

**LONGHORN ARMY  
AMMUNITION PLANT  
KARNACK, TEXAS**

**ADMINISTRATIVE  
RECORD**

**Volume 1**

**2020**

**Bate Stamp Numbers**

**00949987 – 00951821**

**Prepared for**

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

**1976–2020**

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

VOLUME 1

2020

- A. Title: Report – Quarterly Evaluation Report, 3rd Quarter (July – September)  
2019 Groundwater Treatment Plant, Longhorn Army Ammunition Plant,  
Karnack, Texas
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- Recipient: U.S. Army Corps of Engineers, Tulsa District
- Date: December 17, 2019
- Date Stamp: 00949987 – 00951821

**QUARTERLY EVALUATION REPORT  
3<sup>RD</sup> QUARTER (JULY - SEPTEMBER) 2019  
GROUNDWATER TREATMENT PLANT  
LONGHORN ARMY AMMUNITION PLANT  
KARNACK, TEXAS**

**DECEMBER 2019**

Prepared For:



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

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

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GWTP QUARTERLY EVALUATION REPORT – 3<sup>RD</sup> QUARTER 2019  
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## ACRONYMS AND ABBREVIATIONS

AECOM	AECOM Technical Services, Inc.
AMCV(s)	Air Monitoring Comparison Value
amsl	Above mean sea level
bgs	Below ground surface
Bhate	Bhate Environmental Associates, Inc.
CD	Compact disc
COD	Chemical oxygen demand
ESD	Explanation of Significant Difference
ESL(s)	Effects Screening Level
FBR	Fluidized bed reactor
ft	Feet or foot
gpd	Gallons per day
gph	Gallons per hour
gpm	Gallons per minute
GWTP	Groundwater Treatment Plant
HCl	Hydrochloric acid
HDPE	High density polyethylene
ICT(s)	Interception-collection trench(es)
IRA	Interim Remedial Action
lbs/hr	Pounds per hour
LHAAP	Longhorn Army Ammunition Plant
µg/L	Micrograms per liter
Mg(OH) <sub>2</sub>	Magnesium hydroxide
mV	Millivolts
NA	Not applicable
NaOH	Sodium hydroxide
No.	Number
NM	Not measured
ORP	Oxidation-reduction potential
PID	Photoionization detector

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ppmv	Parts per million by volume
psi	Pounds per square inch
ROD	Record of Decision
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
tpy	Tons per year
UEP	Unlined Evaporation Pond
USEPA	United States Environmental Protection Agency
VOC(s)	Volatile Organic Compound(s)



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## EXECUTIVE SUMMARY

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

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

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

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

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

After developing an interim air monitoring plan and obtaining concurrence from the Texas Commission on Environmental Quality (TCEQ) and the United States Environmental Protection Agency (USEPA) to operate the GWTP without use of air abatement equipment, a pilot run of the GWTP was conducted on 6 September 2012. In that first pilot run, 85,170 gallons of water that had been stored in the influent equalization tank (TK-140) were treated. The treated water was re-circulated through the fluidized bed reactor (FBR) to revive the FBR after 3 months of dormancy. Treated groundwater and air samples were collected and analyzed respectively for perchlorate, metals, and Volatile Organic Compounds (VOCs); and VOCs only. On 19 September 2012, a second pilot run was performed at the GWTP and 107,264 gallons of water were treated. Based on the successful re-start of the GWTP, continuous groundwater extraction began again on 24 September 2012. While groundwater extraction occurs on a continuous basis, operation of the GWTP occurs intermittently due to the low volume of water available for treatment with

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respect to the design capacity of the GWTP. During the 3<sup>rd</sup> quarter of 2012, groundwater extraction occurred only from LHAAP-18/24. Groundwater extraction from LHAAP-16 was not performed due to equipment failure. However, extraction from LHAAP-16 began in October 2012 and the extraction volumes increased steadily throughout the 4<sup>th</sup> quarter of 2012, as pumping equipment was gradually repaired/replaced. The GWTP operated under normal conditions until September 2015.

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

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

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

On 27 December 2018, severe storms caused a power outage in Karnack, Texas including LHAAP. When electrical service was restored, the main transformer failed due to a manufacturing defect. A portable emergency generator was brought on-site on 28 December 2018, to allow the FBR to operate in full recycle mode. After a temporary generator was connected to the well field on 11 February 2019, extraction began from LHAAP-18/24, and the GWTP was put into normal operation.

The line to 18WW17 remained off in the third quarter 2019 and repairs are planned for the 4<sup>th</sup> quarter of 2019.

As shown on **Figure ES-1**, the total extracted groundwater volume from LHAAP-18/24 during the 3<sup>rd</sup> quarter of 2019 was within normal range. The extracted groundwater volume was measured on a monthly basis as the sum of the difference between the flow meter totalizer reading at each

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ICT between the beginning and end of each month. Extraction quantities from LHAAP-18/24 were 576,128 gallons in July 2019; 704,900 gallons in August 2019; and 432,478 gallons in September 2019.

Due to the main transformer being down, no extraction from LHAAP-16 occurred in July 2019. This was fixed on 20 August 2019. In August 2019, 11,635 gallons were extracted and another 65,726 gallons were extracted in September 2019 for a total of 77,361 gallons extracted in the 3<sup>rd</sup> Quarter 2019. Approximately 1,790,867 gallons of groundwater were extracted from LHAAP-18/24 and LHAAP 16 during the 3<sup>rd</sup> quarter of 2019 compared to approximately 1,030,110 gallons extracted during the 3<sup>rd</sup> quarter of 2018. No treated water was returned to ICTs 6 and 9 during the 3<sup>rd</sup> quarter of 2018 because this practice was discontinued after system restart in September 2012.

The average discharge flow rate from the GWTP was calculated as approximately 17 gallons per minute (gpm) during the 3<sup>rd</sup> quarter of 2019. Approximately 1,789,833 gallons of groundwater treated by the GWTP was discharged to the Harrison Bayou, with a majority of the discharged water from the INF Pond.

Grab perchlorate samples from the GWTP influent were collected on 16 July, 14 August, and 10 September 2019, and the following concentrations were reported: 6,900 micrograms per liter ( $\mu\text{g/L}$ ); 8,800  $\mu\text{g/L}$ ; and 4,900  $\mu\text{g/L}$ , respectively. A quarterly influent sample was collected and analyzed for perchlorate on 24 September 2019, and had a detection of 15,000  $\mu\text{g/L}$ . Considering all four perchlorate results, the average perchlorate concentration in the GWTP influent during the quarter was 8,900  $\mu\text{g/L}$ . No perchlorate concentrations in any effluent (TK-650) samples discharged to the Harrison Bayou exceeded the daily maximum effluent limit of 589  $\mu\text{g/L}$  during the quarter.

As shown in **Table ES-1**, 886,832 gallons of treated groundwater was discharged directly to the Harrison Bayou, with a majority of that occurring in July 2019. An additional 903,001 was discharged from the INF Pond to the Harrison Bayou during the 3<sup>rd</sup> quarter of 2019. **Table ES-1** also presents the INF Pond staff gauge readings by date, which is used to determine the freeboard available in the pond. During the 3<sup>rd</sup> quarter of 2019, the freeboard did not reduce to 3 feet, which would require TCEQ notification and request for reduction of the pond by another foot of freeboard. A total of 579,986 gallons was discharged to the INF Pond during the 3<sup>rd</sup> quarter of 2019. There was no water discharged to the Harrison Bayou in September 2019 due to low or no flow.

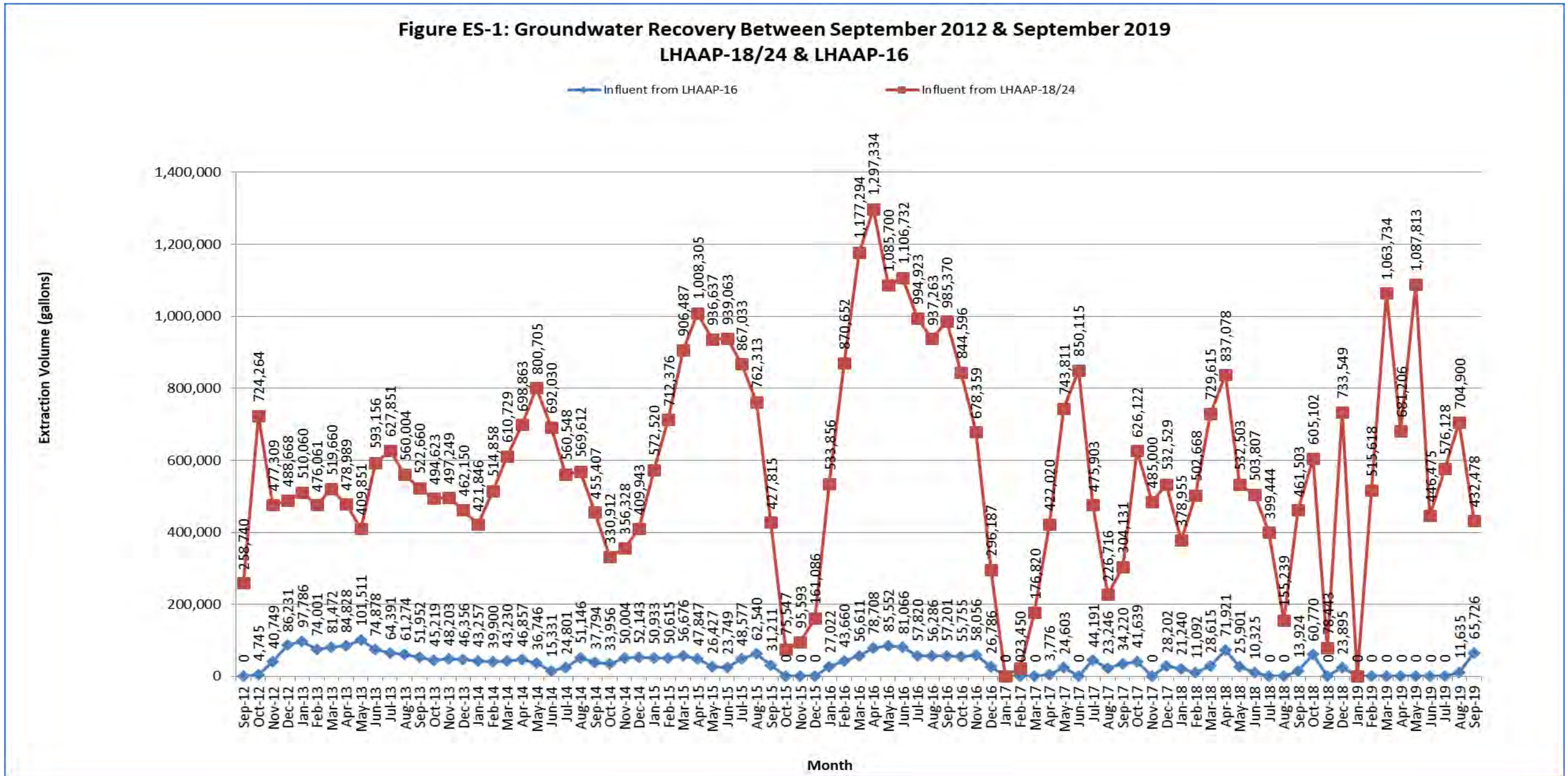
The groundwater volume extracted for treatment at the GWTP ranged from a low of 498,204 gallons in September 2019 to a high of 716,535 gallons in August 2019. The total water extracted for treatment by the GWTP in the 3<sup>rd</sup> quarter of 2019 was approximately 1,790,867 gallons. The 3 month average was approximately 596,956 gallons per month. The total treated water quantities discharged to either the Harrison Bayou or INF Pond each month, since June 2012, are shown on **Figure ES-2**. The total volume of water extracted based upon the sum of the individual extraction wells and ICTs from LHAAP-18/24 and LHAAP-16 in the 3<sup>rd</sup> quarter 2019 (1,790,867 gallons) is slightly higher than the volume of water discharged to the Harrison Bayou and the INF

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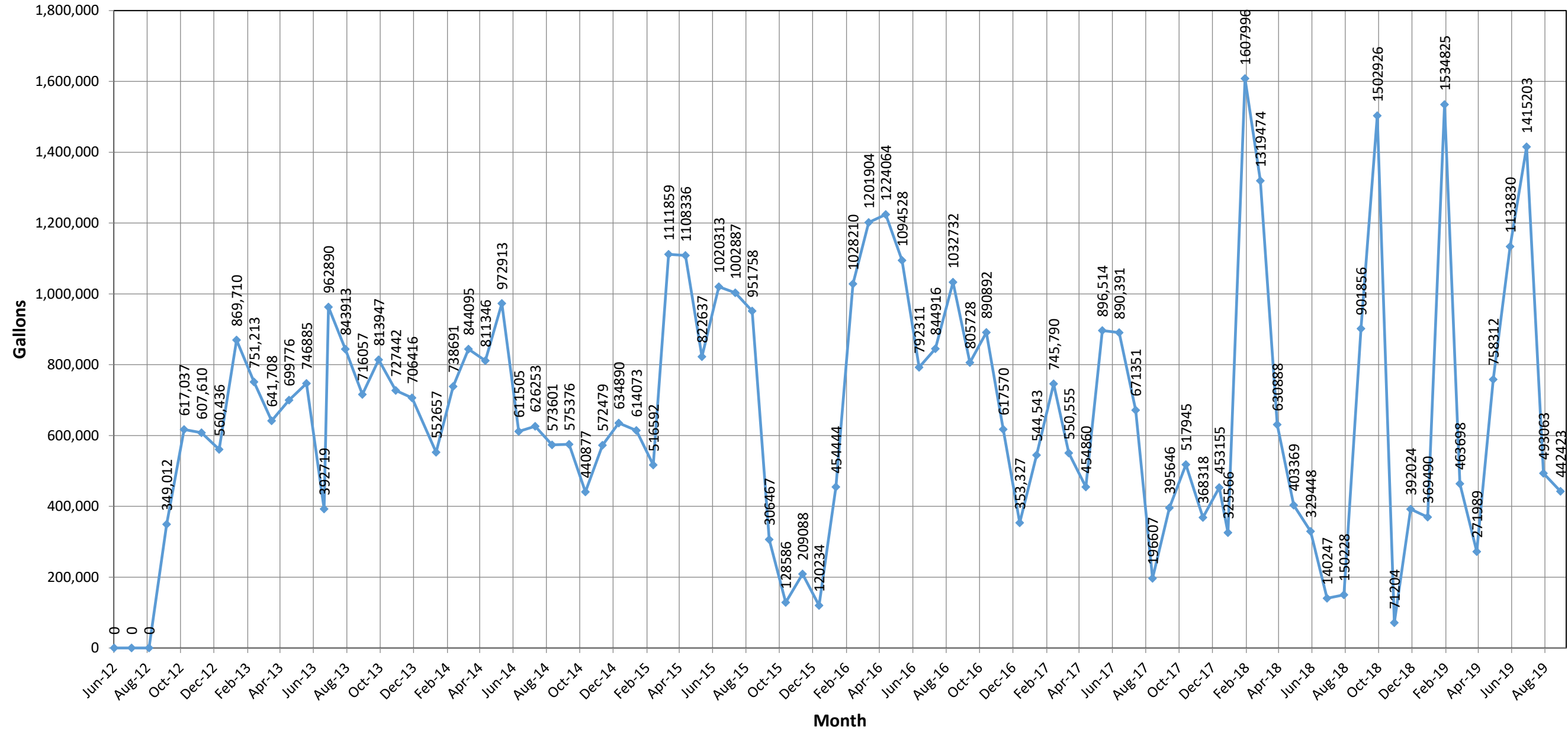
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to the Harrison Bayou and the INF Pond combined (1,466,818 gallons). Typically the reason for the difference is identified as the change in volume stored in the GWTP, the amount of water lost with the removed metals precipitation sludge, and the amount of evaporative water lost in the air stripper (which is included in the volume processed, but not in the volume discharged). However, piping leaks were identified along the 14 ICTs and out to 18WW17. The line associated with the 14 ICTs was repaired in June 2019 but the line out to 18WW17 remained down through the 3<sup>rd</sup> quarter of 2019.

**Figure ES-1: Groundwater Recovery Between September 2012 & September 2019  
 LHAAP-18/24 & LHAAP-16**



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



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**Table ES-1. Discharge Information to Harrison Bayou During 3<sup>rd</sup> Quarter 2019**

Date	Harrison Bayou Flow (gpm)	Calculated Maximum Rate Allowable (gpmM)	Released From GWTP To Harrison Bayou (gallons)	Released From INF Pond to Harrison Bayou (gallons)	Released From GWTP to INF Pond (gallons)	Combined Total Released to Harrison Bayou (gallons)	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
07/01/2019	NA	NA	0	0	0	0	5.38
07/02/2019	NA	NA	0	0	0	0	5.37
07/03/2019	8,589	2,510	0	0	0	0	5.36
07/04/2019	6,943	2,013	0	0	0	0	5.35
07/05/2019	6,048	1,767	23,588	0	0	23,588	5.34
07/06/2019	3,493	1,012	0	0	0	0	5.33
07/07/2019	2,954	856	0	0	0	0	5.31
07/08/2019	2,543	743	41,947	0	0	41,947	5.30
07/09/2019	2,097	612	18,977	0	0	18,977	5.29
07/10/2019	1,946	568	22,081	219,675	0	241,756	4.70
07/11/2019	1,806	527	16,156	184,920	0	201,076	4.08
07/12/2019	1,682	491	14,318	168,020	0	182,338	3.65
07/13/2019	1,501	435	0	0	0	0	3.65
07/14/2019	1,369	397	0	0	0	0	3.64
07/15/2019	1,233	360	66,326	0	0	66,326	3.64
07/16/2019	1,573	459	18,280	156,650	0	174,930	3.38
07/17/2019	1,802	526	19,580	173,736	0	193,316	2.66
07/18/2019	1,619	473	19,395	0	0	19,395	2.64
07/19/2019	1,445	422	18,013	0	0	18,013	2.62
07/20/2019	1,352	392	0	0	0	0	2.60
07/21/2019	1,230	356	0	0	0	0	2.58
07/22/2019	1,128	329	66,573	0	0	66,573	2.56
07/23/2019	1,025	299	18,412	0	0	18,412	2.54
07/24/2019	899	262	17,286	0	0	17,286	2.52
07/25/2019	807	235	17,100	0	0	17,100	2.50
07/26/2019	694	202	15,256	0	0	15,256	2.48
07/27/2019	604	175	0	0	0	0	2.46
07/28/2019	545	158	0	0	0	0	2.45

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Date	Harrison Bayou Flow (gpm)	Calculated Maximum Rate Allowable (gpmM)	Released From GWTP To Harrison Bayou (gallons)	Released From INF Pond to Harrison Bayou (gallons)	Released From GWTP to INF Pond (gallons)	Combined Total Released to Harrison Bayou (gallons)	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
07/29/2019	494	144	63,628	0	0	63,628	2.44
07/30/2019	2,040	596	22,783	0	0	22,783	2.47
07/31/2019	1,791	523	12,504	0	0	12,504	2.45
08/01/2019	1,726	504	21,440	0	0	21,440	2.43
08/02/2019	1,587	464	19,691	0	0	19,691	2.41
08/03/2019	1,385	401	0	0	0	0	2.39
08/04/2019	1,198	347	0	0	0	0	2.37
08/05/2019	1,040	303	53,474	0	0	53,474	2.35
08/06/2019	905	264	12,254	0	0	12,254	2.33
08/07/2019	778	227	12,903	0	0	12,903	2.31
08/08/2019	608	177	11,738	0	0	11,738	2.29
08/09/2019	539	157	16,473	0	0	16,473	2.27
08/10/2019	475	137	0	0	0	0	2.25
08/11/2019	390	113	0	0	0	0	2.23
08/12/2019	305	89	75,893	0	0	75,893	2.20
08/13/2019	268	78	16,102	0	0	16,102	2.18
08/14/2019	230	67	21,235	0	0	21,235	2.16
08/15/2019	206	60	20,440	0	0	20,440	2.15
08/16/2019	398	116	18,627	0	0	18,627	2.14
08/17/2019	223	64	0	0	0	0	2.12
08/18/2019	173	50	0	0	0	0	2.10
08/19/2019	146	42	61,270	0	0	61,270	2.08
08/20/2019	86	25	13,089	0	3,056	13,089	2.06
08/21/2019	NA	NA	0	0	16,171	0	2.30
08/22/2019	NA	NA	0	0	11,470	0	2.32
08/23/2019	NA	NA	0	0	0	0	2.34
08/24/2019	NA	NA	0	0	0	0	2.36
08/25/2019	NA	NA	0	0	0	0	2.38
08/26/2019	NA	NA	0	0	44,556	0	2.40



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Date	Harrison Bayou Flow (gpm)	Calculated Maximum Rate Allowable (gpmM)	Released From GWTP To Harrison Bayou (gallons)	Released From INF Pond to Harrison Bayou (gallons)	Released From GWTP to INF Pond (gallons)	Combined Total Released to Harrison Bayou (gallons)	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
08/27/2019	NA	NA	0	0	16,984	0	2.42
08/28/2019	NA	NA	0	0	16,488	0	2.44
08/29/2019	NA	NA	0	0	12,765	0	2.46
08/30/2019	NA	NA	0	0	16,073	0	2.50
08/31/2019	NA	NA	0	0	0	0	2.65
09/01/2019	NA	NA	0	0	0	0	2.80
09/02/2019	NA	NA	0	0	0	0	2.84
09/03/2019	NA	NA	0	0	46,995	0	2.88
09/04/2019	NA	NA	0	0	9,202	0	2.93
09/05/2019	NA	NA	0	0	8,498	0	2.96
09/06/2019	NA	NA	0	0	10,049	0	2.98
09/07/2019	NA	NA	0	0	0	0	3.00
09/08/2019	NA	NA	0	0	0	0	3.03
09/09/2019	NA	NA	0	0	32,955	0	3.05
09/10/2019	NA	NA	0	0	16,108	0	3.08
09/11/2019	NA	NA	0	0	16,192	0	3.12
09/12/2019	NA	NA	0	0	17,010	0	3.20
09/13/2019	NA	NA	0	0	18,299	0	3.24
09/14/2019	NA	NA	0	0	0	0	3.29
09/15/2019	NA	NA	0	0	0	0	3.36
09/16/2019	NA	NA	0	0	60,429	0	3.42
09/17/2019	NA	NA	0	0	18,797	0	3.51
09/18/2019	NA	NA	0	0	18,784	0	3.60
09/19/2019	NA	NA	0	0	17,740	0	3.67
09/20/2019	NA	NA	0	0	0	0	3.71
09/21/2019	NA	NA	0	0	0	0	3.85
09/22/2019	NA	NA	0	0	0	0	3.89
09/23/2019	NA	NA	0	0	81,590	0	3.94
09/24/2019	NA	NA	0	0	8,590	0	3.97

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Date	Harrison Bayou Flow (gpm)	Calculated Maximum Rate Allowable (gpmM)	Released From GWTP To Harrison Bayou (gallons)	Released From INF Pond to Harrison Bayou (gallons)	Released From GWTP to INF Pond (gallons)	Combined Total Released to Harrison Bayou (gallons)	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
09/25/2019	NA	NA	0	0	8,786	0	3.99
09/26/2019	NA	NA	0	0	8,069	0	4.01
09/27/2019	NA	NA	0	0	10,172	0	4.03
09/28/2019	NA	NA	0	0	0	0	4.05
09/29/2019	NA	NA	0	0	0	0	4.07
09/30/2019	NA	NA	0	0	34,158	0	4.10
			<b>886,832</b>	<b>903,001</b>	<b>579,986</b>	<b>1,789,833</b>	
Notes: NA = Not applicable							

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## 1 EVALUATION OF GROUNDWATER TREATMENT PLANT

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

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

### 1.1 Treatment Configuration

The process flow diagram for the GWTP is presented in **Appendix A, Figure A-2**. The GWTP was not operational between 24 May 2012, and 6 September 2012, due to malfunction of the scrubber unit associated with the catalytic oxidizer. Since 6 September 2012, the GWTP has operated without air abatement equipment. Although major repairs were conducted on the GWTP (e.g., replacement of level alarms, repair of the hydrochloric acid [HCl] tank, replacement of TK-650, replacement of malfunctioning valves and flow meters, replacement of metering pumps, repair or replacement of various system pumps, rust removal and repainting of various tanks, and replacement and repair of various extraction pumps, motors, and level switches), the GWTP treatment configuration has remained relatively unchanged. The only exception to this is that ion exchange vessels were installed in November 2018 following the FBR to further remove perchlorate prior to discharging to the INF pond.

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

In December 2016, an HCl spill caused plant operations to shut down until the issue could be properly addressed. The FBR performance was challenged by the increased chlorides in the

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neutralized wastewater, but performance gradually returned to normal in the 1<sup>st</sup> quarter of 2017. Groundwater extraction was gradually increased to full rates during the 2<sup>nd</sup> quarter of 2017.

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

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

The line to 18WW17 remained off in the third quarter 2019 and repairs are planned for the 4<sup>th</sup> quarter of 2019.

On 7 July 2019, the generator shutdown at 06:30. The mechanic was called and the generator was repaired and the FBR restarted at 14:30 on the same day.

On 9 September 2019, there was a loss of power to the air compressors due to a power glitch. The air compressors and FBR were restarted on the same day.

Flow rates for the treatment processes for metals and Volatile Organic Compounds (VOCs) ranged between 170 and 210 gallons per minute (gpm) with an average of approximately 185 gpm for the operating hours (i.e., this flow rate does not represent continuous flows). The GWTP operated for 107 hours during the quarter. The treatment configuration of the plant at these rates (with minor variations) is as follows:

**GWTP Metals Precipitation Operating Parameters**

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

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**GWTP Air Compressors Operating Parameters**

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

**GWTP Stripper Operating Parameters**

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

**GWTP Fluidized Bed Reactor Operating Parameters**

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

## 1.2 Work Performed at the GWTP

Work performed at the GWTP during the 3<sup>rd</sup> quarter of 2019 is described in the following subsections.

### 1.2.1 Major Maintenance

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

- 7 July 2019: Ark-La-Tex was on site to repair the generator
- 24 July 2019: Ark-La-Tex was on site to perform maintenance on the generator
- 5 – 6, 9, and 15 - 16 August 2019: Ark-La-Tex Electric on site for repairs to electrical lines
- 20 August 2019: Ark-La-Tex Electric on site to set new main transformer in place making the GWTP fully functional again
- 22 August 2019: Ark-La-Tex Electric on site to disconnect wiring from generator and re-connect wiring from transformer (FBR went offline due to power outage)
- 24 August 2019: Ark-La-Tex Electric on site for repairs to electric lines (FBR back online)

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### 1.2.2 Routine Maintenance

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

- Installed new drive belt on lawn mower
- Mowed and performed weed eating activities around GWTP
- Performed housekeeping in GWTP office, Army trailer, in GWTP Shop, and around GWTP and containment area
- Repaired and installed pump P-320
- Repaired check valve on suction side of acetic acid pump
- Repaired check valve on suction side of pump P-104
- Repaired roads at Site 18/24 with gravel
- Replaced leaking ½" tubing on suction side of pump P-225 (sodium hydroxide feed pump)
- Triple rinsed all empty acetic acid drums and place in storage location
- Used track hoe to remove tree that was touching electrical lines by Central Creek

#### 1.2.2.1 Safety

No safety activities were performed during this reporting period.

#### 1.2.2.2 Lubrication

No lubrication maintenance was conducted during the reporting period.

#### 1.2.2.3 Air Compressors

- Performed preventative maintenance on air compressors K-700 A & B
- Added oil to compressor K-700B

#### 1.2.2.4 Belt Press and Waste Disposal

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

#### 1.2.2.5 Sand Filter

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

#### 1.2.2.6 Well Field at LHAAP-18/24

- Collected monthly water levels
- Cleaned level probes on ICTs 14C and 14D
- Replaced pumps in ICTs 13A and 13D

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### 1.2.2.7 Miscellaneous Activities

- 7 July 2019: Generator shut down at 06:30; mechanic was called and generator was repaired and FBR restarted at 14:30
- 9 September 2019: Loss of power to air compressors due to a power glitch; air compressors were restarted

### 1.2.3 Routine Maintenance at LHAAP-16

- Checked site daily
- Collected monthly water levels
- Repaired extraction well pumps
- Repaired PZ 06

### 1.2.4 Routine Maintenance (Potable Water Wells)

- Flushed potable water lines

## 1.3 Filter Cake Operations and Management

No filter cake operations took place during this reporting period.

## 1.4 Fluidized Bed Reactor Operations

The operating parameters for the GWTP FBR are presented in **Table 1**. There were a few instances noted in gray in the table below where either the pH or the ORP fell outside of the optimal range. On 23 August 2019, the FBR was shutdown. It was offline due to a power outage.

**Table 1. Enhanced Fluidized Bed Reactor Operating Parameters – 3<sup>rd</sup> Quarter 2019**

Date	pH (7.1-7.4)	ORP (<-430 mV)	Temperature (Degrees Fahrenheit)
7/1/2019	7.0	-539	88
7/2/2019	7.0	-542	89
7/3/2019	7.0	-404	86
7/4/2019	7.0	-483	86
7/5/2019	7.0	-523	86
7/6/2019	7.0	-530	87
7/7/2019	7.0	-532	87
7/8/2019	7.1	-461	83
7/9/2019	7.2	-460	84
7/10/2019	7.2	-477	85
7/11/2019	7.1	-471	84
7/12/2019	7.1	-496	82

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Date	pH (7.1-7.4)	ORP (<-430 mV)	Temperature (Degrees Fahrenheit)
7/13/2019	7.1	-503	84
7/14/2019	7.1	-500	84
7/15/2019	7.1	-510	80
7/16/2019	7.3	-429	81
7/17/2019	7.3	-455	83
7/18/2019	7.4	-430	82
7/19/2019	7.4	-430	82
7/20/2019	7.4	-429	84
7/21/2019	7.4	-430	86
7/22/2019	7.3	-449	85
7/23/2019	7.4	-430	83
7/24/2019	7.4	-425	83
7/25/2019	7.3	-456	80
7/26/2019	7.2	-440	78
7/27/2019	7.3	-445	82
7/28/2019	7.3	-440	84
7/29/2019	7.3	-448	81
7/30/2019	7.3	-439	81
7/31/2019	7.4	-441	82
8/1/2019	7.3	-454	81
8/2/2019	7.2	-448	81
8/3/2019	7.2	-440	83
8/4/2019	7.3	-445	85
8/5/2019	7.2	-455	84
8/6/2019	7.2	-427	84
8/7/2019	7.2	-439	86
8/8/2019	7.3	-429	85
8/9/2019	7.3	-428	82
8/10/2019	7.3	-423	85
8/11/2019	7.3	-439	86
8/12/2019	7.4	-447	85
8/13/2019	7.4	-448	86
8/14/2019	7.4	-458	86
8/15/2019	7.2	-459	83
8/16/2019	7.2	-463	83
8/17/2019	7.3	-471	86
8/18/2019	7.3	-469	86
8/19/2019	7.2	-469	84
8/20/2019	7.3	-473	85



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Date	pH (7.1-7.4)	ORP (<-430 mV)	Temperature (Degrees Fahrenheit)
8/21/2019	7.4	-465	86
8/22/2019	7.4	-460	88
8/23/2019	Shutdown	Shutdown	Shutdown
8/24/2019	7.3	-452	85
8/25/2019	7.3	-435	85
8/26/2019	7.4	-426	84
8/27/2019	7.4	-430	84
8/28/2019	7.4	-427	85
8/29/2019	7.4	-427	83
8/30/2019	7.4	-430	84
8/31/2019	7.4	-429	84
9/1/2019	7.4	-430	84
9/2/2019	7.3	-428	84
9/3/2019	7.3	-430	84
9/4/2019	7.4	-428	85
9/5/2019	7.4	-437	85
9/6/2019	7.4	-432	86
9/7/2019	7.4	-431	86
9/8/2019	7.4	-439	87
9/9/2019	7.4	-432	85
9/10/2019	7.4	-435	83
9/11/2019	7.4	-428	84
9/12/2019	7.3	-443	83
9/13/2019	7.3	-429	83
9/14/2019	7.3	-428	85
9/15/2019	7.3	-433	86
9/16/2019	7.4	-427	83
9/17/2019	7.4	-433	84
9/18/2019	7.4	-435	84
9/19/2019	7.3	-426	81
9/20/2019	7.3	-435	82
9/21/2019	7.4	-434	83
9/22/2019	7.4	-426	84
9/23/2019	7.3	-439	81
9/24/2019	7.3	-449	82
9/25/2019	7.3	-453	83
9/26/2019	7.2	-459	84
9/27/2019	7.3	-460	85
9/28/2019	7.3	-455	85

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Date	pH (7.1-7.4)	ORP (<-430 mV)	Temperature (Degrees Fahrenheit)
9/29/2019	7.3	-451	85
9/30/2019	7.2	-464	83

## 1.5 Process Chemical Usage at GWTP

Approximate chemical consumption and the quantities delivered during the 3<sup>rd</sup> quarter of 2019 are shown in **Table 2**.

**Table 2. Chemical Usage and Delivery Table**

Chemical	Usage 3 <sup>rd</sup> Quarter 2019	Quantity Delivered 3 <sup>rd</sup> Quarter 2019
Hydrochloric acid	230 gallons	0
Sodium hydroxide (35%)	350 gallons	0
Acetic acid (50%)	3 drums = 165 gallons	0
Phosphoric acid (75%)	37.0 liters	0
Magnesium hydroxide	100 gallons	0
Urea	274.8 pounds	500 pounds
Polymer (magnafloc 110-L)	3.5 liters	0

## 2 EVALUATION OF LHAAP-18/24 ICT EFFECTIVENESS

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

### 2.1 Groundwater Elevation

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

### 2.2 Performance of Plume Capture

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

In 2007 and 2008, in consultation with the Texas Commission on Environmental Quality (TCEQ) and the United States Environmental Protection Agency (USEPA), the Army ceased operations of ICTs 1, 3, 5, 10, and 12A for groundwater extraction (note that extraction from ICT 12A was resumed after pump replacement in December 2012). Two other ICTs (ICT 6 and ICT 9) were changed from extraction ICTs to re-injection ICTs. Groundwater extraction from well EW-1 located in the northeast central portion of the site began in October 2008 and well 18WW17 located to the northeast of the ICT containment area began in January 2008. **Table B-1** in **Appendix B** presents a summary of extraction equipment replacement since 2011, as dictated by poor extraction performance (malfunctioning pumps, poor pump positioning with respect to groundwater, non-operational level probes, scale build up, etc.). Further discussion of extraction performance of various ICTs and extraction wells is presented in Section 2.3.

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Potentiometric surface maps of the shallow zone groundwater in the vicinity of LHAAP-18/24, based on groundwater elevations measured on 31 July, 20 August, and 30 September 2019, are shown on **Figures B-1, B-2, and B-3 in Appendix B**, respectively. The potentiometric surface maps of the shallow zone were contoured using the Kriging geostatistical interpolation method included in the Golden Software Surfer® data analysis software.

The HDPE liners in the ICTs, where present, were interpreted as groundwater flow barriers. The potentiometric surface maps for July through September 2019 continue to reflect high groundwater elevations in the northern/northwestern portion of the site with groundwater flow occurring radially from groundwater highs at monitoring well AWD-2 (175.31 ft above mean sea level [amsl] in July 2019, 175.07 ft amsl in August 2019, and 174.79 ft amsl in September 2019) inside the ICT containment area.

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

Groundwater extraction volumes from the ICTs were 576,128 gallons in July 2019; 704,900 gallons in August 2019; and 432,478 gallons in September 2019. Rainfall amounts recorded at the GWTP were 2.75 inches in July 2019, 0.55 inches in August 2019, and 2.23 inches in September 2019. This amount of rainfall resulted in over 56,403 gallons of additional water treated and discharged but not metered with the influent totals.

During the reporting period, approximately 886,832 gallons of treated groundwater was discharged to Harrison Bayou from the GWTP. In addition, approximately 903,001 gallons of water was released from the INF pond to the Harrison Bayou. No treated groundwater from the GWTP was returned to LHAAP-18/24 via the sprinkler system. A total of 579,986 gallons was released to the INF Pond from the GWTP in the 3<sup>rd</sup> quarter 2019. **Table 4** presents the daily discharge rates and volume for the 3<sup>rd</sup> quarter of 2019. Overall groundwater levels decreased throughout the 3<sup>rd</sup> quarter of 2019.

Groundwater levels in Wilcox Formation wells (generally > 40 to 50 ft bgs) were measured during the 3<sup>rd</sup> quarter of 2019 groundwater gauging events. Wilcox Formation wells correspond generally to those wells previously identified as “Intermediate” and “Deep” wells. “Intermediate” wells are designated as Upper Wilcox Formation wells and “Deep” wells are designated as Lower Wilcox Formation wells. Generally, groundwater in the Upper and Lower Wilcox Formation wells are in hydraulic communication and so can be treated as a single hydrogeologic unit. Therefore, the groundwater elevations in Upper Wilcox wells were used to construct the potentiometric surface maps for the Wilcox Formation. **Figures B-4, B-5, and B-6 in Appendix B** show the locations of the Wilcox Formation monitoring wells and the potentiometric surface of the Wilcox Formation, based on static water levels measured during the July, August, and September 2019 gauging events, respectively. Groundwater in the Wilcox Formation generally flows in a northerly direction, towards Caddo Lake and there is a downward

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vertical gradient between the overlying shallow zone and the Wilcox Formation. However, a groundwater high in the Wilcox Formation occurs in the area of MW-14.

### 2.3 Quantity of Water Extracted from LHAAP-18/24

The average daily extraction rates from the ICTs were 18,585 gallons per day (gpd) in July 2019, approximately 23,114 gpd in August 2019, and approximately 16,607 gpd in September 2019. The variations in volume per month are due to LHAAP-16 becoming operational in August when there was a large amount of water to pump. In September, it came to equilibrium.

The volume of groundwater removed from LHAAP-18/24 during the 3<sup>rd</sup> quarter of 2019 measured approximately 1,713,506 gallons, based on total flow measured from the extraction wells and ICT wells. LHAAP-16 contributed 77,361 gallons to the GWTP due to the main transformer not being operational in July. The transformer was repaired in August 2019. Together, approximately 1,790,867 gallons was extracted from both LHAAP-16 and LHAAP-18/24. **Figure 2-1** shows the historical trends of extracted volumes by quarter.

In contrast to the approximate total extracted volume based on total flow measured at the GWTP, the total estimated volume discharged to the INF pond and/or Harrison Bayou (**Table 4**) following treatment by the GWTP was 512,203 gallons in July 2019; 512,192 gallons in August 2019; and 442,423 gallons in September 2019 for a total of 1,466,818 gallons discharged in the 3<sup>rd</sup> quarter of 2019. The difference between the influent and effluent volumes is approximately 20%. However, considering the over 194,361 gallons of water within the treatment plant as of September 30, 2019, this percent difference is closer to 8% variation, which is contributable to variations in the influent flow meter recordings and evaporative losses. The repairs to the double-walled distribution lines from LHAAP-18/24 have increased the influent flow.

As indicated by **Table 5**, 21 of 27 ICTs and wells produced water for the entirety of the 3<sup>rd</sup> quarter of 2019. ICT EW-01 produced water in August 2019 only.

### 2.4 Groundwater Monitoring at LHAAP-18/24

No groundwater was sampled for offsite analysis at LHAAP-18/24 in the 3<sup>rd</sup> quarter of 2019. The next sampling event will be completed in the 4<sup>th</sup> quarter of 2019.

### 2.5 Groundwater Treatment Plant Sampling and Analysis

As part of the GWTP operations, samples from various water streams are required to be collected and analyzed for the parameters in accordance with the *Final Revised Sampling and Analysis Plan for Groundwater Treatment Plan and Well Fields* (AECOM Technical Services, Inc. [AECOM], September 2017), which was developed in accordance with the Interim Record of Decision (ROD) and the TCEQ letter dated January 8, 2002 (see Administrative Record Volume 1 of 4 in 2002, Document A). Besides the ROD sampling requirement, additional sample analyses are typically performed on the influent and effluent samples to monitor the effectiveness of the perchlorate treatment (FBR and/or ion exchange vessels) process. Sections 2.5.1 through 2.5.4 present the results of analyses conducted during the 3<sup>rd</sup> quarter of 2019. The complete laboratory results are provided on a compact disc (CD) (**Appendix C**).

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#### 2.5.1 Perchlorate Sampling

**Table 6** presents the weekly effluent perchlorate results for the 3<sup>rd</sup> quarter of 2019. None of the effluent samples exceeded the protocol for discharge (**Appendix D**) for perchlorate. All of the GWTP effluent was discharged to the Harrison Bayou in July 2019 and the majority of August 2019. For the remainder of August 2019 and all of September 2019, the GWTP effluent was discharged to the INF Pond. Samples presented in **Table 6** also include samples collected before the ion exchange to verify that the FBR properly treated water for perchlorate. Treated groundwater from the GWTP was discharged to Harrison Bayou during the current quarter when effluent perchlorate concentrations were less than the daily maximum concentration of 589 µg/L and adequate flow in the bayou was observed. When the flow in the bayou ceased in August, effluent was discharged to the INF pond once the water was treated by the ion exchange vessels. Therefore, effluent was sampled after the ion exchange vessels in the later part of August and all of September 2019.

**Table 6** also presents the effluent concentration of ammonia as N and ortho-phosphate, which are soluble nutrients used by the microbes in the metabolic process within the FBR. Effluent samples at the reactor outlet are analyzed to verify that trace amounts of these are present, which indicates that there is enough to sustain the biomass. If there is bypassing or short circuiting in the reactor and perchlorate is not being fully degraded, elevated levels of these nutrients may be present at the FBR outlet. Ortho-phosphate levels stayed relatively stagnant for the entire quarter. The table also notes which samples were collected after the ion exchange vessels. Perchlorate in the effluent is treated by the FBR prior to the ion exchange vessels, which are used to polish the effluent prior to discharge to the INF Pond.

Three monthly grab samples from the influent to the GWTP (TK-140) and one quarterly grab sample (total of four influent samples) were collected in the 3<sup>rd</sup> quarter of 2019. The perchlorate concentrations in these samples ranged from 4,900 µg/L to 15,000 µg/L.

#### 2.5.2 VOC Sampling

**Tables 7 through 9** present the effluent VOC results for July, August, and September 2019. Sampling of the effluent for VOCs was conducted on a biweekly basis beginning on 9 July 2019. The results, where applicable, were below the discharge limits. The tables also provide monthly influent concentrations for VOCs and perchlorate.

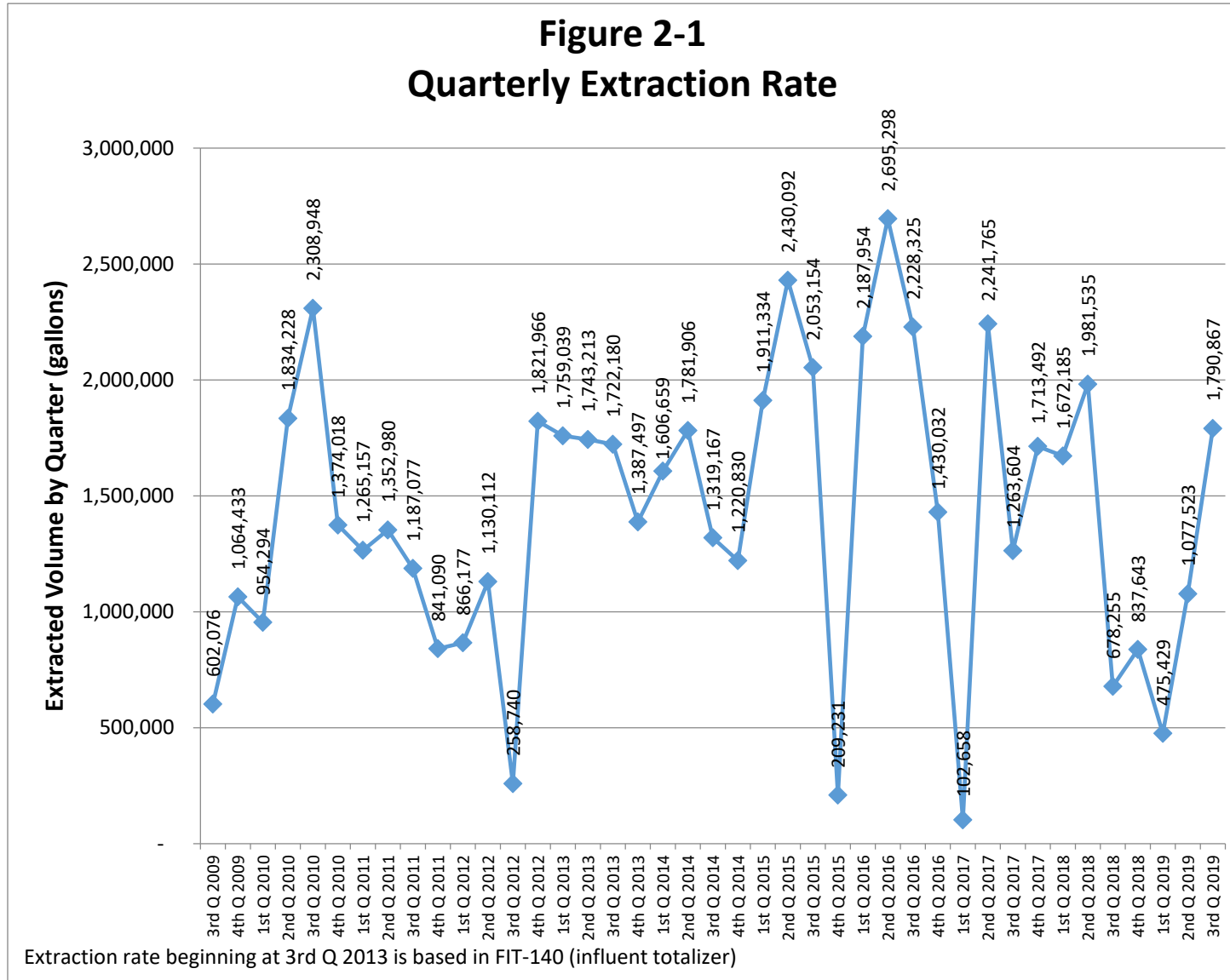
#### 2.5.3 Monthly Metals Sampling

As per the Final Installation-Wide Work Plan (AECOM, July 2014), the monthly metals sampling is reported in **Tables 7 through 9**. None of the metals exceeded the effluent discharge limits.

#### 2.5.4 Quarterly Sampling

Sampling of the effluent for VOCs, anions, chemical oxygen demand (COD), oil and grease, metals, and perchlorate was conducted during this quarter and the results were below the discharge limits. **Table 10** presents the analytical results for the 3<sup>rd</sup> quarter of 2019.

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

Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 7/31/2019	Groundwater Elevation (feet amsl) 7/31/2019	Depth to Water (feet) 8/20/2019	Groundwater Elevation (feet amsl) 8/20/2019	Depth to Water (feet) 9/30/2019	Groundwater Elevation (feet amsl) 9/30/2019
BGPZ-1	Piezometer	184.99	5.43	179.56	6.02	178.97	7.14	177.85
BGPZ-2	Piezometer	184.39	12.61	171.78	12.83	171.56	13.03	171.36
BGPZ-3	Piezometer	180.35	6.77	173.58	6.98	173.37	7.29	173.06
BGPZ-4	Piezometer	177.77	6.50	171.27	6.75	171.02	7.03	170.74
BGPZ-5	Piezometer	180.76	10.44	170.32	10.67	170.09	10.93	169.83
BGPZ-6	Piezometer	197.82	26.40	171.42	26.69	171.13	26.97	170.85
BGPZ-7	Piezometer	195.96	26.05	169.91	26.42	169.54	26.67	169.29
BGPZ-8	Piezometer	197.08	28.17	168.91	28.49	168.59	28.71	168.37
BGPZ-9	Piezometer	196.45	26.73	169.72	26.97	169.48	27.17	169.28
BGPZ-10	Piezometer	197.00	26.77	170.23	26.99	170.01	27.30	169.70
BGPZ-11	Piezometer	196.99	26.83	170.16	27.08	169.91	27.44	169.55
BGPZ-12	Piezometer	188.17	NA	Plugged	NA	Plugged	NA	Plugged
AWD-1	Monitoring Well	182.27	7.88	174.39	8.19	174.08	8.45	173.82
AWD-2	Monitoring Well	186.78	11.47	175.31	11.71	175.07	11.99	174.79
AWD-3	Monitoring Well	200.13	26.49	173.64	26.78	173.35	27.10	173.03
AWD-4	Monitoring Well	193.89	19.70	174.19	19.95	173.94	20.27	173.62
MW-1	Monitoring Well	199.22	25.63	173.59	25.92	173.30	26.20	173.02
MW-2	Monitoring Well	196.73	25.29	171.44	25.50	171.23	25.81	170.92
MW-3	Monitoring Well	196.54	24.78	171.76	25.00	171.54	25.33	171.21
MW-4	Monitoring Well	197.27	25.09	172.18	25.32	171.95	25.65	171.62
MW-5	Monitoring Well	194.97	22.69	172.28	22.98	171.99	23.29	171.68
MW-6	Monitoring Well	192.18	20.50	171.68	20.79	171.39	21.08	171.10
MW-7	Monitoring Well	188.47	16.99	171.48	17.29	171.18	17.57	170.90

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Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 7/31/2019	Groundwater Elevation (feet amsl) 7/31/2019	Depth to Water (feet) 8/20/2019	Groundwater Elevation (feet amsl) 8/20/2019	Depth to Water (feet) 9/30/2019	Groundwater Elevation (feet amsl) 9/30/2019
MW-8	Monitoring Well	187.13	14.77	172.36	15.05	172.08	15.34	171.79
MW-9	Monitoring Well	184.73	12.10	172.63	12.41	172.32	12.75	171.98
MW-10	Monitoring Well	178.12	6.53	171.59	6.80	171.32	7.29	170.83
MW-11	Monitoring Well	184.65	12.75	171.90	13.02	171.63	13.77	170.88
MW-12	Monitoring Well	178.33	6.40	171.93	6.72	171.61	7.31	171.02
MW-13	Monitoring Well	176.72	5.52	171.20	5.84	170.88	6.65	170.07
MW-14	Monitoring Well	186.19	11.45	174.74	11.77	174.42	12.12	174.07
MW-16	Monitoring Well	178.59	6.70	171.89	6.97	171.62	7.40	171.19
MW-17	Monitoring Well	179.03	7.48	171.55	7.80	171.23	8.13	170.90
MW-18	Monitoring Well	178.58	7.00	171.58	7.35	171.23	7.59	170.99
MW-19	Monitoring Well	178.60	7.15	171.45	7.49	171.11	7.88	170.72
MW-20	Monitoring Well	186.64	8.69	177.95	9.00	177.64	9.37	177.27
MW-21	Monitoring Well	198.70	29.69	169.01	30.04	168.66	30.28	168.42
MW-22	Monitoring Well	197.51	27.44	170.07	27.76	169.75	28.05	169.46
MW-23	Monitoring Well	198.79	27.22	171.57	27.55	171.24	27.90	170.89
101	Monitoring Well	197.53	6.03	191.50	6.40	191.13	8.02	189.51
102	Monitoring Well	193.94	18.24	175.70	18.59	175.35	18.93	175.01
109	Monitoring Well	197.02	27.59	169.43	27.96	169.06	28.32	168.70
120	Monitoring Well	184.19	10.61	173.58	10.94	173.25	11.31	172.88
123	Monitoring Well	186.21	11.30	174.91	11.70	174.51	12.55	173.66
125	Monitoring Well	196.28	22.31	173.97	22.56	173.72	23.07	173.21
126	Monitoring Well	199.37	28.52	170.85	28.85	170.52	29.25	170.12
129	Monitoring Well	197.24	24.84	172.40	25.13	172.11	25.40	171.84
130	Monitoring Well	177.73	5.75	171.98	6.07	171.66	7.05	170.68
C-01	Monitoring Well	193.89	22.50	171.39	22.83	171.06	23.19	170.70

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Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 7/31/2019	Groundwater Elevation (feet amsl) 7/31/2019	Depth to Water (feet) 8/20/2019	Groundwater Elevation (feet amsl) 8/20/2019	Depth to Water (feet) 9/30/2019	Groundwater Elevation (feet amsl) 9/30/2019
C-02	Monitoring Well	175.95	4.17	171.78	4.79	171.16	5.85	170.10
C-03	Monitoring Well	196.34	25.04	171.30	25.39	170.95	25.60	170.74
C-04	Monitoring Well	194.64	23.07	171.57	23.42	171.22	23.70	170.94
C-04A	Monitoring Well	194.61	22.80	171.81	23.11	171.50	23.49	171.12
C-05	Monitoring Well	180.74	10.67	170.07	11.08	169.66	11.59	169.15
C-06	Monitoring Well	192.22	23.02	169.20	23.48	168.74	23.89	168.33
C-07	Monitoring Well	196.80	26.29	170.51	26.73	170.07	27.05	169.75
C-08	Monitoring Well	193.10	23.79	169.31	24.15	168.95	24.49	168.61
C-09	Monitoring Well	202.35	32.04	170.31	32.39	169.96	32.75	169.60
C-10	Monitoring Well	201.86	31.32	170.54	31.69	170.17	31.95	169.91
17WW08	Monitoring Well	179.72	8.57	171.15	8.90	170.82	9.63	170.09
18WW01	Monitoring Well	201.31	30.41	170.90	30.76	170.55	31.09	170.22
18WW02	Monitoring Well	179.30	7.65	171.65	8.06	171.24	8.79	170.51
18WW03	Monitoring Well	195.59	25.03	170.56	25.46	170.13	25.85	169.74
18WW04	Monitoring Well	183.74	14.31	169.43	14.89	168.85	15.28	168.46
18WW05	Monitoring Well	189.59	19.30	170.29	19.75	169.84	20.09	169.50
18WW06	Monitoring Well	179.70	8.35	171.35	8.83	170.87	9.59	170.11
18WW07	Monitoring Well	183.67	NM	NM	NM	NM	NM	NM
18WW08	Monitoring Well	177.77	5.90	171.87	6.42	171.35	7.33	170.44
18WW09	Monitoring Well	177.51	6.12	171.39	6.84	170.67	7.60	169.91
18WW10	Monitoring Well	182.26	10.29	171.97	10.65	171.61	10.98	171.28
18WW11	Monitoring Well	182.29	11.58	170.71	11.97	170.32	12.45	169.84
18WW14	Monitoring Well	186.47	14.74	171.73	15.09	171.38	15.45	171.02
18WW15	Monitoring Well	186.24	14.41	171.83	14.77	171.47	15.10	171.14
18WW16	Monitoring Well	201.88	31.70	170.18	32.12	169.76	32.58	169.30

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18WW18	Monitoring Well	196.82	25.85	170.97	26.17	170.65	26.44	170.38
18WW19	Monitoring Well	179.56	10.39	169.17	10.88	168.68	11.59	167.97
18WW20	Monitoring Well	180.42	11.30	169.12	11.71	168.71	12.36	168.06
18WW21	Monitoring Well	195.20	24.95	170.25	25.29	169.91	25.61	169.59
18WW22	Monitoring Well	195.37	23.96	171.41	24.30	171.07	24.77	170.60
18WW24	Monitoring Well	176.40	4.69	171.71	5.39	171.01	6.12	170.28
18WW25	Monitoring Well	175.15	4.57	170.58	5.08	170.07	5.89	169.26
18CPTMW01SW	Monitoring Well	198.20	25.83	172.37	26.17	172.03	26.46	171.74
18CPTMW01DW	Monitoring Well	197.92	27.02	170.90	27.45	170.47	27.71	170.21
18CPTMW03SW	Monitoring Well	198.53	27.27	171.26	27.63	170.90	28.04	170.49
18CPTMW04	Monitoring Well	196.60	22.50	174.10	22.87	173.73	23.21	173.39
18CPTMW04SW	Monitoring Well	196.42	24.96	171.46	25.34	171.08	25.72	170.70
18CPTMW06	Monitoring Well	198.12	26.98	171.14	27.39	170.73	27.76	170.36
18CPTMW07	Monitoring Well	197.32	26.20	171.12	26.58	170.74	26.92	170.40
18CPTMW08SW	Monitoring Well	196.38	24.76	171.62	25.06	171.32	25.51	170.87
18CPTMW08DW	Monitoring Well	196.59	25.27	171.32	25.58	171.01	25.92	170.67
18CPTMW10SW	Monitoring Well	186.98	15.48	171.50	15.91	171.07	16.37	170.61
18CPTMW10DW	Monitoring Well	187.38	16.34	171.04	16.69	170.69	17.05	170.33
18CPTMW12SW	Monitoring Well	190.90	19.78	171.12	20.08	170.82	20.55	170.35
18CPTMW12DW	Monitoring Well	190.25	19.20	171.05	19.47	170.78	19.94	170.31
18CPTMW14	Monitoring Well	196.69	26.67	170.02	26.95	169.74	27.35	169.34
18CPTMW15	Monitoring Well	179.79	8.09	171.70	8.76	171.03	9.57	170.22
18CPTMW16	Monitoring Well	175.37	4.49	170.88	5.29	170.08	6.08	169.29
18CPTMW18	Monitoring Well	194.53	26.95	167.58	27.36	167.17	27.75	166.78
18CPTMW19	Monitoring Well	193.59	18.58	175.01	18.93	174.66	19.30	174.29

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18CPTMW19SW	Monitoring Well	193.29	21.74	171.55	22.05	171.24	22.43	170.86
18CPTMW22SW	Monitoring Well	187.79	17.09	170.70	17.40	170.39	17.89	169.90
18CPTMW22R	Monitoring Well	187.23	6.49	180.74	6.94	180.29	8.11	179.12
18CPTMW22DW	Monitoring Well	188.00	17.20	170.80	17.60	170.40	17.98	170.02
18CPTMW23	Monitoring Well	177.47	6.03	171.44	6.89	170.58	7.79	169.68
18CPTMW23SW	Monitoring Well	177.43	6.40	171.03	7.10	170.33	8.09	169.34
18CPTMW24	Monitoring Well	194.89	26.19	168.70	26.58	168.31	26.95	167.94
18CPTMW26	Monitoring Well	182.60	14.55	168.05	14.87	167.73	15.17	167.43
18CPTMW26SW	Monitoring Well	182.00	10.97	171.03	11.53	170.47	11.91	170.09
1824HBSW7	Surface Water Sample	167.92	2.55	165.37	1.25	166.67	0.90	167.02
Notes: NM-not measured								

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**Table 4. Treated Groundwater Discharged – July through September 2019**

Date	Harrison Bayou Flow (gpm)	Calculated Maximum Rate Allowable (gpm)	Released From GWTP To Harrison Bayou (gallons)	Released From INF Pond to Harrison Bayou (gallons)	Released From GWTP to INF Pond (gallons)	Combined Total Released to Harrison Bayou (gallons)	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
07/01/2019	NA	NA	0	0	0	0	5.38
07/02/2019	NA	NA	0	0	0	0	5.37
07/03/2019	8,589	2,510	0	0	0	0	5.36
07/04/2019	6,943	2,013	0	0	0	0	5.35
07/05/2019	6,048	1,767	23,588	0	0	23,588	5.34
07/06/2019	3,493	1,012	0	0	0	0	5.33
07/07/2019	2,954	856	0	0	0	0	5.31
07/08/2019	2,543	743	41,947	0	0	41,947	5.30
07/09/2019	2,097	612	18,977	0	0	18,977	5.29
07/10/2019	1,946	568	22,081	219,675	0	241,756	4.70
07/11/2019	1,806	527	16,156	184,920	0	201,076	4.08
07/12/2019	1,682	491	14,318	168,020	0	182,338	3.65
07/13/2019	1,501	435	0	0	0	0	3.65
07/14/2019	1,369	397	0	0	0	0	3.64
07/15/2019	1,233	360	66,326	0	0	66,326	3.64
07/16/2019	1,573	459	18,280	156,650	0	174,930	3.38
07/17/2019	1,802	526	19,580	173,736	0	193,316	2.66
07/18/2019	1,619	473	19,395	0	0	19,395	2.64
07/19/2019	1,445	422	18,013	0	0	18,013	2.62
07/20/2019	1,352	392	0	0	0	0	2.60
07/21/2019	1,230	356	0	0	0	0	2.58
07/22/2019	1,128	329	66,573	0	0	66,573	2.56
07/23/2019	1,025	299	18,412	0	0	18,412	2.54
07/24/2019	899	262	17,286	0	0	17,286	2.52
07/25/2019	807	235	17,100	0	0	17,100	2.50
07/26/2019	694	202	15,256	0	0	15,256	2.48
07/27/2019	604	175	0	0	0	0	2.46

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Date	Harrison Bayou Flow (gpm)	Calculated Maximum Rate Allowable (gpm)	Released From GWTP To Harrison Bayou (gallons)	Released From INF Pond to Harrison Bayou (gallons)	Released From GWTP to INF Pond (gallons)	Combined Total Released to Harrison Bayou (gallons)	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
07/28/2019	545	158	0	0	0	0	2.45
07/29/2019	494	144	63,628	0	0	63,628	2.44
07/30/2019	2,040	596	22,783	0	0	22,783	2.47
07/31/2019	1,791	523	12,504	0	0	12,504	2.45
08/01/2019	1,726	504	21,440	0	0	21,440	2.43
08/02/2019	1,587	464	19,691	0	0	19,691	2.41
08/03/2019	1,385	401	0	0	0	0	2.39
08/04/2019	1,198	347	0	0	0	0	2.37
08/05/2019	1,040	303	53,474	0	0	53,474	2.35
08/06/2019	905	264	12,254	0	0	12,254	2.33
08/07/2019	778	227	12,903	0	0	12,903	2.31
08/08/2019	608	177	11,738	0	0	11,738	2.29
08/09/2019	539	157	16,473	0	0	16,473	2.27
08/10/2019	475	137	0	0	0	0	2.25
08/11/2019	390	113	0	0	0	0	2.23
08/12/2019	305	89	75,893	0	0	75,893	2.20
08/13/2019	268	78	16,102	0	0	16,102	2.18
08/14/2019	230	67	21,235	0	0	21,235	2.16
08/15/2019	206	60	20,440	0	0	20,440	2.15
08/16/2019	398	116	18,627	0	0	18,627	2.14
08/17/2019	223	64	0	0	0	0	2.12
08/18/2019	173	50	0	0	0	0	2.10
08/19/2019	146	42	61,270	0	0	61,270	2.08
08/20/2019	86	25	13,089	0	3,056	13,089	2.06
08/21/2019	NA	NA	0	0	16,171	0	2.30
08/22/2019	NA	NA	0	0	11,470	0	2.32
08/23/2019	NA	NA	0	0	0	0	2.34
08/24/2019	NA	NA	0	0	0	0	2.36
08/25/2019	NA	NA	0	0	0	0	2.38
08/26/2019	NA	NA	0	0	44,556	0	2.40



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08/27/2019	NA	NA	0	0	16,984	0	2.42
08/28/2019	NA	NA	0	0	16,488	0	2.44
08/29/2019	NA	NA	0	0	12,765	0	2.46
08/30/2019	NA	NA	0	0	16,073	0	2.50
08/31/2019	NA	NA	0	0	0	0	2.65
09/01/2019	NA	NA	0	0	0	0	2.80
09/02/2019	NA	NA	0	0	0	0	2.84
09/03/2019	NA	NA	0	0	46,995	0	2.88
09/04/2019	NA	NA	0	0	9,202	0	2.93
09/05/2019	NA	NA	0	0	8,498	0	2.96
09/06/2019	NA	NA	0	0	10,049	0	2.98
09/07/2019	NA	NA	0	0	0	0	3.00
09/08/2019	NA	NA	0	0	0	0	3.03
09/09/2019	NA	NA	0	0	32,955	0	3.05
09/10/2019	NA	NA	0	0	16,108	0	3.08
09/11/2019	NA	NA	0	0	16,192	0	3.12
09/12/2019	NA	NA	0	0	17,010	0	3.20
09/13/2019	NA	NA	0	0	18,299	0	3.24
09/14/2019	NA	NA	0	0	0	0	3.29
09/15/2019	NA	NA	0	0	0	0	3.36
09/16/2019	NA	NA	0	0	60,429	0	3.42
09/17/2019	NA	NA	0	0	18,797	0	3.51
09/18/2019	NA	NA	0	0	18,784	0	3.60
09/19/2019	NA	NA	0	0	17,740	0	3.67
09/20/2019	NA	NA	0	0	0	0	3.71
09/21/2019	NA	NA	0	0	0	0	3.85
09/22/2019	NA	NA	0	0	0	0	3.89
09/23/2019	NA	NA	0	0	81,590	0	3.94
09/24/2019	NA	NA	0	0	8,590	0	3.97

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Date	Harrison Bayou Flow (gpm)	Calculated Maximum Rate Allowable (gpm)	Released From GWTP To Harrison Bayou (gallons)	Released From INF Pond to Harrison Bayou (gallons)	Released From GWTP to INF Pond (gallons)	Combined Total Released to Harrison Bayou (gallons)	INF Pond Staff Reading (6.20 = 3 ft. Freeboard)
09/25/2019	NA	NA	0	0	8,786	0	3.99
09/26/2019	NA	NA	0	0	8,069	0	4.01
09/27/2019	NA	NA	0	0	10,172	0	4.03
09/28/2019	NA	NA	0	0	0	0	4.05
09/29/2019	NA	NA	0	0	0	0	4.07
09/30/2019	NA	NA	0	0	34,158	0	4.10
			<b>886,832</b>	<b>903,001</b>	<b>579,986</b>	<b>1,789,833</b>	
Notes: NA = Not applicable							

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**Table 5. Monthly Groundwater Extraction Quantities – July through September 2019**

ICT or Well Number	July 2019 (gallons)	August 2019 (gallons)	September 2019 (gallons)	Total
1	0	0	0	0
2	54,082	65,562	114,188	233,832
3	0	0	0	0
4	4,314	1,772	820	6,906
5	0	0	0	0
EW-01	0	9	0	9
7	7,198	4,216	1,922	13,336
8	34,173	166,053	995	201,221
18WW17	0	0	0	0
10	0	0	0	0
11	6,609	8,112	1,693	16,414
12A	4,929	8,550	6,848	20,327
12B	36,618	24,741	28,514	89,873
12C	43,759	47,899	27,479	119,137
12D	1,118	541	2,094	3,753
12E	35,331	26,218	16,164	77,713
13A	17,823	24,311	18,130	60,264
13B	148,190	108,034	10	256,234
13C	44,345	77,400	45,238	166,983
13D	520	325	155	1,000
13E	13,606	4,496	2,474	20,576
13F	10,228	1,238	2,057	13,523
14A	1,333	2,995	2,314	6,642
14B	5,999	1,997	2,004	10,000
14C	13,165	946	714	14,825
14D	58,120	83,662	30,340	172,122
14E	34,668	45,823	128,325	208,816
<b>LHAAP-18/24 Total</b>	<b>576,128</b>	<b>704,900</b>	<b>432,478</b>	<b>1,713,506</b>
Site 16	0	11,635	65,726	77,361
<b>LHAAP-16 Total</b>	<b>0</b>	<b>11,635</b>	<b>65,726</b>	<b>77,361</b>
	<b>576,128</b>	<b>716,535</b>	<b>498,204</b>	<b>1,790,867</b>

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Table 6. Weekly Perchlorate Sample Results

Sample Identification	Lab Package	Date Sampled	Sample Location	Effluent Discharge Point	Harrison Bayou Maximum Allowable Daily Discharge Perchlorate Concentration (µg/L)	INF Pond Discharge Criteria for Perchlorate (µg/L)	Perchlorate Reporting Limit	Influent Perchlorate (6850)	Effluent Perchlorate (6850)		Does Concentration Meet Discharge Limit? (Yes/No)	No Daily Maximum Concentration		
								Result (µg/L)	Result (µg/L)	DVQ		Ammonia as N (350.3) (mg/L)	Ortho-Phosphate (365.3) (mg/L)	Organic Carbon (SM5310C) (mg/L)
LH18/24-SP650_070919/BIX	HS19070423	7/9/2019	TK-650	Harrison Bayou	589	17	4	NA	5.8		Yes	6.9	2.19	5.09 J
LH18/24-SP650_071619/BIX	HS19070827	7/16/2019	TK-650	Harrison Bayou	589	17	4	NA	< 2.0	U	Yes	7.5	0.276	2.52
LH18/24-SP650_071619/BIX (monthly)	HS19070824	7/16/2019	TK-650	Harrison Bayou	589	17	4	NA	< 2.0	U	Yes	--	--	--
LH18/24-SP140_071619 (monthly)	HS19070822	7/16/2019	TK-140	--	--	--	NA	6,900	NA		NA	--	--	--
LH18/24-SP650_072319/BIX	HS19071160	7/23/2019	TK-650	Harrison Bayou	589	17	4	NA	42		Yes	9.2	2.68	1.96
LH18/24-SP650_073019/BIX	HS19071544	7/30/2019	TK-650	Harrison Bayou	589	17	4	NA	< 2.0	U	Yes	7.2	0.19	2.33
LH18/24-SP650_080619/BIX	HS19080284	8/6/2019	TK-650	Harrison Bayou	589	17	4	NA	< 2.0	U	Yes	11	3.16	2.25
LH18/24-SP650_081419/BIX	HS19080736	8/14/2019	TK-650	Harrison Bayou	589	17	4	NA	10		Yes	11	2.25	19
LH18/24-SP650_081419/BIX (monthly)	HS19080732	8/14/2019	TK-650	Harrison Bayou	589	17	4	NA	12		Yes	--	--	--
LH18/24-SP140_081419 (monthly)	HS19080735	8/14/2019	TK-140	--	--	--	NA	8,800	NA		NA	--	--	--
LH18/24-SP650_082019/BIX	HS19081044	8/20/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	NA	8.9	2.53	2.3
LH18/24-SP650_082019/AIX	HS19081046	8/20/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	NA	--	--	--
LH18/24-SP650_082719/AIX	HS19081495	8/27/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	1.0	2.04	0.72
LH18/24-SP650_090419/AIX	HS19090166	9/4/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	7.9	3.03	0.81
LH18/24-SP650_091019/AIX	HS19090456	9/10/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	9.1	2.83	1.5
LH18/24-SP650_091019/AIX (monthly)	HS19090454	9/10/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	--	--	--
LH18/24-SP140_091019 (monthly)	HS19090455	9/10/2019	TK-140	--	--	--	NA	4,900	NA		NA	--	--	--
LH18/24-SP650_091719/AIX	HS19090804	9/17/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	6.1	1.9	1.14
LH18/24-SP650_092419/AIX	HS19091201	9/24/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	10	2.23	1.64 J
LH18/24-SP650_092419/AIX (quarterly)	HS19091234	9/24/2019	TK-650	INF Pond	589	17	4	NA	< 2.0	U	Yes	--	--	--
LH18/24-SP140_092419 (quarterly)	HS19091233	9/24/2019	TK-140	--	--	--	NA	15,000	NA		NA	--	--	--

## Notes:

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

SP140 samples are influent samples.

µg/L - micrograms per liter

DVQ - data validation qualifier

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

NA - not applicable

U - non detect and reported to the limit of detection

BIX - before ion exchange

mg/L - milligrams per liter

AIX - after the ion exchange

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LONGHORN ARMY AMMUNITION PLANT

Table 7. Bi-Weekly GWTP Analytical Sampling Results for July 2019

Sample Location Sample Identification Lab Package Sample Date Sample Type	EFFLUENT - Biweekly			EFFLUENT - Monthly		INFLUENT - Monthly*		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)		
	LH18/24-SP650_070919			LH18/24-SP650_071619		LH18/24-SP140_071619		LH18/24-SP650_072319				
	HS19070432			HS19070824		HS19070822		HS19071164				
	7/9/2019			7/16/2019		7/16/2019		7/23/2019				
	GRAB			GRAB		GRAB		GRAB				
Effluent Limitation for Discharge (µg/L) per Table 2 of ROD	Daily Average Concentration	Daily Maximum Concentration	Reporting Limit	Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	
	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		
<b>VOLATILES</b>												
1,1,1-Trichloroethane	3,417	7,230	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
1,1,2-Trichloroethane	102.5	216.9	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
1,1-Dichloroethane	6,633	14,032	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
1,1-Dichloroethene	119	253	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
1,2-Dichloroethane	85	181	1	< 0.5	U	0.52	J	NA		< 0.5	U	Yes
1,2-Dichloropropane	NA	NA	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Acetone	1,132	2,395	2	< 1.0	U	7.4		NA		4.6		Yes
Benzene	85	181	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Carbon Tetrachloride	85	181	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Chlorobenzene	22,300	47,180	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Chloroform	1,708	3,615	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Ethylbenzene	26,954	57,025	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
m,p-Xylenes	39.5	83.6	2	< 1.0	U	< 1.0	U	NA		< 1.0	U	Yes
Methylene Chloride	803	1,699	2	< 1.0	U	< 1.0	U	NA		< 1.0	U	Yes
o-Xylene	39.5	83.6	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Styrene	2,829	5,987	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Tetrachloroethene	85.4	180.7	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Toluene	1,980	4,189	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Trichloroethene	85	181	1	1.0		0.99	J	NA		0.88	J	Yes
Vinyl Chloride	34	72	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
<b>ANIONS</b>												
Chloride	NA	NA	10	292		NA		NA		494		NA
Sulfate	NA	NA	10	29.9		NA		NA		32.3		NA
<b>PERCHLORATE</b>												
Perchlorate	278	589	4	NA		< 2.0	U	6,900		NA		Yes
<b>METALS</b>												
Hexavalent Chromium	0.058	0.124	0.010	NA		0.0100		< 0.0100	U	NA		Yes
Barium	1	2	0.004	NA		0.0903		NA		NA		Yes
Lead	0.0022	0.0046	0.002	NA		< 0.00100	U	NA		NA		Yes
Selenium	0.0057	0.0120	0.002	NA		< 0.00250	U	< 0.00250	U	NA		Yes
Silver	0.0014	0.0030	0.002	NA		< 0.000500	U	< 0.00250	U	NA		Yes
<b>SEMI-VOLATILES</b>												
1,4-Dioxane**	NA	134.2	1	NA		12		NA		NA		Yes

Notes:

µg/L - micrograms per liter

mg/L - milligrams per liter

DVQ - data validation qualifier

NA - not applicable or not analyzed

GWTP - Groundwater Treatment Plant

ROD - Record of Decision

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

U - not detected and reported to the limit of detection

J - estimated concentration and/or due to QC discrepancies

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

\*Influent sample not compared to discharge limits

\*\* Calculated Effluent Limit

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LONGHORN ARMY AMMUNITION PLANT

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

Sample Location Sample Identification Lab Package Sample Date Sample Type				EFFLUENT - Biweekly		EFFLUENT - Monthly		INFLUENT - Monthly*		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
				LH18/24-SP650_080619		LH18/24-SP650_081419		LH18/24-SP140_081419		LH18/24-SP650_082019		
HS19080343		HS19080732		HS19080735		HS19081048						
8/6/2019		8/14/2019		8/14/2019		8/20/2019						
Effluent Limitation for Discharge (µg/L) per Table 2 of ROD				Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	
Daily Average Concentration	Daily Maximum Concentration	Detection Limit										
<b>VOLATILES</b>	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		
1,1,1-Trichloroethane	3,417	7,230	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
1,1,2-Trichloroethane	102.5	216.9	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
1,1-Dichloroethane	6,633	14,032	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
1,1-Dichloroethene	119	253	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
1,2-Dichloroethane	85	181	1	0.42	J	< 0.5	U	NA		0.53	J	Yes
1,2-Dichloropropane	NA	NA	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Acetone	1,132	2,395	2	5.6		3.4		NA		< 1.0	U	Yes
Benzene	85	181	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Carbon Tetrachloride	85	181	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Chlorobenzene	22,300	47,180	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Chloroform	1,708	3,615	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Ethylbenzene	26,954	57,025	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
m,p-Xylenes	39.5	83.6	2	< 1.0	U	< 1.0	U	NA		< 1.0	U	Yes
Methylene Chloride	803	1,699	2	0.95	J	< 1.0	U	NA		< 1.0	U	Yes
o-Xylene	39.5	83.6	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Styrene	2,829	5,987	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Tetrachloroethene	85.4	180.7	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Toluene	1,980	4,189	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
Trichloroethene	85	181	1	0.75	J	0.93	J	NA		1.2		Yes
Vinyl Chloride	34	72	1	< 0.5	U	< 0.5	U	NA		< 0.5	U	Yes
<b>ANIONS</b>	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		mg/L		
Chloride	NA	NA	10	338		NA		NA		444		NA
Sulfate	NA	NA	10	37.6		NA		NA		36.7		NA
<b>PERCHLORATE</b>	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		
Perchlorate	278	589	4	NA		12		8,800		NA		Yes
<b>METALS</b>	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		mg/L		
Hexavalent Chromium	0.058	0.124	0.010	NA		< 0.0100	U	< 0.0100	U	NA		Yes
Barium	1	2	0.004	NA		0.138		NA		NA		Yes
Lead	0.0022	0.0046	0.002	NA		< 0.00100	U	NA		NA		Yes
Selenium	0.0057	0.0120	0.002	NA		< 0.00250	U	< 0.00250	U	NA		Yes
Silver	0.0014	0.0030	0.002	NA		< 0.000500	U	< 0.000500	U	NA		Yes
<b>SEMI-VOLATILES</b>	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		
1,4-Dioxane**	NA	134.2	1	NA		0.49		NA		NA		Yes

Notes:

µg/L - micrograms per liter

mg/L - milligrams per liter

DVQ - data validation qualifier

ROD - Record of Decision

GWTP - Groundwater Treatment Plant

\*Influent sample not compared to discharge limits

NA - not applicable or not analyzed

U - not detected and reported to the limit of detection

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

\*\* Calculated Effluent Limit

J - estimated concentration and/or due to QC discrepancies

GWTP QUARTERLY EVALUATION REPORT – 3<sup>RD</sup> QUARTER 2019  
LONGHORN ARMY AMMUNITION PLANT

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

	Sample Location			EFFLUENT - Biweekly		INFLUENT - Monthly*		EFFLUENT - Monthly		EFFLUENT - Biweekly		Does Concentration Meet Effluent Discharge Limits? (Yes/No)
	Sample Identification			LH18/24-SP650_090419		LH18/24-SP140_091019		LH18/24-SP650_091019		LH18/24-SP650_091719		
	Lab Package			HS19090191		HS19090455		HS19090454		HS19090847		
	Sample Date			9/4/2019		9/10/2019		9/10/2019		9/17/2019		
	Sample Type			GRAB		GRAB		GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Table 2 of ROD			Result	DVQ	Result	DVQ	Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	Detection Limit									
<b>VOLATILES</b>	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		
1,1,1-Trichloroethane	3,417	7,230	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
1,1,2-Trichloroethane	102.5	216.9	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
1,1-Dichloroethane	6,633	14,032	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
1,1-Dichloroethene	119	253	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
1,2-Dichloroethane	85	181	1	0.51	J	NA		< 0.5	U	< 0.5	U	Yes
1,2-Dichloropropane	NA	NA	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Acetone	1,132	2,395	2	< 2.0	U	NA		< 2.0	U	< 2.0	U	Yes
Benzene	85	181	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Carbon Tetrachloride	85	181	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Chlorobenzene	22,300	47,180	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Chloroform	1,708	3,615	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Ethylbenzene	26,954	57,025	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
m,p-Xylenes	39.5	83.6	2	< 1.0	U	NA		< 1.0	U	< 1.0	U	Yes
Methylene Chloride	803	1,699	2	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
o-Xylene	39.5	83.6	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Styrene	2,829	5,987	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Tetrachloroethene	85.4	180.7	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Toluene	1,980	4,189	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
Trichloroethene	85	181	1	1.2		NA		1.1		1.0		Yes
Vinyl Chloride	34	72	1	< 0.5	U	NA		< 0.5	U	< 0.5	U	Yes
<b>ANIONS</b>	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		mg/L		
Chloride	NA	NA	10	557		NA		NA		606		NA
Sulfate	NA	NA	10	113		NA		NA		214		NA
<b>PERCHLORATE</b>	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		
Perchlorate	278	589	4	NA		4,900		< 2.0	U	NA		Yes
<b>METALS</b>	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		mg/L		
Hexavalent Chromium	0.058	0.124	0.010	NA		< 0.0100	U	< 0.0100	U	NA		Yes
Barium	1	2	0.004	NA		NA		0.155		NA		Yes
Lead	0.0022	0.0046	0.002	NA		NA		< 0.00100	U	NA		Yes
Selenium	0.0057	0.0120	0.002	NA		< 0.00250	U	< 0.00250	U	NA		Yes
Silver	0.0014	0.0030	0.002	NA		< 0.000500	U	< 0.000500	U	NA		Yes
<b>SEMI-VOLATILES</b>	µg/L	µg/L	µg/L	µg/L		µg/L		µg/L		µg/L		
1,4-Dioxane**	NA	134.2	1	NA		NA		13		NA		Yes

Notes:

µg/L - micrograms per liter

DVQ - data validation qualifier

GWTP - Groundwater Treatment Plant

U - Non detect reported to the limit of detection

mg/L - milligrams per liter

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

\*Influent sample not compared to discharge limits

\*\* Calculated Effluent Limit

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

ROD - Record of Decision

NA - not applicable or not analyzed



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## LONGHORN ARMY AMMUNITION PLANT

Table 10. Quarterly GWTP Analytical Sampling Results

	Sample Location			EFFLUENT		INFLUENT*		Does Concentration Meet Discharge Limits? (Yes/No)
	Sample Identification			LH18/24-SP650_092419		LH18/24-SP140_092419		
	Lab Package			HS19091234		HS19091233		
	Sample Date			9/24/2019		9/24/2019		
	Sample Type			GRAB		GRAB		
	Effluent Limitation for Discharge (µg/L) per Protocol			Result	DVQ	Result	DVQ	
	Daily Average Concentration	Daily Maximum Concentration	Reporting Limit					
<b>VOLATILES</b>	µg/L	µg/L	µg/L	µg/L		µg/L		
1,1,1-Trichloroethane	3,417	7,230	1	< 0.5	U	< 12	U	Yes
1,1,2-Trichloroethane	102.5	216.9	1	< 0.5	U	< 12	U	Yes
1,1-Dichloroethane	6,633	14,032	1	< 0.5	U	< 12	U	Yes
1,1-Dichloroethene	119	253	1	< 0.5	U	< 12	U	Yes
1,2-Dichloroethane	85	181	1	< 0.5	U	53		Yes
1,2-Dichloropropane	NA	NA	1	< 0.5	U	< 12	U	Yes
Acetone	1,132	2,395	2	< 2.0	U	< 25	U	Yes
Benzene	85	181	1	< 0.5	U	< 12	U	Yes
Carbon Tetrachloride	85	181	1	< 0.5	U	< 12	U	Yes
Chlorobenzene	22,300	47,180	1	< 0.5	U	< 12	U	Yes
Chloroform	1,708	3,615	1	< 0.5	U	< 12	U	Yes
Ethylbenzene	26,954	57,025	1	< 0.5	U	< 12	U	Yes
m,p-Xylenes	39.5	83.6	2	< 1.0	U	< 25	U	Yes
Methylene Chloride	803	1,699	2	< 0.5	U	10,000		Yes
o-Xylene	39.5	83.6	1	< 0.5	U	< 12	U	Yes
Styrene	2,829	5,987	1	< 0.5	U	< 12	U	Yes
Tetrachloroethene	85.4	180.7	1	< 0.5	U	73		Yes
Toluene	1,980	4,189	1	< 0.5	U	< 12	U	Yes
Trichloroethene	85	181	1	1.0		8,900		Yes
Vinyl Chloride	34	72	1	< 0.5	U	49		Yes
<b>ANIONS</b>	mg/L	mg/L	mg/L	mg/L		mg/L		
Chloride	NA	NA	10	538		439		NA
Sulfate	NA	NA	10	172		39.2		NA
<b>PERCHLORATE</b>	µg/L	µg/L	µg/L	µg/L		µg/L		
Perchlorate	278	589	4	< 2.0	U	15,000		Yes
<b>METALS</b>	mg/L	mg/L	mg/L	mg/L		mg/L		
Aluminum	0.777	1.644	0.0100	0.0117		0.0495		Yes
Antimony	NA	NA	0.00200	0.00251		0.000427	J	NA
Arsenic	0.365	0.772	0.00200	0.000691	J	0.00102	J	Yes

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Table 10. Quarterly GWTP Analytical Sampling Results

	Sample Location			EFFLUENT		INFLUENT*		Does Concentration Meet Discharge Limits? (Yes/No)
	Sample Identification			LH18/24-SP650_092419		LH18/24-SP140_092419		
	Lab Package			HS19091234		HS19091233		
	Sample Date			9/24/2019		9/24/2019		
Sample Type			GRAB		GRAB			
Effluent Limitation for Discharge (µg/L) per Protocol				Result	DVQ	Result		DVQ
Daily Average Concentration	Daily Maximum Concentration	Reporting Limit						
Barium	1	2	0.00400	0.104		0.973		Yes
Beryllium	NA	NA	0.00200	< 0.00100	U	< 0.00100	U	NA
Cadmium	0.0016	0.0034	0.00200	< 0.00100	U	0.000289	J	Yes
Calcium	NA	NA	0.500	6.84		44.1		NA
Chromium	0.355	0.752	0.00400	0.000534	J	0.00146	J	Yes
Cobalt	5.433	11.495	0.00500	0.000436	J	0.0120		Yes
Iron	1.132	2.395	0.200	0.0772	J	1.00		Yes
Lead	0.0022	0.0046	0.00200	< 0.00100	U	< 0.00100	U	Yes
Magnesium	NA	NA	0.200	20.4		35.3		NA
Manganese	7.323	15.494	0.00500	0.0231		0.714		Yes
Nickel	0.087	0.184	0.00200	0.00102	J	0.0141		Yes
Potassium	NA	NA	0.200	1.61		1.29		NA
Selenium	0.0057	0.012	0.00200	< 0.00250	U	< 0.00250	U	Yes
Silver	0.0014	0.003	0.00200	< 0.00100	U	< 0.00100	U	Yes
Sodium	NA	NA	1.00	504		223		NA
Thallium	NA	NA	0.00200	0.000337	J	0.000424	J	NA
Vanadium	1.698	3.592	0.00500	< 0.00100	U	< 0.00100	U	Yes
Zinc	0.146	0.31	0.00400	0.00863		0.0354		Yes
Mercury	NA	NA	0.000200	< 0.000100	U	< 0.000100	U	NA
<b>1,4-DIOXANE</b>	<b>µg/L</b>	<b>µg/L</b>	<b>µg/L</b>	<b>µg/L</b>		<b>µg/L</b>		
1,4-Dioxane	NA	134.2	1	12.0		20		Yes
<b>CHEMICAL OXYGEN DEMAND (COD)</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>		<b>mg/L</b>		
COD	NA	200	75	6.0	J	18		Yes
<b>OIL AND GREASE (O&amp;G)</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>		<b>mg/L</b>		
O&G	NA	15	2	< 1.0	U	< 1.0	U	Yes

Notes:

µg/L - micrograms per liter

DVQ - data validation qualifier

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

\* only Effluent sample is compared to discharge limits

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

U - non detect and reported to the limit of detection

mg/L - milligrams per liter

NA - not applicable

GWTP - Groundwater Treatment Plant

### 3 EVALUATION OF LHAAP-16 EXTRACTION SYSTEM

#### 3.1 Quantity of Groundwater Extracted From LHAAP-16

Groundwater was not extracted from LHAAP-16 during July and part of August 2019 due to the main transformer being down. Once it was repaired on 20 August 2019, 11,635 gallons of groundwater were extracted in August 2019 and another 65,726 gallons in September 2019 for a total of 77,361 gallons for the reporting period. The volume of extracted groundwater from LHAAP-16 is shown in **Table 5** and on **Figure ES-1**. These flows are based on the sum of individual flow meter readings.

#### 3.2 Groundwater Elevation

The groundwater elevations in the piezometers and monitoring wells at LHAAP-16 for July, August, and September 2019 are presented in **Table 11**. The potentiometric surface maps for the shallow and Upper Wilcox (intermediate) groundwater zones at LHAAP-16 for July, August, and September 2019 are presented on **Figures B-7** through **B-12** in **Appendix B**. Due to the lack of extraction, the groundwater flow is more true to natural conditions for July and part of August. Based on the potentiometric surface maps, the general groundwater flow direction in the shallow and intermediate zone is southeast towards the Harrison Bayou. The intermediate zone also demonstrated a southeastern flow towards the Harrison Bayou.

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**Table 11. Groundwater Elevations at LHAAP-16 Piezometers and Monitoring Wells**

Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 7/31/19	Groundwater Elevation (feet amsl) 7/31/19	Depth to Water (feet) 8/21/19	Groundwater Elevation (feet amsl) 8/21/19	Depth to Water (feet) 9/30/19	Groundwater Elevation (feet amsl) 9/30/19
16PZ-1	Piezometer	199.44	25.85	173.59	26.15	173.29	26.42	173.02
16PZ-2	Piezometer	199.75	25.77	173.98	26.09	173.66	26.37	173.38
16PZ-3	Piezometer	198.61	24.69	173.92	24.96	173.65	25.29	173.32
16PZ-4	Piezometer	198.81	24.93	173.88	25.26	173.55	25.57	173.24
16PZ-5	Piezometer	198.31	24.25	174.06	24.63	173.68	24.97	173.34
16PZ-6	Piezometer	198.61	25.79	172.82	26.07	172.54	26.41	172.20
16PZ-7	Piezometer	200.10	25.75	174.35	26.09	174.01	26.5	173.60
16PZ-8	Piezometer	199.93	26.04	173.89	26.39	173.54	26.74	173.19
16PZ-9	Piezometer	196.49	22.65	173.84	22.91	173.58	23.31	173.18
16PZ-10	Piezometer	196.65	22.88	173.77	23.12	173.53	23.46	173.19
16PZ-11	Piezometer	198.88	24.8	174.08	25.1	173.78	25.44	173.44
16PZ-12	Piezometer	199.00	25.02	173.98	25.41	173.59	25.79	173.21
16PZ-13	Piezometer	196.58	22.66	173.92	22.97	173.61	23.35	173.23
16PZ-14	Piezometer	196.09	22.3	173.79	22.68	173.41	22.98	173.11
16PZ-15	Piezometer	191.93	17.78	174.15	18.02	173.91	18.38	173.55
16PZ-16	Piezometer	190.79	16.9	173.89	17.31	173.48	17.69	173.10
16PZ-17	Piezometer	186.67	12.64	174.03	13.06	173.61	13.75	172.92
16PZ-18	Piezometer	185.99	12.35	173.64	12.69	173.30	13.22	172.77
16PZ-19	Piezometer	183.98	10.37	173.61	10.7	173.28	11.59	172.39
16PZ-20	Piezometer	183.12	9.55	173.57	9.92	173.20	10.63	172.49
16WW12	Monitoring Well	188.81	15.67	173.14	15.99	172.82	16.32	172.49
16WW14	Monitoring Well	198.87	24.18	174.69	24.48	174.39	24.89	173.98
16WW22	Monitoring Well	200.13	26.03	174.10	26.45	173.68	26.77	173.36
16WW25	Monitoring Well	188.77	14.99	173.78	15.5	173.27	15.88	172.89

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Location Identification	Type	Reference Elevation (feet amsl)	Depth to Water (feet) 7/31/19	Groundwater Elevation (feet amsl) 7/31/19	Depth to Water (feet) 8/21/19	Groundwater Elevation (feet amsl) 8/21/19	Depth to Water (feet) 9/30/19	Groundwater Elevation (feet amsl) 9/30/19
16WW26	Monitoring Well	188.83	13.87	174.96	14.16	174.67	14.4	174.43
16WW29	Monitoring Well	178.24	5.12	173.12	6.03	172.21	7.11	171.13
16WW30	Monitoring Well	178.47	5.49	172.98	6.33	172.14	7.45	171.02
16WW31	Monitoring Well	202.78	28.29	174.49	28.6	174.18	28.93	173.85
16WW33	Monitoring Well	203.09	28.5	174.59	28.85	174.24	28.97	174.12
16WW35	Monitoring Well	191.23	16.69	174.54	17.02	174.21	17.37	173.86
16WW36	Monitoring Well	190.94	16.28	174.66	16.58	174.36	16.95	173.99

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## 4 QUALITY CONTROL

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

The purpose of the sampling program is to evaluate the effectiveness of the groundwater pump and treat system, assess water quality within the capture zone, and assure compliance with the effluent discharge requirements of the Interim ROD. Quality control and quality assurance problems noted in the case narratives received from the laboratory are minor and do not affect the usability of the data for compliance at the GWTP. No sample results from the 3<sup>rd</sup> quarter of 2019 were rejected due to quality control problems.

ALS Environmental analyzed the compliance samples collected from the GWTP. Independent data verification and validation was performed by the Bhate Environmental Associates, Inc. (Bhate) project chemist as described in the Quality Control Summary Report in **Appendix E**. The laboratory reports for the 3<sup>rd</sup> quarter of 2019 are included in **Appendix C** on a CD. Air monitoring data is presented in **Appendix F, Attachment 3**.

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## 5 TREATED GROUNDWATER DISCHARGED

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

Treated groundwater that met the perchlorate discharge criteria was discharged to Harrison Bayou or the INF Pond in accordance with the Protocol for Discharging GWTP Effluent (**Appendix D**). **Table 4** summarizes daily volume from the INF Pond to the Harrison Bayou, the maximum flow rate allowed by chloride and sulfate concentrations, and the approximate volumes discharged for the 3<sup>rd</sup> quarter of 2019. Approximately 512,203 gallons of treated groundwater was discharged from the GWTP to the Harrison Bayou in July, 374,629 gallons in August, and 0 gallons in September. In July, 903,001 gallons were discharged from the INF Pond. No treated groundwater was discharged from the INF Pond in August or September due to the continuous flow of the Harrison Bayou.

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## 6 AIR MONITORING

### 6.1 Summary of Air Monitoring Approach

Operation of the GWTP without air abatement was approved by the TCEQ and USEPA conditioned on collection of air monitoring data to determine the effect of GWTP operation on ambient air quality with respect to potential human health exposure risk. An Interim Air Monitoring Plan was developed by AECOM in August 2012 and used to implement the air monitoring program. The air monitoring program included sampling emission concentrations from the air stripper, ambient air at the GWTP, and ambient air downwind of the GWTP. Collection of air data occurred on a weekly basis between September 2012 and September 2013, on a monthly basis between September 2013 and September 2014, and on a quarterly basis since that time. The sampling program includes use of Summa canisters and a photoionization detector (PID) to measure vapor phase concentrations. The air stripper emission sample is collected as a grab sample, while the ambient air samples are collected as composite samples. The GWTP sample is collected over 8 hours to represent a work day and the downwind sample is collected over 24 hours to represent potential exposure to an off-site receptor<sup>1</sup>. The downwind sample is collected at the closest downwind property boundary, based on prevailing wind direction.

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

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

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

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

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

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

## 6.2 Air Monitoring Results for the 3<sup>rd</sup> Quarter of 2019

During the 3<sup>rd</sup> quarter of 2019, air sampling was completed on 9 September 2019. A summary of the air sampling results is presented in **Appendix F**. All results met the criteria described in Section 6.1.

### 6.2.1 Summa Canister Monitoring Results

One sampling event was conducted on 9 September 2019, for presentation during the 3<sup>rd</sup> Quarter 2019 reporting period using Summa canisters. The samples were collected and analyzed as described in Section 6.1 and per the approved air monitoring plan dated August 2012. The analytical results were then compiled in spreadsheets where calculations were completed and comparisons to applicable criteria were made as described in Section 6.1.

#### 6.2.1.1 Ambient Air Results

Acetone; benzene; cis-1,2-dichloroethene; trichloroethene; n-hexane; toluene; m,p-xylenes; dichlorodifluoromethane; ethanol; trichlorofluoromethane; trichlorotrifluoroethane; alpha-pinene; and d-limonene were detected in September 2019 in ambient air downwind of the GWTP.

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

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

### 6.2.1.2 Air Stripper Effluent Results

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

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

### 6.2.2 PID Results

Along with collection of Summa canister air samples, PID measurements from the same sources/areas are collected and recorded. These simultaneous measurements allowed establishing a correlation between PID readings and VOC concentrations in the Summa canister air samples. Conversion from PID to compound concentrations was established by TCEQ in 30 TAC §106.533(h). The TCEQ equation allows use of a PID to determine individual compound concentrations if the distribution of chemicals in the ambient air is known or assumed. This allows the use of a PID as a tool to measure VOC concentrations and convert the PID results to estimates of compound concentrations. Ambient air PID measurements during this quarter at the GWTP were reported at 0.0 parts per million. The results of the PID readings collected during GWTP operations are presented in **Table 3** in **Attachment 2** within **Appendix F**.

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## 7 COMMENTS AND RESPONSES

The TCEQ issued the following comment on 3 December 2019:

**Comment 1:** LHAAP-16 figures (B-7 through B-12) – Please contour Shallow and Intermediate Zone using the same interval frequency. It would be preferable to use 0.5 foot contours for both, rather than the 0.2 foot intervals that were used for the intermediate zone.

**Response to Comment 1:** Concur. The contouring on the LHAAP-16 figures in Appendix B of this report is based upon 0.5 foot intervals. The figures for the 2<sup>nd</sup> Quarter 2019 report were also updated to include 0.5 foot contour intervals.

The USEPA issued the following comments on 12 December 2019:

**Comment 1:** Page 2-7, First Full Paragraph: EPA has no problem with removing well MW-20 from the monitoring program, since there is well MW22R located very close; however, well 126 needs to still be monitored since it is the furthestmost well on the southern part of the plume and it did detect perchlorate at 5.9 ppb.

**Response to Comment 1:** Concur. Starting with the June 2020 sampling event, monitoring well MW-20 will be removed from the monitoring program only.

**Comment 2:** Page 2-7: Second Paragraph: EPA did notice that well 18CPTMW08DW (screened at 89.3 feet – 99.3 feet) had a result of 4300 ppb for perchlorate, which may be the highest result ever detected for this well. EPA looked at the Longhorn “smart map” results and found that a sample taken in 2013 for this well detected perchlorate at .486 ppb. So, this well needs to be evaluated carefully! Also, monitoring well 18CPTMW10DW (screened interval at 88.8 feet – 98.3 feet) located just west of ICTs 12E/12D, has shown some increases in perchlorate over time. In May of 2013, perchlorate was <.2 ppb. In the most recent sampling event (June 2019) perchlorate was found at 9.1 ppb.

**Response to Comment 2:** Concur. These wells will be included in discussions within the 4<sup>th</sup> Quarter 2019 Report following the semi-annual sampling event being completed in December 2019.

**Comment 3:** General Comment for MW-14 and 18CPTMW08DW: The groundwater found in these locations will need to be further delineated vertically and horizontally. Hopefully, the extent of contamination (horizontally and vertically) will be minimal in these areas; however, the longer this task is delayed, the greater the chance of further migration and higher remediation costs for the site.

**Response to Comment 3:** Noted.

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**Comment 4:** Smart Map: While the smart map is not associated with historical GWTP reports, EPA noticed that for site 18/24 there are several recent monitoring results not included (results stop around 2016/2017). Please revise the smart map to include the recent results.

**Response to Comment 4:** Concur. Data for Site 18/24 needs to be updated in the SmartMap and will be completed.



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**APPENDIX A**  
**ICT LAYOUT AND GWTP PROCESS FLOW DIAGRAM**

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Table A-1: ICTs Completion Depths

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

## Note(s):

ICT - interception-collection trench

TOC - top of casing, measuring point for groundwater elevations

Elevations are reported as feet above mean sea level.

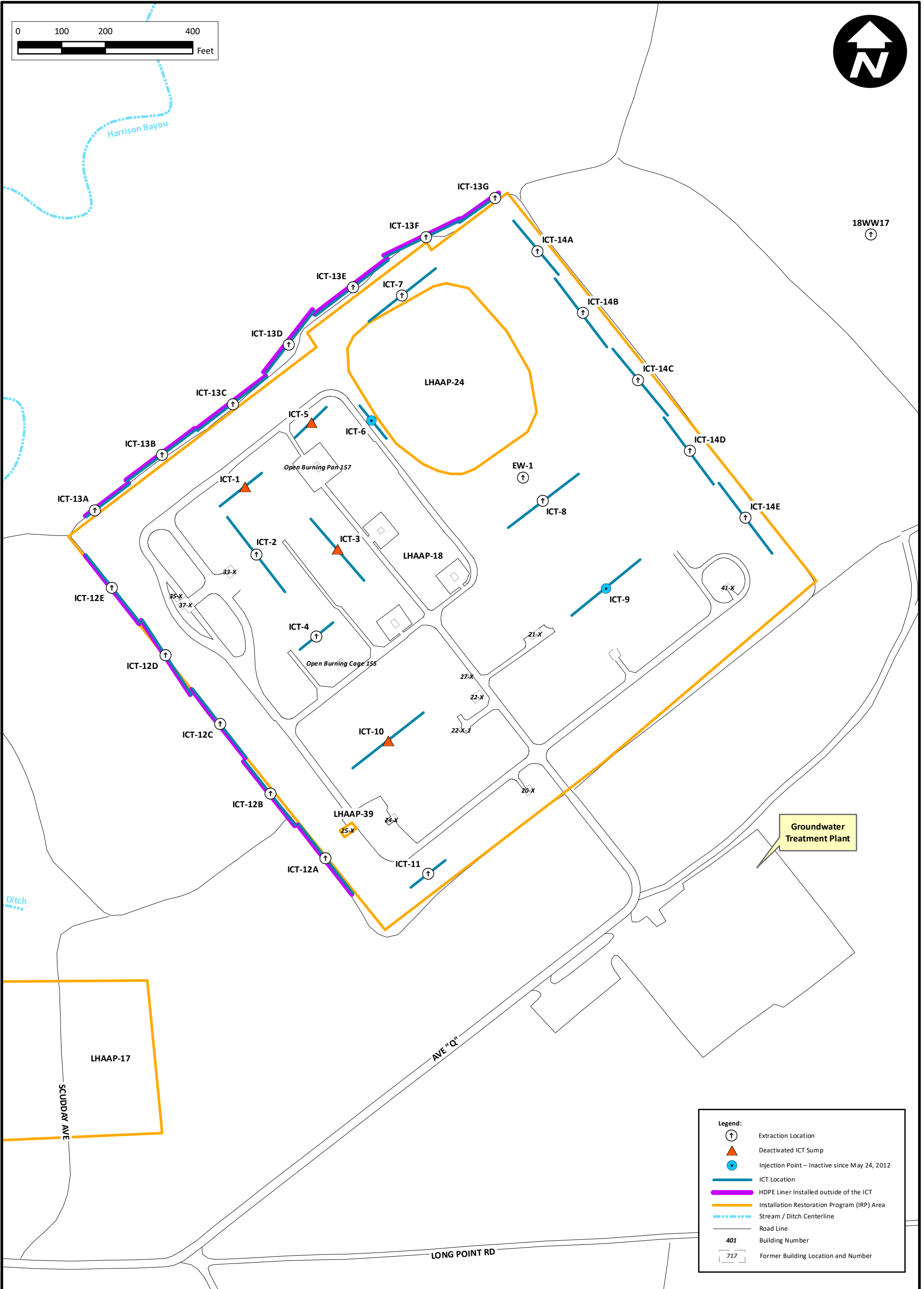
Total depths are reported as feet below TOC.

Sump elevation calculated by subtracting total depth from TOC elevation.

ICTs were installed in 1998.

