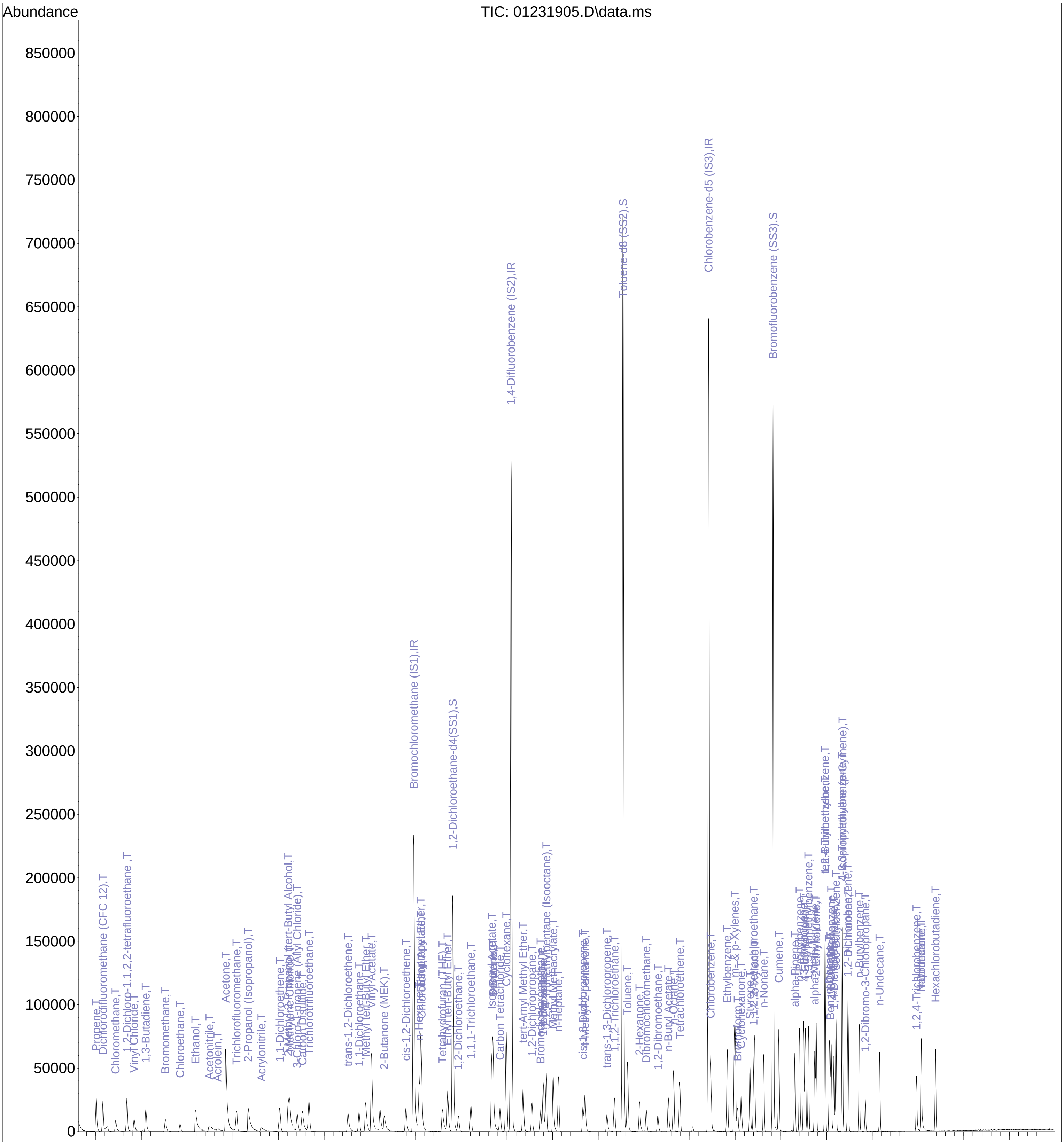
Quant Time: Jan 23 10:39:30 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.13	71	12314	0.969 ng	94
52) cis-1,3-Dichloropropene	14.67	75	18150	0.979 ng	97
53) 4-Methyl-2-pentanone	14.71	58	10810	1.005 ng	95
54) trans-1,3-Dichloropropene	15.19	75	12705	0.814 ng	98
55) 1,1,2-Trichloroethane	15.36	97	11944	0.972 ng	100
58) Toluene	15.64	91	52134	0.979 ng	99
59) 2-Hexanone	15.90	43	22209	1.037 ng	97
60) Dibromochloromethane	16.05	129	13288	0.991 ng	100
61) 1,2-Dibromoethane	16.31	107	12663	1.024 ng	99
62) n-Butyl Acetate	16.53	43	25297	1.023 ng	96
63) n-Octane	16.65	57	10159	1.031 ng	96
64) Tetrachloroethene	16.79	166	16751	1.001 ng	99
65) Chlorobenzene	17.46	112	36012	1.001 ng	99
66) Ethylbenzene	17.83	91	56440	0.974 ng	96
67) m- & p-Xylenes	17.99	91	88976	2.002 ng	99
68) Bromoform	18.05	173	11408	0.879 ng	99
69) Styrene	18.32	104	33724	0.964 ng	95
70) o-Xylene	18.42	91	43939	0.986 ng	97
71) n-Nonane	18.62	43	22251	1.002 ng	98
72) 1,1,2,2-Tetrachloroethane	18.40	83	21186	0.990 ng	99
74) Cumene	18.95	105	59749	0.985 ng	99
75) alpha-Pinene	19.30	93	27308	0.925 ng	95
76) n-Propylbenzene	19.41	91	68547	0.995 ng	98
77) 3-Ethyltoluene	19.50	105	57418	0.969 ng	99
78) 4-Ethyltoluene	19.53	105	56124	0.977 ng	99
79) 1,3,5-Trimethylbenzene	19.60	105	47516	0.942 ng	97
80) alpha-Methylstyrene	19.74	118	22075	0.883 ng	87
81) 2-Ethyltoluene	19.77	105	58546	0.975 ng	99
82) 1,2,4-Trimethylbenzene	19.96	105	47609	0.975 ng	95
83) n-Decane	20.06	57	23892	0.991 ng	98
84) Benzyl Chloride	20.08	91	28882	0.809 ng	96
85) 1,3-Dichlorobenzene	20.10	146	29202	0.937 ng	100
86) 1,4-Dichlorobenzene	20.16	146	31131	0.961 ng	99
87) sec-Butylbenzene	20.20	105	66519	0.966 ng	100
88) 4-Isopropyltoluene (p-...	20.35	119	61624	0.951 ng	99
89) 1,2,3-Trimethylbenzene	20.34	105	46052	0.935 ng	96
90) 1,2-Dichlorobenzene	20.46	146	29303	0.961 ng	97
91) d-Limonene	20.47	68	14686	0.849 ng	96
92) 1,2-Dibromo-3-Chloropr...	20.85	157	9546	0.875 ng	89
93) n-Undecane	21.16	57	19919	0.908 ng	97
94) 1,2,4-Trichlorobenzene	21.97	180	18948	0.890 ng	98
95) Naphthalene	22.07	128	43994	0.759 ng	97
96) n-Dodecane	22.07	57	13115	0.689 ng	96
97) Hexachlorobutadiene	22.38	225	14537	0.884 ng	100
98) Cyclohexanone	18.13	55	15018	0.890 ng	96
99) tert-Butylbenzene	19.96	119	49631	0.981 ng	100
100) n-Butylbenzene	20.72	91	48604	0.966 ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Data File : I:\MS13\DATA\2019_01\23\01231905.D Vial: 15
Acq On : 23 Jan 2019 6:35 Operator: WA
Sample : 1.0ng R13012319 ICAL Std Inst : MS13
Misc : S31-01231908/S31-01161906 (2/14)

Quant Time: Jan 23 10:39:30 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data File : I:\MS13\DATA\2019_01\23\01231908.D Vial: 16
Acq On : 23 Jan 2019 9:13 Operator: WA
Sample : 5.0ng TO-15 ICAL Std Inst : MS13
Misc : S31-01221908/S31-01161903 (2/14)

Quant Time: Jan 23 10:31:46 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 1/23/19

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	10.97	130	133163	12.500 ng	-0.01
37) 1,4-Difluorobenzene (IS2)	13.10	114	573427	12.500 ng	0.00
56) Chlorobenzene-d5 (IS3)	17.42	82	228793	12.500 ng	0.00

System Monitoring Compounds

Compound	R.T.	QIon	Response	Conc Units	Dev(Min)
33) 1,2-Dichloroethane-d4(...	11.82	65	141973	12.147 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.20%		
57) Toluene-d8 (SS2)	15.54	98	608275	12.889 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.12%		
73) Bromofluorobenzene (SS3)	18.83	174	223121	11.473 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 91.76%		