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

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



**Legend:**

- Extraction Location
- Deactivated ICT Sump
- Injection Point – Inactive since May 24, 2012
- ICT Location
- HDPE Liner Installed outside of the ICT
- Installation Restoration Program (IRP) Area
- Stream / Ditch Centerline
- Road Line
- Building Number
- Former Building Location and Number



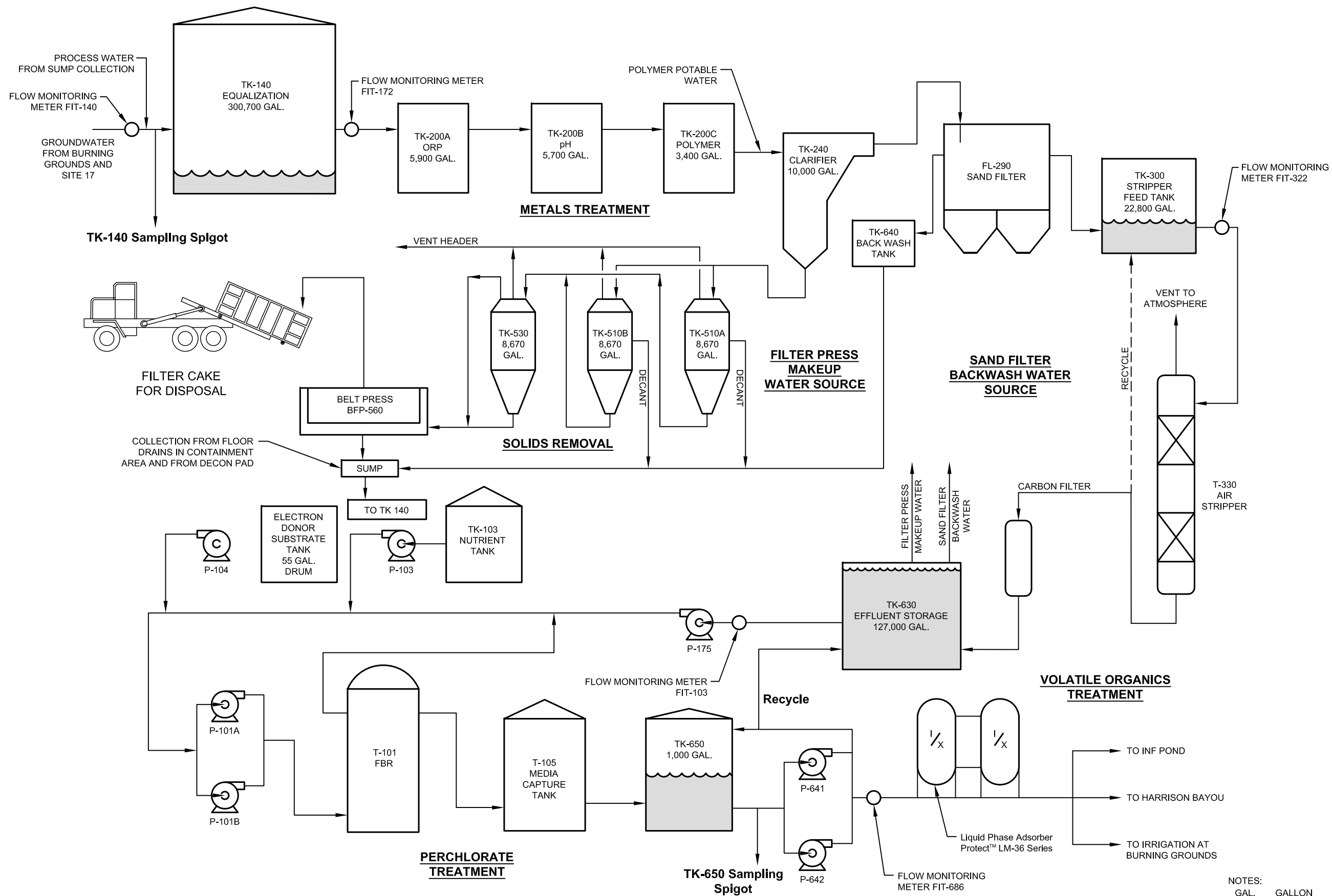
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Quarterly Evaluation Report  
Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

PROJECT NO:	SCALE:	DATE:	DRAWN BY:
NWO1312.0150	As Shown	10/25/2019	MRM

ICT Layout Map

Figure A-1



Process Flow Diagram

Figure A-2

Quarterly Evaluation Report  
Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

DRAWN BY:  
MRM

DATE:  
12/16/2019

SCALE:  
Not to Scale

PROJECT NO:  
NWO1312.0150

- NOTES:
- GAL. GALLON
  - TK or T TANK
  - BFP BELT FILTER PRESS
  - P PUMP
  - FL FILTER
  - FBR FLUIDIZED BED REACTOR
  - 1/X ION EXCHANGE



GWTP QUARTERLY EVALUATION REPORT – 3<sup>RD</sup> QUARTER 2019  
LONGHORN ARMY AMMUNITION PLANT

**APPENDIX B**  
**GROUNDWATER ELEVATION CONTOUR MAPS**

GWTP QUARTERLY EVALUATION REPORT – 3<sup>RD</sup> QUARTER 2019  
LONGHORN ARMY AMMUNITION PLANT

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Table B-1: Extraction Equipment Maintenance Since 2011

## LHAAP-18/24

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



**Table B-1: Extraction Equipment Maintenance Since 2011**

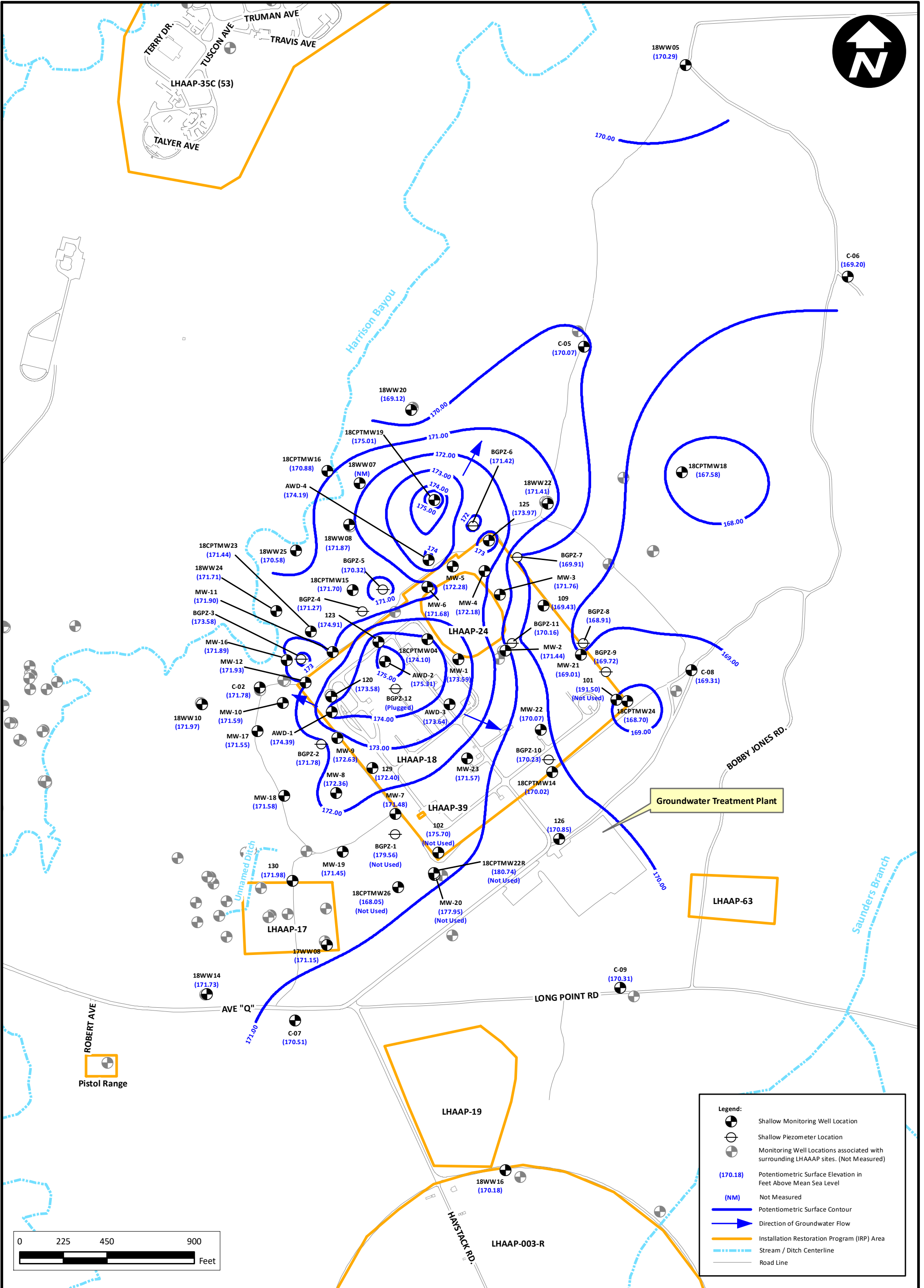
<b>Well I.D.</b>	<b>Replaced Parts</b>	<b>Date</b>	<b>Contractor</b>
ICT 14C	Installed New Pump and Electric Motor	7/29/2015	AECOM
ICT 14E	Installed New Pump and Electric Motor	7/31/2015	AECOM
ICT 12E	Repaired wiring	8/12/2015	AECOM
ICT 13E	Replaced high and low level probes	8/12/2015	AECOM
ICT 2	Installed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

**Table B-1: Extraction Equipment Maintenance Since 2011**

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

**Table B-1: Extraction Equipment Maintenance Since 2011**

<b>Well I.D.</b>	<b>Replaced Parts</b>	<b>Date</b>	<b>Contractor</b>
ICT 12D	Replace pump & motor	3/6/2019	Bhate
ICT 13C	Replace pump	3/8/2019	Bhate
ICT 2	Replace pump & flow meter	3/11/2019	Bhate
ICT 14C	Replace pump & motor	3/12/2019	Bhate
ICT 14D	Replace pump	3/12/2019	Bhate
ICT 14E	Replace pump, seal plate & level probes	3/14/2019	Bhate
ICT 14A	Replace pump and repair leaking 1" pipe	3/15/2019	Bhate
ICT 13C	Lower high level probe	3/22/2019	Bhate
ICT 14A	Lower high level probe	3/22/2019	Bhate
EW-01	Replace pump	3/29/2019	Bhate
ICT 8	Clean level probes	4/1/2019	Bhate
ICT 12C	Clean level probes	4/1/2019	Bhate
ICT 13D	Clean level probes	4/1/2019	Bhate
ICT 14E	Replaced bad relay	4/2/2019	Bhate
ICT 12A	Replace flow meter	4/3/2019	Bhate
ICT 13F	Replace flow meter	4/3/2019	Bhate
ICT 13D	Replace low level probe	4/3/2019	Bhate
ICT 13C	Clean level probes	5/8/2019	Bhate
ICT 14 C	Clean level probes	5/8/2019	Bhate
ICT 12D	Replace bad relay	5/8/2019	Bhate
ICT 13A	Replace pump	7/10/2019	Bhate
ICT 13D	Replace pump	7/17/2019	Bhate
ICT 14C	Clean level probes	9/25/2019	Bhate
ICT 14D	Clean level probes	9/25/2019	Bhate
<b>LHAAP-16</b>			
<b>Well I.D.</b>	<b>Replaced Parts</b>	<b>Date</b>	<b>Contractor</b>
EW08	New pump	2/28/2011	Shaw
EW01	Rebuild pump	8/25/2011	Shaw
EW06	Rebuild pump	8/25/2011	Shaw
EW02	Rebuild pump	2/12/2012	Shaw
EW03	Rebuild pump	2/12/2012	Shaw
EW08	Rebuild pump	11/8/2012	AECOM
EW01	Rebuild pump	11/8/2012	AECOM
EW04	Repair pump	11/13/2012	AECOM
EW07	Rebuild pump	11/13/2012	AECOM
EW04	Installed New Pump	11/28/2012	AECOM
EW06	Installed New Pump	11/28/2012	AECOM
EW02	Installed New Pump	12/4/2012	AECOM
EW03	Installed New Pump	12/4/2012	AECOM
EW01	Installed New Pump	12/17/2012	AECOM
EW01	Replaced Low level probe	1/17/2015	AECOM
EW01	Cleaned and adjusted level probes	10/21/2016	Aerotek



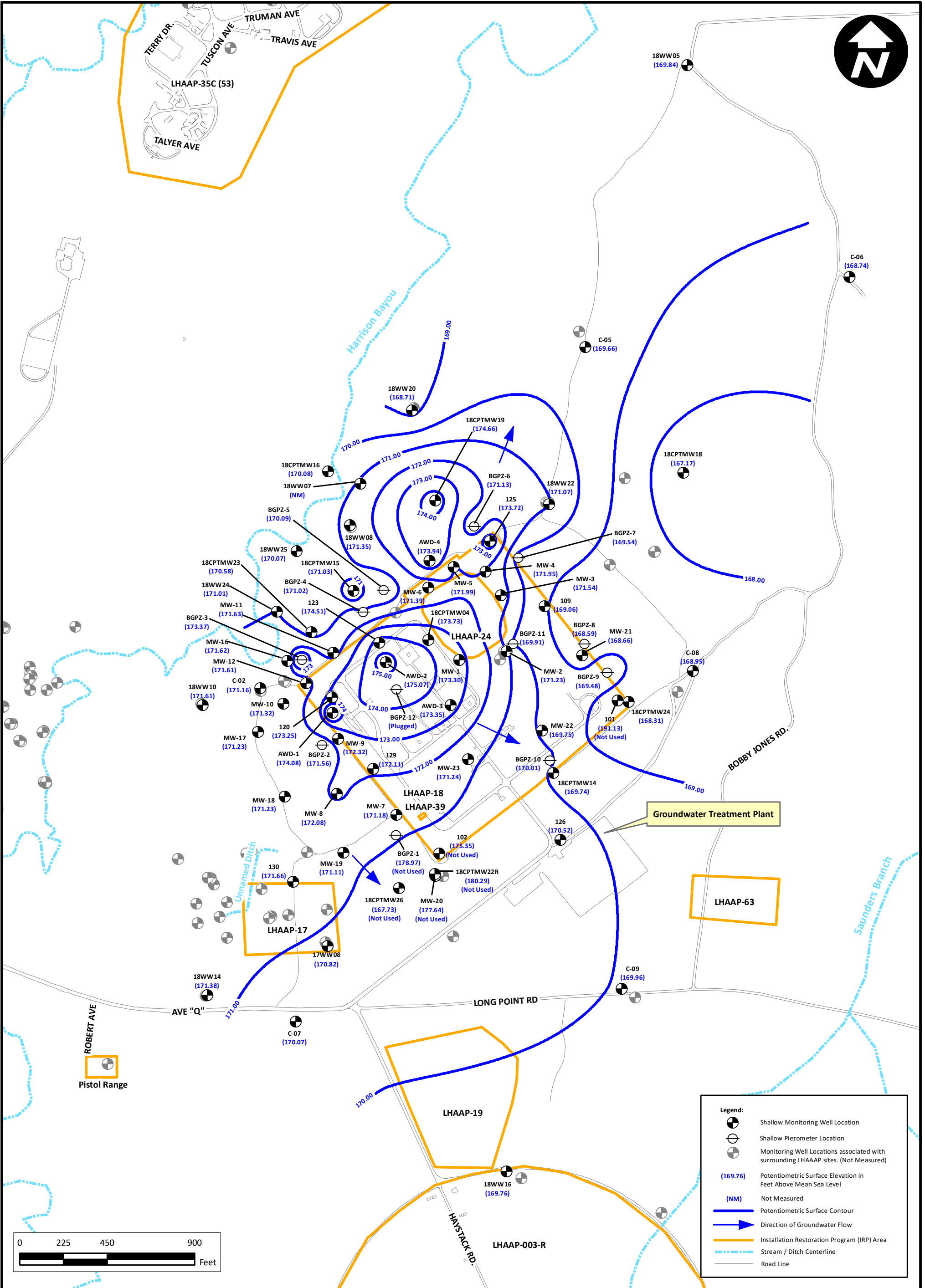
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Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

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Groundwater Potentiometric Surface Map  
Shallow Zone (July 31, 2019) LHAAP-18/24

Figure B-1



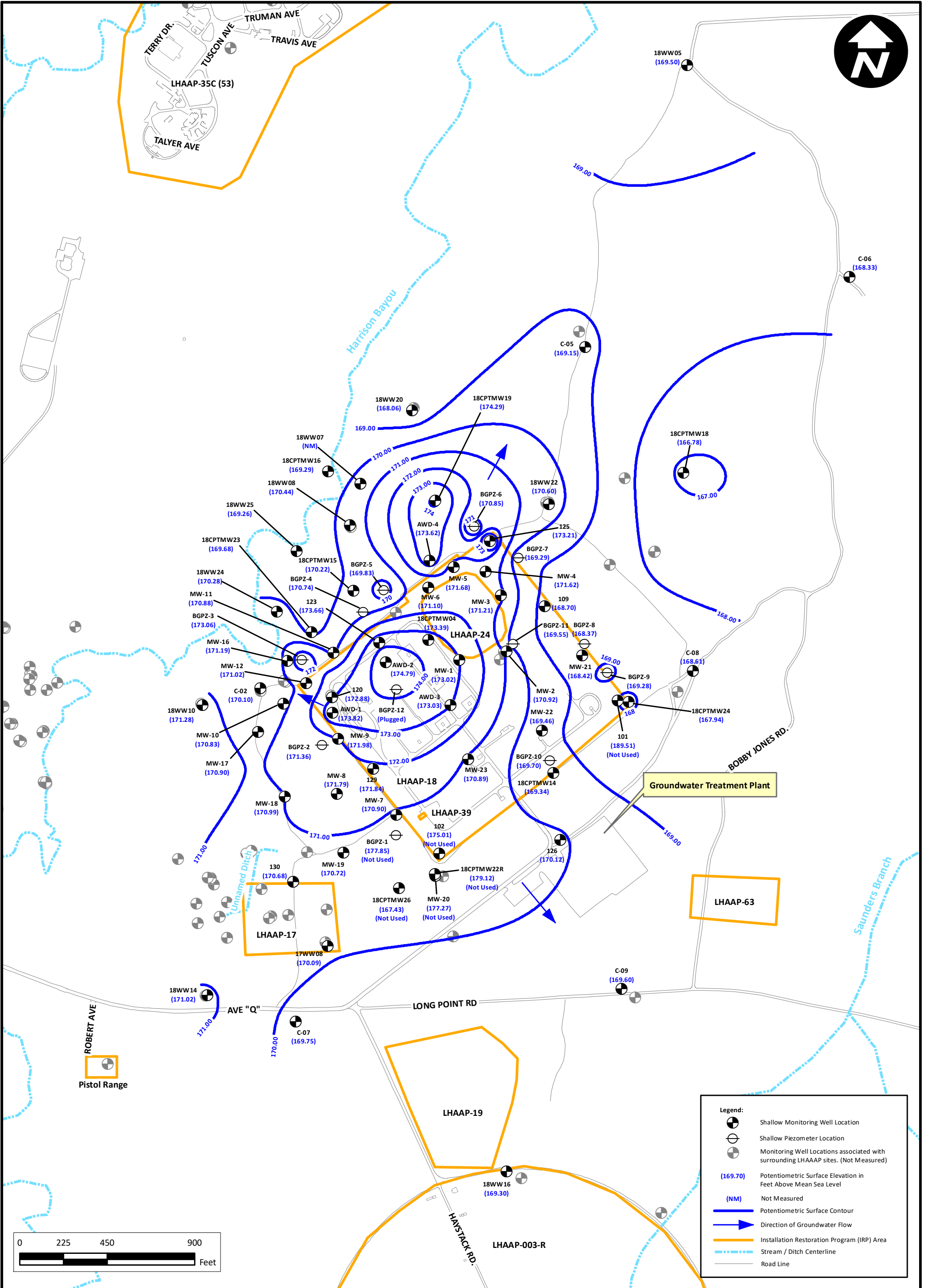
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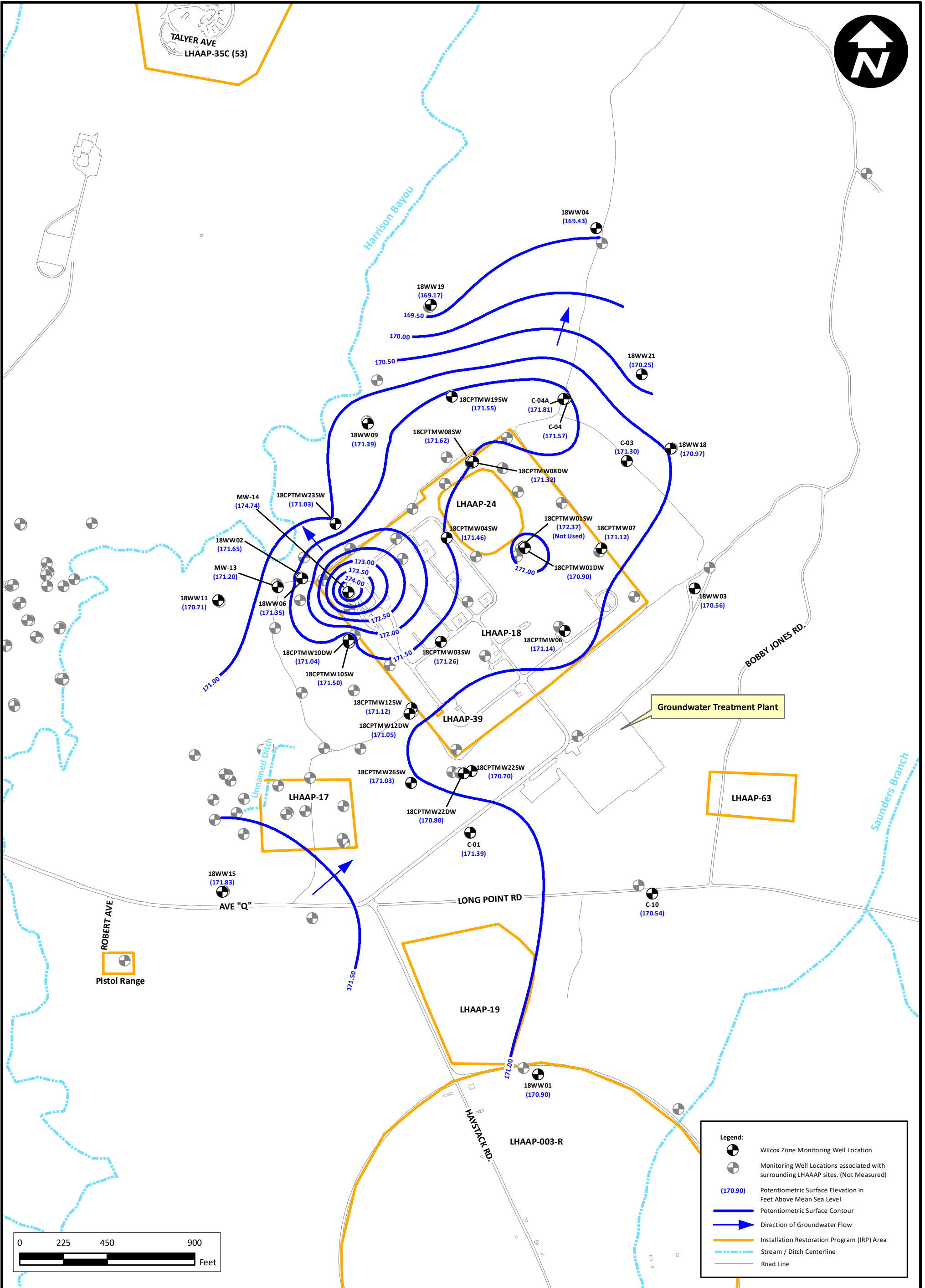
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 Longhorn Army Ammunition Plant, Karnack, Texas

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Groundwater Potentiometric Surface Map  
 Shallow Zone (August 20, 2019) LHAAP-18/24

Figure B-2





Quarterly Evaluation Report 3rd Quarter (July – September) 2019  
 Groundwater Treatment Plant  
 Longhorn Army Ammunition Plant, Karnack, Texas

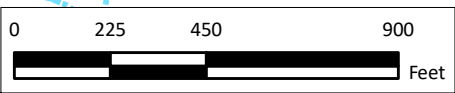
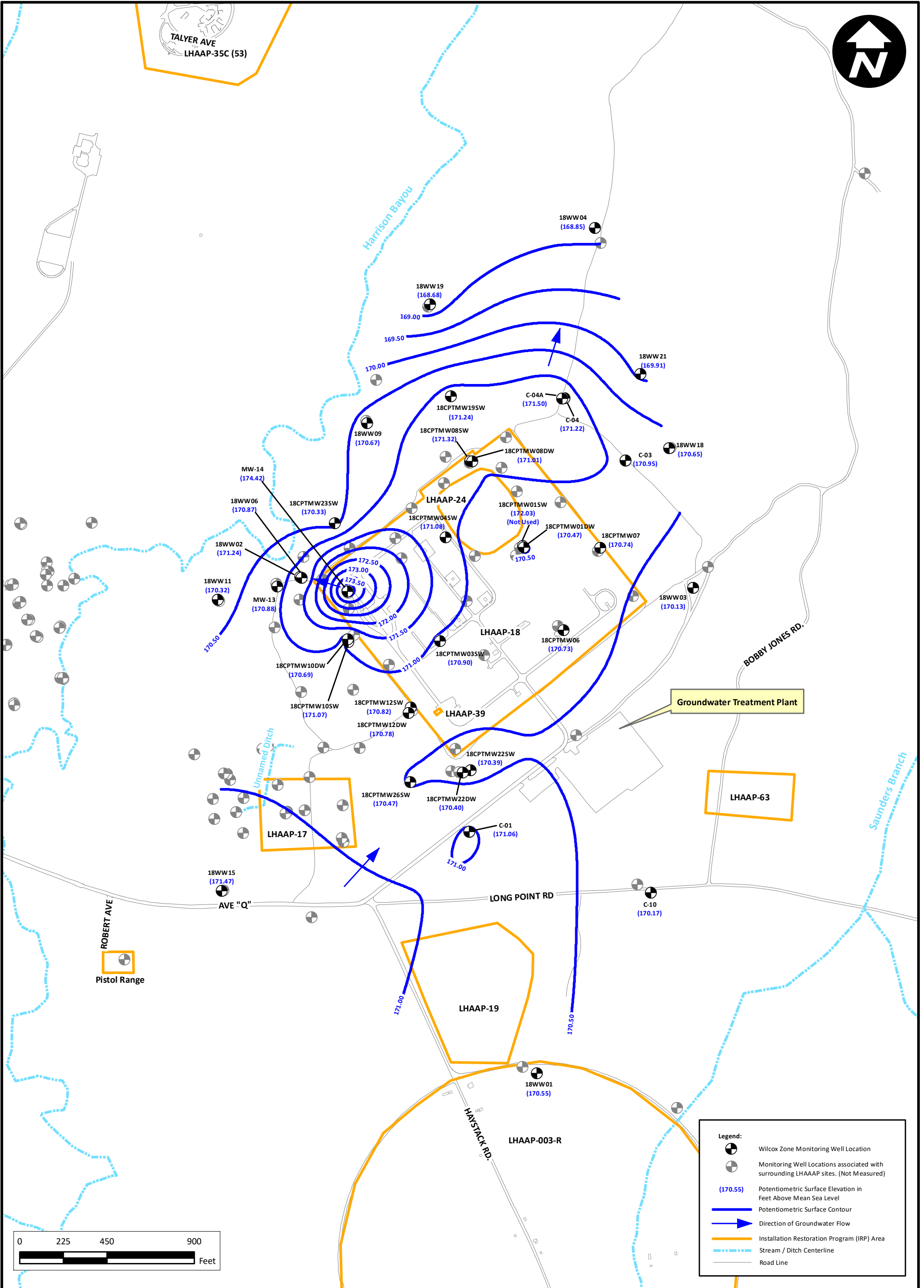
Groundwater Potentiometric Surface Map  
 Wilcox Zone (July 31, 2019) LHAAP-18/24



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Figure B-4



**Legend:**

- Wilcox Zone Monitoring Well Location
- Monitoring Well Locations associated with surrounding LHAAP sites. (Not Measured)
- (170.55)** Potentiometric Surface Elevation in Feet Above Mean Sea Level
- Potentiometric Surface Contour
- Direction of Groundwater Flow
- Installation Restoration Program (IRP) Area
- Stream / Ditch Centerline
- Road Line

Quarterly Evaluation Report 3rd Quarter (July – September) 2019  
 Groundwater Treatment Plant  
 Longhorn Army Ammunition Plant, Karnack, Texas

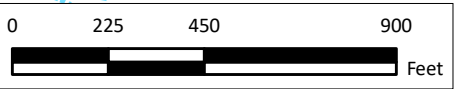
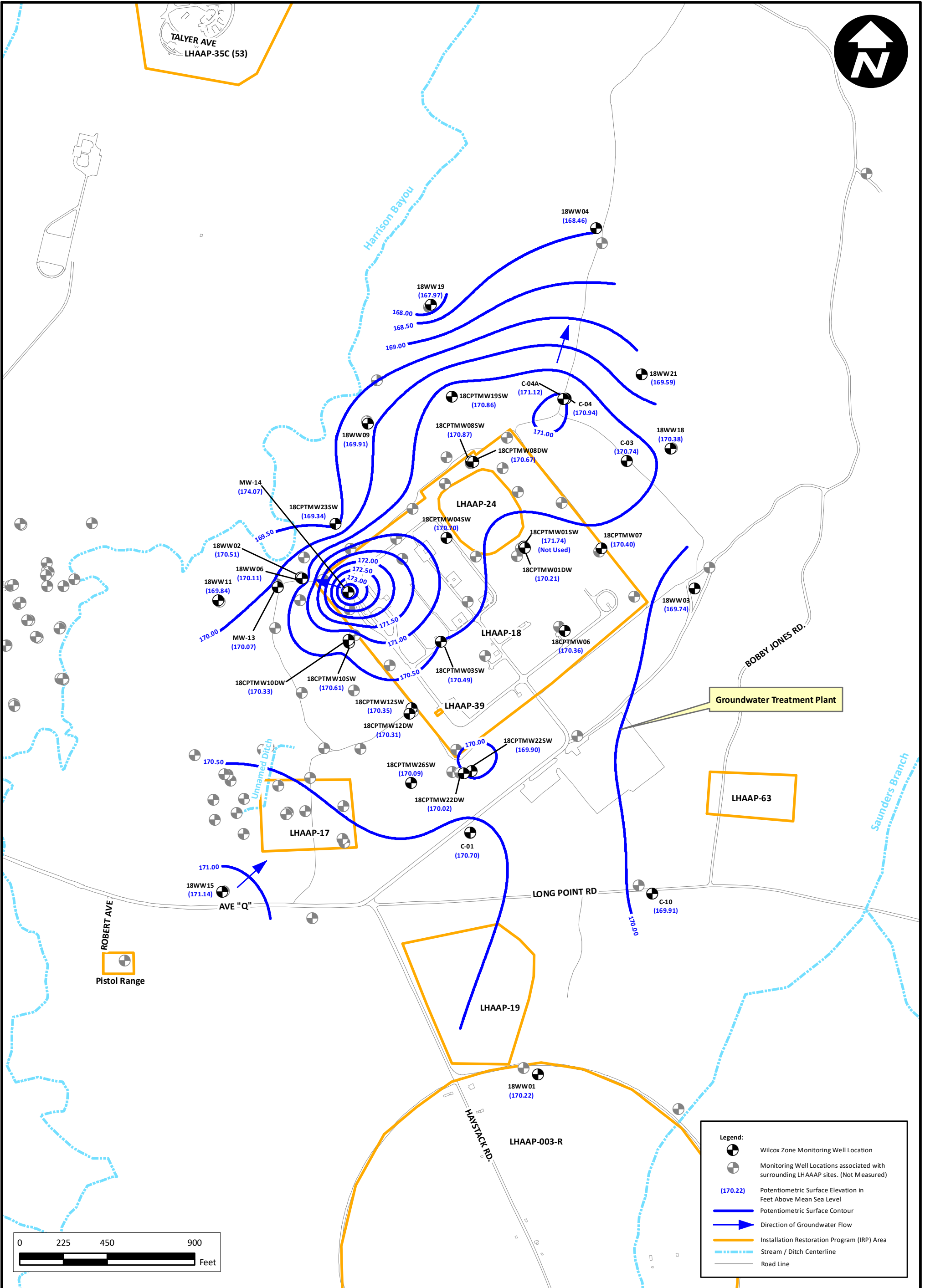
**Groundwater Potentiometric Surface Map  
 Wilcox Zone (August 20, 2019) LHAAP-18/24**

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**Figure B-5**





- Legend:**
- Wilcox Zone Monitoring Well Location
  - Monitoring Well Locations associated with surrounding LHAAAP sites. (Not Measured)
  - (170.22)** Potentiometric Surface Elevation in Feet Above Mean Sea Level
  - Potentiometric Surface Contour
  - Direction of Groundwater Flow
  - Installation Restoration Program (IRP) Area
  - Stream / Ditch Centerline
  - Road Line



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Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

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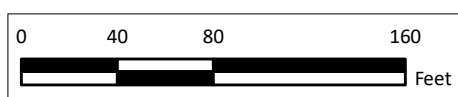
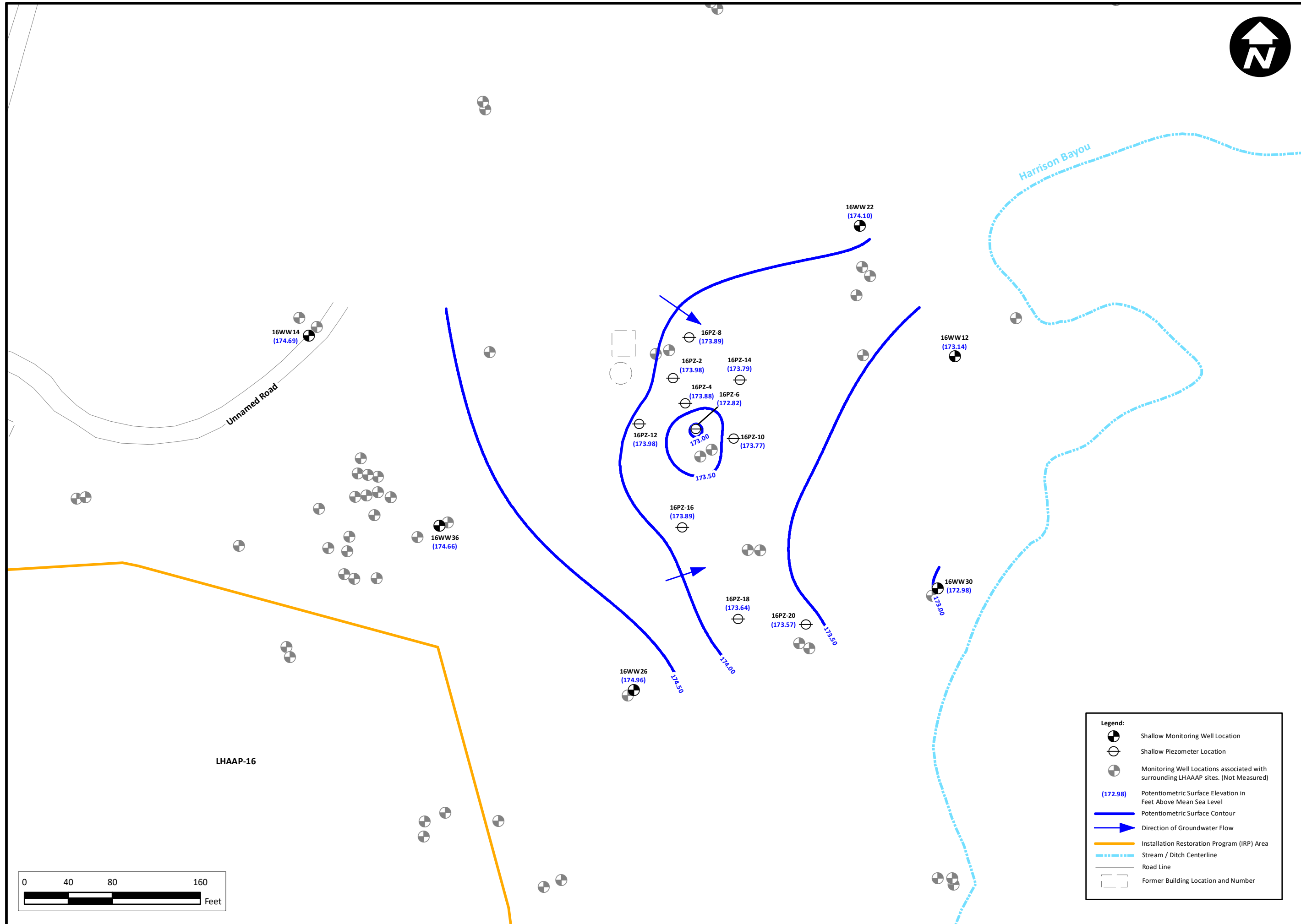
Groundwater Potentiometric Surface Map  
Wilcox Zone (September 30, 2019) LHAAP-18/24

Figure B-6



Groundwater Potentiometric Surface Map  
Shallow Zone (July 31, 2019) LHAAP-16

Figure B-7



**Legend:**

- Shallow Monitoring Well Location
- Shallow Piezometer Location
- Monitoring Well Locations associated with surrounding LHAAP sites. (Not Measured)
- (172.98)** Potentiometric Surface Elevation in Feet Above Mean Sea Level
- Potentiometric Surface Contour
- Direction of Groundwater Flow
- Installation Restoration Program (IRP) Area
- Stream / Ditch Centerline
- Road Line
- Former Building Location and Number

Quarterly Evaluation Report 3rd Quarter (July – September) 2019  
Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

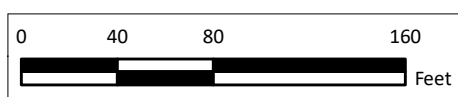
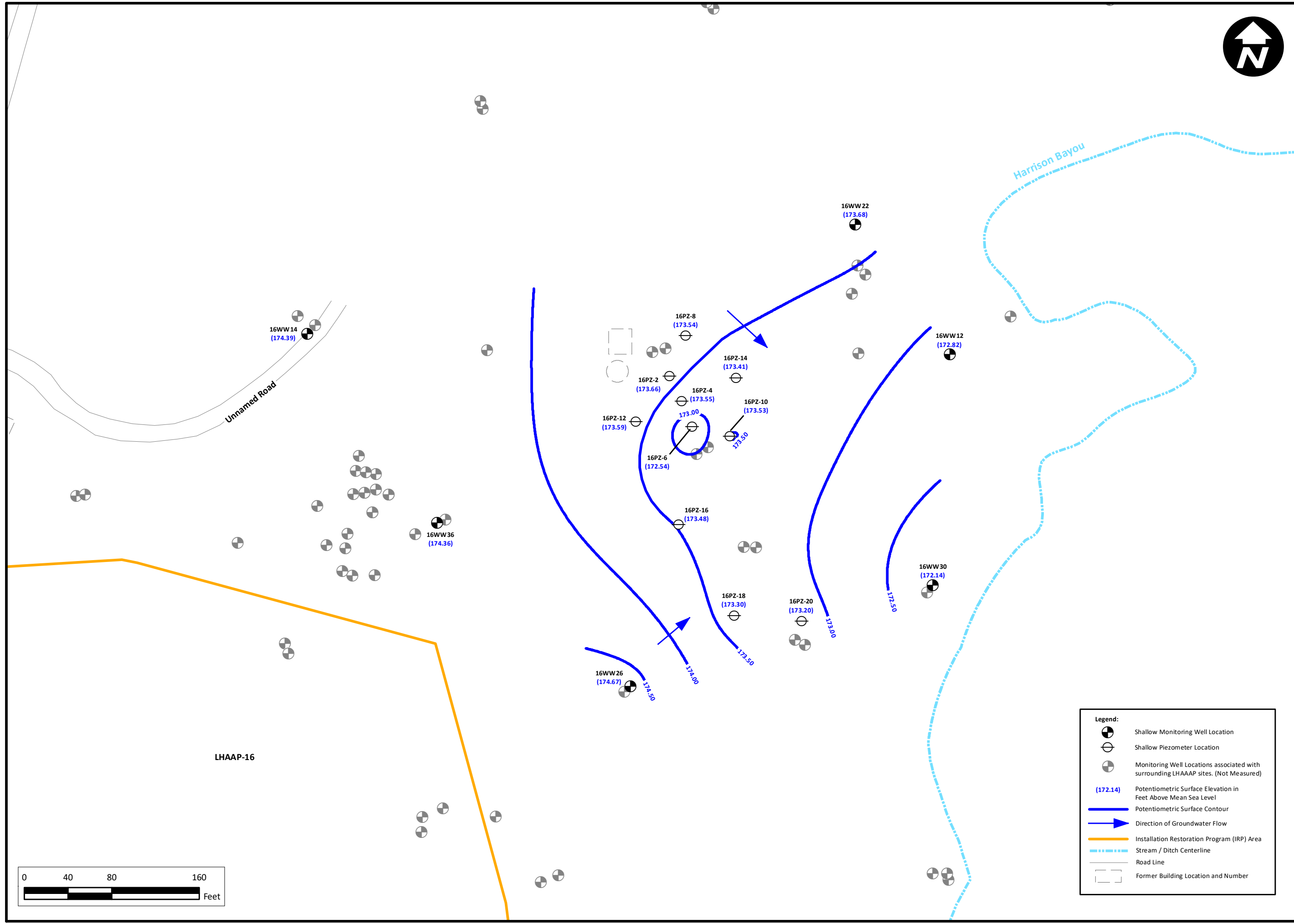
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Groundwater Potentiometric Surface Map  
Shallow Zone (August 21, 2019) LHAAP-16

Figure B-8



**Legend:**

- Shallow Monitoring Well Location
- Shallow Piezometer Location
- Monitoring Well Locations associated with surrounding LHAAP sites. (Not Measured)
- (172.14) Potentiometric Surface Elevation in Feet Above Mean Sea Level
- Potentiometric Surface Contour
- Direction of Groundwater Flow
- Installation Restoration Program (IRP) Area
- Stream / Ditch Centerline
- Road Line
- Former Building Location and Number

Quarterly Evaluation Report 3rd Quarter (July – September) 2019  
Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

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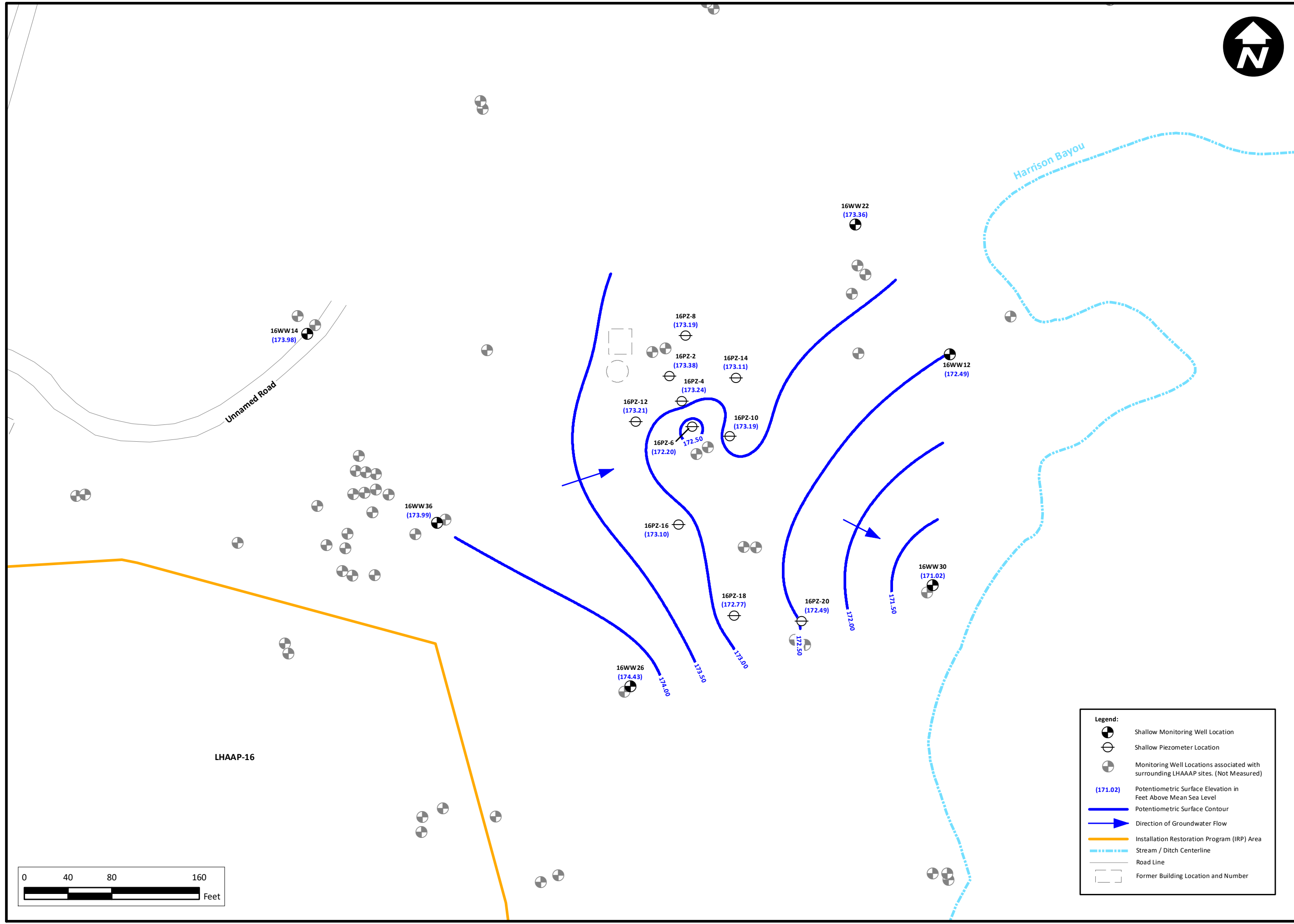


Groundwater Potentiometric Surface Map  
Shallow Zone (September 30, 2019) LHAAP-16

Figure B-9

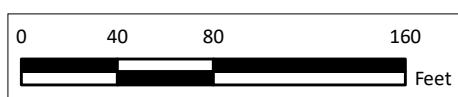
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Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

PROJECT NO:	NW01312.0150	SCALE:	As Shown	DATE:	10/28/2019	DRAWN BY:	MRM
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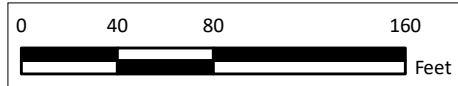
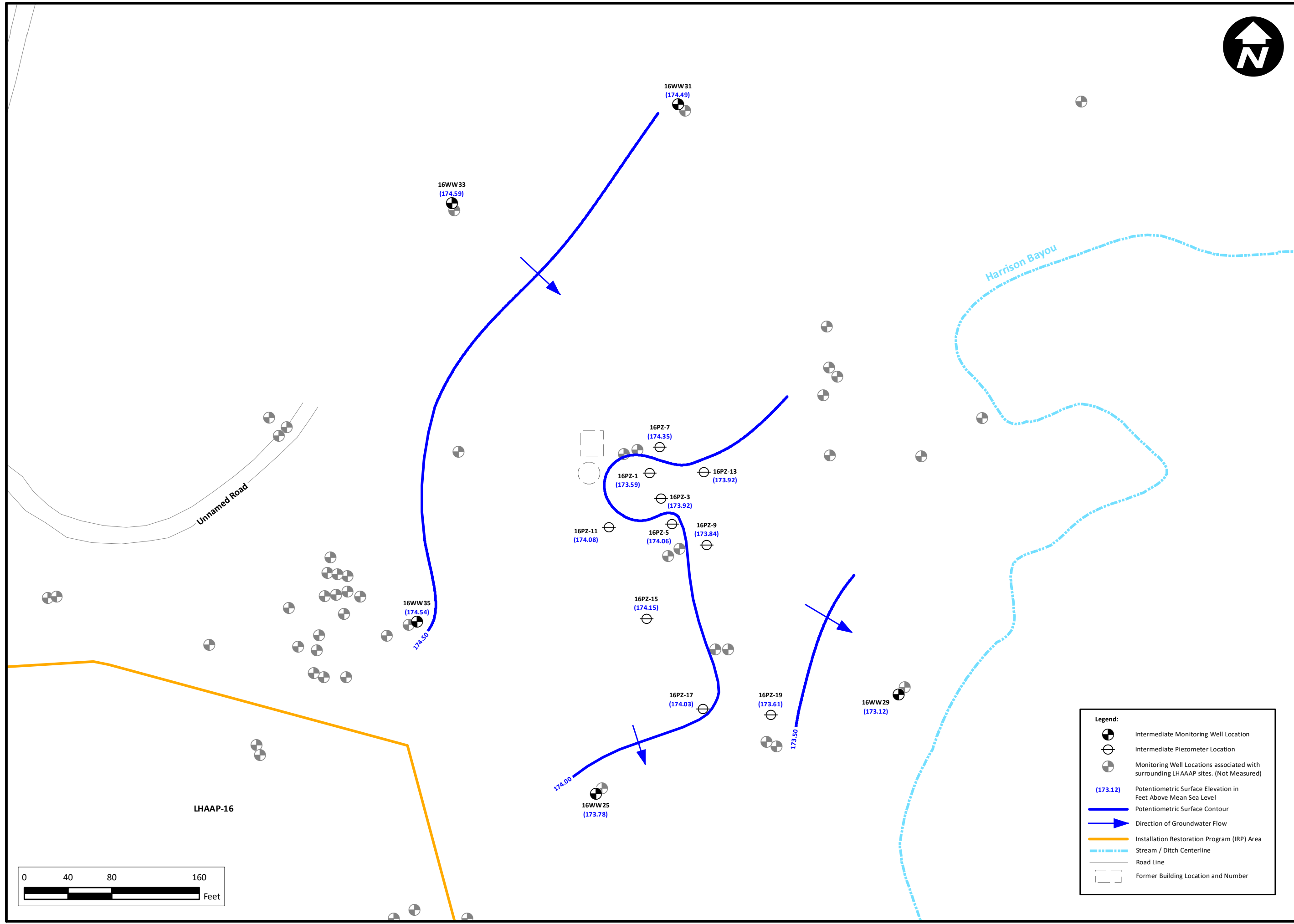


**Legend:**

- Shallow Monitoring Well Location
- Shallow Piezometer Location
- Monitoring Well Locations associated with surrounding LHAAP sites. (Not Measured)
- (171.02) Potentiometric Surface Elevation in Feet Above Mean Sea Level
- Potentiometric Surface Contour
- Direction of Groundwater Flow
- Installation Restoration Program (IRP) Area
- Stream / Ditch Centerline
- Road Line
- Former Building Location and Number



LHAAP-16



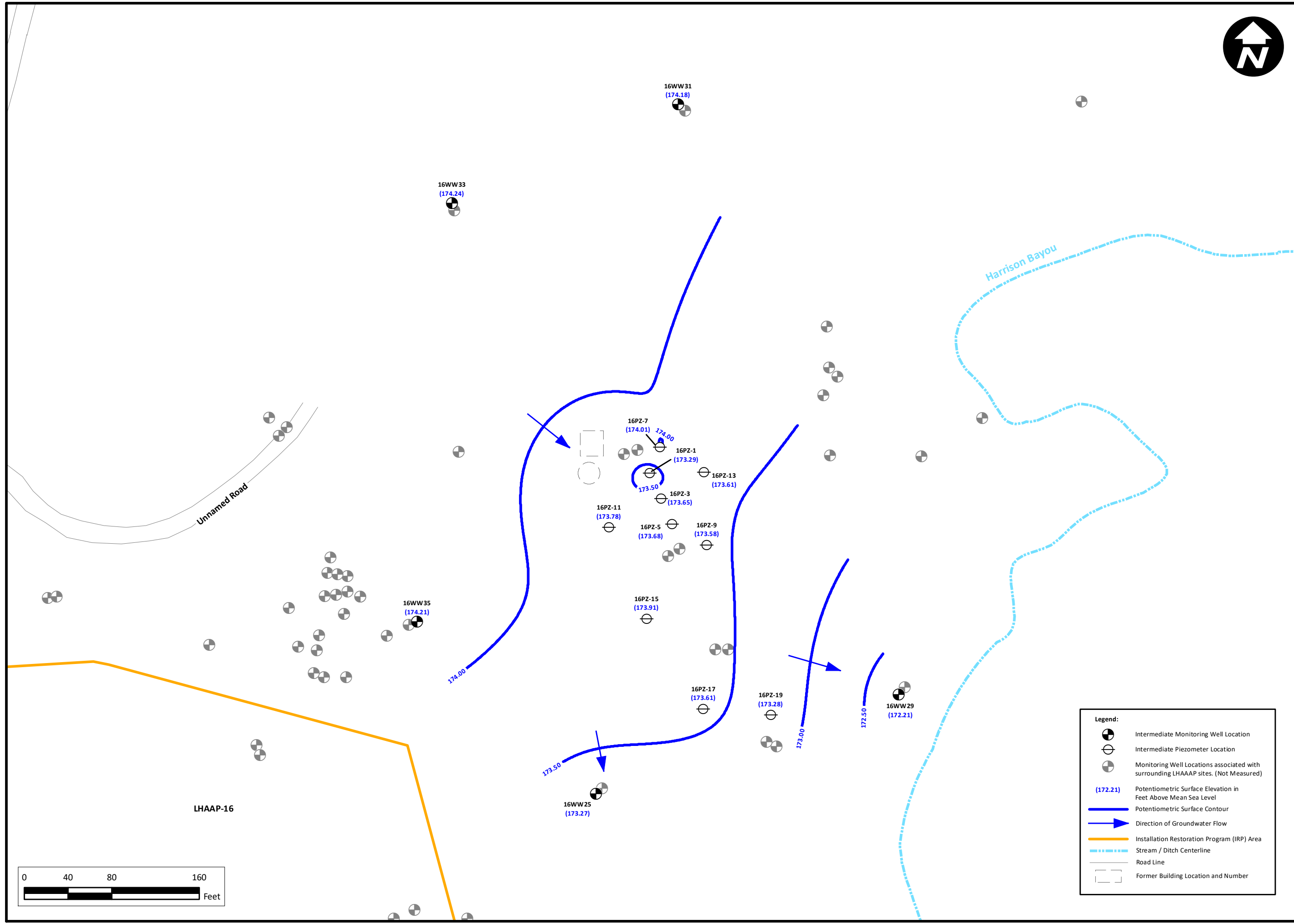
Groundwater Potentiometric Surface Map  
Intermediate Zone (July 31, 2019) LHAAP-16

Figure B-10

Quarterly Evaluation Report 3rd Quarter (July – September) 2019  
Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

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Groundwater Potentiometric Surface Map  
Intermediate Zone (August 21, 2019) LHAAP-16

Figure B-11

Quarterly Evaluation Report 3rd Quarter (July – September) 2019  
Groundwater Treatment Plant  
Longhorn Army Ammunition Plant, Karnack, Texas

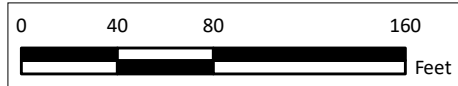
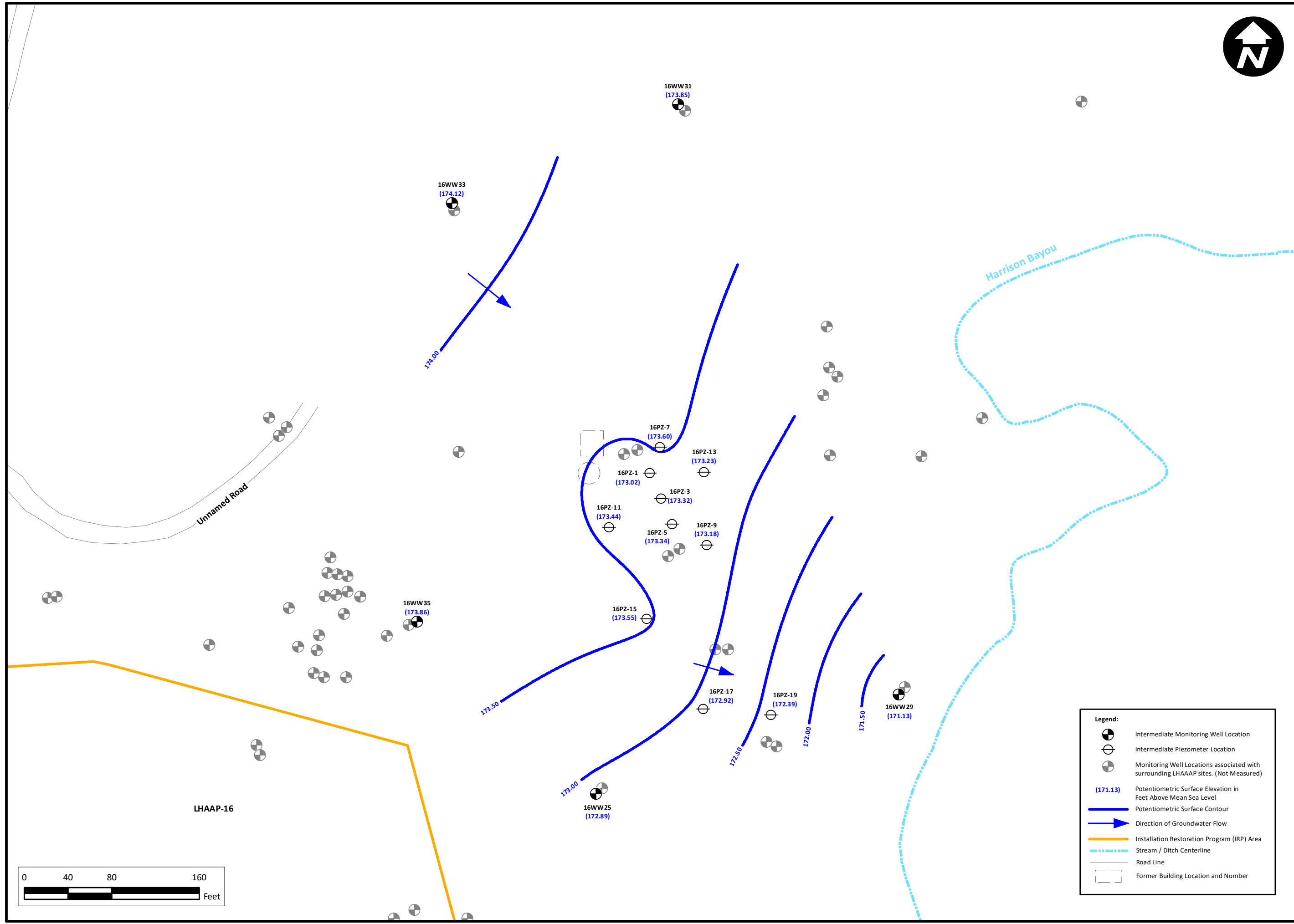
PROJECT NO:	NW01312.0150	SCALE:	As Shown	DATE:	10/25/2019	DRAWN BY:	MRM
-------------	--------------	--------	----------	-------	------------	-----------	-----



**Legend:**

- Intermediate Monitoring Well Location
- Intermediate Piezometer Location
- Monitoring Well Locations associated with surrounding LHAAP sites. (Not Measured)
- (172.21)** Potentiometric Surface Elevation in Feet Above Mean Sea Level
- Potentiometric Surface Contour
- Direction of Groundwater Flow
- Installation Restoration Program (IRP) Area
- Stream / Ditch Centerline
- Road Line
- Former Building Location and Number





- Legend:**
- Intermediate Monitoring Well Location
  - Intermediate Piezometer Location
  - Monitoring Well Locations associated with surrounding LHAAP sites. (Not Measured)
  - (171.13) Potentiometric Surface Elevation in Feet Above Mean Sea Level
  - Potentiometric Surface Contour
  - Direction of Groundwater Flow
  - Installation Restoration Program (IRP) Area
  - Stream / Ditch Centerline
  - Road Line
  - Former Building Location and Number

Quarterly Evaluation Report 3rd Quarter (July – September) 2019  
 Groundwater Treatment Plant  
 Longhorn Army Ammunition Plant, Karnack, Texas

Groundwater Potentiometric Surface Map  
 Intermediate Zone (September 30, 2019) LHAAP-16  
 Figure B-12

PROJECT NO: NWO1312.0150

SCALE: As Shown

DATE: 10/25/2019

DRAWN BY: MRM



GWTP QUARTERLY EVALUATION REPORT – 3<sup>RD</sup> QUARTER 2019  
LONGHORN ARMY AMMUNITION PLANT

**APPENDIX C**  
**GWTP WATER SAMPLING LABORATORY ANALYTICAL RESULTS FOR THE**  
**3<sup>RD</sup> QUARTER 2019 (PROVIDED ON CD ONLY)**



GWTP QUARTERLY EVALUATION REPORT – 3<sup>RD</sup> QUARTER 2019  
LONGHORN ARMY AMMUNITION PLANT

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

July 25, 2019

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

Work Order: **HS19070423**

Laboratory Results for: **Groundwater Treatment Plant Weekly Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on Jul 10, 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval scribble.

Generated By: JUMOKE.LAWAL  
RJ Modashia  
Project Manager

ALS Houston, US

Date: 25-jul-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Weekly Samples  
**Work Order:** HS19070423

---

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19070423-01	LH18/24-SP650_070919	Water		09-Jul-2019 14:00	10-Jul-2019 08:57	<input type="checkbox"/>
HS19070423-02	LH18/24-SP650_070919_BIX	Water		09-Jul-2019 14:00	10-Jul-2019 08:57	<input type="checkbox"/>

---

**ALS Houston, US**

Date: 25-Jul-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Weekly Samples  
**Work Order:**

**CASE NARRATIVE**

---

**Work Order Comments**

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

---

**Work Order Comments**

- The analysis for TOC was subcontracted to ALS Kelso, WA. Final report attached.

---

**WetChemistry by Method E350.3**

**Batch ID: R342503**

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

---

**WetChemistry by Method E365.3**

**Batch ID: R342394**

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

## ALS Houston, US

Date: 25-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Weekly Samples  
 Sample ID: LH18/24-SP650\_070919  
 Collection Date: 09-Jul-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19070423  
 Lab ID:HS19070423-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>								Analyst: MZD
	Method:E350.3							
Nitrogen, Ammonia (As N)	6.9		0.20	0.10	0.20	mg/L	1	16-Jul-2019 13:20
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3</b>								Analyst: MZD
	Method:E365.3							
Phosphorus, Total Orthophosphate (As P)	2.19		0.100	0.200	0.250	mg/L	10	11-Jul-2019 12:00
<b>SUBCONTRACT ANALYSIS - TOC ANALYSIS</b>								Analyst: SUBK
	Method:NA							
Subcontract Analysis	See Attached		0	0		NA	1	18-Jul-2019 09:02

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

## ALS Houston, US

Date: 25-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Weekly Samples  
 Sample ID: LH18/24-SP650\_070919\_BIX  
 Collection Date: 09-Jul-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19070423  
 Lab ID:HS19070423-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: SUB	
Subcontract Analysis	See Attached		0	0		NA	1	25-Jul-2019 18:13	

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

ALS Houston, US

Date: 25-jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Weekly Samples  
**WorkOrder:** HS19070423

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R342394 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3			<b>Matrix:</b> Water	
HS19070423-01	LH18/24-SP650_070919	09 Jul 2019 14:00			11 Jul 2019 12:00	10
<b>Batch ID:</b> R342503 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS19070423-01	LH18/24-SP650_070919	09 Jul 2019 14:00			16 Jul 2019 13:20	1
<b>Batch ID:</b> R342637 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - TOC ANALYSIS			<b>Matrix:</b> Water	
HS19070423-01	LH18/24-SP650_070919	09 Jul 2019 14:00			18 Jul 2019 09:02	1
<b>Batch ID:</b> R343073 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS19070423-02	LH18/24-SP650_070919_BIX	09 Jul 2019 14:00			25 Jul 2019 18:13	1

ALS Houston, US

Date: 25-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Weekly Samples  
**WorkOrder:** HS19070423

**QC BATCH REPORT**

Batch ID:	R342394 ( 0 )	Instrument:	UV-2450	Method:	ORTHO PHOSPHATE (PO4) AS P BY E365.3					
<b>MBLK</b>	Sample ID: <b>MBLK-342394</b>	Units: <b>mg/L</b>		Analysis Date: <b>11-Jul-2019 12:00</b>						
Client ID:	Run ID: <b>UV-2450_342394</b>	SeqNo: <b>5165960</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.0200	0.0250							U	
<b>LCS</b>	Sample ID: <b>LCS-342394</b>	Units: <b>mg/L</b>		Analysis Date: <b>11-Jul-2019 12:00</b>						
Client ID:	Run ID: <b>UV-2450_342394</b>	SeqNo: <b>5165961</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.242	0.0250	0.25	0	96.8	85 - 115				
<b>MS</b>	Sample ID: <b>HS19070475-03MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>11-Jul-2019 12:00</b>						
Client ID:	Run ID: <b>UV-2450_342394</b>	SeqNo: <b>5165963</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.236	0.0250	0.25	0.002	93.6	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19070475-03MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>11-Jul-2019 12:00</b>						
Client ID:	Run ID: <b>UV-2450_342394</b>	SeqNo: <b>5165964</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.24	0.0250	0.25	0.002	95.2	80 - 120	0.236	1.68	20	

The following samples were analyzed in this batch: HS19070423-01



ALS Houston, US

Date: 25-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Weekly Samples  
**WorkOrder:** HS19070423

**QC BATCH REPORT**

Batch ID: R342503 ( 0 )		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
<b>MBLK</b>	Sample ID: <b>MBLK-342503</b>	Units: <b>mg/L</b>			Analysis Date: <b>16-Jul-2019 13:20</b>					
Client ID:	Run ID: <b>WetChem_HS_342503</b>	SeqNo: <b>5168362</b>			PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Nitrogen, Ammonia (As N)	0.10	0.20							U	
<b>LCS</b>	Sample ID: <b>LCS-342503</b>	Units: <b>mg/L</b>			Analysis Date: <b>16-Jul-2019 13:20</b>					
Client ID:	Run ID: <b>WetChem_HS_342503</b>	SeqNo: <b>5168363</b>			PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Nitrogen, Ammonia (As N)	9.899	0.20	10	0	99.0	80 - 120				
<b>MS</b>	Sample ID: <b>HS19070279-01MS</b>	Units: <b>mg/L</b>			Analysis Date: <b>16-Jul-2019 13:20</b>					
Client ID:	Run ID: <b>WetChem_HS_342503</b>	SeqNo: <b>5168366</b>			PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Nitrogen, Ammonia (As N)	9.774	0.20	10	0.642	91.3	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19070279-01MSD</b>	Units: <b>mg/L</b>			Analysis Date: <b>16-Jul-2019 13:20</b>					
Client ID:	Run ID: <b>WetChem_HS_342503</b>	SeqNo: <b>5168367</b>			PrepDate:		DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Nitrogen, Ammonia (As N)	9.784	0.20	10	0.642	91.4	80 - 120	9.774	0.102	20	

The following samples were analyzed in this batch: HS19070423-01

**ALS Houston, US**

Date: 25-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Weekly Samples  
**WorkOrder:** HS19070423

**QUALIFIERS,  
ACRONYMS, UNITS**

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

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

---

**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

**Sample Receipt Checklist**

Client Name: Bhate Environmental  
 Work Order: HS19070423

Date/Time Received: **10-Jul-2019 08:57**  
 Received by: **NDR**

Checklist completed by: Raegen Giga 10-Jul-2019  
 eSignature Date

Reviewed by: RJ Modashia 10-Jul-2019  
 eSignature Date

Matrices: **water**

Carrier name: **FedEx Priority Overnight**

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

Temperature(s)/Thermometer(s): 1.1c uc/c IR 11  
 Cooler(s)/Kit(s): 45024  
 Date/Time sample(s) sent to storage: 07/10/2019 11:55

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

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:  
 Contacted By: Regarding:

Comments:

Corrective Action:



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

Date: 7/9  
 Name: Sco  
 Company: S

**CUSTODY SEAL**  
 Date: 7/9 Time: 1430  
 H Bessinger  
 11979

By: R  
 Date: 7/10/19

**FedEx**  
 1022 4809 7834 3332  
**AB SGRA**  
 WED - 10 JUL 10:30A  
 PRIORITY OVERNIGHT  
 77099  
 TX-US  
 IAH



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F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

July 17, 2019

**Analytical Report for Service Request No: K1906426**

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

**RE: ALS Houston DOD TOC / HS19070423**

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory July 12, 2019  
For your reference, these analyses have been assigned our service request number **K1906426**.

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](http://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](mailto:Kelley.Lovejoy@alsglobal.com).

Respectfully submitted,

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

Kelley Lovejoy  
Project Manager



---

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## Table of Contents

Acronyms

Qualifiers

State Certifications, Accreditations, And Licenses

Case Narrative

Chain of Custody

General Chemistry

Raw Data

    General Chemistry



## Acronyms

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

### Inorganic Data Qualifiers

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

### Metals Data Qualifiers

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

### Organic Data Qualifiers

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

### Additional Petroleum Hydrocarbon Specific Qualifiers

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

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

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

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

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

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

**Service Request:** K1906426  
**Date Received:** 07/12/2019

### 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.

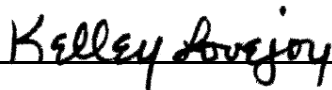
#### Sample Receipt:

One water sample was received for analysis at ALS Environmental on 07/12/2019. 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:

Method SM 5310 C, 07/14/2019: The Relative Percent Difference (RPD) for the replicate analysis of Total Organic Carbon in sample LH18/24-SP-650\_070919 was outside the normal ALS control limits. The associated QA/QC results (e.g. control sample, matrix spike, method blank, calibration standards, etc.) indicate the analysis was in control. No further corrective action was appropriate.

Approved by



Date

07/17/2019



## Chain of Custody

**ALS Environmental—Kelso Laboratory**  
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Phone (360)577- 7222 Fax (360)636-1 068  
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K1906426



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

### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11739

**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:** HS19070423  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19070423-01	LH18/24-SP650_070919	Water	09 Jul 2019 14:00
TOC Analysis for DOD Level IV			18 Jul 2019

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

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

Relinquished By: J. Modashia  
Received By: K. Morrow ALS Kelso  
Cooler ID(s): \_\_\_\_\_

Date/Time: 7/11/19 18:00  
Date/Time: 7/12/19 09:25  
Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS; RIGHT PARTNER



PC KL

### Cooler Receipt and Preservation Form

Client ALS-Houston Service Request K1906426  
 Received: 7/12/19 Opened: 7/12/19 By: km Unloaded: 7/12/19 By: KL

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

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
1.6	1.7	0.9	1.0	+0.1	360	11739	4809 7835 7980		

4. Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves
5. Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA  Y  N  
 If applicable, tissue samples were received:  Frozen  Partially Thawed  Thawed
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA  Y  N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
10. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below. NA  Y  N
11. Were VOA vials received without headspace? Indicate in the table below.  NA  Y  N
12. Was C12/Res negative?  NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

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

Notes, Discrepancies & Resolutions:

# RUSH





## General Chemistry

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Analytical Report

**Client:** ALS Environmental - US  
**Project:** ALS Houston DOD TOC/HS19070423  
**Sample Matrix:** Water  
**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Service Request:** K1906426  
**Date Collected:** 07/9/19  
**Date Received:** 07/12/19  
**Units:** mg/L  
**Basis:** NA

**Carbon, Total Organic**

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP-650_070919	K1906426-001	5.09	0.50	0.20	0.07	1	07/14/19 05:38	
Method Blank	K1906426-MB	ND U	0.50	0.20	0.07	1	07/14/19 02:20	

## ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** ALS Houston DOD TOC/HS19070423  
**Sample Matrix:** Water

**Service Request:** K1906426  
**Date Collected:** 07/09/19  
**Date Received:** 07/12/19  
**Date Analyzed:** 07/14/19

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** LH18/24-SP-650\_070919  
**Lab Code:** K1906426-001

**Units:** mg/L  
**Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>LOQ</u>	<u>LOD</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1906426-001DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Carbon, Total Organic	SM 5310 C	0.50	0.20	0.07	5.09	3.89	4.49	27 *	10

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

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

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

ALS Group USA, Corp.  
dba ALS Environmental

## QA/QC Report

**Client:** ALS Environmental - US  
**Project:** ALS Houston DOD TOC/HS19070423  
**Sample Matrix:** Water

**Service Request:** K1906426  
**Date Collected:** 07/09/19  
**Date Received:** 07/12/19  
**Date Analyzed:** 07/14/19  
**Date Extracted:** NA

**Matrix Spike Summary**  
**Carbon, Total Organic**

**Sample Name:** LH18/24-SP-650\_070919  
**Lab Code:** K1906426-001  
**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
K1906426-001MS

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Carbon, Total Organic	5.09	29.1	25.0	96	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  
**Project:** ALS Houston DOD TOC/HS19070423  
**Sample Matrix:** Water

**Service Request:** K1906426  
**Date Analyzed:** 07/14/19  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Carbon, Total Organic**

**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 643006

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1906426-LCS	24.9	25.0	100	83-117

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** ALS Houston DOD TOC/HS19070423

**Service Request:** K1906426

### Continuing Calibration Verification (CCV) Summary

#### Carbon, Total Organic

**Analysis Method:** SM 5310 C

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	643006	KQ1909776-11	07/14/19 01:51	25.0	23.6	95	90-110
CCV2	643006	KQ1909776-12	07/14/19 06:20	25.0	24.0	96	90-110
CCV3	643006	KQ1909776-13	07/14/19 10:50	25.0	24.0	96	90-110

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** ALS Houston DOD TOC/HS19070423

**Service Request:**K1906426**Continuing Calibration Blank (CCB) Summary**  
Carbon, Total Organic**Analysis Method:** SM 5310 C**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>LOQ</b>	<b>LOD</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	643006	KQ1909776-08	07/14/19 02:05	0.50	0.20	0.07	ND	U
CCB2	643006	KQ1909776-09	07/14/19 06:35	0.50	0.20	0.07	ND	U
CCB3	643006	KQ1909776-10	07/14/19 11:04	0.50	0.20	0.07	ND	U



## Raw Data

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## General Chemistry

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

Work Request # <sup>Original</sup> ( K1906433, 6442, 6279, 6426, 6385, 6489 )  
 Tier: II II II IV I II  
 Date Analyzed: 7/17/19 TOC: 643005, 643006  
 Analyst: Bcd Run # DOC: 643007  
 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  $\geq 0.995$ ?  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: K1906433-1/2/3/4/5/6/7/8/9/10/11/12/13/14/15/16/17/18/19 require a minimum dilution due to highly reactive sample.  
K1906426-1/1d report a high %ESD due to non-homogenous sample.  
K1906433-20 sent for RA due to being above calibration curve.

Final Approved by: [Signature] Date: 7/17/19 DQREPORT

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 643005 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
K1906433-001	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/13/19 18:48	N	II
K1906433-002	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/13/19 19:16	N	II
K1906433-003	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/13/19 19:44	N	II
K1906433-004	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/13/19 20:12	N	II
K1906433-005	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/13/19 21:09	N	II
K1906433-006	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/13/19 21:38	N	II
K1906433-007	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/13/19 22:06	N	II
K1906433-008	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/13/19 22:34	N	II
K1906433-009	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/13/19 23:02	N	II
K1906433-010	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/13/19 23:30	N	II
K1906433-011	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/13/19 23:58	N	II
K1906433-012	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/14/19 00:26	N	II
K1906433-013	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/14/19 00:54	N	II
K1906433-014	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/14/19 01:23	N	II
K1906433-015	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/14/19 02:49	N	II
K1906433-016	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/14/19 03:17	N	II
K1906433-017	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/14/19 03:45	N	II
K1906433-018	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/14/19 04:14	N	II
K1906433-019	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50			7/14/19 04:42	N	II
K1906442-001	Carbon, Total Organic	N/A		Water	1.61 mg/L	10 ml	1.61 mg/L	1	0.07	0.50			7/13/19 17:51	N	II
KQ1909775-01	Carbon, Total Organic	CCV		Water	23.99 mg/L	10 ml	24.0 mg/L	1					7/13/19 16:37	N	II
KQ1909775-02	Carbon, Total Organic	CCV		Water	23.80 mg/L	10 ml	23.8 mg/L	1					7/13/19 20:40	N	II
KQ1909775-03	Carbon, Total Organic	CCV		Water	23.65 mg/L	10 ml	23.6 mg/L	1					7/14/19 01:51	N	II
KQ1909775-04	Carbon, Total Organic	CCV		Water	23.99 mg/L	10 ml	24.0 mg/L	1					7/14/19 06:20	N	II
KQ1909775-05	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/13/19 16:52	N	II
KQ1909775-06	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/13/19 20:54	N	II
KQ1909775-07	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/14/19 02:05	N	II
KQ1909775-08	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/14/19 06:35	N	II
KQ1909775-09	Carbon, Total Organic	MB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/13/19 17:07	N	II
KQ1909775-10	Carbon, Total Organic	LCS		Water	24.94 mg/L	10 ml	24.9 mg/L	1	0.07	0.50	100		7/13/19 17:21	N	II
KQ1909775-11	Carbon, Total Organic	MS	K1906442-001	Water	27.39 mg/L	10 ml	27.4 mg/L	1	0.07	0.50	103		7/13/19 18:19	N	II
KQ1909775-12	Carbon, Total Organic	DUP	K1906442-001	Water	1.64 mg/L	10 ml	1.64 mg/L	1	0.07	0.50		1	7/13/19 17:51	N	II
KQ1909775-13	Carbon, Total Organic	DUP	K1906433-001	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/13/19 18:48	N	II
KQ1909775-14	Carbon, Total Organic	DUP	K1906433-002	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/13/19 19:16	N	II
KQ1909775-15	Carbon, Total Organic	DUP	K1906433-003	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/13/19 19:44	N	II
KQ1909775-16	Carbon, Total Organic	DUP	K1906433-004	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/13/19 20:12	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: 643005 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
KQ1909775-17	Carbon, Total Organic	DUP	K1906433-005	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/13/19 21:09	N	II
KQ1909775-18	Carbon, Total Organic	DUP	K1906433-006	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/13/19 21:38	N	II
KQ1909775-19	Carbon, Total Organic	DUP	K1906433-007	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/13/19 22:06	N	II
KQ1909775-20	Carbon, Total Organic	DUP	K1906433-008	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/13/19 22:34	N	II
KQ1909775-21	Carbon, Total Organic	DUP	K1906433-009	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/13/19 23:02	N	II
KQ1909775-22	Carbon, Total Organic	DUP	K1906433-010	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/13/19 23:30	N	II
KQ1909775-23	Carbon, Total Organic	DUP	K1906433-011	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/13/19 23:58	N	II
KQ1909775-24	Carbon, Total Organic	DUP	K1906433-012	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/14/19 00:26	N	II
KQ1909775-25	Carbon, Total Organic	DUP	K1906433-013	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/14/19 00:54	N	II
KQ1909775-26	Carbon, Total Organic	DUP	K1906433-014	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/14/19 01:23	N	II
KQ1909775-27	Carbon, Total Organic	DUP	K1906433-015	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/14/19 02:49	N	II
KQ1909775-28	Carbon, Total Organic	DUP	K1906433-016	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/14/19 03:17	N	II
KQ1909775-29	Carbon, Total Organic	DUP	K1906433-017	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/14/19 03:45	N	II
KQ1909775-30	Carbon, Total Organic	DUP	K1906433-018	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/14/19 04:14	N	II
KQ1909775-31	Carbon, Total Organic	DUP	K1906433-019	Water	0.00 mg/L	10 ml	50 mg/L U	100	7	50		NC	7/14/19 04:42	N	II

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

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 643006 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
K1906279-003	Carbon, Total Organic	N/A		Water	4.51 mg/L	10 ml	451 mg/L	100	7	50			7/14/19 06:50	N	II
K1906279-004	Carbon, Total Organic	N/A		Water	3.80 mg/L	10 ml	380 mg/L	100	7	50			7/14/19 07:18	N	II
K1906426-001	Carbon, Total Organic	N/A		Water	5.09 mg/L	10 ml	5.09 mg/L	1	0.07	0.50			7/14/19 05:38	N	IV
K1906433-020	Carbon, Total Organic	N/A		Water	129.26 mg/L	10 ml	12900 mg/L	100	7	50			7/14/19 05:10	N	II
KQ1909776-01	Carbon, Total Organic	MS	K1906426-001	Water	29.11 mg/L	10 ml	29.1 mg/L	1	0.07	0.50	96		7/14/19 06:06	N	IV
KQ1909776-02	Carbon, Total Organic	DUP	K1906426-001	Water	3.89 mg/L	10 ml	3.89 mg/L	1	0.07	0.50		27*	7/14/19 05:38	N	IV
KQ1909776-03	Carbon, Total Organic	DUP	K1906433-020	Water	145.26 mg/L	10 ml	14500 mg/L	100	7	50		12*	7/14/19 05:10	N	II
KQ1909776-04	Carbon, Total Organic	DUP	K1906279-003	Water	4.55 mg/L	10 ml	455 mg/L	100	7	50		<1	7/14/19 06:50	N	II
KQ1909776-05	Carbon, Total Organic	DUP	K1906279-004	Water	3.76 mg/L	10 ml	376 mg/L	100	7	50		1	7/14/19 07:18	N	II
KQ1909776-06	Carbon, Total Organic	MB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/14/19 02:20	N	II
KQ1909776-07	Carbon, Total Organic	LCS		Water	24.89 mg/L	10 ml	24.9 mg/L	1	0.07	0.50	100		7/14/19 02:35	N	II
KQ1909776-08	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/14/19 02:05	N	II
KQ1909776-09	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/14/19 06:35	N	II
KQ1909776-10	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/14/19 11:04	N	II
KQ1909776-11	Carbon, Total Organic	CCV		Water	23.65 mg/L	10 ml	23.6 mg/L	1					7/14/19 01:51	N	II
KQ1909776-12	Carbon, Total Organic	CCV		Water	23.99 mg/L	10 ml	24.0 mg/L	1					7/14/19 06:20	N	II
KQ1909776-13	Carbon, Total Organic	CCV		Water	23.96 mg/L	10 ml	24.0 mg/L	1					7/14/19 10:50	N	II

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

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 643007 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
K1906385-001	Carbon, Dissolved Organic (DOC)	N/A		Water	1.20 mg/L	10 ml	1.20 mg/L	1	0.07	0.50			7/14/19 08:14	N	I
K1906385-002	Carbon, Dissolved Organic (DOC)	N/A		Water	4.17 mg/L	10 ml	41.7 mg/L	10	0.7	5.0			7/14/19 08:42	N	I
K1906489-001	Carbon, Dissolved Organic (DOC)	N/A		Effluent	1.51 mg/L	10 ml	1.51 mg/L	1	0.07	0.50			7/14/19 09:53	N	II
K1906489-002	Carbon, Dissolved Organic (DOC)	N/A		Effluent	1.46 mg/L	10 ml	1.46 mg/L	1	0.07	0.50			7/14/19 11:49	N	II
KQ1909777-01	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			7/14/19 06:35	N	I
KQ1909777-02	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			7/14/19 11:04	N	I
KQ1909777-03	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			7/14/19 13:00	N	I
KQ1909777-05	Carbon, Dissolved Organic (DOC)	CCV		Water	23.99 mg/L	10 ml	24.0 mg/L	1					7/14/19 06:20	N	I
KQ1909777-06	Carbon, Dissolved Organic (DOC)	CCV		Water	23.96 mg/L	10 ml	24.0 mg/L	1					7/14/19 10:50	N	I
KQ1909777-07	Carbon, Dissolved Organic (DOC)	CCV		Water	24.04 mg/L	10 ml	24.0 mg/L	1					7/14/19 12:45	N	I
KQ1909777-09	Carbon, Dissolved Organic (DOC)	MB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			7/14/19 11:19	N	I
KQ1909777-10	Carbon, Dissolved Organic (DOC)	LCS		Water	24.96 mg/L	10 ml	25.0 mg/L	1	0.07	0.50	100		7/14/19 11:34	N	I
KQ1909777-11	Carbon, Dissolved Organic (DOC)	MS	K1906489-001	Effluent	27.21 mg/L	10 ml	27.2 mg/L	1	0.07	0.50	103		7/14/19 10:21	N	II
KQ1909777-12	Carbon, Dissolved Organic (DOC)	DUP	K1906385-001	Water	1.19 mg/L	10 ml	1.19 mg/L	1	0.07	0.50		<1	7/14/19 08:14	N	I
KQ1909777-13	Carbon, Dissolved Organic (DOC)	DUP	K1906385-002	Water	4.29 mg/L	10 ml	42.9 mg/L	10	0.7	5.0		3	7/14/19 08:42	N	I
KQ1909777-14	Carbon, Dissolved Organic (DOC)	DUP	K1906489-001	Effluent	1.55 mg/L	10 ml	1.55 mg/L	1	0.07	0.50		3	7/14/19 09:53	N	II
KQ1909777-15	Carbon, Dissolved Organic (DOC)	DUP	K1906489-002	Effluent	1.31 mg/L	10 ml	1.31 mg/L	1	0.07	0.50		10	7/14/19 11:49	N	II

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

TOC: 643005,  
643006  
DOC: 643007

## Schedule: 07132019

Version: 4

Instrument: Fusion1

Last Saved by: Fusion1 (Fusion1)

Last Saved on: 2019/07/13 15:55 - Saturday

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps	Use	State
(Clean)	Clean	Clean		1	True	Ready
(Clean)	Clean	Clean		1	True	Ready
(Clean)	Clean	Clean		1	True	Ready
(Blank)	Blank	Reagent/Acid Blank		1	True	Ready
D	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
1	Sample	MB1	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [24.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
2	Sample	ICS	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
3	Sample	K1906442-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
4	Sample	K1906442-001.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
5	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
6	Sample	K1906433-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
7	Sample	K1906433-002.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
8	Sample	K1906433-003.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
9	Sample	K1906433-004.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
10	Sample	K1906433-005.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K1906433-006.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	K1906433-007.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	K1906433-008.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K1906433-009.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1906433-010.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K1906433-011.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1906433-012.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1906433-013.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	Sample	K1906433-014.01 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	K1906433-015.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K1906433-016.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	K1906433-017.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K1906433-018.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K1906433-019.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K1906433-020.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
27	Sample	K1906426-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
28	Sample	K1906426-001.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
29	Sample	K1906279-003.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1906279-004.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
31	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
32	Sample	K1906385-001.01 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
33	Sample	K1906385-002.01 doc 10x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
34	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
35	Sample	FB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
36	Sample	K1906489-001.03 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
37	Sample	K1906489-001.03 doc ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
38	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready

Printed on: July 16, 2019 09:05:54

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**Schedule: 07132019**

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps	Use	State
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
39	Sample	MB3	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [25.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
40	Sample	K1906489-002.03 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
41	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 - 07132019

### Saturday, July 13, 2019 02:43 PM

(View - Repts, Unused Repts, Meta-Data, Signature, History)  
 Printed on 2019/07/16 09:06 -  
 Tuesday

### Report Summary Information

Company Location: Gen Chem Lab  
 Schedule Name: 07132019  
 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 1.1.5.1  
 Version:  
 Firmware 1.2.0696  
 Version:  
 Connection: RS232 COM1

### Report Results

Sample Type: Clean							From Schedule Version 2
Pos	Analysis Type	Sample ID			Start Time		
◆ (clean)		Clean			2019/07/13 14:43		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	12.95	16.49	3.54	49.65	05:24	
2	TC Clean	8.33	11.59	3.26	50.05	04:04	
3	TC Clean	1.96	5.24	3.29	50.07	03:51	
4	TC Clean	1.67	4.75	3.08	50.05	03:47	

Sample Type: Clean							From Schedule Version 3
Pos	Analysis Type	Sample ID			Start Time		
◆ (clean)		Clean			2019/07/13 15:05		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	1.02	4.37	3.34	49.63	05:13	
2	TC Clean	3.52	6.77	3.25	50.07	04:04	
3	TC Clean	1.59	4.78	3.19	50.02	03:48	
4	TC Clean	1.09	4.40	3.31	50.03	03:46	

<b>Sample Type:</b> Clean							From Schedule Version 3
Pos	Analysis Type	Sample ID			Start Time		
◊ (clean)		Clean			2019/07/13 15:27		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	0.84	4.14	3.30	49.56	05:11	
2	TC Clean	3.33	6.55	3.22	50.08	04:07	
3	TC Clean	1.83	5.22	3.39	50.10	03:50	
4	TC Clean	1.28	4.56	3.28	50.09	03:51	

<b>Sample Type:</b> Blank (Creating v1275)							From Schedule Version 3
Pos	Analysis Type	Sample ID			Start Time		
◊ (blank)		Reagent/Acid Blank			2019/07/13 15:49		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	0.90	4.24	3.35	49.58	05:19	
2	TC Clean	3.63	6.95	3.32	50.11	04:05	
3	TC Clean	1.99	5.34	3.36	50.07	03:55	
4	TC Clean	1.31	4.81	3.50	50.13	03:57	
5	Reagent Blank	5.76	9.09	3.33	50.10	05:04	
6	Acid Blank	1.24	4.55	3.31	49.57	05:28	

<b>Sample Type:</b> Sample							From Schedule Version 4	
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
◊ D	TOC	RB	0.2982 ppm	0.0000 ppm	0.0000%	2019/07/13 16:22		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2982	2.9825	10.92	14.35	3.42	50.34	10:30
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 8.9005 (IC) (v1275)		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)	23.9884 ppm (PASS)	0.0000 ppm	0%	2019/07/13 16:37

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.9884	239.8835	172.29	175.62	3.33	50.35	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%	2019/07/13 16:52

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.77	11.15	3.38	50.36	10:29

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

**Sample Type:** Sample From Schedule Version 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%	2019/07/13 17:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.06	10.27	3.21	50.38	10:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.9005 (IC) (v1275)	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)	24.9396 ppm (PASS)	0.0000 ppm	0%	2019/07/13 17:21

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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Type											
C	TOC	25.0 ppm	1	24.9396	249.3960	178.75	181.94	3.19	50.32	10:31	
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos C</b>			
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	0.1875 ppm	0.0000 ppm	0.0000%	2019/07/13 17:36		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1875	1.8746	10.17	13.37	3.19	50.37	10:30
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 8.9005 (IC) (v1275)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
3	TOC	K1906442-001.01	1.6242 ppm	0.0153 ppm	0.9400%	2019/07/13 17:51		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.6134	16.1337	19.85	23.05	3.20	50.33	10:27
2	TOC	1.6350	16.3503	20.00	23.17	3.18	50.33	10:25
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 8.9005 (IC) (v1275)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
4	TOC	K1906442-001.01 ms	27.3911 ppm	0.0000 ppm	0.0000%	2019/07/13 18:19		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	27.3911	273.9115	194.83	198.15	3.32	50.38	10:31
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 8.9005 (IC) (v1275)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
5	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/13 18:33		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.68	11.10	3.42	50.28	10:27
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 8.9005 (IC) (v1275)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
6	TOC	K1906433-001.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/13 18:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.03	10.37	3.34	50.22	10:29
2	TOC	0.0000	0.0000	7.45	10.51	3.06	50.16	10:25

**Dilution** 1:10      **Blank Contribution** (TC) 8.9005 (IC) (v1275)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
7	TOC	K1906433-002.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/13 19:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.04	10.29	3.25	50.09	10:31
2	TOC	0.0000	0.0000	7.15	10.32	3.16	50.05	10:25

**Dilution** 1:10      **Blank Contribution** (TC) 8.9005 (IC) (v1275)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
8	TOC	K1906433-003.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/13 19:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.91	9.97	3.06	50.02	10:26
2	TOC	0.0000	0.0000	7.24	10.25	3.01	49.99	10:24

**Dilution** 1:10      **Blank Contribution** (TC) 8.9005 (IC) (v1275)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
9	TOC	K1906433-004.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/13 20:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.94	9.98	3.03	49.97	10:26
2	TOC	0.0000	0.0000	7.17	10.20	3.03	49.97	10:28

**Dilution** 1:10      **Blank Contribution** (TC) 8.9005 (IC) (v1275)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

**Sample Type:** Check Standard --> CCV 25 ppm

From Schedule Version 4

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity ( NA / NA )	23.7964 ppm	0.0000 ppm	0%	2019/07/13 20:40

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.7964	237.9639	170.99	174.09	3.10	49.96	10:29

(PASS)

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

**Sample Type:** Check Standard --> CCB From Schedule Version 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%	2019/07/13 20:54

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.41	10.52	3.12	49.94	10:34

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

**Sample Type:** Sample From Schedule Version 4

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 10	TOC	K1906433-005.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/13 21:09

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.86	10.06	3.20	49.92	10:32
2	TOC	0.0000	0.0000	7.15	10.14	2.99	49.92	10:28

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.9005 (IC) (v1275)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 11	TOC	K1906433-006.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/13 21:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.83	9.96	3.13	49.93	10:29
2	TOC	0.0000	0.0000	6.84	10.00	3.16	49.92	10:26

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.9005 (IC) (v1275)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis	Sample ID	Result (ppmC)	Std. Dev.	RSD	Start Time
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Type	(ppmC)
12 TOC K1906433-007.01 100x	0.0000 ppm 0.0000 ppm 0.0000%

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.81	9.91	3.10	49.92	10:28
2	TOC	0.0000	0.0000	6.54	9.64	3.10	49.92	10:25

**Dilution** 1:10  
**Blank Contribution** (TC) 8.9005 (IC) (v1275)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
13	TOC	K1906433-008.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/13 22:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.94	9.03	3.09	49.92	10:31
2	TOC	0.0000	0.0000	6.22	9.27	3.05	49.92	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.9005 (IC) (v1275)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
14	TOC	K1906433-009.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/13 23:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.19	9.28	3.08	49.94	10:26
2	TOC	0.0000	0.0000	6.35	9.44	3.10	49.93	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.9005 (IC) (v1275)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
15	TOC	K1906433-010.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/13 23:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.11	9.25	3.15	49.92	10:25
2	TOC	0.0000	0.0000	6.04	9.28	3.24	49.94	10:31

**Dilution** 1:10  
**Blank Contribution** (TC) 8.9005 (IC) (v1275)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
16	TOC	K1906433-011.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/13 23:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.07	9.30	3.22	49.95	10:27
2	TOC	0.0000	0.0000	6.16	9.36	3.19	49.94	10:28

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	K1906433-012.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 00:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.23	9.37	3.14	49.96	10:28
2	TOC	0.0000	0.0000	6.24	9.47	3.23	49.90	10:26

**Dilution** 1:10      **Blank Contribution** (TC) 8.9005 (IC) (v1275)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	K1906433-013.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 00:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.17	9.29	3.12	49.87	10:26
2	TOC	0.0000	0.0000	6.00	9.12	3.12	49.83	10:26

**Dilution** 1:10      **Blank Contribution** (TC) 8.9005 (IC) (v1275)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
19	TOC	K1906433-014.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 01:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.54	9.51	2.97	49.82	10:25
2	TOC	0.0000	0.0000	6.41	9.43	3.03	49.81	10:25

**Dilution** 1:10      **Blank Contribution** (TC) 8.9005 (IC) (v1275)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

**Sample Type:** Check Standard --> CCV 25 ppm

From Schedule Version 4

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity ( NA / NA )	23.6467 ppm (PASS)	0.0000 ppm	0%	2019/07/14 01:51

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.6467	236.4672	169.98	173.13	3.15	49.82	10:32

**Completion State** Success - Criteria      **Success Action** Do Nothing      **Method** CAS\_salt\_010711      **Calibration** CAS\_salt\_010711      **STD Conc - Pos B** 50 ppmC



met.

(v4)

(v30)

**Sample Type:** Check Standard --> CCB

From Schedule Version 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%	2019/07/14 02:05

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.88	9.94	3.06	49.81	10:31

**Completion State** Success - Criteria met.  
**Success Action** Do Nothing  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)  
**STD Conc - Pos D** 0 ppmC

**Sample Type:** Sample

From Schedule Version 4

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 02:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.31	9.44	3.13	49.81	10:32

**Dilution** 1:10  
**Blank Contribution** (TC) 8.9005 (IC) (v1275)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

**Sample Type:** Check Standard --> LCS

From Schedule Version 4

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊ C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity ( NA / NA )	24.8858 ppm (PASS)	0.0000 ppm	0%	2019/07/14 02:35

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.8858	248.8583	178.39	181.64	3.25	49.86	10:29

**Completion State** Success - Criteria met.  
**Success Action** Do Nothing  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)  
**STD Conc - Pos C** 25 ppmC

**Sample Type:** Sample

From Schedule Version 4

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

◊	21	TOC	K1906433-015.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 02:49
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Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.00	10.24	3.24	49.86	10:30
2	TOC	0.0000	0.0000	6.43	9.63	3.20	49.91	10:26

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.9005 (IC) (v1275)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
◊	22	TOC	K1906433-016.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 03:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.11	9.42	3.31	49.91	10:26
2	TOC	0.0000	0.0000	6.23	9.43	3.20	49.92	10:28

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.9005 (IC) (v1275)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
◊	23	TOC	K1906433-017.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 03:45

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.31	9.49	3.18	49.95	10:32
2	TOC	0.0000	0.0000	6.40	9.48	3.08	49.99	10:25

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.9005 (IC) (v1275)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
◊	24	TOC	K1906433-018.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 04:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.86	9.05	3.19	50.01	10:28
2	TOC	0.0000	0.0000	5.89	9.09	3.21	50.04	10:28

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.9005 (IC) (v1275)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
◊	25	TOC	K1906433-019.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 04:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.94	9.05	3.11	50.05	10:27
2	TOC	0.0000	0.0000	6.31	9.37	3.06	50.06	10:28

**Dilution** 1:10      **Blank Contribution** (TC) 8.9005 (IC) (v1275)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
26	TOC	K1906433-020.01 100x	137.2618 ppm	11.3141 ppm	8.2400%	2019/07/14 05:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	129.2615	1292.6151	886.32	889.53	3.21	50.09	10:25
2	TOC	145.2621	1452.6210	994.93	998.77	3.84	50.07	10:28

**Dilution** 1:10      **Blank Contribution** (TC) 8.9005 (IC) (v1275)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
27	TOC	K1906426-001.01	4.4902 ppm	0.8419 ppm	18.7500%	2019/07/14 05:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.0856	50.8556	43.42	47.32	3.90	50.09	10:27
2	TOC	3.8949	38.9492	35.34	38.53	3.19	50.11	10:27

**Dilution** 1:10      **Blank Contribution** (TC) 8.9005 (IC) (v1275)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
28	TOC	K1906426-001.01 ms	29.1113 ppm	0.0000 ppm	0.0000%	2019/07/14 06:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	29.1113	291.1126	206.51	209.81	3.30	50.10	10:30

**Dilution** 1:10      **Blank Contribution** (TC) 8.9005 (IC) (v1275)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

**Sample Type:** Check Standard --> CCV 25 ppm

From Schedule Version 4

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	23.9889 ppm (PASS)	0.0000 ppm	0%	2019/07/14 06:20

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.9889	239.8894	172.30	175.63	3.33	50.11	10:27

**Completion State** Success - Criteria met.      **Success Action** Do Nothing      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)      **STD Conc - Pos B** 50 ppmC

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

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊ D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/07/14 06:35

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	8.22	11.31	3.09	50.15	10:30

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos D</b>
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	K1906279-003.01 100x	4.5291 ppm	0.0319 ppm	0.7000%	2019/07/14 06:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.5066	45.0659	39.49	42.61	3.12	50.14	10:26
2	TOC	4.5517	45.5167	39.80	42.82	3.02	50.13	10:25

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.9005 (IC) (v1275)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 30	TOC	K1906279-004.01 100x	3.7807 ppm	0.0273 ppm	0.7200%	2019/07/14 07:18

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.8000	38.0005	34.70	37.78	3.09	50.12	10:29
2	TOC	3.7614	37.6145	34.43	37.58	3.14	50.11	10:25

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.9005 (IC) (v1275)	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%	2019/07/14 07:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.68	9.89	3.22	50.11	10:26
2	TOC	0.0000	0.0000	6.56	9.61	3.05	50.11	10:27

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.9005 (IC) (v1275)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
32	TOC	K1906385-001.01 doc	1.1917 ppm	0.0050 ppm	0.4200%	2019/07/14 08:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.1953	11.9528	17.01	20.07	3.05	50.11	10:29
2	TOC	1.1882	11.8821	16.97	20.12	3.15	50.09	10:27

**Dilution** 1:10  
**Blank Contribution** (TC) 8.9005 (IC) (v1275)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
33	TOC	K1906385-002.01 doc 10x	4.2299 ppm	0.0899 ppm	2.1300%	2019/07/14 08:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.1663	41.6628	37.18	40.44	3.26	50.10	10:28
2	TOC	4.2934	42.9342	38.04	41.23	3.19	50.09	10:24

**Dilution** 1:10  
**Blank Contribution** (TC) 8.9005 (IC) (v1275)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
34	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 09:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.29	10.42	3.13	50.08	10:26
2	TOC	0.0000	0.0000	7.74	10.96	3.22	50.05	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.9005 (IC) (v1275)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
35	TOC	FB	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 09:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.00	10.32	3.32	50.05	10:29

**Dilution** 1:10  
**Blank Contribution** (TC) 8.9005 (IC) (v1275)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
36	TOC	K1906489-001.03 doc	1.5307 ppm	0.0289 ppm	1.8900%	2019/07/14 09:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5103	15.1025	19.15	22.36	3.21	50.03	10:28

2	TOC	1.5511	15.5106	19.43	22.50	3.07	50.02	10:25
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>	<b>Calibration</b>			
1:10		(TC) 8.9005 (IC) (v1275)		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)			
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
37	TOC	K1906489-001.03 doc ms	27.2060 ppm	0.0000 ppm	0.0000%	2019/07/14 10:21		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	27.2060	272.0597	193.57	196.68	3.11	50.01	10:30
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>	<b>Calibration</b>			
1:10		(TC) 8.9005 (IC) (v1275)		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)			
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
38	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 10:35		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.63	10.78	3.15	49.99	10:31
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>	<b>Calibration</b>			
1:10		(TC) 8.9005 (IC) (v1275)		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)	23.9592 ppm (PASS)	0.0000 ppm	0%	2019/07/14 10:50	
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.9592	239.5918	172.10	175.33	3.24	49.99	10:29
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>	<b>Calibration</b>		<b>STD Conc - Pos B</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%	2019/07/14 11:04	
Pos	Base Analysis	ID	Rep	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run

Type	#	Time
D TOC 0 ppm	1	10:33

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

**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%	2019/07/14 11:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.51	9.53	3.02	49.93	10:29

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.9005 (IC) (v1275)	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 [25.0 ppm]	0 / infinity (NA / NA)	24.9604 ppm (PASS)	0.0000 ppm	0%	2019/07/14 11:34

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.9604	249.6037	178.89	182.00	3.11	49.96	10:32

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos C</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	25 ppmC

**Sample Type:** Sample From Schedule Version 4

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
40	TOC	K1906489-002.03 doc	1.3866 ppm	0.1020 ppm	7.3600%	2019/07/14 11:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4587	14.5869	18.80	21.87	3.07	49.94	10:30
2	TOC	1.3145	13.1446	17.82	20.90	3.08	49.90	10:26

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.9005 (IC) (v1275)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
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41	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/14 12:17		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.38	9.46	3.08	49.92	10:27
2	TOC	0.0000	0.0000	6.43	9.51	3.08	49.92	10:26
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 8.9005 (IC) (v1275)		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)	24.0417 ppm (PASS)	0.0000 ppm	0%	2019/07/14 12:45

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.0417	240.4168	172.66	175.78	3.12	49.92	10:31

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

**Sample Type:** Check Standard --> CCB From Schedule Version 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%	2019/07/14 13:00

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.79	9.88	3.09	49.93	10:31

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

### Meta Data Used in this Report

**Blanks**

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator



v1274	1.2333	1.3450	0.0000	0.0000	0.0000	2019/07/11 12:21	Fusion1 (Fusion1)
v1275	1.9213	1.2400	0.0000	0.0000	0.0000	2019/07/13 16:22	Fusion1 (Fusion1)

### Calibrations

#### Name: CAS\_salt\_010711 (TOC)

Version: v30  
 Calibration curve formula: TOC:  $y = 6.788x + 9.463$   
 Ver Creation: 2019/03/05 17:42  
 $r^2$  value: TOC:  $r^2 = 0.99963$   
 Comment:  
 Operator: Fusion1 (Fusion1)  
 Basic Analysis Type: TOC

#### Basic Analysis Type: TOC

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

### Methods

#### Name: CAS\_salt\_010711 (TOC)

Version: v4  
 Operator: Fusion1 (Fusion1)  
 Ver Creation: 2019/02/21 17:57  
 Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	ICSpurgeRinseVolume	12.0 ml
UVReactorPrerinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPrerinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPrerinses	1	SyringeSpeedWaste	10
ICSpurgeTime	1.00 mins	SyringeSpeedAcid	7
DetectorSweepFlow	500 ml/min	SyringeSpeedReagent	7
PreSpurgeTime	2.00 mins	SyringeSpeedDIWater	7
SystemFlow	500 ml/min	NDIRPressurization	60 psig
		SyringeSpeedSampleDispense	5
		SyringeSpeedSampleAspirate	4
		SyringeSpeedUVDispense	5

SyringeSpeedUVAspirate	5
SyringeSpeedICDispense	5
SyringeSpeedICAspirate	5
NDIRPressureStabilize	1.75 min
SampleMixing	Off
SampleMixingCycles	1
SampleMixingVolume	10.0
LowLevelFilterNDIR	Off

**Acceptance / Approval**

**Electronic Signatures**

Report Version	User Name	Acceptance	Reason	Date
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**Report History**

**Report History**

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/07/14 13:16

## ALS Environmental

StarLIMS Run: 643005, 643006, 643007  
 Analysis: TOC/DOC  
 Method: 415.1, SM 5310 C, 9060, 9060A

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

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-74A

ICS TV: 25.0 ppm      ICS % R = 2

Spike ID: 11-GEN-05-77J      0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-78J

21 % H3PO4: 11-GEN-05-78O

Equipment ID: K-TOC-03

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

FILTER ID: FC7573      Filtered 7/11/19

Analyzed By: <u>BCP</u>	Date Analyzed: <u>7/11/19</u>
Reviewed By: <u>[Signature]</u>	Date Reviewed: <u>7/11/19</u>



## Case Narrative

**Method:** 6850

**Analysis:** Perchlorate

**Analysis SOP:** LC-MS-CLO4

**ALS WO ID(s):** 1920034; 1920122; 1920123;  
1920571; 1920572; 1920581

**Client:** ALS Laboratories (Houston, TX)

**Matrix:** Water

**ELMS Batch (HBN):** 2273 (244098)

**General Set Information:** There were eleven field samples in this Work Order. 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 <sup>18</sup>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 <sup>18</sup>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 1920122001 and 1920581001 were analyzed and reported from 1:100 dilutions. The reporting limits have been adjusted accordingly.

**Method QC data:** The method blank (LMB 664922) was less than 1/2 the CRDL. The recovery for the LCS (664923) was within acceptable parameters.



**MS/MSD Analysis:** MS/MSD was performed on sample 1920123002 (Client ID: HBW10\_071119). 4.0 $\mu$ l of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4. $\mu$ g/L.

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

**NC/CAR(s):** NA

**Sample Calculation:** Samples were reported in  $\mu$ g/L. Results were calculated in  $\mu$ g/L by the equation (A)x(B),

where: A = Analyte concentration from the standard curve ( $\mu$ g/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 – 664920) is reported from the analysis of the Laboratory Control Sample (LCS – 664923) at a level of 4.0 $\mu$ g/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) along with datafile 23JULD03.

<u>Thomas Bosch</u>	<u>July 25, 2019</u>
Analyst	Date



# ANALYTICAL REPORT

Report Date: July 25, 2019

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

Phone: 281 530-5656

E-mail: RJ.Modashia@ALSGlobal.com

Workorder: **34-1920034**

Project ID: HS19070423

Purchase Order: HS19070423

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_070919_BIX Water	1920034001	07/09/19	07/12/19	11736



## ANALYTICAL REPORT

Workorder: **34-1920034**Client: ALS Environmental  
(Houston)

Project Manager: Kevin W. Griffiths

## Analytical Results

Sample ID: <b>LH18/24-SP650_070919_BIX</b> <b>Water</b>	Sampling Site: 11736	Collected: 07/09/2019				
Lab ID: 1920034001	Media: 125 mL Nalgene	Received: 07/12/2019				
Matrix: Water	Sampling Parameter: NA					
<b>Analysis Method - EPA 6850, DoD QSM</b>						
Preparation: Not Applicable	Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2274 (HBN: 244098) Analyzed: 07/23/2019 09:29	Instrument ID: LCMS04 Percent Solid: NA Report Basis: Wet				
<b>Analyte</b>	<b>Result (ug/L)</b>	<b>DL (ug/L)</b>	<b>LOD (ug/L)</b>	<b>LOQ (ug/L)</b>	<b>Dilution</b>	<b>Qual</b>
Perchlorate	5.8	1.0	2.0	4.0	1	

## 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 07/25/2019 15:05	/S/ Stephen Brose 07/25/2019 16:18

## Laboratory Contact Information

ALS Environmental  
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## ANALYTICAL REPORT

Workorder: 34-1920034

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

**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

00950137

## Analysis Information

**Workorder:** 1920034

**Limits:** Client SOW/Contract Specified  
**Basis:** DoD QSM

**Preparation:** NA  
**Batch:** NA  
**Prepared By:** NA

**Analysis:** EPA 6850, DoD QSM  
**Batch:** ELMS/2274 (HBN: 244098)  
**Analyzed By:** Thomas Bosch

## Blank

<b>LMB:</b> 664922 <b>Analyzed:</b> 07/23/2019 09:15 <b>Units:</b> ug/L			
Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

## Laboratory Control Sample

<b>LCS:</b> 664923 <b>Analyzed:</b> 07/23/2019 08:47 <b>Dilution:</b> 1 <b>Units:</b> ug/L				
Analyte	Result	Target	% Rec	QC Limits
Perchlorate	4.24	4.00	106	78.8   123.8

## Matrix Spike - Matrix Spike Duplicate

<b>Sample:</b> 1920123002 <b>Analyzed:</b> 07/23/2019 10:11 <b>Dilution:</b> 1 <b>Units:</b> ug/L		<b>MS:</b> 664924 <b>Analyzed:</b> 07/23/2019 10:25 <b>Dilution:</b> 1 <b>Units:</b> ug/L				<b>MSD:</b> 664925 <b>Analyzed:</b> 07/23/2019 10:39 <b>Dilution:</b> 1 <b>Units:</b> ug/L			
Analyte	Result	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Perchlorate	ND	4.12	4	103	78.8   123.8	4.14	104	0.46	0.0   20.0

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

Analyst	Peer Review
/S/ Thomas Bosch 07/25/2019 15:11	/S/ Stephen Brose 07/25/2019 16:18

## 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

1920034



1920034

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

18698/#2

### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11736

**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:** HS19070423  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19070423-02	LH18/24-SP650_070919_BIX	Water	09 Jul 2019 14:00
SUB_Perch-6850			18 Jul 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. Mamm  
Received By: RK  
Cooler ID(s): \_\_\_\_\_

Date/Time: 7/11/19 18:00  
Date/Time: 07/12/19 10:04  
Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER

19 Jul 2019

Page 1 of 1

Custody seal intact RK 07/11/19



**ALS Environmental**  
**CHAIN-OF-CUSTODY**

00950139

<b>Project / Job / Task:</b> 11736		<b>Split:</b>		<b>Workorder ID:</b> 1920034		<b>Level:</b> ENV_LVL4		<b>Requested Analysis</b>															
<b>Client:</b> ALS Environmental (Houston)				<b>Account:</b> 8101		<b>Type:</b> 125Poly		EPA 6850, DoD QSM															
<b>Comments:</b>						<b>Preservatives</b>																	
						COOL																	
						<b>Containers</b>																	
<b>Item</b>	<b>Collect Date/Time</b>	<b>Sample ID</b>	<b>Lab ID</b>	<b>QC</b>	<b>Matrix</b>	<b>ID(s)</b>	<b>Count</b>																
1	07/09/2019 14:00	LH18/24-SP650_070919_BIX Water	1920034001		Water	A	1	A															
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							

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**ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY**

<b>Relinquished By: (Signature)</b>	<b>Date / Time</b>	<b>Received By: (Signature)</b>	<b>Reason for Transfer / Storage Location</b>
VanTassell, Tami	07/12/2019 10:00	ALS Sample Receiving	Sample Login
<i>Tami VanTassell</i>	07/12/19 15:20	<i>LB</i>	Storage
R.33.1	7.12.19/14:00	<i>T. Bush</i>	6850

**SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY**

Sample Prep / Analysis for: \_\_\_\_\_ Lab Notebook No.: \_\_\_\_\_

Prepared / Analyzed by: \_\_\_\_\_ Date / Time: \_\_\_\_\_

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

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Husen Project/Task/Site: \_\_\_\_\_  
 Date/Time of Receipt: 07/12/19 10 04 Number of Coolers Received: 1

Condition of Coolers: <u>Acceptable</u> /Unacceptable	Temperature Control: <u>Present</u> /Not Included
Cooler Custody Seals: <u>Present</u> /Absent/NA	Location Temp Taken: <u>Control</u> /Between Samples
Container Custody Seals: <u>Intact</u> /Broken/NA	Are all temperatures within project specific guidelines? Yes/No/NA
Ice Present: <u>Yes</u> /No/NA	VOA Headspace Present? Yes/No/NA
Container Custody Seals: Present/ <u>Absent</u> /NA	
Container Custody Seals: Intact/ <u>Broken</u> /NA	
Container Custody Seals: Frozen/ <u>Melted</u> /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 9761	4 °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] Rebecca Wise 07.12.19  
Signature Printed Name Date

CLIENT-RELATED INFORMATION

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

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

4

Client Notified? YES  NO

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: \_\_\_\_\_ Returned to Sample Receipt by: \_\_\_\_\_ Date: \_\_\_\_\_  
Printed Name Signature

Must Deliver Next Business Day  
Time and Temperature Sensitive!



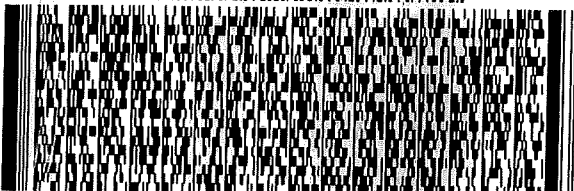
ORIGIN ID:SGRA (281) 530-5656  
CLIENT SERVICES  
ALS LABORATORY GROUP  
10450 STANCLIFF ROAD  
SUITE 210  
HOUSTON, TX 77099  
UNITED STATES US

SHIP DATE: 11JUL19  
ACTWGT: 10.95 LB  
CAD: 300130/CAFE3211  
DIMS: 14x11x10 IN  
BILL. THIRD PARTY

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

**SALT LAKE CITY UT 84123**

(801) 268-7700  
REF: HS19070423 RJ



**FedEx**  
Express

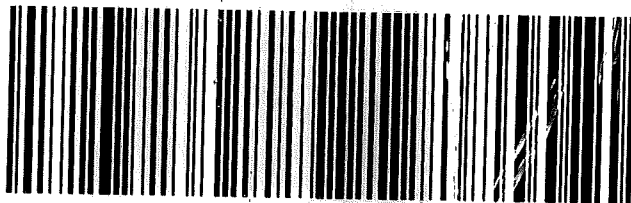


TRK# 4809 7835 7979  
0201

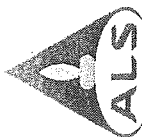
**FRI - 12 JUL 3:00P**  
**STANDARD OVERNIGHT**

**AX BTFA**

**84123**  
**UT-US SLC**



001# 159459-424 RTN EXPI 0220  
55102/05F9/104C



# Batch Worklist

HBN: 244098

Instrument: WP  
Status: WP

Created: 7/23/2019 08:01  
Analyst: T. Bosch

Batch: ELMS/ 2274  
Rule: EPA 6850, DoD QSM Water

- Workorder: 1920034 [ENV\_LVL4]
- Workorder: 1920122 [ENV\_LVL4]
- Workorder: 1920123 [ENV\_LVL4]
- Workorder: 1920571 [ENV\_LVL4]
- Workorder: 1920572 [ENV\_LVL4]
- Workorder: 1920581 [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	664919	CCV for HBN 244098 [ELMS/2274]				CCV	3		E685041C3Q	5311		7/25/2019	
2	664920	RLVS for HBN 244098 [ELMS/2274]				RLVS	3		E685041C3Q	5311		7/25/2019	
3	664921	ICS for HBN 244098 [ELMS/2274]				ICS	3		E6850...D3Q	5311		7/25/2019	
4	664922	LMB for HBN 244098 [ELMS/2274]				LMB	3		E6850Q413Q	5311		7/25/2019	
5	664923	LCS for HBN 244098 [ELMS/2274]				LCS	3		E6850Q413Q	5311		7/25/2019	
6	1920034001	LH18/24-SP650_070919_BIX Water				SAMPLE	3	1920034001-A	E6850Q41.3	5480	8/6/2019	7/25/2019	
7	1920122001	ICT 13A_071119				SAMPLE	3	1920122001-A	E6850Q41.3	5480	8/8/2019	7/26/2019	
8	1920123001	HBW7_071119				SAMPLE	3	1920123001-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
9	1920123002	HBW10_071119				SAMPLE	3	1920123002-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
10	664924	HBW10_071119(1920123002MS)				MS	3		E6850Q413Q	5311		7/25/2019	
11	664925	HBW10_071119(1920123002MSD)				MSD	3		E6850Q413Q	5311		7/25/2019	
12	1920123003	HBW1_071119				SAMPLE	3	1920123003-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
13	1920123004	GPW1_071119				SAMPLE	3	1920123004-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
14	1920123005	GPW1_071119_a				SAMPLE	3	1920123005-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
15	1920123006	GPW3_071119				SAMPLE	3	1920123006-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
16	664926	CCV for HBN 244098 [ELMS/2274]				CCV	3		E685041C3Q	5311		7/25/2019	
17	1920571001	LH18/24-SP650_071619-BIX				SAMPLE	3	1920571001-A	E6850Q41.3	5480	8/13/2019	7/31/2019	
18	1920572001	LH18/24-SP650_071619_BIX				SAMPLE	3	1920572001-A	E6850Q41.3	5480	8/13/2019	7/31/2019	
19	1920581001	LH18/24-SP140_071619				SAMPLE	3	1920581001-A	E6850Q41.3	5480	8/13/2019	7/31/2019	
20	664927	CCV for HBN 244098 [ELMS/2274]				CCV	3		E685041C3Q	5311		7/25/2019	

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**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Analytical Documentation**

ALS Work Order #'s & Sample #( )'s: 1920034 (001); 1920122 (001); 1920123 (001-06); 1920571 (001); 1920572 (001); 1920581 (001) ELMS Batch/HBN ID: 2274 (244098)  
 Prep Date: 07/19/2019 Analysis Date: 07/23/2019 Analyst: T. Bosch  
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**  
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\JUL\23JUL19D.s  
 Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

**SAMPLE PREPARATION/ANALYSIS:**

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

**REAGENTS:** Eluent A1: 95% ASTM Type II water (ALS)/ 5% ACN (B&J Lot AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).  
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

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

**CALIBRATION CURVE:** Used curve from 03/19/2019, sequence 19MARI9D.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: 8 Injection Volume: 35µL  
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

**FLOW GRADIENT:**

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

**QC DATA:** 4.0µL of QC Solution Horizon ID 47516 was used for LCS 664923; Target = 4.0µg/L. ASTM type II water was used for LMB 664922.

**MS/MSD:** The Matrix Spike and duplicate (MS/MSD) were performed on sample 1920123002 (Client ID: HBW10\_071119). 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 1920122001 and 1920581001 were analyzed and reported from 1:100 dilutions. The reporting limits have been adjusted accordingly.
- 2) All QC, Blank, CCV, and MS/MSD results were within method parameters.
- 3) Sample data can be viewed at two directories within the ALS system: \\ALS\TWS013\LCMS\LCMS04\2019\JUL\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\slstws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\244098-DoD-ALS-Hstn LCMS4 or through \\ALS\TWS013\DATAREVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 664920) is reported from the analysis of the Laboratory Control Sample (LCS – 664923) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03) along with datafile 23JUL03.



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

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

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDC: ELMS: 2274 HBN: 244098 1920034/1920122/1920123		
Sample Set IDs if Applicable: 1920571/1920572/1920581		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSS, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on OC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SB
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR#</u>	—	—
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB



## STANDARD REPORT

## Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850 WKG Std 100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	0.1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 INT

CLO4 INT			Description - 6850 Intermdt AccStd 10.ug/mL		
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



## STANDARD REPORT

## Working Standard - CLO4 QC WRK

CLO4 QC WRK		Description - 6850 QC WKG STD 100ug/L			
Standard: 47516		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC WRK 100.ug/L	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020



STANDARD REPORT  
Constituent

Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL	
Standard: 36748		Created By: Thomas Bosch	Amount: 100 mL
MFG: Ultra Scientific		Create Date: 05/11/2017 01:05PM	Expires: 03/31/2020
MFG Lot: CP-0860			Usable: Yes
Part ID: ICC-013			Lab Lot: CLO4 QC STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL





## STANDARD REPORT

## Constituent

## Working Standard - CLO4 QC INT

CLO4 QC INT			Description - 6850 QC Intrmdt Std-QC 10ug/mL		
Standard: 47515		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC INT 10.ug/mL	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020



## STANDARD REPORT

## Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730	Created By: Thomas Bosch	Amount: 25 mL			
MFG: ALS/SLC	Create Date: 09/20/2018 09:09AM	Expires: 09/20/2019			
MFG Lot: TNB: 05/09/2018	Verified By: Thomas Bosch	Usable: Yes			
Pipette ID: Not Provided	Verify Date:	Lab Lot: CLO4ISTDWRK			
Pos.	Analyte	Name	Concentration		
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L		
2	14797-73-0-89	Perchlorate 89	1000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729	Created By: Thomas Bosch	Amount: 1 mL	
MFG: Cambridge Isotope	Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026	
MFG Lot: SDFP-012A	Verified By: Thomas Bosch	Usable: Yes	
Part ID: OLM-7310-S	Verify Date:	Lab Lot: CLO4ISTDSTK	
Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL



## Certificate of Analysis



### ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

#### Description:

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

Analyte	Starting Material	Lot Number	Purity (%)	Calculated Value	True Value	Traceability & Method
perchlorate	potassium perchlorate	RM07987	100	1.001 ± 5 µg/mL	976 ± 6 µg/mL	NIST SRM 3141A; ICP-OES

Solvent: water (low TOC, < 50 ppb)

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

#### Traceability:

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

#### Estimation of Uncertainties:

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

#### Homogeneity:

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

#### Intended Use:

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

#### Instructions for Use:

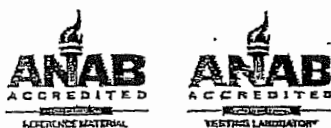
Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the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

#### Hazards:

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

#### Expiration of Certification:

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





# Certificate of Analysis



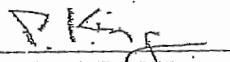
## ISO Guide 34 Reference Material

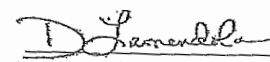
Product Number: ICC-013  
Lot Number: CP-0860

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

### Maintenance of Certification:

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

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

  
Daniel J. Lamendola  
Director of QA/RA



125 Market Street  
New Haven, CT 06513  
USA



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<sub>4</sub>)  
SRM: Ind. Std.  
Lot: 218065075  
Matrix: Water  
Hazards: Refer to SDS for complete safety information

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



Signal Word: None

Component	SRM #	Prepared Concentration (µg/mL)
ClO <sub>4</sub> 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:

*Melgan O'Leary*

Melgan O'Leary, Inorganic QC Manager

Cambridge Isotope Laboratories, Inc.

## Certificate of Analysis

Quality Standards:  
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

## Product Information

Chemical Purity Specification:  $\geq 98\%$

Labeled CAS Number: NA

Unlabeled CAS Number: 7601-89-0

MW\*: 130.4

Chemical Formula:  $\text{NaCl}^*\text{O}_4$

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

Stability: See storage and expiration date.

## Certification

Cambridge Isotope Laboratories, Inc. guarantees that this material meets or exceeds the specifications stated. Absolute identity as well as chemical and isotopic purities are assured by the use of unambiguous synthetic routes and multiple chemical analyses whenever possible. Results are representative of QC testing at time of release from Quality Control unless otherwise stated.

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

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

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

Approved by: T. J. Eckersley

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

## Quality Control Tests and Results

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



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# Raw Data



Batch Review Method:  
C:\HPCHEM\1\METHODS\CLO4-DP2.M

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

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount
*	664919	CCV@25	Vial 71	1	Control	1	1.62672e6	25.50485
*	664923	QC@4.0	Vial 72	1	Control	2	3.26276e5	4.23719
*	664921	ICS@4.0	Vial 73	1	Control	3	2.26823e5	3.59795
*	664922	LMB	Vial 74	1	Control	4	0.00000	0.00000
*	1920034001		Vial 75	1	Sample	5	3.78721e5	5.76393
*	1920122001	100	Vial 76	1	Sample	6	3.81315e5	535.80529
*	1920123001		Vial 77	1	Sample	7	1.88703e6	27.30710
*	1920123002		Vial 78	1	Sample	8	0.00000	0.00000
*	664924	201232S	Vial 79	1	Sample	9	2.94719e5	4.12417
*	664925	201232D	Vial 80	1	Sample	10	2.98082e5	4.14318
*	1920123003		Vial 81	1	Sample	11	0.00000	0.00000
*	1920123004		Vial 82	1	Sample	12	0.00000	0.00000
*	1920123005		Vial 83	1	Sample	13	0.00000	0.00000
*	1920123006		Vial 84	1	Sample	14	0.00000	0.00000
*	664926	CCV@25	Vial 71	1	Control	15	1.58424e6	26.09295
*	1920571001		Vial 85	1	Sample	16	0.00000	0.00000
*	1920572001		Vial 86	1	Sample	17	0.00000	0.00000
*	1920581001	100	Vial 87	1	Sample	18	4.74247e6	6892.89270
*	664927	CCV@25	Vial 71	1	Control	19	1.56539e6	26.50991

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	664919	CCV@25	Vial 71	1	Control	1	4.82242e5	25.47735
*	664923	QC@4.0	Vial 72	1	Control	2	1.06930e5	4.52240
*	664921	ICS@4.0	Vial 73	1	Control	3	8.07927e4	4.14216
*	664922	LMB	Vial 74	1	Control	4	0.00000	0.00000
*	1920034001		Vial 75	1	Sample	5	1.32207e5	6.61445
*	1920122001	100	Vial 76	1	Sample	6	1.27974e5	590.20800
*	1920123001		Vial 77	1	Sample	7	5.71392e5	27.84268
*	1920123002		Vial 78	1	Sample	8	0.00000	0.00000
*	664924	201232S	Vial 79	1	Sample	9	9.30343e4	4.23661
*	664925	201232D	Vial 80	1	Sample	10	9.90502e4	4.47914
*	1920123003		Vial 81	1	Sample	11	0.00000	0.00000
*	1920123004		Vial 82	1	Sample	12	0.00000	0.00000
*	1920123005		Vial 83	1	Sample	13	0.00000	0.00000
*	1920123006		Vial 84	1	Sample	14	0.00000	0.00000
*	664926	CCV@25	Vial 71	1	Control	15	4.73538e5	26.27353
*	1920571001		Vial 85	1	Sample	16	0.00000	0.00000
*	1920572001		Vial 86	1	Sample	17	0.00000	0.00000
*	1920581001	100	Vial 87	1	Sample	18	1.37287e6	6775.22031
*	664927	CCV@25	Vial 71	1	Control	19	4.66031e5	26.59490

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	664919	CCV@25	Vial 71	1	Control	1	1.93813e5	5.00000
*	664923	QC@4.0	Vial 72	1	Control	2	2.53019e5	5.00000
*	664921	ICS@4.0	Vial 73	1	Control	3	2.08874e5	5.00000
*	664922	LMB	Vial 74	1	Control	4	2.28613e5	5.00000
*	1920034001		Vial 75	1	Sample	5	2.12986e5	5.00000
*	1920122001	100	Vial 76	1	Sample	6	2.31390e5	500.00000
*	1920123001		Vial 77	1	Sample	7	2.09097e5	5.00000
*	1920123002		Vial 78	1	Sample	8	2.14312e5	5.00000
*	664924	201232S	Vial 79	1	Sample	9	2.35117e5	5.00000
*	664925	201232D	Vial 80	1	Sample	10	2.36657e5	5.00000
*	1920123003		Vial 81	1	Sample	11	2.72320e5	5.00000
*	1920123004		Vial 82	1	Sample	12	2.70263e5	5.00000
*	1920123005		Vial 83	1	Sample	13	2.50554e5	5.00000
*	1920123006		Vial 84	1	Sample	14	2.77086e5	5.00000

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	664926	CCV@25	Vial 71	1	Control	15	1.84240e5	8.170	5.00000
*	1920571001		Vial 85	1	Sample	16	2.24657e5	7.814	5.00000
*	1920572001		Vial 86	1	Sample	17	2.04102e5	7.796	5.00000
*	1920581001	100	Vial 87	1	Sample	18	1.90565e5	8.391	500.00000
*	664927	CCV@25	Vial 71	1	Control	19	1.79008e5	8.198	5.00000

\*\*\* End of Report \*\*\*

## Sequence Table:

## Method and Injection Info Part:

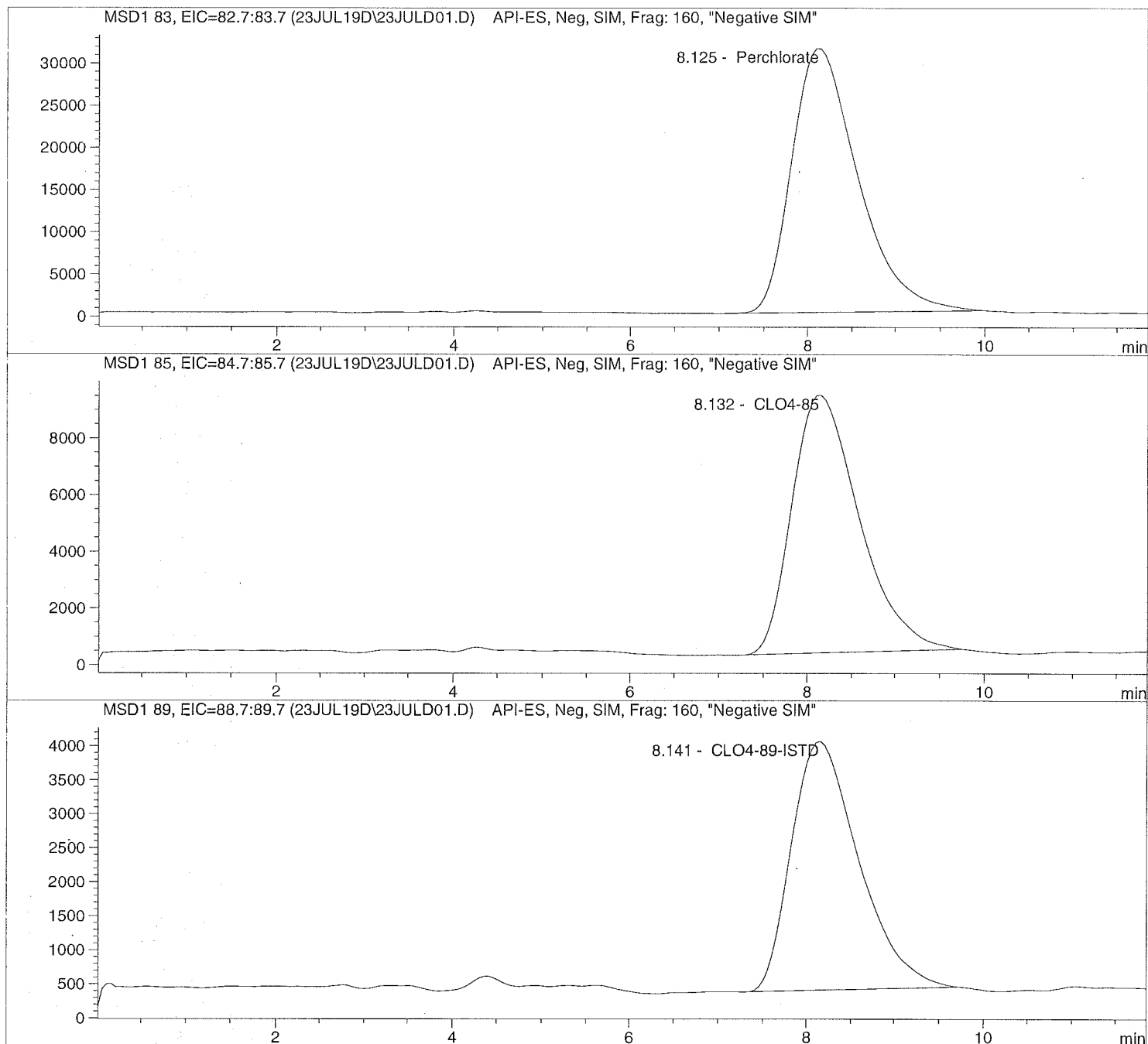
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	664919 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	664923 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	664921 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	664922 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1920034001	CLO4-AQN	1	Sample		
6	Vial 76	1920122001 100	CLO4-AQN	1	Sample		
7	Vial 77	1920123001	CLO4-AQN	1	Sample		
8	Vial 78	1920123002	CLO4-AQN	1	Sample		
9	Vial 79	664924 201232S	CLO4-AQN	1	Sample		
10	Vial 80	664925 201232D	CLO4-AQN	1	Sample		
11	Vial 81	1920123003	CLO4-AQN	1	Sample		
12	Vial 82	1920123004	CLO4-AQN	1	Sample		
13	Vial 83	1920123005	CLO4-AQN	1	Sample		
14	Vial 84	1920123006	CLO4-AQN	1	Sample		
15	Vial 71	664926 CCV@25	CLO4-AQN	1	Ctrl Samp		
16	Vial 85	1920571001	CLO4-AQN	1	Sample		
17	Vial 86	1920572001	CLO4-AQN	1	Sample		
18	Vial 87	1920581001 100	CLO4-AQN	1	Sample		
19	Vial 71	664927 CCV@25	CLO4-AQN	1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD01.D Sample Name: 664919 CCV@25

```
=====
Injection Date: 7/23/2019 08:31:50      Seq Line: 1
Sample Name: 664919 CCV@25              Location: Vial 71
Acq Operator: TNB                        Inj. No.: 1
                                           Inj. Vol.: 35 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13
```

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD01.D Sample Name: 664919 CCV@25

```

=====
Injection Date: 7/23/2019 08:31:50      Seq Line:      1
Sample Name:    664919  CCV@25          Location:      Vial 71
Acq Operator:   TNB                    Inj. No.:     1
                                           Inj. Vol.:    35 µl

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  25.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.125	PBA	1626721.4	25.5049	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.132	PBA	482242.2	25.4774	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.141	PBA	193813.0	5.0000	CLO4-89-ISTD

```

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

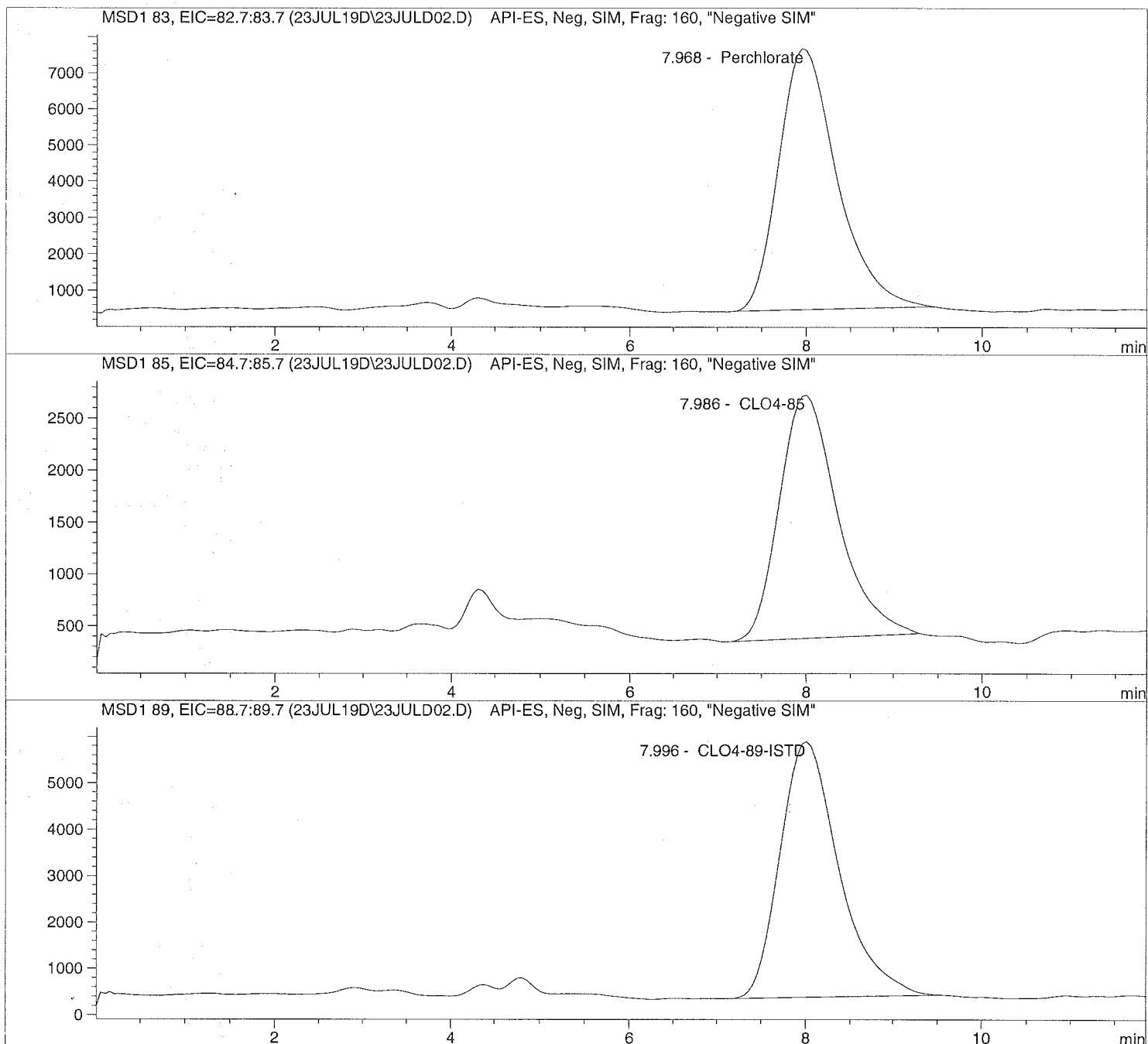
```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD02.D Sample Name: 664923 QC@4.0

```
=====
Injection Date: 7/23/2019 08:47:43      Seq Line:      2
Sample Name:    664923 QC@4.0           Location:      Vial 72
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
```

## Perchlorate analysis



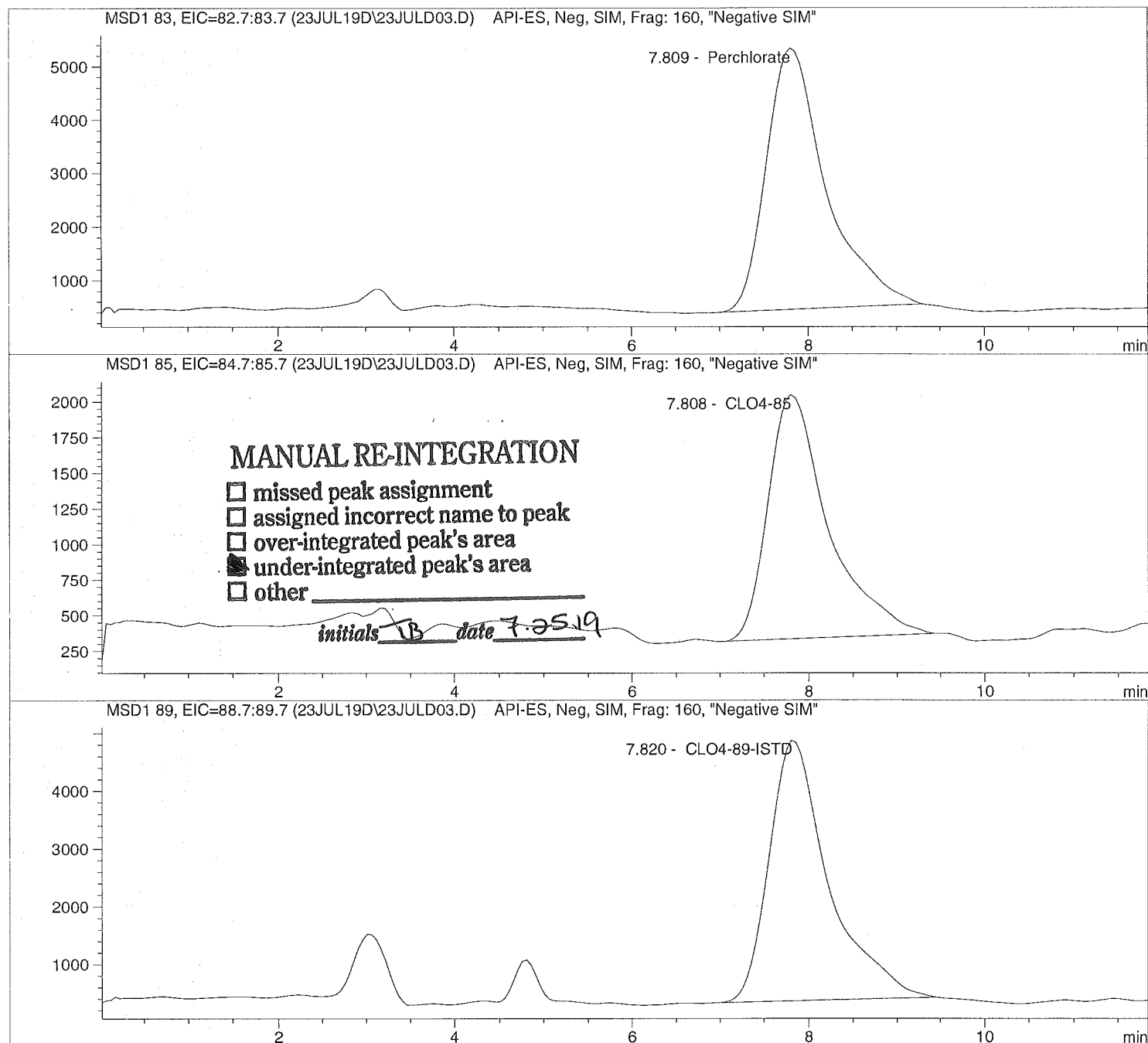


Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD03.D Sample Name: 664921 ICS@4.0

=====  
 Injection Date: 7/23/2019 09:01:39 Seq Line: 3  
 Sample Name: 664921 ICS@4.0 Location: Vial 73  
 Acq Operator: TNB Inj. No.: 1  
 Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
 =====







Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD04.D

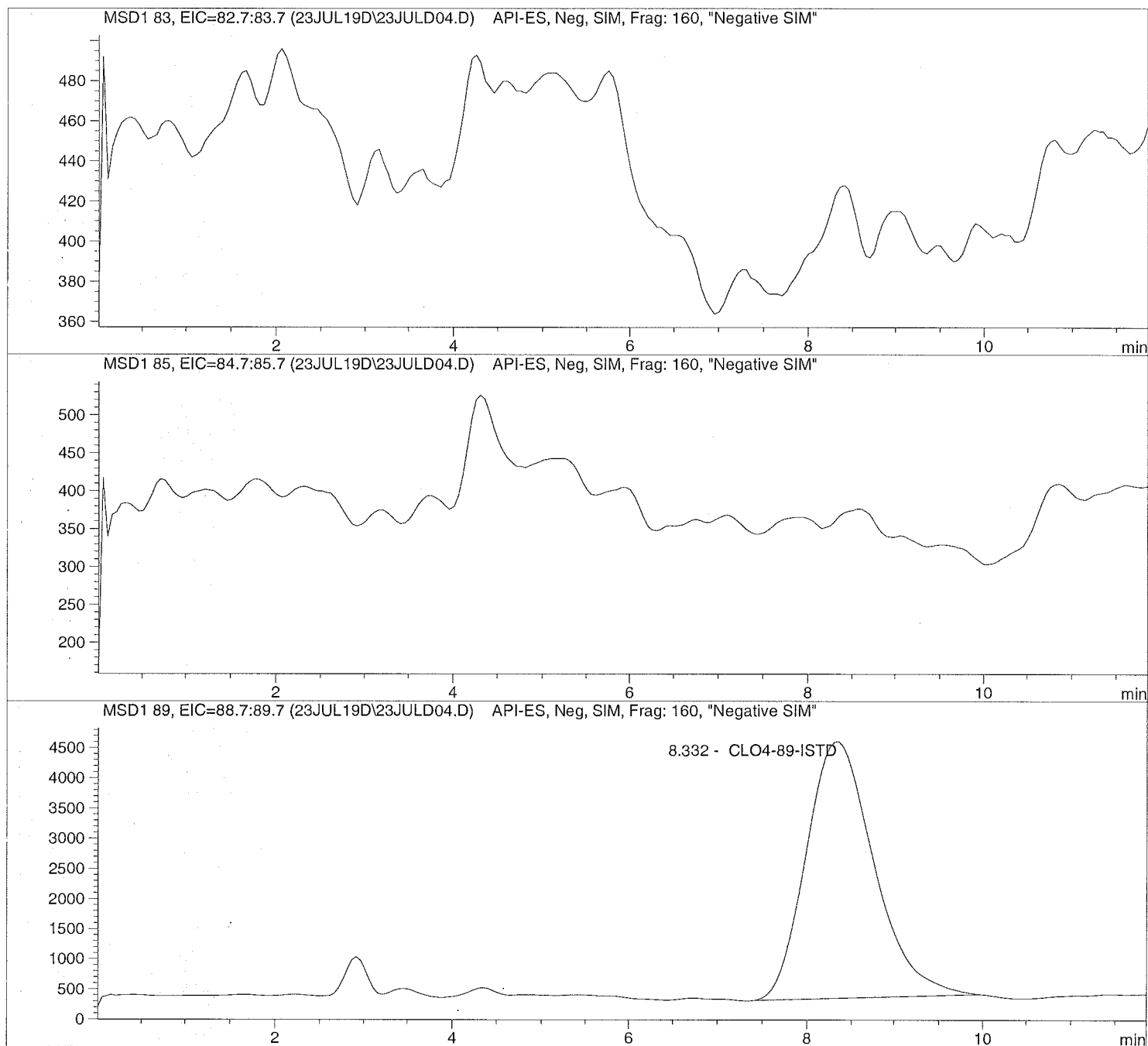
Sample Name: 664922 LMB

=====  
Injection Date: 7/23/2019 09:15:35  
Sample Name: 664922 LMB  
Acq Operator: TNB

Seq Line: 4  
Location: Vial 74  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD05.D

Sample Name: 1920034001

Injection Date: 7/23/2019 09:29:31

Seq Line: 5

Sample Name: 1920034001

Location: Vial 75

Acq Operator: TNB

Inj. No.: 1

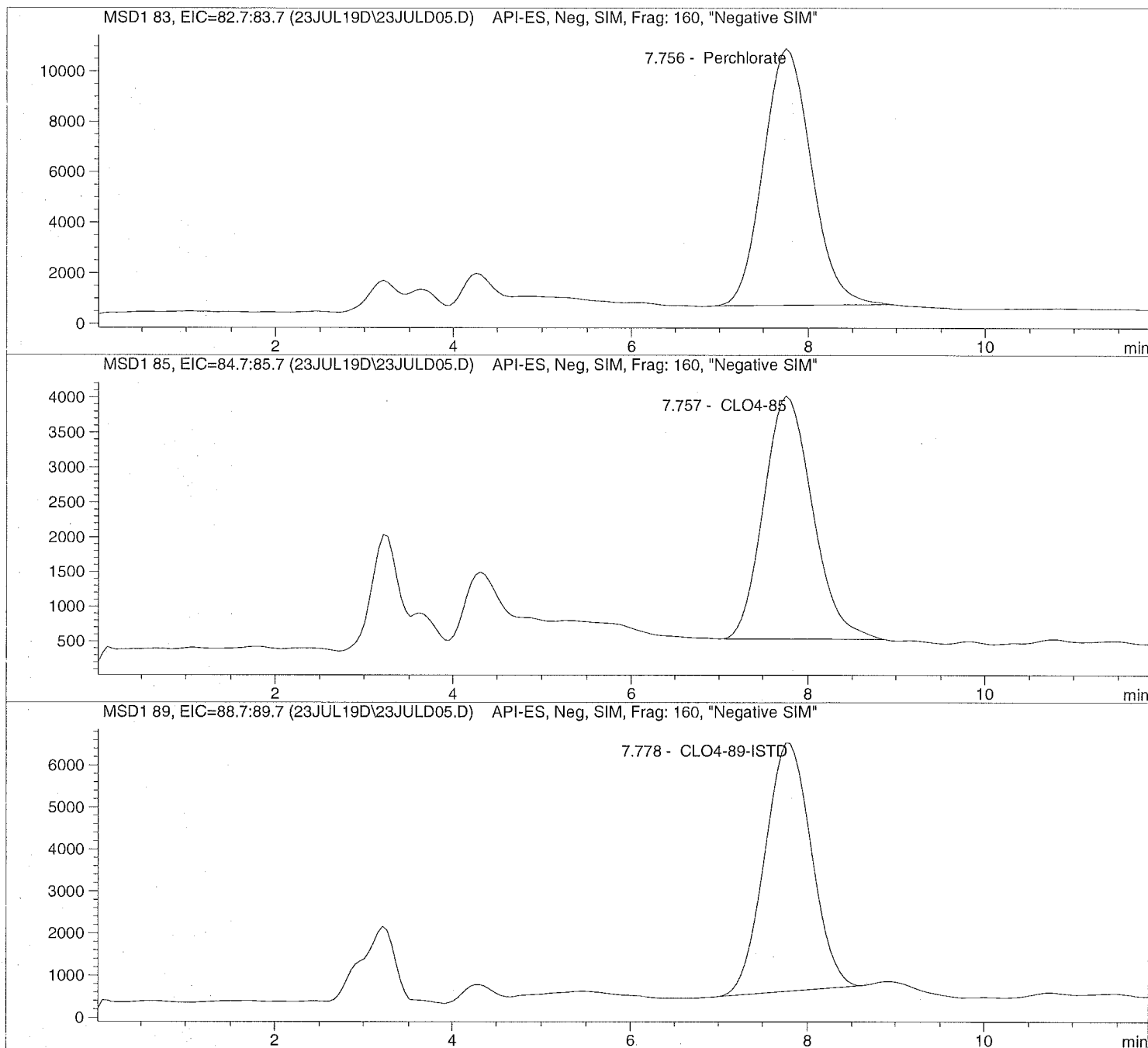
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD05.D Sample Name: 1920034001

```

=====
Injection Date: 7/23/2019 09:29:31      Seq Line:      5
Sample Name:    1920034001              Location:      Vial 75
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    35 µl

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.756	PBA	378721.2	5.7639	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.757	PBA	132206.6	6.6144	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.778	PBA	212985.8	5.0000	CLO4-89-ISTD

```

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

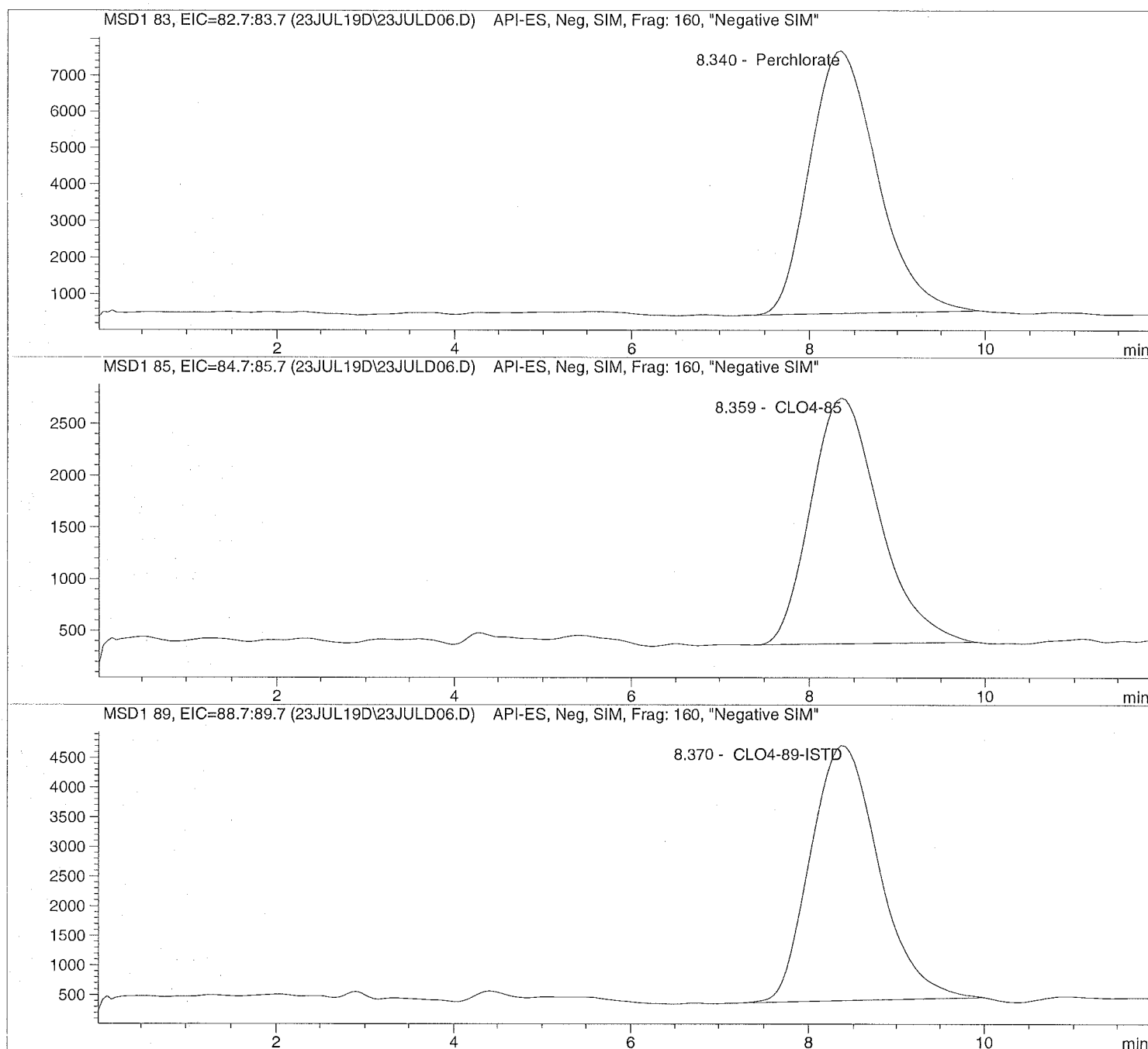
```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD06.D Sample Name: 1920122001 100

```
=====
Injection Date: 7/23/2019 09:43:25      Seq Line: 6
Sample Name: 1920122001 100             Location: Vial 76
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 35 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13
```

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD06.D      Sample Name: 1920122001    100

```
=====
Injection Date: 7/23/2019 09:43:25      Seq Line:            6
Sample Name:    1920122001    100      Location:            Vial 76
Acq Operator:   TNB                      Inj. No.:            1
                                         Inj. Vol.:            35 µl
=====
```

```
Acq. Method:        CLO4-AQN.M
Analysis Method:    C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:      4/12/2019 07:54:13
```

Perchlorate analysis

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

```
Sorted By:                    Signal
Calib. Data Modified:    Fri, 12. Apr. 2019,07:52:58 am
Multiplier:                1.000000
Dilution:                  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
8.340	PBA	381315.1	535.8053	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.359	PBA	127974.4	590.2080	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.370	PBA	231390.0	500.0000	CLO4-89-ISTD

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

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD07.D

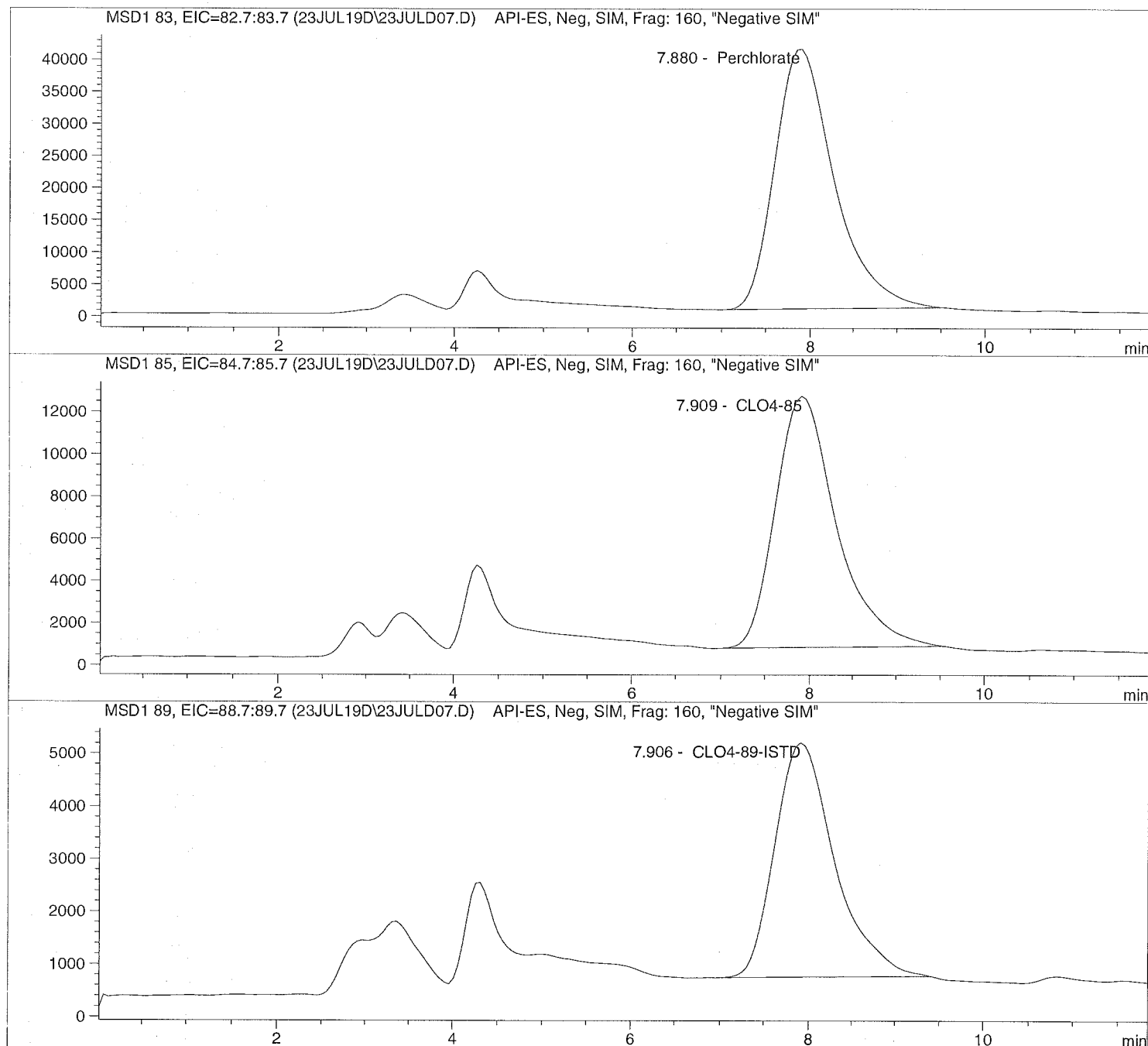
Sample Name: 1920123001

Injection Date: 7/23/2019 09:57:24  
Sample Name: 1920123001  
Acq Operator: TNB

Seq Line: 7  
Location: Vial 77  
Inj. No.: 1  
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD07.D Sample Name: 1920123001

```

=====
Injection Date: 7/23/2019 09:57:24      Seq Line: 7
Sample Name: 1920123001                Location: Vial 77
Acq Operator: TNB                      Inj. No.: 1
                                           Inj. Vol.: 35 µl

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.880	PBA	1887029.5	27.3071	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.909	PBA	571391.9	27.8427	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.906	PBA	209097.0	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD08.D

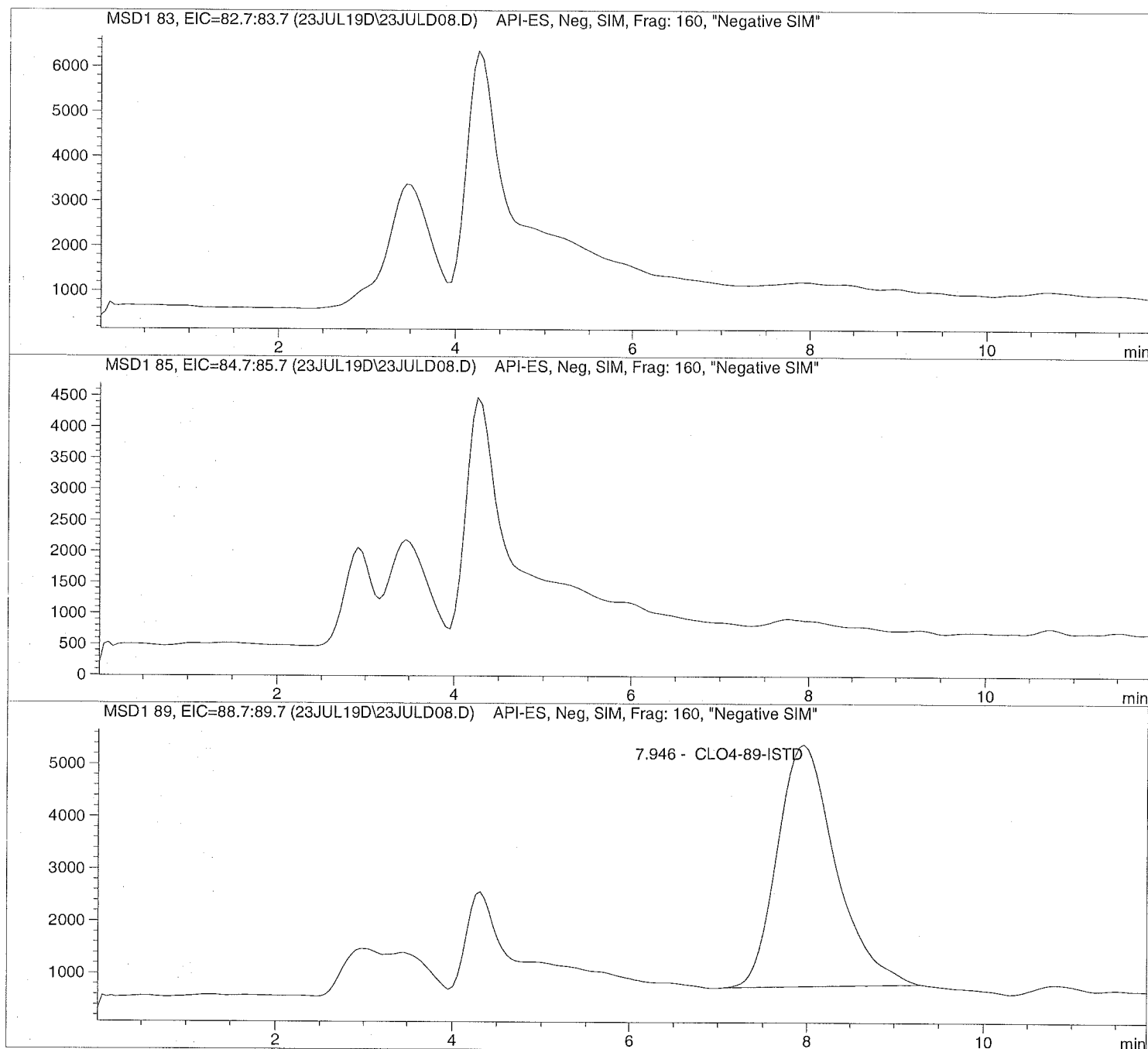
Sample Name: 1920123002

Injection Date: 7/23/2019 10:11:24  
Sample Name: 1920123002  
Acq Operator: TNB

Seq Line: 8  
Location: Vial 78  
Inj. No.: 1  
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD08.D Sample Name: 1920123002

```

=====
Injection Date: 7/23/2019 10:11:24      Seq Line:      8
Sample Name:    1920123002              Location:      Vial 78
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    35 µl

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.946	PBA	214312.1	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD09.D

Sample Name: 664924 201232S

Injection Date: 7/23/2019 10:25:26

Seq Line: 9

Sample Name: 664924 201232S

Location: Vial 79

Acq Operator: TNB

Inj. No.: 1

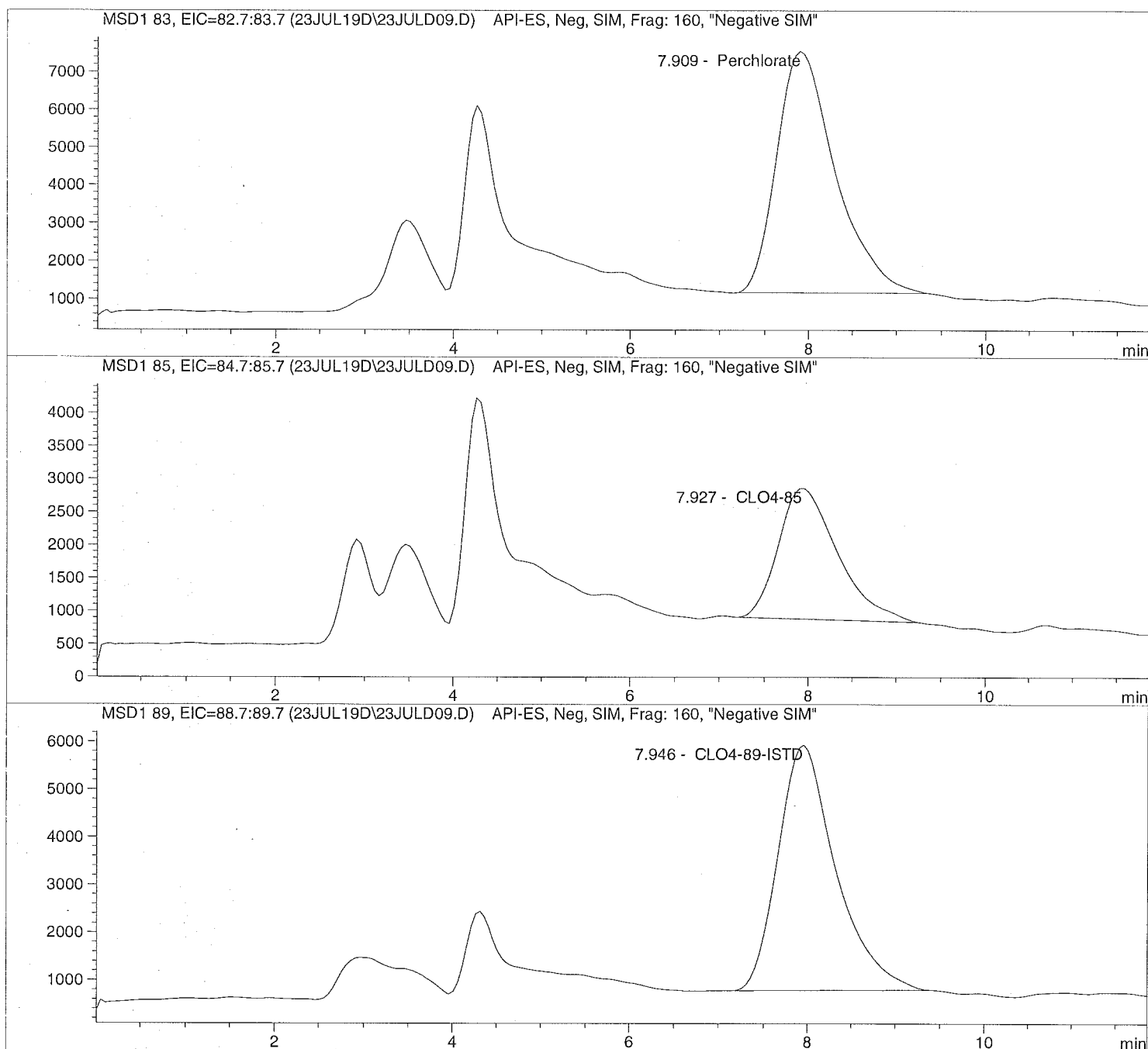
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



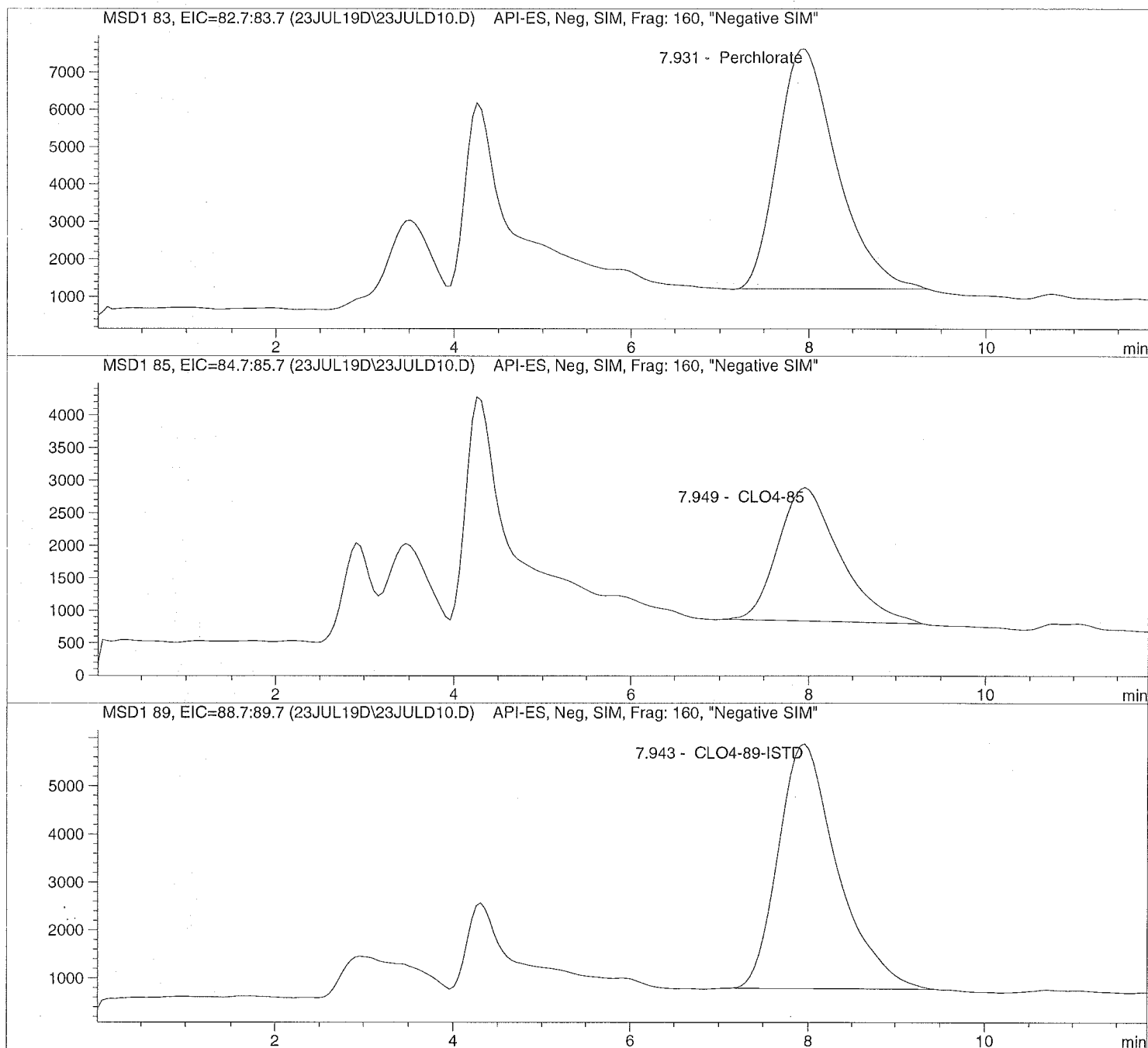


Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD10.D      Sample Name: 664925      201232D

=====  
Injection Date: 7/23/2019 10:39:29      Seq Line: 10  
Sample Name: 664925 201232D      Location: Vial 80  
Acq Operator: TNB      Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD10.D      Sample Name: 664925    201232D

```

=====
Injection Date: 7/23/2019 10:39:29                    Seq Line:                    10
Sample Name:    664925    201232D                    Location:                    Vial 80
Acq Operator:    TNB                                    Inj. No.:                    1
                                                          Inj. Vol.:                    35 µl

```

```

Acq. Method:        CLO4-AQN.M
Analysis Method:    C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:       4/12/2019 07:54:13

```

Perchlorate analysis

Sample Information

```

Sorted By:                    Signal
Calib. Data Modified:        Fri, 12. Apr. 2019,07:52:58 am
Multiplier:                  1.000000
Dilution:                    1.000000
Sample Amount:                0.000

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.931	PBA	298082.3	4.1432	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.949	PBA	99050.2	4.4791	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.943	PBA	236656.9	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD11.D

Sample Name: 1920123003

Injection Date: 7/23/2019 10:53:24

Seq Line: 11

Sample Name: 1920123003

Location: Vial 81

Acq Operator: TNB

Inj. No.: 1

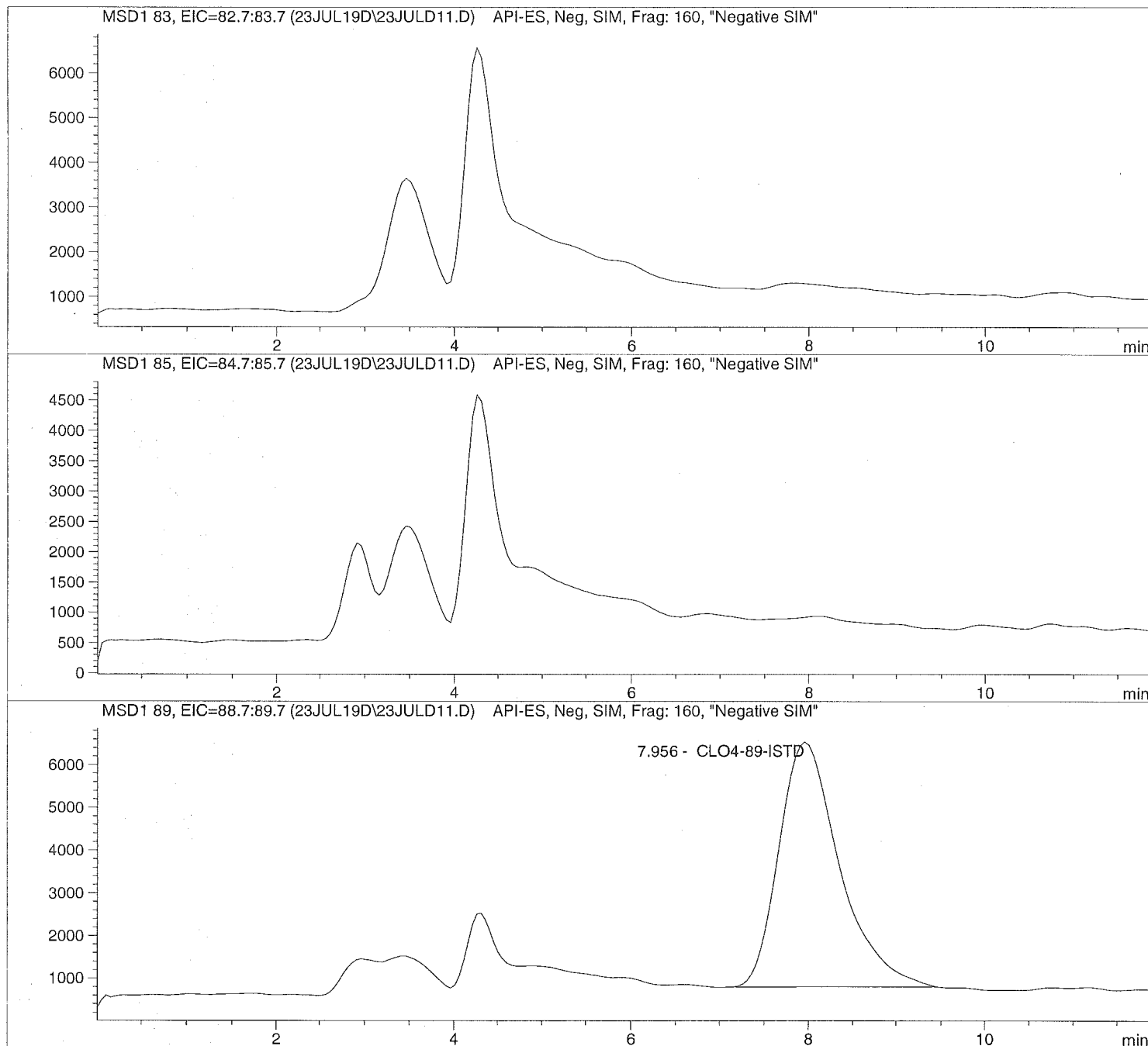
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD11.D Sample Name: 1920123003

```

=====
Injection Date: 7/23/2019 10:53:24      Seq Line:      11
Sample Name:   1920123003              Location:      Vial 81
Acq Operator:  TNB                      Inj. No.:     1
                                           Inj. Vol.:    35 µl

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
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
7.956	PBA	272319.7	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD12.D

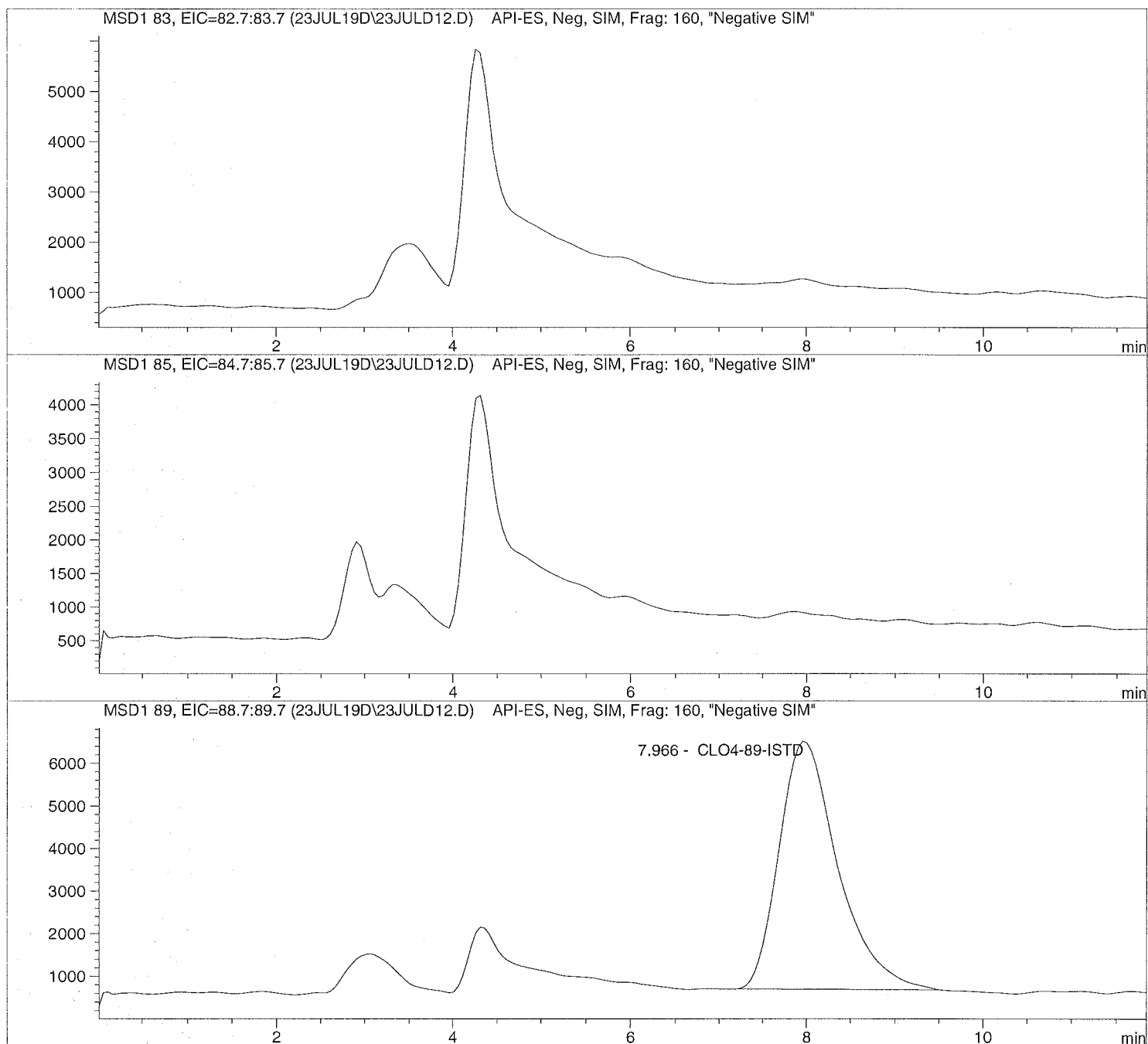
Sample Name: 1920123004

Injection Date: 7/23/2019 11:07:17  
Sample Name: 1920123004  
Acq Operator: TNB

Seq Line: 12  
Location: Vial 82  
Inj. No.: 1  
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD12.D Sample Name: 1920123004

```

=====
Injection Date: 7/23/2019 11:07:17      Seq Line:      12
Sample Name:    1920123004              Location:      Vial 82
Acq Operator:   TNB                      Inj. No.:     1
                                           Inj. Vol.:    35 µl
  
```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
  
```

Perchlorate analysis

Sample Information

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
  
```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.966	PBA	270262.5	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD13.D

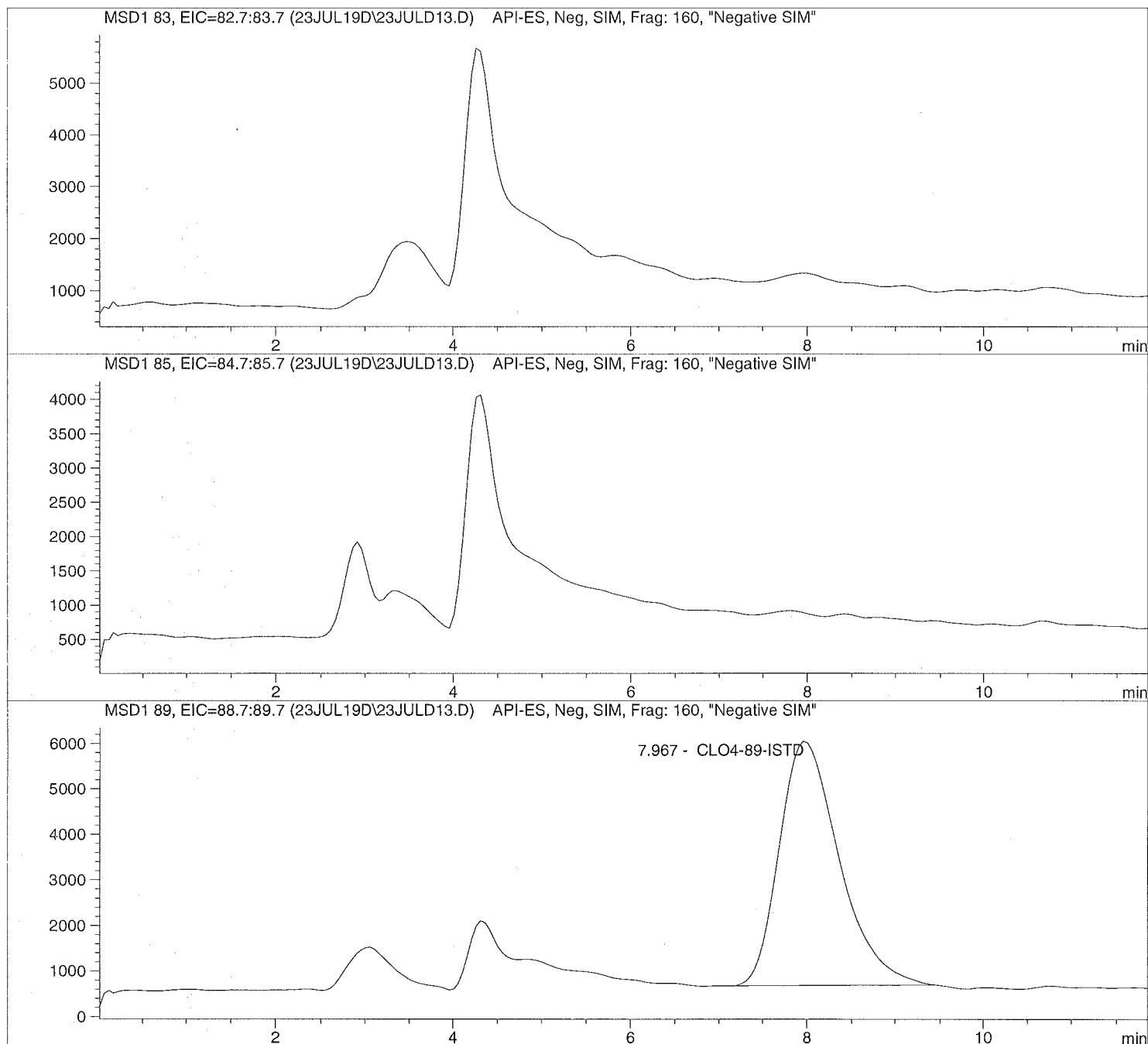
Sample Name: 1920123005

Injection Date: 7/23/2019 11:21:18  
Sample Name: 1920123005  
Acq Operator: TNB

Seq Line: 13  
Location: Vial 83  
Inj. No.: 1  
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD13.D Sample Name: 1920123005

```

=====
Injection Date: 7/23/2019 11:21:18      Seq Line:      13
Sample Name:    1920123005              Location:      Vial 83
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.967	PBA	250553.8	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD14.D

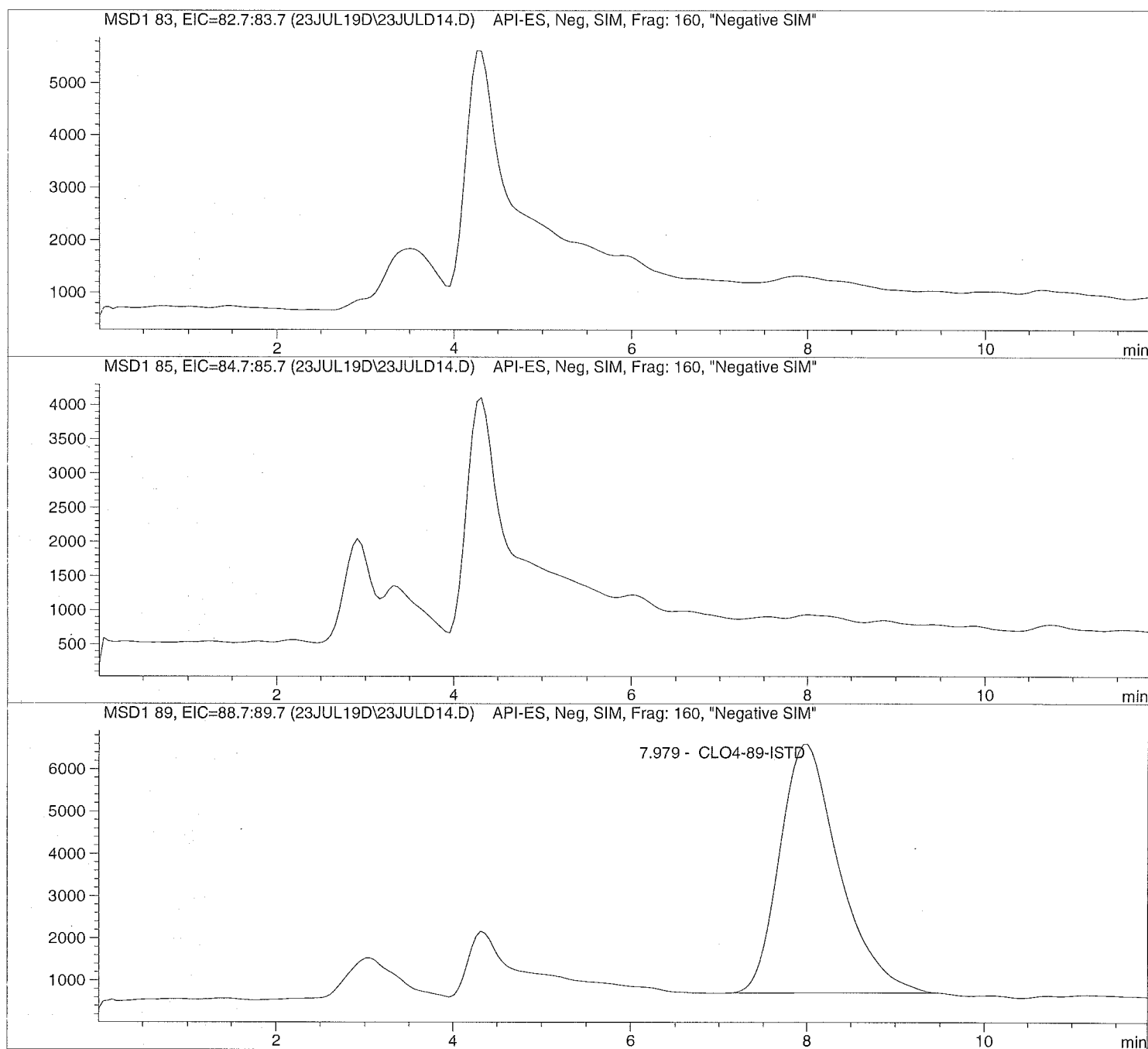
Sample Name: 1920123006

=====  
Injection Date: 7/23/2019 11:35:11  
Sample Name: 1920123006  
Acq Operator: TNB

Seq Line: 14  
Location: Vial 84  
Inj. No.: 1  
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD14.D Sample Name: 1920123006

```

=====
Injection Date: 7/23/2019 11:35:11      Seq Line:          14
Sample Name:    1920123006              Location:          Vial 84
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.979	PBA	277086.1	5.0000	CLO4-89-ISTD

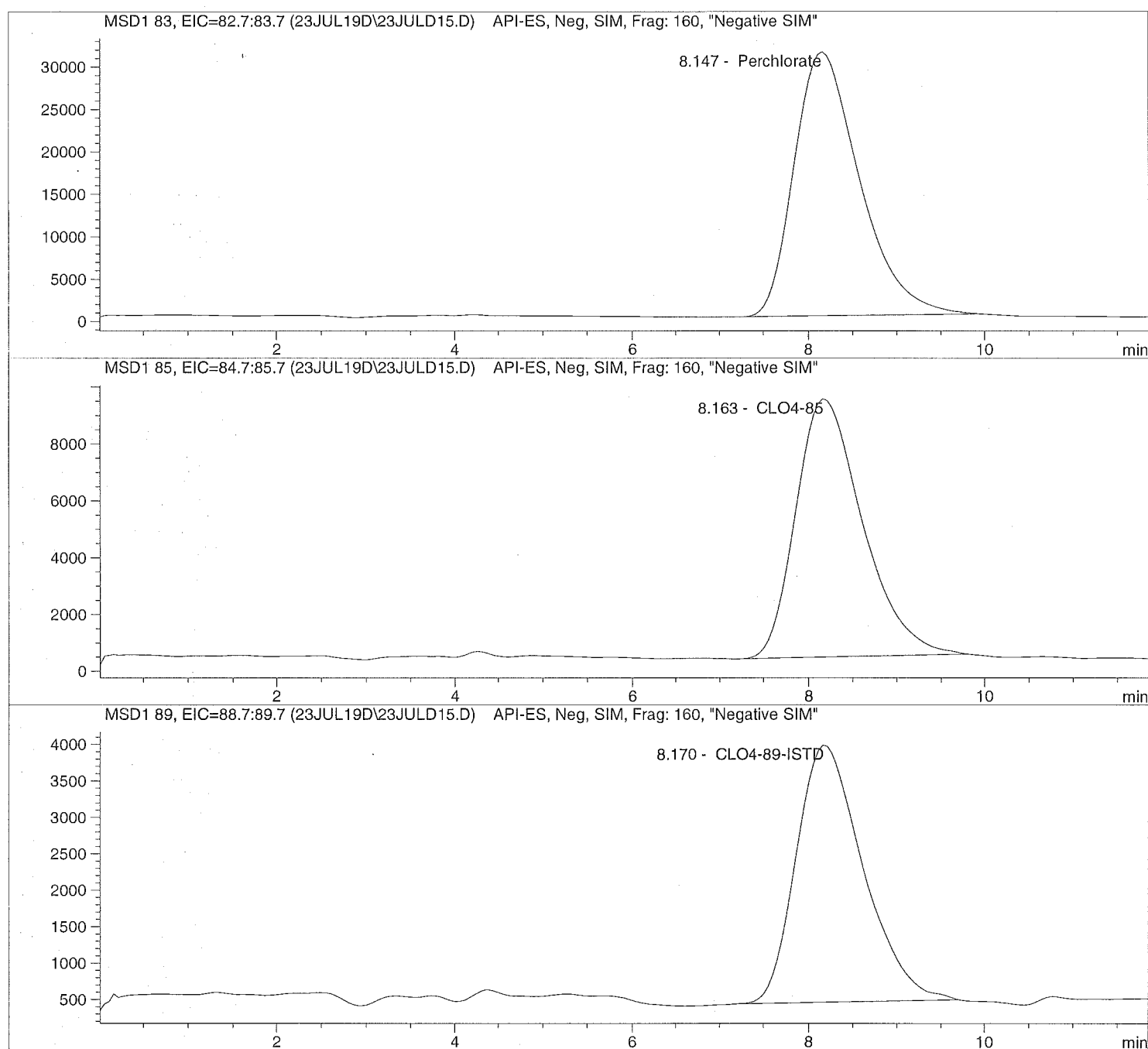
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD15.D Sample Name: 664926 CCV@25

=====  
Injection Date: 7/23/2019 11:49:04 Seq Line: 15  
Sample Name: 664926 CCV@25 Location: Vial 71  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====







Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD16.D

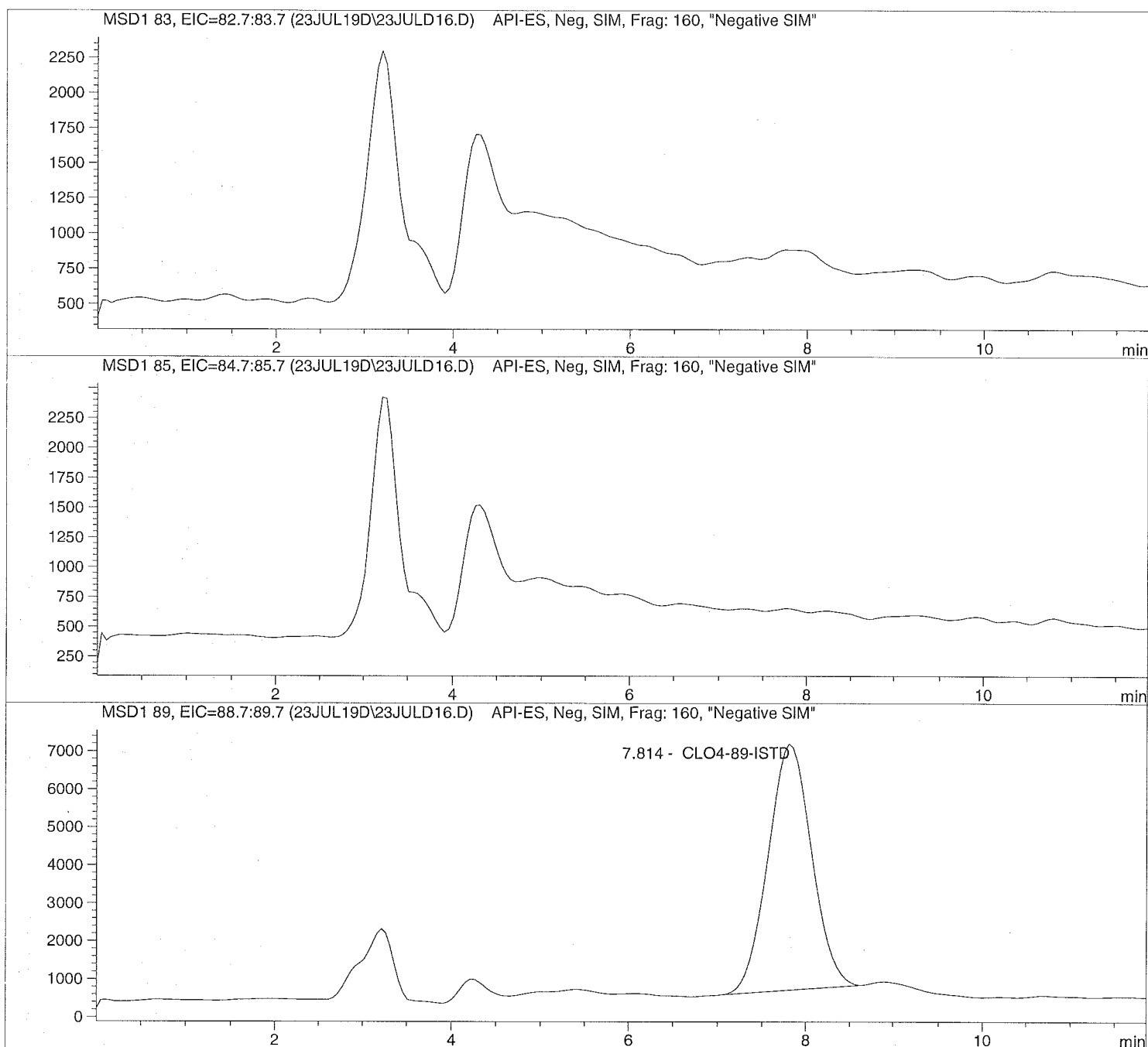
Sample Name: 1920571001

Injection Date: 7/23/2019 12:03:02  
Sample Name: 1920571001  
Acq Operator: TNB

Seq Line: 16  
Location: Vial 85  
Inj. No.: 1  
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD16.D Sample Name: 1920571001

```

=====
Injection Date: 7/23/2019 12:03:02      Seq Line:          16
Sample Name:    1920571001              Location:          Vial 85
Acq Operator:   TNB                      Inj. No.:         1
                                           Inj. Vol.:        35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.814	PBA	224656.6	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD17.D

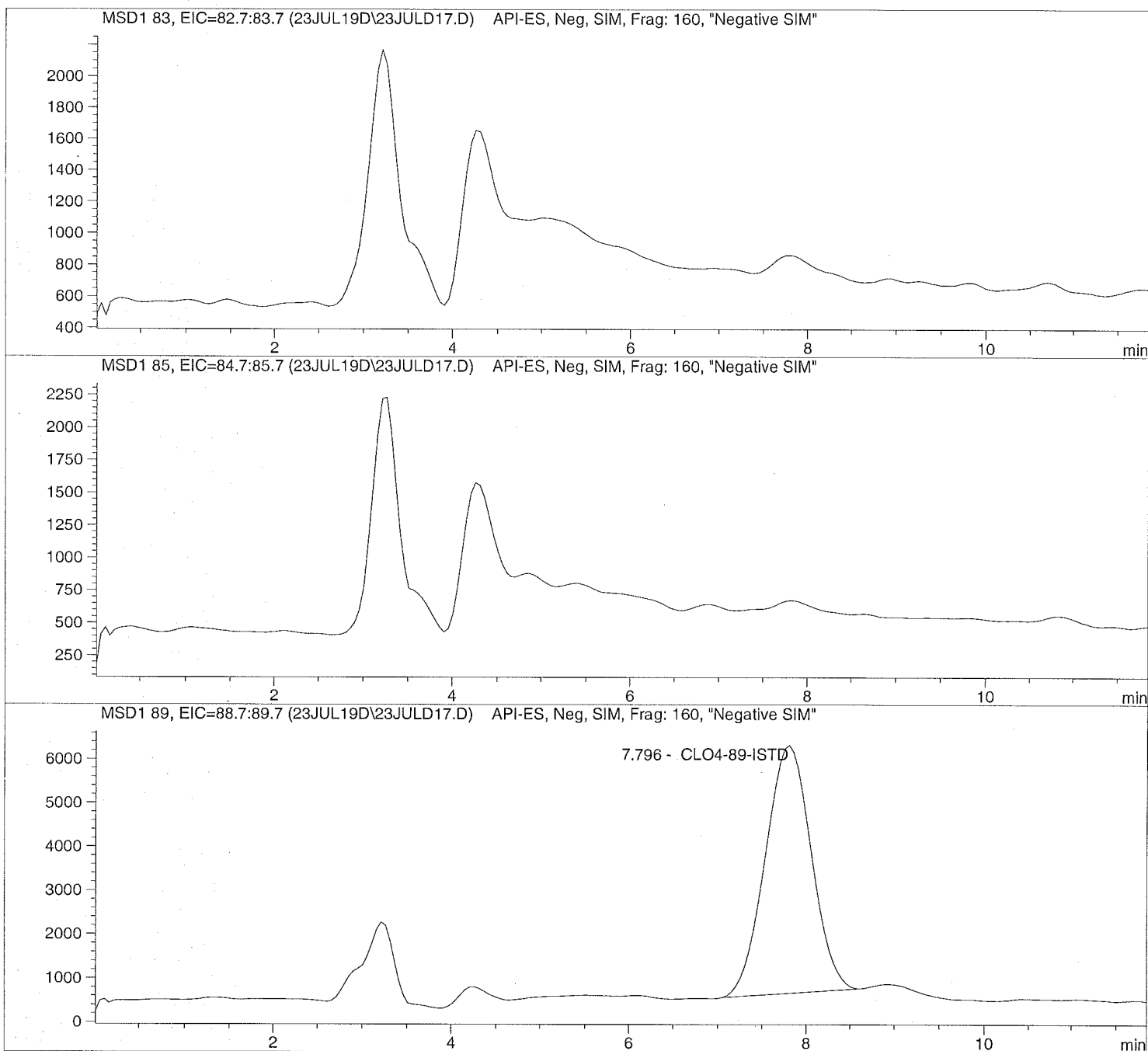
Sample Name: 1920572001

=====  
Injection Date: 7/23/2019 12:16:58  
Sample Name: 1920572001  
Acq Operator: TNB

Seq Line: 17  
Location: Vial 86  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD17.D Sample Name: 1920572001

```

=====
Injection Date: 7/23/2019 12:16:58      Seq Line:          17
Sample Name:    1920572001              Location:          Vial 86
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.796	PBA	204102.5	5.0000	CLO4-89-ISTD

```

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

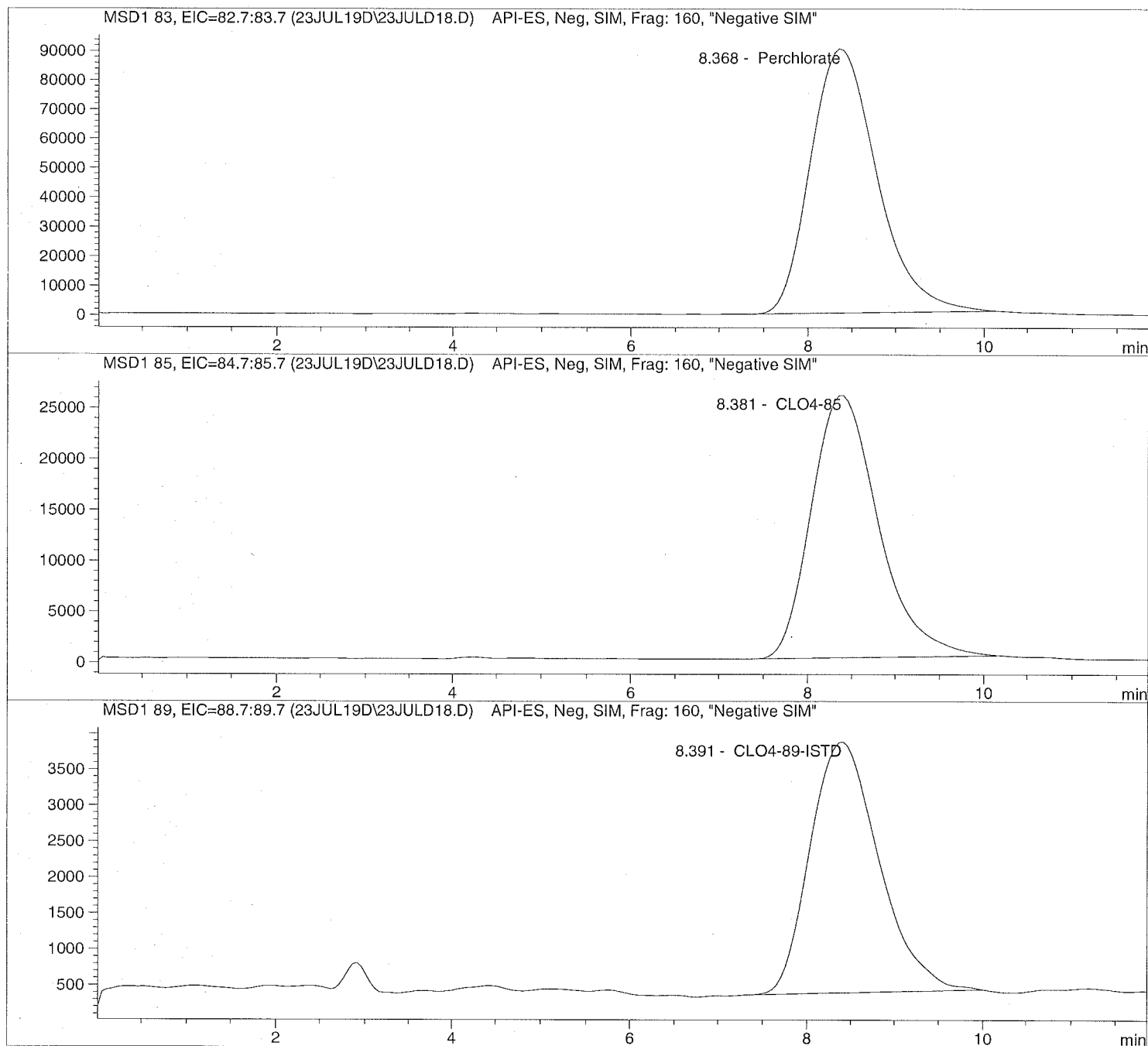
```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD18.D Sample Name: 1920581001 100

```
=====
Injection Date: 7/23/2019 12:30:57      Seq Line:      18
Sample Name:    1920581001 100          Location:      Vial 87
Acq Operator:   TNB                    Inj. No.:     1
                                           Inj. Vol.:    35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
```

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD18.D Sample Name: 1920581001 100

```
=====
Injection Date: 7/23/2019 12:30:57      Seq Line:      18
Sample Name:   1920581001 100          Location:      Vial 87
Acq Operator:  TNB                    Inj. No.:     1
                                           Inj. Vol.:    35 µl
=====
```