Target Compounds

Compound	R.T.	QIon	Response	Conc Units		Qvalue
2) Propene	3.98	42	61288	4.900 ng		95
3) Dichlorodifluoromethan...	4.13	85	107398	4.808 ng		100
4) Chloromethane	4.40	50	83501	4.876 ng		98
5) 1,2-Dichloro-1,1,2,2-t...	4.66	135	66573	4.647 ng		99
6) Vinyl Chloride	4.81	62	83594	5.022 ng		98
7) 1,3-Butadiene	5.07	54	66679	5.475 ng		93
8) Bromomethane	5.50	94	56285	4.900 ng		99
9) Chloroethane	5.82	64	43477	4.818 ng		99
10) Ethanol	6.18	45	205480	24.456 ng		98
11) Acetonitrile	6.44	41	98230	4.696 ng		99
12) Acrolein	6.63	56	34941	4.860 ng		96
13) Acetone	6.82	58	222256	23.524 ng	#	82
14) Trichlorofluoromethane	7.06	101	89880	4.791 ng		99
15) 2-Propanol (Isopropanol)	7.31	45	281104	9.961 ng		96
16) Acrylonitrile	7.58	53	65893	4.932 ng		99
17) 1,1-Dichloroethene	8.01	96	62403	4.987 ng		86
18) 2-Methyl-2-Propanol (t...	8.18	59	282060	9.931 ng		95
19) Methylene Chloride	8.24	84	62044	4.977 ng		95
20) 3-Chloro-1-propene (Al...	8.40	41	81576	5.131 ng		93
21) Trichlorotrifluoroethane	8.66	151	63461	4.806 ng		94
22) Carbon Disulfide	8.50	76	221593	4.781 ng		100
23) trans-1,2-Dichloroethene	9.52	61	77142	5.241 ng		93
24) 1,1-Dichloroethane	9.77	63	99552	4.833 ng		99
25) Methyl tert-Butyl Ether	9.88	73	177677	5.003 ng		97
26) Vinyl Acetate	10.03	86	74341	24.950 ng	#	91
27) 2-Butanone (MEK)	10.29	72	39968	4.721 ng	#	90
28) cis-1,2-Dichloroethene	10.79	61	75760	4.977 ng		93
29) Diisopropyl Ether	11.10	87	62727	5.160 ng	#	72
30) Ethyl Acetate	11.10	61	44547	11.030 ng		99
31) n-Hexane	11.08	57	100179	4.977 ng	#	100
32) Chloroform	11.13	83	95915	4.890 ng		98
34) Tetrahydrofuran (THF)	11.56	72	42364	4.775 ng		97
35) Ethyl tert-Butyl Ether	11.69	87	73478	4.929 ng		98
36) 1,2-Dichloroethane	11.94	62	61320	4.884 ng		99
38) 1,1,1-Trichloroethane	12.21	97	84505	5.047 ng		97
39) Isopropyl Acetate	12.66	61	77927	10.069 ng	#	90
40) 1-Butanol	12.67	56	107106	9.945 ng	#	68
41) Benzene	12.70	78	247723	4.786 ng		98
42) Carbon Tetrachloride	12.86	117	73653	4.808 ng		99
43) Cyclohexane	12.99	84	197718	9.700 ng		97
44) tert-Amyl Methyl Ether	13.35	73	168842	4.941 ng		97
45) 1,2-Dichloropropane	13.55	63	60275	5.029 ng		100
46) Bromodichloromethane	13.74	83	73195	5.043 ng		100
47) Trichloroethene	13.80	130	74501	4.961 ng		100
48) 1,4-Dioxane	13.78	88	53416	5.117 ng		98
49) 2,2,4-Trimethylpentane...	13.86	57	250397	4.812 ng		89
50) Methyl Methacrylate	14.01	100	54065	10.321 ng		99

```
Data File : I:\MS13\DATA\2019_01\23\01231908.D          Vial: 16
Acq On    : 23 Jan 2019   9:13                      Operator: WA
Sample    : 5.0ng TO-15 ICAL Std                    Inst    : MS13
Misc      : S31-01221908/S31-01161903 (2/14)

Quant Time: Jan 23 10:31:46 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.13	71	63371	4.974 ng	98
52) cis-1,3-Dichloropropene	14.66	75	97452	5.243 ng	100
53) 4-Methyl-2-pentanone	14.70	58	52931	4.908 ng	98
54) trans-1,3-Dichloropropene	15.18	75	78615	5.024 ng	99
55) 1,1,2-Trichloroethane	15.35	97	61981	5.026 ng	99
58) Toluene	15.64	91	261216	4.900 ng	99
59) 2-Hexanone	15.89	43	114253	5.332 ng	95
60) Dibromochloromethane	16.05	129	72456	5.401 ng	99
61) 1,2-Dibromoethane	16.30	107	67683	5.471 ng	99
62) n-Butyl Acetate	16.53	43	129007	5.215 ng	95
63) n-Octane	16.65	57	51306	5.203 ng	96
64) Tetrachloroethene	16.78	166	84886	5.067 ng	99
65) Chlorobenzene	17.46	112	181298	5.037 ng	99
66) Ethylbenzene	17.82	91	290291	5.005 ng	98
67) m- & p-Xylenes	17.99	91	448511	10.086 ng	98
68) Bromoform	18.05	173	65088	5.010 ng	99
69) Styrene	18.32	104	188503	5.384 ng	96
70) o-Xylene	18.42	91	223971	5.022 ng	97
71) n-Nonane	18.62	43	114495	5.151 ng	98
72) 1,1,2,2-Tetrachloroethane	18.40	83	109049	5.093 ng	100
74) Cumene	18.95	105	301863	4.970 ng	100
75) alpha-Pinene	19.30	93	147094	4.981 ng	95
76) n-Propylbenzene	19.41	91	351635	5.100 ng	99
77) 3-Ethyltoluene	19.50	105	300539	5.069 ng	99
78) 4-Ethyltoluene	19.54	105	287582	5.001 ng	100
79) 1,3,5-Trimethylbenzene	19.60	105	247436	4.903 ng	97
80) alpha-Methylstyrene	19.74	118	141128	5.643 ng	92
81) 2-Ethyltoluene	19.77	105	297586	4.951 ng	99
82) 1,2,4-Trimethylbenzene	19.96	105	249668	5.107 ng	96
83) n-Decane	20.06	57	128094	5.311 ng	99
84) Benzyl Chloride	20.08	91	183861	5.145 ng	100
85) 1,3-Dichlorobenzene	20.10	146	158457	5.082 ng	100
86) 1,4-Dichlorobenzene	20.16	146	163491	5.041 ng	99
87) sec-Butylbenzene	20.20	105	343634	4.985 ng	99
88) 4-Isopropyltoluene (p-...	20.35	119	324342	5.001 ng	99
89) 1,2,3-Trimethylbenzene	20.34	105	246057	4.990 ng	95
90) 1,2-Dichlorobenzene	20.46	146	154769	5.073 ng	100
91) d-Limonene	20.47	68	91243	5.271 ng	95
92) 1,2-Dibromo-3-Chloropr...	20.85	157	55738	5.106 ng	86
93) n-Undecane	21.16	57	130753	5.954 ng	97
94) 1,2,4-Trichlorobenzene	21.97	180	119437	5.606 ng	100
95) Naphthalene	22.07	128	348909	6.016 ng	99
96) n-Dodecane	22.06	57	119194	6.256 ng	98
97) Hexachlorobutadiene	22.38	225	78626	4.775 ng	100
98) Cyclohexanone	18.12	55	68504	4.059 ng	95
99) tert-Butylbenzene	19.96	119	253961	5.018 ng	100
100) n-Butylbenzene	20.72	91	263504	5.235 ng	99

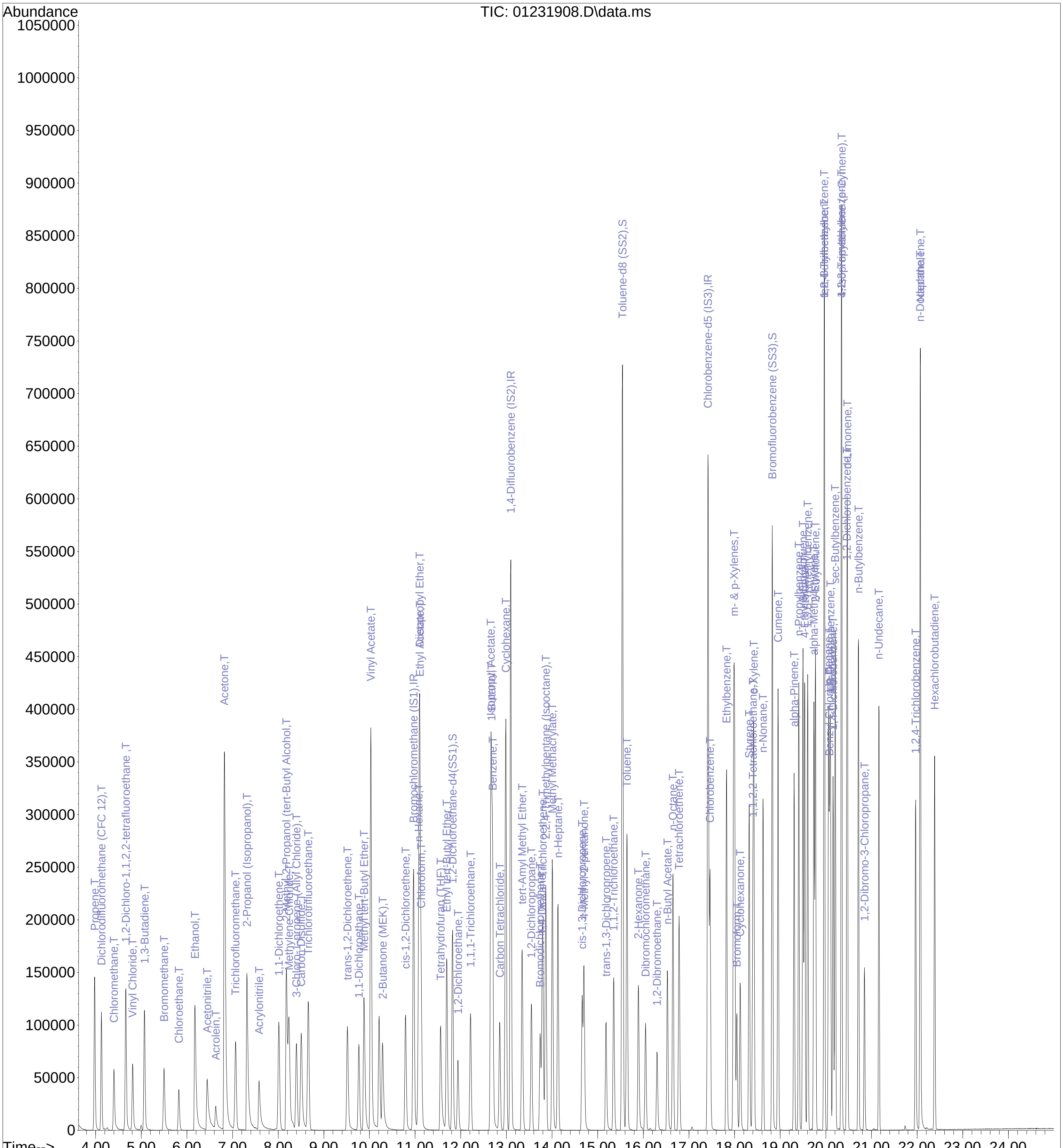
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

00936332

Data File : I:\MS13\DATA\2019_01\23\01231908.D Vial: 16
Acq On : 23 Jan 2019 9:13 Operator: WA
Sample : 5.0ng TO-15 ICAL Std Inst : MS13
Misc : S31-01221908/S31-01161903 (2/14)

Quant Time: Jan 23 10:31:46 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data File : I:\MS13\DATA\2019_01\23\01231909.D   Vial: 16
Acq On : 23 Jan 2019 9:46   Operator: WA
Sample : 25ng TO-15 ICAL Std   Inst : MS13
Misc : S31-01221908/S31-01161903 (2/14)

Quant Time: Jan 23 10:31:48 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 1/23/19

Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
1) Bromochloromethane (IS1)	10.98	130	127070	12.500 ng		0.00
37) 1,4-Difluorobenzene (IS2)	13.10	114	539066	12.500 ng		0.00
56) Chlorobenzene-d5 (IS3)	17.42	82	215185	12.500 ng		0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	11.83	65	133196	11.943 ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.52%			
57) Toluene-d8 (SS2)	15.54	98	573807	12.928 ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 103.44%			
73) Bromofluorobenzene (SS3)	18.83	174	208213	11.383 ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 91.04%			
Target Compounds						Qvalue
2) Propene	3.98	42	281611	23.596 ng		96
3) Dichlorodifluoromethan...	4.13	85	489775	22.976 ng		100
4) Chloromethane	4.41	50	384457	23.528 ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.66	135	308779	22.585 ng		100
6) Vinyl Chloride	4.82	62	388805	24.478 ng		100
7) 1,3-Butadiene	5.08	54	303557	26.122 ng		93
8) Bromomethane	5.50	94	263398	24.029 ng		100
9) Chloroethane	5.83	64	204130	23.707 ng		100
10) Ethanol	6.22	45	946677	118.074 ng		97
11) Acetonitrile	6.45	41	499297	25.015 ng		97
12) Acrolein	6.64	56	176118	25.669 ng		97
13) Acetone	6.84	58	1016443	112.739 ng	#	82
14) Trichlorofluoromethane	7.07	101	406680	22.718 ng		99
15) 2-Propanol (Isopropanol)	7.34	45	1321330	49.064 ng		94
16) Acrylonitrile	7.59	53	367028	28.789 ng		97
17) 1,1-Dichloroethene	8.02	96	295186	24.719 ng		85
18) 2-Methyl-2-Propanol (t...	8.20	59	1335425	49.272 ng		96
19) Methylene Chloride	8.25	84	297023	24.969 ng		94
20) 3-Chloro-1-propene (Al...	8.41	41	388603	25.614 ng		98
21) Trichlorotrifluoroethane	8.66	151	295105	23.422 ng		94
22) Carbon Disulfide	8.51	76	1067121	24.127 ng		99
23) trans-1,2-Dichloroethene	9.53	61	376216	26.786 ng		94
24) 1,1-Dichloroethane	9.78	63	454839	23.140 ng		100
25) Methyl tert-Butyl Ether	9.88	73	825111	24.346 ng		98
26) Vinyl Acetate	10.04	86	368175	129.489 ng		96
27) 2-Butanone (MEK)	10.28	72	201439	24.934 ng	#	89
28) cis-1,2-Dichloroethene	10.80	61	358155	24.655 ng		92
29) Diisopropyl Ether	11.10	87	287847	24.816 ng	#	74
30) Ethyl Acetate	11.10	61	206917	53.689 ng		97
31) n-Hexane	11.08	57	423508	22.049 ng	#	100
32) Chloroform	11.14	83	453309	24.220 ng		99
34) Tetrahydrofuran (THF)	11.55	72	198310	23.422 ng		98
35) Ethyl tert-Butyl Ether	11.69	87	346238	24.338 ng		96
36) 1,2-Dichloroethane	11.95	62	294430	24.577 ng		100
38) 1,1,1-Trichloroethane	12.22	97	395934	25.156 ng		98
39) Isopropyl Acetate	12.66	61	355718	48.891 ng	#	92
40) 1-Butanol	12.68	56	541210	53.456 ng	#	74
41) Benzene	12.70	78	1132300	23.271 ng		99
42) Carbon Tetrachloride	12.86	117	359014	24.929 ng		100
43) Cyclohexane	12.99	84	907672	47.366 ng		98
44) tert-Amyl Methyl Ether	13.35	73	799357	24.886 ng		97
45) 1,2-Dichloropropane	13.55	63	278453	24.711 ng		100
46) Bromodichloromethane	13.74	83	354046	25.950 ng		99
47) Trichloroethene	13.80	130	352521	24.972 ng		100
48) 1,4-Dioxane	13.77	88	250996	25.577 ng		100
49) 2,2,4-Trimethylpentane...	13.86	57	1120282	22.901 ng		90
50) Methyl Methacrylate	14.01	100	264403	53.689 ng		96

Data File : I:\MS13\DATA\2019_01\23\01231909.D Vial: 16
Acq On : 23 Jan 2019 9:46 Operator: WA
Sample : 25ng TO-15 ICAL Std Inst : MS13
Misc : S31-01221908/S31-01161903 (2/14)

Quant Time: Jan 23 10:31:48 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.13	71	288030	24.050	ng	99
52) cis-1,3-Dichloropropene	14.66	75	485798	27.800	ng	100
53) 4-Methyl-2-pentanone	14.70	58	262607	25.904	ng	93
54) trans-1,3-Dichloropropene	15.18	75	404339	27.486	ng	100
55) 1,1,2-Trichloroethane	15.35	97	292085	25.197	ng	99
58) Toluene	15.65	91	1198602	23.905	ng	98
59) 2-Hexanone	15.89	43	560414	27.807	ng	93
60) Dibromochloromethane	16.05	129	356574	28.260	ng	100
61) 1,2-Dibromoethane	16.30	107	333858	28.692	ng	100
62) n-Butyl Acetate	16.53	43	640396	27.524	ng	95
63) n-Octane	16.65	57	235009	25.338	ng	97
64) Tetrachloroethene	16.78	166	396955	25.195	ng	99
65) Chlorobenzene	17.46	112	858357	25.358	ng	99
66) Ethylbenzene	17.83	91	1348824	24.725	ng	98
67) m- & p-Xylenes	18.00	91	2090753	49.990	ng	98
68) Bromoform	18.05	173	337172	27.594	ng	100
69) Styrene	18.32	104	919722	27.931	ng	96
70) o-Xylene	18.42	91	1042553	24.856	ng	96
71) n-Nonane	18.63	43	511403	24.463	ng	100
72) 1,1,2,2-Tetrachloroethane	18.40	83	520505	25.845	ng	99
74) Cumene	18.95	105	1396703	24.452	ng	99
75) alpha-Pinene	19.30	93	708141	25.497	ng	94
76) n-Propylbenzene	19.41	91	1629806	25.134	ng	98
77) 3-Ethyltoluene	19.50	105	1381613	24.774	ng	94
78) 4-Ethyltoluene	19.54	105	1374888	25.419	ng	95
79) 1,3,5-Trimethylbenzene	19.60	105	1150663	24.242	ng	96
80) alpha-Methylstyrene	19.74	118	689186	29.302	ng	92
81) 2-Ethyltoluene	19.77	105	1387145	24.536	ng	98
82) 1,2,4-Trimethylbenzene	19.97	105	1165280	25.344	ng	96