```
Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  4/12/2019 07:54:13
```

Perchlorate analysis

=====

Sample Information

=====

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       100.000000
Sample Amount:  0.000
```

=====

LCMS Results

=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.368	PBA	4742469.5	6892.8927	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.381	PBA	1372874.8	6775.2203	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.391	PBA	190565.5	500.0000	CLO4-89-ISTD

=====

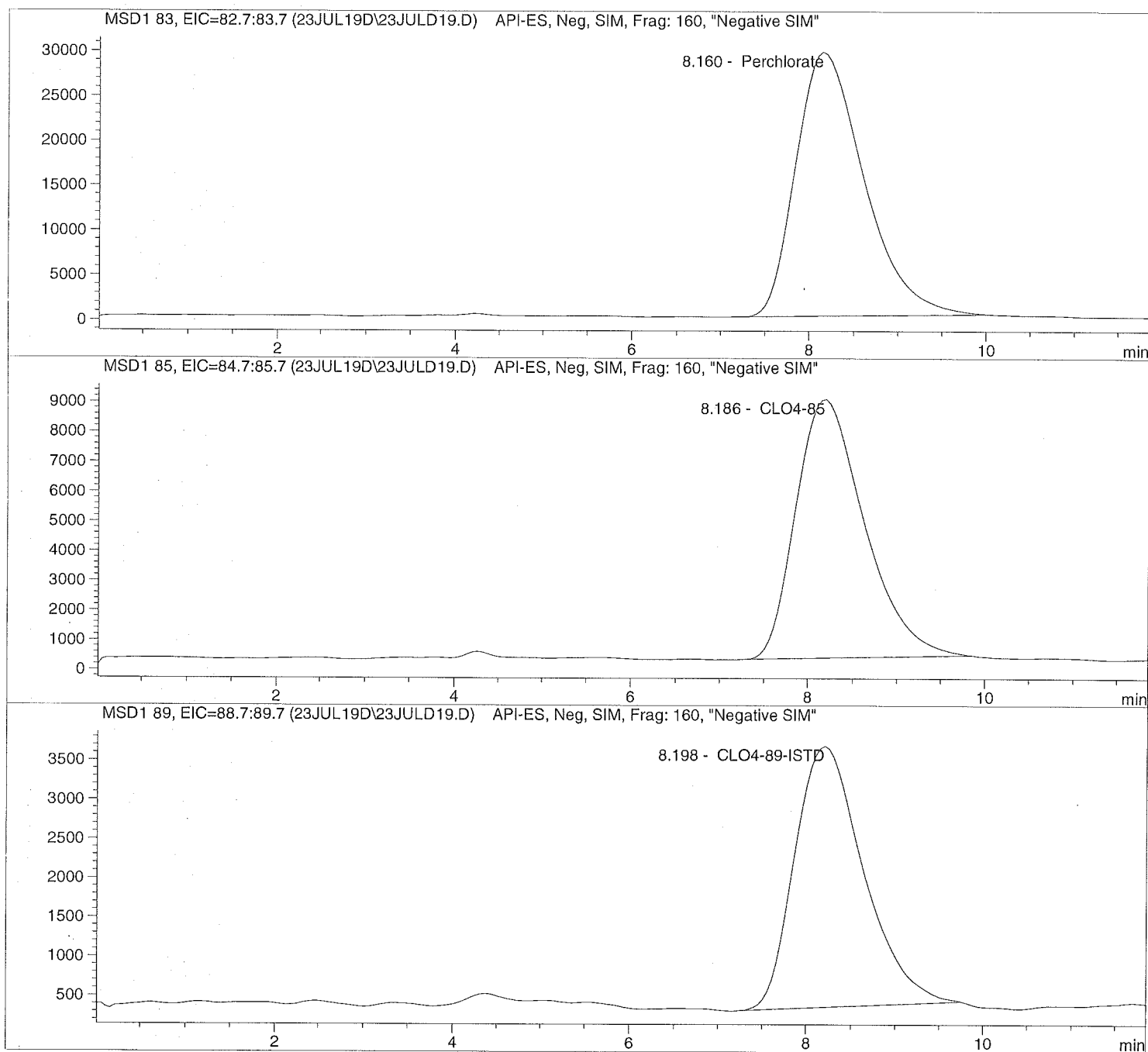
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD19.D      Sample Name: 664927      CCV@25

=====  
Injection Date: 7/23/2019 12:44:47      Seq Line: 19  
Sample Name: 664927      CCV@25      Location: Vial 71  
Acq Operator: TNB      Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====





Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD19.D      Sample Name: 664927    CCV@25

```

=====
Injection Date: 7/23/2019 12:44:47                    Seq Line:                    19
Sample Name:    664927    CCV@25                      Location:                    Vial 71
Acq Operator:    TNB                                    Inj. No.:                    1
                                                          Inj. Vol.:                    35 µl

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

Perchlorate analysis

Sample Information

```

Sorted By:                    Signal
Calib. Data Modified:        Fri, 12. Apr. 2019,07:52:58 am
Multiplier:                  1.000000
Dilution:                    1.000000
Sample Amount:                25.000

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.160	PBA	1565389.9	26.5099	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.186	PBA	466030.6	26.5949	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.198	PBA	179008.0	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

## **Initial Calibration**

=====  
 Calibration Table  
 =====

Perchlorate

Calib. Data Modified : 3/19/2019 2:35:19 PM

Calculate : Internal Standard  
 Based on : Peak Area

Rel. Reference Window : 20.000 %  
 Abs. Reference Window : 0.000 min  
 Rel. Non-ref. Window : 20.000 %  
 Abs. Non-ref. Window : 0.000 min  
 Use Multiplier & Dilution Factor with ISTDs

Uncalibrated Peaks : not reported  
 Partial Calibration : No recalibration if peaks missing

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

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

Calibration Report Options :

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

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

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

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

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp	Name
8.744	1 1	1.00000	7.76074e4	1.28854e-5	1	Perchlorate
		2.00000	1.35273e5	1.47849e-5		
		5.00000	3.37764e5	1.48033e-5		
		10.00000	6.83454e5	1.46316e-5		
		25.00000	2.08433e6	1.19943e-5		
		50.00000	4.13334e6	1.20968e-5		
		75.00000	5.99313e6	1.25143e-5		
8.755	2 1	1.00000	2.36780e4	4.22333e-5	1	CL04-85
		2.00000	4.69486e4	4.25998e-5		
		5.00000	1.06124e5	4.71147e-5		
		10.00000	2.13523e5	4.68335e-5		
		25.00000	6.14295e5	4.06971e-5		
		50.00000	1.19814e6	4.17315e-5		
		75.00000	1.78355e6	4.20509e-5		
8.766	3 1	5.00000	2.73208e5	1.83011e-5	+I1	CL04-89-ISTD
		5.00000	2.24886e5	2.22335e-5		
		5.00000	2.33196e5	2.14412e-5		
		5.00000	2.34454e5	2.13262e-5		
		5.00000	2.50568e5	1.99547e-5		
		5.00000	2.30977e5	2.16472e-5		

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

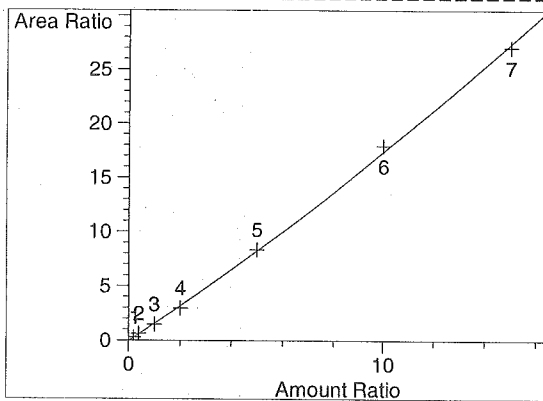
Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min  
 Curve Type : Linear  
 Origin : Included  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

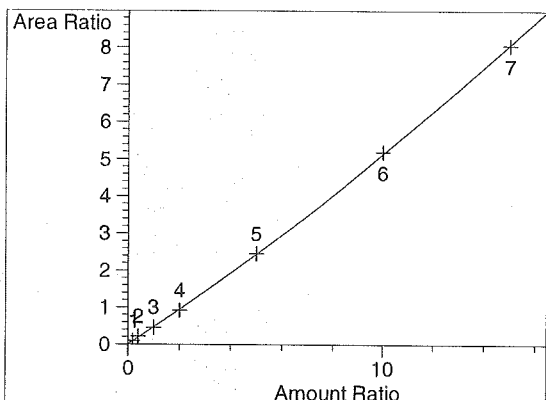
=====  
 Peak Sum Table  
 =====

\*\*\*No Entries in table\*\*\*  
 =====

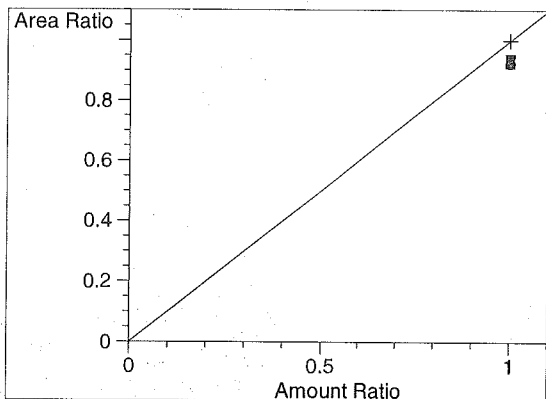
=====  
 Calibration Curves  
 =====



Perchlorate at exp. RT: 8.744  
 MSD1 83, EIC=82.7:83.7  
 Correlation: 0.99957  
 Residual Std. Dev.: 0.30744  
 Formula:  $y = ax^2 + bx + c$   
 a: 1.76988e-2  
 b: 1.56480  
 c: -4.92430e-2  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755  
 MSD1 85, EIC=84.7:85.7  
 Correlation: 0.99983  
 Residual Std. Dev.: 0.03473  
 Formula:  $y = ax^2 + bx + c$   
 a: 5.13396e-3  
 b: 4.62055e-1  
 c: 4.97209e-4  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766  
 MSD1 89, EIC=88.7:89.7  
 Correlation: 1.00000  
 Residual Std. Dev.: 0.00000  
 Formula:  $y = mx + b$   
 m: 1.00000  
 b: 0.00000  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

## Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

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

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	7.76074e4	8.744	1.06245
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	8.992	2.06969
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	8.586	4.73474
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	8.698	9.27727
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	8.451	25.29036
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	8.810	51.36844
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	8.586	74.16754
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	8.702	9.25940

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	8.755	9.30535e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	9.012	2.24255
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	8.602	4.86656
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	8.713	9.64312
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	8.468	25.12159
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	8.825	50.46721
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	8.603	74.72019
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	8.721	9.54024

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.73208e5	8.766	5.00000
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	9.012	5.00000
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	8.609	5.00000
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	8.716	5.00000
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	8.472	5.00000
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	8.825	5.00000
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	8.610	5.00000
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	8.725	5.00000

\*\*\* End of Report \*\*\*

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\MAR\19MAR19I.S

## Sequence Table:

## Method and Injection Info Part:

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

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI03.D

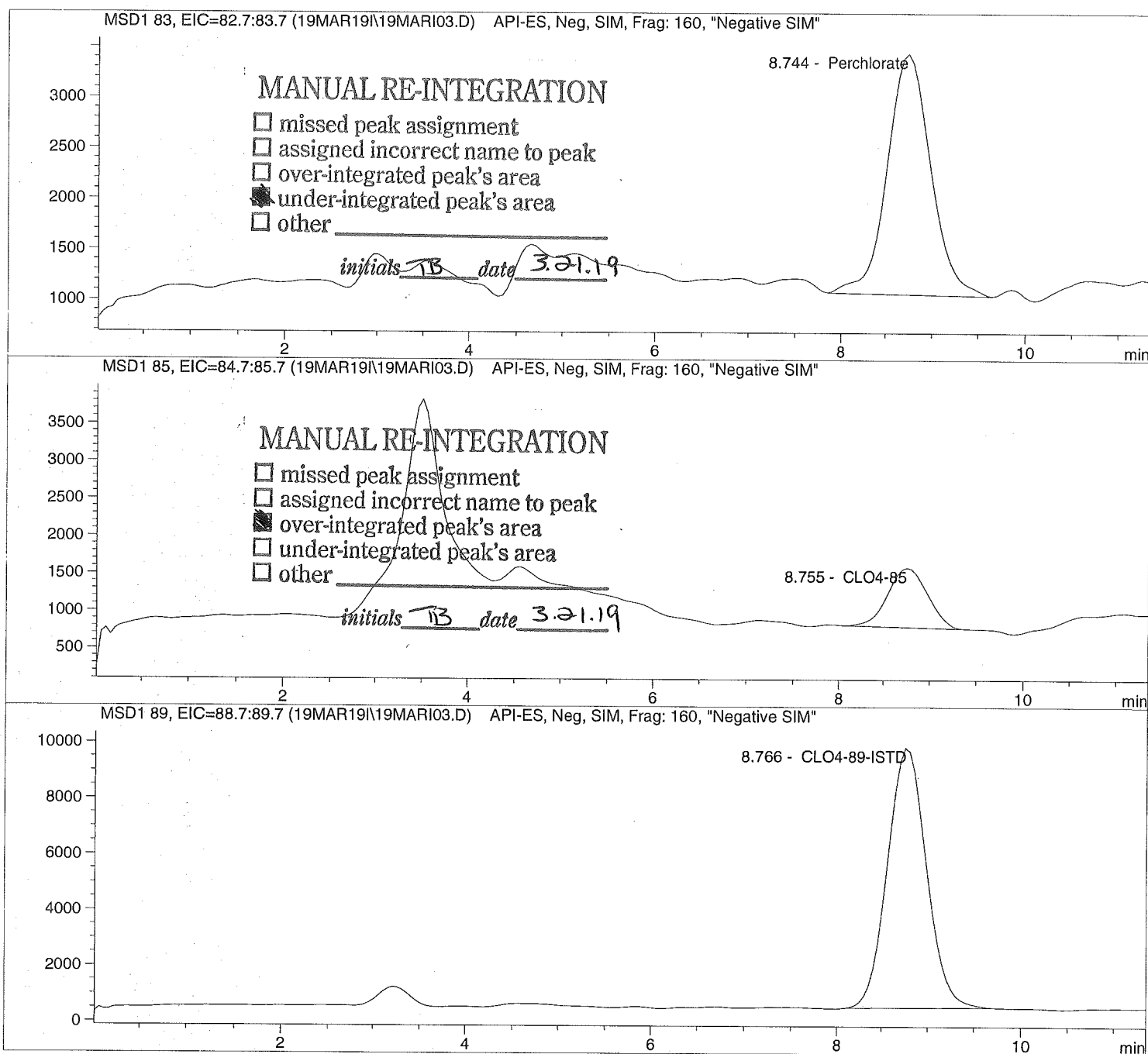
Sample Name: CLO4@ 1.0ug/L

=====  
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 14:35:22

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

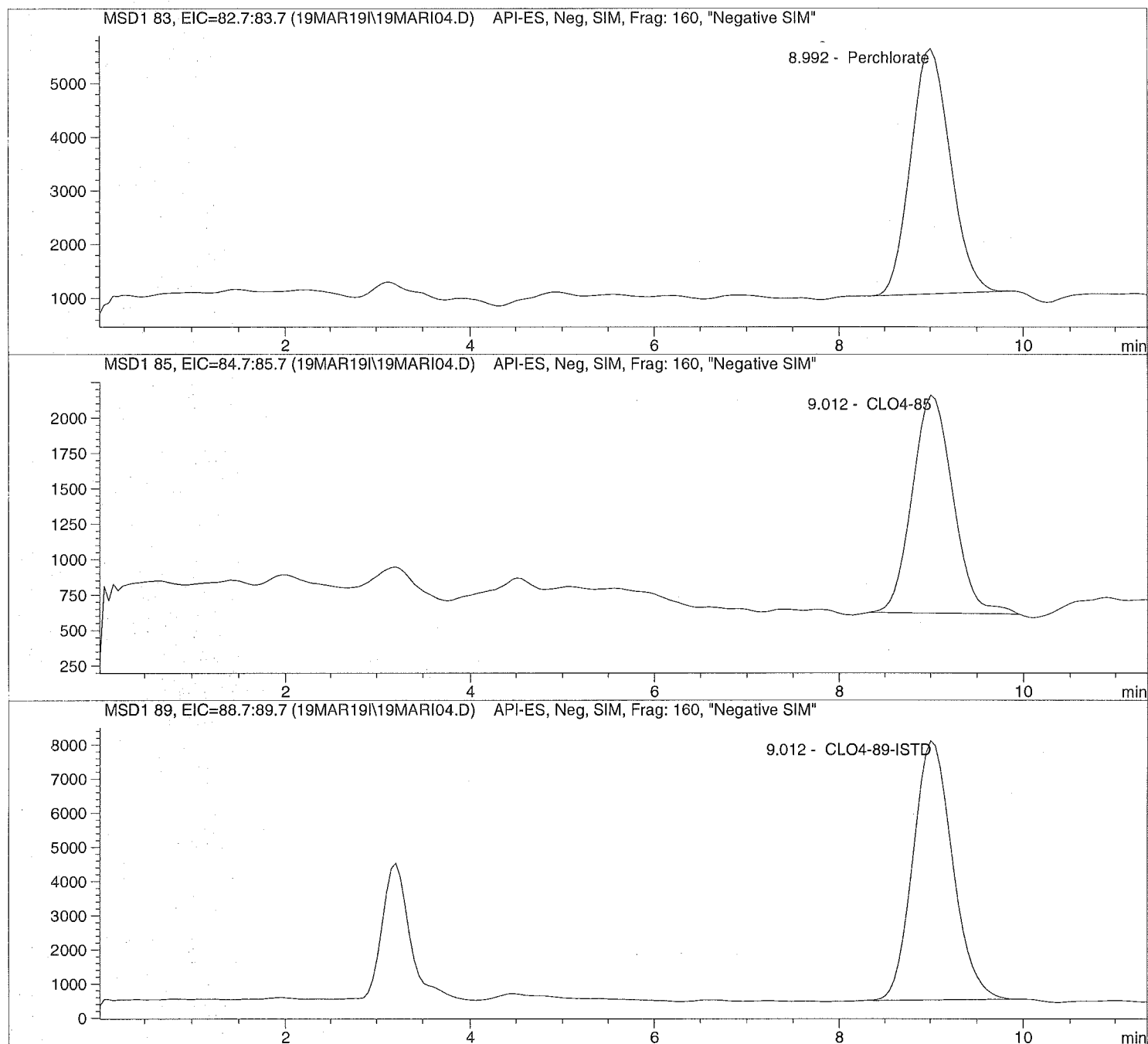
Inj. Vol.: 30 µl

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\19MAR19\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

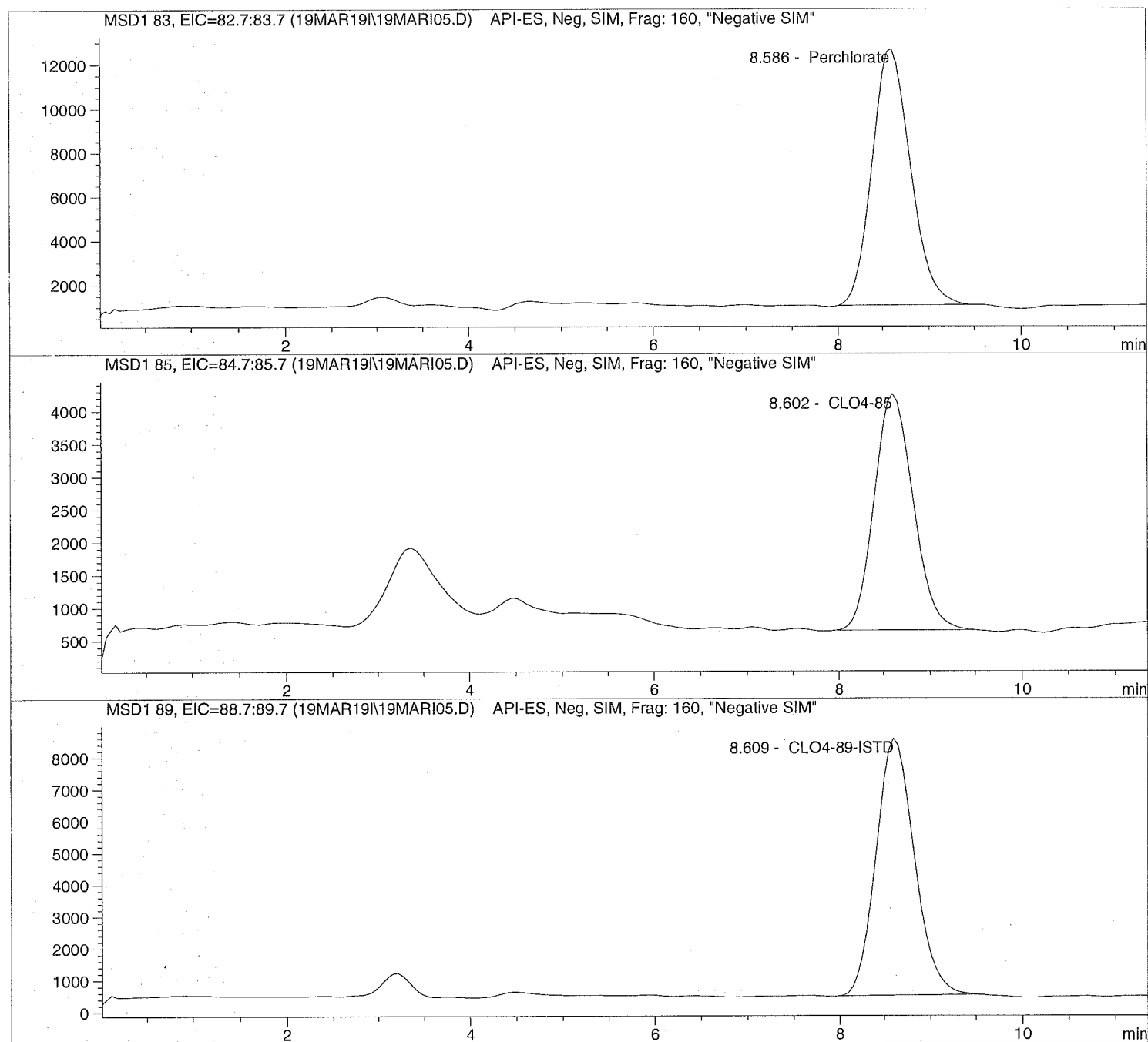
Inj. Vol.: 30 µl

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\19MAR19\19MARI06.D

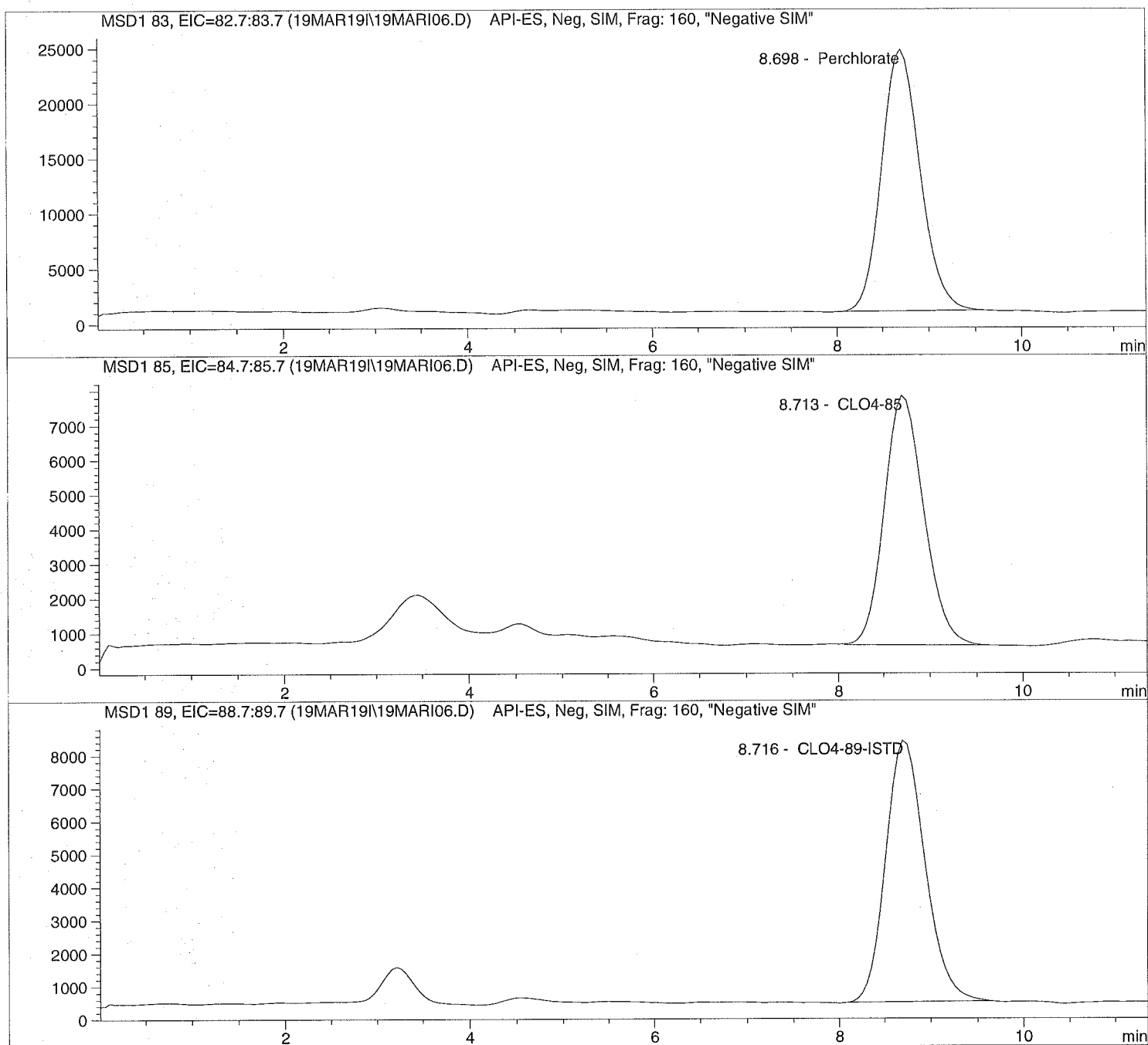
Sample Name: CLO4@ 10.ug/L

Injection Date: 3/19/2019 10:19:32  
Sample Name: CLO4@ 10.ug/L  
Acq Operator: TNB

Seq Line: 6  
Location: Vial 76  
Inj. No.: 1  
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\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

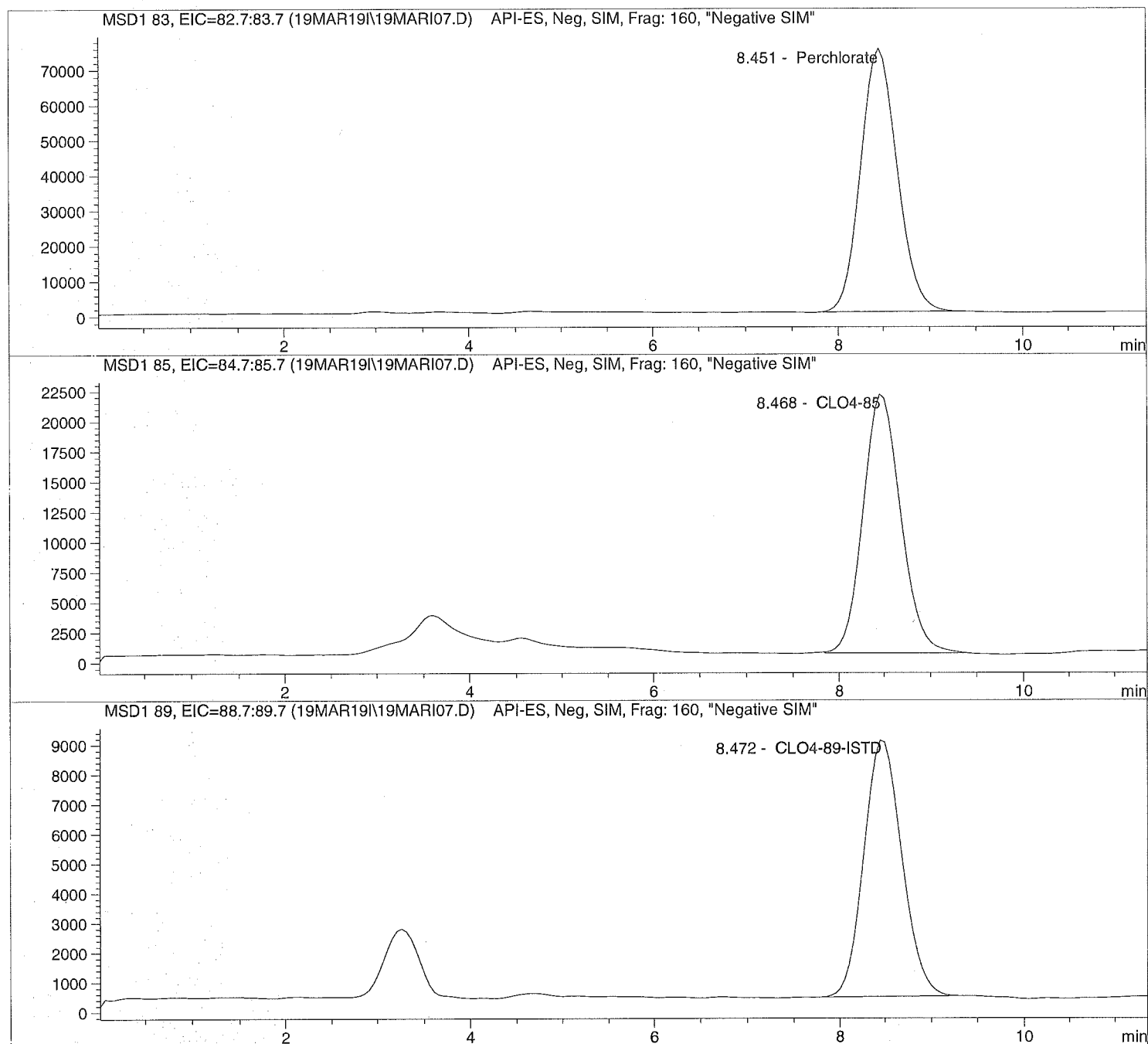
Inj. Vol.: 30 µl

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

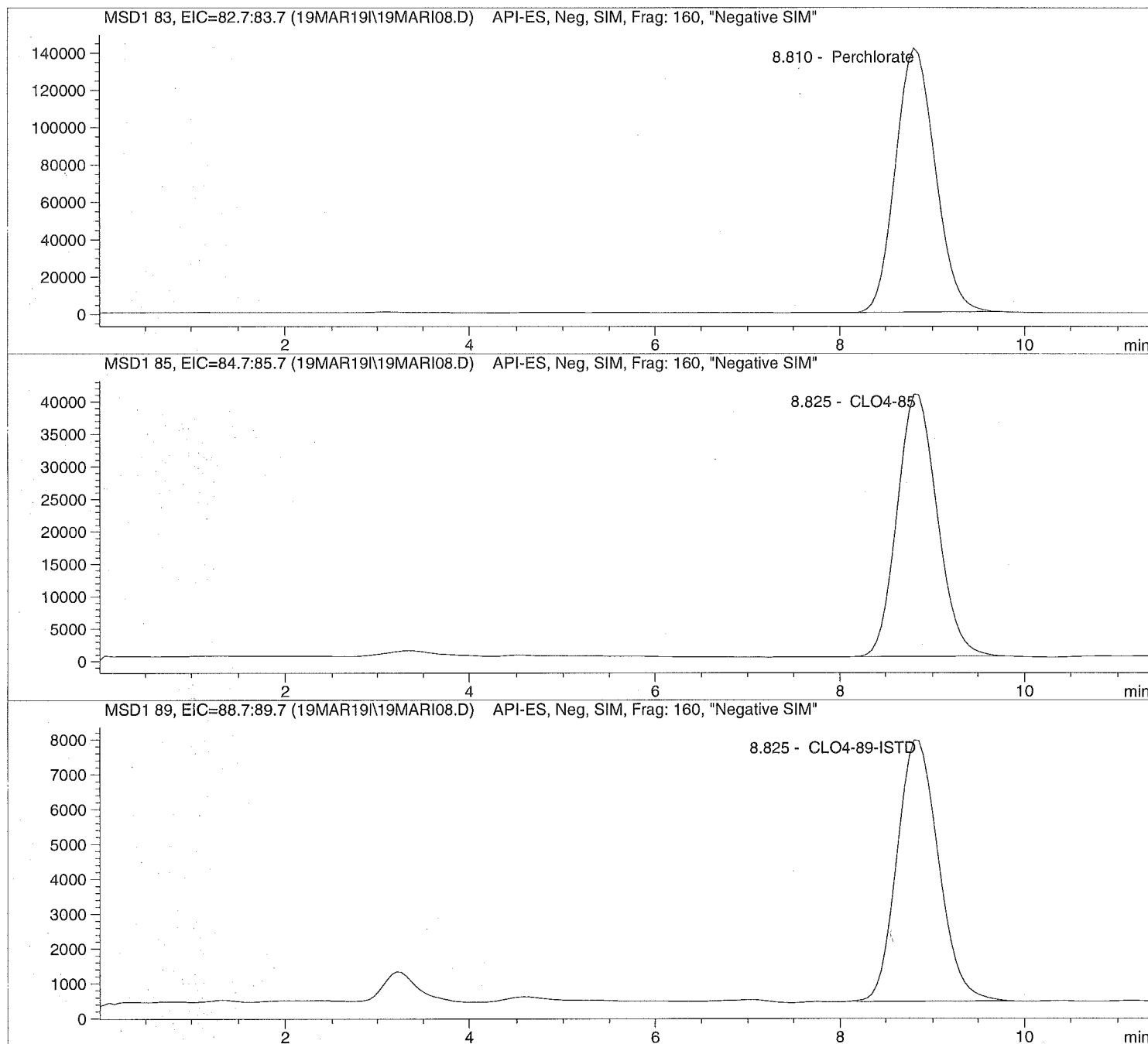
Sample Name: CLO4@ 50.ug/L

Injection Date: 3/19/2019 10:46:05  
Sample Name: CLO4@ 50.ug/L  
Acq Operator: TNB

Seq Line: 8  
Location: Vial 78  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

## Perchlorate analysis



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\19MAR19\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

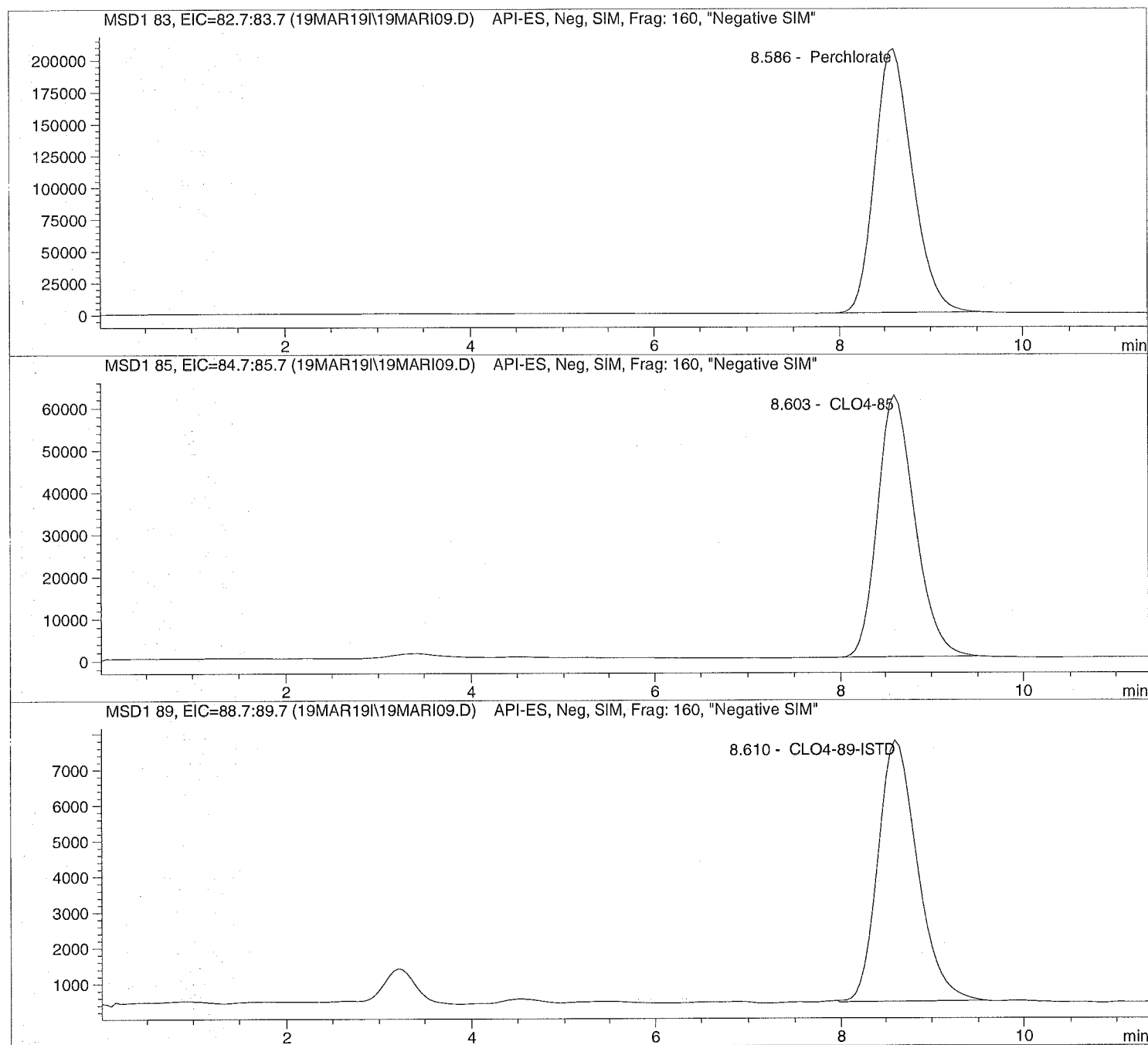
Inj. Vol.: 30 µl

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

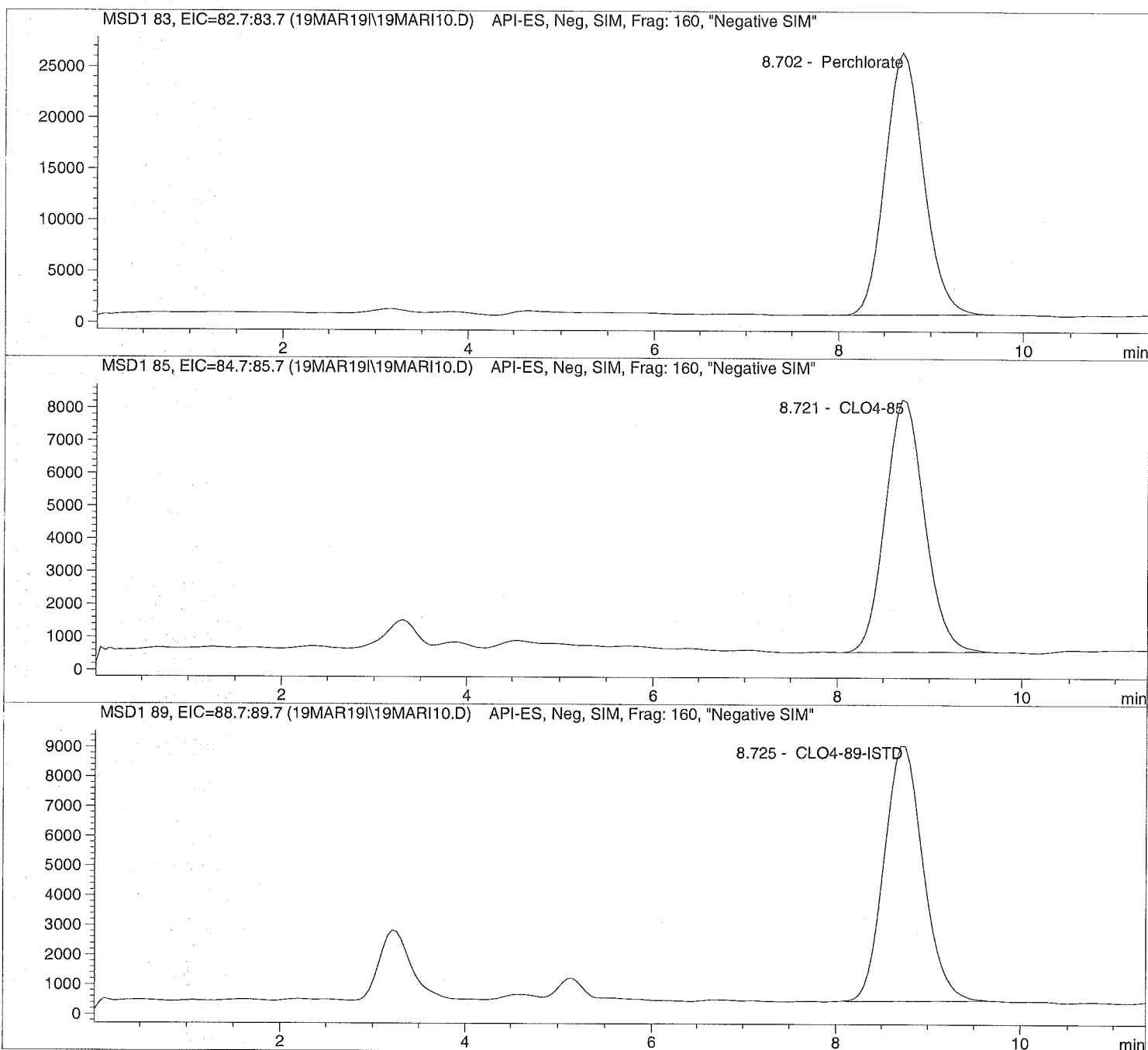
Sample Name: ICAL Verf@10ug/L

Injection Date: 3/19/2019 11:12:42  
Sample Name: ICAL Verf@10ug/L  
Acq Operator: TNB

Seq Line: 10  
Location: Vial 80  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D      Sample Name: ICAL Verf@10ug/L

```

=====
Injection Date: 3/19/2019 11:12:42      Seq Line:            10
Sample Name:    ICAL Verf@10ug/L        Location:            Vial 80
Acq Operator:   TNB                     Inj. No.:            1
                                         Inj. Vol.:            30 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:            Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:          1.000000
Dilution:            1.000000
Sample Amount:        10.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

## **Unmodified**



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI03.D

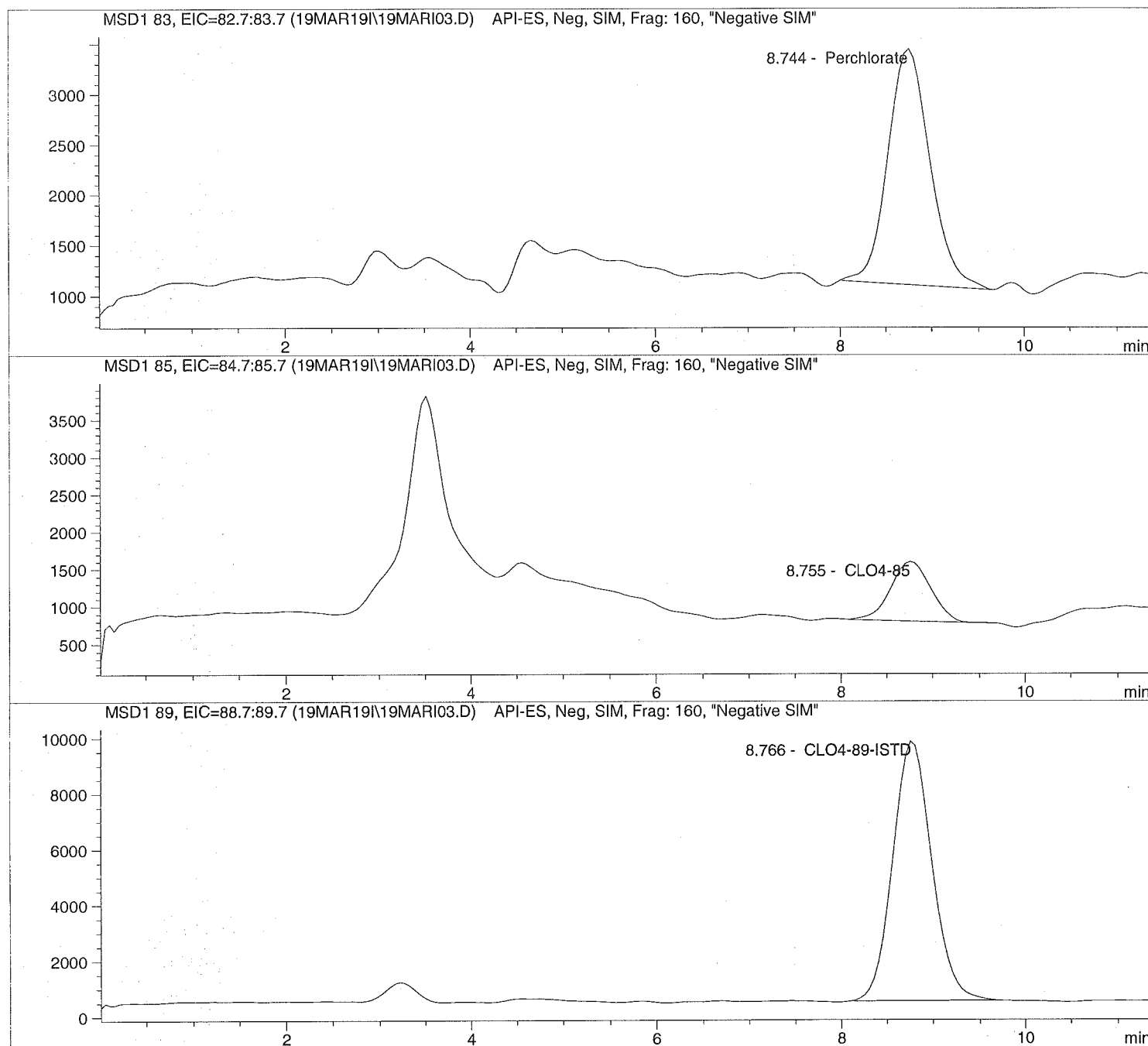
Sample Name: CLO4@ 1.0ug/L

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



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

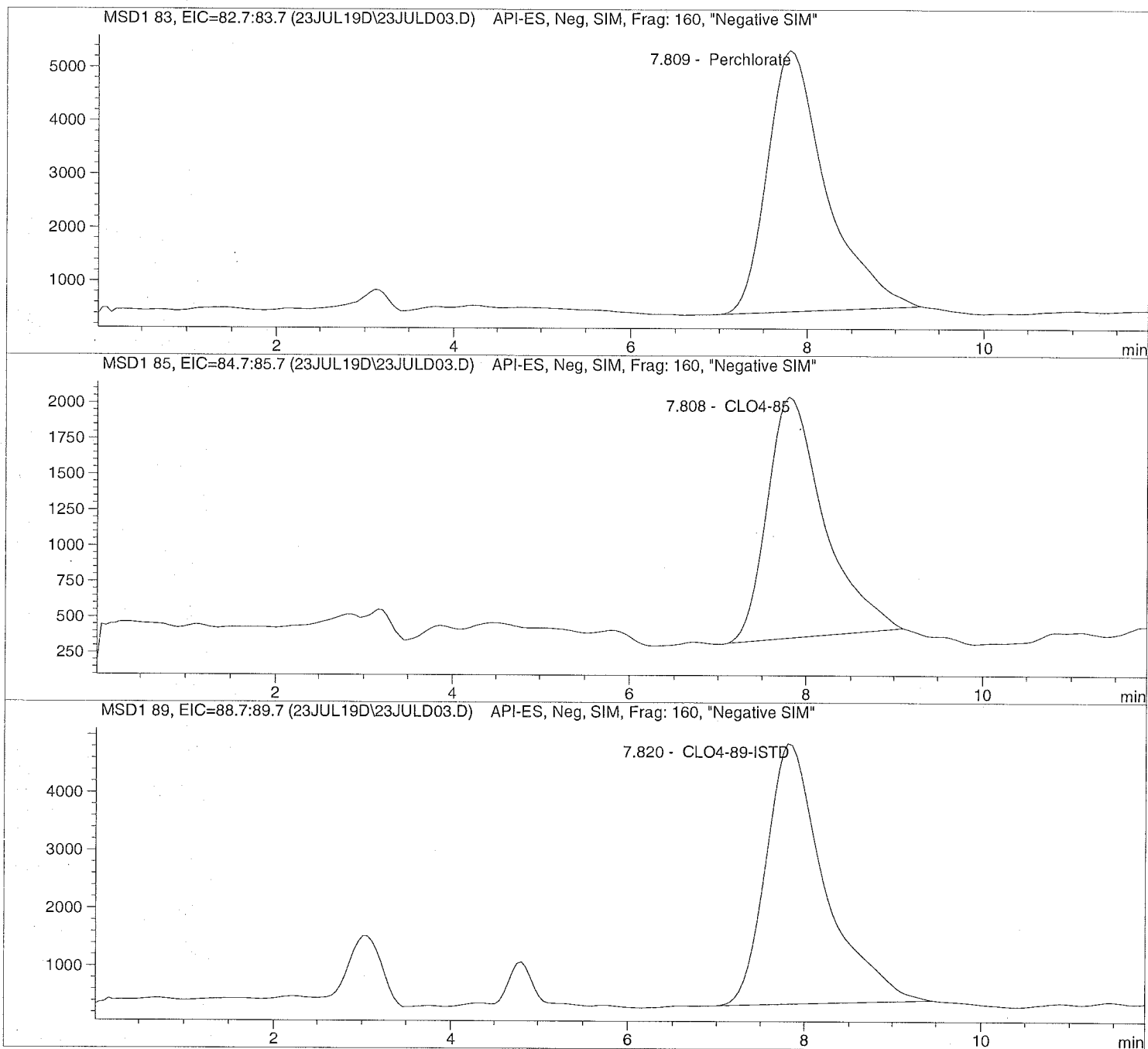
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD03.D Sample Name: 664921 ICS@4.0

```
=====
Injection Date: 7/23/2019 09:01:39      Seq Line:      3
Sample Name:    664921 ICS@4.0          Location:      Vial 73
Acq Operator:  TNB                      Inj. No.:     1
                                           Inj. Vol.:    35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
```

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD03.D Sample Name: 664921 ICS@4.0

```

=====
Injection Date: 7/23/2019 09:01:39      Seq Line:      3
Sample Name:    664921 ICS@4.0          Location:      Vial 73
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:    1.000000
Dilution:      1.000000
Sample Amount: 4.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.809	PBA	226823.0	3.5980	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.808	PBA	75774.9	3.8868	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.820	PBA	208873.6	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

July 24, 2019

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

Work Order: **HS19070432**

Laboratory Results for: **Groundwater Treatment Plant Bi-Weekly Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on Jul 10, 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval scribble.

Generated By: JUMOKE.LAWAL  
RJ Modashia  
Project Manager

ALS Houston, US

Date: 24-Jul-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**Work Order:** HS19070432

---

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19070432-01	LH18/24-SP650_070919	Water		09-Jul-2019 14:00	10-Jul-2019 08:57	<input type="checkbox"/>
HS19070432-02	Trip Blank	Water		09-Jul-2019 00:00	10-Jul-2019 08:57	<input type="checkbox"/>

---

**ALS Houston, US**

Date: 24-Jul-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**Work Order:** HS19070432

---

**CASE NARRATIVE**

---

**GCMS Volatiles by Method SW8260****Batch ID: R342382**

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

**WetChemistry by Method SW9056****Batch ID: R342990**

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

## ALS Houston, US

Date: 24-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_070919  
 Collection Date: 09-Jul-2019 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19070432  
 Lab ID:HS19070432-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>							Analyst: PC
<b>8260C</b>									
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	12-Jul-2019 11:33	
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	12-Jul-2019 11:33	
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	12-Jul-2019 11:33	
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	12-Jul-2019 11:33	
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	12-Jul-2019 11:33	
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	

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



## ALS Houston, US

Date: 24-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Bi-Weekly Samples  
 Sample ID: LH18/24-SP650\_070919  
 Collection Date: 09-Jul-2019 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19070432  
 Lab ID:HS19070432-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
<b>cis-1,2-Dichloroethene</b>	<b>2.0</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	12-Jul-2019 11:33	
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	12-Jul-2019 11:33	
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	12-Jul-2019 11:33	
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	12-Jul-2019 11:33	
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
<b>Trichloroethene</b>	<b>1.0</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	12-Jul-2019 11:33	
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:33	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>95.2</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	1	12-Jul-2019 11:33	
<i>Surr: 4-Bromofluorobenzene</i>	<i>101</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	1	12-Jul-2019 11:33	
<i>Surr: Dibromofluoromethane</i>	<i>95.2</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	1	12-Jul-2019 11:33	
<i>Surr: Toluene-d8</i>	<i>105</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	1	12-Jul-2019 11:33	
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>							Analyst: KMU
<b>Chloride</b>	<b>292</b>		<b>2.00</b>	<b>5.00</b>	<b>5.00</b>	<b>mg/L</b>	10	24-Jul-2019 14:42	
<b>Sulfate</b>	<b>29.9</b>		<b>2.00</b>	<b>5.00</b>	<b>5.00</b>	<b>mg/L</b>	10	24-Jul-2019 14:42	

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

## ALS Houston, US

Date: 24-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 09-Jul-2019 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19070432  
 Lab ID:HS19070432-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						
<b>8260C</b>								Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:09
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	12-Jul-2019 11:09
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	12-Jul-2019 11:09
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:09
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	12-Jul-2019 11:09
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	12-Jul-2019 11:09
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	12-Jul-2019 11:09
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09

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

## ALS Houston, US

Date: 24-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Groundwater Treatment Plant Bi-Weekly Samples  
 Sample ID: Trip Blank  
 Collection Date: 09-Jul-2019 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19070432  
 Lab ID:HS19070432-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						
<b>8260C</b>								Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	12-Jul-2019 11:09
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	12-Jul-2019 11:09
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	12-Jul-2019 11:09
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	12-Jul-2019 11:09
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	12-Jul-2019 11:09
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	12-Jul-2019 11:09
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>99.9</i>			<i>0</i>	<i>81-118</i>	<i>%REC</i>	<i>1</i>	<i>12-Jul-2019 11:09</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>106</i>			<i>0</i>	<i>85-114</i>	<i>%REC</i>	<i>1</i>	<i>12-Jul-2019 11:09</i>
<i>Surr: Dibromofluoromethane</i>	<i>101</i>			<i>0</i>	<i>80-119</i>	<i>%REC</i>	<i>1</i>	<i>12-Jul-2019 11:09</i>
<i>Surr: Toluene-d8</i>	<i>111</i>			<i>0</i>	<i>89-112</i>	<i>%REC</i>	<i>1</i>	<i>12-Jul-2019 11:09</i>

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

ALS Houston, US

Date: 24-jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R342382 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS19070432-01	LH18/24-SP650_070919	09 Jul 2019 14:00			12 Jul 2019 11:33	1
HS19070432-02	Trip Blank	09 Jul 2019 00:00			12 Jul 2019 11:09	1
<b>Batch ID:</b> R342990 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> Water	
HS19070432-01	LH18/24-SP650_070919	09 Jul 2019 14:00			24 Jul 2019 14:42	10

ALS Houston, US

Date: 24-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

**QC BATCH REPORT**

Batch ID: R342382 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MBLK	Sample ID: VBLKW-190712	Units: UG/L			Analysis Date: 12-Jul-2019 10:45					
Client ID:	Run ID: VOA6_342382	SeqNo: 5165498	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	0.50	1.0								U
1,1,1-Trichloroethane	0.50	1.0								U
1,1,2,2-Tetrachloroethane	0.50	1.0								U
1,1,2-Trichloroethane	0.50	1.0								U
1,1-Dichloroethane	0.50	1.0								U
1,1-Dichloroethene	0.50	1.0								U
1,1-Dichloropropene	0.50	1.0								U
1,2,3-Trichlorobenzene	0.50	1.0								U
1,2,3-Trichloropropane	0.50	1.0								U
1,2,4-Trichlorobenzene	0.50	1.0								U
1,2,4-Trimethylbenzene	0.50	1.0								U
1,2-Dibromo-3-chloropropane	0.50	1.0								U
1,2-Dibromoethane	0.50	1.0								U
1,2-Dichlorobenzene	0.50	1.0								U
1,2-Dichloroethane	0.50	1.0								U
1,2-Dichloropropane	0.50	1.0								U
1,3,5-Trimethylbenzene	0.50	1.0								U
1,3-Dichlorobenzene	0.50	1.0								U
1,3-Dichloropropane	0.50	1.0								U
1,4-Dichlorobenzene	0.50	1.0								U
2,2-Dichloropropane	0.50	1.0								U
2-Butanone	1.0	2.0								U
2-Chlorotoluene	0.50	1.0								U
2-Hexanone	1.0	2.0								U
4-Chlorotoluene	0.50	1.0								U
4-Isopropyltoluene	0.50	1.0								U
4-Methyl-2-pentanone	1.0	2.0								U
Acetone	1.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U
Bromomethane	0.50	1.0								U

## ALS Houston, US

Date: 24-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

## QC BATCH REPORT

Batch ID: R342382 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MBLK	Sample ID: VBLKW-190712	Units: UG/L			Analysis Date: 12-Jul-2019 10:45					
Client ID:	Run ID: VOA6_342382	SeqNo: 5165498		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	1.0	2.0								U
Carbon tetrachloride	0.50	1.0								U
Chlorobenzene	0.50	1.0								U
Chloroethane	0.50	1.0								U
Chloroform	0.50	1.0								U
Chloromethane	0.50	1.0								U
cis-1,2-Dichloroethene	0.50	1.0								U
cis-1,3-Dichloropropene	0.50	1.0								U
Dibromochloromethane	0.50	1.0								U
Dibromomethane	0.50	1.0								U
Dichlorodifluoromethane	0.50	1.0								U
Ethylbenzene	0.50	1.0								U
Hexachlorobutadiene	1.0	1.0								U
Isopropylbenzene	0.50	1.0								U
m,p-Xylene	1.0	2.0								U
Methylene chloride	1.0	2.0								U
Naphthalene	0.50	1.0								U
n-Butylbenzene	0.50	1.0								U
n-Propylbenzene	0.50	1.0								U
o-Xylene	0.50	1.0								U
sec-Butylbenzene	0.50	1.0								U
Styrene	0.50	1.0								U
tert-Butylbenzene	0.50	1.0								U
Tetrachloroethene	0.50	1.0								U
Toluene	0.50	1.0								U
trans-1,2-Dichloroethene	0.50	1.0								U
trans-1,3-Dichloropropene	0.50	1.0								U
Trichloroethene	0.50	1.0								U
Trichlorofluoromethane	0.50	1.0								U
Vinyl chloride	0.50	1.0								U
Surr: 1,2-Dichloroethane-d4	45.81	1.0	50	0	91.6	81 - 118				
Surr: 4-Bromofluorobenzene	48.96	1.0	50	0	97.9	85 - 114				
Surr: Dibromofluoromethane	46.24	1.0	50	0	92.5	80 - 119				
Surr: Toluene-d8	50.72	1.0	50	0	101	89 - 112				

## ALS Houston, US

Date: 24-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

## QC BATCH REPORT

Batch ID: R342382 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS	Sample ID: VLCSW-190712	Units: UG/L			Analysis Date: 12-Jul-2019 09:57					
Client ID:	Run ID: VOA6_342382	SeqNo: 5165497	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	21.85	1.0	20	0	109	78 - 124				
1,1,1-Trichloroethane	20.29	1.0	20	0	101	74 - 131				
1,1,2,2-Tetrachloroethane	21.43	1.0	20	0	107	71 - 121				
1,1,2-Trichloroethane	21.06	1.0	20	0	105	80 - 119				
1,1-Dichloroethane	19.91	1.0	20	0	99.5	77 - 125				
1,1-Dichloroethene	19.99	1.0	20	0	99.9	71 - 131				
1,1-Dichloropropene	21.09	1.0	20	0	105	78 - 125				
1,2,3-Trichlorobenzene	24.5	1.0	20	0	122	69 - 129				
1,2,3-Trichloropropane	19.51	1.0	20	0	97.6	73 - 122				
1,2,4-Trichlorobenzene	23.4	1.0	20	0	117	69 - 130				
1,2,4-Trimethylbenzene	21.57	1.0	20	0	108	76 - 124				
1,2-Dibromo-3-chloropropane	21.43	1.0	20	0	107	62 - 128				
1,2-Dibromoethane	20.82	1.0	20	0	104	77 - 121				
1,2-Dichlorobenzene	21.45	1.0	20	0	107	80 - 119				
1,2-Dichloroethane	20.68	1.0	20	0	103	73 - 128				
1,2-Dichloropropane	21.15	1.0	20	0	106	78 - 122				
1,3,5-Trimethylbenzene	21.83	1.0	20	0	109	75 - 124				
1,3-Dichlorobenzene	22.09	1.0	20	0	110	80 - 119				
1,3-Dichloropropane	21.17	1.0	20	0	106	80 - 119				
1,4-Dichlorobenzene	20.92	1.0	20	0	105	79 - 118				
2,2-Dichloropropane	21.19	1.0	20	0	106	60 - 139				
2-Butanone	42.19	2.0	40	0	105	56 - 143				
2-Chlorotoluene	21.28	1.0	20	0	106	79 - 122				
2-Hexanone	41.88	2.0	40	0	105	57 - 139				
4-Chlorotoluene	20.95	1.0	20	0	105	78 - 122				
4-Isopropyltoluene	22.29	1.0	20	0	111	77 - 127				
4-Methyl-2-pentanone	41.45	2.0	40	0	104	67 - 130				
Acetone	48.13	2.0	40	0	120	39 - 160				
Benzene	21.21	1.0	20	0	106	79 - 120				
Bromobenzene	22.16	1.0	20	0	111	80 - 120				
Bromochloromethane	20.41	1.0	20	0	102	78 - 123				
Bromodichloromethane	21.45	1.0	20	0	107	79 - 125				
Bromoform	22.37	1.0	20	0	112	66 - 130				
Bromomethane	23.16	1.0	20	0	116	53 - 141				

## ALS Houston, US

Date: 24-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

## QC BATCH REPORT

Batch ID: R342382 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS	Sample ID: VLCSW-190712	Units: UG/L			Analysis Date: 12-Jul-2019 09:57					
Client ID:	Run ID: VOA6_342382	SeqNo: 5165497	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	40.51	2.0	40	0	101	64 - 133				
Carbon tetrachloride	21.03	1.0	20	0	105	72 - 136				
Chlorobenzene	21.03	1.0	20	0	105	82 - 118				
Chloroethane	19.48	1.0	20	0	97.4	60 - 138				
Chloroform	20.91	1.0	20	0	105	79 - 124				
Chloromethane	21.66	1.0	20	0	108	50 - 139				
cis-1,2-Dichloroethene	20	1.0	20	0	100.0	78 - 123				
cis-1,3-Dichloropropene	22.36	1.0	20	0	112	75 - 124				
Dibromochloromethane	21.95	1.0	20	0	110	74 - 126				
Dibromomethane	21.19	1.0	20	0	106	79 - 123				
Dichlorodifluoromethane	21.43	1.0	20	0	107	32 - 152				
Ethylbenzene	21.97	1.0	20	0	110	79 - 121				
Hexachlorobutadiene	26.01	1.0	20	0	130	66 - 134				
Isopropylbenzene	22.24	1.0	20	0	111	72 - 131				
m,p-Xylene	43.85	2.0	40	0	110	80 - 121				
Methylene chloride	19.35	2.0	20	0	96.7	74 - 124				
Naphthalene	21.65	1.0	20	0	108	61 - 128				
n-Butylbenzene	24	1.0	20	0	120	75 - 128				
n-Propylbenzene	21.86	1.0	20	0	109	76 - 126				
o-Xylene	21.39	1.0	20	0	107	78 - 122				
sec-Butylbenzene	22.27	1.0	20	0	111	77 - 126				
Styrene	21.91	1.0	20	0	110	78 - 123				
tert-Butylbenzene	22.09	1.0	20	0	110	78 - 124				
Tetrachloroethene	23.34	1.0	20	0	117	74 - 129				
Toluene	21.72	1.0	20	0	109	80 - 121				
trans-1,2-Dichloroethene	20.53	1.0	20	0	103	75 - 124				
trans-1,3-Dichloropropene	21.54	1.0	20	0	108	73 - 127				
Trichloroethene	21.81	1.0	20	0	109	79 - 123				
Trichlorofluoromethane	20.33	1.0	20	0	102	65 - 141				
Vinyl chloride	20.55	1.0	20	0	103	58 - 137				
Surr: 1,2-Dichloroethane-d4	49.91	1.0	50	0	99.8	81 - 118				
Surr: 4-Bromofluorobenzene	51.42	1.0	50	0	103	85 - 114				
Surr: Dibromofluoromethane	50.22	1.0	50	0	100	80 - 119				
Surr: Toluene-d8	51.03	1.0	50	0	102	89 - 112				



ALS Houston, US

Date: 24-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

**QC BATCH REPORT**

Batch ID: R342382 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS		Sample ID: HS19070432-01MS		Units: UG/L		Analysis Date: 12-Jul-2019 13:09				
Client ID: LH18/24-SP650_070919		Run ID: VOA6_342382		SeqNo: 5165503		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
1,1,1,2-Tetrachloroethane	18.54	1.0	20	0	92.7	78 - 124				
1,1,1-Trichloroethane	17.59	1.0	20	0	88.0	74 - 131				
1,1,2,2-Tetrachloroethane	18.02	1.0	20	0	90.1	71 - 121				
1,1,2-Trichloroethane	17.57	1.0	20	0	87.9	80 - 119				
1,1-Dichloroethane	16.67	1.0	20	0	83.3	77 - 125				
1,1-Dichloroethene	17.37	1.0	20	0	86.8	71 - 131				
1,1-Dichloropropene	18.31	1.0	20	0	91.6	78 - 125				
1,2,3-Trichlorobenzene	19.94	1.0	20	0	99.7	69 - 129				
1,2,3-Trichloropropane	16.31	1.0	20	0	81.5	73 - 122				
1,2,4-Trichlorobenzene	19.42	1.0	20	0	97.1	69 - 130				
1,2,4-Trimethylbenzene	19.24	1.0	20	0	96.2	76 - 124				
1,2-Dibromo-3-chloropropane	17.36	1.0	20	0	86.8	62 - 128				
1,2-Dibromoethane	17.82	1.0	20	0	89.1	77 - 121				
1,2-Dichlorobenzene	18.55	1.0	20	0	92.8	80 - 119				
1,2-Dichloroethane	18.25	1.0	20	0	91.3	73 - 128				
1,2-Dichloropropane	18.1	1.0	20	0	90.5	78 - 122				
1,3,5-Trimethylbenzene	19.58	1.0	20	0	97.9	75 - 124				
1,3-Dichlorobenzene	19.23	1.0	20	0	96.1	80 - 119				
1,3-Dichloropropane	17.61	1.0	20	0	88.1	80 - 119				
1,4-Dichlorobenzene	18.11	1.0	20	0	90.6	79 - 118				
2,2-Dichloropropane	17.92	1.0	20	0	89.6	60 - 139				
2-Butanone	32.74	2.0	40	0	81.9	56 - 143				
2-Chlorotoluene	18.8	1.0	20	0	94.0	79 - 122				
2-Hexanone	33.6	2.0	40	0	84.0	57 - 139				
4-Chlorotoluene	18.44	1.0	20	0	92.2	78 - 122				
4-Isopropyltoluene	20.31	1.0	20	0	102	77 - 127				
4-Methyl-2-pentanone	33.53	2.0	40	0	83.8	67 - 130				
Acetone	32.19	2.0	40	0	80.5	39 - 160				
Benzene	18.02	1.0	20	0	90.1	79 - 120				
Bromobenzene	18.84	1.0	20	0	94.2	80 - 120				
Bromochloromethane	16.5	1.0	20	0	82.5	78 - 123				
Bromodichloromethane	17.69	1.0	20	0	88.5	79 - 125				
Bromoform	18.38	1.0	20	0	91.9	66 - 130				
Bromomethane	16.88	1.0	20	0	84.4	53 - 141				

## ALS Houston, US

Date: 24-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

## QC BATCH REPORT

Batch ID: R342382 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS		Sample ID: HS19070432-01MS		Units: UG/L		Analysis Date: 12-Jul-2019 13:09				
Client ID: LH18/24-SP650_070919		Run ID: VOA6_342382		SeqNo: 5165503		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Carbon disulfide	37.62	2.0	40	0	94.0	64 - 133				
Carbon tetrachloride	18.36	1.0	20	0	91.8	72 - 136				
Chlorobenzene	18.47	1.0	20	0	92.3	82 - 118				
Chloroethane	14.08	1.0	20	0	70.4	60 - 138				
Chloroform	16.95	1.0	20	0	84.8	79 - 124				
Chloromethane	16.74	1.0	20	0	83.7	50 - 139				
cis-1,2-Dichloroethene	18.41	1.0	20	2.04	81.9	78 - 123				
cis-1,3-Dichloropropene	17.88	1.0	20	0	89.4	75 - 124				
Dibromochloromethane	18.13	1.0	20	0	90.7	74 - 126				
Dibromomethane	17.33	1.0	20	0	86.6	79 - 123				
Dichlorodifluoromethane	13.31	1.0	20	0	66.5	32 - 152				
Ethylbenzene	19.38	1.0	20	0	96.9	79 - 121				
Hexachlorobutadiene	22.2	1.0	20	0	111	66 - 134				
Isopropylbenzene	20.23	1.0	20	0	101	72 - 131				
m,p-Xylene	38.85	2.0	40	0	97.1	80 - 121				
Methylene chloride	16.18	2.0	20	0	80.9	74 - 124				
Naphthalene	17.77	1.0	20	0	88.8	61 - 128				
n-Butylbenzene	21.68	1.0	20	0	108	75 - 128				
n-Propylbenzene	19.75	1.0	20	0	98.8	76 - 126				
o-Xylene	18.67	1.0	20	0	93.3	78 - 122				
sec-Butylbenzene	20.36	1.0	20	0	102	77 - 126				
Styrene	18.82	1.0	20	0	94.1	78 - 123				
tert-Butylbenzene	20.21	1.0	20	0	101	78 - 124				
Tetrachloroethene	21.4	1.0	20	0	107	74 - 129				
Toluene	19.08	1.0	20	0	95.4	80 - 121				
trans-1,2-Dichloroethene	17.47	1.0	20	0	87.4	75 - 124				
trans-1,3-Dichloropropene	17.58	1.0	20	0	87.9	73 - 127				
Trichloroethene	19.35	1.0	20	1.011	91.7	79 - 123				
Trichlorofluoromethane	17.21	1.0	20	0	86.0	65 - 141				
Vinyl chloride	15.72	1.0	20	0	78.6	58 - 137				
Surr: 1,2-Dichloroethane-d4	48.59	1.0	50	0	97.2	81 - 118				
Surr: 4-Bromofluorobenzene	52.36	1.0	50	0	105	85 - 114				
Surr: Dibromofluoromethane	49.53	1.0	50	0	99.1	80 - 119				
Surr: Toluene-d8	53.58	1.0	50	0	107	89 - 112				

ALS Houston, US

Date: 24-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

**QC BATCH REPORT**

Batch ID: R342382 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD	Sample ID: HS19070432-01MSD	Units: UG/L			Analysis Date: 12-Jul-2019 13:33					
Client ID: LH18/24-SP650_070919	Run ID: VOA6_342382	SeqNo: 5165504	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	18.69	1.0	20	0	93.5	78 - 124	18.54	0.841	20	
1,1,1-Trichloroethane	17.68	1.0	20	0	88.4	74 - 131	17.59	0.515	20	
1,1,2,2-Tetrachloroethane	18.82	1.0	20	0	94.1	71 - 121	18.02	4.35	20	
1,1,2-Trichloroethane	18.34	1.0	20	0	91.7	80 - 119	17.57	4.29	20	
1,1-Dichloroethane	16.74	1.0	20	0	83.7	77 - 125	16.67	0.399	20	
1,1-Dichloroethene	17.28	1.0	20	0	86.4	71 - 131	17.37	0.52	20	
1,1-Dichloropropene	18.36	1.0	20	0	91.8	78 - 125	18.31	0.267	20	
1,2,3-Trichlorobenzene	19.58	1.0	20	0	97.9	69 - 129	19.94	1.79	20	
1,2,3-Trichloropropane	16.74	1.0	20	0	83.7	73 - 122	16.31	2.61	20	
1,2,4-Trichlorobenzene	19.51	1.0	20	0	97.5	69 - 130	19.42	0.463	20	
1,2,4-Trimethylbenzene	19.48	1.0	20	0	97.4	76 - 124	19.24	1.22	20	
1,2-Dibromo-3-chloropropane	18.49	1.0	20	0	92.4	62 - 128	17.36	6.28	20	
1,2-Dibromoethane	18.14	1.0	20	0	90.7	77 - 121	17.82	1.8	20	
1,2-Dichlorobenzene	19.09	1.0	20	0	95.5	80 - 119	18.55	2.88	20	
1,2-Dichloroethane	18.32	1.0	20	0	91.6	73 - 128	18.25	0.372	20	
1,2-Dichloropropane	18.38	1.0	20	0	91.9	78 - 122	18.1	1.58	20	
1,3,5-Trimethylbenzene	19.41	1.0	20	0	97.0	75 - 124	19.58	0.893	20	
1,3-Dichlorobenzene	19.36	1.0	20	0	96.8	80 - 119	19.23	0.683	20	
1,3-Dichloropropane	18.1	1.0	20	0	90.5	80 - 119	17.61	2.74	20	
1,4-Dichlorobenzene	18.51	1.0	20	0	92.6	79 - 118	18.11	2.19	20	
2,2-Dichloropropane	17.95	1.0	20	0	89.7	60 - 139	17.92	0.168	20	
2-Butanone	35.19	2.0	40	0	88.0	56 - 143	32.74	7.21	20	
2-Chlorotoluene	18.5	1.0	20	0	92.5	79 - 122	18.8	1.63	20	
2-Hexanone	35.93	2.0	40	0	89.8	57 - 139	33.6	6.7	20	
4-Chlorotoluene	18.41	1.0	20	0	92.0	78 - 122	18.44	0.194	20	
4-Isopropyltoluene	20.26	1.0	20	0	101	77 - 127	20.31	0.241	20	
4-Methyl-2-pentanone	36.38	2.0	40	0	91.0	67 - 130	33.53	8.17	20	
Acetone	34.57	2.0	40	0	86.4	39 - 160	32.19	7.14	20	
Benzene	18.19	1.0	20	0	90.9	79 - 120	18.02	0.924	20	
Bromobenzene	18.99	1.0	20	0	94.9	80 - 120	18.84	0.808	20	
Bromochloromethane	16.89	1.0	20	0	84.5	78 - 123	16.5	2.35	20	
Bromodichloromethane	18.35	1.0	20	0	91.8	79 - 125	17.69	3.66	20	
Bromoform	18.85	1.0	20	0	94.2	66 - 130	18.38	2.5	20	
Bromomethane	16.04	1.0	20	0	80.2	53 - 141	16.88	5.1	20	

ALS Houston, US

Date: 24-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

**QC BATCH REPORT**

Batch ID: R342382 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD	Sample ID: HS19070432-01MSD	Units: UG/L			Analysis Date: 12-Jul-2019 13:33					
Client ID: LH18/24-SP650_070919	Run ID: VOA6_342382	SeqNo: 5165504	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	37.77	2.0	40	0	94.4	64 - 133	37.62	0.42	20	
Carbon tetrachloride	18.13	1.0	20	0	90.7	72 - 136	18.36	1.23	20	
Chlorobenzene	18.33	1.0	20	0	91.6	82 - 118	18.47	0.753	20	
Chloroethane	14.59	1.0	20	0	72.9	60 - 138	14.08	3.56	20	
Chloroform	17.27	1.0	20	0	86.3	79 - 124	16.95	1.85	20	
Chloromethane	16.3	1.0	20	0	81.5	50 - 139	16.74	2.64	20	
cis-1,2-Dichloroethene	18.89	1.0	20	2.04	84.3	78 - 123	18.41	2.58	20	
cis-1,3-Dichloropropene	18.3	1.0	20	0	91.5	75 - 124	17.88	2.35	20	
Dibromochloromethane	18.51	1.0	20	0	92.5	74 - 126	18.13	2.05	20	
Dibromomethane	17.94	1.0	20	0	89.7	79 - 123	17.33	3.47	20	
Dichlorodifluoromethane	13.2	1.0	20	0	66.0	32 - 152	13.31	0.865	20	
Ethylbenzene	19.39	1.0	20	0	97.0	79 - 121	19.38	0.0795	20	
Hexachlorobutadiene	22.58	1.0	20	0	113	66 - 134	22.2	1.68	20	
Isopropylbenzene	20.01	1.0	20	0	100	72 - 131	20.23	1.05	20	
m,p-Xylene	38.39	2.0	40	0	96.0	80 - 121	38.85	1.2	20	
Methylene chloride	16.43	2.0	20	0	82.2	74 - 124	16.18	1.54	20	
Naphthalene	18.22	1.0	20	0	91.1	61 - 128	17.77	2.5	20	
n-Butylbenzene	22.02	1.0	20	0	110	75 - 128	21.68	1.54	20	
n-Propylbenzene	19.73	1.0	20	0	98.6	76 - 126	19.75	0.13	20	
o-Xylene	18.65	1.0	20	0	93.3	78 - 122	18.67	0.0861	20	
sec-Butylbenzene	20.81	1.0	20	0	104	77 - 126	20.36	2.2	20	
Styrene	19.04	1.0	20	0	95.2	78 - 123	18.82	1.2	20	
tert-Butylbenzene	20.09	1.0	20	0	100	78 - 124	20.21	0.61	20	
Tetrachloroethene	21.6	1.0	20	0	108	74 - 129	21.4	0.944	20	
Toluene	18.92	1.0	20	0	94.6	80 - 121	19.08	0.834	20	
trans-1,2-Dichloroethene	17.24	1.0	20	0	86.2	75 - 124	17.47	1.34	20	
trans-1,3-Dichloropropene	18.09	1.0	20	0	90.5	73 - 127	17.58	2.89	20	
Trichloroethene	19.47	1.0	20	1.011	92.3	79 - 123	19.35	0.624	20	
Trichlorofluoromethane	16.91	1.0	20	0	84.5	65 - 141	17.21	1.78	20	
Vinyl chloride	15.58	1.0	20	0	77.9	58 - 137	15.72	0.912	20	
Surr: 1,2-Dichloroethane-d4	50.54	1.0	50	0	101	81 - 118	48.59	3.92	20	
Surr: 4-Bromofluorobenzene	53.09	1.0	50	0	106	85 - 114	52.36	1.37	20	
Surr: Dibromofluoromethane	50.62	1.0	50	0	101	80 - 119	49.53	2.18	20	
Surr: Toluene-d8	53.54	1.0	50	0	107	89 - 112	53.58	0.09	20	

ALS Houston, US

Date: 24-Jul-19

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**Client:** Bhat Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

**QC BATCH REPORT****Batch ID:** R342382 ( 0 )**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch:

HS19070432-01	HS19070432-02
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ALS Houston, US

Date: 24-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

**QC BATCH REPORT**

Batch ID: R342990 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A						
<b>MBLK</b>	Sample ID: <b>WBLKW2-072319</b>	Units: <b>mg/L</b>			Analysis Date: <b>24-Jul-2019 00:02</b>					
Client ID:	Run ID: <b>ICS-Integrion_342990</b>	SeqNo: <b>5179066</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	0.500	0.500							U	
Sulfate	0.500	0.500							U	
<b>LCS</b>	Sample ID: <b>WLCSW2-072319</b>	Units: <b>mg/L</b>			Analysis Date: <b>24-Jul-2019 00:19</b>					
Client ID:	Run ID: <b>ICS-Integrion_342990</b>	SeqNo: <b>5179067</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	19.09	0.500	20	0	95.4	80 - 120				
Sulfate	19.19	0.500	20	0	96.0	80 - 120				
<b>LCSD</b>	Sample ID: <b>WLCSDW2-072319</b>	Units: <b>mg/L</b>			Analysis Date: <b>24-Jul-2019 00:37</b>					
Client ID:	Run ID: <b>ICS-Integrion_342990</b>	SeqNo: <b>5179068</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	19.33	0.500	20	0	96.7	80 - 120	19.09	1.29	20	
Sulfate	19.56	0.500	20	0	97.8	80 - 120	19.19	1.89	20	
<b>MS</b>	Sample ID: <b>HS19070519-01MS</b>	Units: <b>mg/L</b>			Analysis Date: <b>24-Jul-2019 05:19</b>					
Client ID:	Run ID: <b>ICS-Integrion_342990</b>	SeqNo: <b>5179077</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	39.89	0.500	10	30.82	90.7	80 - 120				
Sulfate	68.39	0.500	10	59.65	87.4	80 - 120			O	
<b>MS</b>	Sample ID: <b>HS19070517-05MS</b>	Units: <b>mg/L</b>			Analysis Date: <b>24-Jul-2019 01:47</b>					
Client ID:	Run ID: <b>ICS-Integrion_342990</b>	SeqNo: <b>5179072</b>		PrepDate:			DF: <b>500</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	12660	250	5000	7952	94.1	80 - 120				
Sulfate	6516	250	5000	1725	95.8	80 - 120				

ALS Houston, US

Date: 24-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

**QC BATCH REPORT**

Batch ID: R342990 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A						
<b>MSD</b>	Sample ID: <b>HS19070519-01MSD</b>	Units: <b>mg/L</b>			Analysis Date: <b>24-Jul-2019 05:36</b>					
Client ID:	Run ID: <b>ICS-Integrion_342990</b>	SeqNo: <b>5179078</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	39.72	0.500	10	30.82	89.0	80 - 120	39.89	0.41	20	
Sulfate	67.69	0.500	10	59.65	80.4	80 - 120	68.39	1.03	20	O
<b>MSD</b>	Sample ID: <b>HS19070517-05MSD</b>	Units: <b>mg/L</b>			Analysis Date: <b>24-Jul-2019 02:05</b>					
Client ID:	Run ID: <b>ICS-Integrion_342990</b>	SeqNo: <b>5179073</b>		PrepDate:			DF: <b>500</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	12560	250	5000	7952	92.2	80 - 120	12660	0.785	20	
Sulfate	6432	250	5000	1725	94.1	80 - 120	6516	1.3	20	

The following samples were analyzed in this batch: HS19070432-01

**ALS Houston, US**

Date: 24-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Groundwater Treatment Plant Bi-Weekly Samples  
**WorkOrder:** HS19070432

**QUALIFIERS,  
ACRONYMS, UNITS**

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

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

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter



---

**CERTIFICATIONS, ACCREDITATIONS & LICENSES**

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<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

**Sample Receipt Checklist**

Client Name: Bhate Environmental  
 Work Order: HS19070432

Date/Time Received: **10-Jul-2019 08:57**  
 Received by: **NDR**

Checklist completed by: Raegen Giga 10-Jul-2019  
 eSignature Date

Reviewed by: RJ Modashia 10-Jul-2019  
 eSignature Date

Matrices: **water**

Carrier name: **FedEx Priority Overnight**

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

Temperature(s)/Thermometer(s): 

1.1c uc/c	IR 11
-----------	-------

Cooler(s)/Kit(s): 

45024
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Date/Time sample(s) sent to storage: 

07/10/2019 11:55
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Water - VOA vials have zero headspace? Yes  No  No VOA vials submitted

Water - pH acceptable upon receipt? Yes  No  N/A

pH adjusted? Yes  No  N/A

pH adjusted by: 

--

Login Notes:

Client Contacted: \_\_\_\_\_ Date Contacted: \_\_\_\_\_ Person Contacted: \_\_\_\_\_  
 Contacted By: \_\_\_\_\_ Regarding: \_\_\_\_\_

Comments: 

--

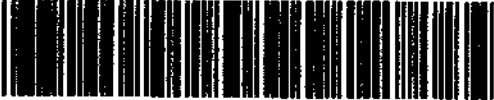
Corrective Action: 

--

**CHAIN OF CUSTODY**

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

Page 1 of 1

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b>  NWO1312.0150.0 16.0001			<b>Analyses</b>										<b>HS19070432</b> Bhate Environmental Associates, Inc. Groundwater Treatment Plant Bi-Weekly Samples 					
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT BI-WEEKLY SAMPLES</b>						CHLORIDE, SULFATE  VOC															
<b>Prepared By:</b>  Scott Beesinger			<b>P.O Number</b>																		
<b>Field Sample I.D.</b>		<b>Sample Matrix</b>		<b>Date / Time</b>		<b>MS / MSD</b>	<b>No. OF CONTAINERS</b>	<b>VOC</b>													
LH18/24-SP650_070919		Water		07/09/19 / 14:00		3	3												HCL		
LH18/24-SP650_070919		Water		07/09/19 / 14:00		1		1											NONE		
Trip Blank		Water		07/09/19		2	2												HCL		
<b>Additional Remarks: STANDARD TAT ON ALL PARAMETERS.</b>																					
<b>Relinquished By:</b> <i>Scott Beesinger</i>		<b>Date</b> 07/09/19	<b>Time</b> 14:30	<b>Received By:</b> <i>RL</i>		<b>Date</b> 7/10/19	<b>Time</b> 08:57	<b>Relinquished By:</b>			<b>Date</b>	<b>Time</b>	<b>Received By:</b>			<b>Date</b>	<b>Time</b>				
<b>9 For Lab Use Only</b>																					
<b>Received At Lab By:</b>		<b>Date</b>	<b>Time</b>	<b>Airbill No.</b>		<b>Opened By:</b>			<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>								
<b>Remarks</b>																					

(Word) S:\1-ees\Forms\Chain of Custody - BiWeekly

45024  
Temp all 1.1  
IL # 11  
SL-0

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

Date: 7/9  
 Name: Sco  
 Company: S

**CUSTODY SEAL**

Time: 1430  
 Name: H Bessinger  
 Date: 7/10/19

By: R9  
 Date: 7/10/19

FedEx  
 4809 7834 3332

**AB SGRA**

WED - 10 JUL 10:30A  
 PRIORITY OVERNIGHT

77099  
 TX-US  
 IAH



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

July 26, 2019

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

Work Order: **HS19070822**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia,

ALS Environmental received 1 sample(s) on Jul 17, 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval scribble.

Generated By: DAYNA.FISHER  
RJ Modashia  
Project Manager

ALS Houston, US

Date: 26-jul-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19070822

---

**SAMPLE SUMMARY**

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Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19070822-01	LH18/24-SP140_071619	Water		16-Jul-2019 14:00	17-Jul-2019 08:56	<input type="checkbox"/>

---

**ALS Houston, US**

Date: 26-Jul-19

**Client:** Bhate Environmental Associates, Inc.**CASE NARRATIVE****Project:** Longhorn GW Treatment Plant**Work Order:**

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**Work Order Comments**

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

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**Metals by Method SW6020****Batch ID: 143326**

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

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**WetChemistry by Method SW7196****Batch ID: R342587**

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

## ALS Houston, US

Date: 26-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP140\_071619  
 Collection Date: 16-Jul-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19070822  
 Lab ID:HS19070822-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>METALS BY ICPMS BY SW6020A</b>	<b>Method:SW6020</b>				Prep:SW3010A / 24-Jul-2019		Analyst: JHD	
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	25-Jul-2019 12:38
Silver	0.00250	U	0.000200	0.00250	0.00500	mg/L	1	25-Jul-2019 12:38
<b>HEXAVALENT CHROMIUM BY SW7196A</b>	<b>Method:SW7196</b>						Analyst: MZD	
Chromium, Hexavalent	0.0100	U	0.00600	0.0100	0.0100	mg/L	1	17-Jul-2019 11:56
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>	<b>Method:NA</b>						Analyst: SUB	
Subcontract Analysis	See Attached		0	0		NA	1	26-Jul-2019 11:05



**WEIGHT LOG**

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070822

**Batch ID:** 143326      **Method:** METALS BY ICPMS BY SW6020A      **Prep:** 3010A

SampleID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19070822-01	1	10	10 (mL)	1

ALS Houston, US

Date: 26-jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070822

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> 143326 ( 0 )		<b>Test Name :</b> METALS BY ICPMS BY SW6020A			<b>Matrix:</b> Water	
HS19070822-01	LH18/24-SP140_071619	16 Jul 2019 14:00		24 Jul 2019 09:30	25 Jul 2019 12:38	1
<b>Batch ID:</b> R342587 ( 0 )		<b>Test Name :</b> HEXAVALENT CHROMIUM BY SW7196A			<b>Matrix:</b> Water	
HS19070822-01	LH18/24-SP140_071619	16 Jul 2019 14:00			17 Jul 2019 11:56	1
<b>Batch ID:</b> R343090 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS19070822-01	LH18/24-SP140_071619	16 Jul 2019 14:00			26 Jul 2019 11:05	1

ALS Houston, US

Date: 26-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070822

**QC BATCH REPORT**

Batch ID: 143326 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A						
<b>MBLK</b>	Sample ID: <b>MBLK-143326</b>	Units: <b>mg/L</b>		Analysis Date: <b>25-Jul-2019 12:17</b>						
Client ID:	Run ID: <b>ICPMS05_343031</b>	SeqNo: <b>5180874</b>		PrepDate: <b>24-Jul-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.00250	0.00500								U
Silver	0.00250	0.00500								U
<b>LCS</b>	Sample ID: <b>LCS-143326</b>	Units: <b>mg/L</b>		Analysis Date: <b>25-Jul-2019 12:20</b>						
Client ID:	Run ID: <b>ICPMS05_343031</b>	SeqNo: <b>5180875</b>		PrepDate: <b>24-Jul-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.05187	0.00500	0.05	0	104	80 - 120				
Silver	0.0515	0.00500	0.05	0	103	85 - 116				
<b>MS</b>	Sample ID: <b>HS19070622-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>25-Jul-2019 12:27</b>						
Client ID:	Run ID: <b>ICPMS05_343031</b>	SeqNo: <b>5180878</b>		PrepDate: <b>24-Jul-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.05084	0.00500	0.05	0.001273	99.1	80 - 120				
Silver	0.04792	0.00500	0.05	0.000012	95.8	85 - 116				
<b>MSD</b>	Sample ID: <b>HS19070622-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>25-Jul-2019 15:43</b>						
Client ID:	Run ID: <b>ICPMS05_343031</b>	SeqNo: <b>5181045</b>		PrepDate: <b>24-Jul-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.05239	0.00500	0.05	0.001273	102	80 - 120	0.05084	3	20	
Silver	0.05214	0.00500	0.05	0	104	85 - 116	0.04792	8.44	20	
<b>PDS</b>	Sample ID: <b>HS19070622-01PDS</b>	Units: <b>mg/L</b>		Analysis Date: <b>25-Jul-2019 12:31</b>						
Client ID:	Run ID: <b>ICPMS05_343031</b>	SeqNo: <b>5180880</b>		PrepDate: <b>24-Jul-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Selenium	0.09668	0.00500	0.1	0.001273	95.4	80 - 120				
Silver	0.09841	0.00500	0.1	0.000012	98.4	80 - 120				

ALS Houston, US

Date: 26-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070822

**QC BATCH REPORT**

Batch ID: 143326 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A						
SD	Sample ID: HS19070622-01SD	Units: mg/L			Analysis Date: 25-Jul-2019 12:24					
Client ID:	Run ID: ICPMS05_343031	SeqNo: 5180877	PrepDate: 24-Jul-2019	DF: 5						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	Limit	Qual
Selenium	0.0125	0.0250					0.001273	0	10	U
Silver	0.0125	0.0250					0.000012	0	10	U

The following samples were analyzed in this batch:

ALS Houston, US

Date: 26-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070822

**QC BATCH REPORT**

Batch ID: R342587 ( 0 )		Instrument: UV-2450		Method: HEXAVALENT CHROMIUM BY SW7196A						
<b>MBLK</b>	Sample ID: <b>MBLK-342587</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Jul-2019 11:56</b>						
Client ID:		Run ID: <b>UV-2450_342587</b>	SeqNo: <b>5170101</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
Chromium, Hexavalent	0.0100	0.0100							U	
<b>LCS</b>	Sample ID: <b>LCS-342587</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Jul-2019 11:56</b>						
Client ID:		Run ID: <b>UV-2450_342587</b>	SeqNo: <b>5170102</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
Chromium, Hexavalent	0.24	0.0100	0.25	0	96.0	90 - 111				
<b>MS</b>	Sample ID: <b>HS19070822-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Jul-2019 11:56</b>						
Client ID: <b>LH18/24-SP140_071619</b>		Run ID: <b>UV-2450_342587</b>	SeqNo: <b>5170103</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
Chromium, Hexavalent	0.239	0.0100	0.25	0.002	94.8	90 - 111				
<b>MSD</b>	Sample ID: <b>HS19070822-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Jul-2019 11:56</b>						
Client ID: <b>LH18/24-SP140_071619</b>		Run ID: <b>UV-2450_342587</b>	SeqNo: <b>5170104</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
Chromium, Hexavalent	0.239	0.0100	0.25	0.002	94.8	90 - 111	0.239	0	20	

The following samples were analyzed in this batch: HS19070822-01

**ALS Houston, US**

Date: 26-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070822

**QUALIFIERS,  
ACRONYMS, UNITS**

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

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

---

**CERTIFICATIONS, ACCREDITATIONS & LICENSES**

---

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

---

ALS Houston, US

Date: 26-jul-19

---

**Client:** Bhate Environmental Associates, Inc.**Project:** Longhorn GW Treatment Plant**Work Order:** HS19070822**SAMPLE TRACKING**

---

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19070822-01	LH18/24-SP140_071619	Login	17/07/2019 11:27:16	JML	Sub
HS19070822-01	LH18/24-SP140_071619	Login	17/07/2019 11:27:16	JML	WET273
HS19070822-01	LH18/24-SP140_071619	Login	17/07/2019 11:27:16	JML	MET032

---



**Sample Receipt Checklist**

Client Name: Bhate Environmental  
 Work Order: HS19070822

Date/Time Received: **17-Jul-2019 08:56**  
 Received by: **RPG**

Checklist completed by: Paresh M. Giga 17-Jul-2019  
 eSignature Date

Reviewed by: RJ Modashia 17-Jul-2019  
 eSignature 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): 1.5c U/C IR11  
 Cooler(s)/Kit(s): 43551  
 Date/Time sample(s) sent to storage: 7/17/19 11:45

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

pH adjusted by:


Login Notes:

Client Contacted: Date Contacted: Person Contacted:  
 Contacted By: Regarding:

Comments:

Corrective Action:



 <b>ALS Environmental</b> 10450 Stancilff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTOMER SEAL</b>		Seal Broken By:
	Date: 7/16/19	Time: 1430	[Signature]
	Name: Scott	[Signature]	Date: 7/18/10
	Company: [Signature]		

<b>FedEx</b> TRK# 4809 7834 3295 0227	WED 17 JUL 10:30A PRIORITY OVERNIGHT
<b>AB SGRA</b>	77099 TX-US IAH
	
<small>410 169785 16JUL19 060A 553C27A6F9/0C8A</small>	



## Case Narrative

**Method:** 6850

**Analysis:** Perchlorate

**Analysis SOP:** LC-MS-CLO4

**ALS WO ID(s):** 1920034; 1920122; 1920123;  
1920571; 1920572; 1920581

**Client:** ALS Laboratories (Houston, TX)

**Matrix:** Water

**ELMS Batch (HBN):** 2273 (244098)

**General Set Information:** There were eleven field samples in this Work Order. 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 <sup>18</sup>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 <sup>18</sup>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 1920122001 and 1920581001 were analyzed and reported from 1:100 dilutions. The reporting limits have been adjusted accordingly.

**Method QC data:** The method blank (LMB 664922) was less than 1/2 the CRDL. The recovery for the LCS (664923) was within acceptable parameters.



**MS/MSD Analysis:** MS/MSD was performed on sample 1920123002 (Client ID: HBW10\_071119). 4.0 $\mu$ l of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4. $\mu$ g/L.

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

**NC/CAR(s):** NA

**Sample Calculation:** Samples were reported in  $\mu$ g/L. Results were calculated in  $\mu$ g/L by the equation (A)x(B),

where: A = Analyte concentration from the standard curve ( $\mu$ g/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 – 664920) is reported from the analysis of the Laboratory Control Sample (LCS – 664923) at a level of 4.0 $\mu$ g/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) along with datafile 23JULD03.

<u>Thomas Bosch</u>	<u>July 25, 2019</u>
Analyst	Date



# ANALYTICAL REPORT

Report Date: July 25, 2019

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

Phone: 281 530-5656

E-mail: RJ.Modashia@ALSGlobal.com

Workorder: **34-1920581**

Project ID: 11792 071619

Purchase Order: 11792

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP140_071619	1920581001	07/16/19	07/18/19	11792



## ANALYTICAL REPORT

Workorder: 34-1920581

Client: ALS Environmental  
(Houston)

Project Manager: Kevin W. Griffiths

## Analytical Results

Sample ID: <b>LH18/24-SP140_071619</b>	Sampling Site: 11792	Collected: 07/16/2019				
Lab ID: 1920581001	Media: 125 mL Nalgene	Received: 07/18/2019				
Matrix: Water	Sampling Parameter: NA					
<b>Analysis Method - EPA 6850, DoD QSM</b>						
Preparation: Not Applicable	Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2274 (HBN: 244098) Analyzed: 07/23/2019 12:30	Instrument ID: LCMS04 Percent Solid: NA Report Basis: Wet				
<b>Analyte</b>	<b>Result (ug/L)</b>	<b>DL (ug/L)</b>	<b>LOD (ug/L)</b>	<b>LOQ (ug/L)</b>	<b>Dilution</b>	<b>Qual</b>
Perchlorate	6900	100	200	400	100	

## 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 07/25/2019 15:05	/S/ Stephen Brose 07/25/2019 16:18

## Laboratory Contact Information

ALS Environmental  
960 W Levoy Drive  
Salt Lake City, Utah 84123Phone: (801) 266-7700  
Email: als@alst.com  
Web: www.alst.com



## ANALYTICAL REPORT

Workorder: 34-1920581

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

**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

00950273

## Analysis Information

**Workorder:** 1920581

**Limits:** Client SOW/Contract Specified  
**Basis:** DoD QSM

**Preparation:** NA  
**Batch:** NA  
**Prepared By:** NA

**Analysis:** EPA 6850, DoD QSM  
**Batch:** ELMS/2274 (HBN: 244098)  
**Analyzed By:** Thomas Bosch

## Blank

<b>LMB:</b> 664922 <b>Analyzed:</b> 07/23/2019 09:15 <b>Units:</b> ug/L			
Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

## Laboratory Control Sample

<b>LCS:</b> 664923 <b>Analyzed:</b> 07/23/2019 08:47 <b>Dilution:</b> 1 <b>Units:</b> ug/L				
Analyte	Result	Target	% Rec	QC Limits
Perchlorate	4.24	4.00	106	78.8   123.8

## Matrix Spike - Matrix Spike Duplicate

<b>Sample:</b> 1920123002 <b>Analyzed:</b> 07/23/2019 10:11 <b>Dilution:</b> 1 <b>Units:</b> ug/L		<b>MS:</b> 664924 <b>Analyzed:</b> 07/23/2019 10:25 <b>Dilution:</b> 1 <b>Units:</b> ug/L				<b>MSD:</b> 664925 <b>Analyzed:</b> 07/23/2019 10:39 <b>Dilution:</b> 1 <b>Units:</b> ug/L			
Analyte	Result	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Perchlorate	ND	4.12	4	103	78.8   123.8	4.14	104	0.46	0.0   20.0

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

Analyst	Peer Review
/S/ Thomas Bosch 07/25/2019 15:11	/S/ Stephen Brose 07/25/2019 16:18

## Symbols and Definitions

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

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



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

1920581

18698/#2

### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11792

**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:**  
**Email:**

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS19070822  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19070822-01	LH18/24-SP140_071619	Water	16 Jul 2019 14:00
SUB_Perch-6850			25 Jul 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:

7/17/19 1800.

Received By:

*[Signature]*

Date/Time:

07/18/19 10:07

Cooler ID(s):

Temperature(s):

RIGHT SOLUTIONS | RIGHT PARTNER



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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: <u>ALS Houston</u>		Project/Task/Site: _____				
Date/Time of Receipt: <u>07-18-19 10:00</u>		Number of Coolers Received: <u>1</u>				
Condition of Coolers: <u>Acceptable</u> /Unacceptable		Temperature Control: <u>Present</u> /Not Included				
Cooler Custody Seals: <u>Present</u> /Absent/NA		Location Temp Taken: <u>Control</u> /Between Samples				
Container Custody Seals: <u>Present</u> /Absent/NA		Are all temperatures within project specific guidelines? Yes/No/NA				
Ice Present: <u>Yes</u> /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 <u>9776</u>	<u>2</u> °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By: Jamir V. Jassse T. Vantassel 07-18-19  
Signature Printed Name Date

CLIENT-RELATED INFORMATION

- |  |   |  |   |
|--|---|--|---|
| <input type="checkbox"/> Missing Cooler                  | <input type="checkbox"/> Missing Samples/Bottles          | <input type="checkbox"/> Incorrect Preservation    | <input type="checkbox"/> Insufficient Sample Volume |
| <input type="checkbox"/> Cooler Conditions               | <input type="checkbox"/> Broken/Leaking Samples           | <input type="checkbox"/> pH Criteria Not Met       | <input type="checkbox"/> Chain of Custody Problems  |
| <input type="checkbox"/> Missing Paperwork               | <input type="checkbox"/> Incorrect Bottle Type            | <input type="checkbox"/> Residual Chlorine Present | <input type="checkbox"/> Other:                     |
| <input type="checkbox"/> Missing/Incorrect Bottle Labels | <input type="checkbox"/> Cooler Temperatures Out of Range | <input type="checkbox"/> Head Space in Bottles     |   |

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES  NO

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: \_\_\_\_\_ Returned to Sample Receipt by: \_\_\_\_\_ Date: \_\_\_\_\_  
Printed Name Signature



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

Part # 150433-434 B172 EXP 02/20/14

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

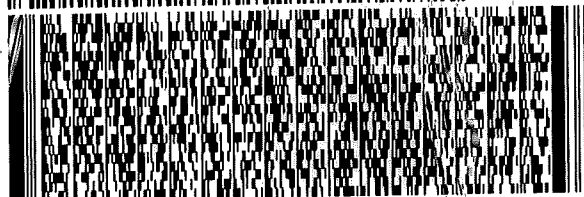
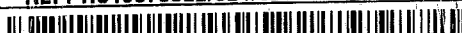
SHIP DATE: 17JUL19  
ACTWGT: 8.25 LB  
CAD: 300130/CAFE3211  
DIMS: 14x11x10 IN  
BILL THIRD PARTY

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

**SALT LAKE CITY UT 84123**

(801) 288-7700

REF: HS19070822/824/827 - RJ



**FedEx  
Express**



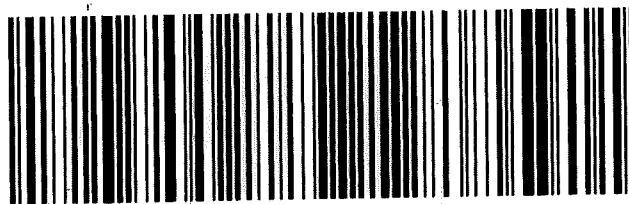
J18111306050104

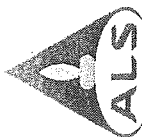
TRK# 4809 7835 9397  
0201

**THU - 18 JUL 3:00P  
STANDARD OVERNIGHT**

**AX BTFA**

**84123  
UT-US SLC**





# Batch Worklist

HBN: 244098



Instrument:

Status: WP

Created: 7/23/2019 08:01

Analyst: T. Bosch

Batch: ELMS/ 2274

Rule: EPA 6850, DoD QSM Water

- Workorder: 1920034 [ENV\_LVL4]
- Workorder: 1920122 [ENV\_LVL4]
- Workorder: 1920123 [ENV\_LVL4]
- Workorder: 1920571 [ENV\_LVL4]
- Workorder: 1920572 [ENV\_LVL4]
- Workorder: 1920581 [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	664919	CCV for HBN 244098 [ELMS/2274]				CCV	3		E685041C3Q	5311		7/25/2019	
2	664920	RLVS for HBN 244098 [ELMS/2274]				RLVS	3		E685041C3Q	5311		7/25/2019	
3	664921	ICS for HBN 244098 [ELMS/2274]				ICS	3		E6850...D3Q	5311		7/25/2019	
4	664922	LMB for HBN 244098 [ELMS/2274]				LMB	3		E6850Q413Q	5311		7/25/2019	
5	664923	LCS for HBN 244098 [ELMS/2274]				LCS	3		E6850Q413Q	5311		7/25/2019	
6	1920034001	LH18/24-SP650_070919_BIX Water				SAMPLE	3	1920034001-A	E6850Q41.3	5480	8/6/2019	7/25/2019	
7	1920122001	ICT 13A_071119				SAMPLE	3	1920122001-A	E6850Q41.3	5480	8/8/2019	7/26/2019	
8	1920123001	HBW7_071119				SAMPLE	3	1920123001-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
9	1920123002	HBW10_071119				SAMPLE	3	1920123002-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
10	664924	HBW10_071119(1920123002MS)				MS	3		E6850Q413Q	5311		7/25/2019	
11	664925	HBW10_071119(1920123002MSD)				MSD	3		E6850Q413Q	5311		7/25/2019	
12	1920123003	HBW1_071119				SAMPLE	3	1920123003-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
13	1920123004	GPW1_071119				SAMPLE	3	1920123004-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
14	1920123005	GPW1_071119_a				SAMPLE	3	1920123005-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
15	1920123006	GPW3_071119				SAMPLE	3	1920123006-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
16	664926	CCV for HBN 244098 [ELMS/2274]				CCV	3		E685041C3Q	5311		7/25/2019	
17	1920571001	LH18/24-SP650_071619-BIX				SAMPLE	3	1920571001-A	E6850Q41.3	5480	8/13/2019	7/31/2019	
18	1920572001	LH18/24-SP650_071619_BIX				SAMPLE	3	1920572001-A	E6850Q41.3	5480	8/13/2019	7/31/2019	
19	1920581001	LH18/24-SP140_071619				SAMPLE	3	1920581001-A	E6850Q41.3	5480	8/13/2019	7/31/2019	
20	664927	CCV for HBN 244098 [ELMS/2274]				CCV	3		E685041C3Q	5311		7/25/2019	



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Analytical Documentation**

ALS Work Order #'s & Sample #'s: 1920034 (001); 1920122 (001); 1920123 (001-06); 1920571 (001); 1920572 (001); 1920581 (001) ELMS Batch/HBN ID: 2274 (244098)  
 Prep Date: 07/19/2019 Analysis Date: 07/23/2019 Analyst: T. Bosch  
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**  
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\JUL\23JUL19D.s  
 Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

**SAMPLE PREPARATION/ANALYSIS:**

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

**REAGENTS:** Eluent A1: 95% ASTM Type II water (ALS)/ 5% ACN (B&J Lot AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).  
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

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

**CALIBRATION CURVE:** Used curve from 03/19/2019, sequence 19MARI9D.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: 8 Injection Volume: 35µL  
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

**FLOW GRADIENT:**

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

**QC DATA:** 4.0µL of QC Solution Horizon ID 47516 was used for LCS 664923; Target = 4.0µg/L. ASTM type II water was used for LMB 664922.

**MS/MSD:** The Matrix Spike and duplicate (MS/MSD) were performed on sample 1920123002 (Client ID: HBW10\_071119). 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 1920122001 and 1920581001 were analyzed and reported from 1:100 dilutions. The reporting limits have been adjusted accordingly.
- 2) All QC, Blank, CCV, and MS/MSD results were within method parameters.
- 3) Sample data can be viewed at two directories within the ALS system: \\ALS\TWS013\LCMS\LCMS04\2019\JUL\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\slstws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\244098-DoD-ALS-Hstn LCMS4 or through \\ALS\TWS013\DATAREVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 664920) is reported from the analysis of the Laboratory Control Sample (LCS – 664923) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03) along with datafile 23JUL03.



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

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

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDC: ELMS: 2274 HBN: 244098 1920034/1920122/1920123		
Sample Set IDs if Applicable: 1920571/1920572/1920581		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSS, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on OC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SB
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR#</u>	—	—
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB



## STANDARD REPORT

## Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850 WKG Std 100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	0.1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 INT

CLO4 INT		Description - 6850 Intermdt AccStd 10.ug/mL			
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



## STANDARD REPORT

## Working Standard - CLO4 QC WRK

CLO4 QC WRK		Description - 6850 QC WKG STD 100ug/L			
Standard: 47516		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC WRK 100.ug/L	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL	
Standard: 36748		Created By: Thomas Bosch	Amount: 100 mL
MFG: Ultra Scientific		Create Date: 05/11/2017 01:05PM	Expires: 03/31/2020
MFG Lot: CP-0860			Usable: Yes
Part ID: ICC-013			Lab Lot: CLO4 QC STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL





## STANDARD REPORT

## Constituent

## Working Standard - CLO4 QC INT

CLO4 QC INT			Description - 6850 QC Intrmdt Std-QC 10ug/mL		
Standard: 47515		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC INT 10.ug/mL	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020



## STANDARD REPORT

## Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730	Created By: Thomas Bosch	Amount: 25 mL			
MFG: ALS/SLC	Create Date: 09/20/2018 09:09AM	Expires: 09/20/2019			
MFG Lot: TNB: 05/09/2018	Verified By: Thomas Bosch	Usable: Yes			
Pipette ID: Not Provided	Verify Date:	Lab Lot: CLO4ISTDWRK			
Pos.	Analyte	Name	Concentration		
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L		
2	14797-73-0-89	Perchlorate 89	1000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729		Created By: Thomas Bosch	Amount: 1 mL
MFG: Cambridge Isotope		Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026
MFG Lot: SDFF-012A		Verified By: Thomas Bosch	Usable: Yes
Part ID: OLM-7310-S		Verify Date:	Lab Lot: CLO4ISTDSTK
Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL



## Certificate of Analysis



### ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

#### Description:

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

Analyte	Starting Material	Lot Number	Purity (%)	Calculated Value	True Value	Traceability & Method
perchlorate	potassium perchlorate	RM07987	100	1.001 ± 5 µg/mL	976 ± 6 µg/mL	NIST SRM 3141A; ICP-OES

Solvent: water (low TOC, < 50 ppb)

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

#### Traceability:

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

#### Estimation of Uncertainties:

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

#### Homogeneity:

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

#### Intended Use:

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

#### Instructions for Use:

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

#### Hazards:

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

#### Expiration of Certification:

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





# Certificate of Analysis



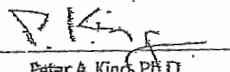
## ISO Guide 34 Reference Material

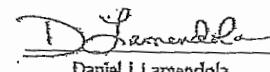
Product Number: ICC-013  
Lot Number: CP-0860

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

### Maintenance of Certification:

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

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

  
Daniel J. Lamendola  
Director of QA/QA



125 Market Street  
New Haven, CT 06513  
USA



AccuStandard®

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

# CERTIFICATE OF ANALYSIS



S 43659

AccuTrace™ Reference Standard

Catalog No: IC-PER-10X-1  
Description: Perchlorate Standard  
Element: Perchlorate (ClO<sub>4</sub>)  
SRM: Ind. Std.  
Lot: 218065075  
Matrix: Water  
Hazards: Refer to SDS for complete safety information

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



Signal Word: None

Component	SRM #	Prepared Concentration (µg/mL)
ClO <sub>4</sub> Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is ±0.24%.

The final solution was checked against an independent standard to verify its concentration.

We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.

All solutions are filtered through a 0.2 µm filter prior to being bottled.

All glassware used in preparation is Class A and calibrated regularly.

All weights are traceable through NIST, Test No. 822-275872-11

All bottles are triple rinsed with deionized water prior to use.

Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.

We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By:

*Meigan O'Leary*

Meigan O'Leary, Inorganic QC Manager

Cambridge Isotope Laboratories, Inc.

## Certificate of Analysis

Quality Standards:  
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

Product Name: PERCHLORIC ACID, SODIUM SALT  
(Isotopic Label & Enrichment Specification) (18O<sub>4</sub>, 90%+) 100 UG/ML IN WATER

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

## Product Information

Chemical Purity Specification:  $\geq 98\%$

Labeled CAS Number: NA

Unlabeled CAS Number: 7601-89-0

MW\*: 130.4

Chemical Formula: NaCl\*O<sub>4</sub>

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
*	664919	CCV@25	Vial 71	1	Control	1	1.62672e6	25.50485
*	664923	QC@4.0	Vial 72	1	Control	2	3.26276e5	4.23719
*	664921	ICS@4.0	Vial 73	1	Control	3	2.26823e5	3.59795
*	664922	LMB	Vial 74	1	Control	4	0.00000	0.00000
*	1920034001		Vial 75	1	Sample	5	3.78721e5	5.76393
*	1920122001	100	Vial 76	1	Sample	6	3.81315e5	535.80529
*	1920123001		Vial 77	1	Sample	7	1.88703e6	27.30710
*	1920123002		Vial 78	1	Sample	8	0.00000	0.00000
*	664924	201232S	Vial 79	1	Sample	9	2.94719e5	4.12417
*	664925	201232D	Vial 80	1	Sample	10	2.98082e5	4.14318
*	1920123003		Vial 81	1	Sample	11	0.00000	0.00000
*	1920123004		Vial 82	1	Sample	12	0.00000	0.00000
*	1920123005		Vial 83	1	Sample	13	0.00000	0.00000
*	1920123006		Vial 84	1	Sample	14	0.00000	0.00000
*	664926	CCV@25	Vial 71	1	Control	15	1.58424e6	26.09295
*	1920571001		Vial 85	1	Sample	16	0.00000	0.00000
*	1920572001		Vial 86	1	Sample	17	0.00000	0.00000
*	1920581001	100	Vial 87	1	Sample	18	4.74247e6	6892.89270
*	664927	CCV@25	Vial 71	1	Control	19	1.56539e6	26.50991

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	664919	CCV@25	Vial 71	1	Control	1	4.82242e5	25.47735
*	664923	QC@4.0	Vial 72	1	Control	2	1.06930e5	4.52240
*	664921	ICS@4.0	Vial 73	1	Control	3	8.07927e4	4.14216
*	664922	LMB	Vial 74	1	Control	4	0.00000	0.00000
*	1920034001		Vial 75	1	Sample	5	1.32207e5	6.61445
*	1920122001	100	Vial 76	1	Sample	6	1.27974e5	590.20800
*	1920123001		Vial 77	1	Sample	7	5.71392e5	27.84268
*	1920123002		Vial 78	1	Sample	8	0.00000	0.00000
*	664924	201232S	Vial 79	1	Sample	9	9.30343e4	4.23661
*	664925	201232D	Vial 80	1	Sample	10	9.90502e4	4.47914
*	1920123003		Vial 81	1	Sample	11	0.00000	0.00000
*	1920123004		Vial 82	1	Sample	12	0.00000	0.00000
*	1920123005		Vial 83	1	Sample	13	0.00000	0.00000
*	1920123006		Vial 84	1	Sample	14	0.00000	0.00000
*	664926	CCV@25	Vial 71	1	Control	15	4.73538e5	26.27353
*	1920571001		Vial 85	1	Sample	16	0.00000	0.00000
*	1920572001		Vial 86	1	Sample	17	0.00000	0.00000
*	1920581001	100	Vial 87	1	Sample	18	1.37287e6	6775.22031
*	664927	CCV@25	Vial 71	1	Control	19	4.66031e5	26.59490

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	664919	CCV@25	Vial 71	1	Control	1	1.93813e5	5.00000
*	664923	QC@4.0	Vial 72	1	Control	2	2.53019e5	5.00000
*	664921	ICS@4.0	Vial 73	1	Control	3	2.08874e5	5.00000
*	664922	LMB	Vial 74	1	Control	4	2.28613e5	5.00000
*	1920034001		Vial 75	1	Sample	5	2.12986e5	5.00000
*	1920122001	100	Vial 76	1	Sample	6	2.31390e5	500.00000
*	1920123001		Vial 77	1	Sample	7	2.09097e5	5.00000
*	1920123002		Vial 78	1	Sample	8	2.14312e5	5.00000
*	664924	201232S	Vial 79	1	Sample	9	2.35117e5	5.00000
*	664925	201232D	Vial 80	1	Sample	10	2.36657e5	5.00000
*	1920123003		Vial 81	1	Sample	11	2.72320e5	5.00000
*	1920123004		Vial 82	1	Sample	12	2.70263e5	5.00000
*	1920123005		Vial 83	1	Sample	13	2.50554e5	5.00000
*	1920123006		Vial 84	1	Sample	14	2.77086e5	5.00000

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	664926	CCV@25	Vial 71	1	Control	15	1.84240e5	8.170	5.00000
*	1920571001		Vial 85	1	Sample	16	2.24657e5	7.814	5.00000
*	1920572001		Vial 86	1	Sample	17	2.04102e5	7.796	5.00000
*	1920581001	100	Vial 87	1	Sample	18	1.90565e5	8.391	500.00000
*	664927	CCV@25	Vial 71	1	Control	19	1.79008e5	8.198	5.00000

\*\*\* End of Report \*\*\*

## Sequence Table:

## Method and Injection Info Part:

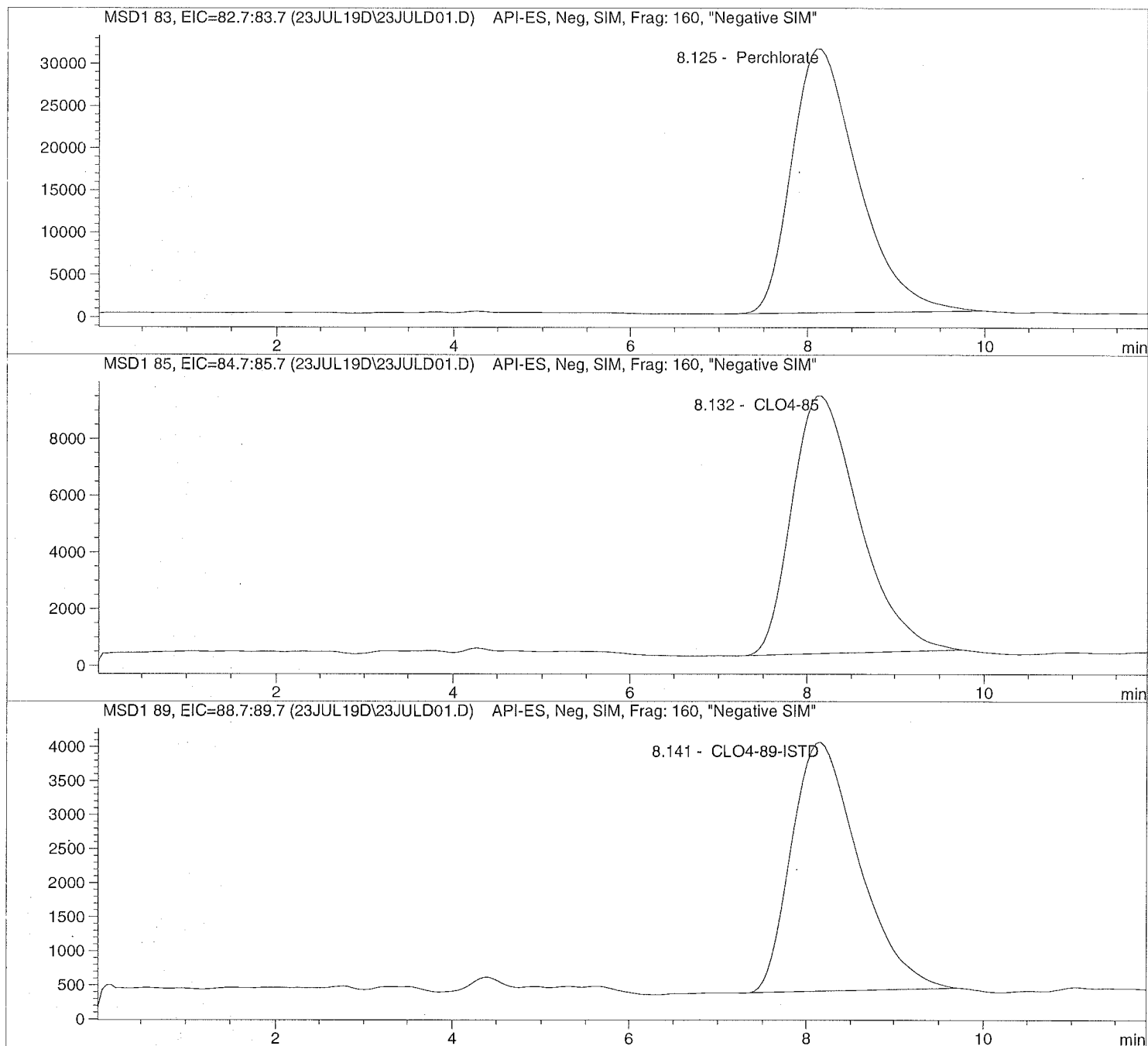
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	664919	CCV@25	CLO4-AQN	1	Ctrl Samp	
2	Vial 72	664923	QC@4.0	CLO4-AQN	1	Ctrl Samp	
3	Vial 73	664921	ICS@4.0	CLO4-AQN	1	Ctrl Samp	
4	Vial 74	664922	LMB	CLO4-AQN	1	Ctrl Samp	
5	Vial 75	1920034001		CLO4-AQN	1	Sample	
6	Vial 76	1920122001	100	CLO4-AQN	1	Sample	
7	Vial 77	1920123001		CLO4-AQN	1	Sample	
8	Vial 78	1920123002		CLO4-AQN	1	Sample	
9	Vial 79	664924	201232S	CLO4-AQN	1	Sample	
10	Vial 80	664925	201232D	CLO4-AQN	1	Sample	
11	Vial 81	1920123003		CLO4-AQN	1	Sample	
12	Vial 82	1920123004		CLO4-AQN	1	Sample	
13	Vial 83	1920123005		CLO4-AQN	1	Sample	
14	Vial 84	1920123006		CLO4-AQN	1	Sample	
15	Vial 71	664926	CCV@25	CLO4-AQN	1	Ctrl Samp	
16	Vial 85	1920571001		CLO4-AQN	1	Sample	
17	Vial 86	1920572001		CLO4-AQN	1	Sample	
18	Vial 87	1920581001	100	CLO4-AQN	1	Sample	
19	Vial 71	664927	CCV@25	CLO4-AQN	1	Ctrl Samp	

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD01.D Sample Name: 664919 CCV@25

=====  
Injection Date: 7/23/2019 08:31:50 Seq Line: 1  
Sample Name: 664919 CCV@25 Location: Vial 71  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD01.D Sample Name: 664919 CCV@25

```

=====
Injection Date: 7/23/2019 08:31:50      Seq Line: 1
Sample Name: 664919 CCV@25             Location: Vial 71
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 35 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 25.000
=====

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.125	PBA	1626721.4	25.5049	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.132	PBA	482242.2	25.4774	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.141	PBA	193813.0	5.0000	CLO4-89-ISTD

```

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

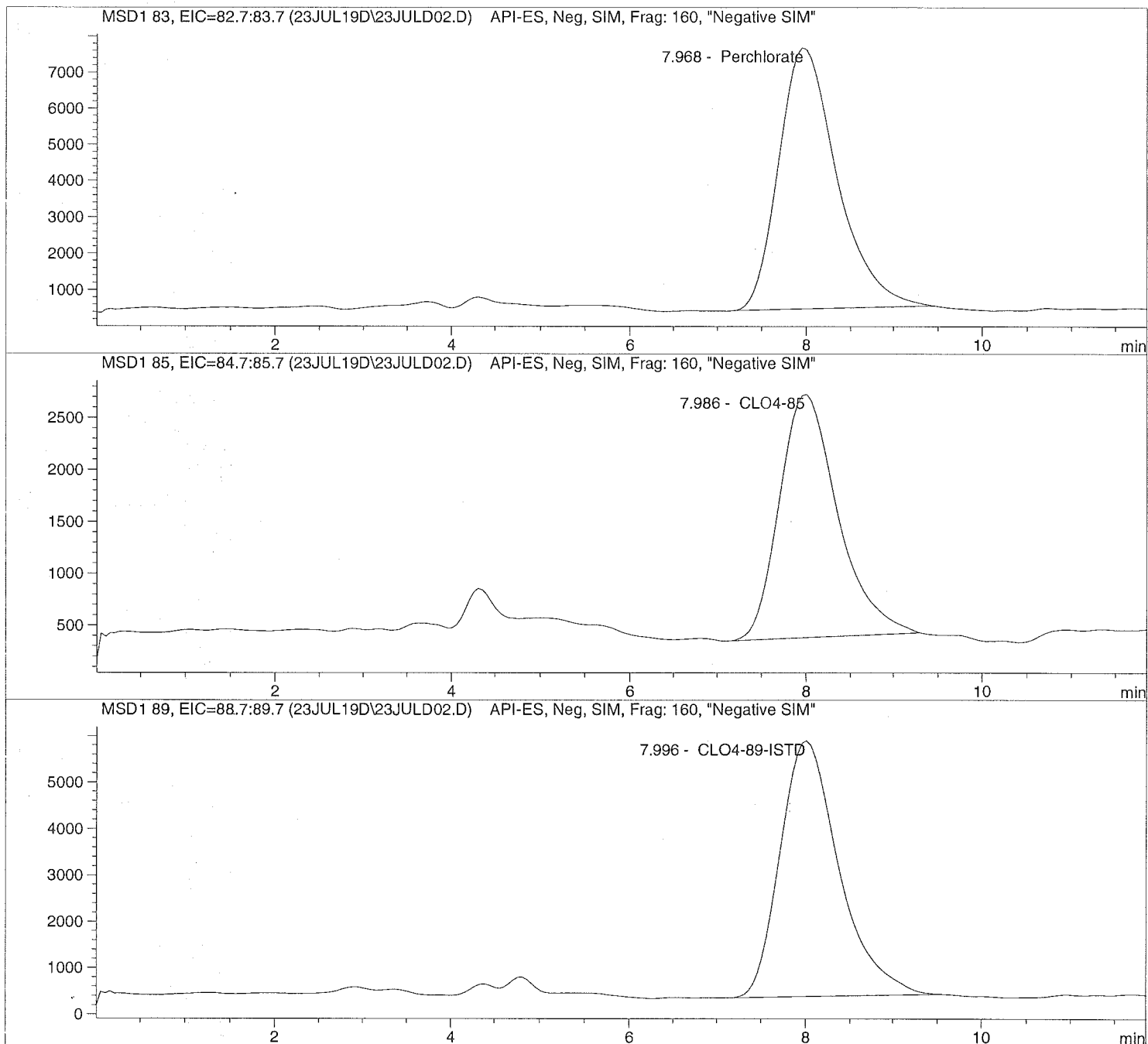
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Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD02.D Sample Name: 664923 QC@4.0

=====  
Injection Date: 7/23/2019 08:47:43 Seq Line: 2  
Sample Name: 664923 QC@4.0 Location: Vial 72  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



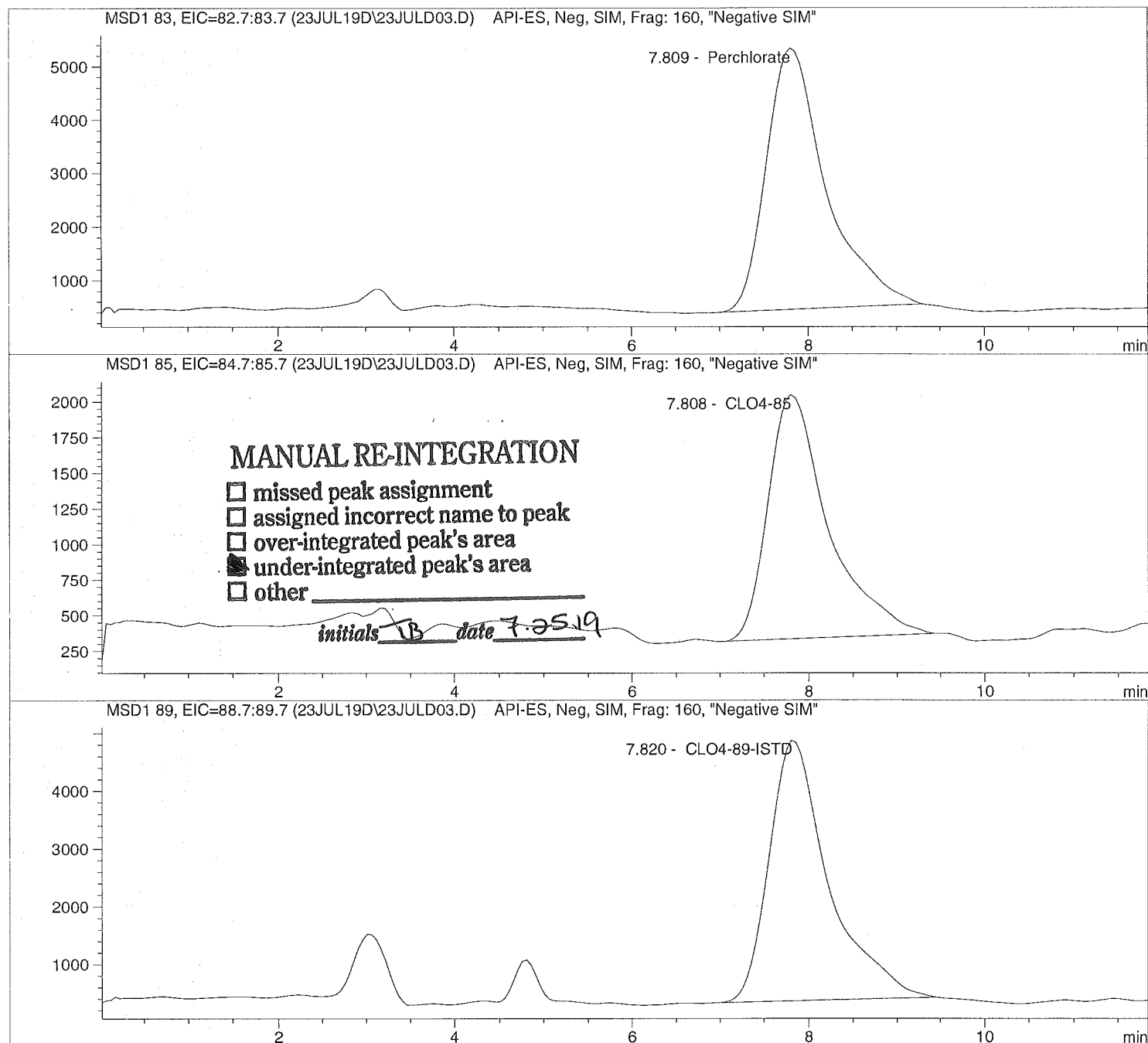


Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD03.D Sample Name: 664921 ICS@4.0

=====  
 Injection Date: 7/23/2019 09:01:39 Seq Line: 3  
 Sample Name: 664921 ICS@4.0 Location: Vial 73  
 Acq Operator: TNB Inj. No.: 1  
 Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
 =====







Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD04.D

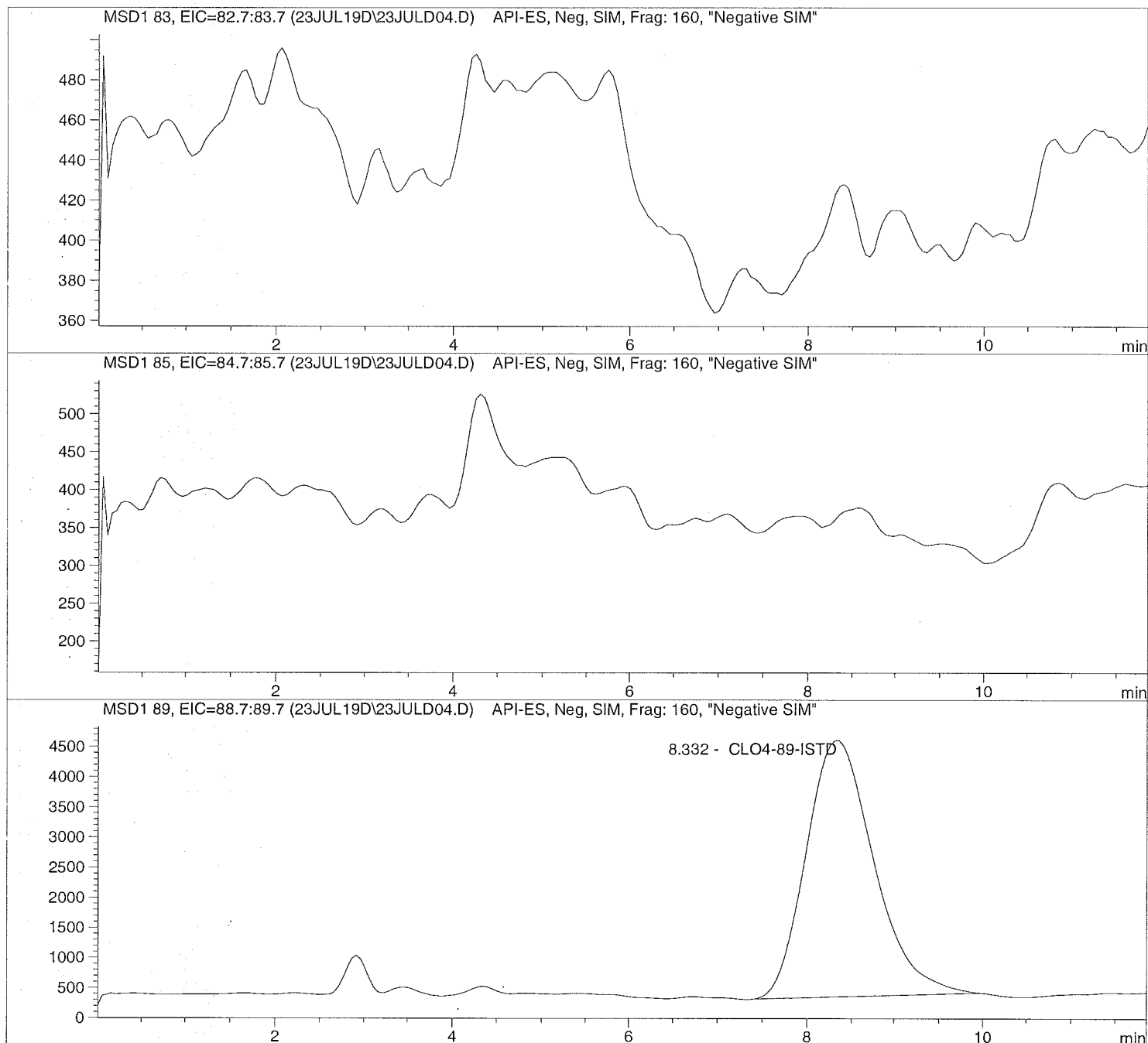
Sample Name: 664922 LMB

Injection Date: 7/23/2019 09:15:35  
Sample Name: 664922 LMB  
Acq Operator: TNB

Seq Line: 4  
Location: Vial 74  
Inj. No.: 1  
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD04.D Sample Name: 664922 LMB

```

=====
Injection Date: 7/23/2019 09:15:35      Seq Line:          4
Sample Name:   664922 LMB                Location:         Vial 74
Acq Operator:  TNB                       Inj. No.:        1
                                           Inj. Vol.:       35 µl
=====

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  4/12/2019 07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.332	PBA	228612.6	5.0000	CLO4-89-ISTD

```

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

```

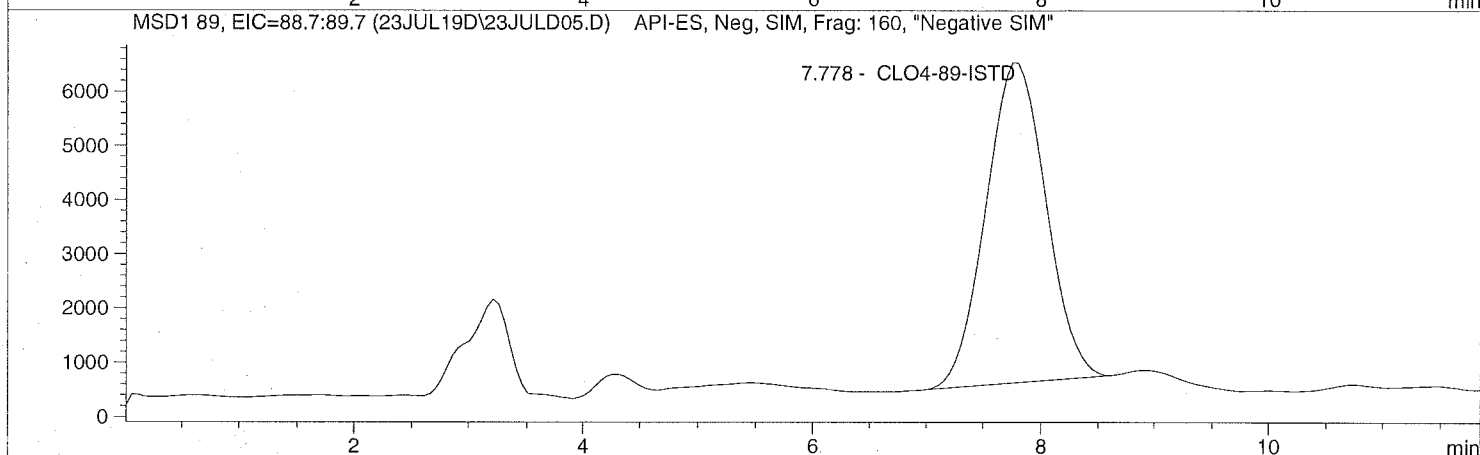
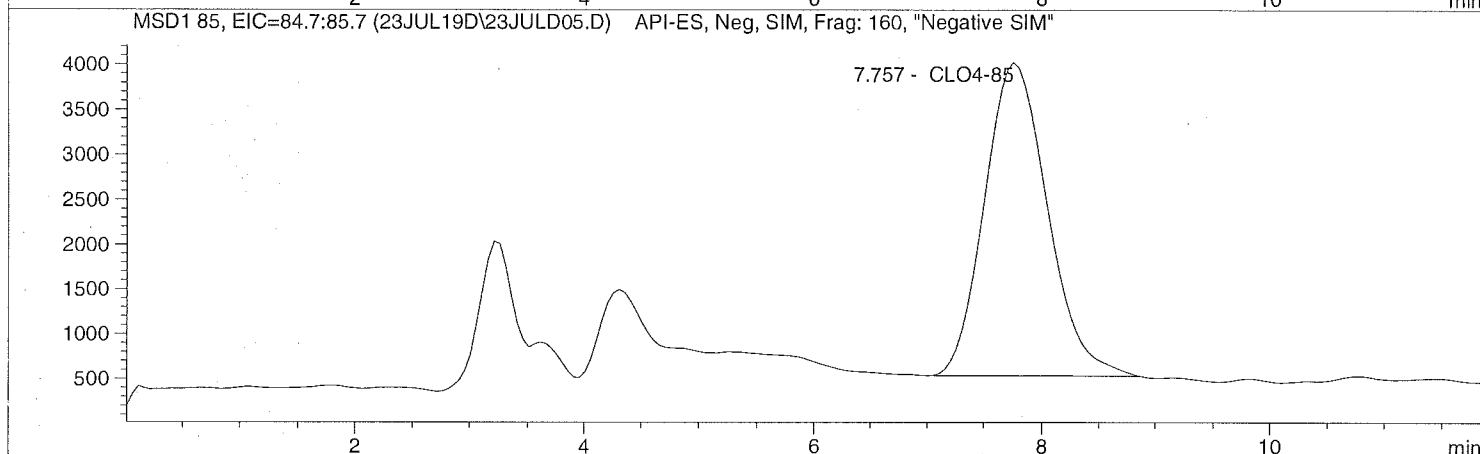
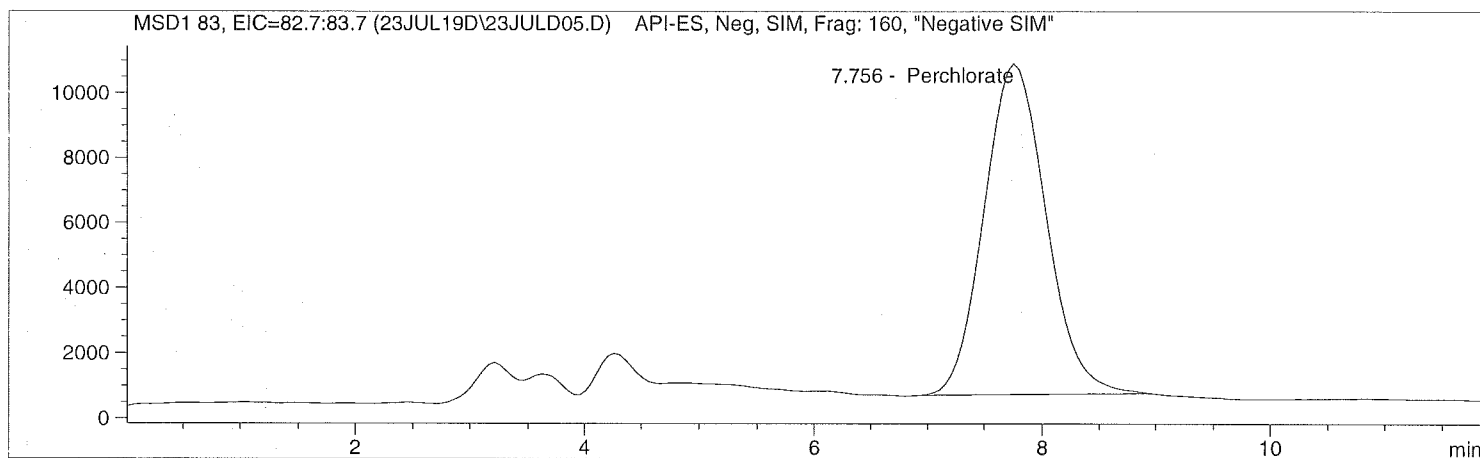
Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD05.D

Sample Name: 1920034001

=====  
Injection Date: 7/23/2019 09:29:31  
Sample Name: 1920034001  
Acq Operator: TNB

Seq Line: 5  
Location: Vial 75  
Inj. No.: 1  
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD05.D Sample Name: 1920034001

```

=====
Injection Date: 7/23/2019 09:29:31      Seq Line:      5
Sample Name:   1920034001              Location:      Vial 75
Acq Operator:  TNB                     Inj. No.:     1
                                           Inj. Vol.:    35 µl
=====

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  4/12/2019 07:54:13
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:    1.000000
Dilution:      1.000000
Sample Amount: 0.000
=====

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.756	PBA	378721.2	5.7639	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.757	PBA	132206.6	6.6144	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.778	PBA	212985.8	5.0000	CLO4-89-ISTD

```

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

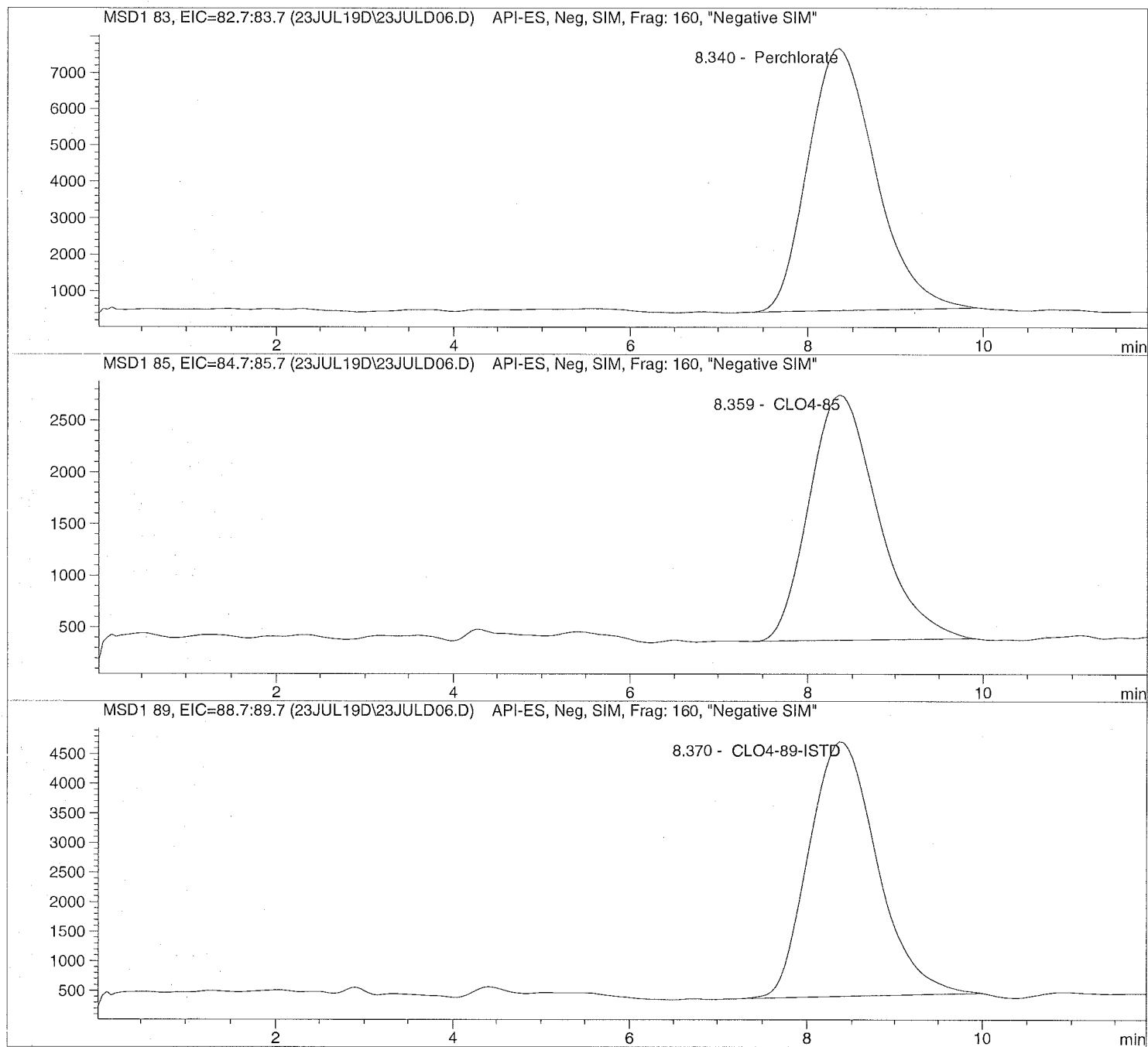
```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD06.D Sample Name: 1920122001 100

=====  
Injection Date: 7/23/2019 09:43:25 Seq Line: 6  
Sample Name: 1920122001 100 Location: Vial 76  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD06.D Sample Name: 1920122001 100

```

=====
Injection Date: 7/23/2019 09:43:25      Seq Line: 6
Sample Name: 1920122001 100            Location: Vial 76
Acq Operator: TNB                      Inj. No.: 1
                                           Inj. Vol.: 35 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 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
8.340	PBA	381315.1	535.8053	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.359	PBA	127974.4	590.2080	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.370	PBA	231390.0	500.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD07.D

Sample Name: 1920123001

Injection Date: 7/23/2019 09:57:24

Seq Line: 7

Sample Name: 1920123001

Location: Vial 77

Acq Operator: TNB

Inj. No.: 1

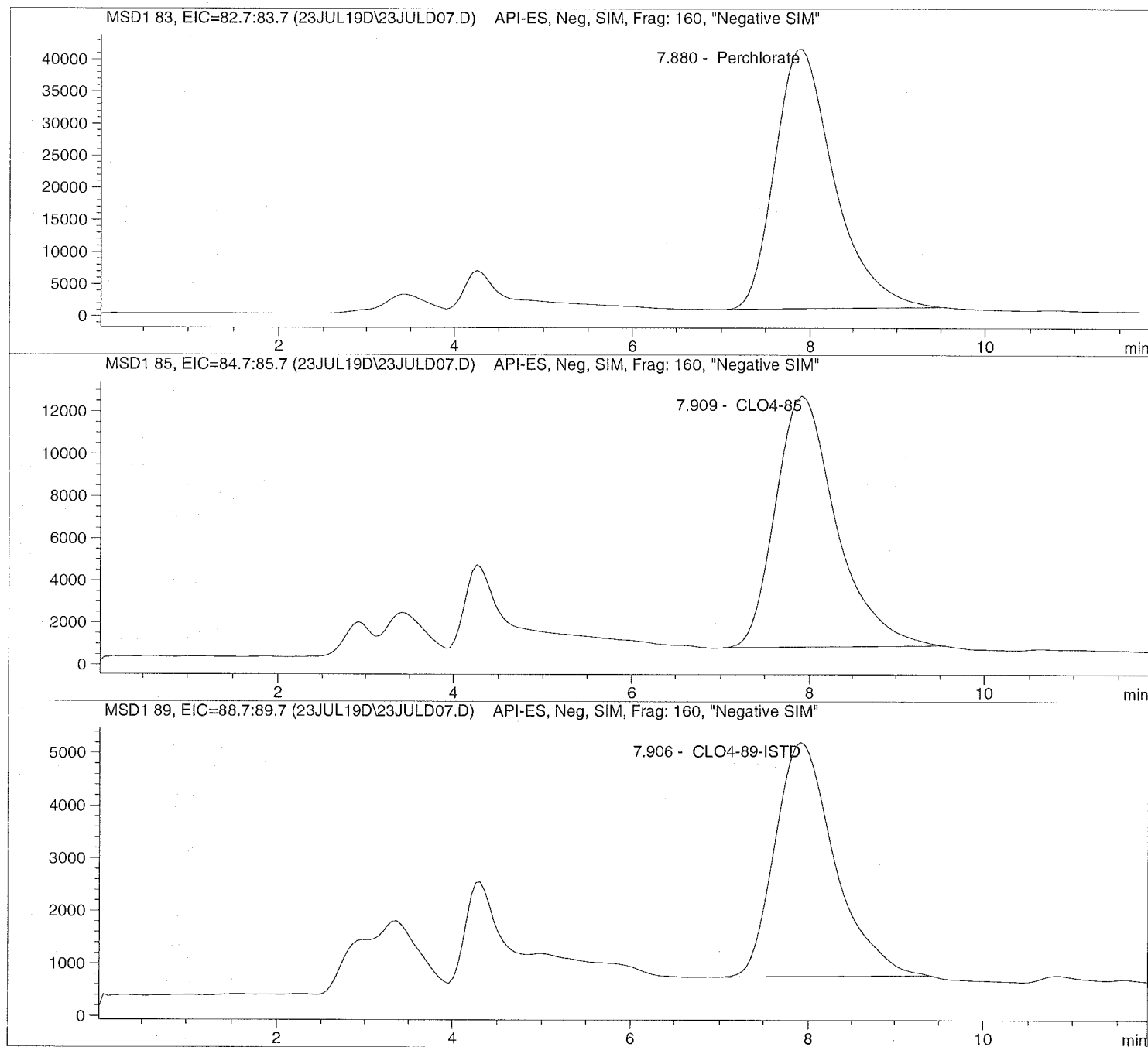
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD07.D

Sample Name: 1920123001

```

=====
Injection Date:  7/23/2019  09:57:24      Seq Line:           7
Sample Name:    1920123001                Location:           Vial 77
Acq Operator:   TNB                       Inj. No.:          1
                                           Inj. Vol.:         35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019  07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
Multiplier:    1.000000
Dilution:      1.000000
Sample Amount:  0.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.880	PBA	1887029.5	27.3071	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.909	PBA	571391.9	27.8427	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.906	PBA	209097.0	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD08.D

Sample Name: 1920123002

Injection Date: 7/23/2019 10:11:24

Seq Line: 8

Sample Name: 1920123002

Location: Vial 78

Acq Operator: TNB

Inj. No.: 1

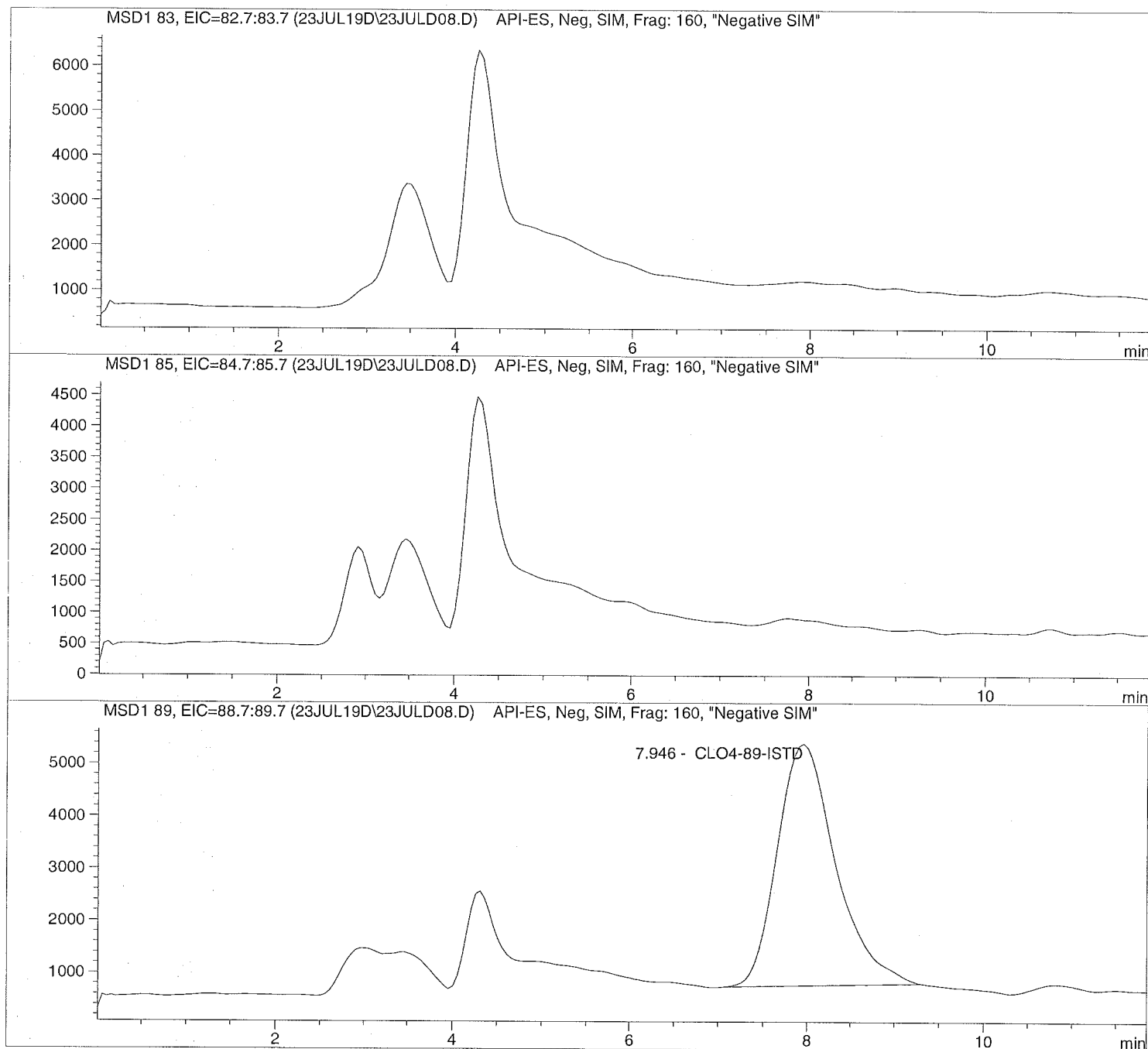
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD08.D

Sample Name: 1920123002

```

=====
Injection Date: 7/23/2019 10:11:24      Seq Line:      8
Sample Name:    1920123002              Location:      Vial 78
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.946	PBA	214312.1	5.0000	CLO4-89-ISTD

```

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

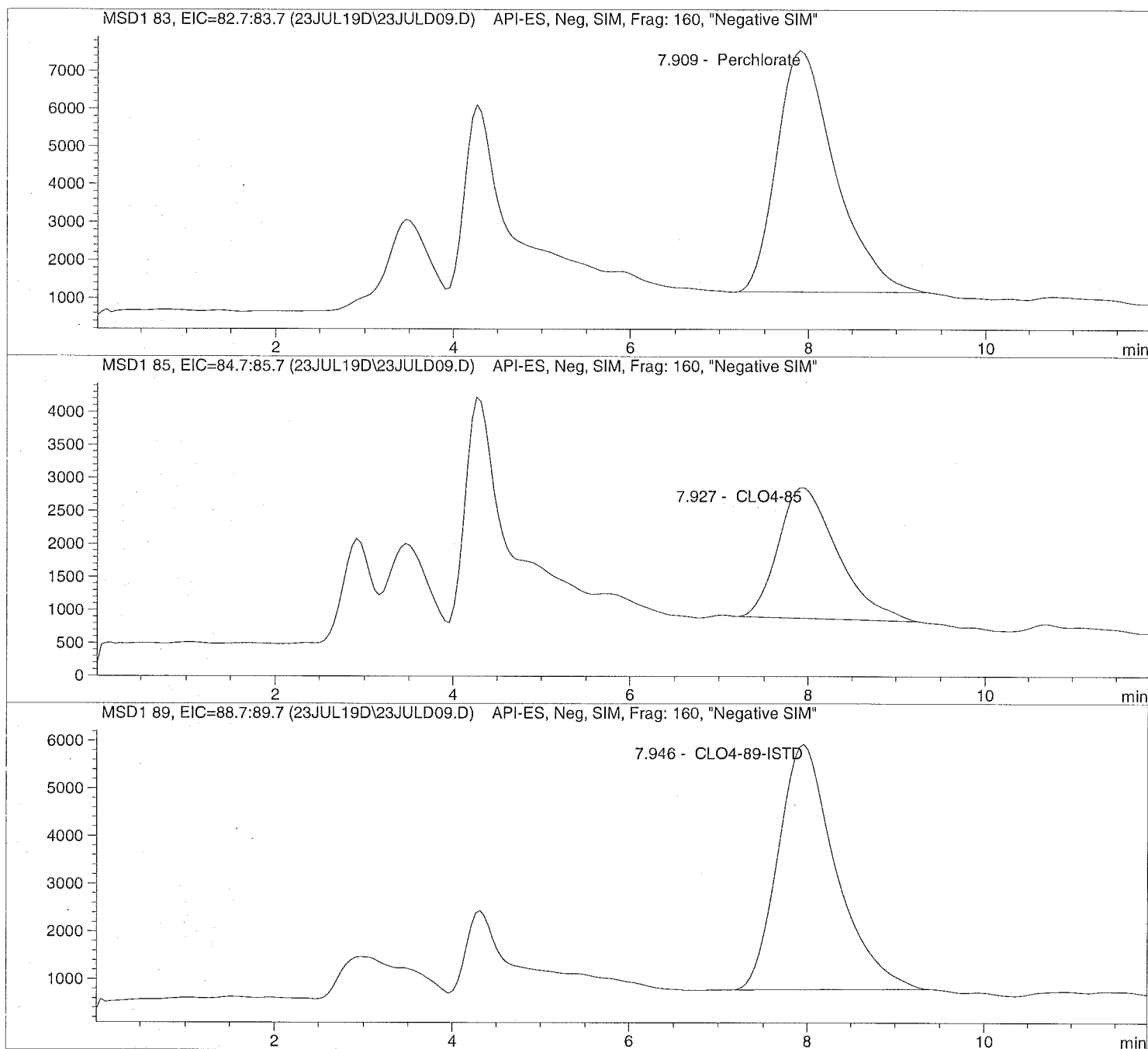
```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD09.D Sample Name: 664924 201232S

```
=====
Injection Date: 7/23/2019 10:25:26      Seq Line:          9
Sample Name:    664924 201232S          Location:          Vial 79
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD09.D Sample Name: 664924 201232S

```

=====
Injection Date: 7/23/2019 10:25:26      Seq Line:          9
Sample Name:    664924 201232S          Location:          Vial 79
Acq Operator:  TNB                      Inj. No.:         1
                                           Inj. Vol.:        35 µl

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:    1.000000
Dilution:      1.000000
Sample Amount: 0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.909	PBA	294718.6	4.1242	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.927	PBA	93034.3	4.2366	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.946	PBA	235117.5	5.0000	CLO4-89-ISTD

```

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

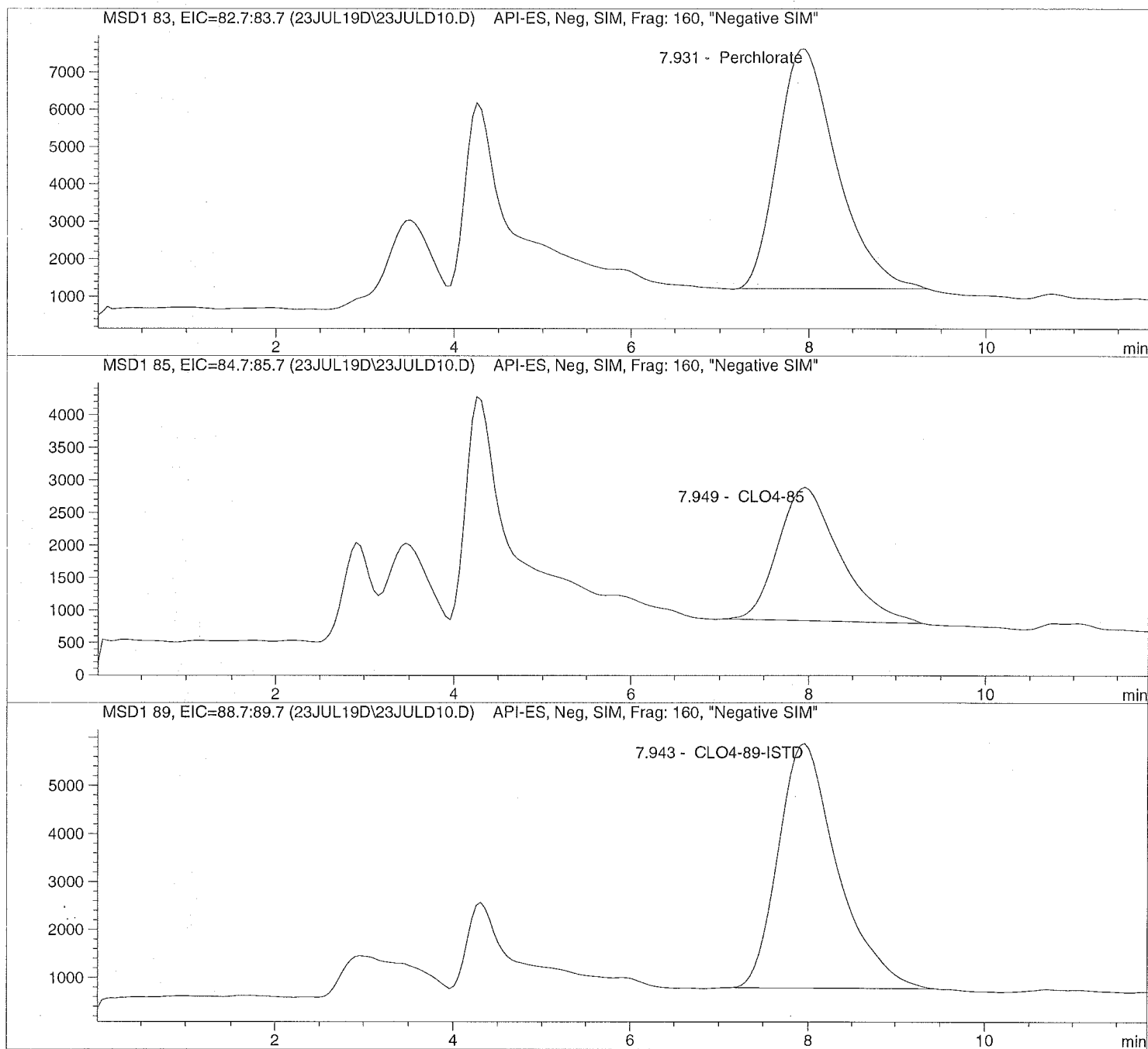
```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD10.D Sample Name: 664925 201232D

=====  
Injection Date: 7/23/2019 10:39:29 Seq Line: 10  
Sample Name: 664925 201232D Location: Vial 80  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====





Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD11.D

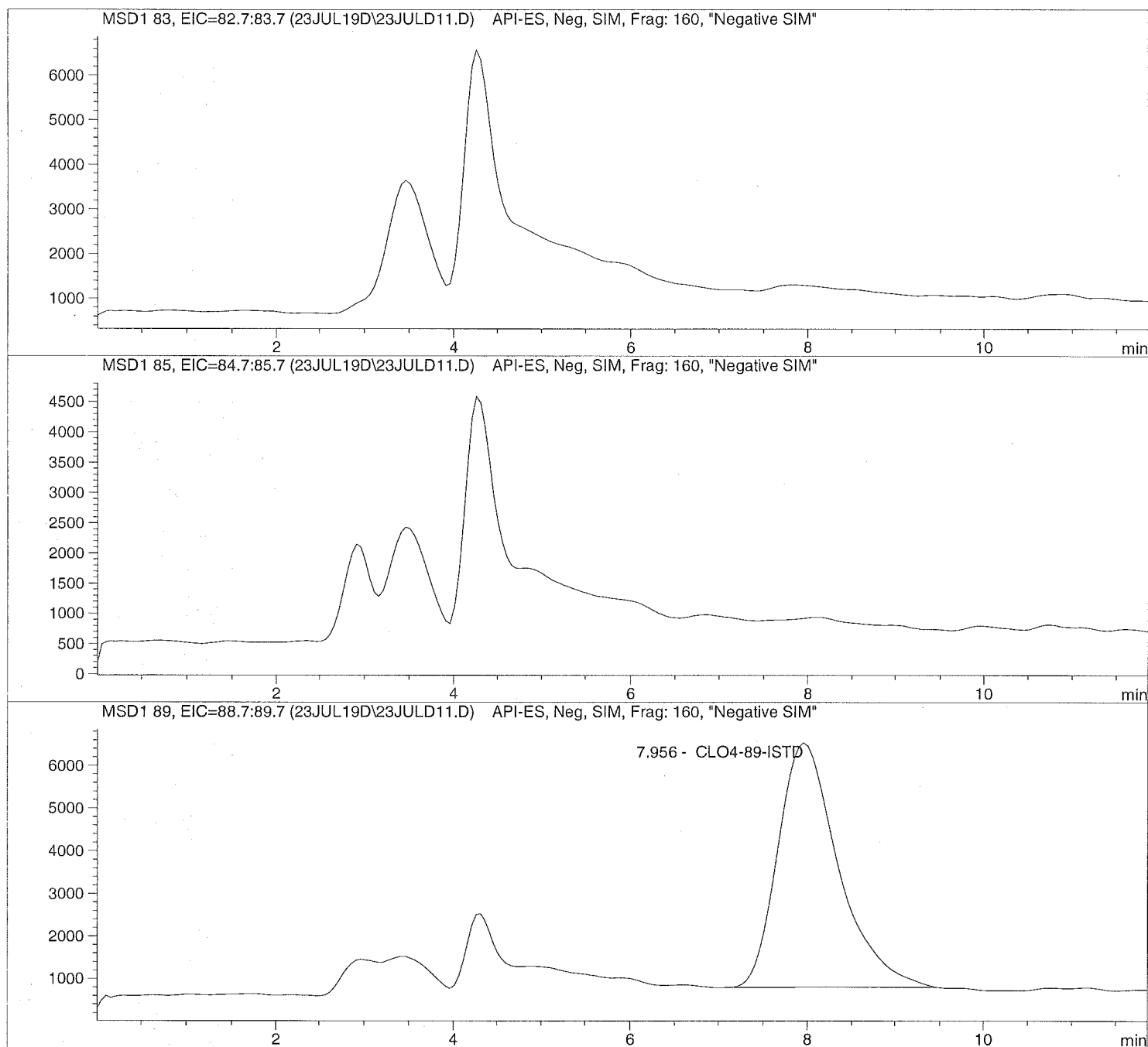
Sample Name: 1920123003

Injection Date: 7/23/2019 10:53:24  
Sample Name: 1920123003  
Acq Operator: TNB

Seq Line: 11  
Location: Vial 81  
Inj. No.: 1  
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD11.D Sample Name: 1920123003

```

=====
Injection Date: 7/23/2019 10:53:24      Seq Line:      11
Sample Name:    1920123003              Location:      Vial 81
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    35 µl

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
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
7.956	PBA	272319.7	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD12.D

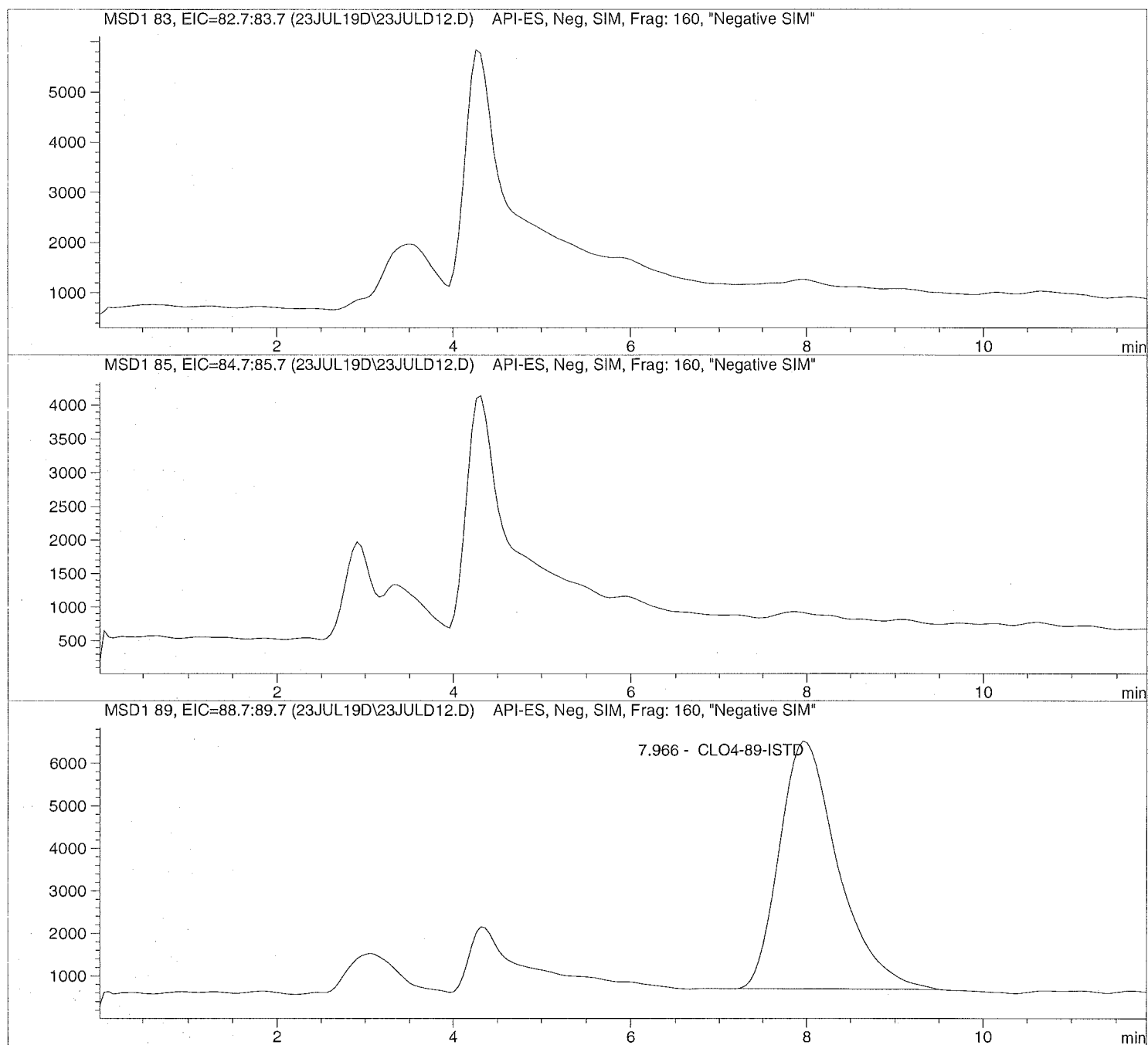
Sample Name: 1920123004

=====  
Injection Date: 7/23/2019 11:07:17  
Sample Name: 1920123004  
Acq Operator: TNB

Seq Line: 12  
Location: Vial 82  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====  
Injection Date: 7/23/2019 11:07:17      Seq Line:          12  
Sample Name:    1920123004              Location:          Vial 82  
Acq Operator:   TNB                     Inj. No.:         1  
                                           Inj. Vol.:        35 µl
```

```
Acq. Method:    CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed:   4/12/2019 07:54:13
```

## Perchlorate analysis

=====  
Sample Information  
=====

```
Sorted By:      Signal  
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am  
Multiplier:    1.000000  
Dilution:      1.000000  
Sample Amount: 0.000
```

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.966	PBA	270262.5	5.0000	CLO4-89-ISTD

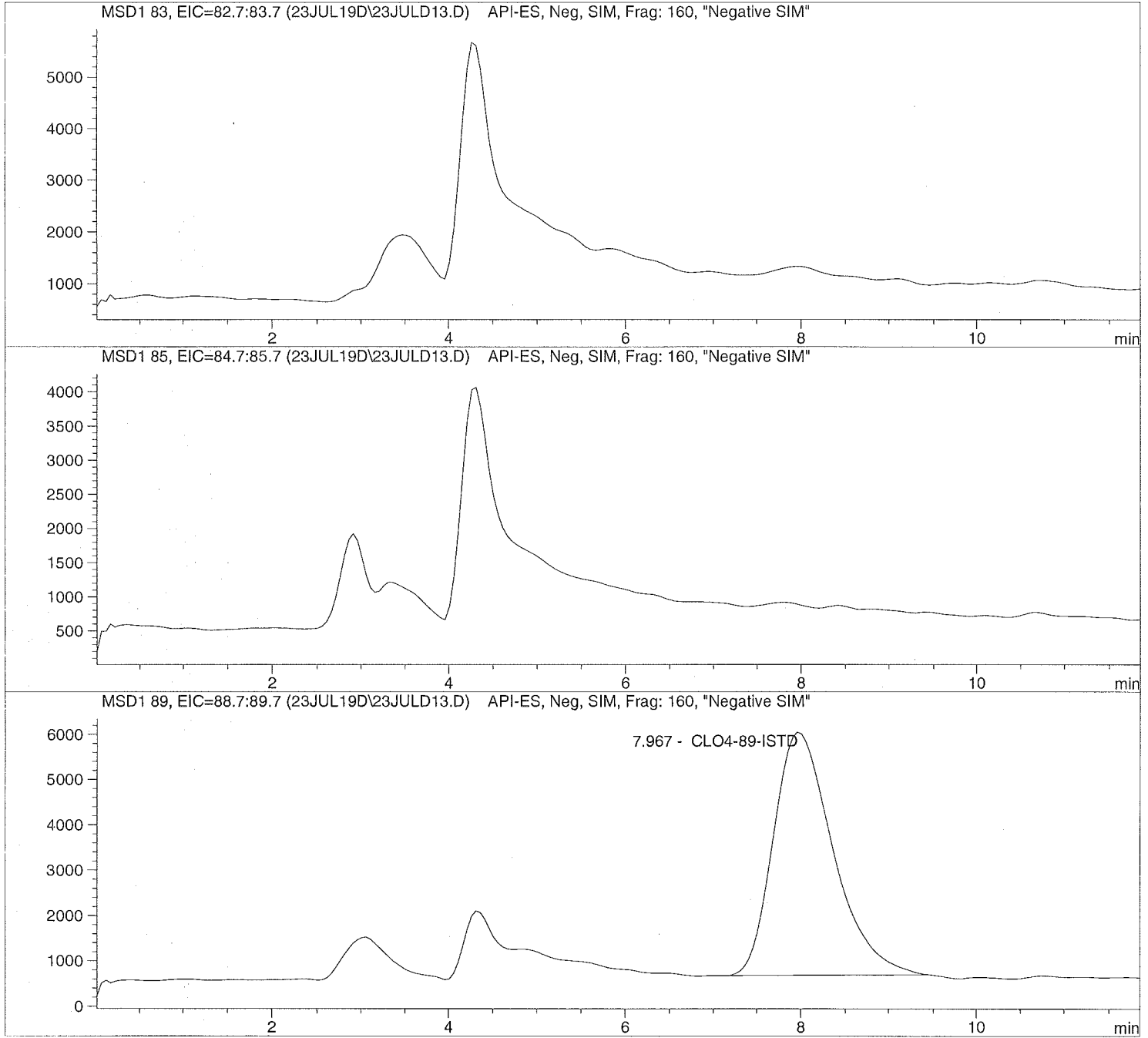
=====  
\*\*\* End of Report \*\*\*

Injection Date: 7/23/2019 11:21:18  
Sample Name: 1920123005  
Acq Operator: TNB

Seq Line: 13  
Location: Vial 83  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====  
Injection Date: 7/23/2019 11:21:18      Seq Line:      13  
Sample Name:    1920123005              Location:      Vial 83  
Acq Operator:   TNB                     Inj. No.:     1  
                                           Inj. Vol.:    35 µl
```

```
Acq. Method:    CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed:   4/12/2019 07:54:13
```

## Perchlorate analysis

=====  
Sample Information  
=====

```
Sorted By:      Signal  
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am  
Multiplier:     1.000000  
Dilution:       1.000000  
Sample Amount:  0.000
```

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

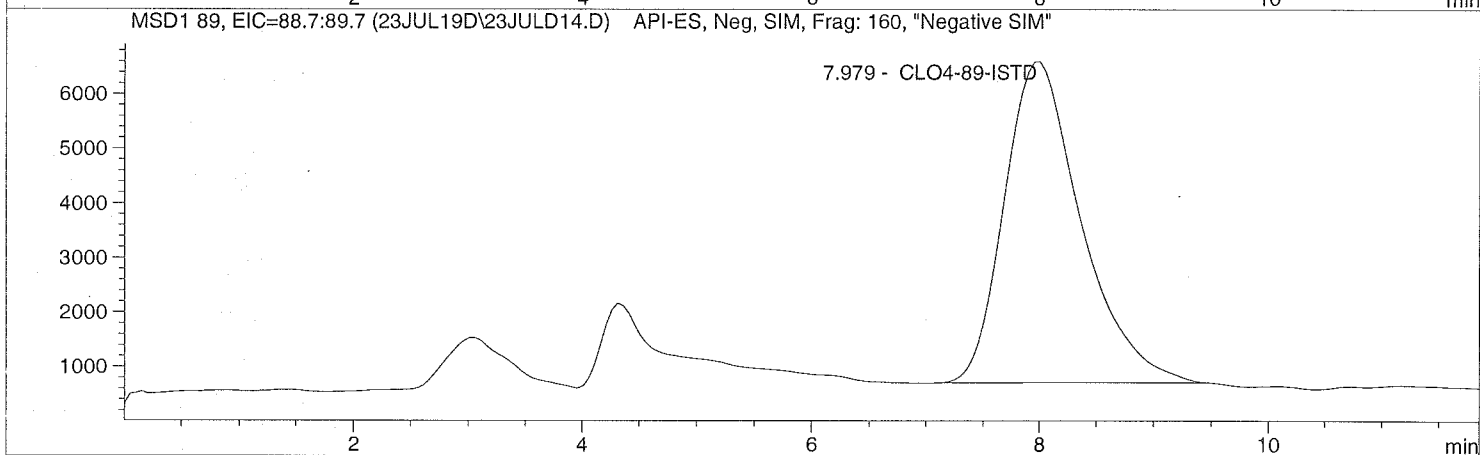
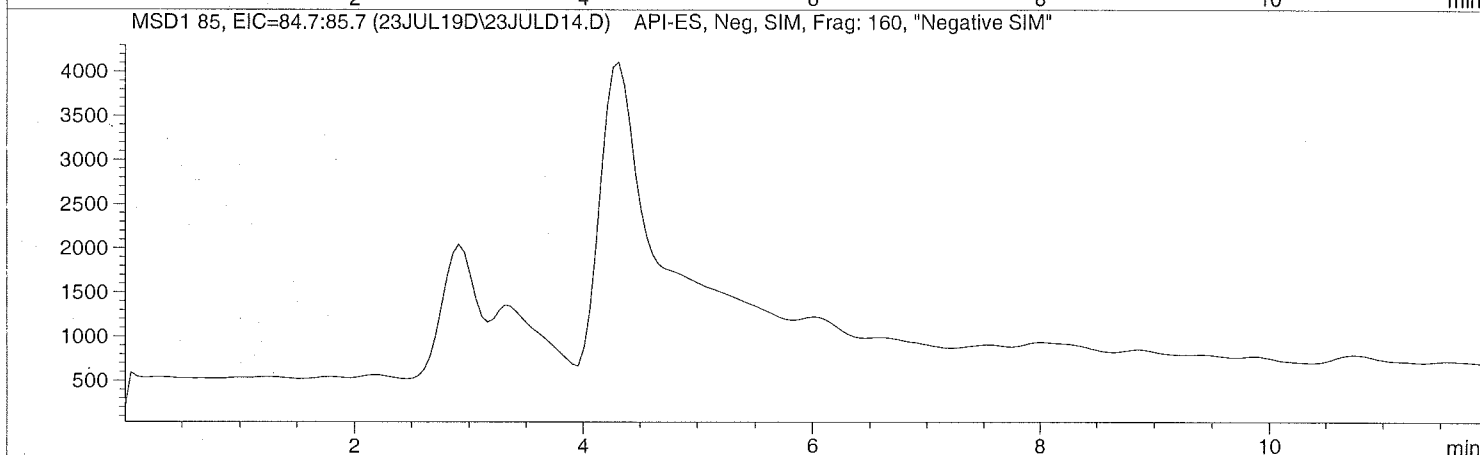
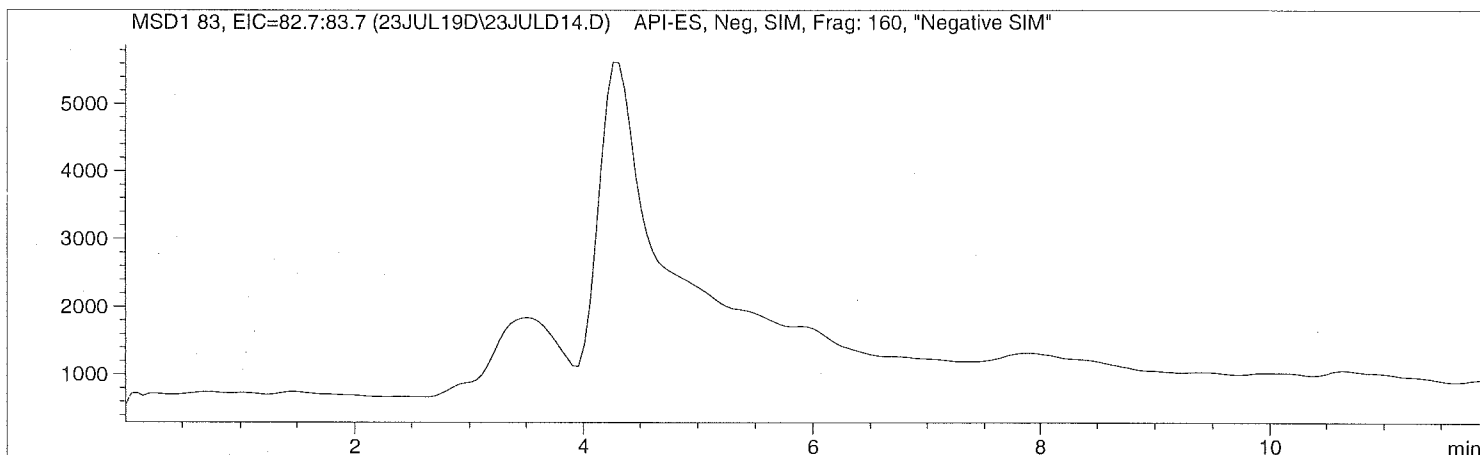
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.967	PBA	250553.8	5.0000	CLO4-89-ISTD

=====  
\*\*\* End of Report \*\*\*

=====  
Injection Date: 7/23/2019 11:35:11                   Seq Line:                   14  
Sample Name:       1920123006                        Location:                 Vial 84  
Acq Operator:     TNB                                Inj. No.:                1  
  Inj. Vol.:                35 µl

Acq. Method:       CLO4-AQN.M  
Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed:      4/12/2019 07:54:13

Perchlorate analysis  
=====



```
=====
Injection Date: 7/23/2019 11:35:11      Seq Line:          14
Sample Name:    1920123006              Location:         Vial 84
Acq Operator:   TNB                     Inj. No.:        1
                                           Inj. Vol.:       35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.979	PBA	277086.1	5.0000	CLO4-89-ISTD

=====
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD15.D

Sample Name: 664926 CCV@25

Injection Date: 7/23/2019 11:49:04

Seq Line: 15

Sample Name: 664926 CCV@25

Location: Vial 71

Acq Operator: TNB

Inj. No.: 1

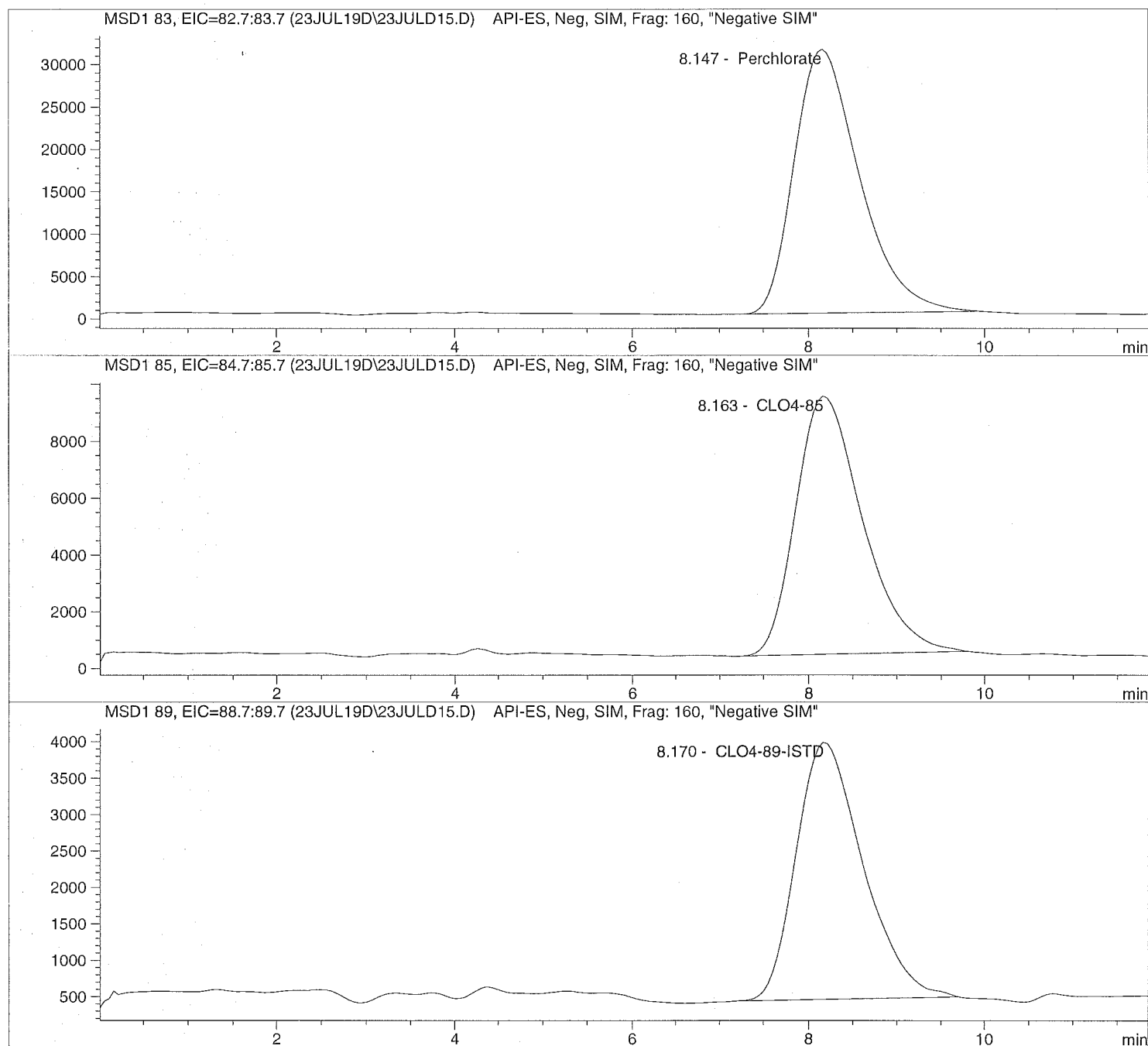
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD15.D      Sample Name: 664926      CCV@25

=====  
Injection Date: 7/23/2019 11:49:04      Seq Line: 15  
Sample Name: 664926      CCV@25      Location: Vial 71  
Acq Operator: TNB      Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====  
Sample Information  
=====

Sorted By: Signal  
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am  
Multiplier: 1.000000  
Dilution: 1.000000  
Sample Amount: 25.000

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.147	PBA	1584242.1	26.0929	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.163	PBA	473537.8	26.2735	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.170	PBA	184240.3	5.0000	CLO4-89-ISTD

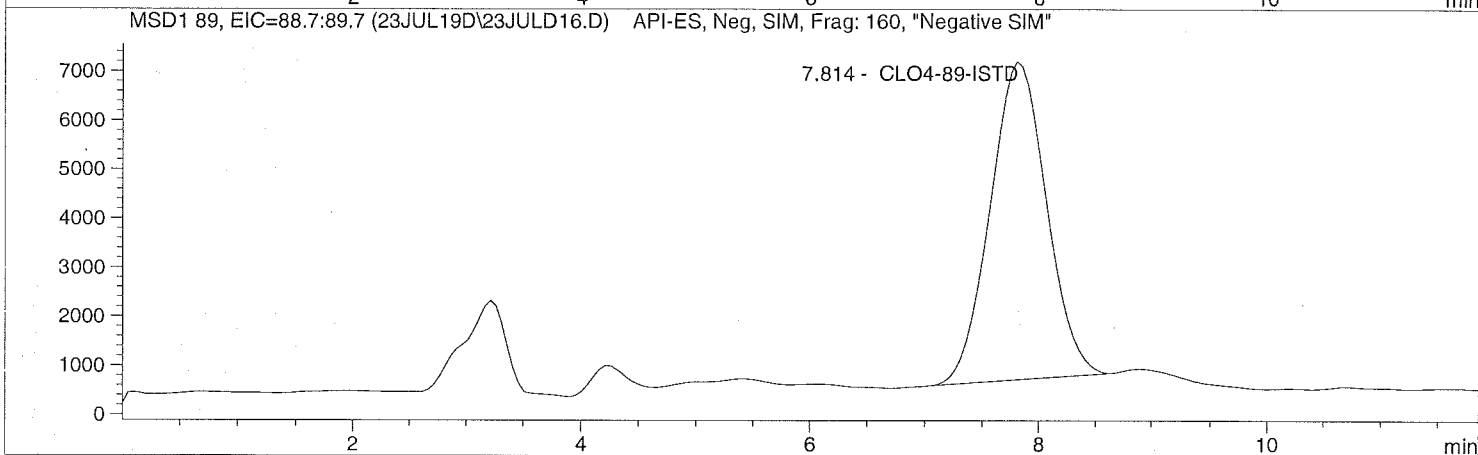
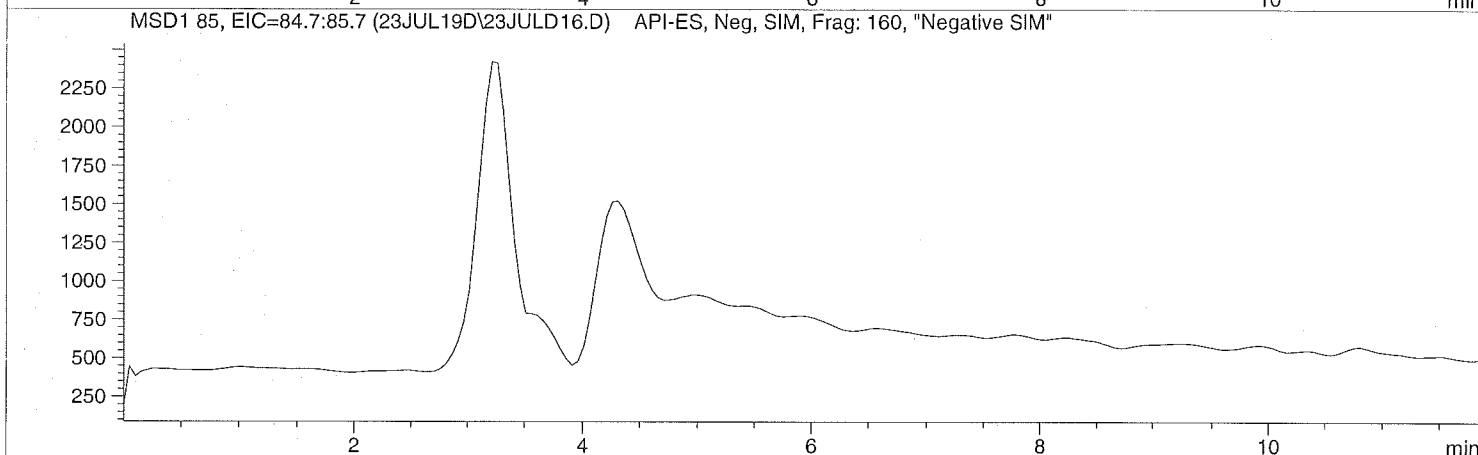
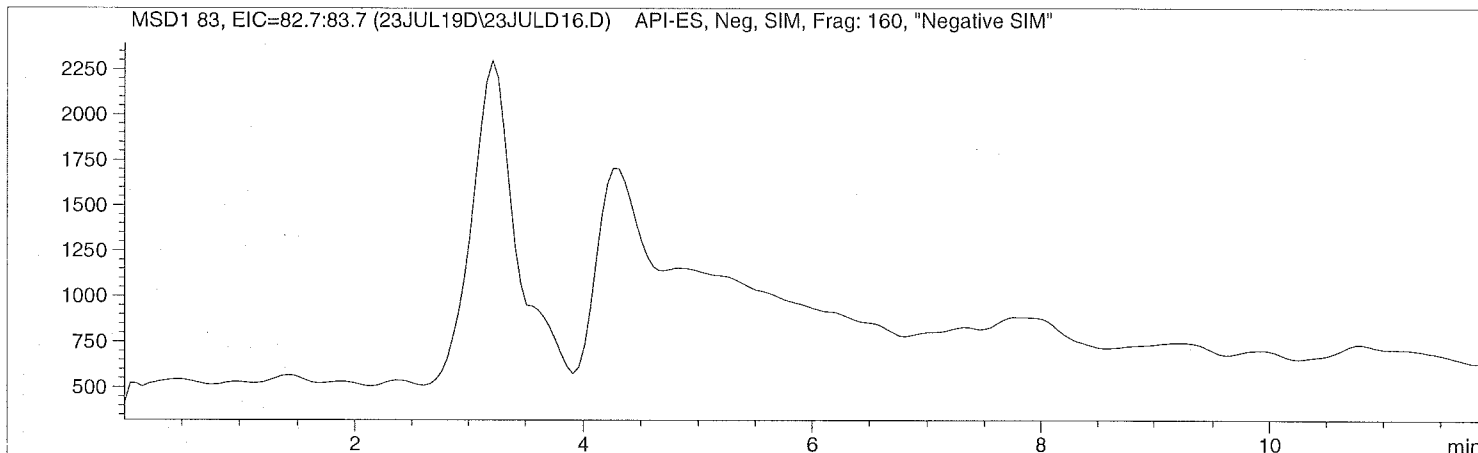
=====  
\*\*\* End of Report \*\*\*

Injection Date: 7/23/2019 12:03:02  
Sample Name: 1920571001  
Acq Operator: TNB

Seq Line: 16  
Location: Vial 85  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date: 7/23/2019 12:03:02      Seq Line:          16
Sample Name:    1920571001              Location:          Vial 85
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

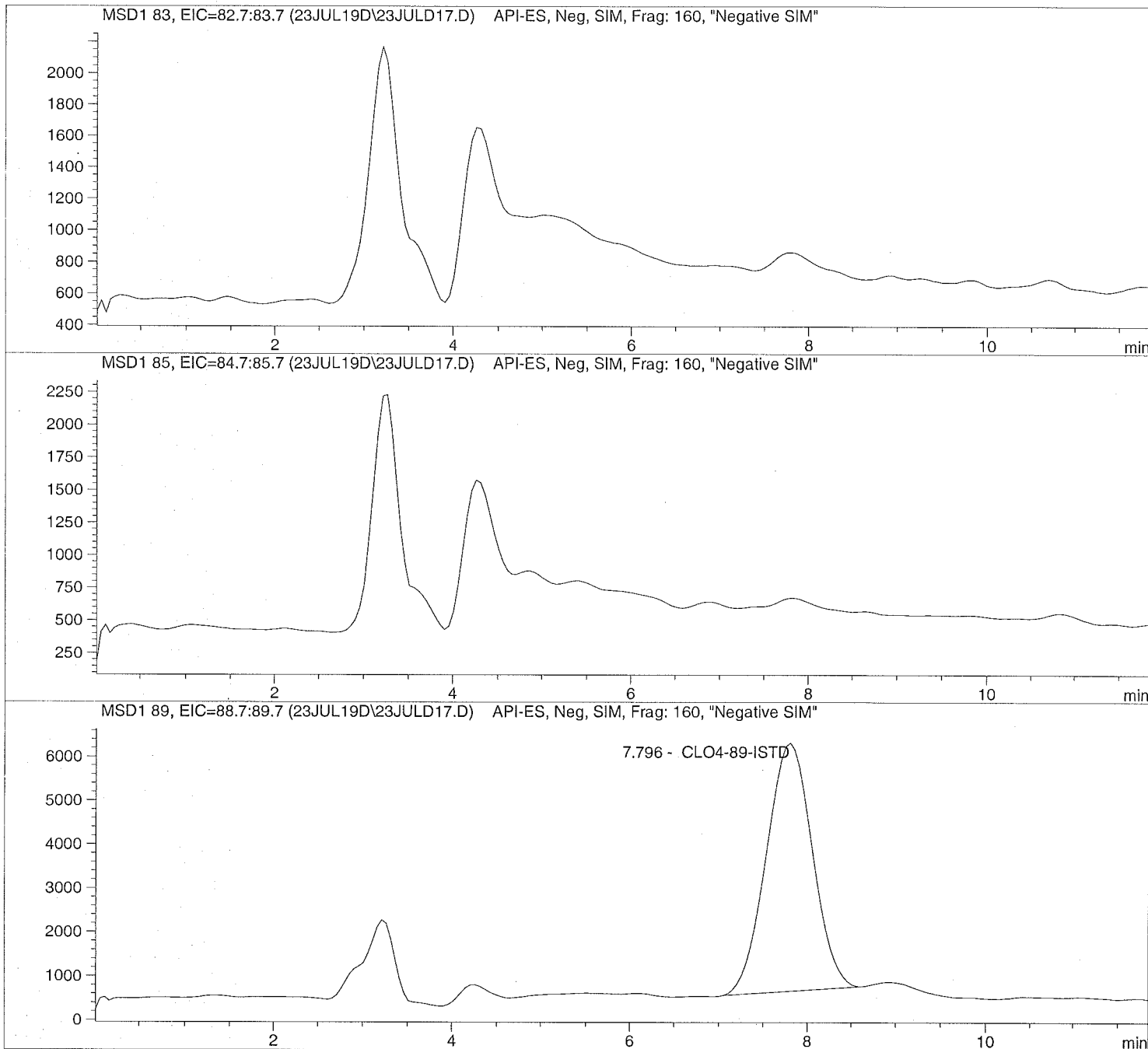
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.814	PBA	224656.6	5.0000	CLO4-89-ISTD

=====
\*\*\* End of Report \*\*\*

=====  
Injection Date: 7/23/2019 12:16:58                   Seq Line:                   17  
Sample Name: 1920572001                            Location:                   Vial 86  
Acq Operator: TNB                                   Inj. No.:                   1  
  Inj. Vol.:                   35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date: 7/23/2019 12:16:58      Seq Line:          17
Sample Name:    1920572001              Location:         Vial 86
Acq Operator:   TNB                     Inj. No.:        1
                                           Inj. Vol.:       35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.796	PBA	204102.5	5.0000	CLO4-89-ISTD

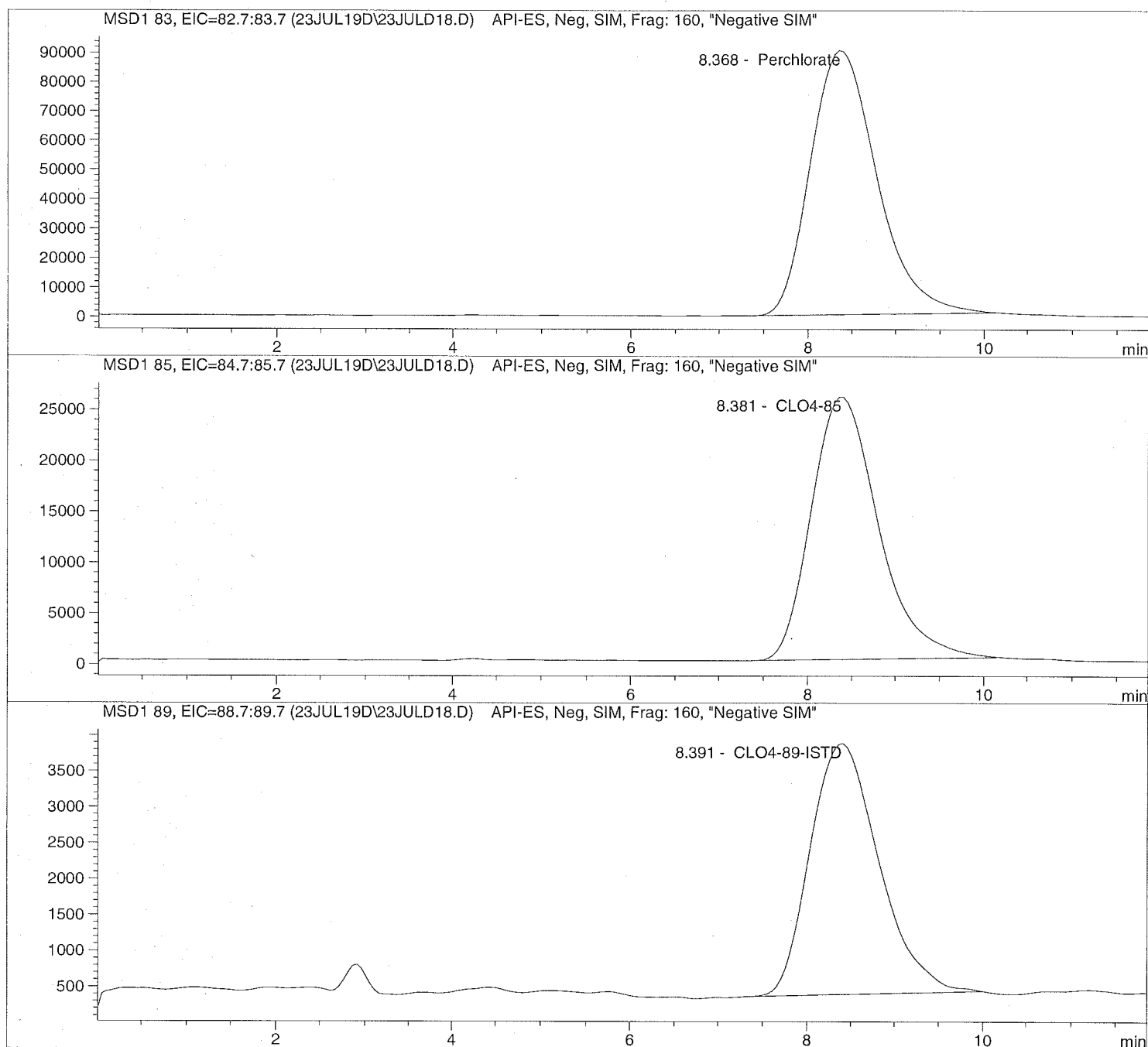
=====
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD18.D Sample Name: 1920581001 100

=====  
Injection Date: 7/23/2019 12:30:57 Seq Line: 18  
Sample Name: 1920581001 100 Location: Vial 87  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD19.D

Sample Name: 664927 CCV025

Injection Date: 7/23/2019 12:44:47

Seq Line: 19

Sample Name: 664927 CCV025

Location: Vial 71

Acq Operator: TNB

Inj. No.: 1

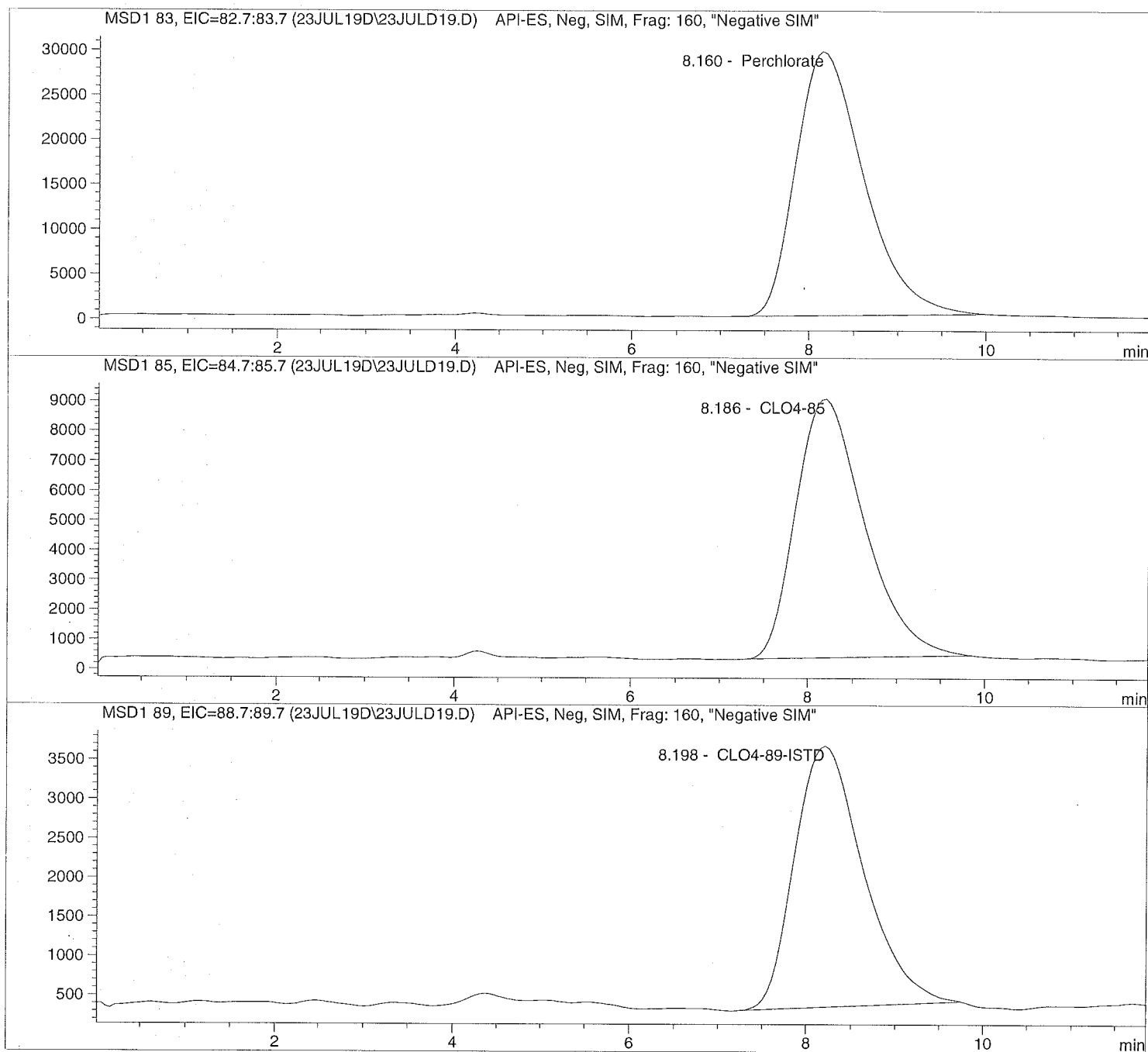
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD19.D Sample Name: 664927 CCV@25

=====  
 Injection Date: 7/23/2019 12:44:47 Seq Line: 19  
 Sample Name: 664927 CCV@25 Location: Vial 71  
 Acq Operator: TNB Inj. No.: 1  
 Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====  
 Sample Information  
 =====

Sorted By: Signal  
 Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am  
 Multiplier: 1.000000  
 Dilution: 1.000000  
 Sample Amount: 25.000

=====  
 LCMS Results  
 =====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.160	PBA	1565389.9	26.5099	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.186	PBA	466030.6	26.5949	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.198	PBA	179008.0	5.0000	CLO4-89-ISTD

=====  
 \*\*\* End of Report \*\*\*



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

## **Initial Calibration**

=====  
 Calibration Table  
 =====

Perchlorate

Calib. Data Modified : 3/19/2019 2:35:19 PM  
 Calculate : Internal Standard  
 Based on : Peak Area  
 Rel. Reference Window : 20.000 %  
 Abs. Reference Window : 0.000 min  
 Rel. Non-ref. Window : 20.000 %  
 Abs. Non-ref. Window : 0.000 min  
 Use Multiplier & Dilution Factor with ISTDs  
 Uncalibrated Peaks : not reported  
 Partial Calibration : No recalibration if peaks missing  
 Curve Type : Quadratic (some peaks differ, see below)  
 Origin : Ignored (some peaks differ, see below)  
 Weight : Linear (Amnt) (some peaks differ, see below)

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

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

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

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

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

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp	Name
8.744	1 1	1.00000	7.76074e4	1.28854e-5	1	Perchlorate
		2.00000	1.35273e5	1.47849e-5		
		5.00000	3.37764e5	1.48033e-5		
		10.00000	6.83454e5	1.46316e-5		
		25.00000	2.08433e6	1.19943e-5		
		50.00000	4.13334e6	1.20968e-5		
		75.00000	5.99313e6	1.25143e-5		
8.755	2 1	1.00000	2.36780e4	4.22333e-5	1	CL04-85
		2.00000	4.69486e4	4.25998e-5		
		5.00000	1.06124e5	4.71147e-5		
		10.00000	2.13523e5	4.68335e-5		
		25.00000	6.14295e5	4.06971e-5		
		50.00000	1.19814e6	4.17315e-5		
		75.00000	1.78355e6	4.20509e-5		
8.766	3 1	5.00000	2.73208e5	1.83011e-5	+I1	CLO4-89-ISTD
		5.00000	2.24886e5	2.22335e-5		
		5.00000	2.33196e5	2.14412e-5		
		5.00000	2.34454e5	2.13262e-5		
		5.00000	2.50568e5	1.99547e-5		
		5.00000	2.30977e5	2.16472e-5		

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

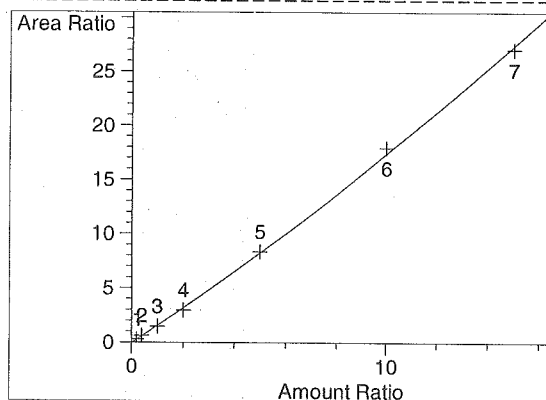
Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min  
 Curve Type : Linear  
 Origin : Included  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

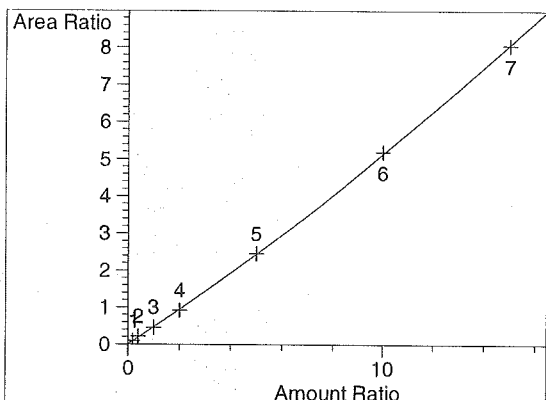
=====  
 Peak Sum Table  
 =====

\*\*\*No Entries in table\*\*\*  
 =====

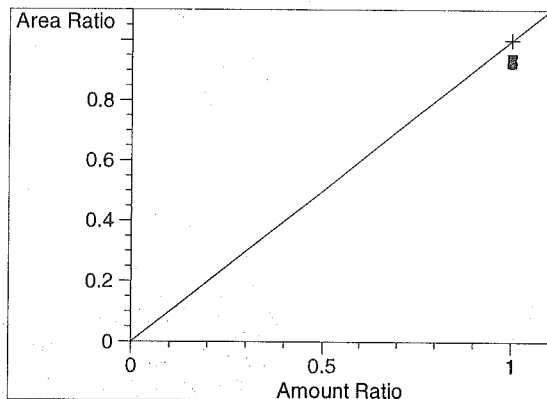
=====  
 Calibration Curves  
 =====



Perchlorate at exp. RT: 8.744  
 MSD1 83, EIC=82.7:83.7  
 Correlation: 0.99957  
 Residual Std. Dev.: 0.30744  
 Formula:  $y = ax^2 + bx + c$   
 a: 1.76988e-2  
 b: 1.56480  
 c: -4.92430e-2  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755  
 MSD1 85, EIC=84.7:85.7  
 Correlation: 0.99983  
 Residual Std. Dev.: 0.03473  
 Formula:  $y = ax^2 + bx + c$   
 a: 5.13396e-3  
 b: 4.62055e-1  
 c: 4.97209e-4  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766  
 MSD1 89, EIC=88.7:89.7  
 Correlation: 1.00000  
 Residual Std. Dev.: 0.00000  
 Formula:  $y = mx + b$   
 m: 1.00000  
 b: 0.00000  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

## Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

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

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	7.76074e4	8.744	1.06245
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	8.992	2.06969
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	8.586	4.73474
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	8.698	9.27727
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	8.451	25.29036
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	8.810	51.36844
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	8.586	74.16754
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	8.702	9.25940

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	8.755	9.30535e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	9.012	2.24255
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	8.602	4.86656
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	8.713	9.64312
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	8.468	25.12159
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	8.825	50.46721
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	8.603	74.72019
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	8.721	9.54024

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.73208e5	8.766	5.00000
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	9.012	5.00000
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	8.609	5.00000
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	8.716	5.00000
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	8.472	5.00000
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	8.825	5.00000
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	8.610	5.00000
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	8.725	5.00000

\*\*\* End of Report \*\*\*

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\MAR\19MAR19I.S

## Sequence Table:

## Method and Injection Info Part:

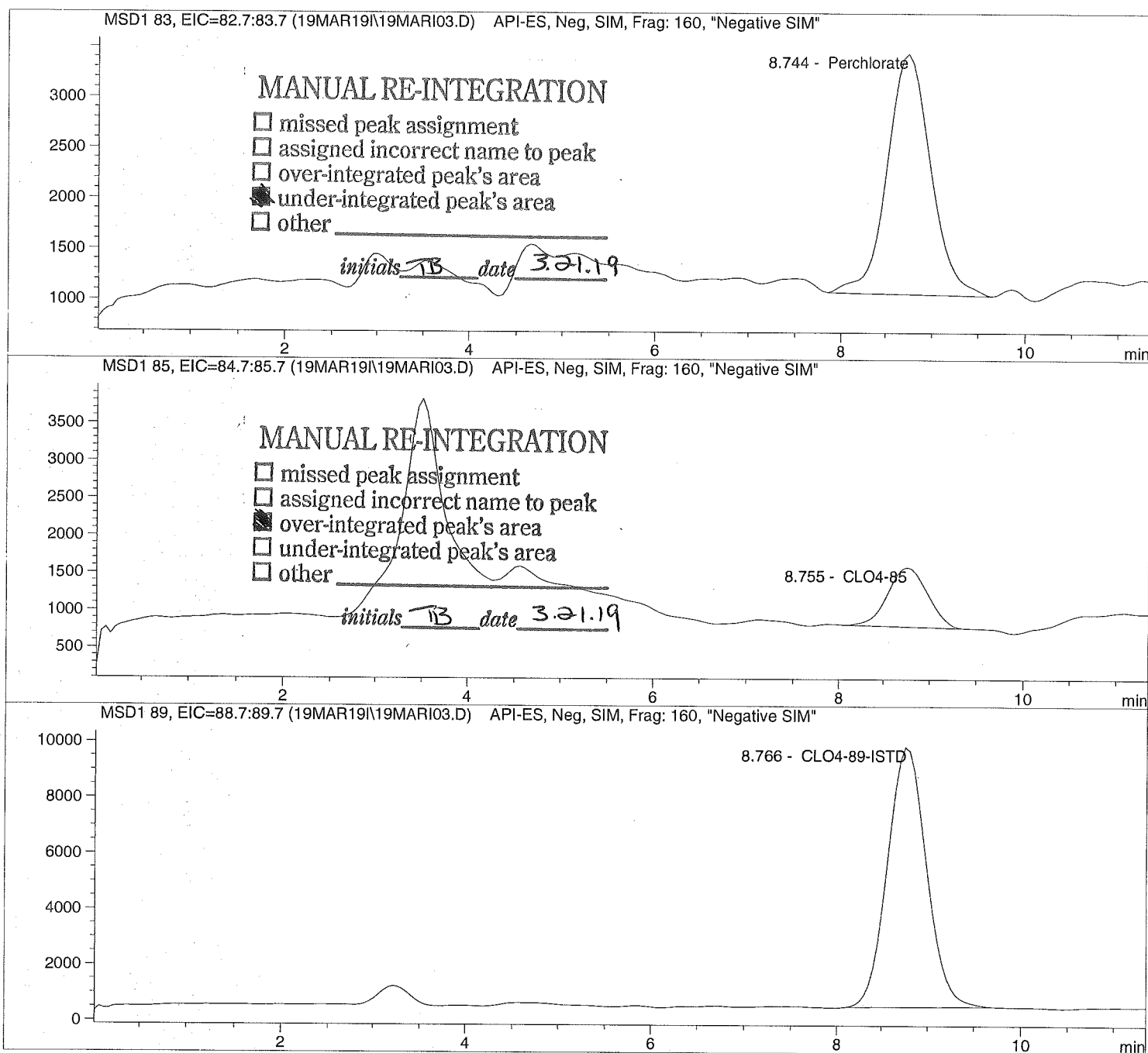
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	CLO4@ 0.2ug/L	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	CLO4@ 0.5ug/L	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	CLO4@ 1.0ug/L	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	CLO4@ 2.0ug/L	CLO4-AQN	1	Ctrl Samp		
5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

Data file: C:\HPCHEM\1\DATA\19MAR19\19MARI03.D Sample Name: CLO4@ 1.0ug/L

=====  
Injection Date: 3/19/2019 09:39:40 Seq Line: 3  
Sample Name: CLO4@ 1.0ug/L Location: Vial 73  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

## 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

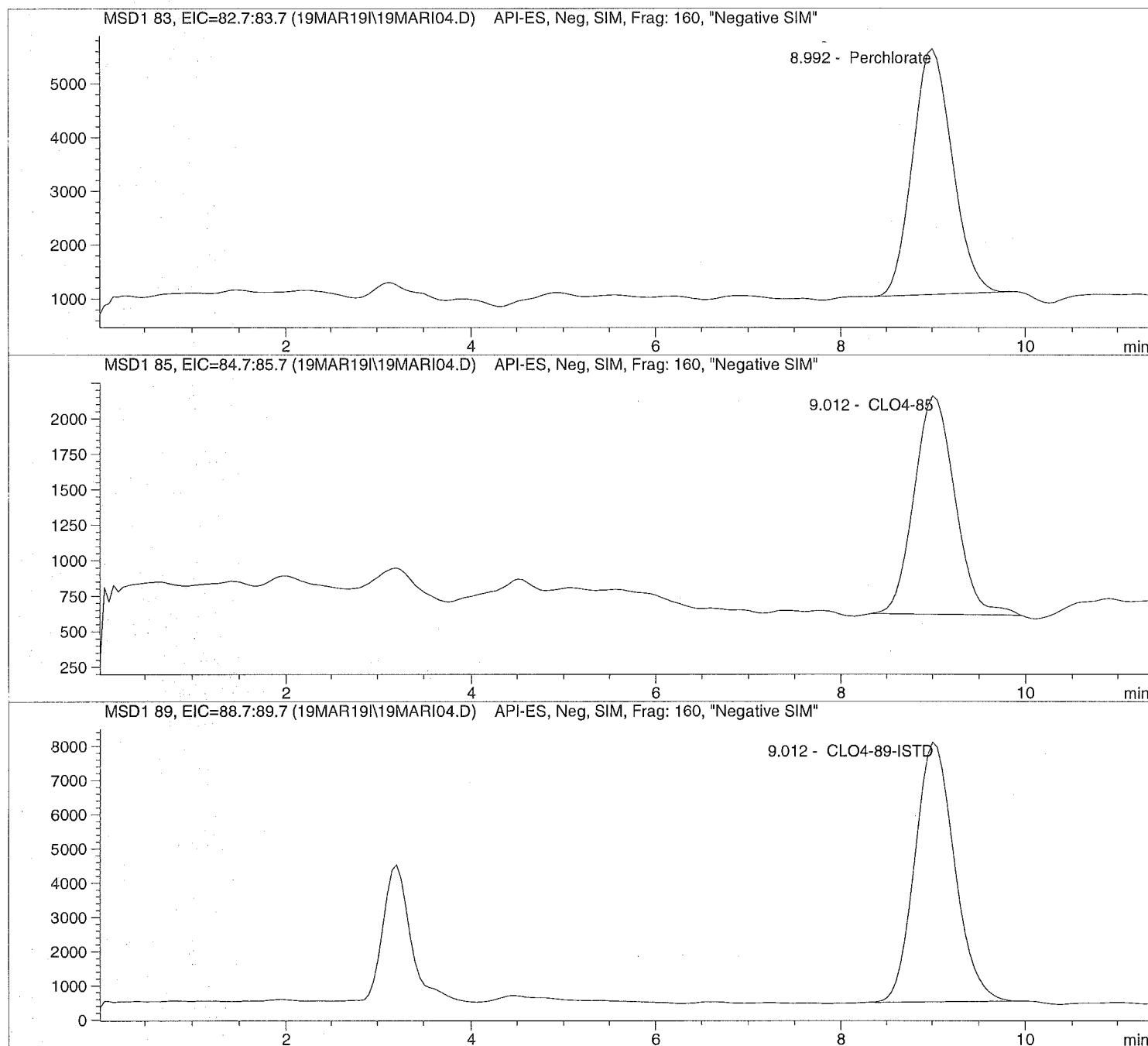
Sample Name: CLO4@ 2.0ug/L

Injection Date: 3/19/2019 09:53:00  
Sample Name: CLO4@ 2.0ug/L  
Acq Operator: TNB

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

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

## Perchlorate analysis



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