83) n-Decane	20.06	57	584605	25.770	ng	99
84) Benzyl Chloride	20.08	91	997797	29.686	ng	98
85) 1,3-Dichlorobenzene	20.10	146	777844	26.527	ng	100
86) 1,4-Dichlorobenzene	20.16	146	790407	25.911	ng	100
87) sec-Butylbenzene	20.21	105	1588997	24.509	ng	99
88) 4-Isopropyltoluene (p-...	20.35	119	1486568	24.371	ng	100
89) 1,2,3-Trimethylbenzene	20.35	105	1149185	24.778	ng	95
90) 1,2-Dichlorobenzene	20.47	146	750207	26.147	ng	100
91) d-Limonene	20.47	68	434969	26.719	ng	97
92) 1,2-Dibromo-3-Chloropr...	20.85	157	282742	27.538	ng	85
93) n-Undecane	21.17	57	613692	29.713	ng	98
94) 1,2,4-Trichlorobenzene	21.97	180	604264	30.156	ng	100
95) Naphthalene	22.07	128	1767201	32.400	ng	100
96) n-Dodecane	22.06	57	576084	32.148	ng	99
97) Hexachlorobutadiene	22.38	225	377819	24.397	ng	100
98) Cyclohexanone	18.12	55	368619	23.221	ng	94
99) tert-Butylbenzene	19.96	119	1169859	24.579	ng	99
100) n-Butylbenzene	20.72	91	1228352	25.948	ng	98

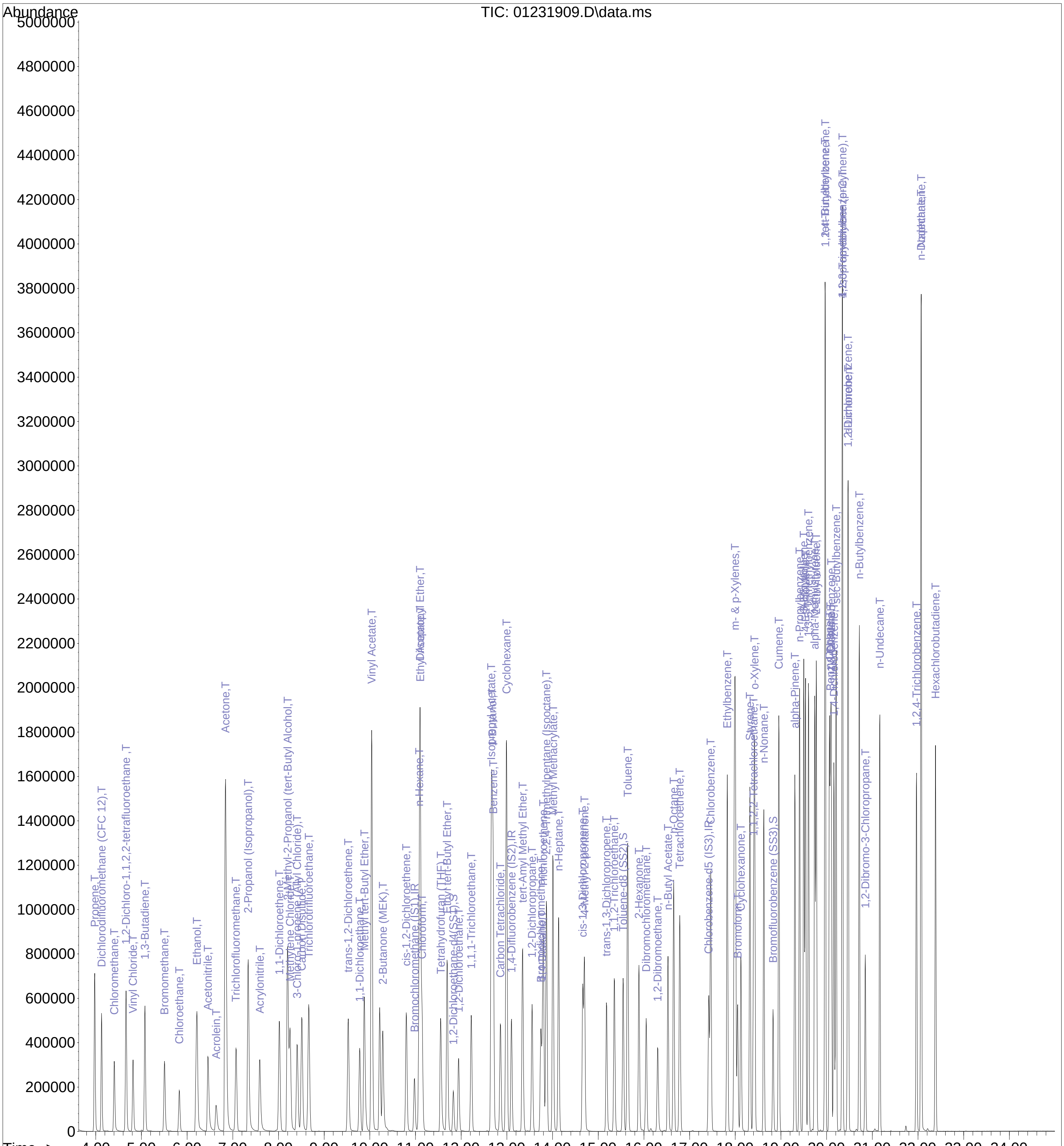
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

00936335

Data File : I:\MS13\DATA\2019_01\23\01231909.D Vial: 16
Acq On : 23 Jan 2019 9:46 Operator: WA
Sample : 25ng TO-15 ICAL Std Inst : MS13
Misc : S31-01221908/S31-01161903 (2/14)

Quant Time: Jan 23 10:31:48 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

00936336

Data File : I:\MS13\DATA\2019_01\23\01231910.D   Vial: 16
Acq On : 23 Jan 2019 10:20   Operator: WA
Sample : 50ng TO-15 ICAL Std   Inst : MS13
Misc : S31-01221908/S31-01161903 (2/14)

Quant Time: Jan 23 10:54:36 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration   WA 1/23/19
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	10.98	130	129676	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.10	114	554115	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.42	82	217596	12.500	ng	0.00

System Monitoring Compounds

Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
33) 1,2-Dichloroethane-d4(...	11.83	65	136294	11.975	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.76%			
57) Toluene-d8 (SS2)	15.55	98	586897	13.076	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 104.64%			
73) Bromofluorobenzene (SS3)	18.83	174	211351	11.427	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 91.44%			

Target Compounds	R.T.	QIon	Response	Conc	Units		Qvalue
2) Propene	3.98	42	550963	45.236	ng		96
3) Dichlorodifluoromethan...	4.13	85	958014	44.038	ng		99
4) Chloromethane	4.41	50	749838	44.966	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.67	135	619578	44.407	ng		99
6) Vinyl Chloride	4.82	62	774206	47.762	ng		100
7) 1,3-Butadiene	5.08	54	615017	51.861	ng		93
8) Bromomethane	5.51	94	518382	46.340	ng		99
9) Chloroethane	5.83	64	400255	45.550	ng		100
10) Ethanol	6.24	45	1820404	222.486	ng		97
11) Acetonitrile	6.47	41	995157	48.855	ng		98
12) Acrolein	6.65	56	349588	49.928	ng		97
13) Acetone	6.85	58	1938708	210.711	ng	#	80
14) Trichlorofluoromethane	7.07	101	813055	44.506	ng		99
15) 2-Propanol (Isopropanol)	7.36	45	2536963	92.311	ng		94
16) Acrylonitrile	7.60	53	739164	56.813	ng		98
17) 1,1-Dichloroethene	8.03	96	589118	48.342	ng	#	84
18) 2-Methyl-2-Propanol (t...	8.22	59	2597364	93.906	ng		96
19) Methylene Chloride	8.26	84	587709	48.411	ng		94
20) 3-Chloro-1-propene (Al...	8.42	41	780458	50.409	ng		98
21) Trichlorotrifluoroethane	8.67	151	589650	45.859	ng		93
22) Carbon Disulfide	8.51	76	2099717	46.519	ng		99
23) trans-1,2-Dichloroethene	9.53	61	747632	52.161	ng		93
24) 1,1-Dichloroethane	9.78	63	899332	44.833	ng		100
25) Methyl tert-Butyl Ether	9.88	73	1619009	46.810	ng		98
26) Vinyl Acetate	10.05	86	716439	246.912	ng	#	84
27) 2-Butanone (MEK)	10.29	72	403390	48.927	ng	#	88
28) cis-1,2-Dichloroethene	10.80	61	705591	47.597	ng		92
29) Diisopropyl Ether	11.10	87	561552	47.440	ng	#	75
30) Ethyl Acetate	11.11	61	395905	100.662	ng		95
31) n-Hexane	11.08	57	828858	42.286	ng	#	100
32) Chloroform	11.15	83	900170	47.128	ng		100
34) Tetrahydrofuran (THF)	11.55	72	391881	45.354	ng		99
35) Ethyl tert-Butyl Ether	11.70	87	685968	47.249	ng		95
36) 1,2-Dichloroethane	11.95	62	578293	47.302	ng		99
38) 1,1,1-Trichloroethane	12.23	97	786422	48.609	ng		97
39) Isopropyl Acetate	12.66	61	684341	91.504	ng		96
40) 1-Butanol	12.69	56	1041001	100.029	ng	#	75
41) Benzene	12.70	78	2183231	43.651	ng		99
42) Carbon Tetrachloride	12.86	117	714110	48.239	ng		100
43) Cyclohexane	12.99	84	1758366	89.267	ng		99
44) tert-Amyl Methyl Ether	13.35	73	1571599	47.598	ng		97
45) 1,2-Dichloropropane	13.56	63	547191	47.242	ng		100
46) Bromodichloromethane	13.74	83	706028	50.344	ng		99
47) Trichloroethene	13.80	130	704224	48.531	ng		99
48) 1,4-Dioxane	13.78	88	499338	49.502	ng		99
49) 2,2,4-Trimethylpentane...	13.87	57	2175437	43.264	ng		90
50) Methyl Methacrylate	14.01	100	528051	104.313	ng		93

00936337

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Data File : I:\MS13\DATA\2019_01\23\01231910.D          Vial: 16
Acq On    : 23 Jan 2019  10:20                       Operator: WA
Sample    : 50ng TO-15 ICAL Std                      Inst    : MS13
Misc      : S31-01221908/S31-01161903 (2/14)

Quant Time: Jan 23 10:54:36 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.14	71	566594	46.024 ng	99
52) cis-1,3-Dichloropropene	14.66	75	963259	53.626 ng	100
53) 4-Methyl-2-pentanone	14.70	58	512957	49.224 ng	92
54) trans-1,3-Dichloropropene	15.18	75	805902	53.295 ng	99
55) 1,1,2-Trichloroethane	15.36	97	582332	48.870 ng	98
58) Toluene	15.65	91	2363408	46.614 ng	98
59) 2-Hexanone	15.90	43	1097984	53.877 ng	93
60) Dibromochloromethane	16.05	129	714941	56.034 ng	100
61) 1,2-Dibromoethane	16.31	107	664969	56.514 ng	100
62) n-Butyl Acetate	16.53	43	1241427	52.766 ng	94
63) n-Octane	16.65	57	456775	48.703 ng	98
64) Tetrachloroethene	16.79	166	794176	49.849 ng	99
65) Chlorobenzene	17.46	112	1673750	48.899 ng	99
66) Ethylbenzene	17.82	91	2601402	47.157 ng	99
67) m- & p-Xylenes	18.00	91	4065083	96.120 ng	98
68) Bromoform	18.05	173	680568	55.080 ng	99
69) Styrene	18.32	104	1804766	54.201 ng	97
70) o-Xylene	18.43	91	2029602	47.852 ng	96
71) n-Nonane	18.63	43	964989	45.649 ng	99
72) 1,1,2,2-Tetrachloroethane	18.40	83	1011065	49.647 ng	100
74) Cumene	18.96	105	2694136	46.644 ng	98
75) alpha-Pinene	19.30	93	1391956	49.562 ng	94
76) n-Propylbenzene	19.41	91	3123059	47.628 ng	97
77) 3-Ethyltoluene	19.50	105	2810434	49.837 ng	99
78) 4-Ethyltoluene	19.54	105	2506081	45.820 ng	98
79) 1,3,5-Trimethylbenzene	19.61	105	2241971	46.711 ng	96
80) alpha-Methylstyrene	19.74	118	1355760	57.003 ng	92
81) 2-Ethyltoluene	19.78	105	2690410	47.062 ng	97
82) 1,2,4-Trimethylbenzene	19.97	105	2226342	47.884 ng	96
83) n-Decane	20.06	57	1101364	48.012 ng	99
84) Benzyl Chloride	20.08	91	1985624	58.420 ng	96
85) 1,3-Dichlorobenzene	20.11	146	1551652	52.330 ng	99
86) 1,4-Dichlorobenzene	20.16	146	1571568	50.949 ng	100
87) sec-Butylbenzene	20.21	105	3056416	46.620 ng	98
88) 4-Isopropyltoluene (p-...	20.35	119	2789874	45.230 ng	98
89) 1,2,3-Trimethylbenzene	20.35	105	2205069	47.017 ng	96
90) 1,2-Dichlorobenzene	20.47	146	1470738	50.692 ng	99
91) d-Limonene	20.48	68	824220	50.068 ng	99
92) 1,2-Dibromo-3-Chloropr...	20.85	157	567508	54.662 ng	84
93) n-Undecane	21.17	57	1155291	55.316 ng	100
94) 1,2,4-Trichlorobenzene	21.97	180	1205152	59.477 ng	100
95) Naphthalene	22.07	128	3390515	61.472 ng	99
96) n-Dodecane	22.07	57	1057288	58.347 ng	97
97) Hexachlorobutadiene	22.38	225	770156	49.181 ng	100
98) Cyclohexanone	18.13	55	729990	45.476 ng	93
99) tert-Butylbenzene	19.97	119	2220306	46.132 ng	99
100) n-Butylbenzene	20.72	91	2361092	49.324 ng	97

(#) = qualifier out of range (m) = manual integration (+) = signals summed

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Data File : I:\MS13\DATA\2019_01\23\01231910.D          Vial: 16
Acq On    : 23 Jan 2019  10:20                        Operator: WA
Sample    : 50ng TO-15 ICAL Std                        Inst    : MS13
Misc      : S31-01221908/S31-01161903 (2/14)

Quant Time: Jan 23 10:54:36 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
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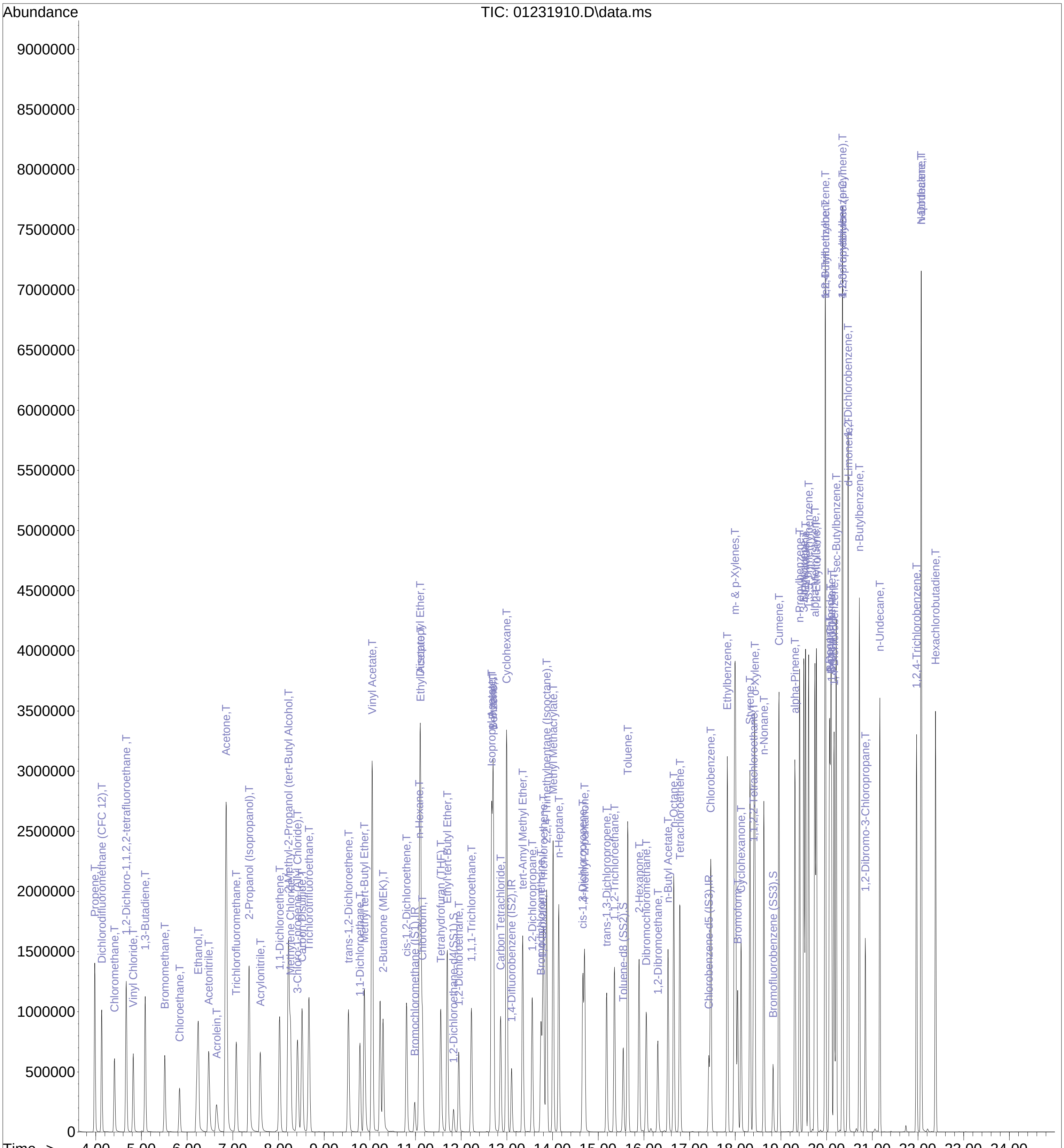

00936339

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Data File : I:\MS13\DATA\2019_01\23\01231911.D          Vial: 16
Acq On    : 23 Jan 2019  10:53                       Operator: WA
Sample    : 100ng TO-15 ICAL Std                     Inst    : MS13
Misc      : S31-01221908/S31-01161903 (2/14)

Quant Time: Jan 23 11:18:52 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

WA 1/23/19

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	10.99	130	130622	12.500	ng	0.01
37) 1,4-Difluorobenzene (IS2)	13.11	114	567955	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.42	82	224304	12.500	ng	0.00

System Monitoring Compounds	R.T.	QIon	Response	Conc	Units	Dev(Min)
33) 1,2-Dichloroethane-d4(...	11.84	65	138527	12.083	ng	0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.64%			
57) Toluene-d8 (SS2)	15.55	98	593656	12.831	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 102.64%			
73) Bromofluorobenzene (SS3)	18.83	174	216071	11.333	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 90.64%			

Target Compounds	R.T.	QIon	Response	Conc	Units		Qvalue
2) Propene	3.98	42	1235949	100.742	ng		96
3) Dichlorodifluoromethan...	4.14	85	1857522	84.768	ng		99
4) Chloromethane	4.42	50	1265365	75.331	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.67	135	1235486	87.909	ng		100
6) Vinyl Chloride	4.83	62	1531085	93.771	ng		100
7) 1,3-Butadiene	5.09	54	1199165	100.388	ng		93
8) Bromomethane	5.52	94	1034074	91.771	ng		99
9) Chloroethane	5.85	64	789553	89.203	ng		99
10) Ethanol	6.29	45	3485746	422.935	ng		97
11) Acetonitrile	6.50	41	1992641	97.116	ng		97
12) Acrolein	6.66	56	702088	99.545	ng		98
13) Acetone	6.88	58	3570661	385.272	ng	#	77
14) Trichlorofluoromethane	7.09	101	1626310	88.379	ng		99
15) 2-Propanol (Isopropanol)	7.39	45	4163038	150.381	ng		94
16) Acrylonitrile	7.62	53	1484683	113.287	ng		98
17) 1,1-Dichloroethene	8.03	96	1169842	95.299	ng	#	83
18) 2-Methyl-2-Propanol (t...	8.25	59	4887273	175.417	ng		97
19) Methylene Chloride	8.28	84	1136520	92.941	ng		89
20) 3-Chloro-1-propene (Al...	8.42	41	1535540	98.462	ng		99
21) Trichlorotrifluoroethane	8.67	151	1181859	91.252	ng		93
22) Carbon Disulfide	8.53	76	4103868	90.262	ng		99
23) trans-1,2-Dichloroethene	9.54	61	1468459	101.711	ng		92
24) 1,1-Dichloroethane	9.79	63	1755345	86.873	ng		99
25) Methyl tert-Butyl Ether	9.89	73	3168796	90.956	ng		98
26) Vinyl Acetate	10.07	86	1356871	464.242	ng	#	64
27) 2-Butanone (MEK)	10.30	72	797486	96.026	ng	#	86
28) cis-1,2-Dichloroethene	10.81	61	1387029	92.887	ng		90
29) Diisopropyl Ether	11.11	87	1076818	90.311	ng	#	79
30) Ethyl Acetate	11.13	61	717888	181.208	ng		91
31) n-Hexane	11.09	57	1530523	77.518	ng	#	100
32) Chloroform	11.16	83	1772093	92.105	ng		99
34) Tetrahydrofuran (THF)	11.55	72	775181	89.065	ng		98
35) Ethyl tert-Butyl Ether	11.70	87	1356833	92.781	ng		93
36) 1,2-Dichloroethane	11.95	62	1139631	92.541	ng		99
38) 1,1,1-Trichloroethane	12.23	97	1548462	93.379	ng		97
39) Isopropyl Acetate	12.67	61	1268000	165.413	ng		99
40) 1-Butanol	12.71	56	1948054	182.625	ng	#	76
41) Benzene	12.71	78	4015436	78.328	ng		100
42) Carbon Tetrachloride	12.87	117	1421053	93.655	ng		100
43) Cyclohexane	13.00	84	3299631	163.431	ng		98
44) tert-Amyl Methyl Ether	13.35	73	3048509	90.079	ng		97
45) 1,2-Dichloropropane	13.56	63	1063738	89.600	ng		99
46) Bromodichloromethane	13.75	83	1392144	96.849	ng		100
47) Trichloroethene	13.81	130	1389814	93.443	ng		100
48) 1,4-Dioxane	13.78	88	979074	94.696	ng		97
49) 2,2,4-Trimethylpentane...	13.88	57	4083483	79.231	ng		91
50) Methyl Methacrylate	14.02	100	1029562	198.428	ng		90

Data File : I:\MS13\DATA\2019_01\23\01231911.D   Vial: 16
Acq On   : 23 Jan 2019 10:53   Operator: WA
Sample   : 100ng TO-15 ICAL Std   Inst   : MS13
Misc   : S31-01221908/S31-01161903 (2/14)

Quant Time: Jan 23 11:18:52 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.14	71	1090107	86.391 ng	99
52) cis-1,3-Dichloropropene	14.67	75	1884084	102.334 ng	99
53) 4-Methyl-2-pentanone	14.71	58	992068	92.881 ng	89
54) trans-1,3-Dichloropropene	15.19	75	1594371	102.868 ng	99
55) 1,1,2-Trichloroethane	15.36	97	1147869	93.984 ng	98
58) Toluene	15.65	91	4475365	85.628 ng	97
59) 2-Hexanone	15.90	43	2095409	99.745 ng	92
60) Dibromochloromethane	16.06	129	1427371	108.526 ng	100
61) 1,2-Dibromoethane	16.31	107	1320897	108.902 ng	100
62) n-Butyl Acetate	16.53	43	2358975	97.268 ng	93
63) n-Octane	16.66	57	861202	89.078 ng	99
64) Tetrachloroethene	16.79	166	1586409	96.598 ng	98
65) Chlorobenzene	17.47	112	3227442	91.470 ng	98
66) Ethylbenzene	17.83	91	4917151	86.470 ng	99
67) m- & p-Xylenes	18.00	91	7590877	174.120 ng	98
68) Bromoform	18.06	173	1381752	108.485 ng	99
69) Styrene	18.33	104	3469181	101.072 ng	97
70) o-Xylene	18.43	91	3850302	88.064 ng	95
71) n-Nonane	18.63	43	1749023	80.263 ng	96
72) 1,1,2,2-Tetrachloroethane	18.41	83	1936312	92.237 ng	100
74) Cumene	18.96	105	5008946	84.128 ng	96
75) alpha-Pinene	19.31	93	2645675	91.386 ng	95
76) n-Propylbenzene	19.41	91	5716632	84.573 ng	95
77) 3-Ethyltoluene	19.50	105	4994193	85.913 ng	91
78) 4-Ethyltoluene	19.54	105	4883267	86.612 ng	98
79) 1,3,5-Trimethylbenzene	19.61	105	4250628	85.912 ng	95
80) alpha-Methylstyrene	19.75	118	2590177	105.647 ng	90
81) 2-Ethyltoluene	19.78	105	5013066	85.068 ng	96
82) 1,2,4-Trimethylbenzene	19.98	105	4028708	84.058 ng	97
83) n-Decane	20.07	57	1961905	82.968 ng	96
84) Benzyl Chloride	20.09	91	3781785	107.939 ng	94
85) 1,3-Dichlorobenzene	20.11	146	3017833	98.733 ng	99
86) 1,4-Dichlorobenzene	20.16	146	3041985	95.669 ng	99
87) sec-Butylbenzene	20.21	105	5588775	82.698 ng	95
88) 4-Isopropyltoluene (p-...	20.35	119	4811990	75.680 ng	95
89) 1,2,3-Trimethylbenzene	20.35	105	3957709	81.864 ng	98
90) 1,2-Dichlorobenzene	20.47	146	2784546	93.105 ng	99
91) d-Limonene	20.48	68	1448812	85.378 ng	96
92) 1,2-Dibromo-3-Chloropr...	20.85	157	1138300	106.361 ng	83
93) n-Undecane	21.17	57	2071611	96.224 ng	97
94) 1,2,4-Trichlorobenzene	21.97	180	2394698	114.649 ng	99
95) Naphthalene	22.08	128	6034979	106.146 ng	98
96) n-Dodecane	22.07	57	1761991	94.328 ng	93
97) Hexachlorobutadiene	22.38	225	1567243	97.089 ng	100
98) Cyclohexanone	18.13	55	1413902	85.447 ng	92
99) tert-Butylbenzene	19.98	119	3957503	79.767 ng	97
100) n-Butylbenzene	20.72	91	4337953	87.911 ng	95

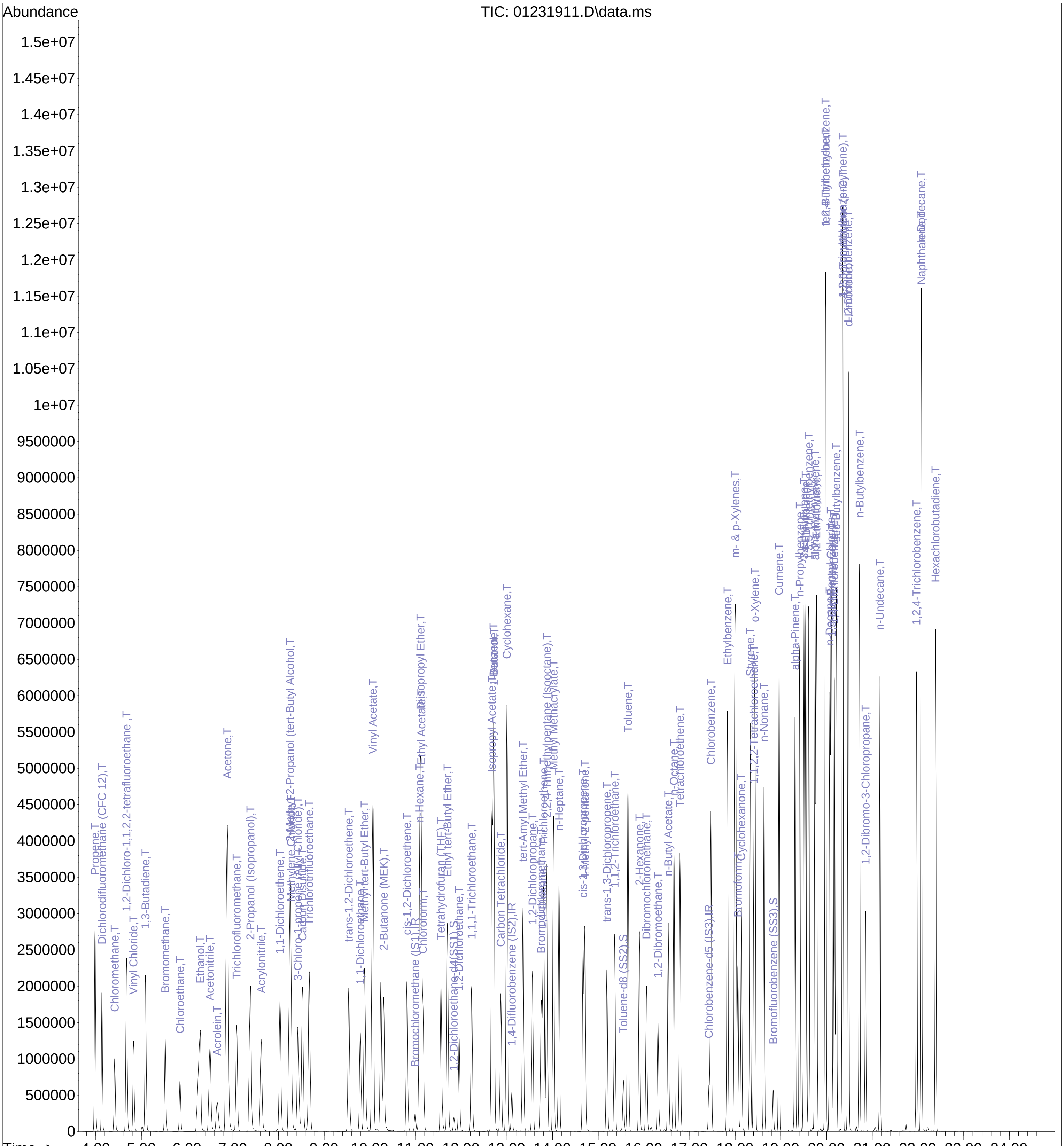
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

00936341

Data File : I:\MS13\DATA\2019_01\23\01231911.D Vial: 16
Acq On : 23 Jan 2019 10:53 Operator: WA
Sample : 100ng TO-15 ICAL Std Inst : MS13
Misc : S31-01221908/S31-01161903 (2/14)

Quant Time: Jan 23 11:18:52 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 10:31:09 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data File : I:\MS13\DATA\2019_01\23\01231912.D Vial: 13
Acq On : 23 Jan 2019 11:31 Operator: WA
Sample : 25ng TO-15 ICV Std Inst : MS13
Misc : S31-01221908/S31-12271803 (1/25)

Quant Time: Jan 23 11:53:59 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 1/23/19

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Bromochloromethane (IS1)	10.97	130	131810	12.500 ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.10	114	562964	12.500 ng	-0.01
56) Chlorobenzene-d5 (IS3)	17.42	82	224891	12.500 ng	0.00

System Monitoring Compounds

	R.T.	QIon	Response	Conc Units	Dev(Min)
33) 1,2-Dichloroethane-d4(...	11.83	65	137705	12.253 ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.00%		
57) Toluene-d8 (SS2)	15.54	98	595617	12.368 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.96%		
73) Bromofluorobenzene (SS3)	18.83	174	216386	12.479 ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.84%		

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
2) Propene	3.97	42	290238	25.307 ng		95
3) Dichlorodifluoromethan...	4.13	85	493642	25.193 ng		100
4) Chloromethane	4.41	50	413687	27.195 ng		100
5) 1,2-Dichloro-1,1,2,2-t...	4.66	135	326224	25.834 ng		100
6) Vinyl Chloride	4.82	62	414491	28.421 ng		100
7) 1,3-Butadiene	5.08	54	320393	29.205 ng		92
8) Bromomethane	5.50	94	282739	27.020 ng		99
9) Chloroethane	5.83	64	213940	26.654 ng		99
10) Ethanol	6.22	45	1011763	129.405 ng		98
11) Acetonitrile	6.45	41	513663	27.151 ng		97
12) Acrolein	6.63	56	175696	27.188 ng		98
13) Acetone	6.84	58	1042912	125.541 ng	#	81
14) Trichlorofluoromethane	7.07	101	417709	25.440 ng		99
15) 2-Propanol (Isopropanol)	7.34	45	1342639	53.071 ng		93
16) Acrylonitrile	7.59	53	378092	31.217 ng		98
17) 1,1-Dichloroethene	8.02	96	301396	27.502 ng	#	84
18) 2-Methyl-2-Propanol (t...	8.20	59	1312557	52.782 ng		96
19) Methylene Chloride	8.25	84	302373	28.711 ng		94
20) 3-Chloro-1-propene (Al...	8.41	41	415896	29.468 ng		97
21) Trichlorotrifluoroethane	8.66	151	301621	26.034 ng		93
22) Carbon Disulfide	8.51	76	1087556	25.282 ng		99
23) trans-1,2-Dichloroethene	9.52	61	379244	29.572 ng		93
24) 1,1-Dichloroethane	9.78	63	478565	26.232 ng		100
25) Methyl tert-Butyl Ether	9.87	73	825622	26.494 ng		98
26) Vinyl Acetate	10.04	86	372308	139.318 ng		96
27) 2-Butanone (MEK)	10.28	72	207861	27.296 ng	#	90
28) cis-1,2-Dichloroethene	10.80	61	359087	27.074 ng		92
29) Diisopropyl Ether	11.10	87	294686	27.567 ng	#	73
30) Ethyl Acetate	11.10	61	210958	55.937 ng		97
31) n-Hexane	11.08	57	447408	25.559 ng	#	100
32) Chloroform	11.14	83	456008	26.591 ng		99
34) Tetrahydrofuran (THF)	11.55	72	200595	25.956 ng		99
35) Ethyl tert-Butyl Ether	11.69	87	349375	26.320 ng		96
36) 1,2-Dichloroethane	11.94	62	294048	27.012 ng		99
38) 1,1,1-Trichloroethane	12.22	97	391363	26.333 ng		97
39) Isopropyl Acetate	12.66	61	359720	50.382 ng		93
40) 1-Butanol	12.68	56	538707	55.408 ng	#	73
41) Benzene	12.70	78	1163976	25.038 ng		99
42) Carbon Tetrachloride	12.86	117	362977	26.541 ng		100
43) Cyclohexane	12.99	84	917901	50.250 ng		98
44) tert-Amyl Methyl Ether	13.34	73	800206	26.373 ng		97
45) 1,2-Dichloropropane	13.55	63	280406	26.372 ng		100
46) Bromodichloromethane	13.74	83	360643	28.023 ng		99
47) Trichloroethene	13.80	130	359395	26.746 ng		100
48) 1,4-Dioxane	13.77	88	256432	27.377 ng		99
49) 2,2,4-Trimethylpentane...	13.86	57	1140295	24.936 ng		90
50) Methyl Methacrylate	14.01	100	270630	60.210 ng		95

00936343

Data File : I:\MS13\DATA\2019_01\23\01231912.D Vial: 13
Acq On : 23 Jan 2019 11:31 Operator: WA
Sample : 25ng TO-15 ICV Std Inst : MS13
Misc : S31-01221908/S31-12271803 (1/25)

Quant Time: Jan 23 11:53:59 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.13	71	294825	26.312 ng	99
52) cis-1,3-Dichloropropene	14.66	75	466898	27.704 ng	100
53) 4-Methyl-2-pentanone	14.69	58	263484	27.506 ng	92
54) trans-1,3-Dichloropropene	15.18	75	409912	28.951 ng	100
55) 1,1,2-Trichloroethane	15.35	97	296327	27.429 ng	98
58) Toluene	15.65	91	1214741	23.730 ng	98
59) 2-Hexanone	15.89	43	564646	28.070 ng	93
60) Dibromochloromethane	16.05	129	360060	28.871 ng	100
61) 1,2-Dibromoethane	16.30	107	337840	29.150 ng	100
62) n-Butyl Acetate	16.53	43	638988	27.373 ng	94
63) n-Octane	16.65	57	238507	25.357 ng	97
64) Tetrachloroethene	16.78	166	403400	25.748 ng	99
65) Chlorobenzene	17.46	112	864555	25.463 ng	100
66) Ethylbenzene	17.82	91	1360808	24.698 ng	99
67) m- & p-Xylenes	18.00	91	2113341	49.688 ng	98
68) Bromoform	18.05	173	336959	29.577 ng	100
69) Styrene	18.32	104	919763	27.664 ng	96
70) o-Xylene	18.42	91	1055135	24.892 ng	96
71) n-Nonane	18.63	43	520296	25.111 ng	100
72) 1,1,2,2-Tetrachloroethane	18.40	83	519389	26.149 ng	99
74) Cumene	18.95	105	1421080	24.569 ng	99
75) alpha-Pinene	19.30	93	717581	25.916 ng	94
76) n-Propylbenzene	19.41	91	1653750	25.491 ng	98
77) 3-Ethyltoluene	19.50	105	1365282	24.834 ng	94
78) 4-Ethyltoluene	19.54	105	1440290	26.218 ng	96
79) 1,3,5-Trimethylbenzene	19.61	105	1160035	24.059 ng	97
80) alpha-Methylstyrene	19.74	118	687603	28.890 ng	92
81) 2-Ethyltoluene	19.77	105	1401382	24.495 ng	98
82) 1,2,4-Trimethylbenzene	19.97	105	1175021	25.121 ng	95
83) n-Decane	20.06	57	586875	25.783 ng	99
84) Benzyl Chloride	20.08	91	1001220	29.269 ng	98
85) 1,3-Dichlorobenzene	20.10	146	788851	26.876 ng	100
86) 1,4-Dichlorobenzene	20.16	146	804355	26.104 ng	100
87) sec-Butylbenzene	20.21	105	1609639	24.789 ng	99
88) 4-Isopropyltoluene (p-...	20.35	119	1532048	25.277 ng	100
89) 1,2,3-Trimethylbenzene	20.35	105	1204084	26.022 ng	96
90) 1,2-Dichlorobenzene	20.47	146	758450	26.474 ng	100
91) d-Limonene	20.47	68	444284	27.213 ng	96
92) 1,2-Dibromo-3-Chloropr...	20.85	157	290539	28.052 ng	85
93) n-Undecane	21.17	57	595406	28.366 ng	98
94) 1,2,4-Trichlorobenzene	21.97	180	613462	28.126 ng	100
95) Naphthalene	22.07	128	1732271	29.113 ng	100
96) n-Dodecane	22.06	57	483693	24.640 ng	99
97) Hexachlorobutadiene	22.38	225	384807	23.731 ng	100
98) Cyclohexanone	18.12	55	363308	23.435 ng	94
99) tert-Butylbenzene	19.96	119	1190104	24.957 ng	99
100) n-Butylbenzene	20.72	91	1235644	25.970 ng	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

00936344