```

=====
Injection Date:  3/19/2019  09:53:00      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\19MAR19\19MARI05.D

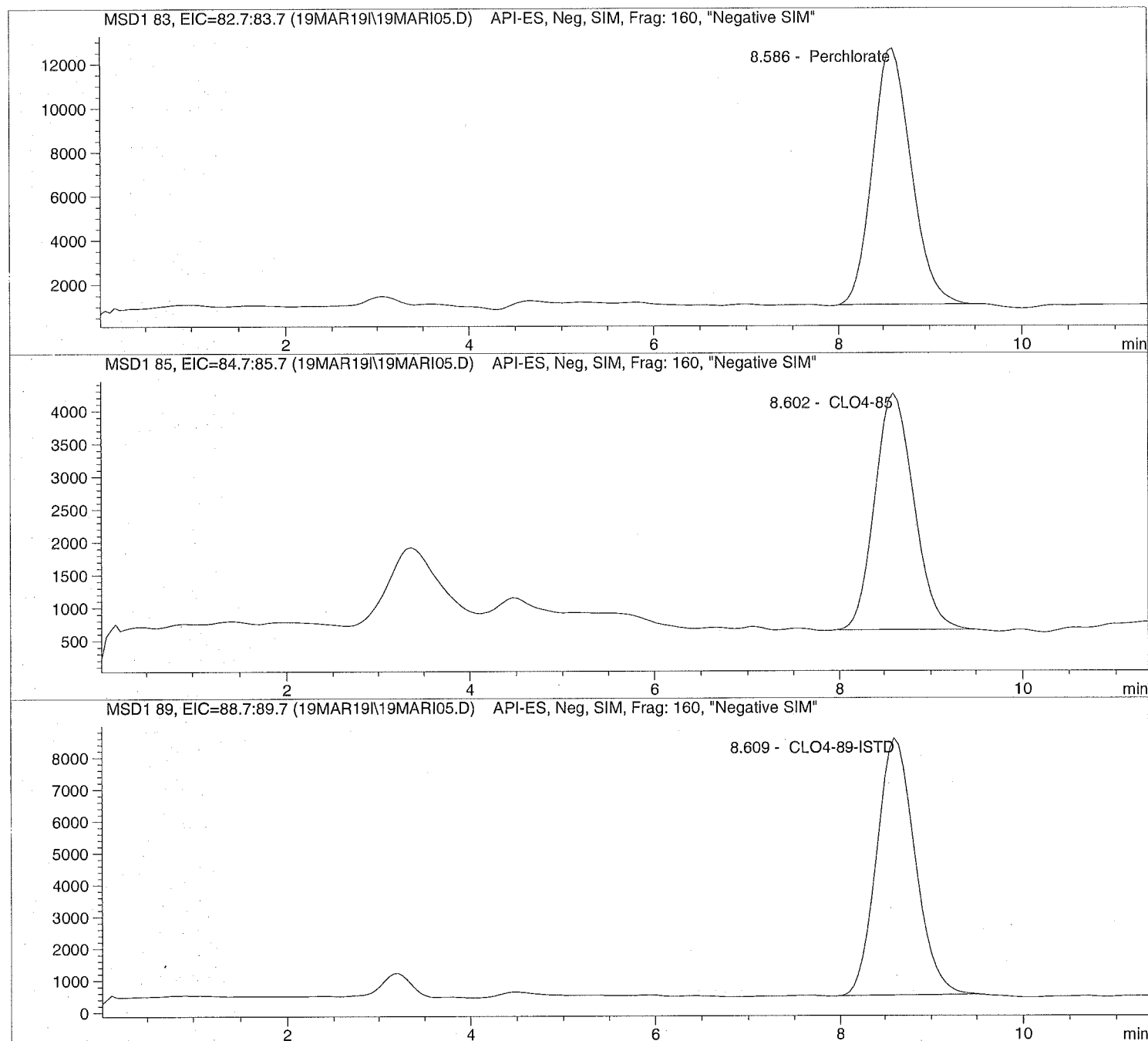
Sample Name: CLO4@ 5.0ug/L

=====  
Injection Date: 3/19/2019 10:06:16  
Sample Name: CLO4@ 5.0ug/L  
Acq Operator: TNB

Seq Line: 5  
Location: Vial 75  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



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\19MAR19\19MARI06.D

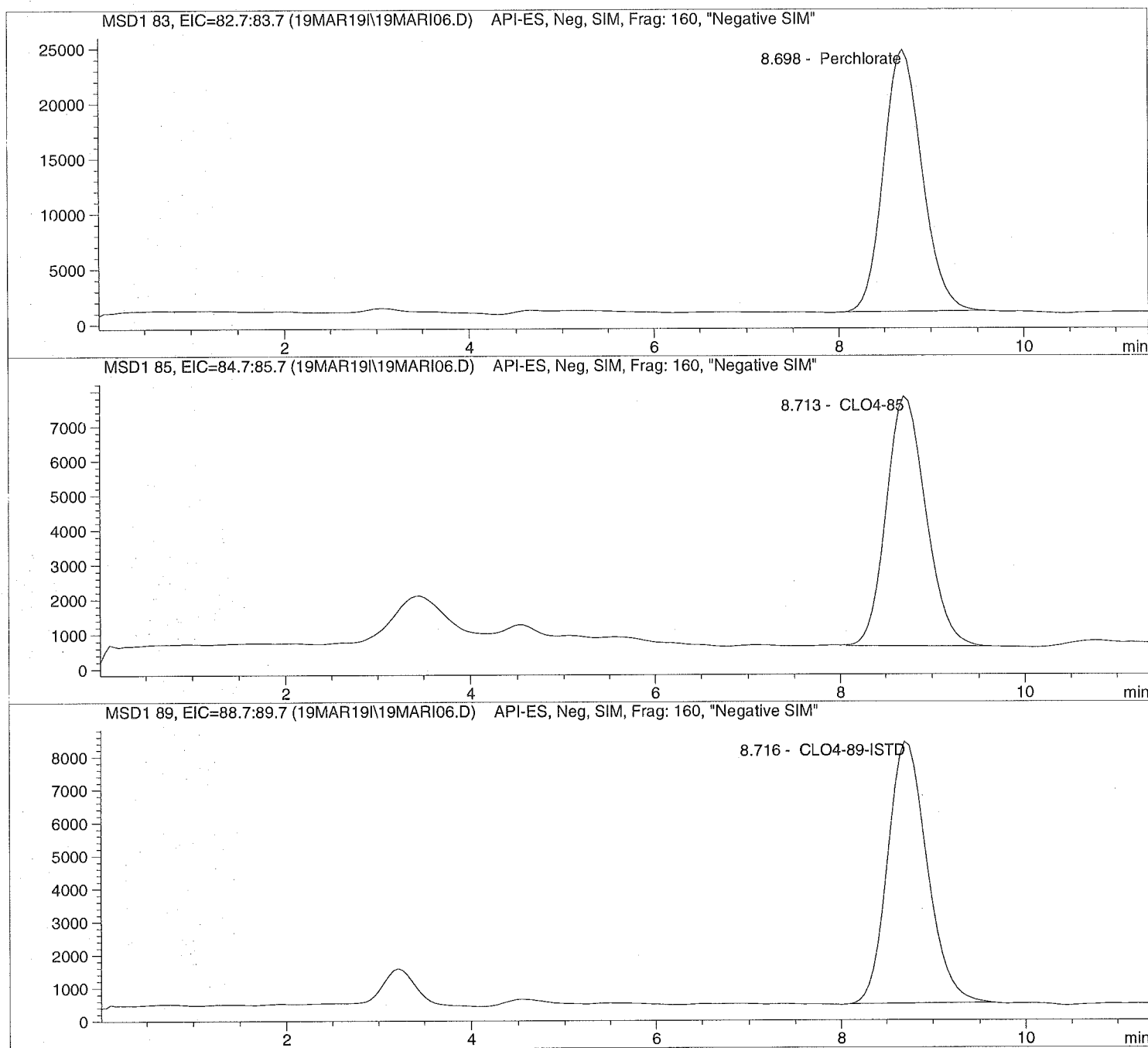
Sample Name: CLO4@ 10.ug/L

Injection Date: 3/19/2019 10:19:32  
Sample Name: CLO4@ 10.ug/L  
Acq Operator: TNB

Seq Line: 6  
Location: Vial 76  
Inj. No.: 1  
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\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

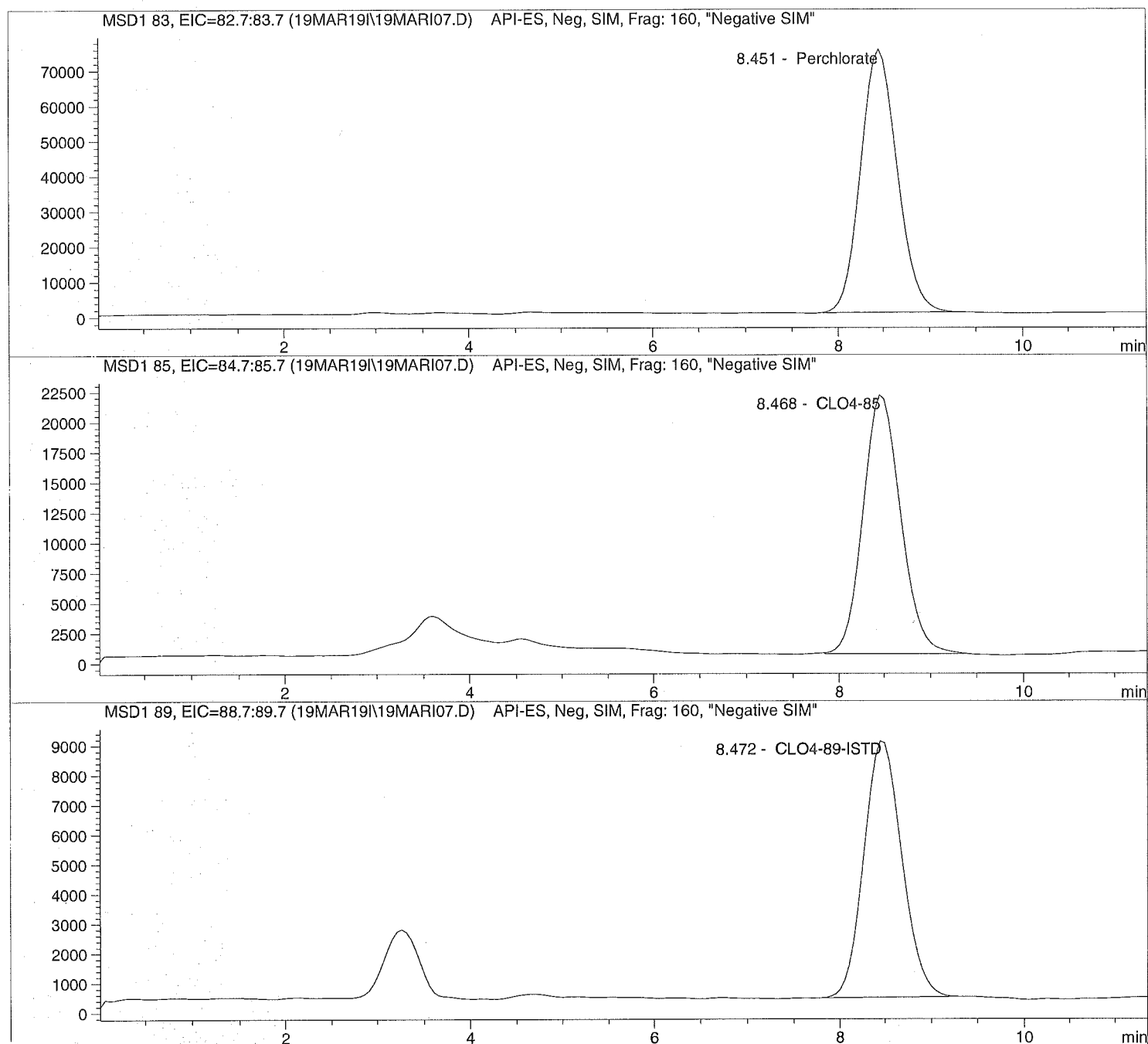
Inj. Vol.: 30 µl

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

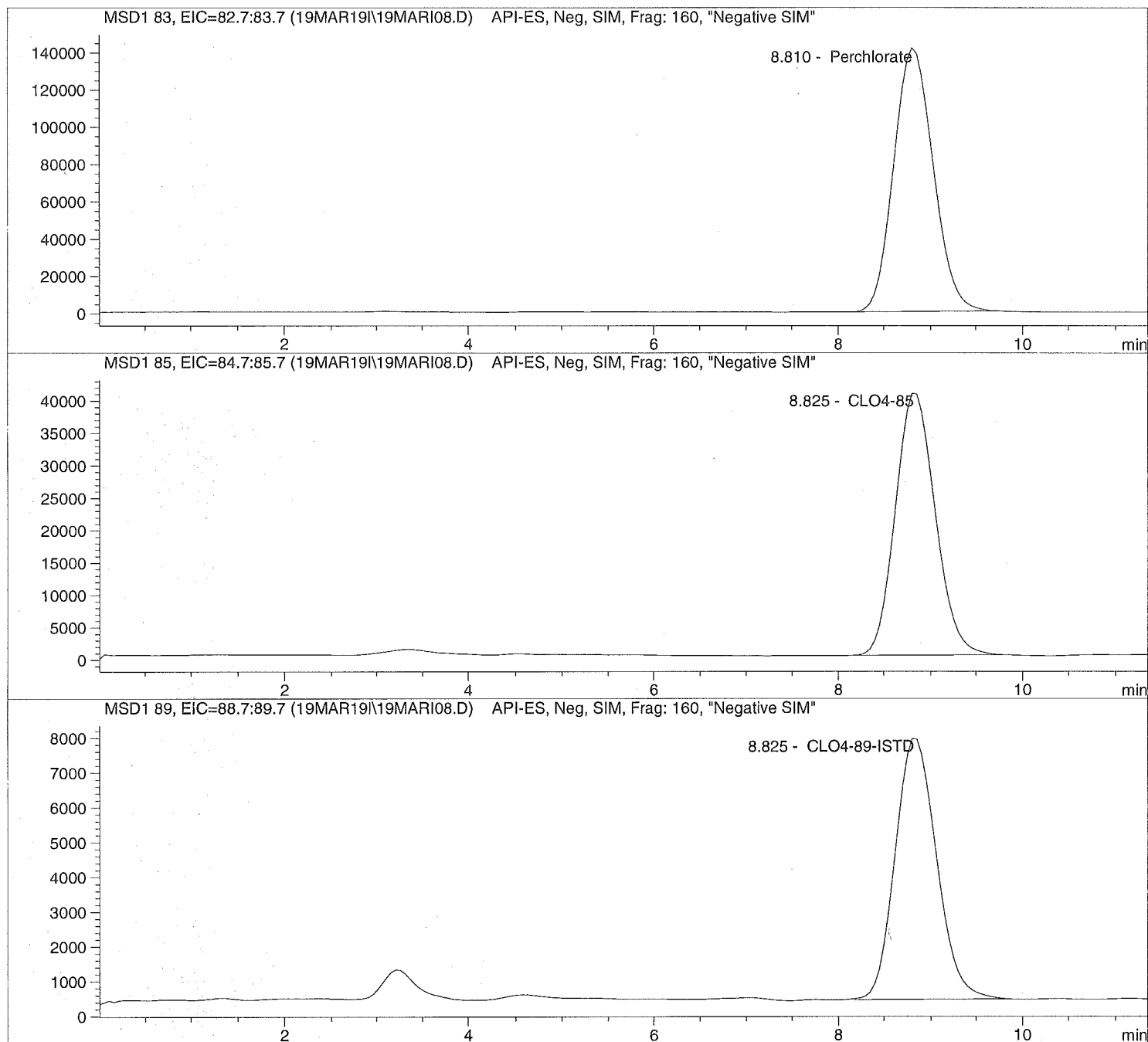
Inj. Vol.: 30 µl

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

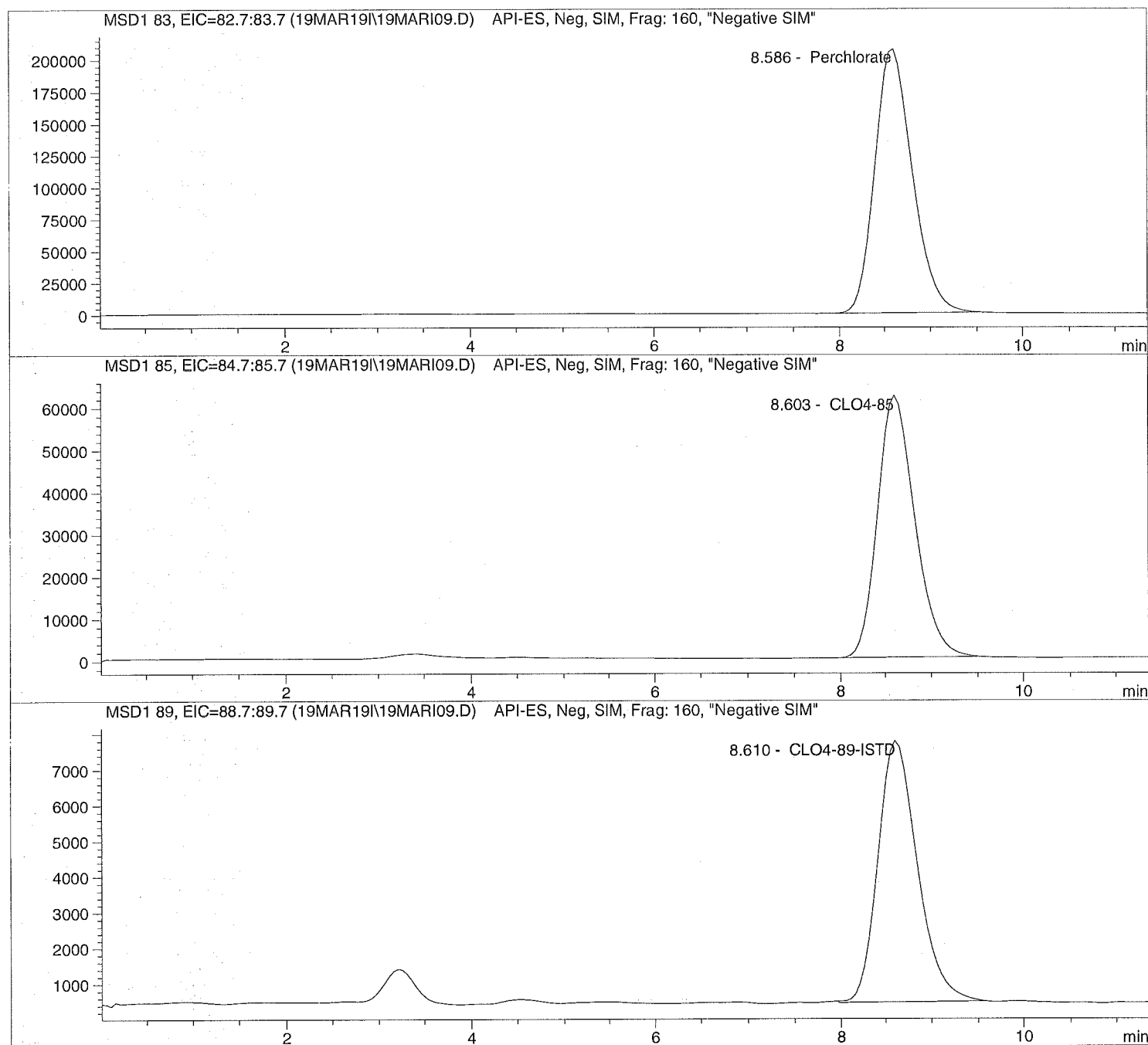
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\19MAR19\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

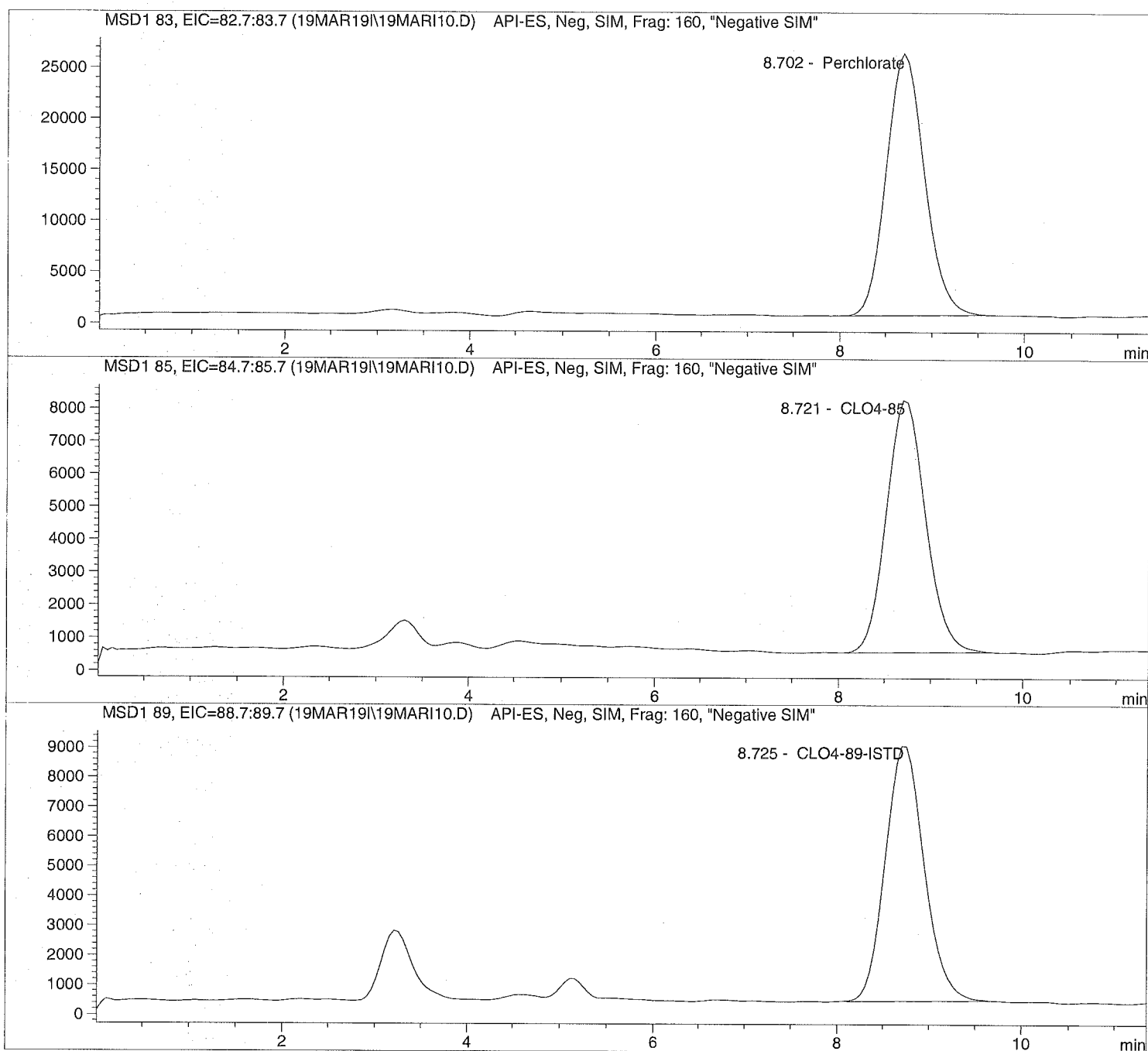
Sample Name: ICAL Verf@10ug/L

=====  
Injection Date: 3/19/2019 11:12:42  
Sample Name: ICAL Verf@10ug/L  
Acq Operator: TNB

Seq Line: 10  
Location: Vial 80  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D Sample Name: ICAL Verf@10ug/L

```

=====
Injection Date: 3/19/2019 11:12:42 Seq Line: 10
Sample Name: ICAL Verf@10ug/L Location: Vial 80
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 30 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 10.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

**Unmodified**



Data file: C:\HPCHEM\1\DATA\19MAR19\19MARI03.D

Sample Name: CLO4@ 1.0ug/L

Injection Date: 3/19/2019 09:39:40

Seq Line: 3

Sample Name: CLO4@ 1.0ug/L

Location: Vial 73

Acq Operator: TNB

Inj. No.: 1

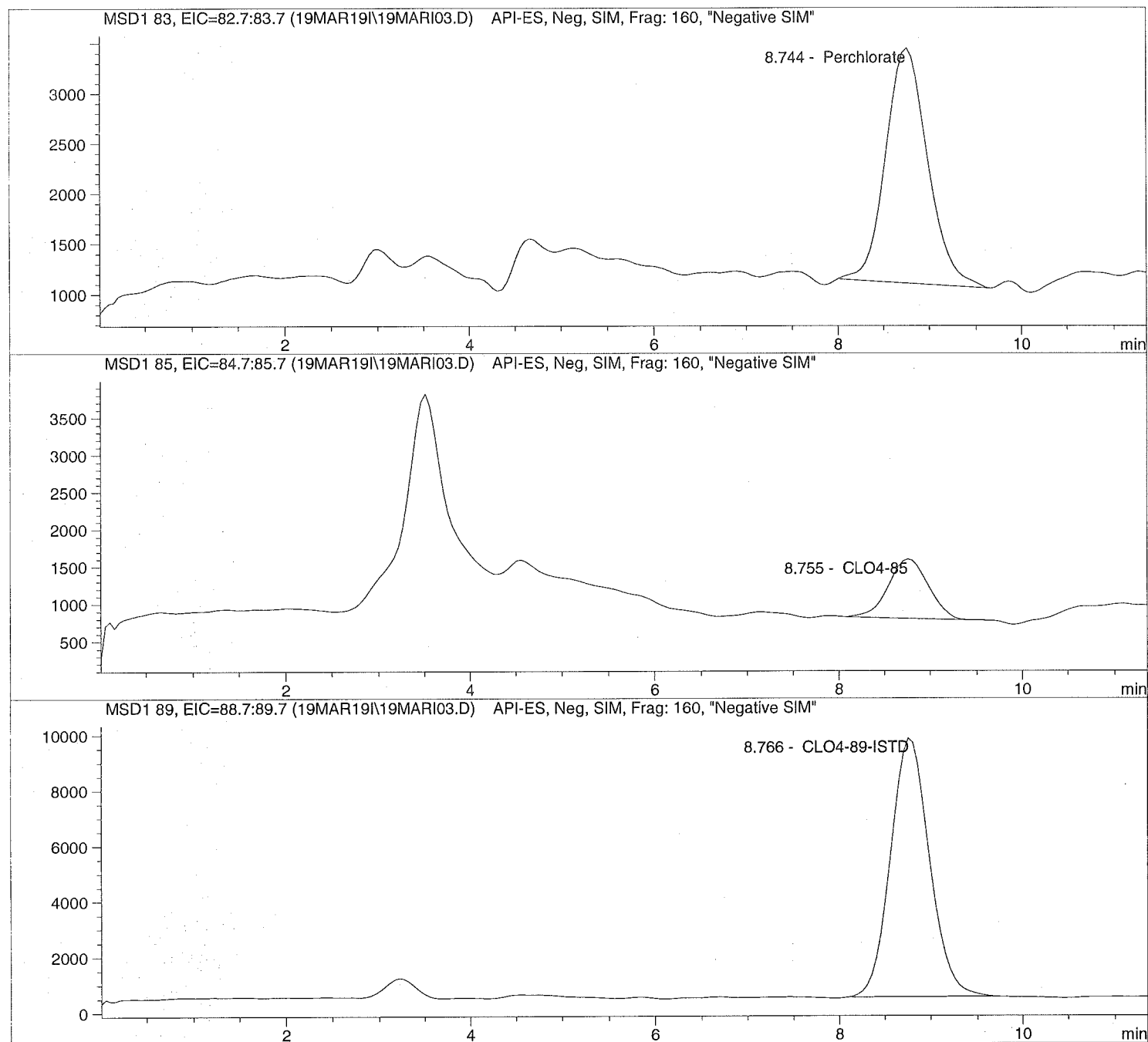
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:38:25

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI03.D      Sample Name: CLO4@ 1.0ug/L

```

=====
Injection Date:   3/19/2019  09:39:40      Seq Line:           3
Sample Name:     CLO4@ 1.0ug/L      Location:           Vial 73
Acq Operator:    TNB      Inj. No.:           1
                                           Inj. Vol.:          30 µl
=====

```

```

Acq. Method:     CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:    3/19/2019  14:38:25
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:       Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  1.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.744	BBA	74166.3	1.0224	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	BBA	24138.1	0.9487	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

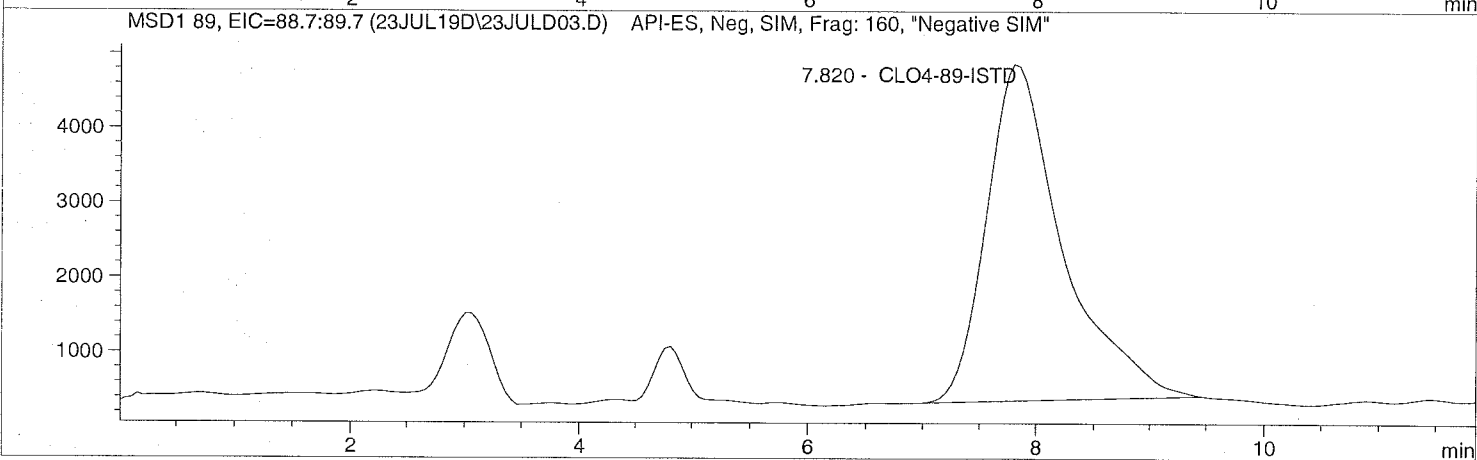
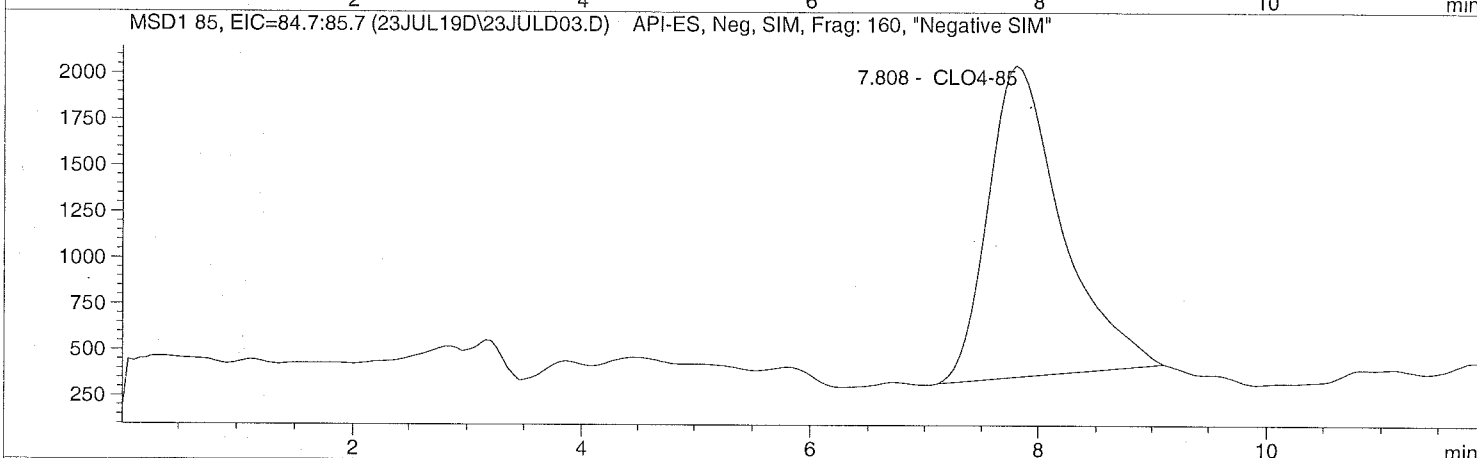
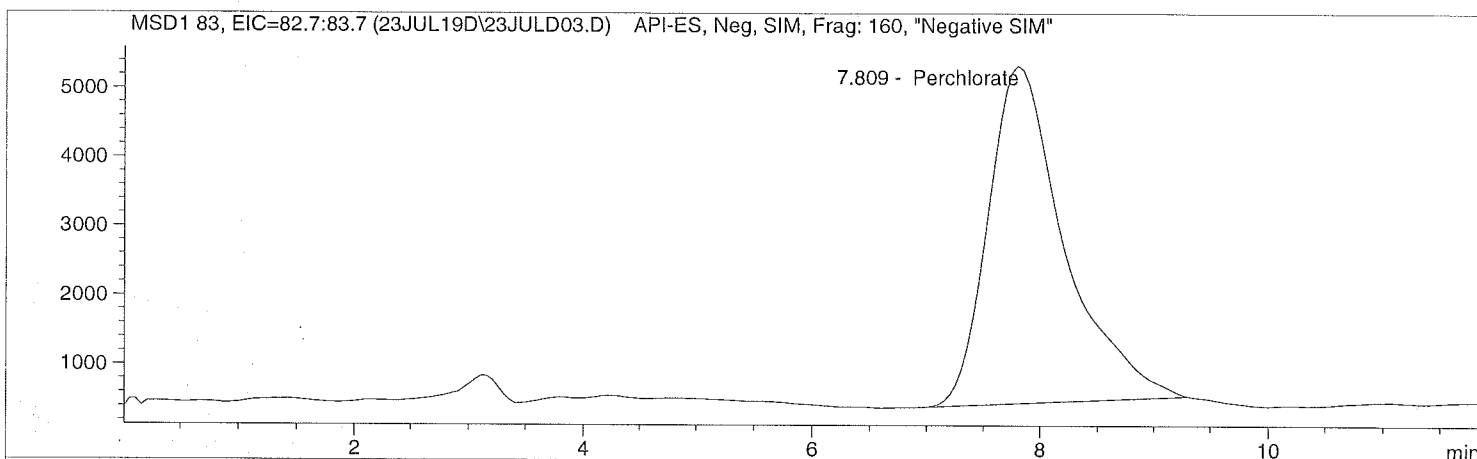
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD03.D Sample Name: 664921 ICS@4.0

=====  
Injection Date: 7/23/2019 09:01:39 Seq Line: 3  
Sample Name: 664921 ICS@4.0 Location: Vial 73  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====







---

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

July 29, 2019

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

Work Order: **HS19070824**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia,

ALS Environmental received 3 sample(s) on Jul 17, 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval scribble.

Generated By: JUMOKE.LAWAL  
RJ Modashia  
Project Manager

## ALS Houston, US

Date: 29-jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19070824

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19070824-01	LH18/24-SP650_071619	Water		16-Jul-2019 14:00	17-Jul-2019 08:56	<input type="checkbox"/>
HS19070824-02	Trip Blank	Water	C&G- 050119-184	16-Jul-2019 00:00	17-Jul-2019 08:56	<input type="checkbox"/>
HS19070824-03	LH18/24-SP650_071619-BIX	Water		16-Jul-2019 14:00	17-Jul-2019 08:56	<input type="checkbox"/>

**ALS Houston, US**

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.**CASE NARRATIVE****Project:** Longhorn GW Treatment Plant**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 Perchlorate was subcontracted to ALS Salt Lake City, UT. Final report attached.

---

**GCMS Semivolatiles by Method SW8270SIM****Batch ID: 143210**

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

---

**GCMS Volatiles by Method SW8260****Batch ID: R342595****Sample ID: CCV**

- Bromoform exceeded %D limits for CCV. Samples are ND for this compound.

---

**Metals by Method SW6020****Batch ID: 143326****Sample ID: HS19070622-01MSD**

- MSD is for an unrelated sample

---

**WetChemistry by Method SW7196****Batch ID: R342587**

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

## ALS Houston, US

Date: 29-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_071619  
 Collection Date: 16-Jul-2019 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19070824  
 Lab ID:HS19070824-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
<b>1,2-Dichloroethane</b>	<b>0.52</b>	<b>J</b>	<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	17-Jul-2019 14:00	
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	17-Jul-2019 14:00	
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	17-Jul-2019 14:00	
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	17-Jul-2019 14:00	
<b>Acetone</b>	<b>7.4</b>		<b>0.40</b>	<b>1.0</b>	<b>2.0</b>	<b>UG/L</b>	1	17-Jul-2019 14:00	
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	17-Jul-2019 14:00	
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	

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



## ALS Houston, US

Date: 29-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_071619  
 Collection Date: 16-Jul-2019 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19070824  
 Lab ID:HS19070824-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>						Analyst: PC	
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
<b>cis-1,2-Dichloroethene</b>	<b>2.3</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	17-Jul-2019 14:00	
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	17-Jul-2019 14:00	
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	17-Jul-2019 14:00	
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	17-Jul-2019 14:00	
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
<b>Trichloroethene</b>	<b>0.99</b>	<b>J</b>	<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	17-Jul-2019 14:00	
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 14:00	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>95.9</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	1	17-Jul-2019 14:00	
<i>Surr: 4-Bromofluorobenzene</i>	<i>104</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	1	17-Jul-2019 14:00	
<i>Surr: Dibromofluoromethane</i>	<i>96.5</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	1	17-Jul-2019 14:00	
<i>Surr: Toluene-d8</i>	<i>107</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	1	17-Jul-2019 14:00	
<b>SEMIVOLATILES SIM</b>		<b>Method:SW8270SIM</b>				Prep:SW3510 / 19-Jul-2019		Analyst: LG	
<b>1,4-Dioxane</b>	<b>12</b>		<b>1.0</b>	<b>1.0</b>	<b>1.0</b>	<b>ug/L</b>	100	23-Jul-2019 15:17	
<i>Surr: 2-Fluorobiphenyl</i>	<i>134</i>			<b>0</b>	<i>40-140</i>	<b>%REC</b>	100	23-Jul-2019 15:17	
<i>Surr: 4-Terphenyl-d14</i>	<i>121</i>			<b>0</b>	<i>40-140</i>	<b>%REC</b>	100	23-Jul-2019 15:17	
<i>Surr: Nitrobenzene-d5</i>	<i>111</i>			<b>0</b>	<i>40-140</i>	<b>%REC</b>	100	23-Jul-2019 15:17	
<b>METALS BY ICPMS BY SW6020A</b>		<b>Method:SW6020</b>				Prep:SW3010A / 24-Jul-2019		Analyst: JHD	
<b>Barium</b>	<b>0.0903</b>		<b>0.00190</b>	<b>0.00250</b>	<b>0.00500</b>	<b>mg/L</b>	1	25-Jul-2019 12:36	
Lead	0.00100	U	0.000600	0.00100	0.00500	mg/L	1	25-Jul-2019 12:36	
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	25-Jul-2019 12:36	
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	25-Jul-2019 12:36	

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

## ALS Houston, US

Date: 29-Jul-19

Client: Bhatte Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_071619  
 Collection Date: 16-Jul-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19070824  
 Lab ID:HS19070824-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>HEXAVALENT CHROMIUM BY SW7196A</b>		<b>Method:SW7196</b>		Analyst: MZD				
Chromium, Hexavalent	0.0100		0.00600	0.0100	0.0100	mg/L	1	17-Jul-2019 11:56

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

## ALS Houston, US

Date: 29-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: Trip Blank  
 Collection Date: 16-Jul-2019 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19070824  
 Lab ID:HS19070824-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	17-Jul-2019 13:12	
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	17-Jul-2019 13:12	
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	17-Jul-2019 13:12	
<b>Acetone</b>	<b>8.1</b>		<b>0.40</b>	<b>1.0</b>	<b>2.0</b>	<b>UG/L</b>	1	17-Jul-2019 13:12	
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	17-Jul-2019 13:12	
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	

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

## ALS Houston, US

Date: 29-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: Trip Blank  
 Collection Date: 16-Jul-2019 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19070824  
 Lab ID:HS19070824-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	17-Jul-2019 13:12	
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	17-Jul-2019 13:12	
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	17-Jul-2019 13:12	
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	17-Jul-2019 13:12	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>91.9</i>			<b>0</b>	<i>81-118</i>	<i>%REC</i>	<i>1</i>	<i>17-Jul-2019 13:12</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>98.7</i>			<b>0</b>	<i>85-114</i>	<i>%REC</i>	<i>1</i>	<i>17-Jul-2019 13:12</i>	
<i>Surr: Dibromofluoromethane</i>	<i>91.7</i>			<b>0</b>	<i>80-119</i>	<i>%REC</i>	<i>1</i>	<i>17-Jul-2019 13:12</i>	
<i>Surr: Toluene-d8</i>	<i>103</i>			<b>0</b>	<i>89-112</i>	<i>%REC</i>	<i>1</i>	<i>17-Jul-2019 13:12</i>	

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

## ALS Houston, US

Date: 29-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_071619-BIX  
 Collection Date: 16-Jul-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19070824  
 Lab ID:HS19070824-03  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>		Analyst: SUB				
Subcontract Analysis	See Attached		0	0		NA	1	26-Jul-2019 11:05

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

**WEIGHT LOG****Client:** Bhate Environmental Associates, Inc.**Project:** Longhorn GW Treatment Plant**WorkOrder:** HS19070824**Batch ID:** 143210      **Method:** SEMIVOLATILES SIM      **Prep:** 3510\_B\_SIM

<b>SampID</b>	<b>Container</b>	<b>Sample Wt/Vol</b>	<b>Final Volume</b>	<b>Prep Factor</b>
HS19070824-01	1	1000	1 (mL)	0.001

**Batch ID:** 143326      **Method:** METALS BY ICPMS BY SW6020A      **Prep:** 3010A

<b>SampID</b>	<b>Container</b>	<b>Sample Wt/Vol</b>	<b>Final Volume</b>	<b>Prep Factor</b>
HS19070824-01	1	10	10 (mL)	1

ALS Houston, US

Date: 29-jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> 143210 ( 0 )		<b>Test Name :</b> SEMIVOLATILES SIM			<b>Matrix:</b> Water	
HS19070824-01	LH18/24-SP650_071619	16 Jul 2019 14:00		19 Jul 2019 14:49	23 Jul 2019 15:17	100
<b>Batch ID:</b> 143326 ( 0 )		<b>Test Name :</b> METALS BY ICPMS BY SW6020A			<b>Matrix:</b> Water	
HS19070824-01	LH18/24-SP650_071619	16 Jul 2019 14:00		24 Jul 2019 09:30	25 Jul 2019 12:36	1
<b>Batch ID:</b> R342587 ( 0 )		<b>Test Name :</b> HEXAVALENT CHROMIUM BY SW7196A			<b>Matrix:</b> Water	
HS19070824-01	LH18/24-SP650_071619	16 Jul 2019 14:00			17 Jul 2019 11:56	1
<b>Batch ID:</b> R342595 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS19070824-01	LH18/24-SP650_071619	16 Jul 2019 14:00			17 Jul 2019 14:00	1
HS19070824-02	Trip Blank	16 Jul 2019 00:00			17 Jul 2019 13:12	1
<b>Batch ID:</b> R343090 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS19070824-03	LH18/24-SP650_071619-BIX	16 Jul 2019 14:00			26 Jul 2019 11:05	1

ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

**QC BATCH REPORT**

Batch ID: 143326 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A						
<b>MBLK</b>	Sample ID: <b>MBLK-143326</b>	Units: <b>mg/L</b>			Analysis Date: <b>25-Jul-2019 12:17</b>					
Client ID:	Run ID: <b>ICPMS05_343031</b>	SeqNo: <b>5180874</b>	PrepDate: <b>24-Jul-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.00250	0.00500								U
Lead	0.00100	0.00500								U
Selenium	0.00250	0.00500								U
Silver	0.000500	0.00500								U
<b>LCS</b>	Sample ID: <b>LCS-143326</b>	Units: <b>mg/L</b>			Analysis Date: <b>25-Jul-2019 12:20</b>					
Client ID:	Run ID: <b>ICPMS05_343031</b>	SeqNo: <b>5180875</b>	PrepDate: <b>24-Jul-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.04718	0.00500	0.05	0	94.4	86 - 114				
Lead	0.04852	0.00500	0.05	0	97.0	88 - 115				
Selenium	0.05187	0.00500	0.05	0	104	80 - 120				
Silver	0.0515	0.00500	0.05	0	103	85 - 116				
<b>MS</b>	Sample ID: <b>HS19070622-01MS</b>	Units: <b>mg/L</b>			Analysis Date: <b>25-Jul-2019 12:27</b>					
Client ID:	Run ID: <b>ICPMS05_343031</b>	SeqNo: <b>5180878</b>	PrepDate: <b>24-Jul-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.1207	0.00500	0.05	0.06556	110	86 - 114				
Lead	0.04902	0.00500	0.05	0.000925	96.2	88 - 115				
Selenium	0.05084	0.00500	0.05	0.001273	99.1	80 - 120				
Silver	0.04792	0.00500	0.05	0.000012	95.8	85 - 116				
<b>MSD</b>	Sample ID: <b>HS19070622-01MSD</b>	Units: <b>mg/L</b>			Analysis Date: <b>25-Jul-2019 15:43</b>					
Client ID:	Run ID: <b>ICPMS05_343031</b>	SeqNo: <b>5181045</b>	PrepDate: <b>24-Jul-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.124	0.00500	0.05	0.06556	117	86 - 114	0.1207	2.62	20	S
Lead	0.04903	0.00500	0.05	0.000925	96.2	88 - 115	0.04902	0.0143	20	
Selenium	0.05239	0.00500	0.05	0.001273	102	80 - 120	0.05084	3	20	
Silver	0.05214	0.00500	0.05	0	104	85 - 116	0.04792	8.44	20	



ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

**QC BATCH REPORT**

Batch ID: 143326 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A						
<b>PDS</b>	Sample ID: <b>HS19070622-01PDS</b>	Units: <b>mg/L</b>			Analysis Date: <b>25-Jul-2019 12:31</b>					
Client ID:	Run ID: <b>ICPMS05_343031</b>	SeqNo: <b>5180880</b>		PrepDate: <b>24-Jul-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Barium	0.1697	0.00500	0.1	0.06556	104	80 - 120				
Lead	0.09646	0.00500	0.1	0.000925	95.5	80 - 120				
Selenium	0.09668	0.00500	0.1	0.001273	95.4	80 - 120				
Silver	0.09841	0.00500	0.1	0.000012	98.4	80 - 120				
<b>SD</b>	Sample ID: <b>HS19070622-01SD</b>	Units: <b>mg/L</b>			Analysis Date: <b>25-Jul-2019 12:24</b>					
Client ID:	Run ID: <b>ICPMS05_343031</b>	SeqNo: <b>5180877</b>		PrepDate: <b>24-Jul-2019</b>		DF: <b>5</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	Limit Qual	
Barium	0.06576	0.0250					0.06556	0.294	10	
Lead	0.00500	0.0250					0.000925	0	10 U	
Selenium	0.0125	0.0250					0.001273	0	10 U	
Silver	0.00250	0.0250					0.000012	0	10 U	
The following samples were analyzed in this batch: <span style="border: 1px solid black; padding: 2px;">HS19070824-01</span>										

ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

**QC BATCH REPORT**

Batch ID: 143210 ( 0 )		Instrument: SV-5		Method: SEMIVOLATILES SIM						
<b>MBLK</b>	Sample ID: <b>MBLK-143210</b>	Units: <b>ug/L</b>			Analysis Date: <b>23-Jul-2019 12:18</b>					
Client ID:	Run ID: <b>SV-5_342903</b>	SeqNo: <b>5177215</b>		PrepDate: <b>19-Jul-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
1,4-Dioxane	0.010	0.010							U	
<i>Surr: 2-Fluorobiphenyl</i>	<i>0.09972</i>	<i>0</i>	<i>0.08</i>	<i>0</i>	<i>125</i>	<i>40 - 140</i>				
<i>Surr: 4-Terphenyl-d14</i>	<i>0.1059</i>	<i>0</i>	<i>0.08</i>	<i>0</i>	<i>132</i>	<i>40 - 140</i>				
<i>Surr: Nitrobenzene-d5</i>	<i>0.0985</i>	<i>0</i>	<i>0.08</i>	<i>0</i>	<i>123</i>	<i>40 - 140</i>				
<b>LCS</b>	Sample ID: <b>LCS-143210</b>	Units: <b>ug/L</b>			Analysis Date: <b>23-Jul-2019 12:50</b>					
Client ID:	Run ID: <b>SV-5_342903</b>	SeqNo: <b>5177216</b>		PrepDate: <b>19-Jul-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
1,4-Dioxane	0.07891	0.010	0.08	0	98.6	40 - 140				
<i>Surr: 2-Fluorobiphenyl</i>	<i>0.08669</i>	<i>0</i>	<i>0.08</i>	<i>0</i>	<i>108</i>	<i>40 - 140</i>				
<i>Surr: 4-Terphenyl-d14</i>	<i>0.1026</i>	<i>0</i>	<i>0.08</i>	<i>0</i>	<i>128</i>	<i>40 - 140</i>				
<i>Surr: Nitrobenzene-d5</i>	<i>0.1059</i>	<i>0</i>	<i>0.08</i>	<i>0</i>	<i>132</i>	<i>40 - 140</i>				
<b>LCSD</b>	Sample ID: <b>LCSD-143210</b>	Units: <b>ug/L</b>			Analysis Date: <b>23-Jul-2019 14:09</b>					
Client ID:	Run ID: <b>SV-5_342903</b>	SeqNo: <b>5177217</b>		PrepDate: <b>19-Jul-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
1,4-Dioxane	0.09392	0.010	0.08	0	117	40 - 140	0.07891	17.4	20	
<i>Surr: 2-Fluorobiphenyl</i>	<i>0.09439</i>	<i>0</i>	<i>0.08</i>	<i>0</i>	<i>118</i>	<i>40 - 140</i>	<i>0.08669</i>	<i>8.51</i>	<i>20</i>	
<i>Surr: 4-Terphenyl-d14</i>	<i>0.09713</i>	<i>0</i>	<i>0.08</i>	<i>0</i>	<i>121</i>	<i>40 - 140</i>	<i>0.1026</i>	<i>5.48</i>	<i>20</i>	
<i>Surr: Nitrobenzene-d5</i>	<i>0.09366</i>	<i>0</i>	<i>0.08</i>	<i>0</i>	<i>117</i>	<i>40 - 140</i>	<i>0.1059</i>	<i>12.3</i>	<i>20</i>	
The following samples were analyzed in this batch: <span style="border: 1px solid black; padding: 2px;">HS19070824-01</span>										

ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

**QC BATCH REPORT**

Batch ID: R342595 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MBLK	Sample ID: VBLKW-190717	Units: UG/L			Analysis Date: 17-Jul-2019 12:24					
Client ID:	Run ID: VOA6_342595	SeqNo: 5170289	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	0.50	1.0								U
1,1,1-Trichloroethane	0.50	1.0								U
1,1,2,2-Tetrachloroethane	0.50	1.0								U
1,1,2-Trichloroethane	0.50	1.0								U
1,1-Dichloroethane	0.50	1.0								U
1,1-Dichloroethene	0.50	1.0								U
1,1-Dichloropropene	0.50	1.0								U
1,2,3-Trichlorobenzene	0.50	1.0								U
1,2,3-Trichloropropane	0.50	1.0								U
1,2,4-Trichlorobenzene	0.50	1.0								U
1,2,4-Trimethylbenzene	0.50	1.0								U
1,2-Dibromo-3-chloropropane	0.50	1.0								U
1,2-Dibromoethane	0.50	1.0								U
1,2-Dichlorobenzene	0.50	1.0								U
1,2-Dichloroethane	0.50	1.0								U
1,2-Dichloropropane	0.50	1.0								U
1,3,5-Trimethylbenzene	0.50	1.0								U
1,3-Dichlorobenzene	0.50	1.0								U
1,3-Dichloropropane	0.50	1.0								U
1,4-Dichlorobenzene	0.50	1.0								U
2,2-Dichloropropane	0.50	1.0								U
2-Butanone	1.0	2.0								U
2-Chlorotoluene	0.50	1.0								U
2-Hexanone	1.0	2.0								U
4-Chlorotoluene	0.50	1.0								U
4-Isopropyltoluene	0.50	1.0								U
4-Methyl-2-pentanone	1.0	2.0								U
Acetone	1.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U
Bromomethane	0.50	1.0								U

## ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

## QC BATCH REPORT

Batch ID: R342595 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MBLK	Sample ID: VBLKW-190717	Units: UG/L			Analysis Date: 17-Jul-2019 12:24					
Client ID:	Run ID: VOA6_342595	SeqNo: 5170289	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	1.0	2.0								U
Carbon tetrachloride	0.50	1.0								U
Chlorobenzene	0.50	1.0								U
Chloroethane	0.50	1.0								U
Chloroform	0.50	1.0								U
Chloromethane	0.50	1.0								U
cis-1,2-Dichloroethene	0.50	1.0								U
cis-1,3-Dichloropropene	0.50	1.0								U
Dibromochloromethane	0.50	1.0								U
Dibromomethane	0.50	1.0								U
Dichlorodifluoromethane	0.50	1.0								U
Ethylbenzene	0.50	1.0								U
Hexachlorobutadiene	1.0	1.0								U
Isopropylbenzene	0.50	1.0								U
m,p-Xylene	1.0	2.0								U
Methylene chloride	1.0	2.0								U
Naphthalene	0.50	1.0								U
n-Butylbenzene	0.50	1.0								U
n-Propylbenzene	0.50	1.0								U
o-Xylene	0.50	1.0								U
sec-Butylbenzene	0.50	1.0								U
Styrene	0.50	1.0								U
tert-Butylbenzene	0.50	1.0								U
Tetrachloroethene	0.50	1.0								U
Toluene	0.50	1.0								U
trans-1,2-Dichloroethene	0.50	1.0								U
trans-1,3-Dichloropropene	0.50	1.0								U
Trichloroethene	0.50	1.0								U
Trichlorofluoromethane	0.50	1.0								U
Vinyl chloride	0.50	1.0								U
Surr: 1,2-Dichloroethane-d4	50.53	1.0	50	0	101	81 - 118				
Surr: 4-Bromofluorobenzene	54.47	1.0	50	0	109	85 - 114				
Surr: Dibromofluoromethane	50.65	1.0	50	0	101	80 - 119				
Surr: Toluene-d8	55.93	1.0	50	0	112	89 - 112				

ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

**QC BATCH REPORT**

Batch ID: R342595 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS	Sample ID: VLCSW-190717	Units: UG/L			Analysis Date: 17-Jul-2019 11:36					
Client ID:	Run ID: VOA6_342595	SeqNo: 5170288	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	22.74	1.0	20	0	114	78 - 124				
1,1,1-Trichloroethane	20.49	1.0	20	0	102	74 - 131				
1,1,2,2-Tetrachloroethane	21.54	1.0	20	0	108	71 - 121				
1,1,2-Trichloroethane	21.76	1.0	20	0	109	80 - 119				
1,1-Dichloroethane	20.7	1.0	20	0	103	77 - 125				
1,1-Dichloroethene	19.83	1.0	20	0	99.1	71 - 131				
1,1-Dichloropropene	20.95	1.0	20	0	105	78 - 125				
1,2,3-Trichlorobenzene	16.64	1.0	20	0	83.2	69 - 129				
1,2,3-Trichloropropane	19.79	1.0	20	0	99.0	73 - 122				
1,2,4-Trichlorobenzene	17.65	1.0	20	0	88.3	69 - 130				
1,2,4-Trimethylbenzene	20.6	1.0	20	0	103	76 - 124				
1,2-Dibromo-3-chloropropane	20.19	1.0	20	0	101	62 - 128				
1,2-Dibromoethane	22.08	1.0	20	0	110	77 - 121				
1,2-Dichlorobenzene	20.65	1.0	20	0	103	80 - 119				
1,2-Dichloroethane	21.2	1.0	20	0	106	73 - 128				
1,2-Dichloropropane	22.34	1.0	20	0	112	78 - 122				
1,3,5-Trimethylbenzene	20.53	1.0	20	0	103	75 - 124				
1,3-Dichlorobenzene	21.06	1.0	20	0	105	80 - 119				
1,3-Dichloropropane	22.02	1.0	20	0	110	80 - 119				
1,4-Dichlorobenzene	20.42	1.0	20	0	102	79 - 118				
2,2-Dichloropropane	21.43	1.0	20	0	107	60 - 139				
2-Butanone	43.44	2.0	40	0	109	56 - 143				
2-Chlorotoluene	20.47	1.0	20	0	102	79 - 122				
2-Hexanone	44.93	2.0	40	0	112	57 - 139				
4-Chlorotoluene	20.4	1.0	20	0	102	78 - 122				
4-Isopropyltoluene	20.26	1.0	20	0	101	77 - 127				
4-Methyl-2-pentanone	43.83	2.0	40	0	110	67 - 130				
Acetone	51.22	2.0	40	0	128	39 - 160				
Benzene	21.65	1.0	20	0	108	79 - 120				
Bromobenzene	21.74	1.0	20	0	109	80 - 120				
Bromochloromethane	20.38	1.0	20	0	102	78 - 123				
Bromodichloromethane	22.06	1.0	20	0	110	79 - 125				
Bromoform	22.57	1.0	20	0	113	66 - 130				
Bromomethane	23.23	1.0	20	0	116	53 - 141				

## ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

## QC BATCH REPORT

Batch ID: R342595 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS	Sample ID: VLCSW-190717	Units: UG/L			Analysis Date: 17-Jul-2019 11:36					
Client ID:	Run ID: VOA6_342595	SeqNo: 5170288	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	41.68	2.0	40	0	104	64 - 133				
Carbon tetrachloride	20.12	1.0	20	0	101	72 - 136				
Chlorobenzene	21.89	1.0	20	0	109	82 - 118				
Chloroethane	19.78	1.0	20	0	98.9	60 - 138				
Chloroform	21.25	1.0	20	0	106	79 - 124				
Chloromethane	22.16	1.0	20	0	111	50 - 139				
cis-1,2-Dichloroethene	20.61	1.0	20	0	103	78 - 123				
cis-1,3-Dichloropropene	22.54	1.0	20	0	113	75 - 124				
Dibromochloromethane	22.45	1.0	20	0	112	74 - 126				
Dibromomethane	21.24	1.0	20	0	106	79 - 123				
Dichlorodifluoromethane	20.61	1.0	20	0	103	32 - 152				
Ethylbenzene	21.76	1.0	20	0	109	79 - 121				
Hexachlorobutadiene	19.87	1.0	20	0	99.3	66 - 134				
Isopropylbenzene	21.13	1.0	20	0	106	72 - 131				
m,p-Xylene	43.69	2.0	40	0	109	80 - 121				
Methylene chloride	20.53	2.0	20	0	103	74 - 124				
Naphthalene	16.3	1.0	20	0	81.5	61 - 128				
n-Butylbenzene	21.39	1.0	20	0	107	75 - 128				
n-Propylbenzene	20.26	1.0	20	0	101	76 - 126				
o-Xylene	21.41	1.0	20	0	107	78 - 122				
sec-Butylbenzene	19.9	1.0	20	0	99.5	77 - 126				
Styrene	22.31	1.0	20	0	112	78 - 123				
tert-Butylbenzene	19.9	1.0	20	0	99.5	78 - 124				
Tetrachloroethene	22.4	1.0	20	0	112	74 - 129				
Toluene	22.64	1.0	20	0	113	80 - 121				
trans-1,2-Dichloroethene	21.17	1.0	20	0	106	75 - 124				
trans-1,3-Dichloropropene	22.07	1.0	20	0	110	73 - 127				
Trichloroethene	21.35	1.0	20	0	107	79 - 123				
Trichlorofluoromethane	19.58	1.0	20	0	97.9	65 - 141				
Vinyl chloride	20.3	1.0	20	0	102	58 - 137				
Surr: 1,2-Dichloroethane-d4	47.06	1.0	50	0	94.1	81 - 118				
Surr: 4-Bromofluorobenzene	49.63	1.0	50	0	99.3	85 - 114				
Surr: Dibromofluoromethane	47.68	1.0	50	0	95.4	80 - 119				
Surr: Toluene-d8	49.83	1.0	50	0	99.7	89 - 112				

ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

**QC BATCH REPORT**

Batch ID: R342595 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS	Sample ID: HS19070675-01MS	Units: UG/L			Analysis Date: 17-Jul-2019 14:24					
Client ID:	Run ID: VOA6_342595	SeqNo: 5171424	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	22930	1000	20000	0	115	78 - 124				
1,1,1-Trichloroethane	21910	1000	20000	0	110	74 - 131				
1,1,2,2-Tetrachloroethane	21930	1000	20000	0	110	71 - 121				
1,1,2-Trichloroethane	22150	1000	20000	0	111	80 - 119				
1,1-Dichloroethane	21520	1000	20000	0	108	77 - 125				
1,1-Dichloroethene	20920	1000	20000	0	105	71 - 131				
1,1-Dichloropropene	22140	1000	20000	0	111	78 - 125				
1,2,3-Trichlorobenzene	18500	1000	20000	0	92.5	69 - 129				
1,2,3-Trichloropropane	20530	1000	20000	0	103	73 - 122				
1,2,4-Trichlorobenzene	19760	1000	20000	0	98.8	69 - 130				
1,2,4-Trimethylbenzene	22780	1000	20000	0	114	76 - 124				
1,2-Dibromo-3-chloropropane	21450	1000	20000	0	107	62 - 128				
1,2-Dibromoethane	22380	1000	20000	0	112	77 - 121				
1,2-Dichlorobenzene	21890	1000	20000	0	109	80 - 119				
1,2-Dichloroethane	21420	1000	20000	0	107	73 - 128				
1,2-Dichloropropane	22230	1000	20000	0	111	78 - 122				
1,3,5-Trimethylbenzene	22650	1000	20000	0	113	75 - 124				
1,3-Dichlorobenzene	22550	1000	20000	0	113	80 - 119				
1,3-Dichloropropane	22260	1000	20000	0	111	80 - 119				
1,4-Dichlorobenzene	21620	1000	20000	0	108	79 - 118				
2,2-Dichloropropane	22250	1000	20000	0	111	60 - 139				
2-Butanone	43080	2000	40000	0	108	56 - 143				
2-Chlorotoluene	21800	1000	20000	0	109	79 - 122				
2-Hexanone	43630	2000	40000	0	109	57 - 139				
4-Chlorotoluene	21890	1000	20000	0	109	78 - 122				
4-Isopropyltoluene	23230	1000	20000	0	116	77 - 127				
4-Methyl-2-pentanone	44420	2000	40000	0	111	67 - 130				
Acetone	42230	2000	40000	0	106	39 - 160				
Benzene	23600	1000	20000	1600	110	79 - 120				
Bromobenzene	22460	1000	20000	0	112	80 - 120				
Bromochloromethane	21400	1000	20000	0	107	78 - 123				
Bromodichloromethane	22040	1000	20000	0	110	79 - 125				
Bromoform	22990	1000	20000	0	115	66 - 130				
Bromomethane	21120	1000	20000	0	106	53 - 141				

## ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

## QC BATCH REPORT

Batch ID: R342595 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS	Sample ID: HS19070675-01MS	Units: UG/L			Analysis Date: 17-Jul-2019 14:24					
Client ID:	Run ID: VOA6_342595	SeqNo: 5171424	PrepDate:	DF: 1000						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	43650	2000	40000	0	109	64 - 133				
Carbon tetrachloride	22080	1000	20000	0	110	72 - 136				
Chlorobenzene	31950	1000	20000	8788	116	82 - 118				
Chloroethane	19850	1000	20000	0	99.3	60 - 138				
Chloroform	23620	1000	20000	1213	112	79 - 124				
Chloromethane	20780	1000	20000	0	104	50 - 139				
cis-1,2-Dichloroethene	21170	1000	20000	0	106	78 - 123				
cis-1,3-Dichloropropene	22660	1000	20000	0	113	75 - 124				
Dibromochloromethane	22710	1000	20000	0	114	74 - 126				
Dibromomethane	21530	1000	20000	0	108	79 - 123				
Dichlorodifluoromethane	15500	1000	20000	0	77.5	32 - 152				
Ethylbenzene	23150	1000	20000	0	116	79 - 121				
Hexachlorobutadiene	22650	1000	20000	0	113	66 - 134				
Isopropylbenzene	23970	1000	20000	0	120	72 - 131				
m,p-Xylene	47220	2000	40000	0	118	80 - 121				
Methylene chloride	22020	2000	20000	1279	104	74 - 124				
Naphthalene	17820	1000	20000	0	89.1	61 - 128				
n-Butylbenzene	24340	1000	20000	0	122	75 - 128				
n-Propylbenzene	22910	1000	20000	0	115	76 - 126				
o-Xylene	22780	1000	20000	0	114	78 - 122				
sec-Butylbenzene	23430	1000	20000	0	117	77 - 126				
Styrene	23160	1000	20000	0	116	78 - 123				
tert-Butylbenzene	23180	1000	20000	0	116	78 - 124				
Tetrachloroethene	24910	1000	20000	0	125	74 - 129				
Toluene	23020	1000	20000	0	115	80 - 121				
trans-1,2-Dichloroethene	21760	1000	20000	0	109	75 - 124				
trans-1,3-Dichloropropene	22160	1000	20000	0	111	73 - 127				
Trichloroethene	22120	1000	20000	0	111	79 - 123				
Trichlorofluoromethane	20740	1000	20000	0	104	65 - 141				
Vinyl chloride	18580	1000	20000	0	92.9	58 - 137				
Surr: 1,2-Dichloroethane-d4	45290	1000	50000	0	90.6	81 - 118				
Surr: 4-Bromofluorobenzene	44950	1000	50000	0	89.9	85 - 114				
Surr: Dibromofluoromethane	44110	1000	50000	0	88.2	80 - 119				
Surr: Toluene-d8	44940	1000	50000	0	89.9	89 - 112				



ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

**QC BATCH REPORT**

Batch ID: R342595 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD	Sample ID: HS19070675-01MSD	Units: UG/L			Analysis Date: 17-Jul-2019 14:48					
Client ID:	Run ID: VOA6_342595	SeqNo: 5171425		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	23240	1000	20000	0	116	78 - 124	22930	1.34	20	
1,1,1-Trichloroethane	21680	1000	20000	0	108	74 - 131	21910	1.03	20	
1,1,2,2-Tetrachloroethane	22890	1000	20000	0	114	71 - 121	21930	4.27	20	
1,1,2-Trichloroethane	22600	1000	20000	0	113	80 - 119	22150	2.02	20	
1,1-Dichloroethane	21210	1000	20000	0	106	77 - 125	21520	1.43	20	
1,1-Dichloroethene	20650	1000	20000	0	103	71 - 131	20920	1.32	20	
1,1-Dichloropropene	21840	1000	20000	0	109	78 - 125	22140	1.36	20	
1,2,3-Trichlorobenzene	20610	1000	20000	0	103	69 - 129	18500	10.8	20	
1,2,3-Trichloropropane	21200	1000	20000	0	106	73 - 122	20530	3.17	20	
1,2,4-Trichlorobenzene	21370	1000	20000	0	107	69 - 130	19760	7.84	20	
1,2,4-Trimethylbenzene	22760	1000	20000	0	114	76 - 124	22780	0.081	20	
1,2-Dibromo-3-chloropropane	21130	1000	20000	0	106	62 - 128	21450	1.51	20	
1,2-Dibromoethane	22730	1000	20000	0	114	77 - 121	22380	1.55	20	
1,2-Dichlorobenzene	22150	1000	20000	0	111	80 - 119	21890	1.17	20	
1,2-Dichloroethane	22150	1000	20000	0	111	73 - 128	21420	3.36	20	
1,2-Dichloropropane	22660	1000	20000	0	113	78 - 122	22230	1.9	20	
1,3,5-Trimethylbenzene	22510	1000	20000	0	113	75 - 124	22650	0.632	20	
1,3-Dichlorobenzene	22710	1000	20000	0	114	80 - 119	22550	0.679	20	
1,3-Dichloropropane	22890	1000	20000	0	114	80 - 119	22260	2.79	20	
1,4-Dichlorobenzene	21850	1000	20000	0	109	79 - 118	21620	1.05	20	
2,2-Dichloropropane	21840	1000	20000	0	109	60 - 139	22250	1.84	20	
2-Butanone	44340	2000	40000	0	111	56 - 143	43080	2.89	20	
2-Chlorotoluene	22100	1000	20000	0	110	79 - 122	21800	1.34	20	
2-Hexanone	45730	2000	40000	0	114	57 - 139	43630	4.7	20	
4-Chlorotoluene	21830	1000	20000	0	109	78 - 122	21890	0.247	20	
4-Isopropyltoluene	22990	1000	20000	0	115	77 - 127	23230	1.06	20	
4-Methyl-2-pentanone	46140	2000	40000	0	115	67 - 130	44420	3.79	20	
Acetone	43750	2000	40000	0	109	39 - 160	42230	3.55	20	
Benzene	23760	1000	20000	1600	111	79 - 120	23600	0.686	20	
Bromobenzene	22610	1000	20000	0	113	80 - 120	22460	0.633	20	
Bromochloromethane	21610	1000	20000	0	108	78 - 123	21400	1	20	
Bromodichloromethane	22450	1000	20000	0	112	79 - 125	22040	1.82	20	
Bromoform	23440	1000	20000	0	117	66 - 130	22990	1.92	20	
Bromomethane	20760	1000	20000	0	104	53 - 141	21120	1.72	20	

ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

**QC BATCH REPORT**

Batch ID: R342595 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD	Sample ID: HS19070675-01MSD	Units: UG/L			Analysis Date: 17-Jul-2019 14:48					
Client ID:	Run ID: VOA6_342595	SeqNo: 5171425	PrepDate:	DF: 1000						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	42730	2000	40000	0	107	64 - 133	43650	2.14	20	
Carbon tetrachloride	22180	1000	20000	0	111	72 - 136	22080	0.469	20	
Chlorobenzene	31740	1000	20000	8788	115	82 - 118	31950	0.664	20	
Chloroethane	19460	1000	20000	0	97.3	60 - 138	19850	2.03	20	
Chloroform	23800	1000	20000	1213	113	79 - 124	23620	0.769	20	
Chloromethane	19630	1000	20000	0	98.2	50 - 139	20780	5.69	20	
cis-1,2-Dichloroethene	21410	1000	20000	0	107	78 - 123	21170	1.09	20	
cis-1,3-Dichloropropene	22930	1000	20000	0	115	75 - 124	22660	1.19	20	
Dibromochloromethane	23160	1000	20000	0	116	74 - 126	22710	1.95	20	
Dibromomethane	22020	1000	20000	0	110	79 - 123	21530	2.25	20	
Dichlorodifluoromethane	15190	1000	20000	0	75.9	32 - 152	15500	2.06	20	
Ethylbenzene	23350	1000	20000	0	117	79 - 121	23150	0.837	20	
Hexachlorobutadiene	23200	1000	20000	0	116	66 - 134	22650	2.36	20	
Isopropylbenzene	23660	1000	20000	0	118	72 - 131	23970	1.26	20	
m,p-Xylene	46940	2000	40000	0	117	80 - 121	47220	0.596	20	
Methylene chloride	22020	2000	20000	1279	104	74 - 124	22020	0.0325	20	
Naphthalene	19180	1000	20000	0	95.9	61 - 128	17820	7.31	20	
n-Butylbenzene	24410	1000	20000	0	122	75 - 128	24340	0.288	20	
n-Propylbenzene	22700	1000	20000	0	113	76 - 126	22910	0.953	20	
o-Xylene	22740	1000	20000	0	114	78 - 122	22780	0.151	20	
sec-Butylbenzene	23080	1000	20000	0	115	77 - 126	23430	1.53	20	
Styrene	23210	1000	20000	0	116	78 - 123	23160	0.211	20	
tert-Butylbenzene	22880	1000	20000	0	114	78 - 124	23180	1.29	20	
Tetrachloroethene	24600	1000	20000	0	123	74 - 129	24910	1.25	20	
Toluene	22920	1000	20000	0	115	80 - 121	23020	0.442	20	
trans-1,2-Dichloroethene	21590	1000	20000	0	108	75 - 124	21760	0.773	20	
trans-1,3-Dichloropropene	22090	1000	20000	0	110	73 - 127	22160	0.316	20	
Trichloroethene	21680	1000	20000	0	108	79 - 123	22120	2.03	20	
Trichlorofluoromethane	20350	1000	20000	0	102	65 - 141	20740	1.91	20	
Vinyl chloride	18110	1000	20000	0	90.6	58 - 137	18580	2.53	20	
Surr: 1,2-Dichloroethane-d4	45740	1000	50000	0	91.5	81 - 118	45290	1	20	
Surr: 4-Bromofluorobenzene	45130	1000	50000	0	90.3	85 - 114	44950	0.42	20	
Surr: Dibromofluoromethane	44440	1000	50000	0	88.9	80 - 119	44110	0.743	20	
Surr: Toluene-d8	44510	1000	50000	0	89.0	89 - 112	44940	0.954	20	

ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

**QC BATCH REPORT**

<b>Batch ID:</b> R342595 ( 0 )	<b>Instrument:</b> VOA6	<b>Method:</b> VOLATILES ORGANICS BY METHOD 8260C
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The following samples were analyzed in this batch: HS19070824-01 HS19070824-02

ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070824

**QC BATCH REPORT**

Batch ID:	R342587 ( 0 )	Instrument:	UV-2450	Method:	HEXAVALENT CHROMIUM BY SW7196A					
<b>MBLK</b>	Sample ID: <b>MBLK-342587</b>	Units:	<b>mg/L</b>	Analysis Date:	<b>17-Jul-2019 11:56</b>					
Client ID:	Run ID: <b>UV-2450_342587</b>	SeqNo:	<b>5170101</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.0100	0.0100								U
<b>LCS</b>	Sample ID: <b>LCS-342587</b>	Units:	<b>mg/L</b>	Analysis Date:	<b>17-Jul-2019 11:56</b>					
Client ID:	Run ID: <b>UV-2450_342587</b>	SeqNo:	<b>5170102</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.24	0.0100	0.25	0	96.0	90 - 111				
<b>MS</b>	Sample ID: <b>HS19070822-01MS</b>	Units:	<b>mg/L</b>	Analysis Date:	<b>17-Jul-2019 11:56</b>					
Client ID:	Run ID: <b>UV-2450_342587</b>	SeqNo:	<b>5170103</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.239	0.0100	0.25	0.002	94.8	90 - 111				
<b>MSD</b>	Sample ID: <b>HS19070822-01MSD</b>	Units:	<b>mg/L</b>	Analysis Date:	<b>17-Jul-2019 11:56</b>					
Client ID:	Run ID: <b>UV-2450_342587</b>	SeqNo:	<b>5170104</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.239	0.0100	0.25	0.002	94.8	90 - 111	0.239		0 20	

The following samples were analyzed in this batch: HS19070824-01

**ALS Houston, US**

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** **HS19070824**

**QUALIFIERS,  
ACRONYMS, UNITS**

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

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

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

ALS Houston, US

Date: 29-jul-19

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**Client:** Bhate Environmental Associates, Inc.**Project:** Longhorn GW Treatment Plant**Work Order:** HS19070824**SAMPLE TRACKING**

---

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19070824-01	LH18/24-SP650_071619	Login	17/07/2019 11:56:37	PMG	Sub
HS19070824-01	LH18/24-SP650_071619	Login	17/07/2019 11:56:37	PMG	WET273
HS19070824-01	LH18/24-SP650_071619	Login	17/07/2019 11:56:37	PMG	MET032

**Sample Receipt Checklist**

Client Name: Bhate Environmental  
 Work Order: HS19070824

Date/Time Received: **17-Jul-2019 08:56**  
 Received by: **RPG**

Checklist completed by: Paresh M. Giga 17-Jul-2019  
 eSignature Date

Reviewed by: RJ Modashia 17-Jul-2019  
 eSignature 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): 1.5c U/C IR11  
 Cooler(s)/Kit(s): 43551  
 Date/Time sample(s) sent to storage: 7/17/19 12:10

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

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:  
 Contacted By: Regarding:

Comments:

Corrective Action:



**CHAIN OF CUSTODY**

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

Project: BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			Project No. NWO1312.0150.0 16.0001		Analyses										Remarks (Preservatives, etc.)	Lab I.D.#		
Job: <b>GROUNDWATER TREATMENT PLANT MONTHLY EFFLUENT SAMPLES</b>					MS / MSD	No. OF CONTAINERS	VOLATILES	SILVER, SELENIUM, LEAD, BARIUM	HEXAVALENT CHROMIUM	1, 4 - DIOXANE	PERCHLORATE							
Field Sample I.D.	Sample Matrix	Date / Time																
LH18/24-SP650_071619	Water	07/16/19 / 14:00	3	X														HCL
LH18/24-SP650_071619	Water	07/16/19 / 14:00	2			X	X											NONE
LH18/24-SP650_071619_BIX	Water	07/16/19 / 14:00	1						X									NONE
LH18/24-SP650_071619	Water	07/16/19 / 14:00	1	X														HNO3
Trip Blank	Water	07/16/19	2	X														HCL

Additional Remarks: **STANDARD TURN AROUND TIME** 43551 15416  
JRH

Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
<i>Scott Beesinger</i>	06/04/19	14:30	RG	07/17/19	10:56						


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



Remarks:

**HS19070824**  
Bhate Environmental Associates, Inc.  
Longhorn GW Treatment Plant



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

 <b>ALS Environmental</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTOMER</b> Date: <u>7/16/19</u> Name: <u>Scott</u> Company: <u>B...</u>		<b>STODY SEAL</b> Time: <u>1430</u> Seal Broken By: <u>[Signature]</u> Date: <u>7/16/19</u>
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 TDY# 4809 7834 3295  
**AB SGRA**  
 WED 17 JUL 10:30A  
 PRIORITY OVERNIGHT  
 77099  
 TX-US  
 IAH  
  
 FID 252785 16JUL19 606A 553C27A019/8C0A



## Case Narrative

**Method:** 6850

**Analysis:** Perchlorate

**Analysis SOP:** LC-MS-CLO4

**ALS WO ID(s):** 1920034; 1920122; 1920123;  
1920571; 1920572; 1920581

**Client:** ALS Laboratories (Houston, TX)

**Matrix:** Water

**ELMS Batch (HBN):** 2273 (244098)

**General Set Information:** There were eleven field samples in this Work Order. 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  $^{18}\text{O}$  labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in quantitation.

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

**Holding Times:** Holding times were met for all analyses.

**Dilutions:** Field samples 1920122001 and 1920581001 were analyzed and reported from 1:100 dilutions. The reporting limits have been adjusted accordingly.

**Method QC data:** The method blank (LMB 664922) was less than 1/2 the CRDL. The recovery for the LCS (664923) was within acceptable parameters.



**MS/MSD Analysis:** MS/MSD was performed on sample 1920123002 (Client ID: HBW10\_071119). 4.0 $\mu$ l of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4. $\mu$ g/L.

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

**NC/CAR(s):** NA

**Sample Calculation:** Samples were reported in  $\mu$ g/L. Results were calculated in  $\mu$ g/L by the equation (A)x(B),

where: A = Analyte concentration from the standard curve ( $\mu$ g/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 – 664920) is reported from the analysis of the Laboratory Control Sample (LCS – 664923) at a level of 4.0 $\mu$ g/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) along with datafile 23JULD03.

<u>Thomas Bosch</u>	<u>July 25, 2019</u>
Analyst	Date



# ANALYTICAL REPORT

Report Date: July 25, 2019

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

Phone: 281 530-5656

E-mail: RJ.Modashia@ALSGlobal.com

Workorder: **34-1920571**

Project ID: 11793 071619

Purchase Order: 11793

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_071619-BIX	1920571001	07/16/19	07/18/19	11793



## ANALYTICAL REPORT

Workorder: 34-1920571

Client: ALS Environmental  
(Houston)

Project Manager: Kevin W. Griffiths

## Analytical Results

Sample ID: <b>LH18/24-SP650_071619-BIX</b>	Sampling Site: 11793	Collected: 07/16/2019				
Lab ID: 1920571001	Media: 125 mL Nalgene	Received: 07/18/2019				
Matrix: Water	Sampling Parameter: NA					
<b>Analysis Method - EPA 6850, DoD QSM</b>						
Preparation: Not Applicable	Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2274 (HBN: 244098) Analyzed: 07/23/2019 12:03	Instrument ID: LCMS04 Percent Solid: NA Report Basis: Wet				
<b>Analyte</b>	<b>Result (ug/L)</b>	<b>DL (ug/L)</b>	<b>LOD (ug/L)</b>	<b>LOQ (ug/L)</b>	<b>Dilution</b>	<b>Qual</b>
Perchlorate	ND	1.0	2.0	4.0	1	U

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

Method	Analyst	Peer Review
EPA 6850, DoD QSM	/S/ Thomas Bosch 07/25/2019 15:05	/S/ Stephen Brose 07/25/2019 16:18

## Laboratory Contact Information

ALS Environmental  
960 W Levoy Drive  
Salt Lake City, Utah 84123Phone: (801) 266-7700  
Email: als@alst.com  
Web: www.alst.com



## ANALYTICAL REPORT

Workorder: 34-1920571

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

**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

00950400

## Analysis Information

**Workorder:** 1920571

**Limits:** Client SOW/Contract Specified  
**Basis:** DoD QSM

**Preparation:** NA  
**Batch:** NA  
**Prepared By:** NA

**Analysis:** EPA 6850, DoD QSM  
**Batch:** ELMS/2274 (HBN: 244098)  
**Analyzed By:** Thomas Bosch

## Blank

<b>LMB:</b> 664922 <b>Analyzed:</b> 07/23/2019 09:15 <b>Units:</b> ug/L			
Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

## Laboratory Control Sample

<b>LCS:</b> 664923 <b>Analyzed:</b> 07/23/2019 08:47 <b>Dilution:</b> 1 <b>Units:</b> ug/L				
Analyte	Result	Target	% Rec	QC Limits
Perchlorate	4.24	4.00	106	78.8   123.8

## Matrix Spike - Matrix Spike Duplicate

<b>Sample:</b> 1920123002 <b>Analyzed:</b> 07/23/2019 10:11 <b>Dilution:</b> 1 <b>Units:</b> ug/L		<b>MS:</b> 664924 <b>Analyzed:</b> 07/23/2019 10:25 <b>Dilution:</b> 1 <b>Units:</b> ug/L				<b>MSD:</b> 664925 <b>Analyzed:</b> 07/23/2019 10:39 <b>Dilution:</b> 1 <b>Units:</b> ug/L			
Analyte	Result	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Perchlorate	ND	4.12	4	103	78.8   123.8	4.14	104	0.46	0.0   20.0

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

Analyst	Peer Review
/S/ Thomas Bosch 07/25/2019 15:11	/S/ Stephen Brose 07/25/2019 16:18

## Symbols and Definitions

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

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





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

1920571

1869842

### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11793

**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:**  
**Email:**

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS19070824  
**TSR:** Danielle Winnings

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	HS19070824-01	LH18/24-SP650_071619	Water	16 Jul 2019 14:00
	SUB_Perch-6850			25 Jul 2019
2.	HS19070824-03	LH18/24-SP650_071619-BIX	Water	16 Jul 2019 14:00
	SUB_Perch-6850			25 Jul 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]  
Received By: [Signature]  
Cooler ID(s): \_\_\_\_\_

Date/Time: 7/17/19 1800  
Date/Time: 7/18/19 10:07  
Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



Must Deliver Next Business Day  
Time and Tempature Sensitive!



Part #: 159169-434 RT23 EXP 02/20

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

SHIP DATE: 17JUL19  
ACTWGT: 8.25 LB  
CAD: 300130/CAFE3211  
DIMS: 14x11x10 IN  
BILL THIRD PARTY

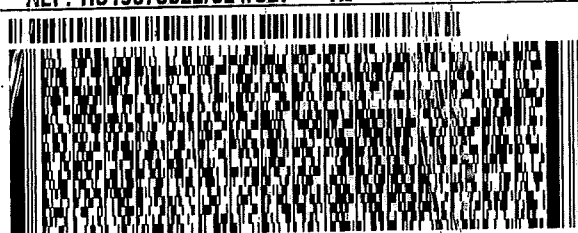
TO **SAMPLE RECEIVING  
ALS ENVIRONMENTAL  
960 W. LEVOY DRIVE**

**SALT LAKE CITY UT 84123**

(801) 286-7700

REF: HS19070822/824/827 - RJ

3601/68FV/2C155



**FedEx  
Express**



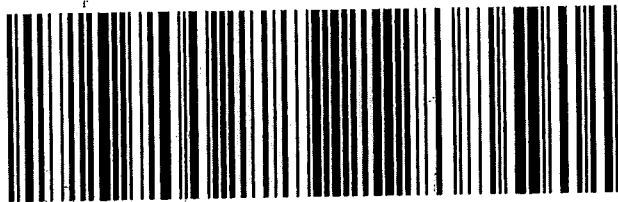
AT105090818111811

TRK# 4809 7835 9397  
0201

**THU - 18 JUL 3:00P  
STANDARD OVERNIGHT**

**AX BTFA**

**84123  
UT-US SLC**



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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: <u>ALS Houston</u>		Project/Task/Site: _____				
Date/Time of Receipt: <u>07-18-19 10:07</u>		Number of Coolers Received: <u>1</u>				
Condition of Coolers: <u>Acceptable</u> /Unacceptable		Temperature Control: <u>Present</u> /Not Included				
Cooler Custody Seals: <u>Present</u> /Absent/NA		Location Temp Taken: <u>Control</u> /Between Samples				
Container Custody Seals: <u>Present</u> /Absent/NA		Are all temperatures within project specific guidelines? Yes/No/NA				
Ice Present: <u>Yes</u> /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 <u>9776</u>	<u>2</u> °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By: Jamie Van Gassel T. Ventassel 07-18-19  
Signature Printed Name Date

CLIENT-RELATED INFORMATION

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

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

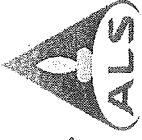
Client Notified? YES  NO

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: \_\_\_\_\_ Returned to Sample Receipt by: \_\_\_\_\_ Date: \_\_\_\_\_  
Printed Name Signature



# Batch Worklist

HBN: 244098

Instrument: WP  
Status: WP

Created: 7/23/2019 08:01  
Analyst: T. Bosch

Batch: ELMS/ 2274  
Rule: EPA 6850, DoD QSM Water

- Workorder: 1920034 [ENV\_LVL4]
- Workorder: 1920122 [ENV\_LVL4]
- Workorder: 1920123 [ENV\_LVL4]
- Workorder: 1920571 [ENV\_LVL4]
- Workorder: 1920572 [ENV\_LVL4]
- Workorder: 1920581 [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	664919	CCV for HBN 244098 [ELMS/2274]				CCV	3		E685041C3Q	5311		7/25/2019	
2	664920	RLVS for HBN 244098 [ELMS/2274]				RLVS	3		E685041C3Q	5311		7/25/2019	
3	664921	ICS for HBN 244098 [ELMS/2274]				ICS	3		E6850...D3Q	5311		7/25/2019	
4	664922	LMB for HBN 244098 [ELMS/2274]				LMB	3		E6850Q413Q	5311		7/25/2019	
5	664923	LCS for HBN 244098 [ELMS/2274]				LCS	3		E6850Q413Q	5311		7/25/2019	
6	1920034001	LH18/24-SP650_070919_BIX Water				SAMPLE	3	1920034001-A	E6850Q41.3	5480	8/6/2019	7/25/2019	
7	1920122001	ICT 13A_071119				SAMPLE	3	1920122001-A	E6850Q41.3	5480	8/8/2019	7/26/2019	
8	1920123001	HBW7_071119				SAMPLE	3	1920123001-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
9	1920123002	HBW10_071119				SAMPLE	3	1920123002-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
10	664924	HBW10_071119(1920123002MS)				MS	3		E6850Q413Q	5311		7/25/2019	
11	664925	HBW10_071119(1920123002MSD)				MSD	3		E6850Q413Q	5311		7/25/2019	
12	1920123003	HBW1_071119				SAMPLE	3	1920123003-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
13	1920123004	GPW1_071119				SAMPLE	3	1920123004-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
14	1920123005	GPW1_071119_a				SAMPLE	3	1920123005-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
15	1920123006	GPW3_071119				SAMPLE	3	1920123006-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
16	664926	CCV for HBN 244098 [ELMS/2274]				CCV	3		E685041C3Q	5311		7/25/2019	
17	1920571001	LH18/24-SP650_071619-BIX				SAMPLE	3	1920571001-A	E6850Q41.3	5480	8/13/2019	7/31/2019	
18	1920572001	LH18/24-SP650_071619_BIX				SAMPLE	3	1920572001-A	E6850Q41.3	5480	8/13/2019	7/31/2019	
19	1920581001	LH18/24-SP140_071619				SAMPLE	3	1920581001-A	E6850Q41.3	5480	8/13/2019	7/31/2019	
20	664927	CCV for HBN 244098 [ELMS/2274]				CCV	3		E685041C3Q	5311		7/25/2019	



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Analytical Documentation**

ALS Work Order #'s & Sample #'s: 1920034 (001); 1920122 (001); 1920123 (001-06); 1920571 (001); 1920572 (001); 1920581 (001) ELMS Batch/HBN ID: 2274 (244098)  
 Prep Date: 07/19/2019 Analysis Date: 07/23/2019 Analyst: T. Bosch  
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**  
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\JUL\23JUL19D.s  
 Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

**SAMPLE PREPARATION/ANALYSIS:**

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

**REAGENTS:** Eluent A1: 95% ASTM Type II water (ALS)/ 5% ACN (B&J Lot AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).  
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

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

**CALIBRATION CURVE:** Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.M

**INSTRUMENT CONDITIONS:** Samples were analyzed with an Agilent 1100 LC/MSD system, in negative SIM mode, monitoring m/z 83, 85, and 89.