```
Data File : I:\MS13\DATA\2019_01\23\01231912.D          Vial: 13
Acq On    : 23 Jan 2019  11:31                       Operator: WA
Sample    : 25ng TO-15 ICV Std                       Inst    : MS13
Misc      : S31-01221908/S31-12271803 (1/25)

Quant Time: Jan 23 11:53:59 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
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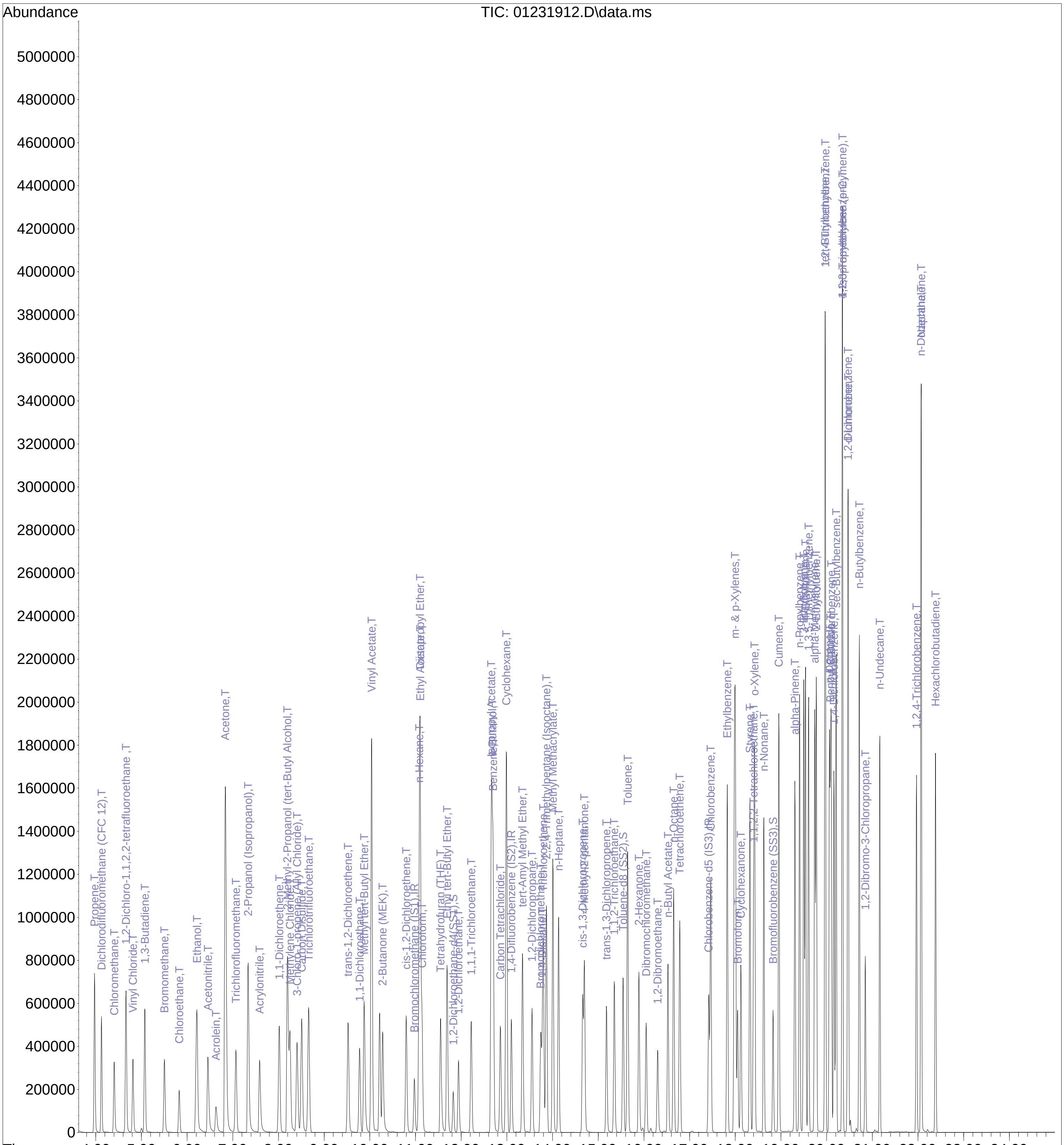


Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name:	**01231912.D**	Acq. Method File:	**TO15.M**
Data File Path:	**I:\MS13\DATA\2019_01\23**	Sample Name:	**25ng TO-15 ICV Std**
Operator:	**WA**	Misc Info:	**S31-01221908/S31-12271803 (**
Date Acquired:	**1/23/2019 11:31**	Instrument Name:	**MS13**

WA 1/23/19

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
2)	Propene	3.97	25.3	26.43	96	53	112	*	*
3)	Dichlorodifluoromethane (CFC 1:	4.13	25.2	26.30	96	62	103	*	*
4)	Chloromethane	4.41	27.2	26.38	103	51	121	*	*
5)	1,2-Dichloro-1,1,2,2-tetrafluoroetl	4.66	25.8	26.38	98	56	111	*	*
6)	Vinyl Chloride	4.82	28.4	26.73	106	57	117	*	*
7)	1,3-Butadiene	5.08	29.2	26.28	111	53	134	*	*
8)	Bromomethane	5.50	27.0	26.48	102	65	110	*	*
9)	Chloroethane	5.83	26.7	26.75	100	64	111	*	*
10)	Ethanol	6.22	129	128.10	101	57	124	*	*
11)	Acetonitrile	6.45	27.2	25.73	106	57	126	*	*
12)	Acrolein	6.63	27.2	25.63	106	62	121	*	*
13)	Acetone	6.84	126	132.33	95	60	113	*	*
14)	Trichlorofluoromethane	7.07	25.4	26.40	96	63	104	*	*
15)	2-Propanol (Isopropanol)	7.34	53.1	51.60	103	60	124	*	*
16)	Acrylonitrile	7.59	31.2	25.88	121	66	125	*	*
17)	1,1-Dichloroethene	8.02	27.5	27.23	101	68	107	*	*
18)	2-Methyl-2-Propanol (tert-Butyl Alco	8.20	52.8	54.25	97	64	114	*	*
19)	Methylene Chloride	8.25	28.7	27.08	106	66	105	FAIL	*
20)	3-Chloro-1-propene (Allyl Chloric	8.41	29.5	27.00	109	63	127	*	*
21)	Trichlorotrifluoroethane	8.66	26.0	26.95	96	59	109	*	*
22)	Carbon Disulfide	8.51	25.3	27.20	93	67	109	*	*
23)	trans-1,2-Dichloroethene	9.52	29.6	26.73	111	70	115	*	*
24)	1,1-Dichloroethane	9.78	26.2	26.95	97	66	106	*	*
25)	Methyl tert-Butyl Ether	9.87	26.5	26.80	99	67	109	*	*
26)	Vinyl Acetate	10.04	139	133.03	104	68	136	*	*
27)	2-Butanone (MEK)	10.28	27.3	25.95	105	71	116	*	*
28)	cis-1,2-Dichloroethene	10.80	27.1	26.35	103	67	110	*	*
29)	Diisopropyl Ether	11.10	27.6	27.18	102	62	109	*	*
30)	Ethyl Acetate	11.10	55.9	54.45	103	64	127	*	*
31)	n-Hexane	11.08	25.6	26.95	95	60	115	*	*
32)	Chloroform	11.14	26.6	27.08	98	66	105	*	*
34)	Tetrahydrofuran (THF)	11.55	26.0	27.00	96	65	110	*	*
35)	Ethyl tert-Butyl Ether	11.69	26.3	26.80	98	69	109	*	*
36)	1,2-Dichloroethane	11.94	27.0	26.85	101	60	110	*	*
38)	1,1,1-Trichloroethane	12.22	26.3	26.90	98	64	108	*	*
39)	Isopropyl Acetate	12.66	50.4	51.55	98	66	119	*	*
40)	1-Butanol	12.68	55.4	51.58	107	54	143	*	*
41)	Benzene	12.70	25.0	26.38	95	67	106	*	*
42)	Carbon Tetrachloride	12.86	26.5	26.45	100	64	112	*	*
43)	Cyclohexane	12.99	50.2	52.05	96	67	110	*	*
44)	tert-Amyl Methyl Ether	13.34	26.4	27.08	98	68	112	*	*
45)	1,2-Dichloropropane	13.55	26.4	26.98	98	66	112	*	*
46)	Bromodichloromethane	13.74	28.0	26.83	104	67	113	*	*
47)	Trichloroethene	13.80	26.7	26.68	100	66	108	*	*
48)	1,4-Dioxane	13.77	27.4	26.73	103	70	116	*	*
49)	2,2,4-Trimethylpentane (Isooctane)	13.86	24.9	26.65	93	64	113	*	*

Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **01231912.D** **TO15.M**
Data File Path: **I:\MS13\DATA\2019_01\23** Sample Name: **25ng TO-15 ICV Std**
Operator: **WA** Misc Info: **S31-01221908/S31-12271803 (**
Date Acquired: **1/23/2019 11:31** Instrument Name: **MS13**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
50)	**Methyl Methacrylate**	14.01	60.2	53.88	112	73	118	*	*
51)	**n-Heptane**	14.13	26.3	26.90	98	66	110	*	*
52)	**cis-1,3-Dichloropropene**	14.66	27.7	26.78	103	75	120	*	*
53)	**4-Methyl-2-pentanone**	14.69	27.5	26.15	105	65	124	*	*
54)	**trans-1,3-Dichloropropene**	15.18	29.0	26.60	109	77	123	*	*
55)	**1,1,2-Trichloroethane**	15.35	27.4	26.85	102	68	112	*	*
58)	**Toluene**	15.65	23.7	26.50	89	62	111	*	*
59)	**2-Hexanone**	15.89	28.1	26.78	105	59	128	*	*
60)	**Dibromochloromethane**	16.05	28.9	26.60	109	67	123	*	*
61)	**1,2-Dibromoethane**	16.30	29.2	27.03	108	66	122	*	*
62)	**n-Butyl Acetate**	16.53	27.4	27.35	100	64	128	*	*
63)	**n-Octane**	16.65	25.4	27.13	94	65	114	*	*
64)	**Tetrachloroethene**	16.78	25.7	26.60	97	55	120	*	*
65)	**Chlorobenzene**	17.46	25.5	26.83	95	61	114	*	*
66)	**Ethylbenzene**	17.82	24.7	26.53	93	64	113	*	*
67)	**m- & p-Xylenes**	18.00	49.7	53.28	93	64	114	*	*
68)	**Bromoform**	18.05	29.6	26.68	111	65	132	*	*
69)	**Styrene**	18.32	27.7	26.50	105	67	124	*	*
70)	**o-Xylene**	18.42	24.9	26.75	93	65	114	*	*
71)	**n-Nonane**	18.63	25.1	26.83	94	64	117	*	*
72)	**1,1,2,2-Tetrachloroethane**	18.40	26.1	26.80	97	66	119	*	*
74)	**Cumene**	18.95	24.6	26.80	92	61	116	*	*
75)	**alpha-Pinene**	19.30	25.9	26.40	98	65	120	*	*
76)	**n-Propylbenzene**	19.41	25.5	27.23	94	63	117	*	*
77)	3-Ethyltoluene	19.50	24.8	26.83	92	60	117	*	*
78)	**4-Ethyltoluene**	19.54	26.2	26.80	98	63	124	*	*
79)	**1,3,5-Trimethylbenzene**	19.61	24.1	26.73	90	60	117	*	*
80)	alpha-Methylstyrene	19.74	28.9	26.75	108	64	131	*	*
81)	2-Ethyltoluene	19.77	24.5	27.08	90	62	116	*	*
82)	**1,2,4-Trimethylbenzene**	19.97	25.1	26.90	93	61	122	*	*
83)	n-Decane	20.06	25.8	26.88	96	67	120	*	*
84)	**Benzyl Chloride**	20.08	29.3	27.08	108	77	142	*	*
85)	**1,3-Dichlorobenzene**	20.10	26.9	26.98	100	61	125	*	*
86)	**1,4-Dichlorobenzene**	20.16	26.1	27.00	97	59	123	*	*
87)	sec-Butylbenzene	20.21	24.8	26.55	93	62	117	*	*
88)	4-Isopropyltoluene (p-Cymene)	20.35	25.3	26.95	94	58	122	*	*
89)	1,2,3-Trimethylbenzene	20.35	26.0	26.95	96	62	124	*	*
90)	**1,2-Dichlorobenzene**	20.47	26.5	26.95	98	61	126	*	*
91)	**d-Limonene**	20.47	27.2	26.38	103	66	124	*	*
92)	**1,2-Dibromo-3-Chloropropane**	20.85	28.1	26.15	107	67	138	*	*
93)	n-Undecane	21.17	28.4	27.03	105	68	127	*	*
94)	**1,2,4-Trichlorobenzene**	21.97	28.1	26.78	105	62	141	*	*
95)	**Naphthalene**	22.07	29.1	25.38	115	62	145	*	*
96)	n-Dodecane	22.06	24.6	25.63	96	64	152	*	*
97)	**Hexachlorobutadiene**	22.38	23.7	26.13	91	49	131	*	*
98)	Cyclohexanone	18.13	23.4	24.45	96	61	127	*	*
99)	tert-Butylbenzene	19.96	25.0	26.88	93	58	122	*	*
100)	n-Butylbenzene	20.72	26.0	27.00	96	64	121	*	*

Bold = 75 Compound List

*** = Pass**

Evaluate Continuing Calibration Report

00936347

```
Data File : I:\MS13\DATA\2019_03\11\03111901.D          Vial: 2
Acq On    : 11 Mar 2019   6:51                       Operator: WA
Sample    : CCV R13031119_25ng                       Inst    : MS13
Misc      : S31-02211904/S31-02281905

Quant Time: Mar 11 07:15:15 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

WA 3/11/19