Instrument ID: LCMS04 Online Acquisition Method: CLO4-AQN.M Fragmentor: 160 Output Gain: 8 Injection Volume: 35µL  
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

**FLOW GRADIENT:**

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

**QC DATA:** 4.0µL of QC Solution Horizon ID 47516 was used for LCS 664923; Target = 4.0µg/L. ASTM type II water was used for LMB 664922.

**MS/MSD:** The Matrix Spike and duplicate (MS/MSD) were performed on sample 1920123002 (Client ID: HBW10\_071119). 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 1920122001 and 1920581001 were analyzed and reported from 1:100 dilutions. The reporting limits have been adjusted accordingly.
- 2) All QC, Blank, CCV, and MS/MSD results were within method parameters.
- 3) Sample data can be viewed at two directories within the ALS system: \\ALS\TWS013\LCMS\LCMS04\2019\JUL\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\slstws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\244098-DoD-ALS-Hstn LCMS4 or through \\ALS\TWS013\DATAREVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 664920) is reported from the analysis of the Laboratory Control Sample (LCS – 664923) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03) along with datafile 23JUL03.

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

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

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDC: ELMS: 2274 HBN: 244098 1920034/1920122/1920123		
Sample Set IDs if Applicable: 1920571/1920572/1920581		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSS, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on OC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SB
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR#</u>	—	—
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB





## STANDARD REPORT

## Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850 WKG Std 100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	0.1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



STANDARD REPORT

Constituent

Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 INT

CLO4 INT		Description - 6850 Intermdt AccStd 10.ug/mL			
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



## STANDARD REPORT

## Working Standard - CLO4 QC WRK

CLO4 QC WRK		Description - 6850 QC WKG STD 100ug/L			
Standard: 47516		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC WRK 100.ug/L	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL	
Standard: 36748		Created By: Thomas Bosch	Amount: 100 mL
MFG: Ultra Scientific		Create Date: 05/11/2017 01:05PM	Expires: 03/31/2020
MFG Lot: CP-0860			Usable: Yes
Part ID: ICC-013			Lab Lot: CLO4 QC STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 QC INT

CLO4 QC INT			Description - 6850 QC Intrmdt Std-QC 10ug/mL		
Standard: 47515		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC INT 10.ug/mL	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020





## STANDARD REPORT

## Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730	Created By: Thomas Bosch	Amount: 25 mL			
MFG: ALS/SLC	Create Date: 09/20/2018 09:09AM	Expires: 09/20/2019			
MFG Lot: TNB: 05/09/2018	Verified By: Thomas Bosch	Usable: Yes			
Pipette ID: Not Provided	Verify Date:	Lab Lot: CLO4ISTDWRK			
Pos.	Analyte	Name	Concentration		
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L		
2	14797-73-0-89	Perchlorate 89	1000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729		Created By: Thomas Bosch	Amount: 1 mL
MFG: Cambridge Isotope		Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026
MFG Lot: SDFF-012A		Verified By: Thomas Bosch	Usable: Yes
Part ID: OLM-7310-S		Verify Date:	Lab Lot: CLO4ISTDSTK
Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL



## Certificate of Analysis



### ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

#### Description:

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

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

Solvent: water (low TOC, < 50 ppb)

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

#### Traceability:

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

#### Estimation of Uncertainties:

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

#### Homogeneity:

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

#### Intended Use:

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

#### Instructions for Use:

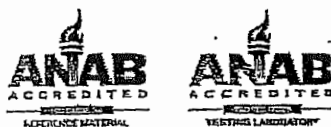
Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the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

#### Hazards:

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

#### Expiration of Certification:

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





# Certificate of Analysis



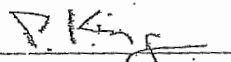
## ISO Guide 34 Reference Material

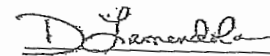
Product Number: ICC-013  
Lot Number: CP-0860

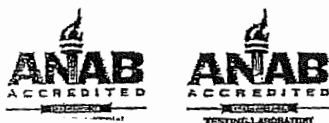
Lot Issue Date: 29-Feb 2016  
Expiration Date: 31-Mar 2020

### Maintenance of Certification:

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

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

  
Daniel J. Lamendola  
Director of QAVRA



125 Market Street  
New Haven, CT 06513  
USA



AccuStandard®

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

# CERTIFICATE OF ANALYSIS



S 43659

AccuTrace™ Reference Standard

Catalog No: IC-PER-10X-1  
Description: Perchlorate Standard  
Element: Perchlorate (ClO<sub>4</sub>)  
SRM: Ind. Std.  
Lot: 218065075  
Matrix: Water  
Hazards: Refer to SDS for complete safety information

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



Signal Word: None

Component	SRM #	Prepared Concentration (µg/mL)
ClO <sub>4</sub> Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is ±0.24%.

The final solution was checked against an independent standard to verify its concentration.

We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.

All solutions are filtered through a 0.2 µm filter prior to being bottled.

All glassware used in preparation is Class A and calibrated regularly.

All weights are traceable through NIST, Test No. 822-275872-11

All bottles are triple rinsed with deionized water prior to use.

Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.

We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By:

*Meigan O'Leary*

Meigan O'Leary, Inorganic QC Manager

Cambridge Isotope Laboratories, Inc.

## Certificate of Analysis

Quality Standards:  
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

Product Name: PERCHLORIC ACID, SODIUM SALT  
(Isotopic Label & Enrichment Specification) (18O<sub>4</sub>, 90%+) 100 UG/ML IN WATER

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

## Product Information

Chemical Purity Specification:  $\geq 98\%$

Labeled CAS Number: NA

Unlabeled CAS Number: 7601-89-0

MW\*: 130.4

Chemical Formula: NaCl<sup>+</sup>O<sub>4</sub>

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	
*	664919	CCV@25	Vial 71	1	Control	1	1.62672e6	8.125	25.50485
*	664923	QC@4.0	Vial 72	1	Control	2	3.26276e5	7.968	4.23719
*	664921	ICS@4.0	Vial 73	1	Control	3	2.26823e5	7.809	3.59795
*	664922	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1920034001		Vial 75	1	Sample	5	3.78721e5	7.756	5.76393
*	1920122001	100	Vial 76	1	Sample	6	3.81315e5	8.340	535.80529
*	1920123001		Vial 77	1	Sample	7	1.88703e6	7.880	27.30710
*	1920123002		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	664924	201232S	Vial 79	1	Sample	9	2.94719e5	7.909	4.12417
*	664925	201232D	Vial 80	1	Sample	10	2.98082e5	7.931	4.14318
*	1920123003		Vial 81	1	Sample	11	0.00000	0.000	0.00000
*	1920123004		Vial 82	1	Sample	12	0.00000	0.000	0.00000
*	1920123005		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1920123006		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	664926	CCV@25	Vial 71	1	Control	15	1.58424e6	8.147	26.09295
*	1920571001		Vial 85	1	Sample	16	0.00000	0.000	0.00000
*	1920572001		Vial 86	1	Sample	17	0.00000	0.000	0.00000
*	1920581001	100	Vial 87	1	Sample	18	4.74247e6	8.368	6892.89270
*	664927	CCV@25	Vial 71	1	Control	19	1.56539e6	8.160	26.50991

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	664919	CCV@25	Vial 71	1	Control	1	4.82242e5	8.132	25.47735
*	664923	QC@4.0	Vial 72	1	Control	2	1.06930e5	7.986	4.52240
*	664921	ICS@4.0	Vial 73	1	Control	3	8.07927e4	7.808	4.14216
*	664922	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1920034001		Vial 75	1	Sample	5	1.32207e5	7.757	6.61445
*	1920122001	100	Vial 76	1	Sample	6	1.27974e5	8.359	590.20800
*	1920123001		Vial 77	1	Sample	7	5.71392e5	7.909	27.84268
*	1920123002		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	664924	201232S	Vial 79	1	Sample	9	9.30343e4	7.927	4.23661
*	664925	201232D	Vial 80	1	Sample	10	9.90502e4	7.949	4.47914
*	1920123003		Vial 81	1	Sample	11	0.00000	0.000	0.00000
*	1920123004		Vial 82	1	Sample	12	0.00000	0.000	0.00000
*	1920123005		Vial 83	1	Sample	13	0.00000	0.000	0.00000
*	1920123006		Vial 84	1	Sample	14	0.00000	0.000	0.00000
*	664926	CCV@25	Vial 71	1	Control	15	4.73538e5	8.163	26.27353
*	1920571001		Vial 85	1	Sample	16	0.00000	0.000	0.00000
*	1920572001		Vial 86	1	Sample	17	0.00000	0.000	0.00000
*	1920581001	100	Vial 87	1	Sample	18	1.37287e6	8.381	6775.22031
*	664927	CCV@25	Vial 71	1	Control	19	4.66031e5	8.186	26.59490

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	664919	CCV@25	Vial 71	1	Control	1	1.93813e5	8.141	5.00000
*	664923	QC@4.0	Vial 72	1	Control	2	2.53019e5	7.996	5.00000
*	664921	ICS@4.0	Vial 73	1	Control	3	2.08874e5	7.820	5.00000
*	664922	LMB	Vial 74	1	Control	4	2.28613e5	8.332	5.00000
*	1920034001		Vial 75	1	Sample	5	2.12986e5	7.778	5.00000
*	1920122001	100	Vial 76	1	Sample	6	2.31390e5	8.370	500.00000
*	1920123001		Vial 77	1	Sample	7	2.09097e5	7.906	5.00000
*	1920123002		Vial 78	1	Sample	8	2.14312e5	7.946	5.00000
*	664924	201232S	Vial 79	1	Sample	9	2.35117e5	7.946	5.00000
*	664925	201232D	Vial 80	1	Sample	10	2.36657e5	7.943	5.00000
*	1920123003		Vial 81	1	Sample	11	2.72320e5	7.956	5.00000
*	1920123004		Vial 82	1	Sample	12	2.70263e5	7.966	5.00000
*	1920123005		Vial 83	1	Sample	13	2.50554e5	7.967	5.00000
*	1920123006		Vial 84	1	Sample	14	2.77086e5	7.979	5.00000



Batch Report: C:\HPCHEM\1\DATA\23JUL19D\23JUL19S.B

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	664926	CCV@25	Vial 71	1	Control	15	1.84240e5	8.170	5.00000
*	1920571001		Vial 85	1	Sample	16	2.24657e5	7.814	5.00000
*	1920572001		Vial 86	1	Sample	17	2.04102e5	7.796	5.00000
*	1920581001	100	Vial 87	1	Sample	18	1.90565e5	8.391	500.00000
*	664927	CCV@25	Vial 71	1	Control	19	1.79008e5	8.198	5.00000

\*\*\* End of Report \*\*\*

## Sequence Table:

## Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	664919	CCV@25	CLO4-AQN	1	Ctrl Samp	
2	Vial 72	664923	QC@4.0	CLO4-AQN	1	Ctrl Samp	
3	Vial 73	664921	ICS@4.0	CLO4-AQN	1	Ctrl Samp	
4	Vial 74	664922	LMB	CLO4-AQN	1	Ctrl Samp	
5	Vial 75	1920034001		CLO4-AQN	1	Sample	
6	Vial 76	1920122001	100	CLO4-AQN	1	Sample	
7	Vial 77	1920123001		CLO4-AQN	1	Sample	
8	Vial 78	1920123002		CLO4-AQN	1	Sample	
9	Vial 79	664924	201232S	CLO4-AQN	1	Sample	
10	Vial 80	664925	201232D	CLO4-AQN	1	Sample	
11	Vial 81	1920123003		CLO4-AQN	1	Sample	
12	Vial 82	1920123004		CLO4-AQN	1	Sample	
13	Vial 83	1920123005		CLO4-AQN	1	Sample	
14	Vial 84	1920123006		CLO4-AQN	1	Sample	
15	Vial 71	664926	CCV@25	CLO4-AQN	1	Ctrl Samp	
16	Vial 85	1920571001		CLO4-AQN	1	Sample	
17	Vial 86	1920572001		CLO4-AQN	1	Sample	
18	Vial 87	1920581001	100	CLO4-AQN	1	Sample	
19	Vial 71	664927	CCV@25	CLO4-AQN	1	Ctrl Samp	



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD01.D Sample Name: 664919 CCV@25

```

=====
Injection Date: 7/23/2019 08:31:50      Seq Line: 1
Sample Name: 664919 CCV@25             Location: Vial 71
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 35 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 25.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.125	PBA	1626721.4	25.5049	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.132	PBA	482242.2	25.4774	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.141	PBA	193813.0	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD02.D

Sample Name: 664923 QC@4.0

Injection Date: 7/23/2019 08:47:43

Seq Line: 2

Sample Name: 664923 QC@4.0

Location: Vial 72

Acq Operator: TNB

Inj. No.: 1

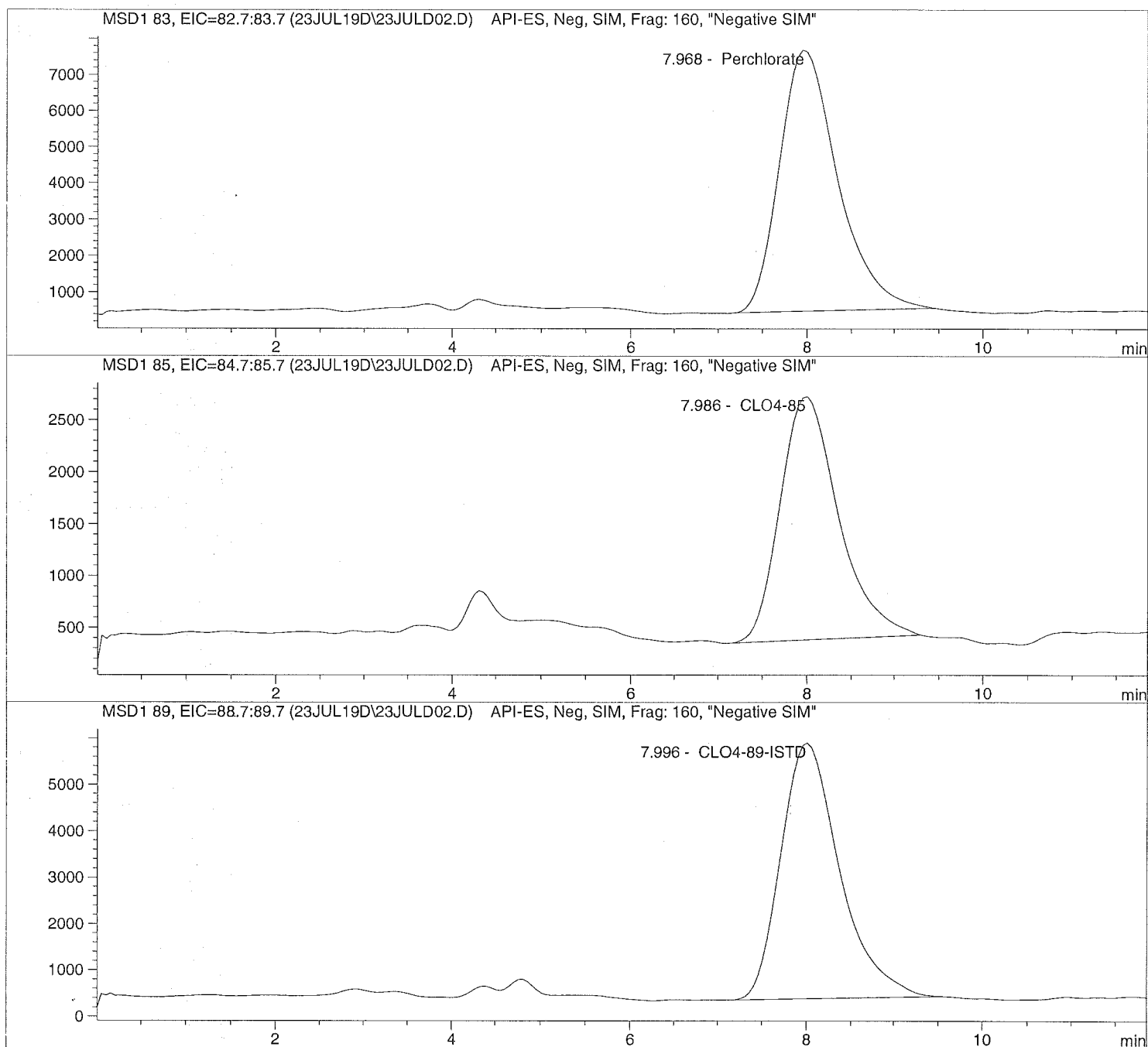
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD02.D Sample Name: 664923 QC@4.0

```

=====
Injection Date: 7/23/2019 08:47:43      Seq Line: 2
Sample Name: 664923 QC@4.0             Location: Vial 72
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 35 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.968	PBA	326275.9	4.2372	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.986	PBA	106930.0	4.5224	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.996	PBA	253018.7	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD03.D

Sample Name: 664921 ICS@4.0

Injection Date: 7/23/2019 09:01:39

Seq Line: 3

Sample Name: 664921 ICS@4.0

Location: Vial 73

Acq Operator: TNB

Inj. No.: 1

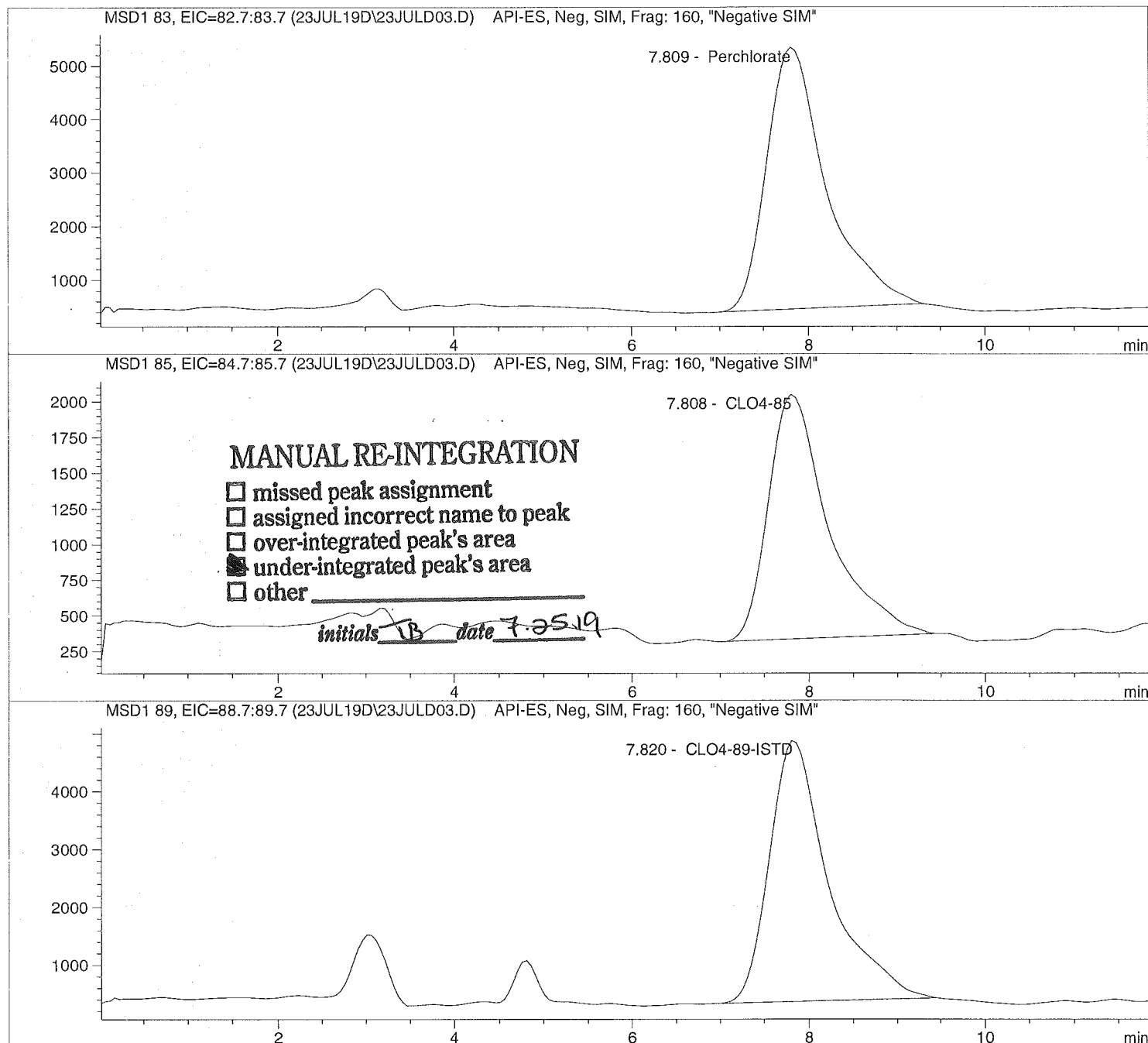
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD03.D      Sample Name: 664921    ICS@4.0

```

=====
Injection Date: 7/23/2019 09:01:39                    Seq Line:                    3
Sample Name:    664921    ICS@4.0                    Location:                    Vial 73
Acq Operator:    TNB                                    Inj. No.:                    1
                                                          Inj. Vol.:                    35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:                    Signal
Calib. Data Modified:        Fri, 12. Apr. 2019,07:52:58 am
Multiplier:                  1.000000
Dilution:                    1.000000
Sample Amount:                4.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.809	PBA	226823.0	3.5980	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.808	MM	80792.7	4.1422	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.820	PBA	208873.6	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD04.D

Sample Name: 664922 LMB

Injection Date: 7/23/2019 09:15:35

Seq Line: 4

Sample Name: 664922 LMB

Location: Vial 74

Acq Operator: TNB

Inj. No.: 1

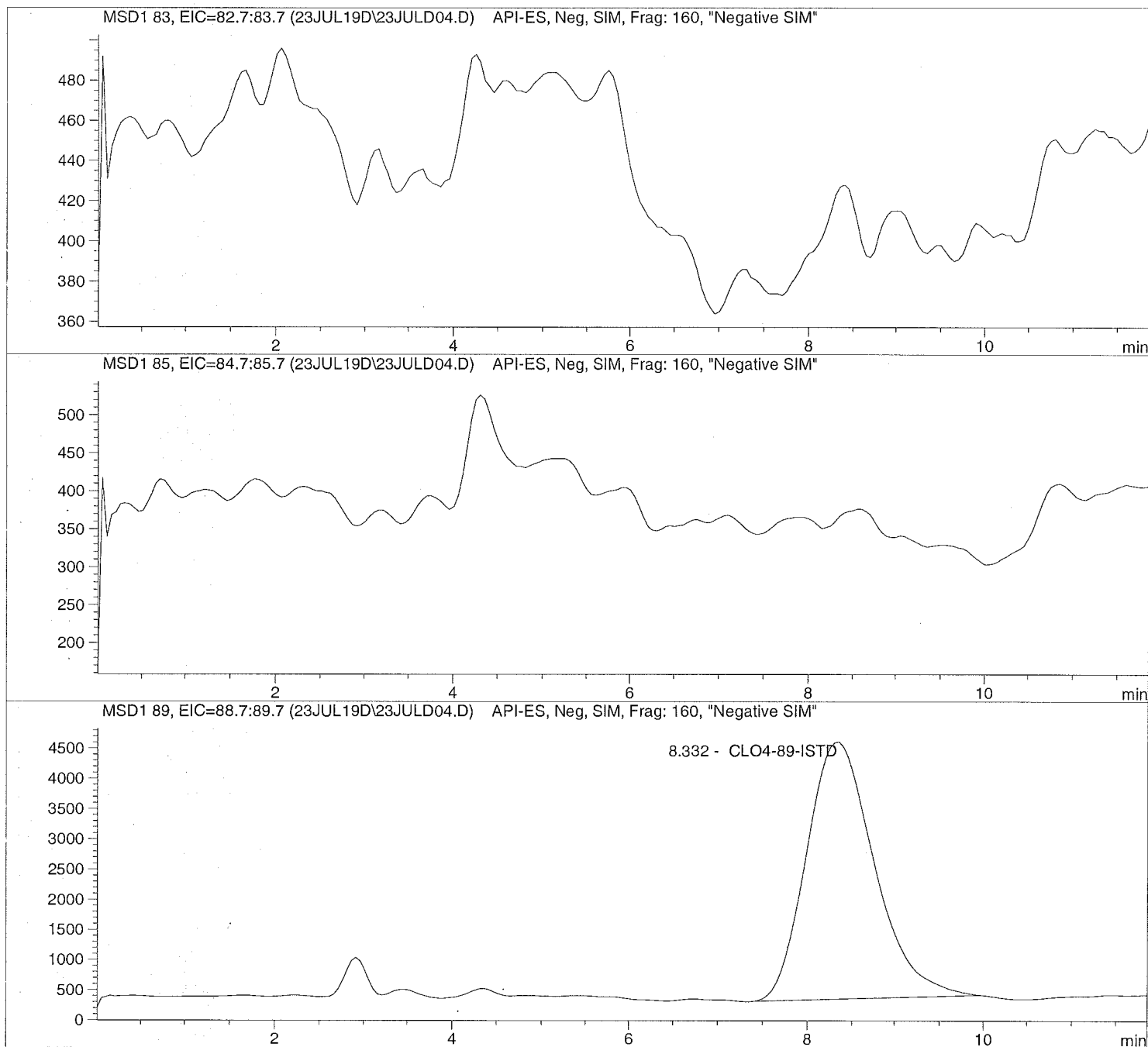
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD04.D      Sample Name: 664922    LMB

```

=====
Injection Date: 7/23/2019 09:15:35      Seq Line:            4
Sample Name:    664922    LMB            Location:            Vial 74
Acq Operator:   TNB                        Inj. No.:            1
                                              Inj. Vol.:           35 µl

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

Perchlorate analysis

Sample Information

```

Sorted By:            Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:          1.000000
Dilution:            1.000000
Sample Amount:        0.000

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.332	PBA	228612.6	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD05.D

Sample Name: 1920034001

Injection Date: 7/23/2019 09:29:31

Seq Line: 5

Sample Name: 1920034001

Location: Vial 75

Acq Operator: TNB

Inj. No.: 1

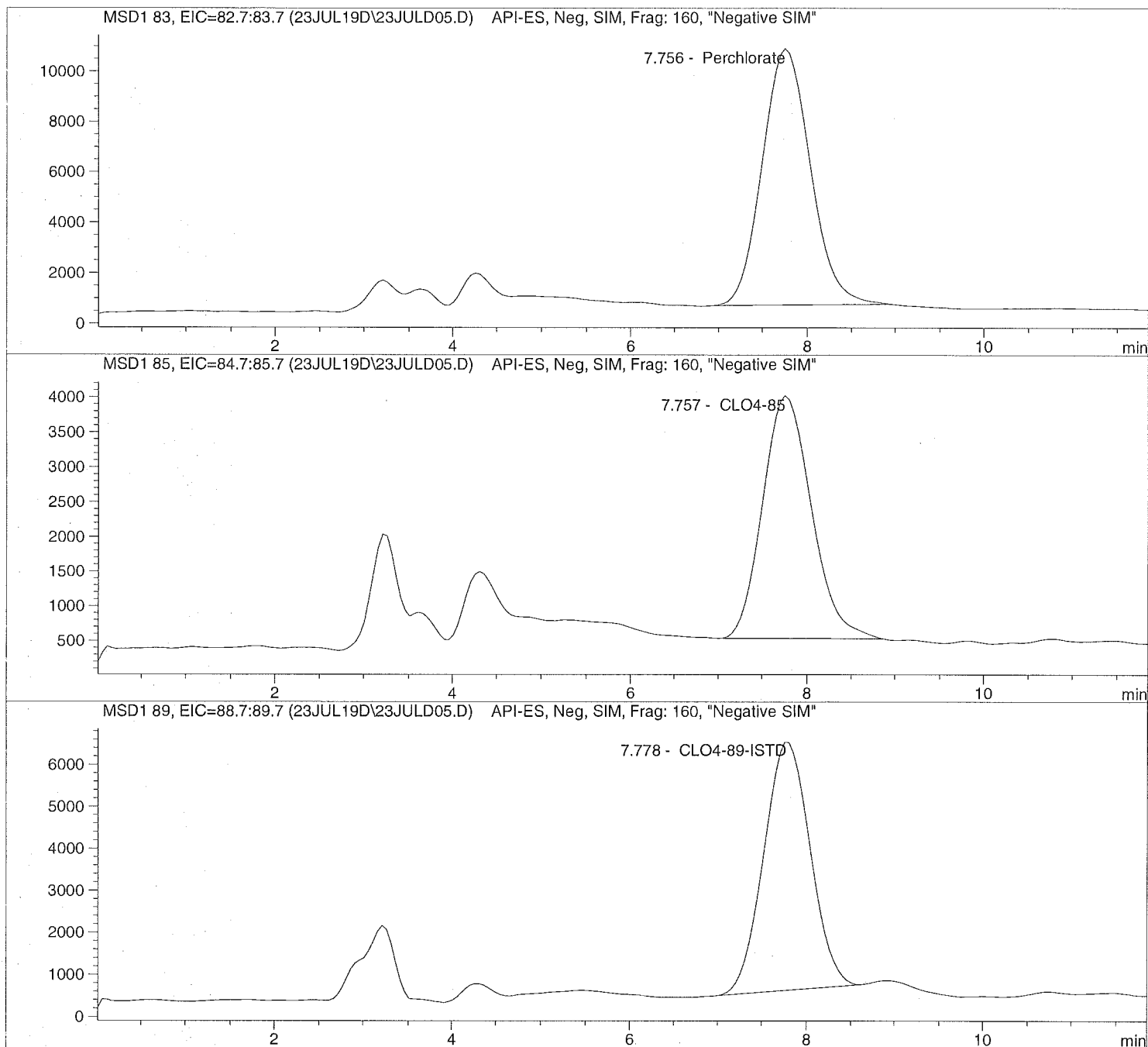
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD05.D Sample Name: 1920034001

```

=====
Injection Date: 7/23/2019 09:29:31      Seq Line:      5
Sample Name:    1920034001              Location:      Vial 75
Acq Operator:   TNB                    Inj. No.:     1
                                           Inj. Vol.:    35 µl

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:    1.000000
Dilution:      1.000000
Sample Amount: 0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.756	PBA	378721.2	5.7639	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.757	PBA	132206.6	6.6144	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.778	PBA	212985.8	5.0000	CLO4-89-ISTD

```

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

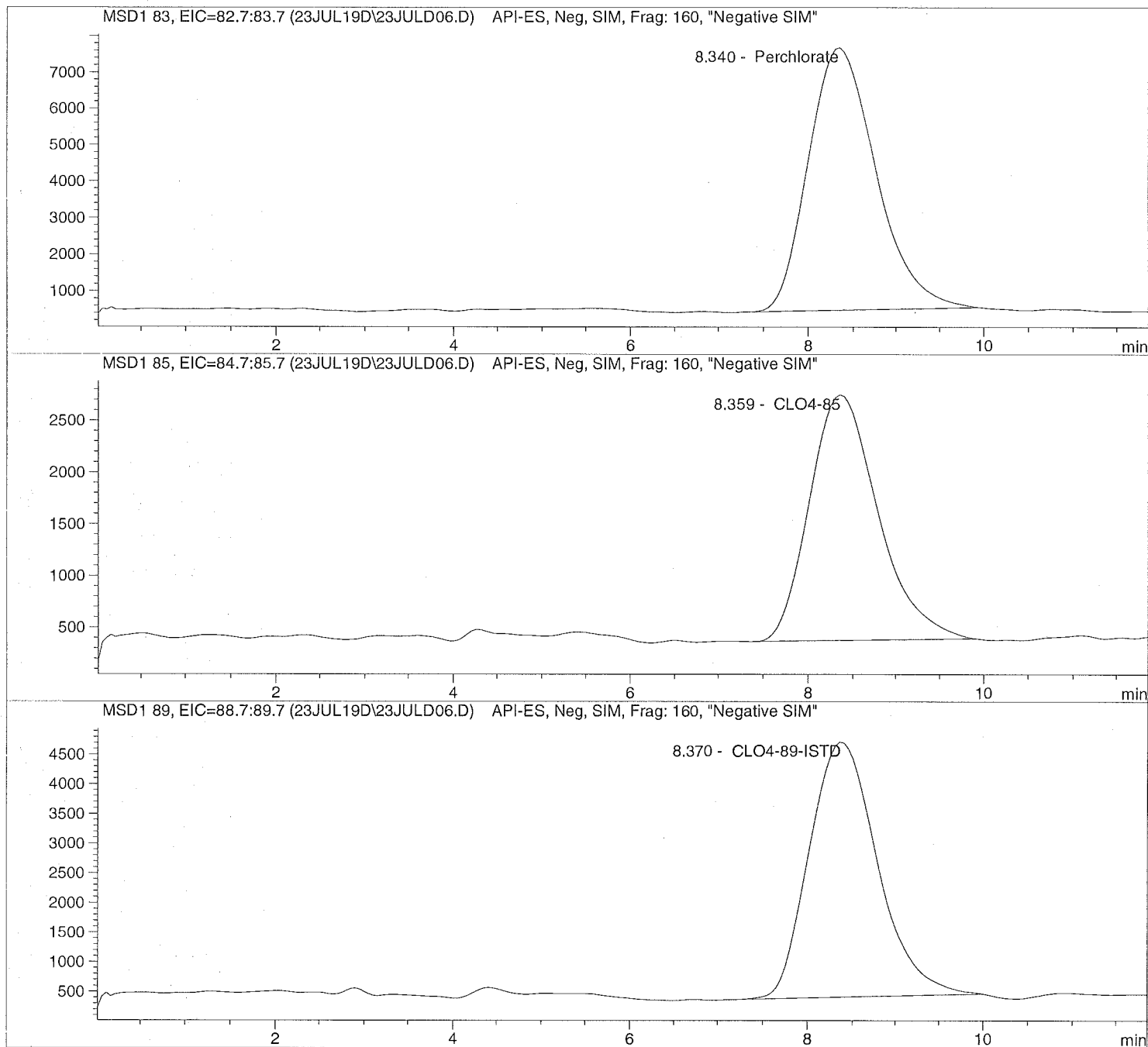
```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD06.D Sample Name: 1920122001 100

```
=====
Injection Date: 7/23/2019 09:43:25      Seq Line: 6
Sample Name: 1920122001 100             Location: Vial 76
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 35 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13
```

## Perchlorate analysis





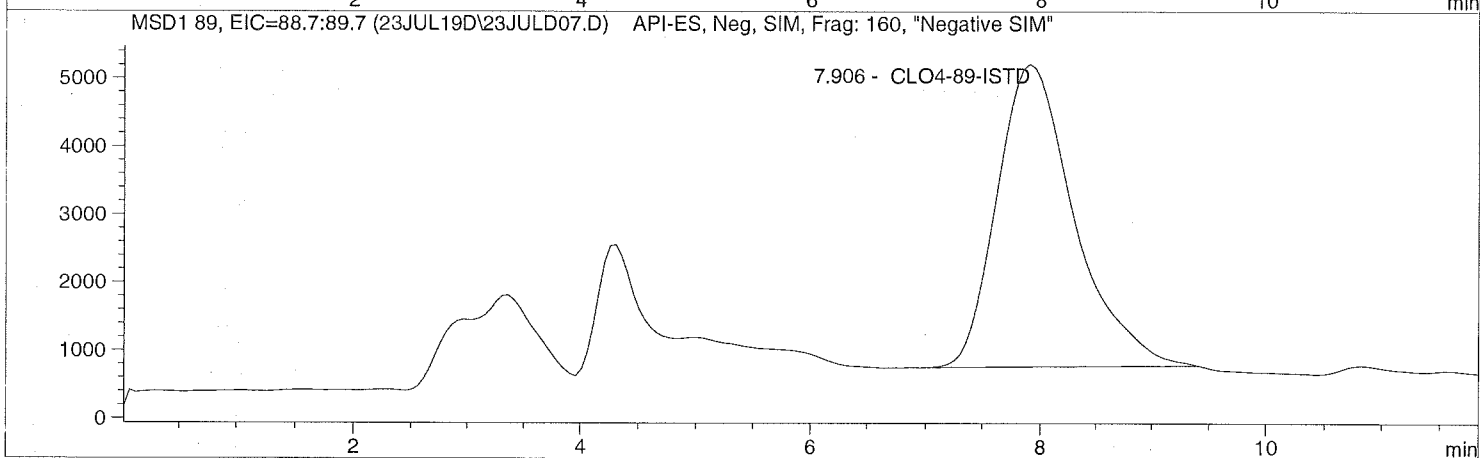
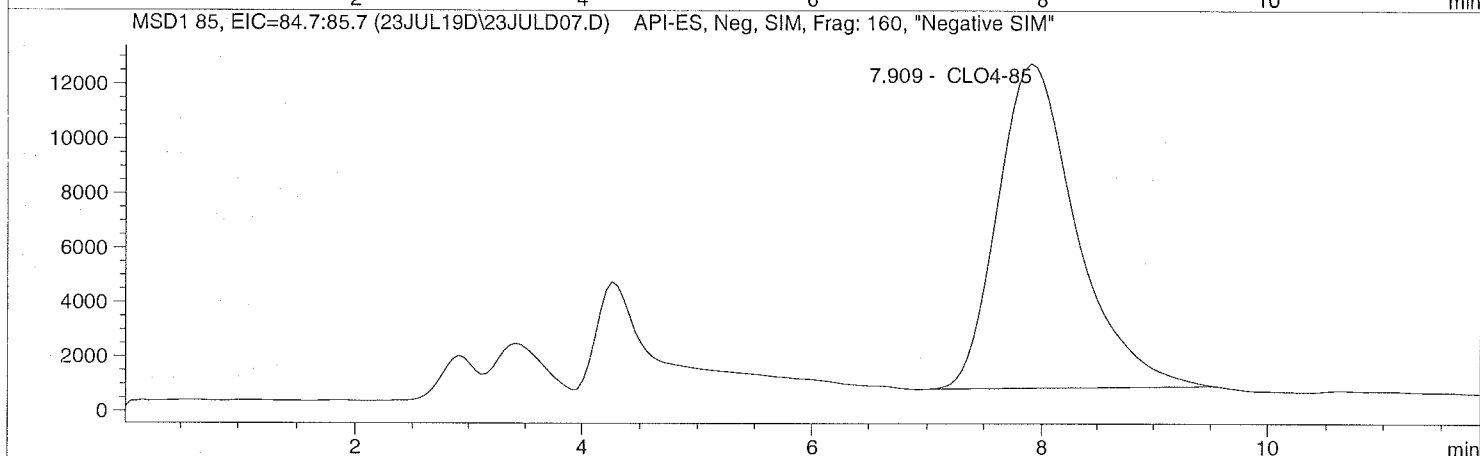
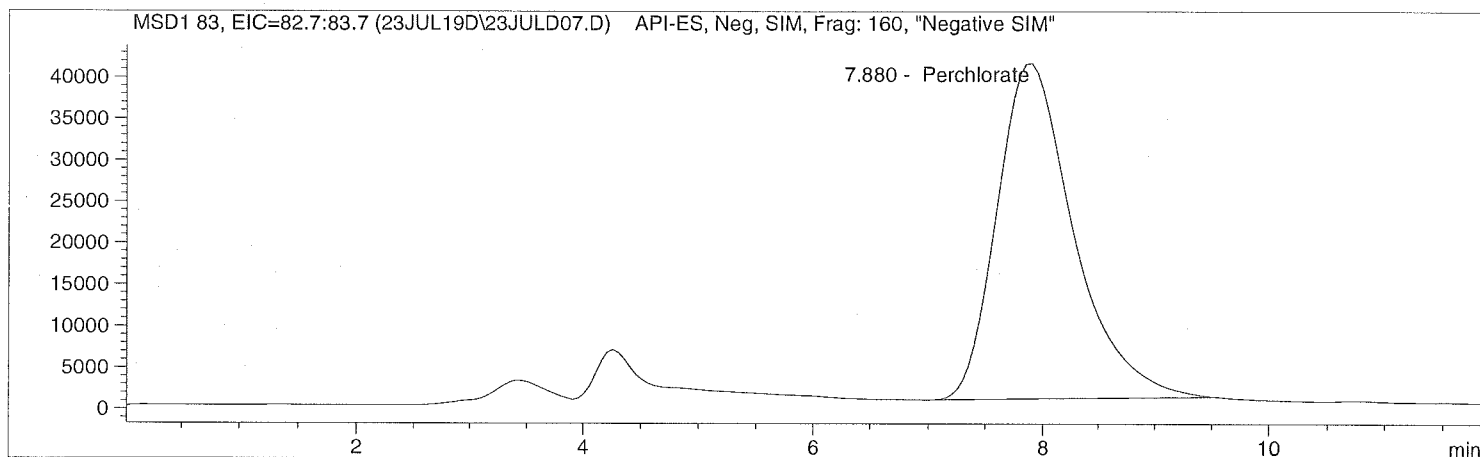
Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD07.D

Sample Name: 1920123001

=====  
Injection Date: 7/23/2019 09:57:24  
Sample Name: 1920123001  
Acq Operator: TNB

Seq Line: 7  
Location: Vial 77  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD07.D Sample Name: 1920123001

```

=====
Injection Date: 7/23/2019 09:57:24      Seq Line:      7
Sample Name:    1920123001              Location:      Vial 77
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    35 µl
  
```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
  
```

Perchlorate analysis

Sample Information

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
  
```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.880	PBA	1887029.5	27.3071	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.909	PBA	571391.9	27.8427	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.906	PBA	209097.0	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

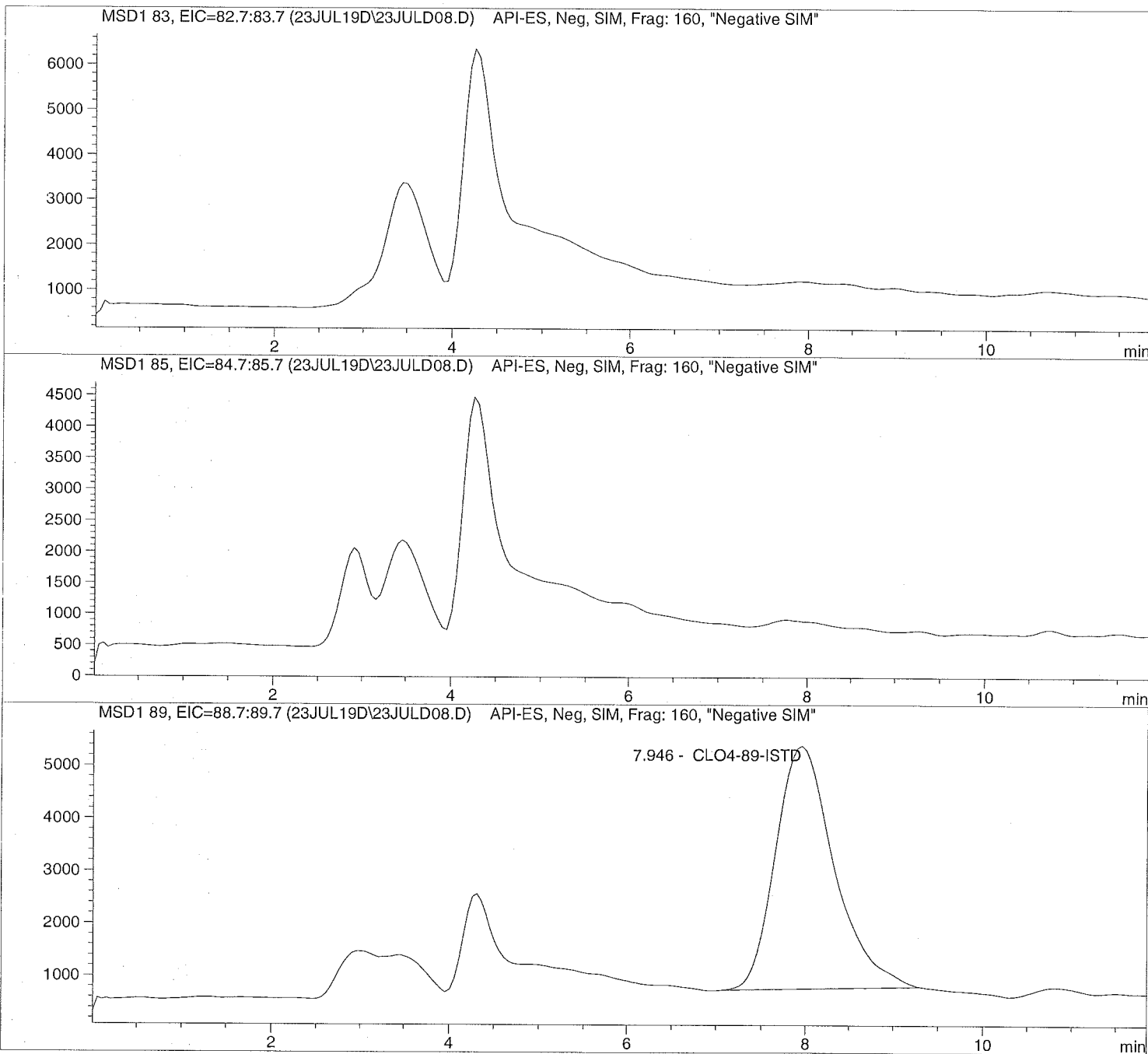


Injection Date: 7/23/2019 10:11:24  
Sample Name: 1920123002  
Acq Operator: TNB

Seq Line: 8  
Location: Vial 78  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date: 7/23/2019 10:11:24      Seq Line:      8
Sample Name:    1920123002              Location:      Vial 78
Acq Operator:   TNB                    Inj. No.:     1
                                           Inj. Vol.:    35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.946	PBA	214312.1	5.0000	CLO4-89-ISTD

=====
\*\*\* End of Report \*\*\*
=====

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD09.D

Sample Name: 664924 201232S

Injection Date: 7/23/2019 10:25:26

Seq Line: 9

Sample Name: 664924 201232S

Location: Vial 79

Acq Operator: TNB

Inj. No.: 1

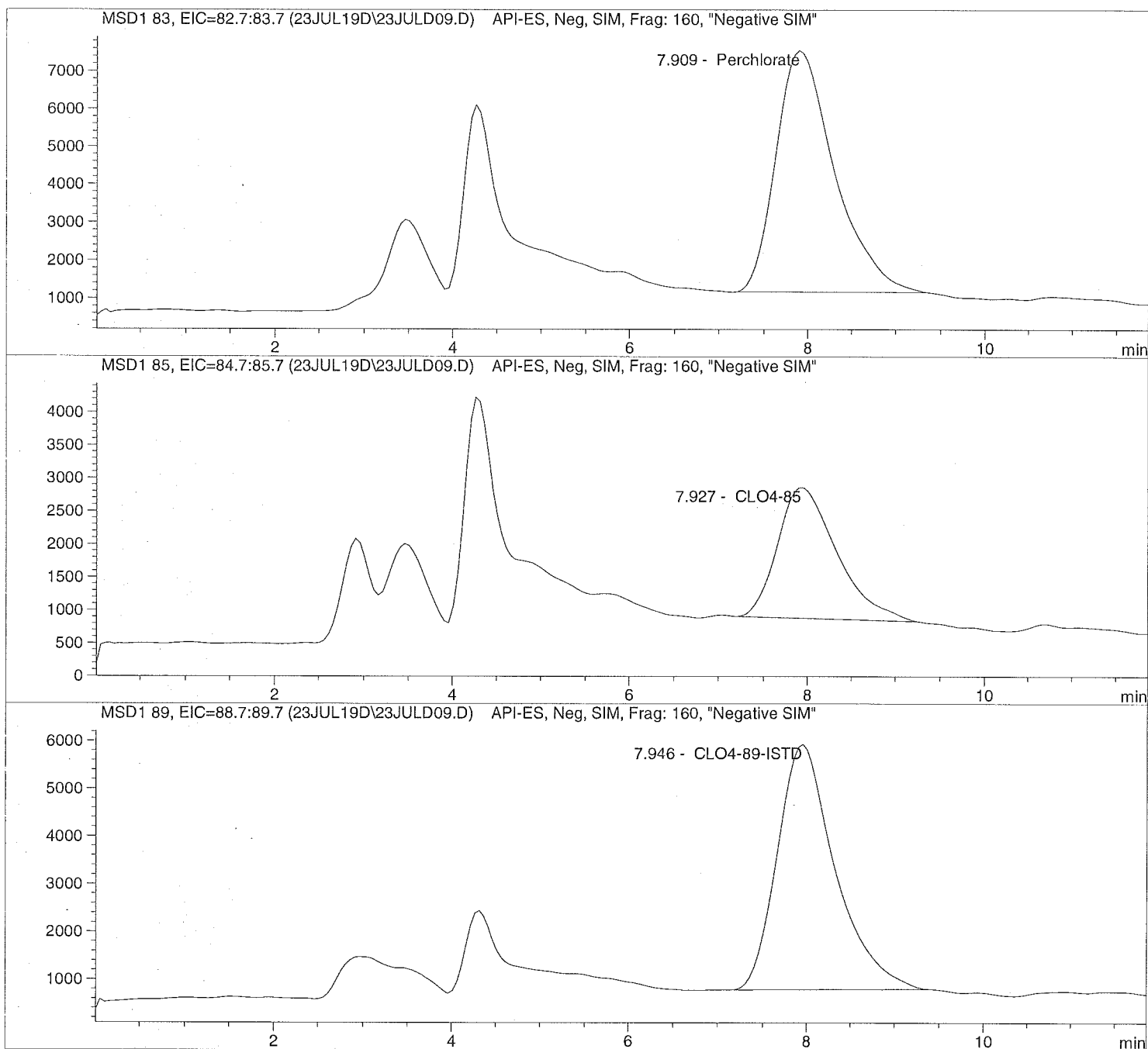
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD09.D      Sample Name: 664924    201232S

```

=====
Injection Date: 7/23/2019 10:25:26      Seq Line:            9
Sample Name:    664924    201232S      Location:            Vial 79
Acq Operator:   TNB                      Inj. No.:            1
                                         Inj. Vol.:            35 µl

```

```

Acq. Method:        CLO4-AQN.M
Analysis Method:    C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:      4/12/2019 07:54:13

```

Perchlorate analysis

=====  
   Sample Information  
=====

```

Sorted By:                    Signal
Calib. Data Modified:      Fri, 12. Apr. 2019,07:52:58 am
Multiplier:                1.000000
Dilution:                  1.000000
Sample Amount:             0.000

```

=====  
   LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.909	PBA	294718.6	4.1242	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.927	PBA	93034.3	4.2366	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.946	PBA	235117.5	5.0000	CLO4-89-ISTD

=====  
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD10.D

Sample Name: 664925 201232D

Injection Date: 7/23/2019 10:39:29

Seq Line: 10

Sample Name: 664925 201232D

Location: Vial 80

Acq Operator: TNB

Inj. No.: 1

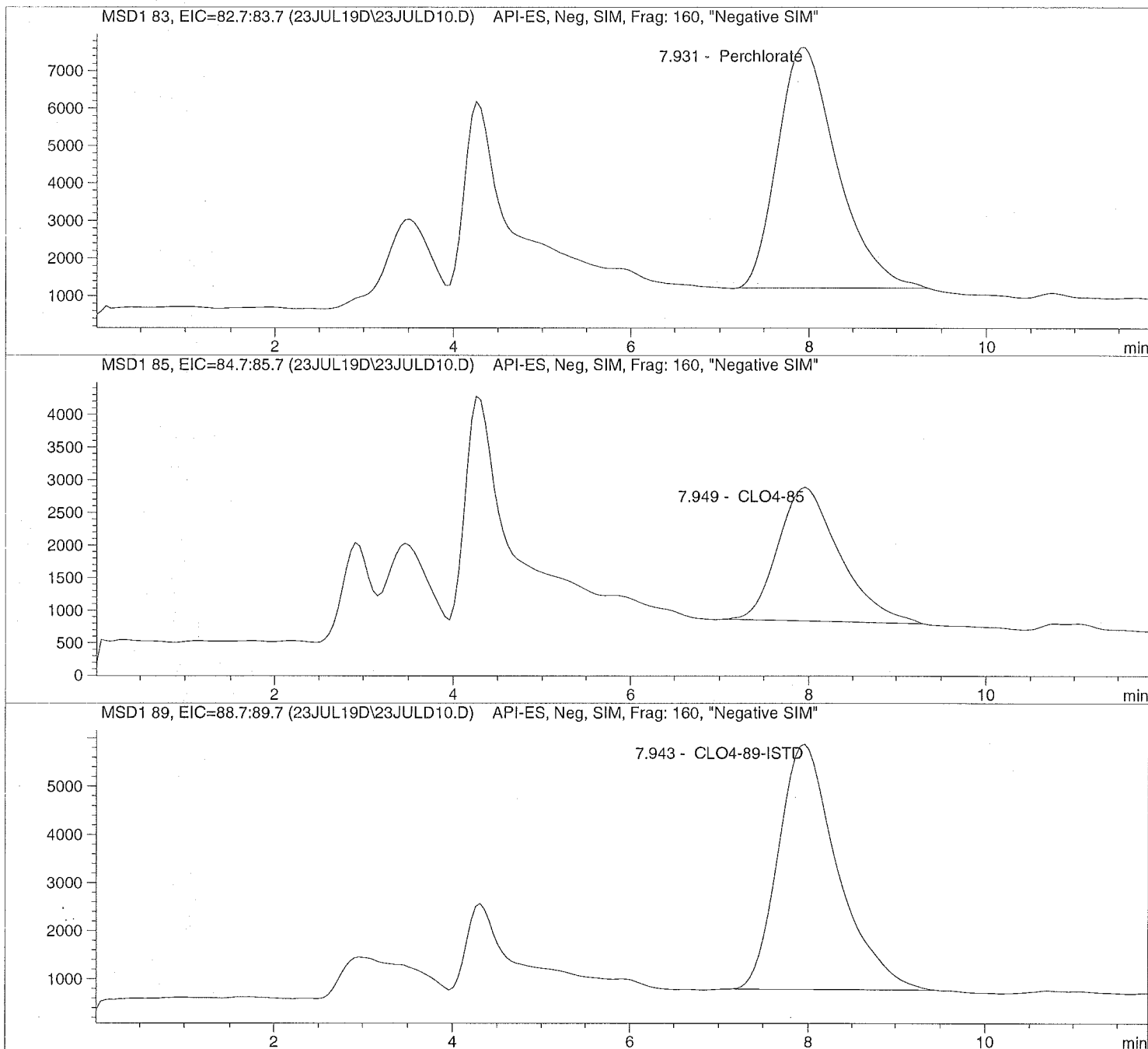
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD10.D Sample Name: 664925 201232D

```

=====
Injection Date: 7/23/2019 10:39:29      Seq Line:          10
Sample Name:    664925 201232D          Location:          Vial 80
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.931	PBA	298082.3	4.1432	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.949	PBA	99050.2	4.4791	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.943	PBA	236656.9	5.0000	CLO4-89-ISTD

```

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

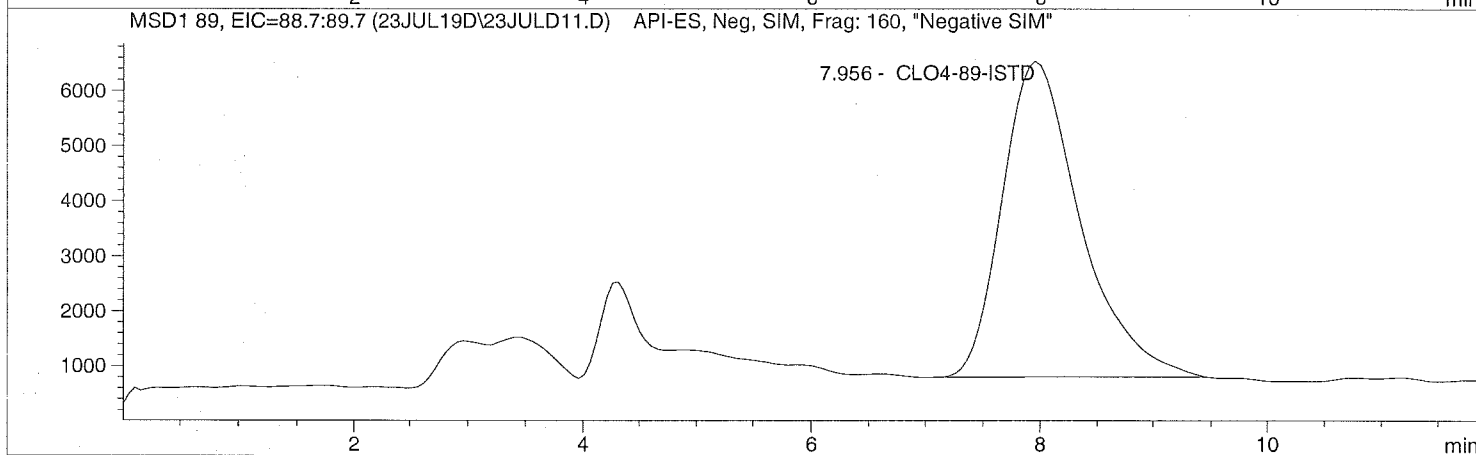
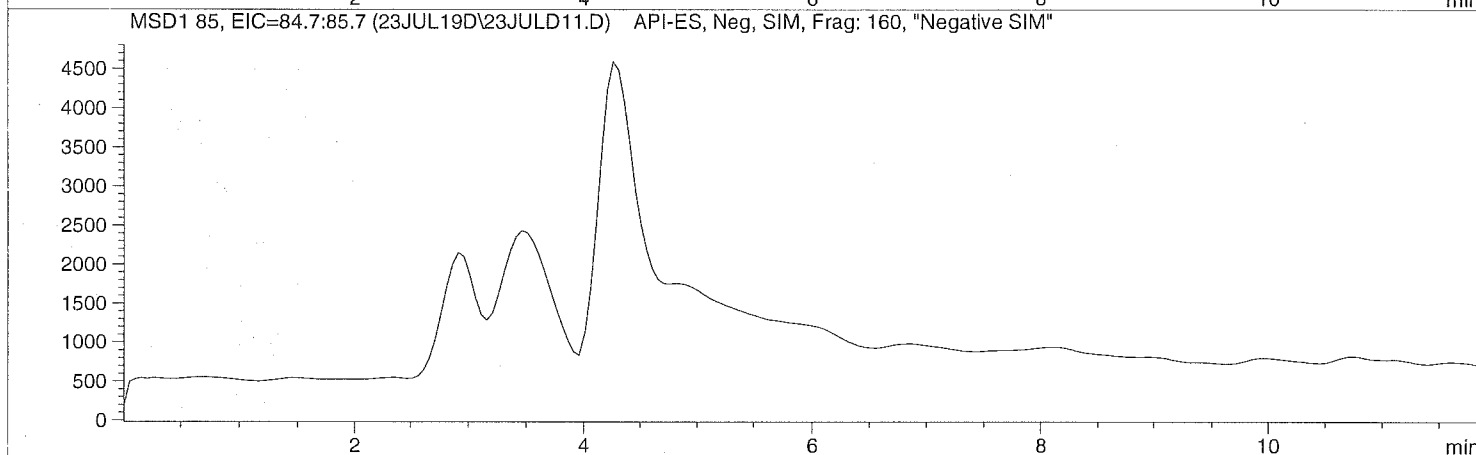
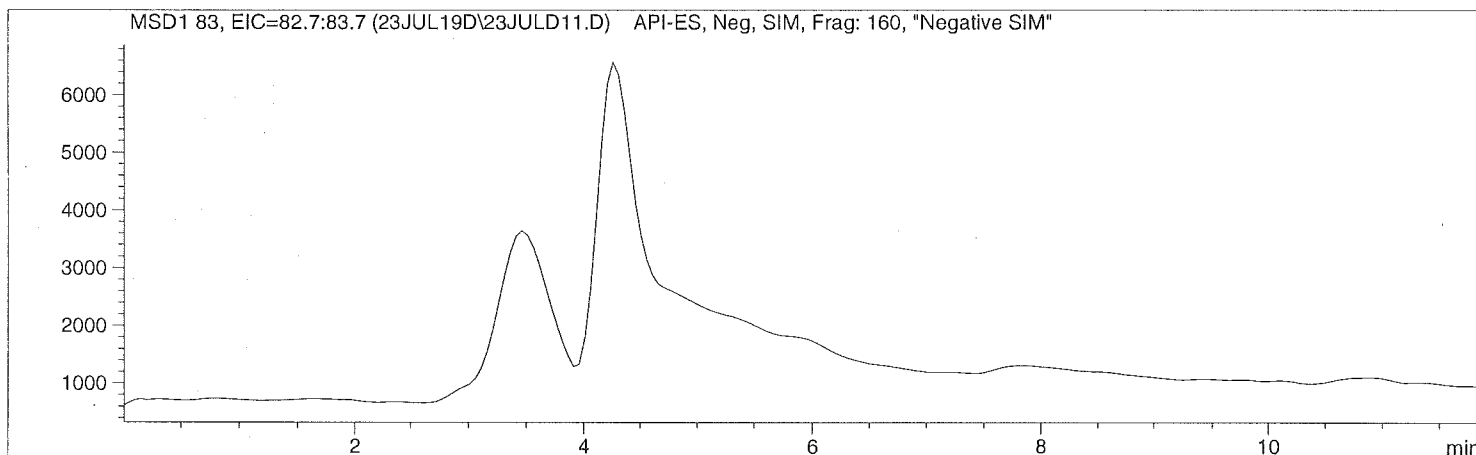
```

=====  
Injection Date: 7/23/2019 10:53:24  
Sample Name: 1920123003  
Acq Operator: TNB

Seq Line: 11  
Location: Vial 81  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====



```
=====  
Injection Date: 7/23/2019 10:53:24      Seq Line: 11  
Sample Name: 1920123003                Location: Vial 81  
Acq Operator: TNB                      Inj. No.: 1  
                                         Inj. Vol.: 35 µl  
=====
```

```
Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13
```

## Perchlorate analysis

=====  
Sample Information  
=====

```
Sorted By: Signal  
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am  
Multiplier: 1.000000  
Dilution: 1.000000  
Sample Amount: 0.000
```

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
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
7.956	PBA	272319.7	5.0000	CLO4-89-ISTD

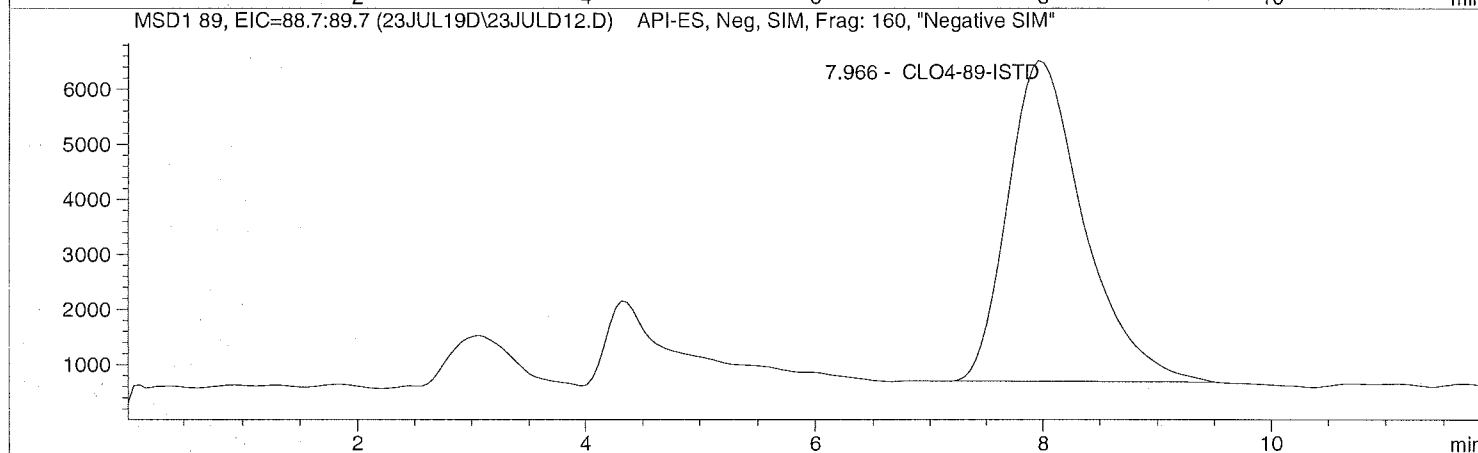
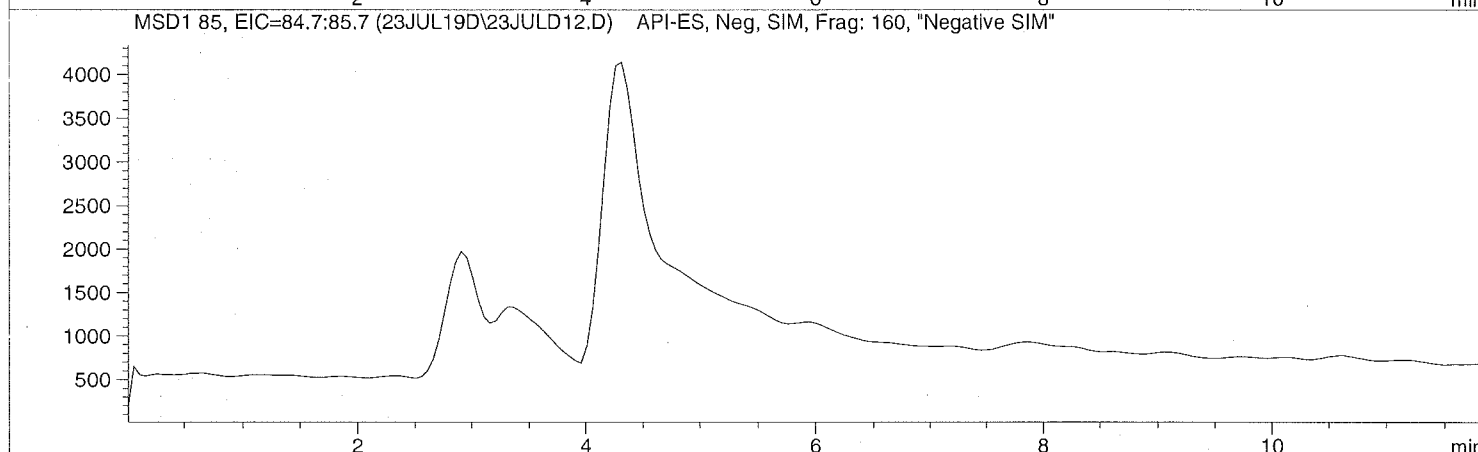
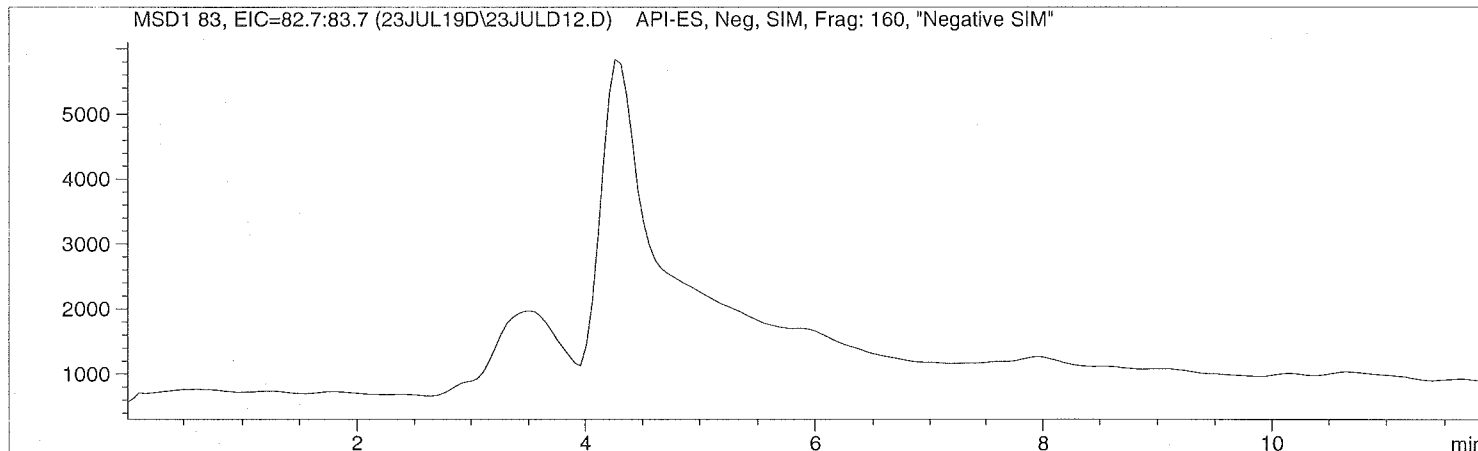
=====  
\*\*\* End of Report \*\*\*



=====  
Injection Date: 7/23/2019 11:07:17                   Seq Line:                   12  
Sample Name: 1920123004                            Location:                   Vial 82  
Acq Operator: TNB                                   Inj. No.:                   1  
  Inj. Vol.:                   35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====



```
=====
Injection Date: 7/23/2019 11:07:17      Seq Line: 12
Sample Name: 1920123004                 Location: Vial 82
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 35 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.966	PBA	270262.5	5.0000	CLO4-89-ISTD

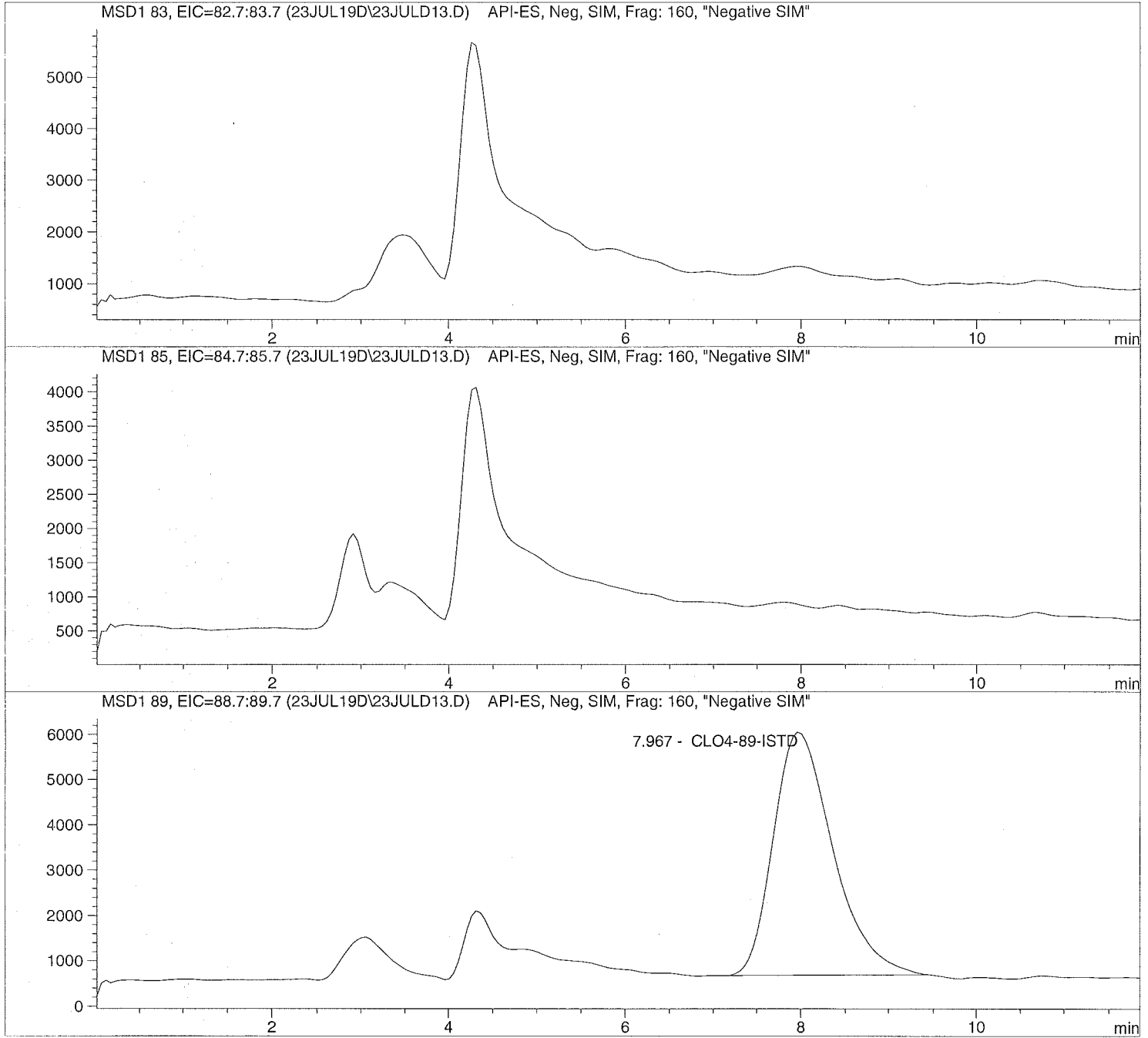
=====
\*\*\* End of Report \*\*\*

Injection Date: 7/23/2019 11:21:18  
Sample Name: 1920123005  
Acq Operator: TNB

Seq Line: 13  
Location: Vial 83  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====  
Injection Date: 7/23/2019 11:21:18      Seq Line:      13  
Sample Name:    1920123005              Location:      Vial 83  
Acq Operator:   TNB                     Inj. No.:     1  
                                           Inj. Vol.:    35 µl
```

```
Acq. Method:    CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed:   4/12/2019 07:54:13
```

## Perchlorate analysis

=====  
Sample Information  
=====

```
Sorted By:      Signal  
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am  
Multiplier:     1.000000  
Dilution:       1.000000  
Sample Amount:  0.000
```

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.967	PBA	250553.8	5.0000	CLO4-89-ISTD

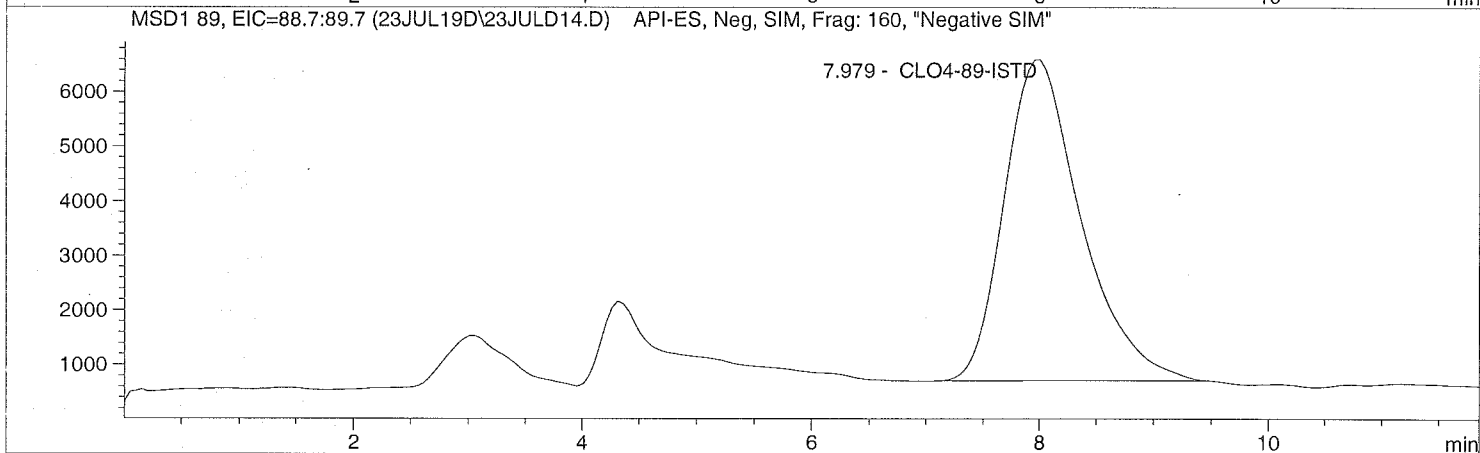
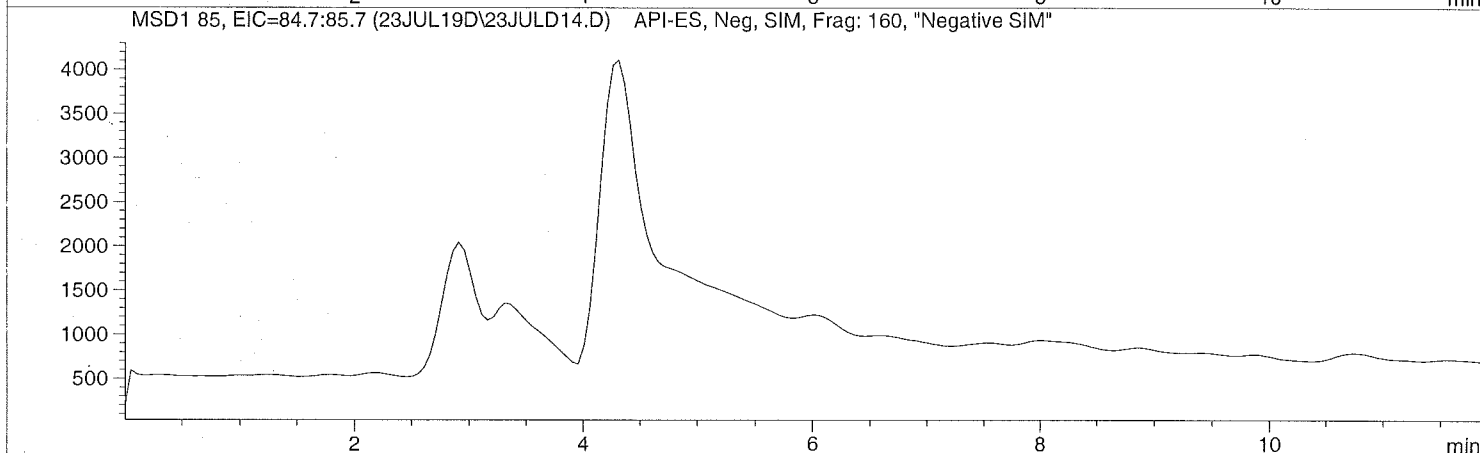
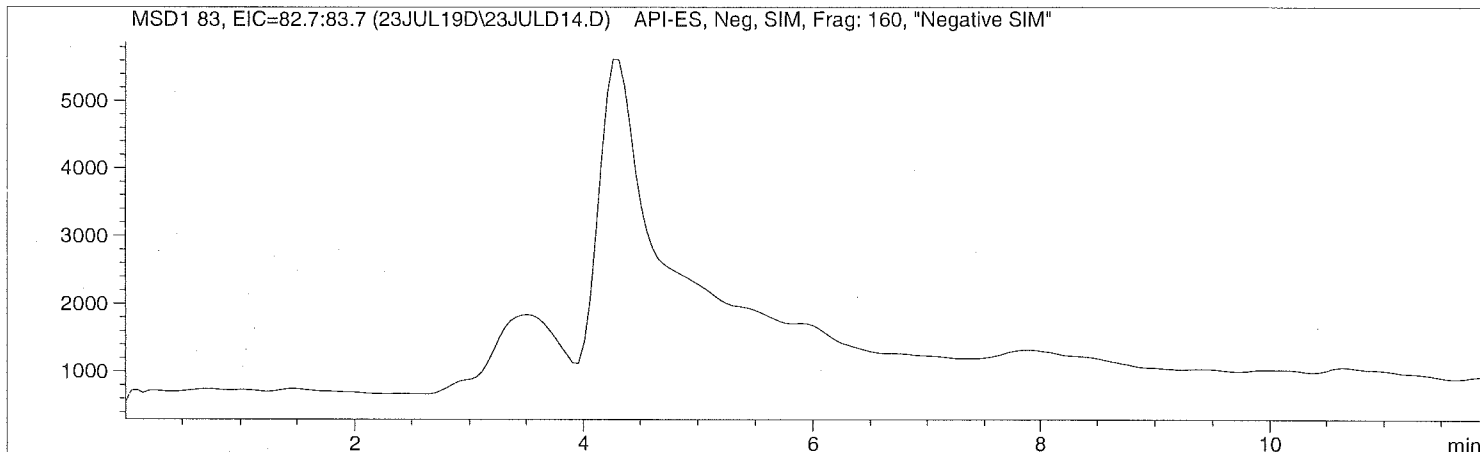
=====  
\*\*\* End of Report \*\*\*

=====  
Injection Date: 7/23/2019 11:35:11  
Sample Name: 1920123006  
Acq Operator: TNB

Seq Line: 14  
Location: Vial 84  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====



```
=====
Injection Date: 7/23/2019 11:35:11      Seq Line:          14
Sample Name:    1920123006              Location:         Vial 84
Acq Operator:   TNB                     Inj. No.:        1
                                           Inj. Vol.:       35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.979	PBA	277086.1	5.0000	CLO4-89-ISTD

=====
\*\*\* End of Report \*\*\*
=====

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD15.D

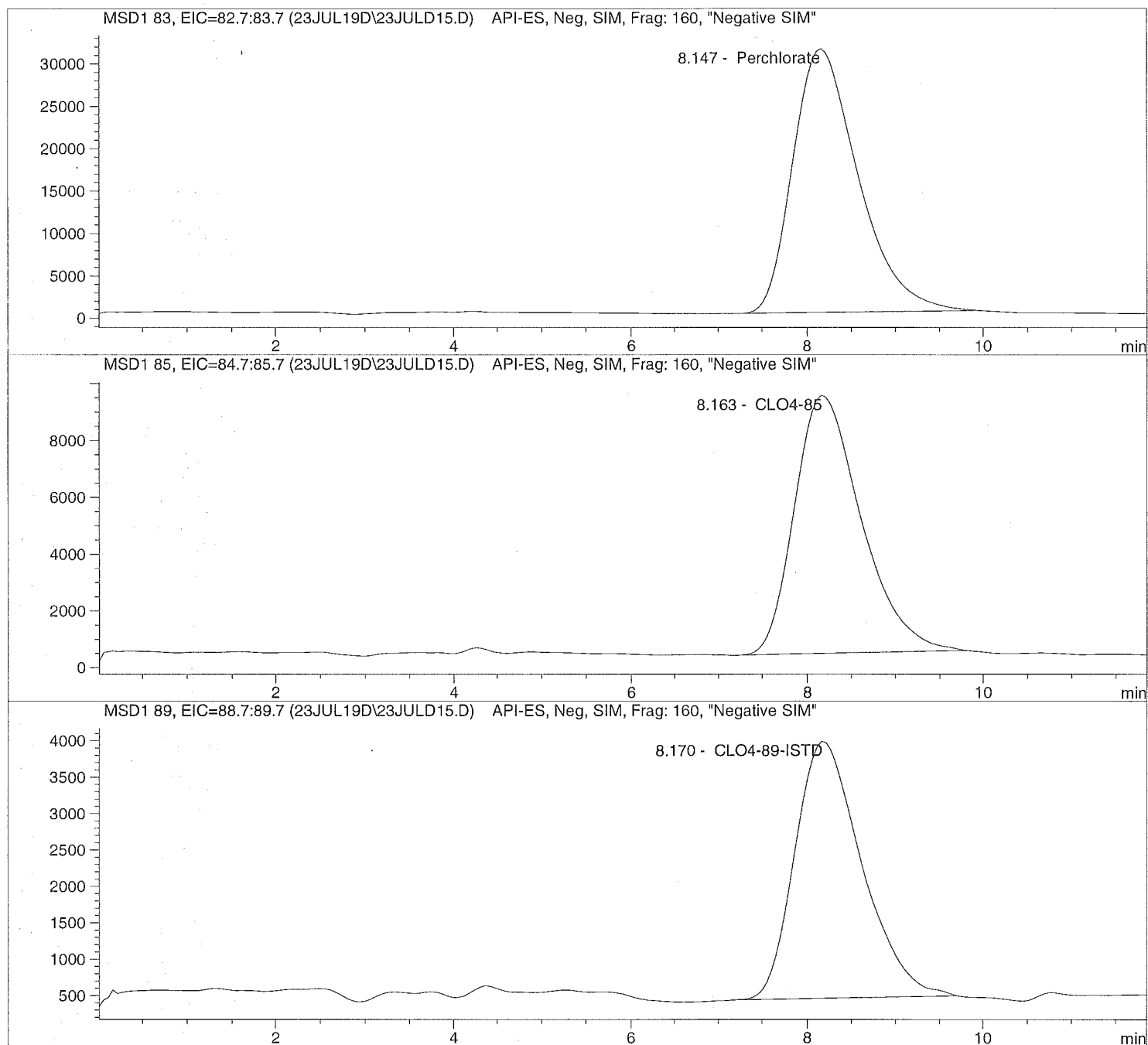
Sample Name: 664926 CCV@25

Injection Date: 7/23/2019 11:49:04  
Sample Name: 664926 CCV@25  
Acq Operator: TNB

Seq Line: 15  
Location: Vial 71  
Inj. No.: 1  
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis





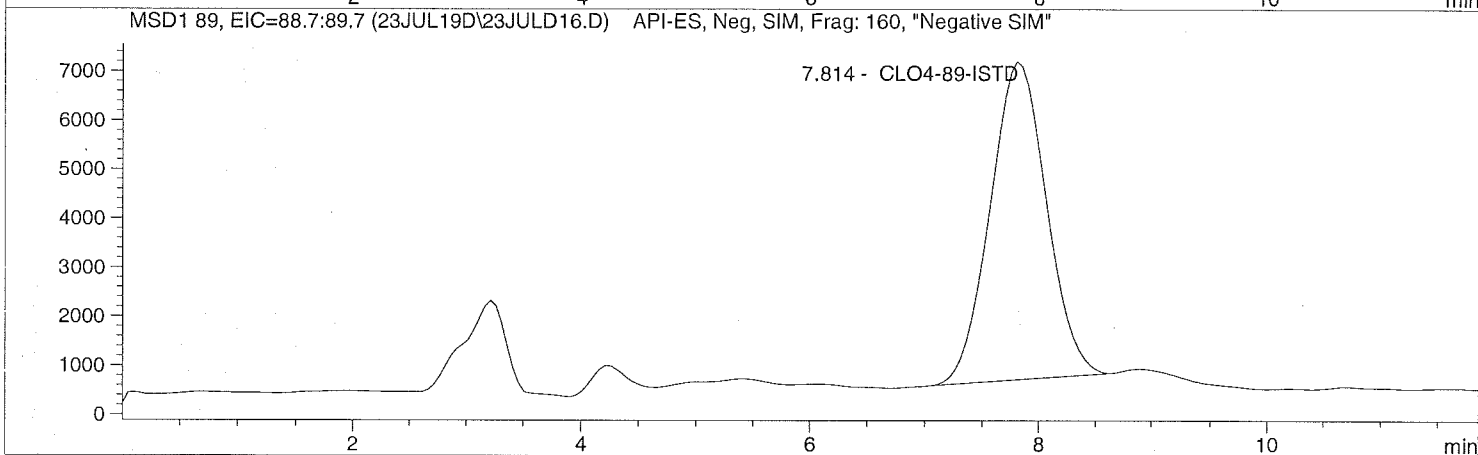
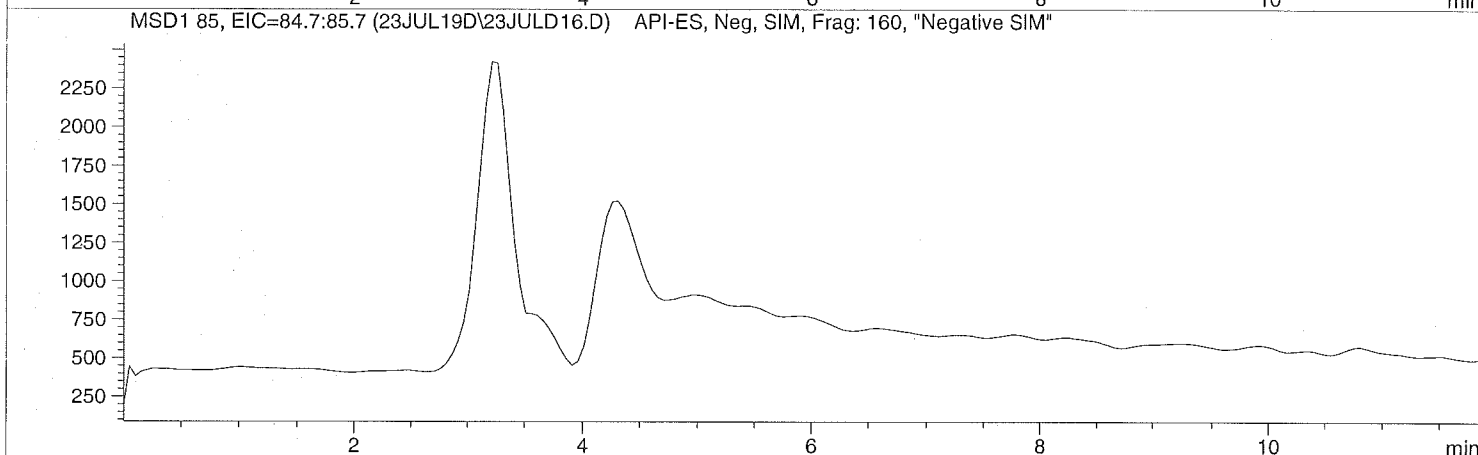
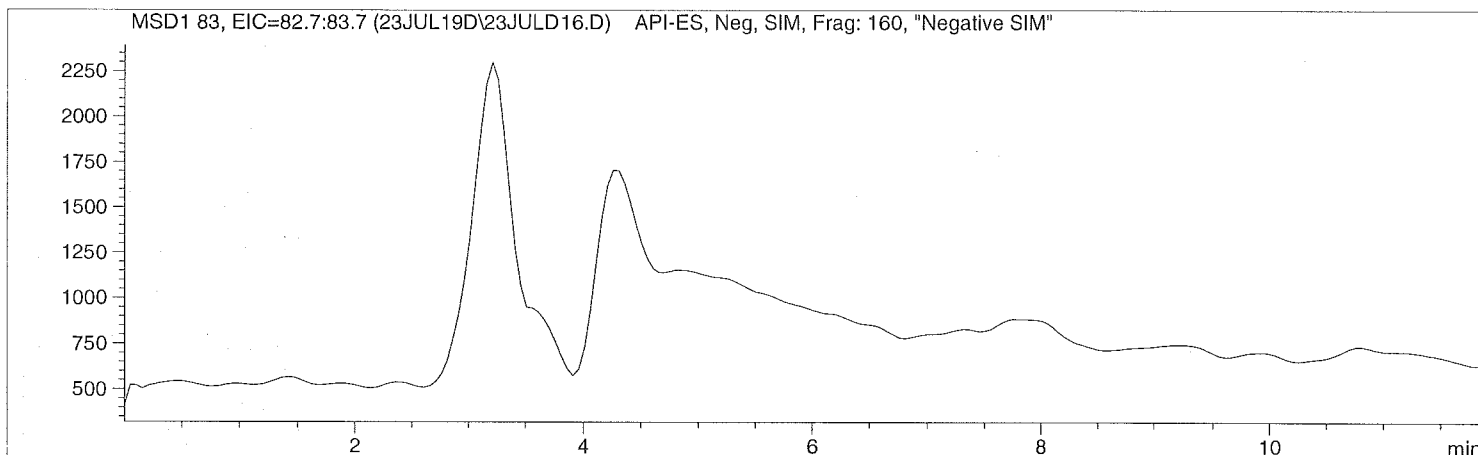


Injection Date: 7/23/2019 12:03:02  
Sample Name: 1920571001  
Acq Operator: TNB

Seq Line: 16  
Location: Vial 85  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date: 7/23/2019 12:03:02      Seq Line:          16
Sample Name:    1920571001              Location:         Vial 85
Acq Operator:   TNB                    Inj. No.:        1
                                           Inj. Vol.:       35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.814	PBA	224656.6	5.0000	CLO4-89-ISTD

=====
\*\*\* End of Report \*\*\*



```
=====
Injection Date: 7/23/2019 12:16:58      Seq Line:          17
Sample Name:    1920572001              Location:          Vial 86
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

## Perchlorate analysis

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

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====
```

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

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.796	PBA	204102.5	5.0000	CLO4-89-ISTD

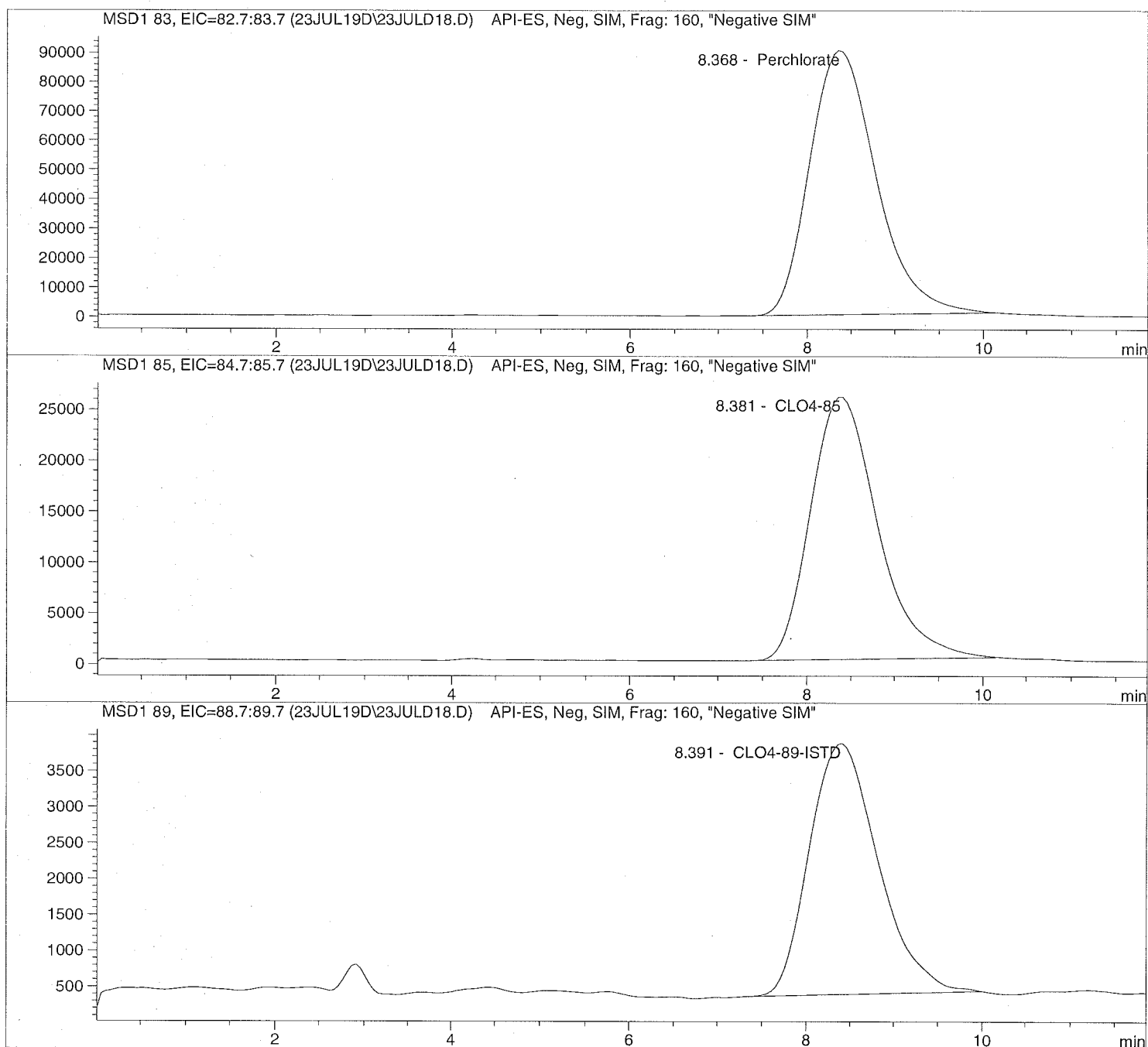
```
=====
*** End of Report ***
=====
```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD18.D Sample Name: 1920581001 100

=====  
Injection Date: 7/23/2019 12:30:57 Seq Line: 18  
Sample Name: 1920581001 100 Location: Vial 87  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JUL18.D Sample Name: 1920581001 100

```

=====
Injection Date: 7/23/2019 12:30:57      Seq Line:      18
Sample Name:    1920581001 100          Location:      Vial 87
Acq Operator:   TNB                    Inj. No.:     1
                                           Inj. Vol.:    35 µl
  
```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
  
```

Perchlorate analysis

Sample Information

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       100.000000
Sample Amount:  0.000
  
```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.368	PBA	4742469.5	6892.8927	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.381	PBA	1372874.8	6775.2203	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.391	PBA	190565.5	500.0000	CLO4-89-ISTD

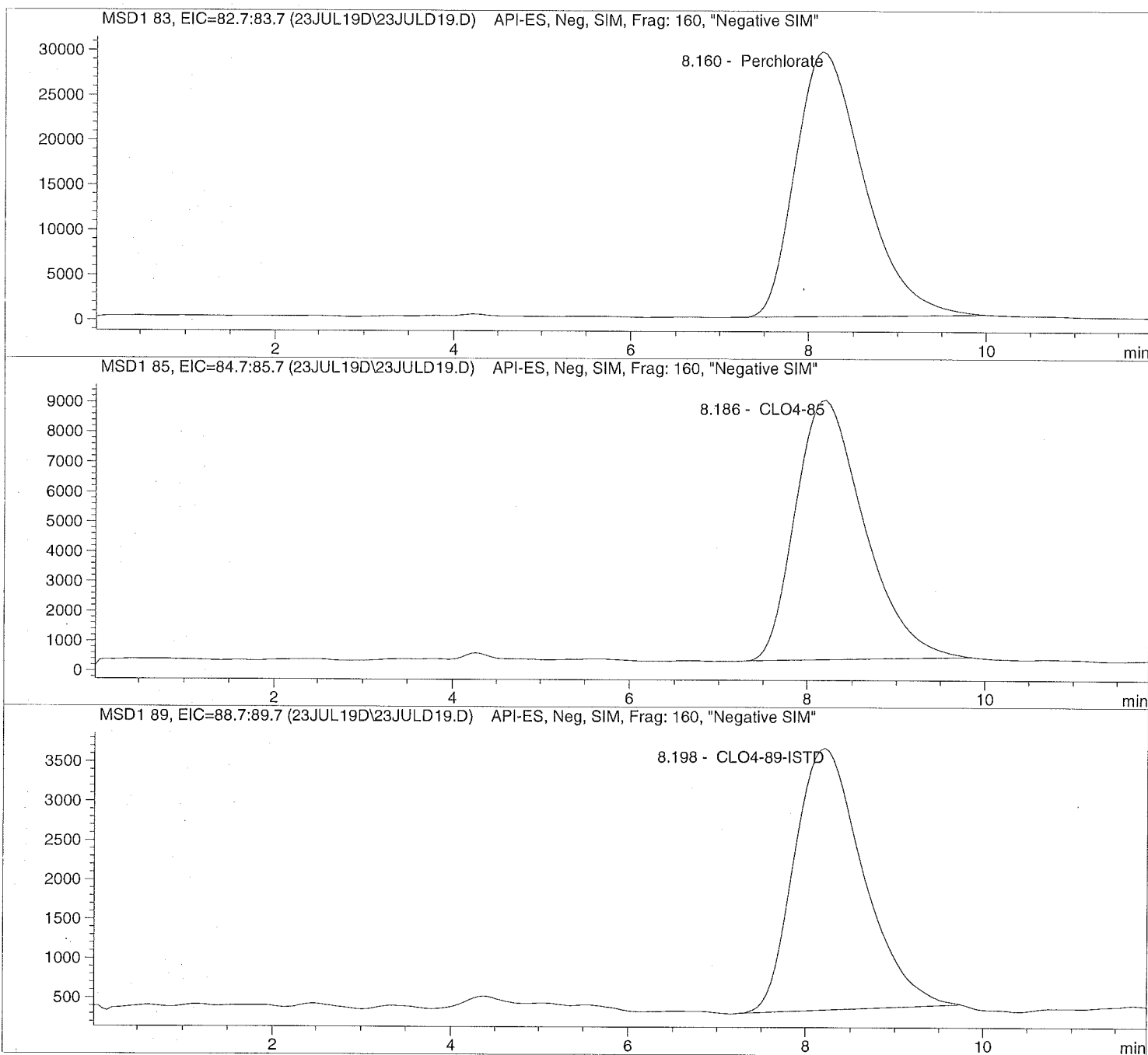
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD19.D      Sample Name: 664927      CCV@25

=====  
Injection Date: 7/23/2019 12:44:47      Seq Line: 19  
Sample Name: 664927      CCV@25      Location: Vial 71  
Acq Operator: TNB      Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD19.D Sample Name: 664927 CCV@25

=====  
Injection Date: 7/23/2019 12:44:47 Seq Line: 19  
Sample Name: 664927 CCV@25 Location: Vial 71  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====  
Sample Information  
=====

Sorted By: Signal  
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am  
Multiplier: 1.000000  
Dilution: 1.000000  
Sample Amount: 25.000