```
Min. RRF     :   0.000  Min. Rel. Area :  50%  Max. R.T. Dev  0.33min
Max. RRF Dev :  30%     Max. Rel. Area : 200%
```

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	84	-0.01
2	T	Propene	1.088	1.070	1.7	84	0.00
3	T	Dichlorodifluoromethane (CF	1.858	1.763	5.1	80	0.00
4	T	Chloromethane	1.443	1.537	-6.5	86	0.00
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.198	1.106	7.7	79	0.00
6	T	Vinyl Chloride	1.383	1.422	-2.8	82	0.00
7	T	1,3-Butadiene	1.040	1.182	-13.7	87	0.00
8	T	Bromomethane	0.992	0.947	4.5	77	-0.01
9	T	Chloroethane	0.761	0.749	1.6	80	-0.01
10	T	Ethanol	0.741	0.750	-1.2	87	-0.06
11	T	Acetonitrile	1.794	1.940	-8.1	86	-0.03
12	T	Acrolein	0.613	0.677	-10.4	84	-0.02
13	T	Acetone	0.788	0.728	7.6	82	-0.03
14	T	Trichlorofluoromethane	1.557	1.445	7.2	80	-0.02
15	T	2-Propanol (Isopropanol)	2.399	2.509	-4.6	84	-0.05
16	T	Acrylonitrile	1.149	1.394	-21.3	84	-0.03
17	T	1,1-Dichloroethene	1.039	0.998	3.9	77	-0.01
18	T	2-Methyl-2-Propanol (tert-B	2.358	2.393	-1.5	82	-0.05
19	T	Methylene Chloride	0.999	1.021	-2.2	78	-0.02
20	T	3-Chloro-1-propene (Allyl C	1.338	1.422	-6.3	83	-0.02
21	T	Trichlorotrifluoroethane	1.099	0.991	9.8	76	-0.01
22	T	Carbon Disulfide	4.079	3.707	9.1	80	-0.02
23	T	trans-1,2-Dichloroethene	1.216	1.320	-8.6	80	-0.01
24	T	1,1-Dichloroethane	1.730	1.643	5.0	79	-0.01
25	T	Methyl tert-Butyl Ether	2.955	2.762	6.5	78	0.00
26	T	Vinyl Acetate	0.253	0.261	-3.2	79	-0.02
27	T	2-Butanone (MEK)	0.722	0.722	0.0	79	-0.02
28	T	cis-1,2-Dichloroethene	1.258	1.278	-1.6	80	-0.02
29	T	Diisopropyl Ether	1.014	0.964	4.9	77	-0.01
30	T	Ethyl Acetate	0.358	0.359	-0.3	80	-0.02
31	T	n-Hexane	1.660	1.446	12.9	79	0.00
32	T	Chloroform	1.626	1.554	4.4	79	-0.02
33	S	1,2-Dichloroethane-d4(SS1)	1.066	1.165	-9.3	93	-0.01
34	T	Tetrahydrofuran (THF)	0.733	0.777	-6.0	89	0.00
35	T	Ethyl tert-Butyl Ether	1.259	1.172	6.9	77	-0.01
36	T	1,2-Dichloroethane	1.032	1.041	-0.9	80	0.00
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	83	0.00
38	T	1,1,1-Trichloroethane	0.330	0.320	3.0	78	-0.01
39	T	Isopropyl Acetate	0.159	0.155	2.5	81	0.00
40	T	1-Butanol	0.216	0.253	-17.1	86	-0.03
41	T	Benzene	1.032	0.949	8.0	77	0.00
42	T	Carbon Tetrachloride	0.304	0.303	0.3	78	0.00
43	T	Cyclohexane	0.406	0.377	7.1	77	0.00
44	T	tert-Amyl Methyl Ether	0.674	0.647	4.0	78	0.00
45	T	1,2-Dichloropropane	0.236	0.227	3.8	78	-0.01
46	T	Bromodichloromethane	0.286	0.292	-2.1	79	0.00
47	T	Trichloroethene	0.298	0.280	6.0	75	0.00
48	T	1,4-Dioxane	0.208	0.207	0.5	78	0.00
49	T	2,2,4-Trimethylpentane (Iso	1.015	0.927	8.7	78	-0.01
50	T	Methyl Methacrylate	0.100	0.105	-5.0	76	-0.01
51	T	n-Heptane	0.249	0.230	7.6	77	0.00
52	T	cis-1,3-Dichloropropene	0.374	0.382	-2.1	79	0.00
53	T	4-Methyl-2-pentanone	0.213	0.220	-3.3	80	0.00
54	T	trans-1,3-Dichloropropene	0.314	0.337	-7.3	79	0.00
55	T	1,1,2-Trichloroethane	0.240	0.232	3.3	77	0.00

Data File : I:\MS13\DATA\2019_03\11\03111901.D Vial: 2
Acq On : 11 Mar 2019 6:51 Operator: WA
Sample : CCV R13031119_25ng Inst : MS13
Misc : S31-02211904/S31-02281905

Quant Time: Mar 11 07:15:15 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	89	0.00
57	S	Toluene-d8 (SS2)	2.677	2.587	3.4	87	0.00
58	T	Toluene	2.845	2.271	20.2	77	0.00
59	T	2-Hexanone	1.118	1.133	-1.3	83	0.00
60	T	Dibromochloromethane	0.693	0.663	4.3	77	0.00
61	T	1,2-Dibromoethane	0.644	0.622	3.4	77	0.00
62	T	n-Butyl Acetate	1.298	1.276	1.7	83	0.00
63	T	n-Octane	0.523	0.448	14.3	79	0.00
64	T	Tetrachloroethene	0.871	0.718	17.6	74	0.00
65	T	Chlorobenzene	1.887	1.571	16.7	75	0.00
66	T	Ethylbenzene	3.062	2.578	15.8	76	0.00
67	T	m- & p-Xylenes	2.364	1.975	16.5	77	0.00
68	T	Bromoform	0.633	0.631	0.3	76	0.00
69	T	Styrene	1.848	1.687	8.7	75	0.00
70	T	o-Xylene	2.356	1.964	16.6	77	0.00
71	T	n-Nonane	1.152	1.016	11.8	82	0.00
72	T	1,1,2,2-Tetrachloroethane	1.104	0.999	9.5	78	0.00
73	S	Bromofluorobenzene (SS3)	0.964	0.955	0.9	88	0.00
74	T	Cumene	3.215	2.616	18.6	76	0.00
75	T	alpha-Pinene	1.539	1.349	12.3	76	0.00
76	T	n-Propylbenzene	3.606	3.037	15.8	77	0.00
77	T	3-Ethyltoluene	3.056	2.639	13.6	78	0.00
78	T	4-Ethyltoluene	3.053	2.479	18.8	74	0.00
79	T	1,3,5-Trimethylbenzene	2.680	2.163	19.3	76	0.00
80	T	alpha-Methylstyrene	1.323	1.258	4.9	74	0.00
81	T	2-Ethyltoluene	3.180	2.567	19.3	76	0.00
82	T	1,2,4-Trimethylbenzene	2.600	2.196	15.5	77	0.00
83	T	n-Decane	1.265	1.117	11.7	79	0.00
84	T	Benzyl Chloride	1.901	1.964	-3.3	80	0.00
85	T	1,3-Dichlorobenzene	1.631	1.397	14.3	75	0.00
86	T	1,4-Dichlorobenzene	1.713	1.424	16.9	75	0.00
87	T	sec-Butylbenzene	3.609	2.958	18.0	76	0.00
88	T	4-Isopropyltoluene (p-Cymen	3.369	2.851	15.4	77	0.00
89	T	1,2,3-Trimethylbenzene	2.572	2.226	13.5	78	0.00
90	T	1,2-Dichlorobenzene	1.592	1.343	15.6	75	0.00
91	T	d-Limonene	0.907	0.875	3.5	78	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.576	0.535	7.1	76	0.00
93	T	n-Undecane	1.167	1.203	-3.1	80	0.00
94	T	1,2,4-Trichlorobenzene	1.212	1.100	9.2	74	0.00
95	T	Naphthalene	3.307	3.410	-3.1	76	0.00
96	T	n-Dodecane	1.091	1.165	-6.8	80	0.00
97	T	Hexachlorobutadiene	0.901	0.694	23.0	74	0.01
98	T	Cyclohexanone	0.862	0.849	1.5	87	0.00
99	T	tert-Butylbenzene	2.651	2.177	17.9	76	0.00
100	T	n-Butylbenzene	2.645	2.323	12.2	77	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Data File : I:\MS13\DATA\2019_03\11\03111901.D Vial: 2
Acq On : 11 Mar 2019 6:51 Operator: WA
Sample : CCV R13031119_25ng Inst : MS13
Misc : S31-02211904/S31-02281905

Quant Time: Mar 11 07:15:15 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 3/11/19

Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
1) Bromochloromethane (IS1)	10.98	130	106667	12.500 ng		-0.01
37) 1,4-Difluorobenzene (IS2)	13.10	114	447071	12.500 ng		0.00
56) Chlorobenzene-d5 (IS3)	17.42	82	192180	12.500 ng		0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	11.83	65	124247	13.662 ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery =	109.28%		
57) Toluene-d8 (SS2)	15.55	98	497175	12.081 ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery =	96.64%		
73) Bromofluorobenzene (SS3)	18.83	174	183581	12.390 ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery =	99.12%		
Target Compounds						Qvalue
2) Propene	3.98	42	235322	25.355 ng		96
3) Dichlorodifluoromethan...	4.13	85	392965	24.783 ng		100
4) Chloromethane	4.41	50	330438	26.843 ng		99
5) 1,2-Dichloro-1,1,2,2-t...	4.67	135	242491	23.729 ng		100
6) Vinyl Chloride	4.82	62	318899	27.021 ng		99
7) 1,3-Butadiene	5.08	54	264522	29.796 ng		95
8) Bromomethane	5.51	94	203909	24.080 ng		99
9) Chloroethane	5.83	64	163214	25.128 ng		99
10) Ethanol	6.23	45	822363	129.974 ng		97
11) Acetonitrile	6.47	41	427457	27.920 ng		98
12) Acrolein	6.64	56	148566	28.409 ng		97
13) Acetone	6.85	58	833838	124.033 ng		85
14) Trichlorofluoromethane	7.07	101	326653	24.584 ng		99
15) 2-Propanol (Isopropanol)	7.34	45	1104101	53.930 ng		94
16) Acrylonitrile	7.59	53	307571	31.381 ng		97
17) 1,1-Dichloroethene	8.02	96	228590	25.775 ng		90
18) 2-Methyl-2-Propanol (t...	8.21	59	1094314	54.379 ng		96
19) Methylene Chloride	8.26	84	233098	27.351 ng		100
20) 3-Chloro-1-propene (Al...	8.41	41	323593	28.333 ng		95
21) Trichlorotrifluoroethane	8.66	151	225186	24.018 ng		97
22) Carbon Disulfide	8.51	76	850054	24.419 ng		99
23) trans-1,2-Dichloroethene	9.53	61	299115	28.822 ng		97
24) 1,1-Dichloroethane	9.78	63	361106	24.459 ng		99
25) Methyl tert-Butyl Ether	9.88	73	641730	25.447 ng		97
26) Vinyl Acetate	10.05	86	291877	134.966 ng	#	94
27) 2-Butanone (MEK)	10.28	72	158222	25.675 ng		98
28) cis-1,2-Dichloroethene	10.80	61	287393	26.776 ng		96
29) Diisopropyl Ether	11.10	87	222396	25.708 ng	#	69
30) Ethyl Acetate	11.10	61	165812	54.330 ng		100
31) n-Hexane	11.08	57	333813	23.565 ng	#	100
32) Chloroform	11.14	83	357022	25.726 ng		99
34) Tetrahydrofuran (THF)	11.55	72	177100	28.317 ng		94
35) Ethyl tert-Butyl Ether	11.69	87	265116	24.680 ng		98
36) 1,2-Dichloroethane	11.95	62	235605	26.745 ng		100
38) 1,1,1-Trichloroethane	12.22	97	309300	26.206 ng		98
39) Isopropyl Acetate	12.66	61	287134	50.640 ng	#	87
40) 1-Butanol	12.68	56	467883	60.598 ng	#	74
41) Benzene	12.70	78	876518	23.742 ng		99
42) Carbon Tetrachloride	12.86	117	280583	25.834 ng		100
43) Cyclohexane	12.99	84	702816	48.449 ng		95
44) tert-Amyl Methyl Ether	13.35	73	620844	25.766 ng		97
45) 1,2-Dichloropropane	13.55	63	217851	25.800 ng		100
46) Bromodichloromethane	13.74	83	278511	27.251 ng		100
47) Trichloroethene	13.80	130	265611	24.891 ng		99
48) 1,4-Dioxane	13.78	88	196768	26.453 ng		97
49) 2,2,4-Trimethylpentane...	13.86	57	879320	24.214 ng		91
50) Methyl Methacrylate	14.01	100	199639	55.930 ng		97

00936350

Data File : I:\MS13\DATA\2019_03\11\03111901.D Vial: 2
Acq On : 11 Mar 2019 6:51 Operator: WA
Sample : CCV R13031119_25ng Inst : MS13
Misc : S31-02211904/S31-02281905

Quant Time: Mar 11 07:15:15 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M

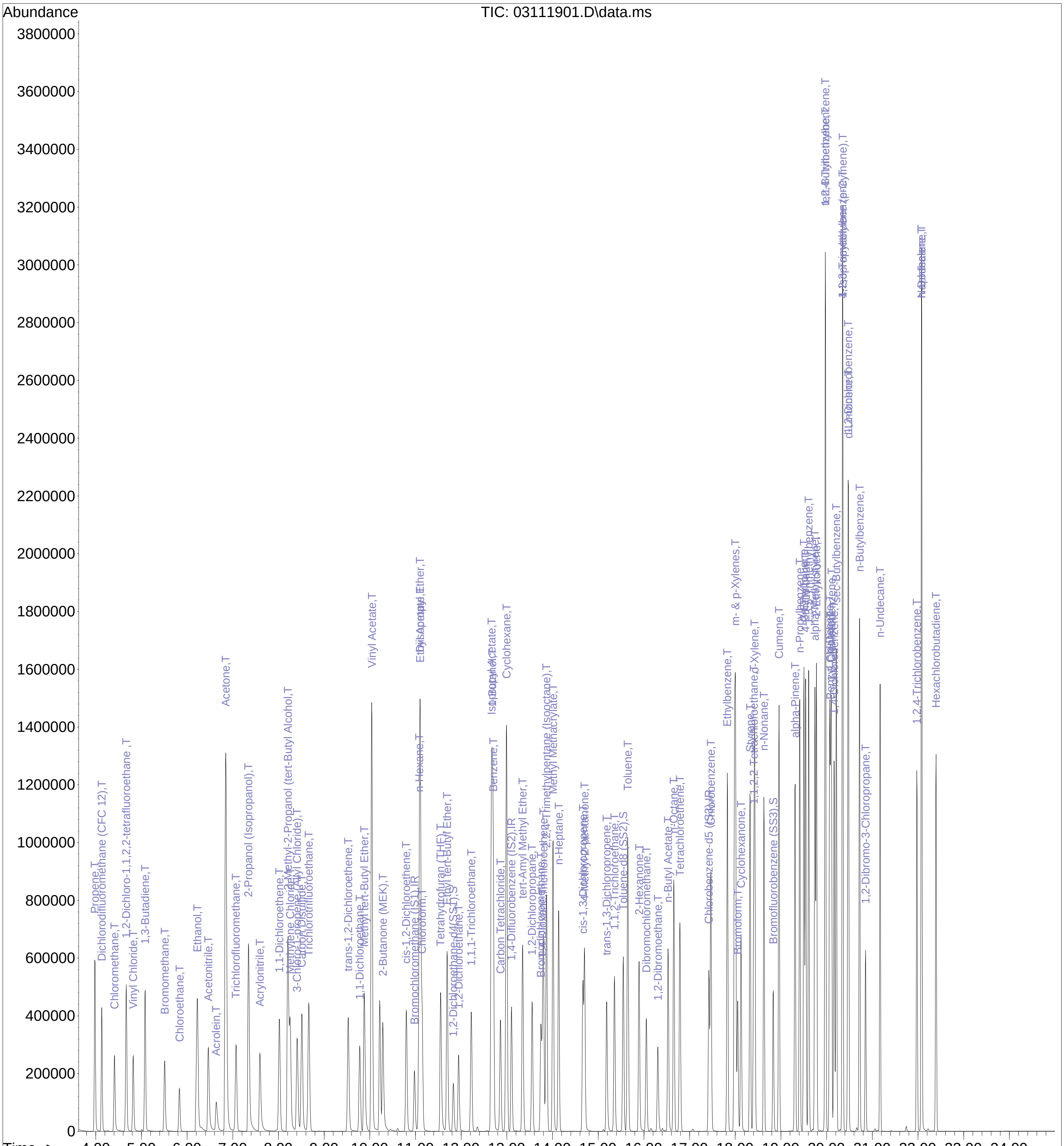
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.14	71	221459	24.888 ng	98
52) cis-1,3-Dichloropropene	14.67	75	382316	28.566 ng	100
53) 4-Methyl-2-pentanone	14.70	58	208948	27.467 ng	96
54) trans-1,3-Dichloropropene	15.18	75	317511	28.238 ng	100
55) 1,1,2-Trichloroethane	15.36	97	223507	26.051 ng	100
58) Toluene	15.65	91	918137	20.989 ng	99
59) 2-Hexanone	15.90	43	467579	27.201 ng	95
60) Dibromochloromethane	16.06	129	273856	25.696 ng	100
61) 1,2-Dibromoethane	16.31	107	257132	25.963 ng	100
62) n-Butyl Acetate	16.53	43	532315	26.684 ng	96
63) n-Octane	16.65	57	185336	23.057 ng	93
64) Tetrachloroethene	16.79	166	292166	21.823 ng	99
65) Chlorobenzene	17.47	112	643493	22.178 ng	100
66) Ethylbenzene	17.82	91	1023485	21.738 ng	98
67) m- & p-Xylenes	18.00	91	1611680	44.343 ng	100
68) Bromoform	18.05	173	257887	26.489 ng	100
69) Styrene	18.33	104	687351	24.192 ng	97
70) o-Xylene	18.42	91	801502	22.127 ng	98
71) n-Nonane	18.63	43	418034	23.610 ng	96
72) 1,1,2,2-Tetrachloroethane	18.41	83	408510	24.067 ng	99
74) Cumene	18.96	105	1062690	21.500 ng	100
75) alpha-Pinene	19.31	93	536819	22.688 ng	95
76) n-Propylbenzene	19.41	91	1256120	22.658 ng	99
77) 3-Ethyltoluene	19.50	105	1077374	22.932 ng	100
78) 4-Ethyltoluene	19.54	105	1010947	21.535 ng	100
79) 1,3,5-Trimethylbenzene	19.61	105	878705	21.326 ng	98
80) alpha-Methylstyrene	19.74	118	511648	25.156 ng	91
81) 2-Ethyltoluene	19.78	105	1057528	21.631 ng	99
82) 1,2,4-Trimethylbenzene	19.97	105	901441	22.552 ng	97
83) n-Decane	20.07	57	461988	23.751 ng	99
84) Benzyl Chloride	20.08	91	793566	27.147 ng	99
85) 1,3-Dichlorobenzene	20.11	146	579892	23.119 ng	99
86) 1,4-Dichlorobenzene	20.16	146	591797	22.475 ng	100
87) sec-Butylbenzene	20.21	105	1208388	21.777 ng	99
88) 4-Isopropyltoluene (p-...	20.35	119	1141876	22.046 ng	99
89) 1,2,3-Trimethylbenzene	20.35	105	891642	22.549 ng	97
90) 1,2-Dichlorobenzene	20.47	146	562103	22.960 ng	99
91) d-Limonene	20.48	68	339751	24.353 ng	94
92) 1,2-Dibromo-3-Chloropr...	20.85	157	214319	24.215 ng	90
93) n-Undecane	21.17	57	488673	27.244 ng	97
94) 1,2,4-Trichlorobenzene	21.97	180	449693	24.127 ng	100
95) Naphthalene	22.08	128	1343621	26.425 ng	100
96) n-Dodecane	22.08	57	461720	27.524 ng	99
97) Hexachlorobutadiene	22.39	225	281020	20.280 ng	100
98) Cyclohexanone	18.13	55	320326	24.179 ng	96
99) tert-Butylbenzene	19.97	119	892611	21.904 ng	100
100) n-Butylbenzene	20.72	91	949882	23.362 ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

```
Data File : I:\MS13\DATA\2019_03\11\03111901.D           Vial: 2
Acq On    : 11 Mar 2019   6:51                        Operator: WA
Sample    : CCV R13031119_25ng                        Inst    : MS13
Misc      : S31-02211904/S31-02281905

Quant Time: Mar 11 07:15:15 2019
Quant Method : I:\MS13\METHODS\R13012319.M
Quant Title  : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Jan 23 11:21:29 2019
Response via : Initial Calibration
DataAcq Meth:TO15.M
```

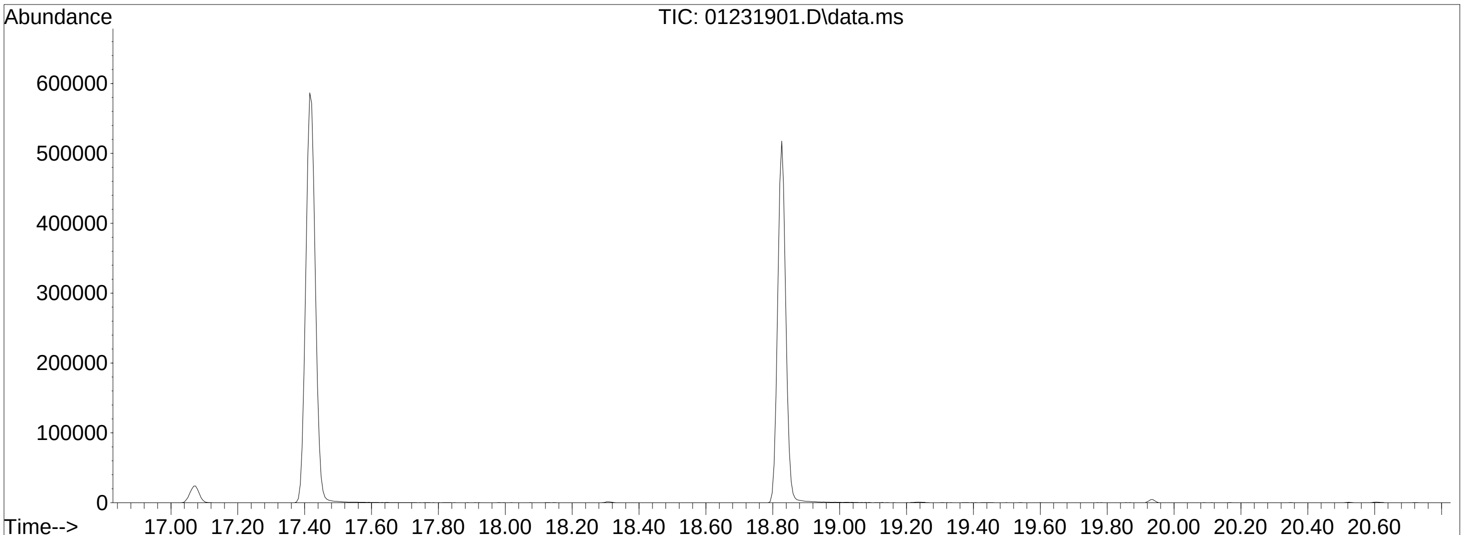


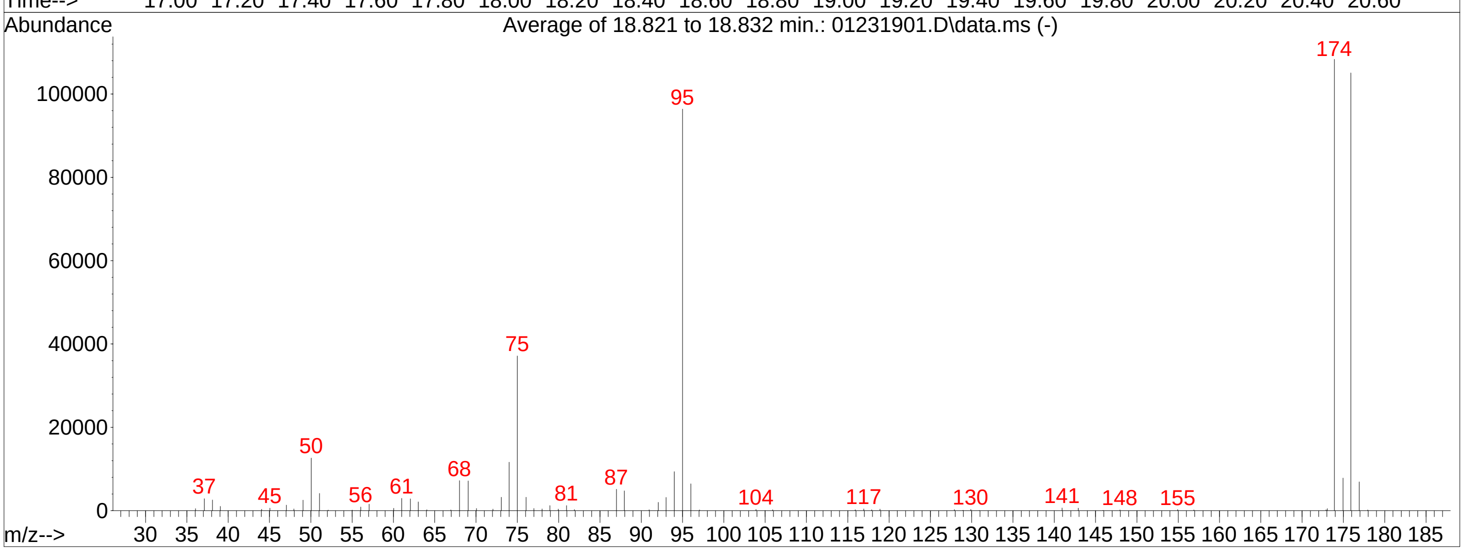
00936352

Data Path : I:\MS13\DATA\2019_01\23\
Data File : 01231901.D
Acq On : 23 Jan 2019 4:21
Operator : WA
Sample : BFB Std
Misc : S31-01221908
ALS Vial : 2 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS13\METHODS\R13012319.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Wed Jan 23 11:21:29 2019





AutoFind: Scans 2671, 2672, 2673; Background Corrected with Scan 2664

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	13.1	12653	PASS
75	95	30	66	38.5	37123	PASS
95	95	100	100	100.0	96387	PASS
96	95	5	9	6.7	6460	PASS
173	174	0.00	2	0.5	489	PASS
174	95	50	120	112.4	108333	PASS
175	174	4	9	7.2	7833	PASS
176	174	93	101	97.0	105085	PASS
177	176	5	9	6.6	6896	PASS

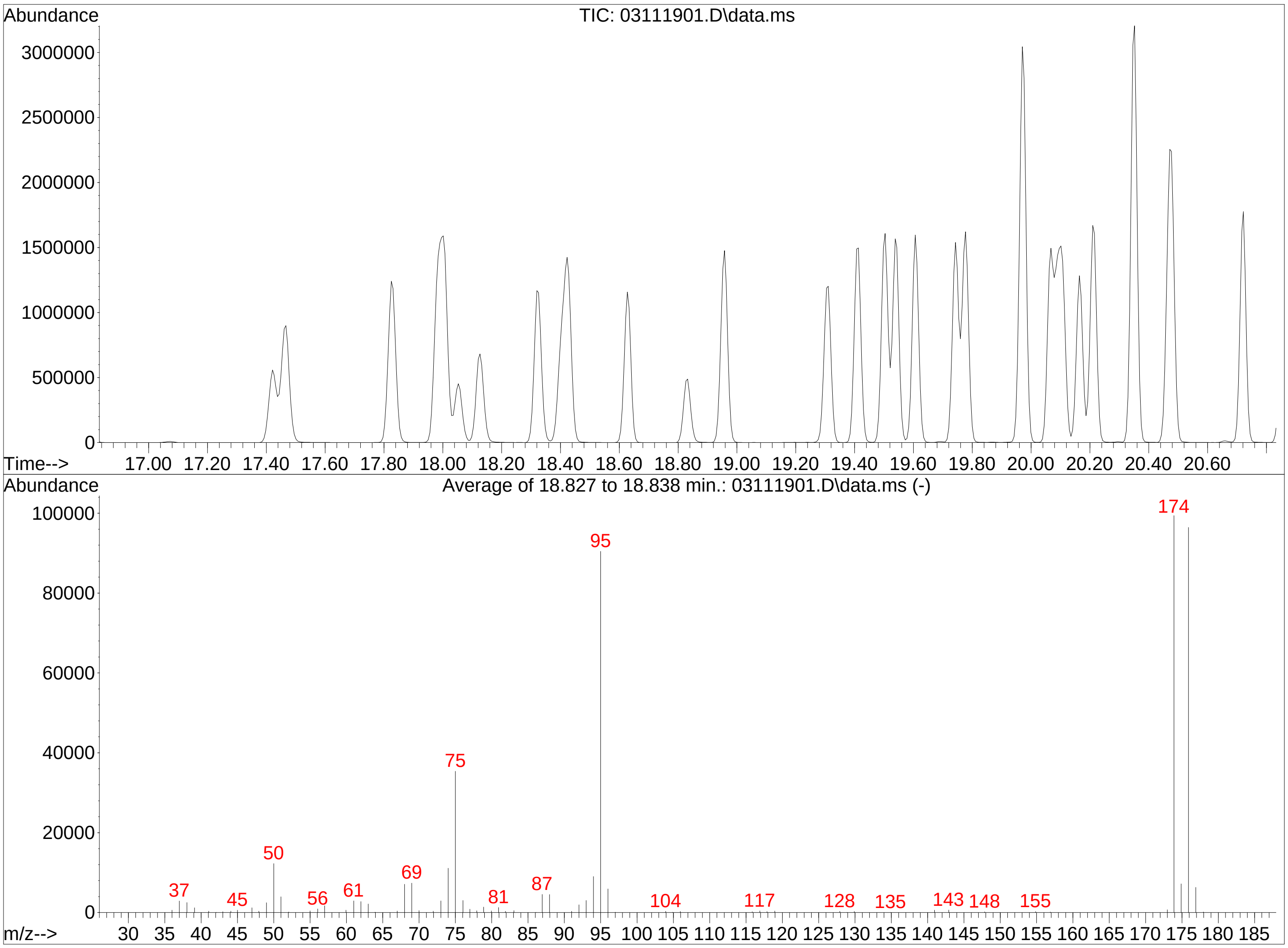
WA 1/23/19

00936353

```
Data Path : I:\MS13\DATA\2019_03\11\
Data File : 03111901.D
Acq On    : 11 Mar 2019   6:51
Operator  : WA
Sample    : CCV R13031119_25ng
Misc      : S31-02211904/S31-02281905
ALS Vial  : 2   Sample Multiplier: 1

Integration File: LSCINT.P

Method    : I:\MS13\METHODS\R13012319.M
Title     : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update  : Wed Jan 23 11:21:29 2019
```



AutoFind: Scans 2672, 2673, 2674; Background Corrected with Scan 2665

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	13.6	12265	PASS
75	95	30	66	39.1	35389	PASS
95	95	100	100	100.0	90475	PASS
96	95	5	9	6.5	5922	PASS
173	174	0.00	2	0.7	706	PASS
174	95	50	120	109.9	99416	PASS
175	174	4	9	7.2	7181	PASS
176	174	93	101	97.0	96467	PASS
177	176	5	9	6.5	6309	PASS

WA 3/11/19

Injection Log

Directory: I:\MS13\DATA\2019_01\23\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	1/23/19 4:21	01231901.D	BFB Std	S31-01221908	WA	2	*Pass*
2	1/23/19 4:55	01231902.D	Std check	S31-1212181/S31-01181901 (2/16)	WA	2	
3	1/23/19 5:28	01231903.D	Std check	S31-1212181/S31-01181901 (2/16)	WA	2	
4	1/23/19 6:01	01231904.D	0.5ng R13012319 ICAL Std	S31-01231908/S31-01161906 (2/14)	WA	15	*R13012319.M*
5	1/23/19 6:35	01231905.D	1.0ng R13012319 ICAL Std	S31-01231908/S31-01161906 (2/14)	WA	15	
6	1/23/19 8:07	01231906.D	0.1ng R13012319 ICAL Std	S31-01231908/S31-01221902 (2/20)	WA	14	
7	1/23/19 8:40	01231907.D	0.2ng R13012319 ICAL Std	S31-01231908/S31-01221902 (2/20)	WA	14	
8	1/23/19 9:13	01231908.D	5.0ng R13012319 ICAL Std	S31-01221908/S31-01161903 (2/14)	WA	16	
9	1/23/19 9:46	01231909.D	25ng R13012319 ICAL Std	S31-01221908/S31-01161903 (2/14)	WA	16	
10	1/23/19 10:20	01231910.D	50ng R13012319 ICAL Std	S31-01221908/S31-01161903 (2/14)	WA	16	
11	1/23/19 10:53	01231911.D	100ng R13012319 ICAL Std	S31-01221908/S31-01161903 (2/14)	WA	16	
12	1/23/19 11:31	01231912.D	25ng TO-15 ICV Std	S31-01221908/S31-12271803 (1/25)	WA	13	*Pass all compds*
	R13012319.M:good for low level compounds; ranges from 0.1ng -->100ng (except: chloroethane, CS2, Naphthalene: 0.2ng --> 100ng; Acetonitrile,						
	Acrolein, Acrylonitrile, MEK, cis/trans-1,3-DCP, Benzyl-Cl, n-Dodecane: 0.5ng --> 100ng; Ethyl Ac,: 1.0ng --> 200ng;Vinyl Ac.: 2.5ng --> 500ng						

WA 1/29/19

Injection Log

00936355

Directory: I:\MS13\DATA\2019_03\11\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	3/11/19 6:51	03111901.D	CCV R13031119_25ng	S31-02211904/S31-02281905	WA	2	*Pass*
2	3/11/19 7:24	03111902.D	CCV C13031119_25ng	S31-02211904/S31-02211902	WA	16	*Pass*
3	3/11/19 7:57	03111903.D	MB R13031119_1000mL	S31-02211904_AC00880	WA	2	*Pass*
4	3/11/19 8:31	03111904.D	LCS R13031119_25ng	S31-02211904/S31-03051901	WA	2	*Pass*
5	3/11/19 9:05	03111905.D	LCSD R13031119_25ng	S31-02211904/S31-03051901	WA	2	*Pass*
6	3/11/19 9:38	03111906.D	P1901209-001 (1000mL)	S31-02211904	WA	4	
7	3/11/19 10:12	03111907.D	P1901209-003 (1000mL)	S31-02211904	WA	8	
8	3/11/19 10:45	03111908.D	P1901209-004 (1000mL)	S31-02211904	WA	9	
9	3/11/19 11:22	03111909.D	P1901209-005 (1000mL)	S31-02211904	WA	10	
10	3/11/19 11:56	03111910.D	CCV2 R13031119_25ng	S31-02211904/S31-02281905	WA	2	*Pass- end DoD*
11	3/11/19 12:41	03111911.D	P1901200-005 (1000mL)	S31-02211904	WA	15	
12	3/11/19 13:14	03111912.D	P1901200-006 (1000mL)	S31-02211904	WA	1	
13	3/11/19 14:02	03111913.D	P1901179-001 (7.5mL)	S31-02211904	WA	3	*rerun higher*
14	3/11/19 14:37	03111914.D	P1901179-001 (10mL)	S31-02211904	WA	3	
15	3/11/19 15:20	03111915.D	P1901179-002 (10mL)	S31-02211904	WA	3	
16	3/11/19 15:53	03111916.D	P1901179-002dup (10mL)	S31-02211904	WA	3	*Pass*
17	3/11/19 16:28	03111917.D	P1901190-001dil (10mL)	S31-02211904	WA	3	
18	3/11/19 17:01	03111918.D	P1901190-002 (400mL)	S31-02211904	WA	6	
19	3/11/19 17:35	03111919.D	P1901190-001 (100mL)	S31-02211904	WA	11	
20	3/11/19 18:08	03111920.D	System	S31-02211904	WA	2	
21	3/11/19 18:42	03111921.D	P1901179-003 (1000mL)	S31-02211904	WA	1	
22	3/11/19 19:15	03111922.D	P1901179-004 (1000mL)	S31-02211904	WA	5	
23	3/11/19 19:48	03111923.D	P1901202-001 (400mL)	S31-02211904	WA	8	
24	3/11/19 20:22	03111924.D	P1901214-001 (1000mL)	S31-02211904	WA	9	*need dil*
25	3/11/19 20:55	03111925.D	P1901214-002 (1000mL)	S31-02211904	WA	7	
26	3/11/19 21:29	03111926.D	P1901157-002 (75mL)	S31-02211904	WA	7	*need dil*

WA 3/12/19