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.160	PBA	1565389.9	26.5099	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.186	PBA	466030.6	26.5949	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.198	PBA	179008.0	5.0000	CLO4-89-ISTD

=====  
\*\*\* End of Report \*\*\*





**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

## **Initial Calibration**

=====  
 Calibration Table  
 =====

Perchlorate

Calib. Data Modified : 3/19/2019 2:35:19 PM

Calculate : Internal Standard  
 Based on : Peak Area

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

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

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

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

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

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

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

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp	Name
8.744	1 1	1.00000	7.76074e4	1.28854e-5	1	Perchlorate
	2	2.00000	1.35273e5	1.47849e-5		
	3	5.00000	3.37764e5	1.48033e-5		
	4	10.00000	6.83454e5	1.46316e-5		
	5	25.00000	2.08433e6	1.19943e-5		
	6	50.00000	4.13334e6	1.20968e-5		
	7	75.00000	5.99313e6	1.25143e-5		
8.755	2 1	1.00000	2.36780e4	4.22333e-5	1	CL04-85
	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	CL04-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5		
	3	5.00000	2.33196e5	2.14412e-5		
	4	5.00000	2.34454e5	2.13262e-5		
	5	5.00000	2.50568e5	1.99547e-5		
	6	5.00000	2.30977e5	2.16472e-5		

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

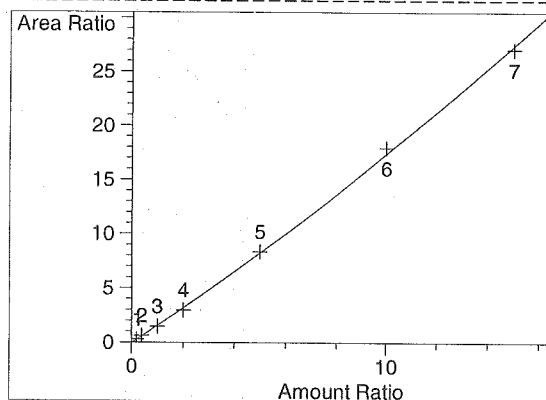
Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min  
 Curve Type : Linear  
 Origin : Included  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

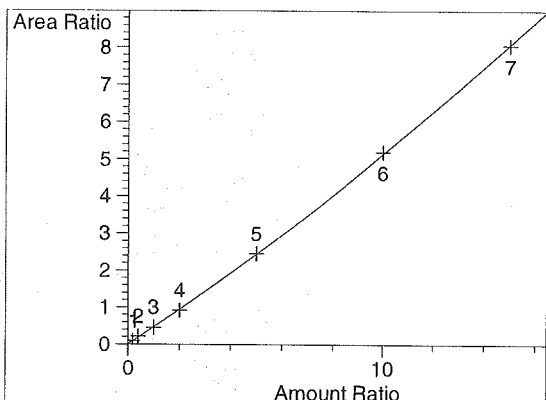
=====  
 Peak Sum Table  
 =====

\*\*\*No Entries in table\*\*\*

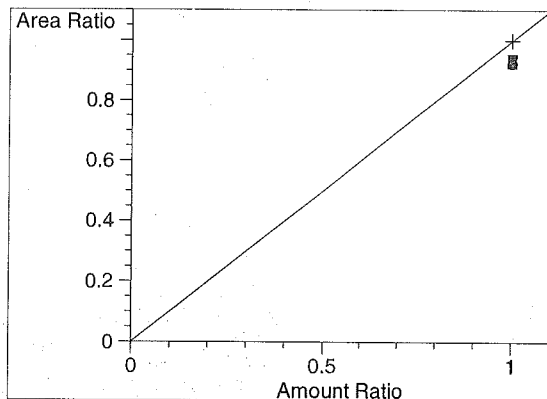
=====  
 Calibration Curves  
 =====



Perchlorate at exp. RT: 8.744  
 MSD1 83, EIC=82.7:83.7  
 Correlation: 0.99957  
 Residual Std. Dev.: 0.30744  
 Formula:  $y = ax^2 + bx + c$   
 a: 1.76988e-2  
 b: 1.56480  
 c: -4.92430e-2  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755  
 MSD1 85, EIC=84.7:85.7  
 Correlation: 0.99983  
 Residual Std. Dev.: 0.03473  
 Formula:  $y = ax^2 + bx + c$   
 a: 5.13396e-3  
 b: 4.62055e-1  
 c: 4.97209e-4  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766  
 MSD1 89, EIC=88.7:89.7  
 Correlation: 1.00000  
 Residual Std. Dev.: 0.00000  
 Formula:  $y = mx + b$   
 m: 1.00000  
 b: 0.00000  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

## Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

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

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	7.76074e4	8.744	1.06245
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	8.992	2.06969
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	8.586	4.73474
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	8.698	9.27727
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	8.451	25.29036
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	8.810	51.36844
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	8.586	74.16754
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	8.702	9.25940

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	8.755	9.30535e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	9.012	2.24255
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	8.602	4.86656
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	8.713	9.64312
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	8.468	25.12159
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	8.825	50.46721
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	8.603	74.72019
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	8.721	9.54024

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.73208e5	8.766	5.00000
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	9.012	5.00000
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	8.609	5.00000
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	8.716	5.00000
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	8.472	5.00000
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	8.825	5.00000
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	8.610	5.00000
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	8.725	5.00000

\*\*\* End of Report \*\*\*

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\MAR\19MAR19I.S

## Sequence Table:

## Method and Injection Info Part:

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

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

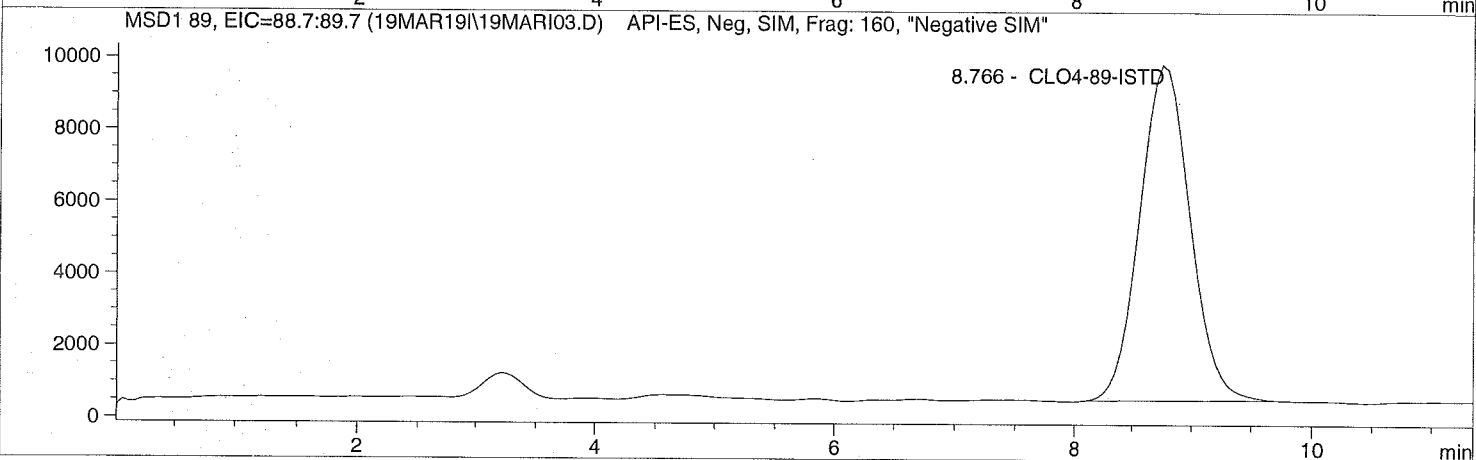
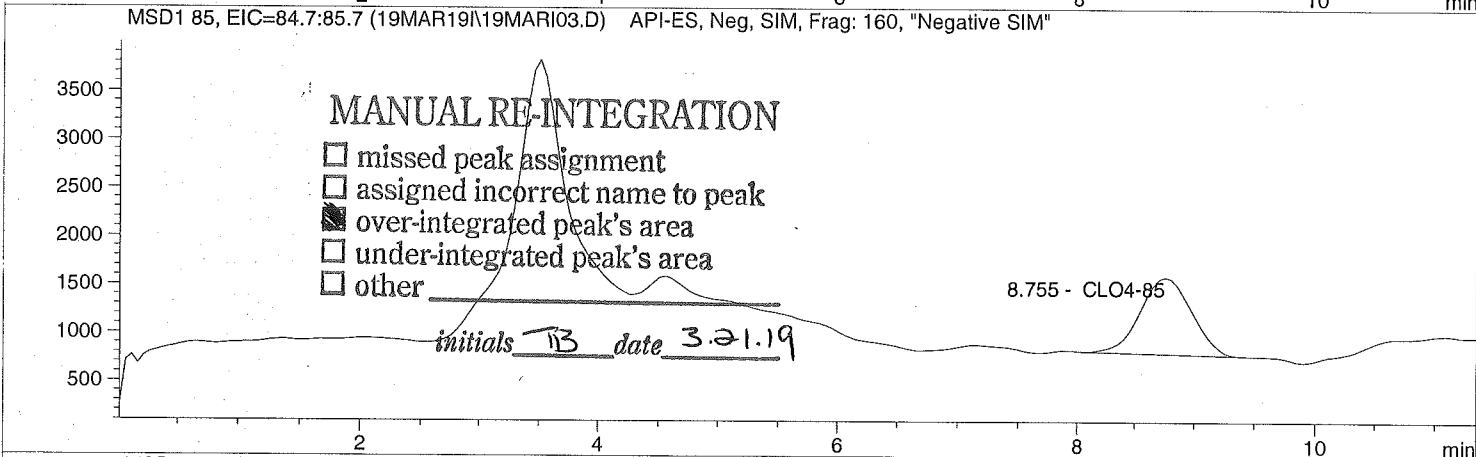
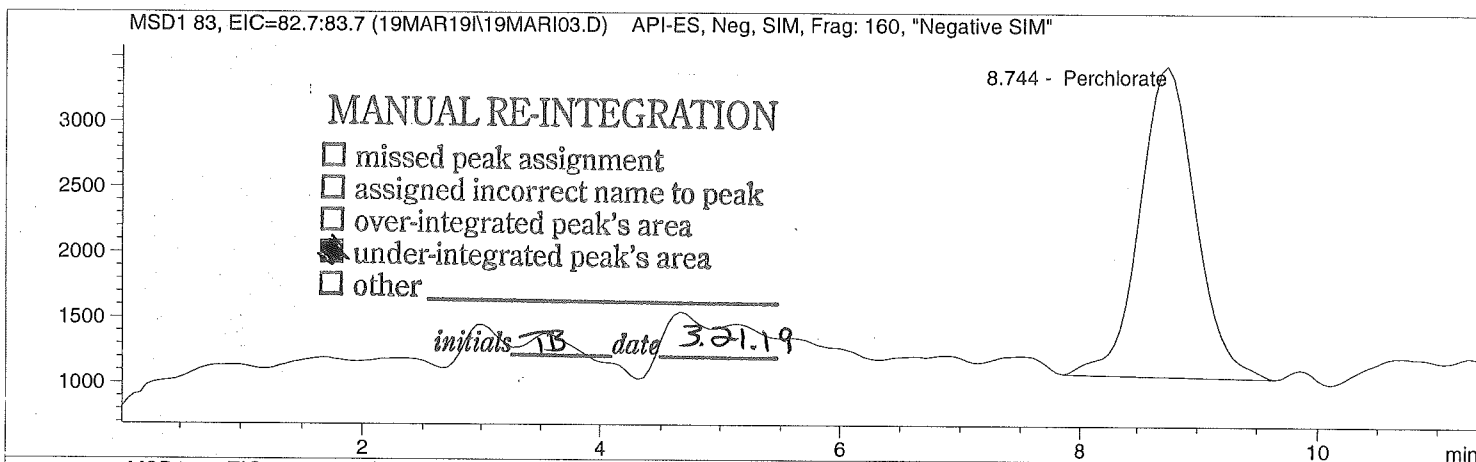
Inj. Vol.: 30 µl

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\19MAR19\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

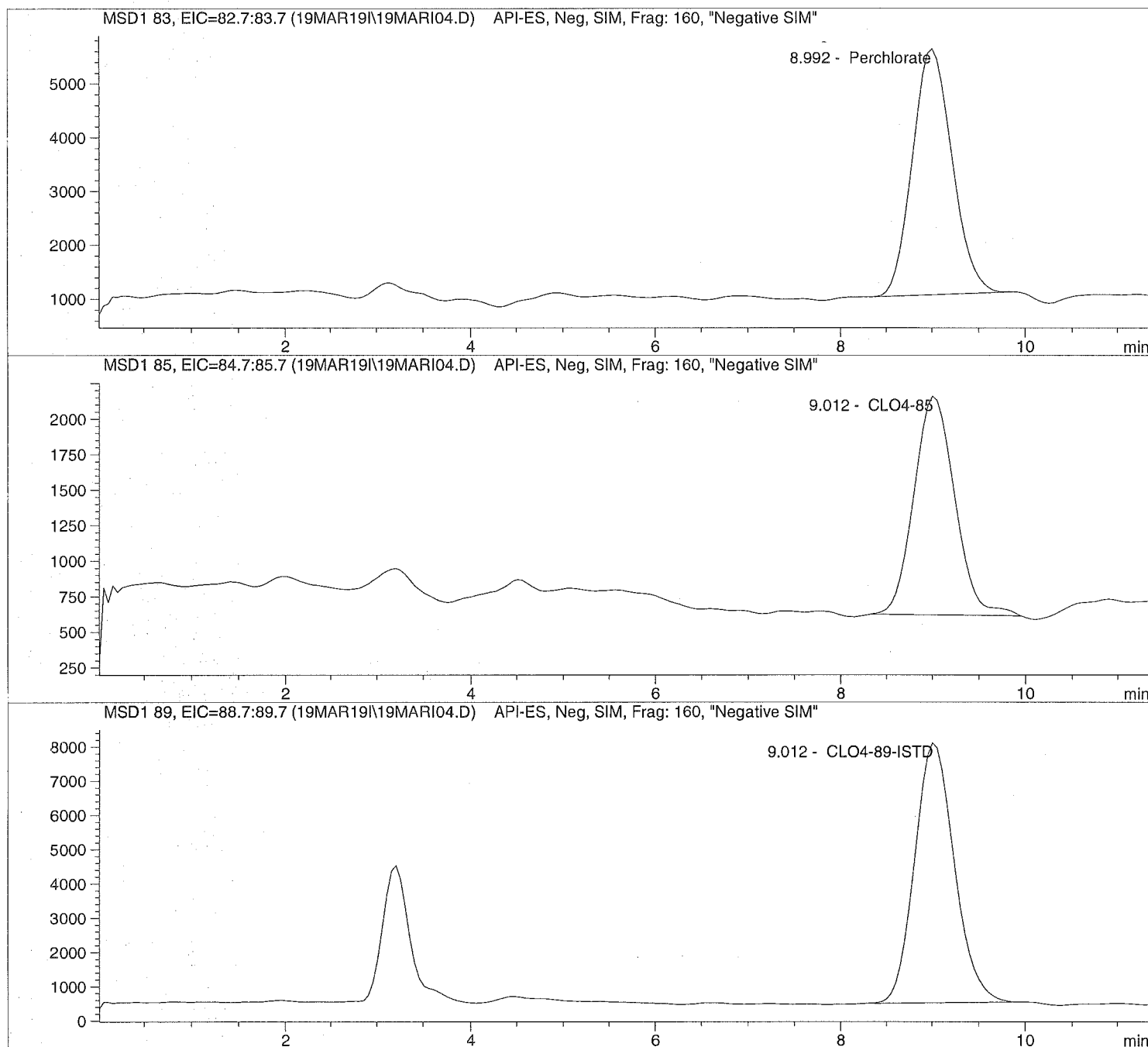
Inj. Vol.: 30 µl

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

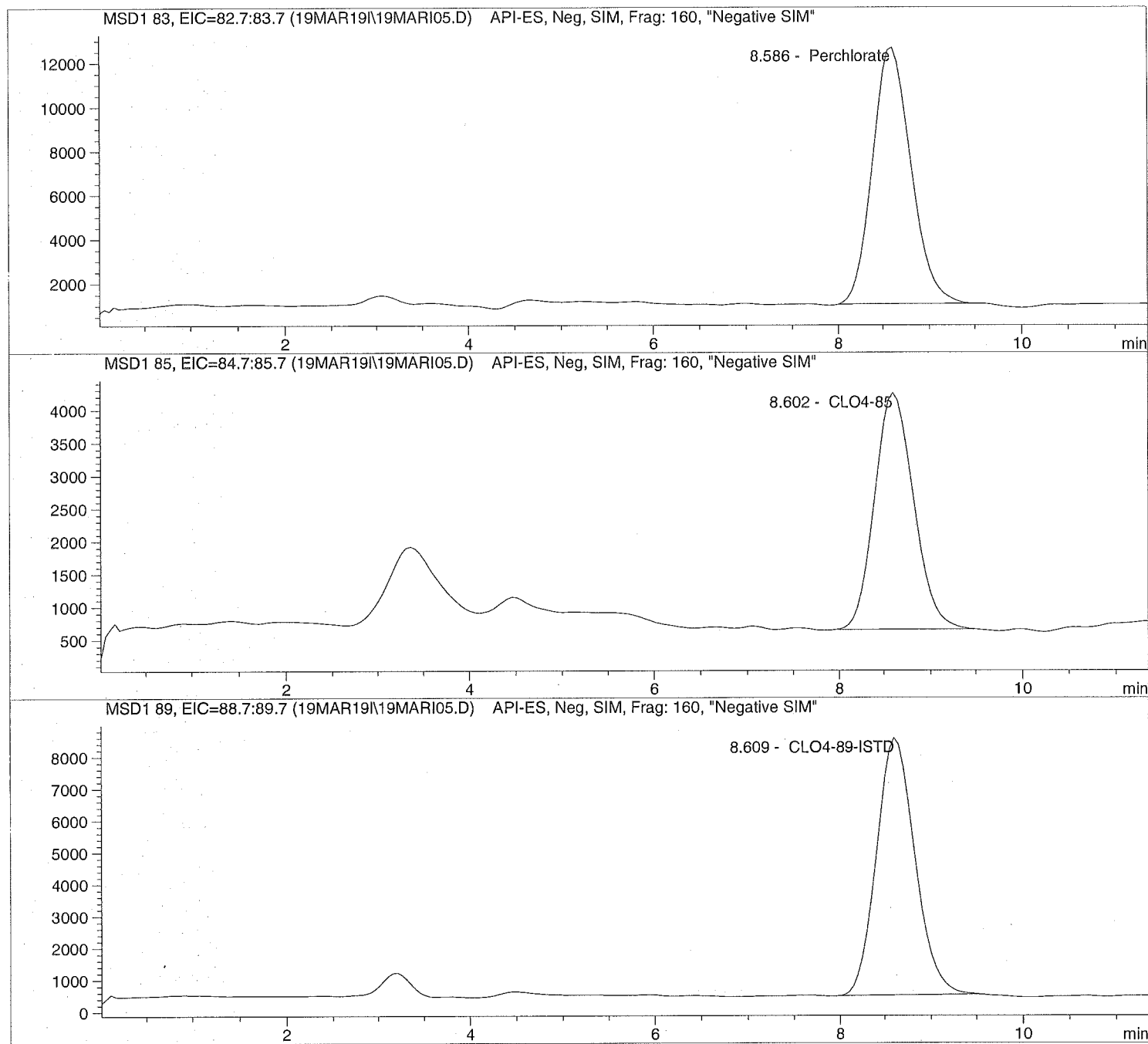
\*\*\* End of Report \*\*\*

Injection Date: 3/19/2019 10:06:16  
Sample Name: CLO4@ 5.0ug/L  
Acq Operator: TNB

Seq Line: 5  
Location: Vial 75  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI05.D Sample Name: CLO4@ 5.0ug/L

```

=====
Injection Date: 3/19/2019 10:06:16      Seq Line:          5
Sample Name:    CLO4@ 5.0ug/L           Location:          Vial 75
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:       30 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  5.000
=====

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

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

```

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

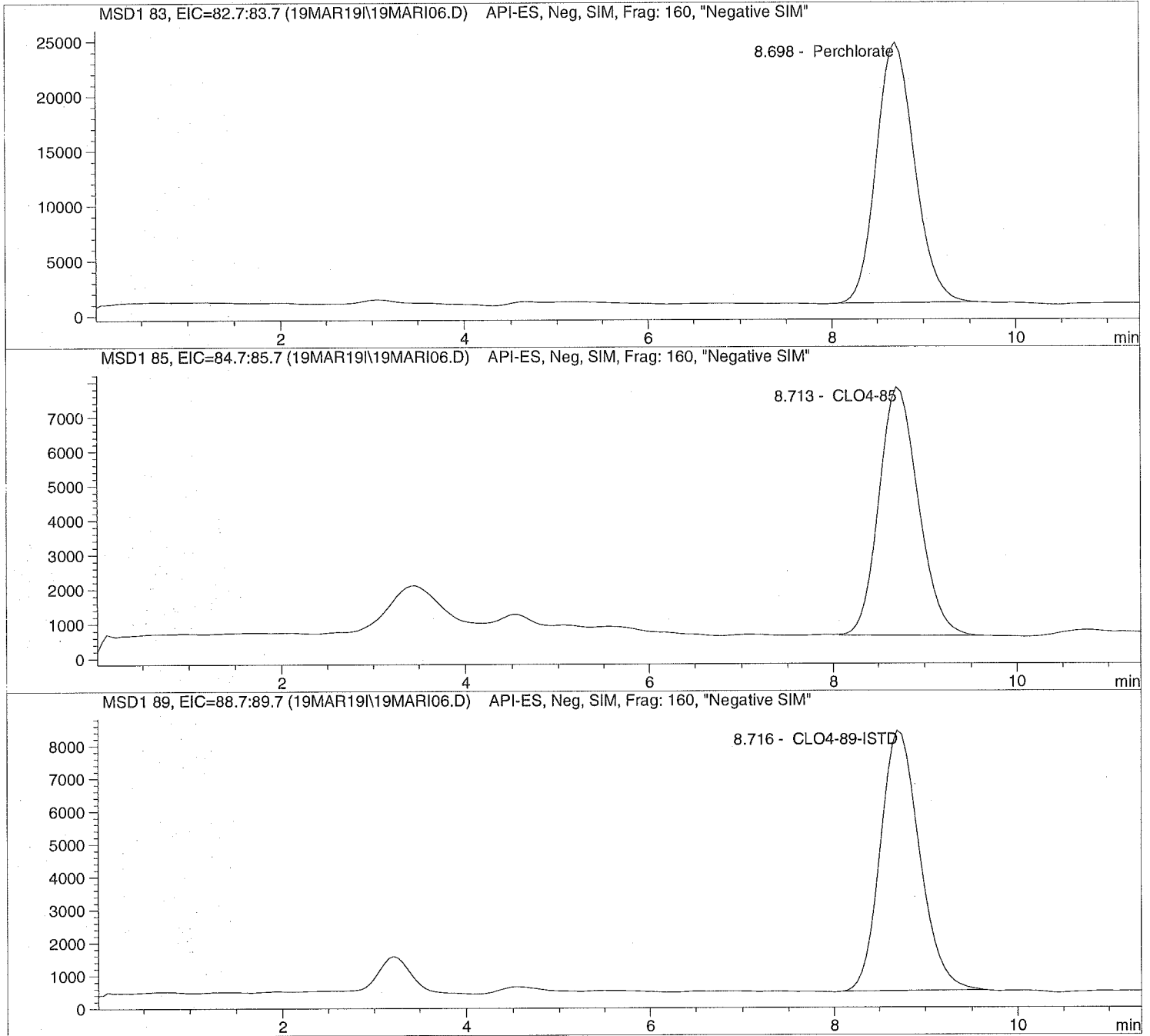
```

Injection Date: 3/19/2019 10:19:32  
Sample Name: CLO4@ 10.ug/L  
Acq Operator: TNB

Seq Line: 6  
Location: Vial 76  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date:  3/19/2019  10:19:32      Seq Line:          6
Sample Name:    CLO4@ 10.ug/L           Location:         Vial 76
Acq Operator:   TNB                     Inj. No.:        1
                                           Inj. Vol.:       30 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019  14:35:22
=====
```

## Perchlorate analysis

## Sample Information

```
Sorted By:      Signal
Calib. Data Modified:  Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  10.000
=====
```

## LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.698	PBA	683454.4	9.2773	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

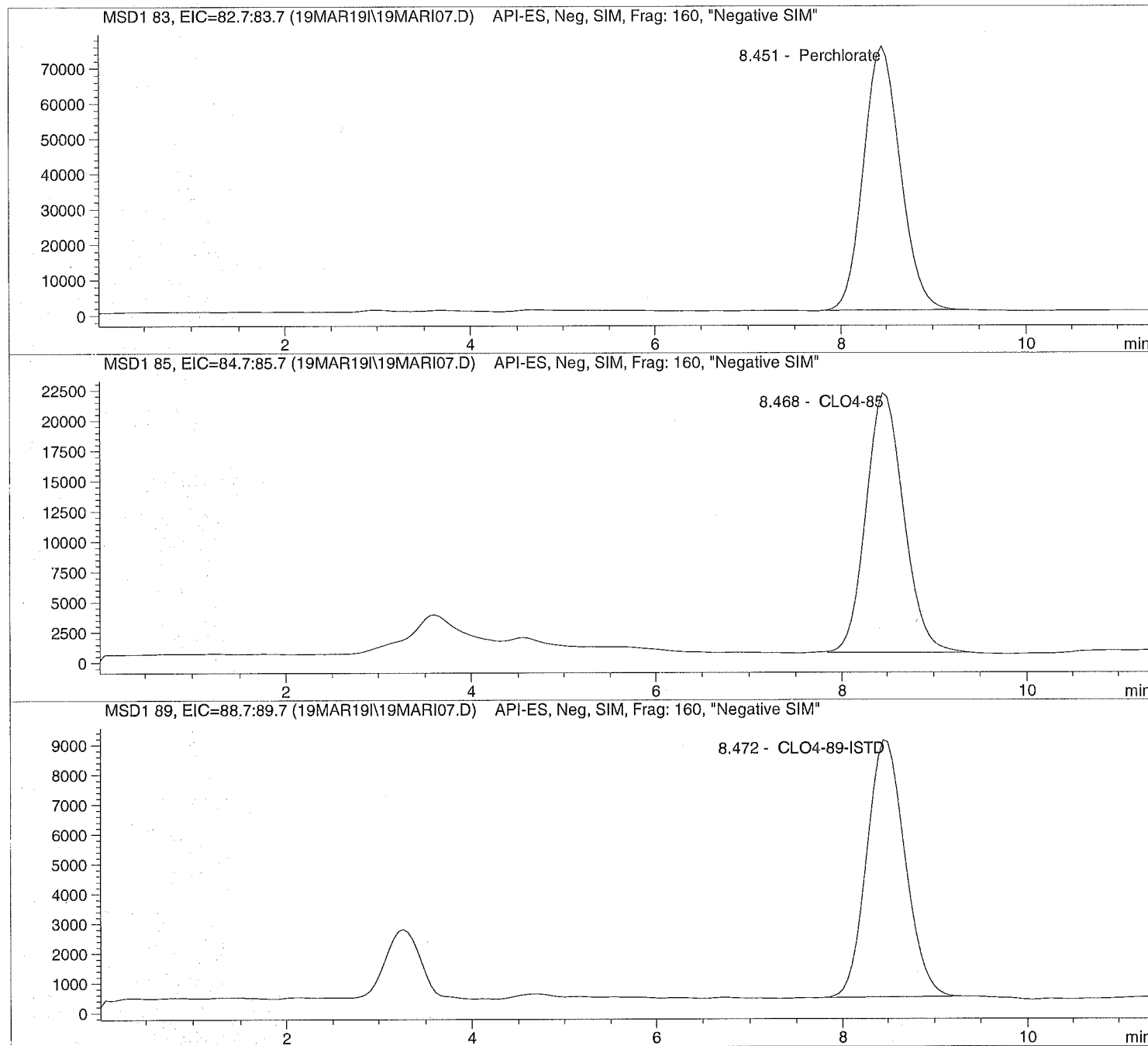
\*\*\* End of Report \*\*\*

Injection Date: 3/19/2019 10:32:49  
Sample Name: CLO4@ 25.ug/L  
Acq Operator: TNB

Seq Line: 7  
Location: Vial 77  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



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 ***
=====

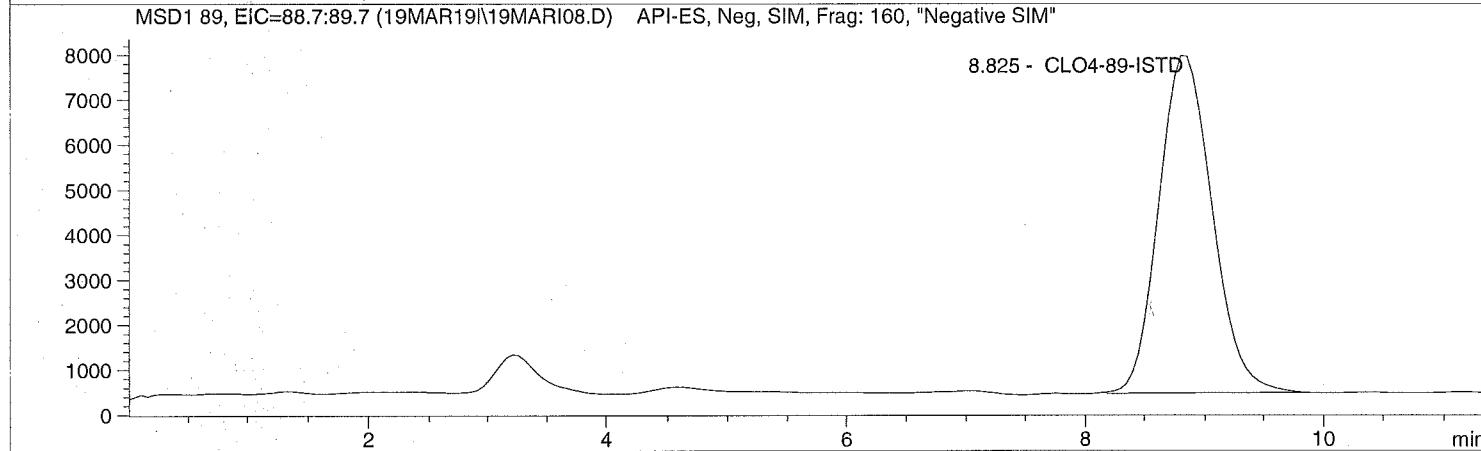
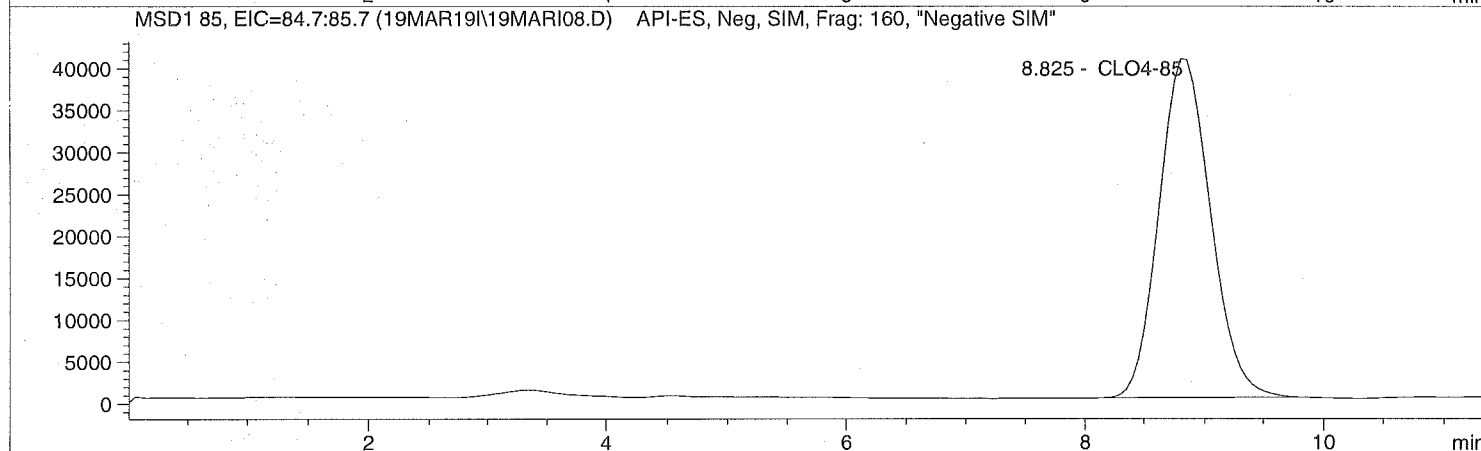
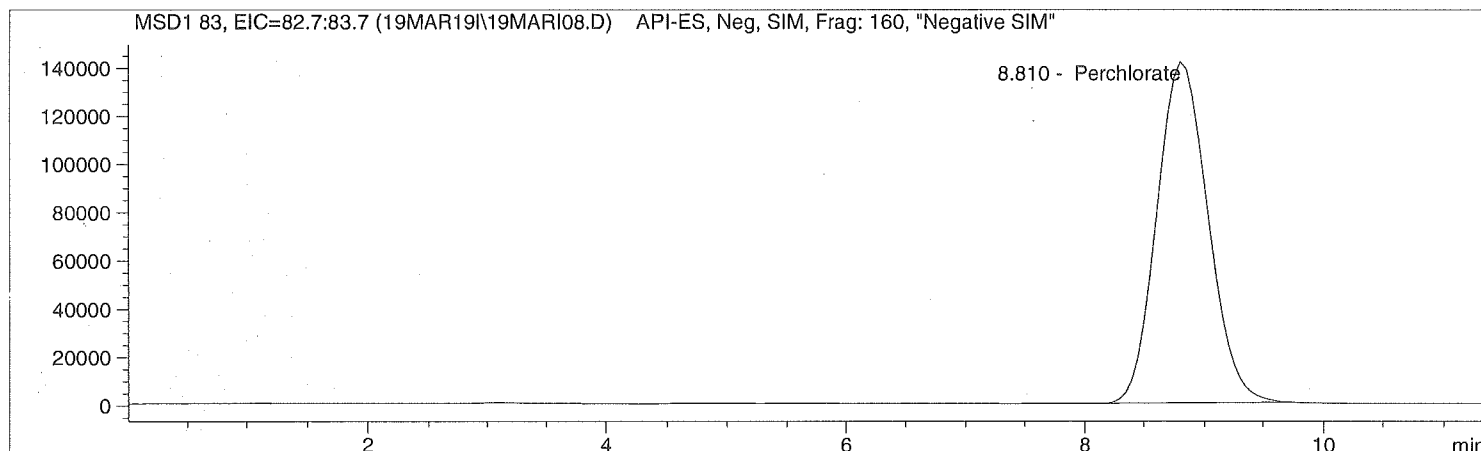
```



=====  
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  
=====



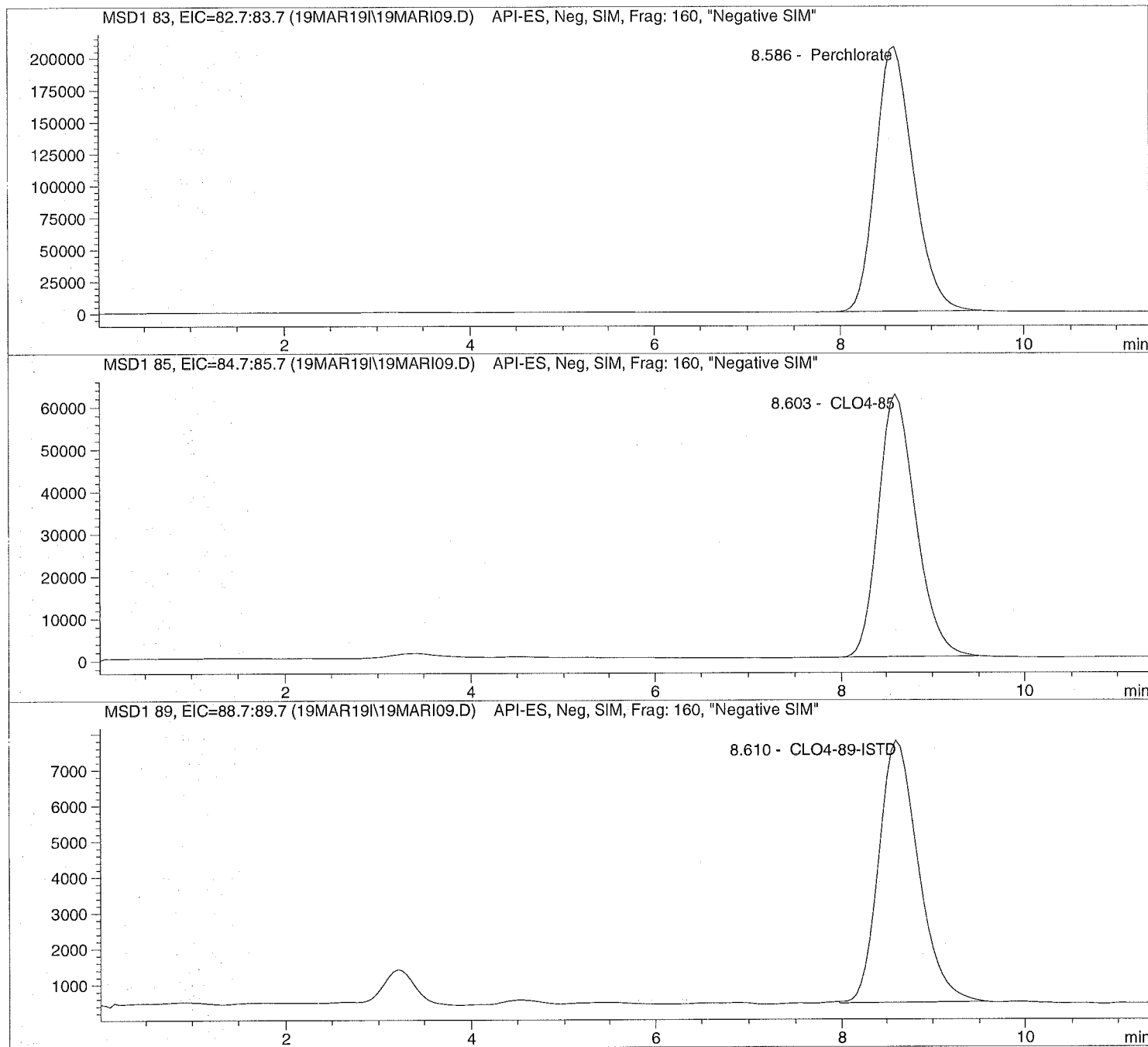


Injection Date: 3/19/2019 10:59:22  
Sample Name: CLO4@ 75.ug/L  
Acq Operator: TNB

Seq Line: 9  
Location: Vial 79  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI09.D Sample Name: CLO4@ 75.ug/L

```

=====
Injection Date:  3/19/2019  10:59:22      Seq Line:           9
Sample Name:    CLO4@ 75.ug/L             Location:           Vial 79
Acq Operator:   TNB                       Inj. No.:          1
                                           Inj. Vol.:         30 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019  14:35:22
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Tue, 19. Mar. 2019, 02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  75.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

```

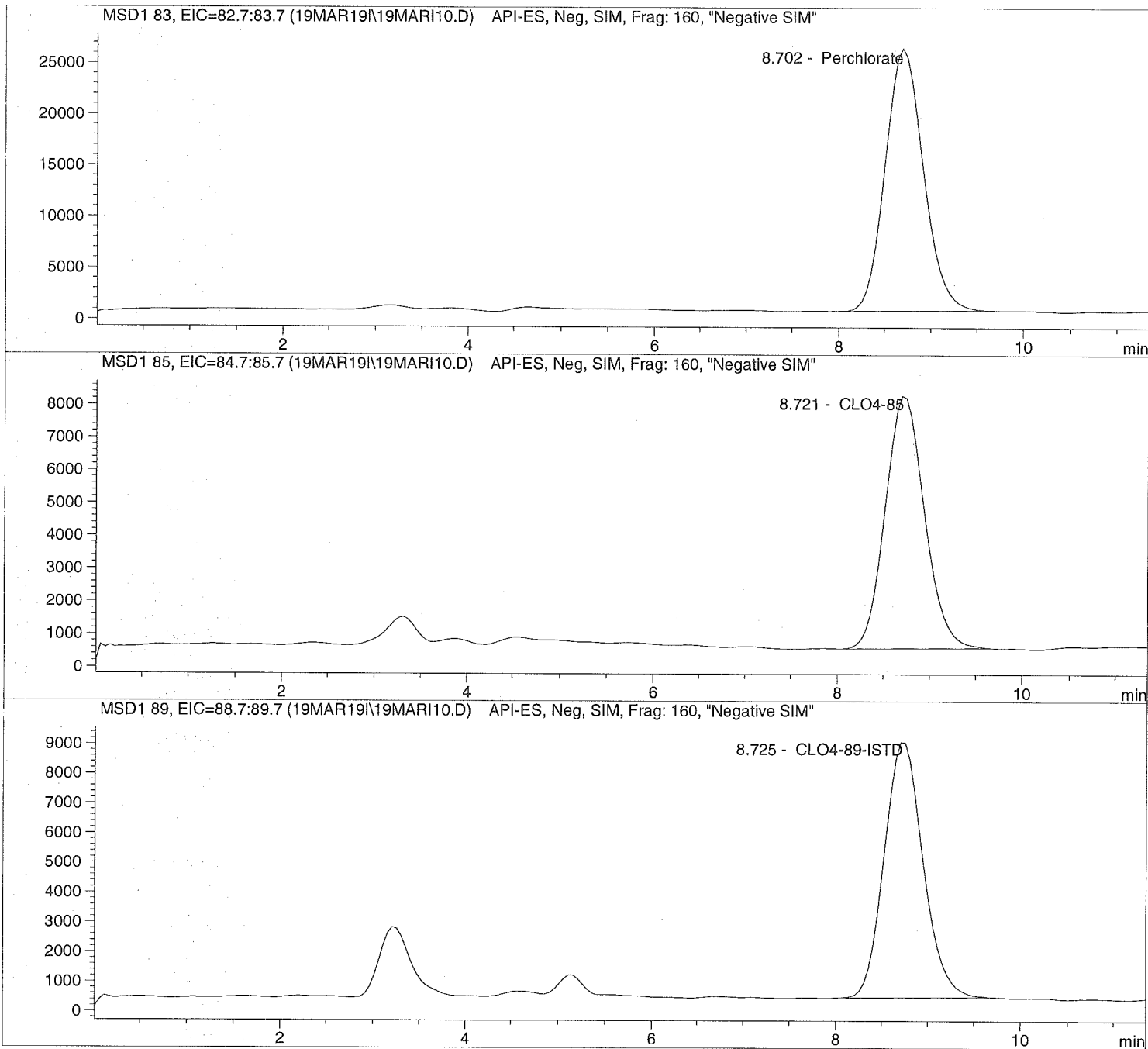
=====
*** End of Report ***
=====

```

=====  
Injection Date: 3/19/2019 11:12:42                   Seq Line:                   10  
Sample Name:    ICAL Verf@10ug/L                    Location:                  Vial 80  
Acq Operator:   TNB                                   Inj. No.:                  1  
  Inj. Vol.:                 30 µl

Acq. Method:    CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed:   3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D Sample Name: ICAL Verf@10ug/L

```

=====
Injection Date: 3/19/2019 11:12:42      Seq Line:          10
Sample Name:   ICAL Verf@10ug/L        Location:         Vial 80
Acq Operator:  TNB                     Inj. No.:        1
                                           Inj. Vol.:       30 µl
=====

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  3/19/2019 14:35:22
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  10.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

```

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

```



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

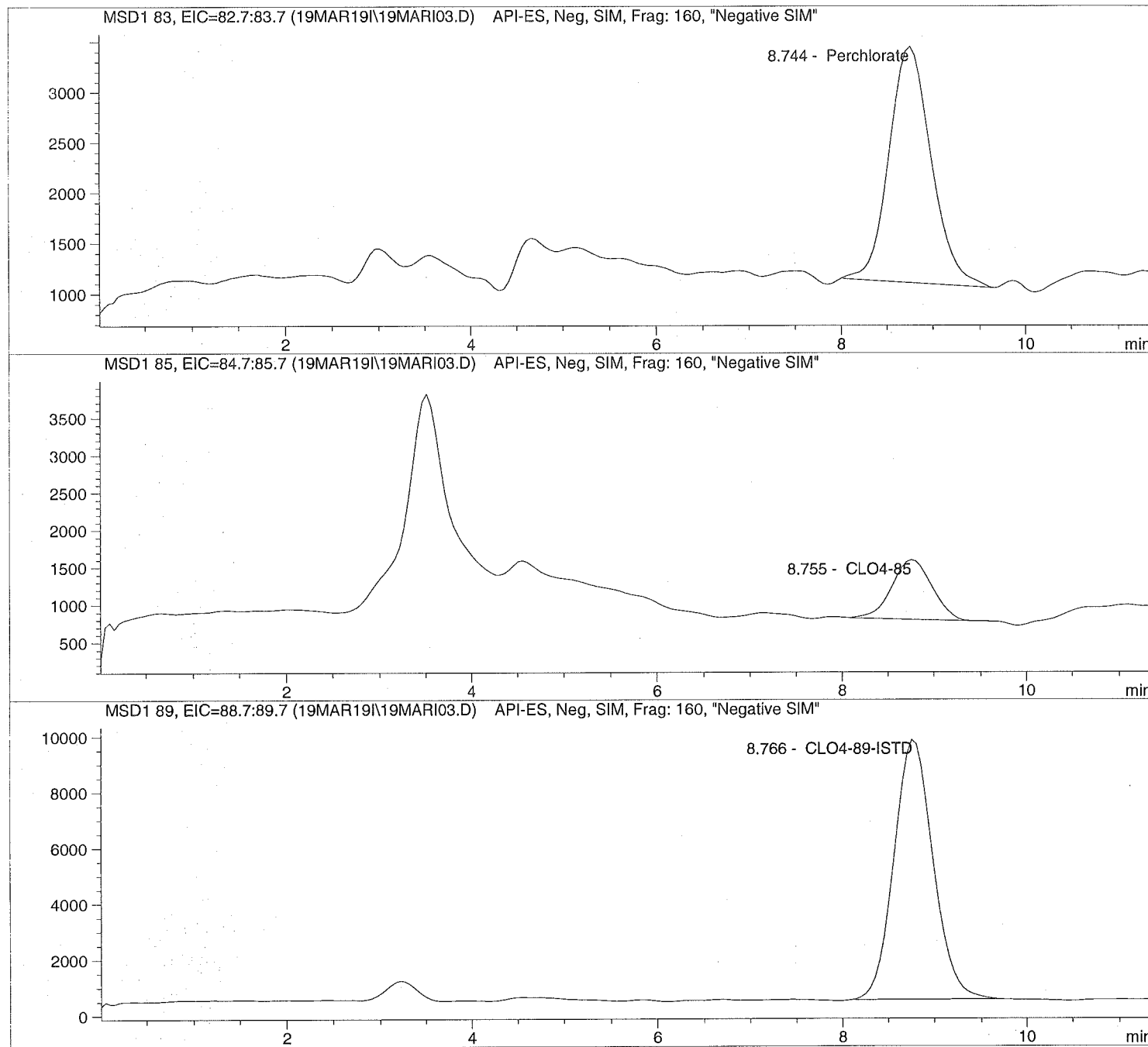
## **Unmodified**

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





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 ***
=====

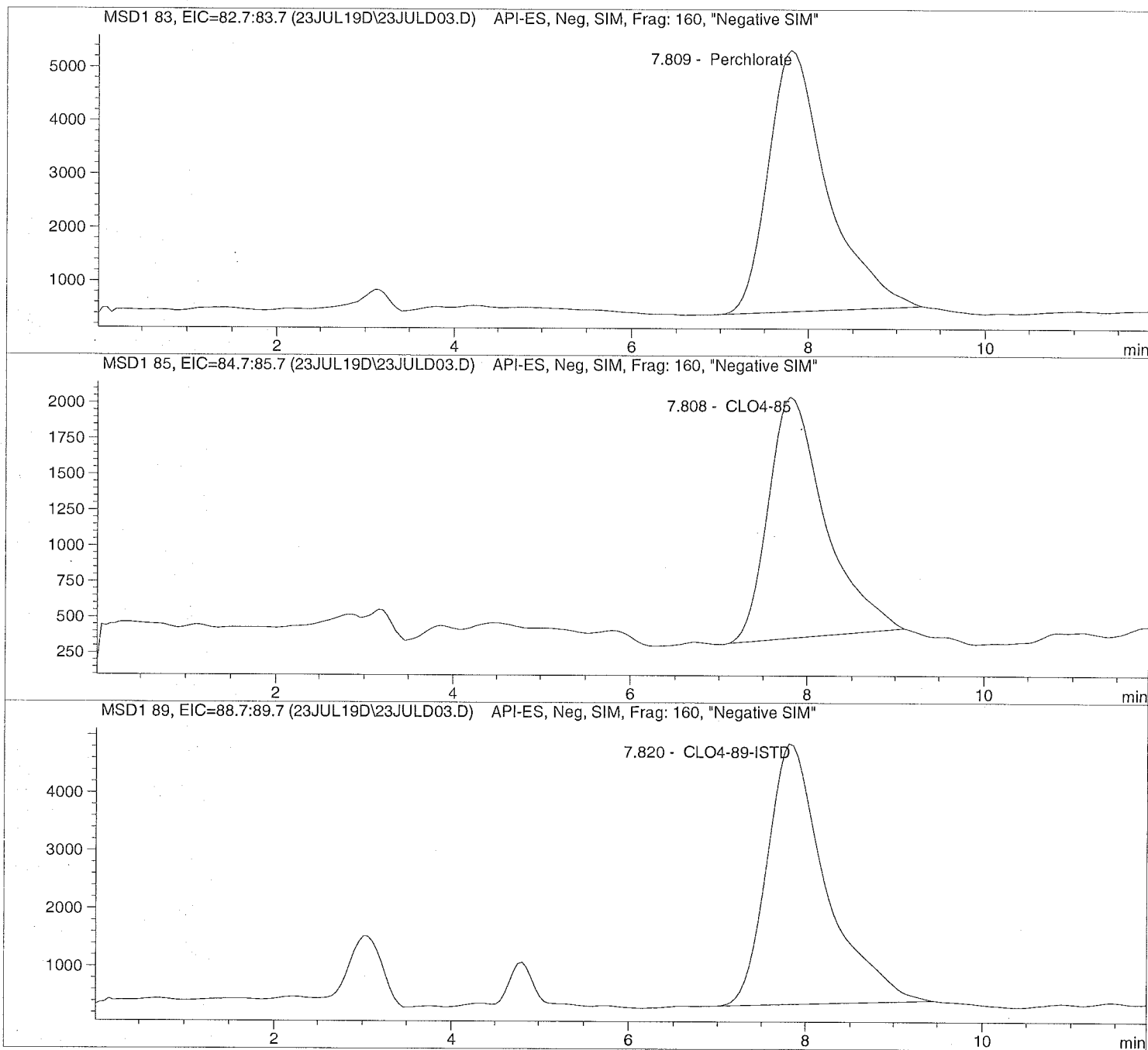
```

Injection Date: 7/23/2019 09:01:39  
Sample Name: 664921 ICS@4.0  
Acq Operator: TNB

Seq Line: 3  
Location: Vial 73  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis







---

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

July 29, 2019

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

Work Order: **HS19070827**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia,

ALS Environmental received 2 sample(s) on Jul 17, 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval scribble.

Generated By: JUMOKE.LAWAL  
RJ Modashia  
Project Manager

ALS Houston, US

Date: 29-jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19070827

**SAMPLE SUMMARY**

---

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19070827-01	LH18/24-SP650_071619	Water		16-Jul-2019 14:00	17-Jul-2019 08:56	<input type="checkbox"/>
HS19070827-02	LH18/24-SP650_071619_BIX	Water		16-Jul-2019 14:00	17-Jul-2019 08:56	<input type="checkbox"/>

---

**ALS Houston, US**

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.**CASE NARRATIVE****Project:** Longhorn GW Treatment Plant**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: R342824**

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

---

**WetChemistry by Method E365.3****Batch ID: R342682**

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

## ALS Houston, US

Date: 29-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_071619  
 Collection Date: 16-Jul-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19070827  
 Lab ID:HS19070827-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>								Analyst: RG
	<b>Method:E350.3</b>							
Nitrogen, Ammonia (As N)	7.5		0.20	0.20	0.20	mg/L	1	22-Jul-2019 11:30
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3</b>								Analyst: MZD
	<b>Method:E365.3</b>							
Phosphorus, Total Orthophosphate (As P)	0.276		0.0100	0.0250	0.0250	mg/L	1	17-Jul-2019 13:22
<b>SUBCONTRACT ANALYSIS - TOC ANALYSIS</b>								Analyst: SUBK
	<b>Method:NA</b>							
Subcontract Analysis	See Attached		0	0		NA	1	23-Jul-2019 18:04

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

## ALS Houston, US

Date: 29-Jul-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_071619\_BIX  
 Collection Date: 16-Jul-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19070827  
 Lab ID:HS19070827-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>		Analyst: SUB				
Subcontract Analysis	See Attached		0	0		NA	1	26-Jul-2019 11:05

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



ALS Houston, US

Date: 29-jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070827

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R342682 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3			<b>Matrix:</b> Water	
HS19070827-01	LH18/24-SP650_071619	16 Jul 2019 14:00			17 Jul 2019 13:22	1
<b>Batch ID:</b> R342824 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS19070827-01	LH18/24-SP650_071619	16 Jul 2019 14:00			22 Jul 2019 11:30	1
<b>Batch ID:</b> R342916 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - TOC ANALYSIS			<b>Matrix:</b> Water	
HS19070827-01	LH18/24-SP650_071619	16 Jul 2019 14:00			23 Jul 2019 18:04	1
<b>Batch ID:</b> R343090 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS19070827-02	LH18/24-SP650_071619_BIX	16 Jul 2019 14:00			26 Jul 2019 11:05	1

ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070827

**QC BATCH REPORT**

Batch ID:	R342682 ( 0 )	Instrument:	UV-2450	Method:	ORTHO PHOSPHATE (PO4) AS P BY E365.3					
<b>MBLK</b>	Sample ID: <b>MBLK-342682</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Jul-2019 13:22</b>						
Client ID:	Run ID: <b>UV-2450_342682</b>	SeqNo: <b>5172211</b>		PrepDate:		DF: <b>1</b>				
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	
<b>LCS</b>	Sample ID: <b>LCS-342682</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Jul-2019 13:22</b>						
Client ID:	Run ID: <b>UV-2450_342682</b>	SeqNo: <b>5172212</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.238	0.0250	0.25	0	95.2	85 - 115				
<b>MS</b>	Sample ID: <b>HS19070821-03MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Jul-2019 13:22</b>						
Client ID:	Run ID: <b>UV-2450_342682</b>	SeqNo: <b>5172239</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.264	0.0250	0.25	0.022	96.8	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19070821-03MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Jul-2019 13:22</b>						
Client ID:	Run ID: <b>UV-2450_342682</b>	SeqNo: <b>5172240</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.265	0.0250	0.25	0.022	97.2	80 - 120	0.264	0.378	20	

The following samples were analyzed in this batch: HS19070827-01

ALS Houston, US

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070827

**QC BATCH REPORT**

Batch ID:	R342824 ( 0 )	Instrument:	WetChem_HS	Method:	AMMONIA AS N BY E350.3(ISE)					
<b>MBLK</b>	Sample ID: <b>MBLK-R342824</b>	Units:	mg/L	Analysis Date:	<b>22-Jul-2019 11:30</b>					
Client ID:	Run ID: <b>WetChem_HS_342824</b>	SeqNo:	<b>5175306</b>	PrepDate:	DF: <b>1</b>					
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
<b>LCS</b>	Sample ID: <b>LCS-R342824</b>	Units:	mg/L	Analysis Date:	<b>22-Jul-2019 11:30</b>					
Client ID:	Run ID: <b>WetChem_HS_342824</b>	SeqNo:	<b>5175305</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.48	0.20	10	0	105	80 - 120				
<b>MS</b>	Sample ID: <b>HS19070802-01MS</b>	Units:	mg/L	Analysis Date:	<b>22-Jul-2019 11:30</b>					
Client ID:	Run ID: <b>WetChem_HS_342824</b>	SeqNo:	<b>5175308</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.22	0.20	10	0.2764	99.4	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19070802-01MSD</b>	Units:	mg/L	Analysis Date:	<b>22-Jul-2019 11:30</b>					
Client ID:	Run ID: <b>WetChem_HS_342824</b>	SeqNo:	<b>5175307</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.19	0.20	10	0.2764	99.1	80 - 120	10.22	0.294	20	

The following samples were analyzed in this batch: HS19070827-01

**ALS Houston, US**

Date: 29-Jul-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19070827

**QUALIFIERS,  
ACRONYMS, UNITS**

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

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

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**CERTIFICATIONS, ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2018-2019	31-Jul-2019
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

ALS Houston, US

Date: 29-jul-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19070827

---

**SAMPLE TRACKING**

---

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19070827-01	LH18/24-SP650_071619	Login	17/07/2019 12:15:49	PMG	Sub
HS19070827-01	LH18/24-SP650_071619	Login	17/07/2019 12:15:49	PMG	EXT035
HS19070827-01	LH18/24-SP650_071619	Login	17/07/2019 12:15:49	PMG	WET273
HS19070827-01	LH18/24-SP650_071619	Login	17/07/2019 12:15:49	PMG	MET032
HS19070827-01	LH18/24-SP650_071619	Login	17/07/2019 12:15:49	PMG	VOA153
HS19070827-02	LH18/24-SP650_071619_BIX	Login	17/07/2019 12:15:49	PMG	VOA153

---

**Sample Receipt Checklist**

Client Name: Bhate Environmental  
 Work Order: HS19070827

Date/Time Received: **17-Jul-2019 08:56**  
 Received by: **RPG**

Checklist completed by: Paresh M. Giga 17-Jul-2019  
 eSignature Date

Reviewed by: \_\_\_\_\_  
 eSignature 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): 

1.5c U/C	IR11
----------	------

Cooler(s)/Kit(s): 

43551
-------

Date/Time sample(s) sent to storage: 

7/17/19 12:30
---------------

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

pH adjusted by: 

--

Login Notes:

Client Contacted: \_\_\_\_\_ Date Contacted: \_\_\_\_\_ Person Contacted: \_\_\_\_\_  
 Contacted By: \_\_\_\_\_ Regarding: \_\_\_\_\_

Comments: 

--

Corrective Action: 

--

**CHAIN OF CUSTODY**

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

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001		<b>Analyses</b>										Remarks (Preservatives, etc.)	Lab I.D.#					
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT                  WEEKLY SAMPLES</b>			MS / MSD No. OF CONTAINERS	AMMONIA-N TOTAL ORGANIC CARBON ORTHO-PHOSPHATE PERCHLORATE																	
<b>Prepared By:</b> Scott Beesinger		P.O. Number																			
Field Sample I.D.	Sample Matrix	Date / Time																			
LH18/24-SP650_071619	Water	07/16/19 / 14:00	2	X	X															H2SO4	
LH18/24-SP650_071619	Water	07/16/19 / 14:00	1			X															NONE
LH18/24-SP650_071619_BIX	Water	07/16/19 / 14:00	1				X														NONE

Additional Remarks: **Standard TAT on all parameters** *43551 1.5 u/c IRL*


Relinquished By:	Date	Time	Received By:	Date	Time	Relinquished By:	Date	Time	Received By:	Date	Time
<i>Scott Beesinger</i>	07/16/19	14:30	<i>RG</i>	07/19	08:56						



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

**HS19070827**  
 Bhate Environmental Associates, Inc.  
 Longhorn GW Treatment Plant  


(Word) S:\1-ces\Forms\Chain of Custody - BiWeekly



 <b>ALS Environmental</b> 10450 Stanciff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTOMER</b>		<b>STODY SEAL</b>		
	Date: 7/16/19	Name: Scott	Time: 1430	Seal Broken By: A	
	43551		Company: ALS	Date: 7/17/19	

 TRK# 0221 4809 7834 3295	WED 17 JUL 10:30A PRIORITY OVERNIGHT
<b>AB SGRA</b>	77099 TX-LS IAH
	
F10 162785 1630L19 000A 55302/AS13/000A	



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
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F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

July 23, 2019

**Analytical Report for Service Request No: K1906631**

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

**RE: HS19070827**

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory July 18, 2019  
For your reference, these analyses have been assigned our service request number **K1906631**.

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](http://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](mailto:Kelley.Lovejoy@alsglobal.com).

Respectfully submitted,

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

Kelley Lovejoy  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
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## Acronyms

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

### Inorganic Data Qualifiers

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

### Metals Data Qualifiers

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

### Organic Data Qualifiers

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

### Additional Petroleum Hydrocarbon Specific Qualifiers

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

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

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

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

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



**Client:** ALS Environmental - US  
**Project:** HS19070827  
**Sample Matrix:** Water

**Service Request:** K1906631  
**Date Received:** 07/18/2019

**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 07/18/2019. 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 Avejoy          

Date           07/23/2019





## 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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Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

K1906631

### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11795

**SUBCONTRACT TO:**

ALS Environmental Kelso  
1317 S. 13th Avenue  
Kelso, WA 98626

**Phone:** +1 360 501 3312

**CUSTOMER INFORMATION:**

**Company:** ALS Houston  
**Contact:** RJ Modashia  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RJ.Modashia@alsglobal.com  
**Alternate Contact:**  
**Email:**

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS19070827  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19070827-01	LH18/24-SP650_071619	Water	16 Jul 2019 14:00
TOC Analysis for DOD Level IV			25 Jul 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]  
Received By: [Signature]  
Cooler ID(s): \_\_\_\_\_

Date/Time: 7/19/19 1800  
Date/Time: 7/18/19 0945  
Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



KL  
PC ~~HH~~ <sup>CG</sup> 7/18

**Cooler Receipt and Preservation Form**

Client ALS Houston Service Request K19 06631

Received: 7/18/19 Opened: 7/18/19 By: CG Unloaded: 7/18/19 By: CG

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

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
-0.3	-0.1	1.3	1.5	+0.2	395	11795 / <del>NA</del> CG 7/8	4809 7835 9489		

- Packing material:  Inserts  ~~Baggies~~  Bubble Wrap  Gel Packs  ~~Wet Ice~~  Dry Ice  Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA  N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA  N  
If applicable, tissue samples were received:  Frozen  Partially Thawed  Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA  N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA  N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA  N
- Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? *Indicate in the table below* NA  N
- Were VOA vials received without headspace? *Indicate in the table below.* ~~NA~~ Y N
- 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](http://www.alsglobal.com)

Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS19070827  
**Sample Matrix:** Water  
**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Service Request:** K1906631  
**Date Collected:** 07/16/19  
**Date Received:** 07/18/19  
**Units:** mg/L  
**Basis:** NA

**Carbon, Total Organic**

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_071619	K1906631-001	2.52	0.50	0.20	0.07	1	07/19/19 23:15	
Method Blank	K1906631-MB	ND U	0.50	0.20	0.07	1	07/20/19 02:33	

## ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19070827  
**Sample Matrix:** Water

**Service Request:** K1906631  
**Date Collected:** 07/16/19  
**Date Received:** 07/18/19  
**Date Analyzed:** 07/19/19

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** LH18/24-SP650\_071619  
**Lab Code:** K1906631-001

**Units:** mg/L  
**Basis:** NA

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>LOQ</u>	<u>LOD</u>	<u>MDL</u>	<u>Sample Result</u>	<u>Duplicate Sample K1906631-001DUP Result</u>	<u>Average</u>	<u>RPD</u>	<u>RPD Limit</u>
Carbon, Total Organic	SM 5310 C	0.50	0.20	0.07	2.52	2.49	2.51	<1	10

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

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

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

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19070827  
**Sample Matrix:** Water

**Service Request:** K1906631  
**Date Analyzed:** 07/20/19  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Carbon, Total Organic**

**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 643950

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1906631-LCS	23.9	25.0	96	83-117

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19070827

**Service Request:** K1906631

### Continuing Calibration Verification (CCV) Summary

#### Carbon, Total Organic

**Analysis Method:** SM 5310 C

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	643950	KQ1910155-01	07/19/19 17:18	25.0	23.4	93	90-110
CCV2	643950	KQ1910155-02	07/19/19 21:49	25.0	23.5	94	90-110
CCV3	643950	KQ1910155-03	07/20/19 02:04	25.0	23.1	92	90-110
CCV4	643950	KQ1910155-17	07/20/19 03:03	25.0	23.0	92	90-110



**Client:** ALS Environmental - US  
**Project:** HS19070827

**Service Request:** K1906631

**Continuing Calibration Blank (CCB) Summary**  
**Carbon, Total Organic**

**Analysis Method:** SM 5310 C

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>LOQ</b>	<b>LOD</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	643950	KQ1910155-04	07/19/19 17:32	0.50	0.20	0.07	ND	U
CCB2	643950	KQ1910155-05	07/19/19 22:03	0.50	0.20	0.07	ND	U
CCB3	643950	KQ1910155-06	07/20/19 02:19	0.50	0.20	0.07	ND	U
CCB4	643950	KQ1910155-16	07/20/19 03:17	0.50	0.20	0.07	ND	U



## Raw Data

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



## General Chemistry

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



## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 643949 Method/Testcode: 9060A/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1906620-005	Carbon, Total Organic (TOC)	N/A		Water	30.47 mg/L	10 ml	30.5 mg/L	1		0.50			7/19/19 20:23	N	I
KQ1910181-01	Carbon, Total Organic (TOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1		0.50			7/19/19 17:32	N	I
KQ1910181-02	Carbon, Total Organic (TOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1		0.50			7/19/19 22:03	N	I
KQ1910181-03	Carbon, Total Organic (TOC)	CCV		Water	23.37 mg/L	10 ml	23.4 mg/L	1					7/19/19 17:18	N	I
KQ1910181-04	Carbon, Total Organic (TOC)	CCV		Water	23.52 mg/L	10 ml	23.5 mg/L	1					7/19/19 21:49	N	I
KQ1910181-05	Carbon, Total Organic (TOC)	MB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1		0.50			7/19/19 17:47	N	I
KQ1910181-06	Carbon, Total Organic (TOC)	MB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1		0.50			7/19/19 17:47	N	I
KQ1910181-07	Carbon, Total Organic (TOC)	MB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1		0.50			7/19/19 17:47	N	I
KQ1910181-08	Carbon, Total Organic (TOC)	MB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1		0.50			7/19/19 17:47	N	I
KQ1910181-09	Carbon, Total Organic (TOC)	LCS		Water	24.21 mg/L	10 ml	24.2 mg/L	1		0.50	97		7/19/19 18:43	N	I
KQ1910181-10	Carbon, Total Organic (TOC)	LCS		Water	24.34 mg/L	10 ml	24.3 mg/L	1		0.50	97		7/19/19 18:43	N	I
KQ1910181-11	Carbon, Total Organic (TOC)	LCS		Water	24.21 mg/L	10 ml	24.2 mg/L	1		0.50	97		7/19/19 18:43	N	I
KQ1910181-12	Carbon, Total Organic (TOC)	LCS		Water	24.38 mg/L	10 ml	24.4 mg/L	1		0.50	98		7/19/19 18:43	N	I

*BDITZLER* 7/22/19

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

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 643950 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
K1906620-005	Carbon, Total Organic	N/A		Water	30.51 mg/L	10 ml	30.5 mg/L	1	0.07	0.50			7/19/19 21:34	N	I
K1906621-001	Carbon, Total Organic	N/A		Water	1.28 mg/L	10 ml	1.28 mg/L	1	0.07	0.50			7/19/19 22:18	N	II
K1906622-001	Carbon, Total Organic	N/A		Water	15.00 mg/L	10 ml	15.0 mg/L	1	0.07	0.50			7/19/19 23:43	N	II
K1906622-002	Carbon, Total Organic	N/A		Water	35.19 mg/L	10 ml	35.2 mg/L	1	0.07	0.50			7/20/19 00:12	N	II
K1906622-003	Carbon, Total Organic	N/A		Water	11.22 mg/L	10 ml	11.2 mg/L	1	0.07	0.50			7/20/19 00:40	N	II
K1906622-004	Carbon, Total Organic	N/A		Water	115.40 mg/L	10 ml	115 mg/L	1	0.07	0.50			7/20/19 01:08	N	II
K1906631-001	Carbon, Total Organic	N/A		Water	2.52 mg/L	10 ml	2.52 mg/L	1	0.07	0.50			7/19/19 23:15	N	IV
KQ1910155-01	Carbon, Total Organic	CCV		Water	23.37 mg/L	10 ml	23.4 mg/L	1					7/19/19 17:18	N	I
KQ1910155-02	Carbon, Total Organic	CCV		Water	23.52 mg/L	10 ml	23.5 mg/L	1					7/19/19 21:49	N	I
KQ1910155-03	Carbon, Total Organic	CCV		Water	23.11 mg/L	10 ml	23.1 mg/L	1					7/20/19 02:04	N	I
KQ1910155-04	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/19/19 17:32	N	I
KQ1910155-05	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/19/19 22:03	N	I
KQ1910155-06	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/20/19 02:19	N	I
KQ1910155-07	Carbon, Total Organic	MB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			7/20/19 02:33	N	I
KQ1910155-08	Carbon, Total Organic	LCS		Water	23.91 mg/L	10 ml	23.9 mg/L	1	0.07	0.50	96		7/20/19 02:48	N	I
KQ1910155-09	Carbon, Total Organic	MS	K1906621-001	Water	26.53 mg/L	10 ml	26.5 mg/L	1	0.07	0.50	101		7/19/19 22:46	N	II
KQ1910155-10	Carbon, Total Organic	DUP	K1906621-001	Water	1.27 mg/L	10 ml	1.27 mg/L	1	0.07	0.50		1	7/19/19 22:18	N	II
KQ1910155-11	Carbon, Total Organic	DUP	K1906631-001	Water	2.49 mg/L	10 ml	2.49 mg/L	1	0.07	0.50		<1	7/19/19 23:15	N	II
KQ1910155-12	Carbon, Total Organic	DUP	K1906622-001	Water	14.95 mg/L	10 ml	15.0 mg/L	1	0.07	0.50		<1	7/19/19 23:43	N	II
KQ1910155-13	Carbon, Total Organic	DUP	K1906622-002	Water	34.70 mg/L	10 ml	34.7 mg/L	1	0.07	0.50		1	7/20/19 00:12	N	II
KQ1910155-14	Carbon, Total Organic	DUP	K1906622-003	Water	10.98 mg/L	10 ml	11.0 mg/L	1	0.07	0.50		2	7/20/19 00:40	N	II
KQ1910155-15	Carbon, Total Organic	DUP	K1906622-004	Water	121.98 mg/L	10 ml	122 mg/L	1	0.07	0.50		6	7/20/19 01:08	N	II
KQ1910155-16	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/20/19 03:17:00	N	I
KQ1910155-17	Carbon, Total Organic	CCV		Water	22.96 mg/L	10 mL	23.0 mg/L	1					7/20/19 03:03:00	N	I

*BDITZLER* 7/22/19

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

TOC: 643949,  
643950

## Schedule: 07192019

Version: 2

Instrument: Fusion1

Last Saved by: Fusion1 (Fusion1)

Last Saved on: 2019/07/19 15:17 - 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)	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)	1	True	Ready
4	Sample	LOQ	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
5	Sample	K1906620-005.01	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
6	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
7	Sample	LOD	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
8	Sample	LOQ	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
9	Sample	K1906620-005.01	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
10	Sample	K1906621-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K1906621-001.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
12	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
13	Sample	K1906631-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K1906622-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1906622-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K1906622-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1906622-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	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
19	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
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 - 07192019

### Friday, July 19, 2019 03:17 PM

(View - Repts, Unused Repts, Meta-Data, Signature, History)  
 Printed on 2019/07/20 12:29 - Saturday

### Report Summary Information

Company Location:	Gen Chem Lab	Engine	1.1.5.1
Schedule Name:	07192019	Version:	
Instrument Name:	Fusion1	Firmware	1.2.0696
Report Version:	1 of 1	Version:	
Report Creation by	Fusion1 (Fusion1) (v2)	Connection:	RS232 COM1
Operators (schedule version):			
Comment:			

### Report Results

Sample Type: Clean							From Schedule Version 2
Pos	Analysis Type	Sample ID			Start Time		
◊ (clean)		Clean			2019/07/19 15:17		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	13.21	16.99	3.78	49.63	05:24	
2	TC Clean	5.44	8.71	3.27	49.90	07:16	
3	TC Clean	1.52	4.68	3.16	49.92	07:02	
4	TC Clean	0.98	4.19	3.21	50.02	03:57	

Sample Type: Clean							From Schedule Version 2
Pos	Analysis Type	Sample ID			Start Time		
◊ (clean)		Clean			2019/07/19 15:45		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	0.99	3.99	3.00	49.67	05:23	
2	TC Clean	2.80	5.98	3.18	50.04	04:04	
3	TC Clean	1.26	4.48	3.22	50.03	03:46	
4	TC Clean	1.07	4.32	3.26	50.04	03:51	



**Sample Type:** Clean From Schedule Version 2

Pos	Analysis Type	Sample ID	Start Time
◊ (clean)		Clean	2019/07/19 16:07

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.75	3.91	3.16	49.63	05:23
2	TC Clean	2.81	6.12	3.30	50.05	04:06
3	TC Clean	1.48	4.70	3.22	50.06	03:48
4	TC Clean	1.32	4.46	3.14	50.02	03:50

**Sample Type:** Blank (Creating v1277) From Schedule Version 2

Pos	Analysis Type	Sample ID	Start Time
◊ (blank)		Reagent/Acid Blank	2019/07/19 16:29

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.84	3.88	3.05	49.60	05:15
2	TC Clean	3.06	6.43	3.37	50.04	04:02
3	TC Clean	1.61	4.96	3.35	50.06	03:57
4	TC Clean	1.27	4.72	3.45	50.07	03:56
5	Reagent Blank	2.86	6.30	3.43	50.06	05:07
6	Acid Blank	0.76	4.13	3.36	49.61	05:30

**Sample Type:** Sample From Schedule Version 2

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ D	TOC	RB	0.1368 ppm	0.0000 ppm	0.0000%	2019/07/19 17:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1368	1.3684	9.64	13.01	3.37	50.25	10:30

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.7071 (IC) (v1277)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

**Sample Type:** Check Standard --> CCV 25 ppm From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
* B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity ( NA / NA )	23.3724 ppm (PASS)	0.0000 ppm	0%	2019/07/19 17:18

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.3724	233.7241	168.11	171.34	3.22	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 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
* D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/07/19 17:32

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.87	9.10	3.22	50.28	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 2

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
* 1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/19 17:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.73	7.99	3.27	50.27	10:27
2	TOC	0.0000	0.0000	4.76	7.98	3.22	50.25	10:28
3	TOC	0.0000	0.0000	6.14	9.41	3.27	50.33	10:31
4	TOC	0.0000	0.0000	4.95	8.13	3.17	50.25	10:24

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7071 (IC) (v1277)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

**Sample Type:** Check Standard --> LCS From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
* C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity ( NA / NA )	24.2832 ppm	0.0866 ppm	0.36%	2019/07/19 18:43

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
(PASS)										
C	TOC	25.0 ppm	1	24.2082	242.0815	173.79	176.99	3.21	50.15	10:30
C	TOC	25.0 ppm	2	24.3359	243.3588	174.65	178.09	3.44	50.07	10:27
C	TOC	25.0 ppm	3	24.2111	242.1110	173.81	176.94	3.14	50.01	10:26
C	TOC	25.0 ppm	4	24.3776	243.7757	174.94	178.13	3.19	49.95	10:30

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos C</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	25 ppmC

**Sample Type:** Sample From Schedule Version 2

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
2	TOC	ICS	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/19 19:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.73	10.92	3.19	49.92	10:29

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.7071 (IC) (v1277)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
3	TOC	LOD	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/19 19:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.53	11.73	3.20	49.91	10:33

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.7071 (IC) (v1277)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
4	TOC	LOQ	0.1835 ppm	0.0000 ppm	0.0000%	2019/07/19 20:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1835	1.8355	9.95	13.22	3.27	49.93	10:33

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.7071 (IC) (v1277)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
5	TOC	K1906620-005.01	30.4749 ppm	0.0000 ppm	0.0000%	2019/07/19 20:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time

1	TOC	30.4749	304.7491	215.57	218.78	3.21	49.91	10:34
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**Dilution** 1:10      **Blank Contribution** (TC) 8.7071 (IC) (v1277)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
6	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/19 20:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.80	9.12	3.32	49.87	10:26
2	TOC	0.0000	0.0000	4.70	8.11	3.41	49.86	10:29

**Dilution** 1:10      **Blank Contribution** (TC) 8.7071 (IC) (v1277)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
7	TOC	LOD	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/19 21:05

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.03	11.37	3.34	49.85	10:31

**Dilution** 1:10      **Blank Contribution** (TC) 8.7071 (IC) (v1277)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
8	TOC	LOQ	0.1404 ppm	0.0000 ppm	0.0000%	2019/07/19 21:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1404	1.4038	9.66	12.90	3.24	49.99	10:32

**Dilution** 1:10      **Blank Contribution** (TC) 8.7071 (IC) (v1277)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
9	TOC	K1906620-005.01	30.5095 ppm	0.0000 ppm	0.0000%	2019/07/19 21:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	30.5095	305.0953	215.80	219.04	3.24	49.88	10:31

**Dilution** 1:10      **Blank Contribution** (TC) 8.7071 (IC) (v1277)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

**Sample Type:** Check Standard --> CCV 25 ppm

From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
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◆	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity ( NA / NA )	23.5190 ppm (PASS)	0.0000 ppm	0%	2019/07/19 21:49
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.5190	235.1899	169.11	172.40	3.29	49.89	10:30
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos B</b>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		50 ppmC		

**Sample Type:** Check Standard --> CCB From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time	
◆	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/07/19 22:03
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.37	8.58	3.21	49.89	10:31
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos D</b>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		0 ppmC		

**Sample Type:** Sample From Schedule Version 2

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time			
◆	10	TOC	K1906621-001.01	1.2744 ppm	0.0132 ppm	1.0400%	2019/07/19 22:18		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	TOC	1.2837	12.8373	17.42	20.54	3.12	49.88	10:28	
2	TOC	1.2650	12.6502	17.29	20.36	3.06	49.87	10:28	
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>			
1:10		(TC) 8.7071 (IC) (v1277)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)			
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time			
◆	11	TOC	K1906621-001.01 ms	26.5334 ppm	0.0000 ppm	0.0000%	2019/07/19 22:46		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	TOC	26.5334	265.3336	188.81	192.03	3.22	49.90	10:34	
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>			
1:10		(TC) 8.7071 (IC) (v1277)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)			

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
12	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/19 23:01		
<b>Rep #</b>	<b>Base Analysis Type</b>	<b>ppm</b>	<b>µg</b>	<b>Adjusted (Abs)</b>	<b>NDIR (Abs)</b>	<b>Baseline (Abs)</b>	<b>Pressure (psig)</b>	<b>Run Time</b>
1	TOC	0.0000	0.0000	5.88	9.01	3.13	49.91	10:29
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>		<u>Calibration</u>		
1:10		(TC) 8.7071 (IC) (v1277)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
13	TOC	K1906631-001.01	2.5054 ppm	0.0151 ppm	0.6000%	2019/07/19 23:15		
<b>Rep #</b>	<b>Base Analysis Type</b>	<b>ppm</b>	<b>µg</b>	<b>Adjusted (Abs)</b>	<b>NDIR (Abs)</b>	<b>Baseline (Abs)</b>	<b>Pressure (psig)</b>	<b>Run Time</b>
1	TOC	2.5161	25.1606	25.79	29.05	3.27	49.88	10:28
2	TOC	2.4947	24.9470	25.64	28.89	3.25	49.89	10:25
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>		<u>Calibration</u>		
1:10		(TC) 8.7071 (IC) (v1277)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
14	TOC	K1906622-001.01	14.9768 ppm	0.0336 ppm	0.2200%	2019/07/19 23:43		
<b>Rep #</b>	<b>Base Analysis Type</b>	<b>ppm</b>	<b>µg</b>	<b>Adjusted (Abs)</b>	<b>NDIR (Abs)</b>	<b>Baseline (Abs)</b>	<b>Pressure (psig)</b>	<b>Run Time</b>
1	TOC	15.0006	150.0056	110.53	113.79	3.26	49.91	10:32
2	TOC	14.9530	149.5297	110.21	113.39	3.19	49.93	10:26
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>		<u>Calibration</u>		
1:10		(TC) 8.7071 (IC) (v1277)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
15	TOC	K1906622-002.01	34.9448 ppm	0.3413 ppm	0.9800%	2019/07/20 00:12		
<b>Rep #</b>	<b>Base Analysis Type</b>	<b>ppm</b>	<b>µg</b>	<b>Adjusted (Abs)</b>	<b>NDIR (Abs)</b>	<b>Baseline (Abs)</b>	<b>Pressure (psig)</b>	<b>Run Time</b>
1	TOC	35.1861	351.8606	247.55	250.76	3.21	49.95	10:27
2	TOC	34.7034	347.0344	244.27	247.42	3.15	49.96	10:27
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>		<u>Calibration</u>		
1:10		(TC) 8.7071 (IC) (v1277)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
16	TOC	K1906622-003.01	11.0993 ppm	0.1705 ppm	1.5400%	2019/07/20 00:40		
<b>Rep #</b>	<b>Base Analysis Type</b>	<b>ppm</b>	<b>µg</b>	<b>Adjusted (Abs)</b>	<b>NDIR (Abs)</b>	<b>Baseline (Abs)</b>	<b>Pressure (psig)</b>	<b>Run Time</b>
1	TOC	11.2199	112.1988	84.87	88.02	3.16	49.97	10:27
2	TOC	10.9787	109.7872	83.23	86.39	3.16	49.99	10:28

**Dilution** 1:10      **Blank Contribution** (TC) 8.7071 (IC) (v1277)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	K1906622-004.01	118.6899 ppm	4.6500 ppm	3.9200%	2019/07/20 01:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	115.4018	1154.0185	792.05	795.19	3.14	50.03	10:26
2	TOC	121.9779	1219.7792	836.69	840.03	3.34	50.01	10:30

**Dilution** 1:10      **Blank Contribution** (TC) 8.7071 (IC) (v1277)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	RB	0.2655 ppm	0.3755 ppm	141.4200%	2019/07/20 01:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5311	5.3107	12.31	15.74	3.43	50.04	10:28
2	TOC	0.0000	0.0000	7.39	10.62	3.23	50.05	10:27

**Dilution** 1:10      **Blank Contribution** (TC) 8.7071 (IC) (v1277)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

**Sample Type:** Check Standard --> CCV 25 ppm From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	23.1053 ppm (PASS)	0.0000 ppm	0%	2019/07/20 02:04

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.1053	231.0532	166.30	169.65	3.35	50.07	10:28

**Completion State** Success - Criteria met.      **Success Action** Do Nothing      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)      **STD Conc - Pos B** 50 ppmC

**Sample Type:** Check Standard --> CCB From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/07/20 02:19

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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	<b>Type</b>									
D	TOC	0 ppm	1	0.0000	0.0000	5.96	9.19	3.23	50.09	10:28
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos D</b>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		0 ppmC		

**Sample Type:** Sample From Schedule Version 2

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
19	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/20 02:33

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.84	8.12	3.28	50.10	10:32

**Dilution:** 1:10      **Blank Contribution:** (TC) 8.7071 (IC) (v1277)      **Method:** CAS\_salt\_010711 (v4)      **Calibration:** CAS\_salt\_010711 (v30)

**Sample Type:** Check Standard --> LCS From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	23.9075 ppm (PASS)	0.0000 ppm	0%	2019/07/20 02:48

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	23.9075	239.0747	171.74	175.02	3.28	50.13	10:29

**Completion State:** Success - Criteria met.      **Success Action:** Do Nothing      **Method:** CAS\_salt\_010711 (v4)      **Calibration:** CAS\_salt\_010711 (v30)      **STD Conc - Pos C:** 25 ppmC

**Sample Type:** Check Standard --> CCV 25 ppm From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	22.9637 ppm (PASS)	0.0000 ppm	0%	2019/07/20 03:03

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	22.9637	229.6374	165.34	168.65	3.31	50.13	10:31

**Completion State:** Success - Criteria met.      **Success Action:** Do Nothing      **Method:** CAS\_salt\_010711 (v4)      **Calibration:** CAS\_salt\_010711 (v30)      **STD Conc - Pos B:** 50 ppmC



**Sample Type:** Check Standard --> CCB

From Schedule Version 2

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/07/20 03:17

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.12	8.53	3.41	50.17	10:32

**Completion State**

Success - Criteria met.

**Success Action**

Do Nothing

**Method**

CAS\_salt\_010711 (v4)

**Calibration**

CAS\_salt\_010711 (v30)

**STD Conc - Pos D**

0 ppmC

### Meta Data Used in this Report

**Blanks**

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1276	1.3593	1.2910	0.0000	0.0000	0.0000	2019/07/18 12:39	Fusion1 (Fusion1)
v1277	0.9543	0.7610	0.0000	0.0000	0.0000	2019/07/19 17:03	Fusion1 (Fusion1)

**Calibrations****Name:** CAS\_salt\_010711 (TOC)

Version: v30

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

Ver Creation: 2019/03/05 17:42

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

Comment:

Operator: Fusion1 (Fusion1)

Basic Analysis Type: TOC

**Basic Analysis Type:** TOC

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

**Methods**

**Name: CAS\_salt\_010711 (TOC)**

Version: v4

Operator: Fusion1 (Fusion1)

Ver Creation: 2019/02/21 17:57

Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	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**

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Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/07/20 03:33

StarLIMS Run: 643949, 643950  
 Analysis: TOC/DOC  
 Method: 415.1, SM 5310 C, 9060, 9060A

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

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-74A

ICS TV: 25.0 ppm                      ICS % R = 2

Spike ID: 11-GEN-05-77J              0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-79G

21 % H3PO4: 11-GEN-05-79H

Equipment ID: K-TOC-03

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

FILTER ID: N/A

Analyzed By: <i>BCP</i>	Date Analyzed: <i>7/20/19</i>
Reviewed By: <i>JAN</i>	Date Reviewed: <i>7/22/19</i>



## Case Narrative

**Method:** 6850  
**Analysis:** Perchlorate  
**Analysis SOP:** LC-MS-CLO4  
**ALS WO ID(s):** 1920034; 1920122; 1920123;  
1920571; 1920572; 1920581

**Client:** ALS Laboratories (Houston, TX)  
**Matrix:** Water  
**ELMS Batch (HBN):** 2273 (244098)

**General Set Information:** There were eleven field samples in this Work Order. 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  $^{18}\text{O}$  labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in quantitation.

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

**Holding Times:** Holding times were met for all analyses.

**Dilutions:** Field samples 1920122001 and 1920581001 were analyzed and reported from 1:100 dilutions. The reporting limits have been adjusted accordingly.

**Method QC data:** The method blank (LMB 664922) was less than 1/2 the CRDL. The recovery for the LCS (664923) was within acceptable parameters.



**MS/MSD Analysis:** MS/MSD was performed on sample 1920123002 (Client ID: HBW10\_071119). 4.0 $\mu$ l of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4. $\mu$ g/L.

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

**NC/CAR(s):** NA

**Sample Calculation:** Samples were reported in  $\mu$ g/L. Results were calculated in  $\mu$ g/L by the equation (A)x(B),

where: A = Analyte concentration from the standard curve ( $\mu$ g/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 – 664920) is reported from the analysis of the Laboratory Control Sample (LCS – 664923) at a level of 4.0 $\mu$ g/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) along with datafile 23JULD03.

<u>Thomas Bosch</u>	<u>July 25, 2019</u>
Analyst	Date



# ANALYTICAL REPORT

Report Date: July 25, 2019

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E-mail: RJ.Modashia@ALSGlobal.com

Workorder: **34-1920572**

Project ID: 11794 071619

Purchase Order: 11794

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_071619_BIX	1920572001	07/16/19	07/18/19	11794



## ANALYTICAL REPORT

Workorder: 34-1920572

Client: ALS Environmental  
(Houston)

Project Manager: Kevin W. Griffiths

## Analytical Results

Sample ID: <b>LH18/24-SP650_071619_BIX</b>	Sampling Site: 11794	Collected: 07/16/2019				
Lab ID: 1920572001	Media: 125 mL Nalgene	Received: 07/18/2019				
Matrix: Water	Sampling Parameter: NA					
<b>Analysis Method - EPA 6850, DoD QSM</b>						
Preparation: Not Applicable	Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2274 (HBN: 244098) Analyzed: 07/23/2019 12:16	Instrument ID: LCMS04 Percent Solid: NA Report Basis: Wet				
<b>Analyte</b>	<b>Result (ug/L)</b>	<b>DL (ug/L)</b>	<b>LOD (ug/L)</b>	<b>LOQ (ug/L)</b>	<b>Dilution</b>	<b>Qual</b>
Perchlorate	ND	1.0	2.0	4.0	1	U

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

Method	Analyst	Peer Review
EPA 6850, DoD QSM	/S/ Thomas Bosch 07/25/2019 15:05	/S/ Stephen Brose 07/25/2019 16:18

## Laboratory Contact Information

ALS Environmental  
960 W Levoy Drive  
Salt Lake City, Utah 84123Phone: (801) 266-7700  
Email: als@alst.com  
Web: www.alst.com





## ANALYTICAL REPORT

Workorder: 34-1920572

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

**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

00950546

## Analysis Information

**Workorder:** 1920572

**Limits:** Client SOW/Contract Specified  
**Basis:** DoD QSM

**Preparation:** NA  
**Batch:** NA  
**Prepared By:** NA

**Analysis:** EPA 6850, DoD QSM  
**Batch:** ELMS/2274 (HBN: 244098)  
**Analyzed By:** Thomas Bosch

## Blank

<b>LMB:</b> 664922 <b>Analyzed:</b> 07/23/2019 09:15 <b>Units:</b> ug/L			
Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

## Laboratory Control Sample

<b>LCS:</b> 664923 <b>Analyzed:</b> 07/23/2019 08:47 <b>Dilution:</b> 1 <b>Units:</b> ug/L				
Analyte	Result	Target	% Rec	QC Limits
Perchlorate	4.24	4.00	106	78.8   123.8

## Matrix Spike - Matrix Spike Duplicate

<b>Sample:</b> 1920123002 <b>Analyzed:</b> 07/23/2019 10:11 <b>Dilution:</b> 1 <b>Units:</b> ug/L		<b>MS:</b> 664924 <b>Analyzed:</b> 07/23/2019 10:25 <b>Dilution:</b> 1 <b>Units:</b> ug/L				<b>MSD:</b> 664925 <b>Analyzed:</b> 07/23/2019 10:39 <b>Dilution:</b> 1 <b>Units:</b> ug/L			
Analyte	Result	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Perchlorate	ND	4.12	4	103	78.8   123.8	4.14	104	0.46	0.0   20.0

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

Analyst	Peer Review
/S/ Thomas Bosch 07/25/2019 15:11	/S/ Stephen Brose 07/25/2019 16:18

## 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



1920572

1920572

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

### Subcontract Chain of Custody

18698/#2

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11794

**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:**  
**Email:**

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS19070827  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19070827-02	LH18/24-SP650_071619_BIX	Water	16 Jul 2019 14:00
SUB_Perch-6850			25 Jul 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:

7/17/19 1800

Received By:

*[Signature]*

Date/Time:

07/18/19 10:07

Cooler ID(s):

Temperature(s):

RIGHT SOLUTIONS | RIGHT PARTNER



**ALS Environmental**  
**CHAIN-OF-CUSTODY**

<b>Project / Job / Task:</b> 11794		<b>Split:</b>	<b>Workorder ID:</b> 1920572	<b>Level:</b> ENV_LVL4	<b>Requested Analysis</b>					
<b>Client:</b> ALS Environmental (Houston)		<b>Account:</b> 8101		<b>Type:</b> 125Poly						
<b>Comments:</b>										
<b>Item</b>	<b>Collect Date/Time</b>	<b>Sample ID</b>	<b>Lab ID</b>	<b>QC</b>	<b>Matrix</b>	<b>Containers</b>				
1	07/16/2019 14:00	LH18/24-SP650_071619_BIX	1920572001		Water	<table border="1"> <tr> <th>ID(s)</th> <th>Count</th> </tr> <tr> <td>A</td> <td>1</td> </tr> </table>	ID(s)	Count	A	1
ID(s)	Count									
A	1									
2										
3										
4										
5										
6										
7										
8										
9										
1057										

<b>ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY</b>				<b>SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY</b>			
<b>Relinquished By: (Signature)</b>		<b>Date / Time</b>	<b>Received By: (Signature)</b>	<b>Sample Prep / Analysis for:</b>	<b>Lab Notebook No.:</b>	<b>Reason for Transfer / Storage Location</b>	
VanTassell, Tami		07/18/2019 10:07	ALS Sample Receiving	Prepared / Analyzed by:	Date / Time:	Received By: (Signature)	
 R-33.1		07-18-19 10:07	 KJB	Relinquished By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
 T. Bush		07-19-19 14:00	 T. Bush	Received By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
			 Storage	Relinquished By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
			6850	Received By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
				Relinquished By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
				Received By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
				Relinquished By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
				Received By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
				Relinquished By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
				Received By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
				Relinquished By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
				Received By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
				Relinquished By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
				Received By: (Signature)	Date / Time	Reason for Transfer / Storage Location	

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Houston Project/Task/Site: \_\_\_\_\_  
 Date/Time of Receipt: 07/18/19 10:00T 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 Yes/No/NA  
 Ice Present: Yes/No/NA project specific guidelines?  
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 <u>9776</u>	<u>2</u> °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By: Janis Vantassel T. Vantassel 07/18/19  
Signature Printed Name Date

CLIENT-RELATED INFORMATION

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

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES  NO

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: \_\_\_\_\_ Returned to Sample Receipt by: \_\_\_\_\_ Date: \_\_\_\_\_  
Printed Name Signature



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

Part #: 159460-434 B1T2 EXP 02/20

ORIGIN ID:SGRA (281) 530-5656  
CLIENT SERVICES  
ALS LABORATORY GROUP  
10450 STANCLIFF ROAD  
SUITE 210  
HOUSTON, TX 77089  
UNITED STATES US

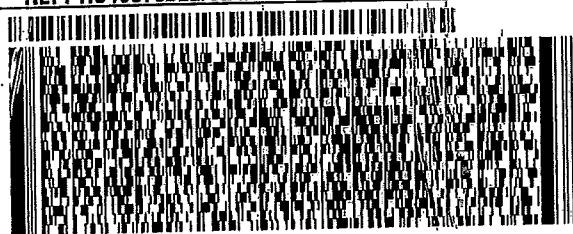
SHIP DATE: 17JUL19  
ACTWGT: 8.25 LB  
CAD: 300130/CAFE3211  
DIMS: 14x11x10 IN  
BILL THIRD PARTY

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

**SALT LAKE CITY UT 84123**

(801) 266-7700

REF: HS19070822/824/827 - RJ



**FedEx  
Express**



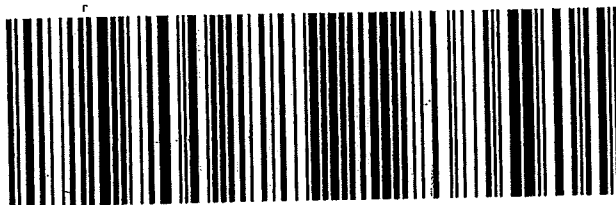
301/6/98/2/2155

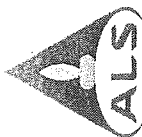
TRK# 4809 7835 9397  
0201

**THU - 18 JUL 3:00P  
STANDARD OVERNIGHT**

**AX BTFA**

**84123  
UT-US SLC**





# Batch Worklist

HBN: 244098



Instrument:

Status: WP

Created: 7/23/2019 08:01

Analyst: T. Bosch

Batch: ELMS/ 2274

Rule: EPA 6850, DoD QSM Water

- Workorder: 1920034 [ENV\_LVL4]
- Workorder: 1920122 [ENV\_LVL4]
- Workorder: 1920123 [ENV\_LVL4]
- Workorder: 1920571 [ENV\_LVL4]
- Workorder: 1920572 [ENV\_LVL4]
- Workorder: 1920581 [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	664919	CCV for HBN 244098 [ELMS/2274]				CCV	3		E685041C3Q	5311		7/25/2019	
2	664920	RLVS for HBN 244098 [ELMS/2274]				RLVS	3		E685041C3Q	5311		7/25/2019	
3	664921	ICS for HBN 244098 [ELMS/2274]				ICS	3		E6850...D3Q	5311		7/25/2019	
4	664922	LMB for HBN 244098 [ELMS/2274]				LMB	3		E6850Q413Q	5311		7/25/2019	
5	664923	LCS for HBN 244098 [ELMS/2274]				LCS	3		E6850Q413Q	5311		7/25/2019	
6	1920034001	LH18/24-SP650_070919_BIX Water				SAMPLE	3	1920034001-A	E6850Q41.3	5480	8/6/2019	7/25/2019	
7	1920122001	ICT 13A_071119				SAMPLE	3	1920122001-A	E6850Q41.3	5480	8/8/2019	7/26/2019	
8	1920123001	HBW7_071119				SAMPLE	3	1920123001-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
9	1920123002	HBW10_071119				SAMPLE	3	1920123002-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
10	664924	HBW10_071119(1920123002MS)				MS	3		E6850Q413Q	5311		7/25/2019	
11	664925	HBW10_071119(1920123002MSD)				MSD	3		E6850Q413Q	5311		7/25/2019	
12	1920123003	HBW1_071119				SAMPLE	3	1920123003-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
13	1920123004	GPW1_071119				SAMPLE	3	1920123004-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
14	1920123005	GPW1_071119_a				SAMPLE	3	1920123005-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
15	1920123006	GPW3_071119				SAMPLE	3	1920123006-A	E6850Q41.3	5480	8/8/2019	7/25/2019	
16	664926	CCV for HBN 244098 [ELMS/2274]				CCV	3		E685041C3Q	5311		7/25/2019	
17	1920571001	LH18/24-SP650_071619-BIX				SAMPLE	3	1920571001-A	E6850Q41.3	5480	8/13/2019	7/31/2019	
18	1920572001	LH18/24-SP650_071619_BIX				SAMPLE	3	1920572001-A	E6850Q41.3	5480	8/13/2019	7/31/2019	
19	1920581001	LH18/24-SP140_071619				SAMPLE	3	1920581001-A	E6850Q41.3	5480	8/13/2019	7/31/2019	
20	664927	CCV for HBN 244098 [ELMS/2274]				CCV	3		E685041C3Q	5311		7/25/2019	



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Analytical Documentation**



ALS Work Order #'s & Sample #( )'s: 1920034 (001); 1920122 (001); 1920123 (001-06); 1920571 (001); 1920572 (001); 1920581 (001) ELMS Batch/HBN ID: 2274 (244098)  
 Prep Date: 07/19/2019 Analysis Date: 07/23/2019 Analyst: T. Bosch  
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**  
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\JUL\23JUL19D.s  
 Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

**SAMPLE PREPARATION/ANALYSIS:**

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

**REAGENTS:** Eluent A1: 95% ASTM Type II water (ALS)/ 5% ACN (B&J Lot AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).  
 Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

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

**CALIBRATION CURVE:** Used curve from 03/19/2019, sequence 19MARI9D.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: 8 Injection Volume: 35µL  
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

**FLOW GRADIENT:**

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

**QC DATA:** 4.0µL of QC Solution Horizon ID 47516 was used for LCS 664923; Target = 4.0µg/L. ASTM type II water was used for LMB 664922.

**MS/MSD:** The Matrix Spike and duplicate (MS/MSD) were performed on sample 1920123002 (Client ID: HBW10\_071119). 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 1920122001 and 1920581001 were analyzed and reported from 1:100 dilutions. The reporting limits have been adjusted accordingly.
- 2) All QC, Blank, CCV, and MS/MSD results were within method parameters.
- 3) Sample data can be viewed at two directories within the ALS system: \\ALS\TWS013\LCMS\LCMS04\2019\JUL\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\slstws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\244098-DoD-ALS-Hstn LCMS4 or through \\ALS\TWS013\DATAREVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 664920) is reported from the analysis of the Laboratory Control Sample (LCS – 664923) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03) along with datafile 23JUL03.

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

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

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDC: ELMS: 2274 HBN: 244098 1920034/1920122/1920123		
Sample Set IDs if Applicable: 1920571/1920572/1920581		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSS, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on OC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SB
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR#</u>	—	—
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB



## STANDARD REPORT

## Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850 WKG Std 100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	0.1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 INT

CLO4 INT		Description - 6850 Intermdt AccStd 10.ug/mL			
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



## STANDARD REPORT

## Working Standard - CLO4 QC WRK

CLO4 QC WRK		Description - 6850 QC WKG STD 100ug/L			
Standard: 47516		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC WRK 100.ug/L	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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





## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL	
Standard: 36748		Created By: Thomas Bosch	Amount: 100 mL
MFG: Ultra Scientific		Create Date: 05/11/2017 01:05PM	Expires: 03/31/2020
MFG Lot: CP-0860			Usable: Yes
Part ID: ICC-013			Lab Lot: CLO4 QC STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 QC INT

CLO4 QC INT			Description - 6850 QC Intrmdt Std-QC 10ug/mL		
Standard: 47515		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC INT 10.ug/mL	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020



## STANDARD REPORT

## Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730	Created By: Thomas Bosch	Amount: 25 mL			
MFG: ALS/SLC	Create Date: 09/20/2018 09:09AM	Expires: 09/20/2019			
MFG Lot: TNB: 05/09/2018	Verified By: Thomas Bosch	Usable: Yes			
Pipette ID: Not Provided	Verify Date:	Lab Lot: CLO4ISTDWRK			
Pos.	Analyte	Name	Concentration		
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L		
2	14797-73-0-89	Perchlorate 89	1000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729	Created By: Thomas Bosch	Amount: 1 mL	
MFG: Cambridge Isotope	Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026	
MFG Lot: SDFP-012A	Verified By: Thomas Bosch	Usable: Yes	
Part ID: OLM-7310-S	Verify Date:	Lab Lot: CLO4ISTDSTK	
Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL



## Certificate of Analysis



### ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

#### Description:

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

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

Solvent: water (low TOC, < 50 ppb)

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

#### Traceability:

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

#### Estimation of Uncertainties:

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

#### Homogeneity:

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

#### Intended Use:

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

#### Instructions for Use:

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

#### Hazards:

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

#### Expiration of Certification:

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





# Certificate of Analysis



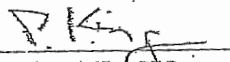
## ISO Guide 34 Reference Material

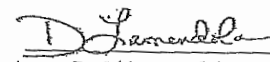
Product Number: ICC-013  
Lot Number: CP-0860

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

### Maintenance of Certification:

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

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

  
Daniel J. Lamendola  
Director of QA/QA



125 Market Street  
New Haven, CT 06513  
USA



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<sub>4</sub>)  
SRM: Ind. Std.  
Lot: 218065075  
Matrix: Water  
Hazards: Refer to SDS for complete safety information

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



Signal Word: None

Component	SRM #	Prepared Concentration (µg/mL)
ClO <sub>4</sub> 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:

*Melgan O'Leary*

Melgan O'Leary, Inorganic QC Manager

Cambridge Isotope Laboratories, Inc.

## Certificate of Analysis

Quality Standards:  
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

Product Name: PERCHLORIC ACID, SODIUM SALT  
(Isotopic Label & Enrichment Specification) (18O<sub>4</sub>, 90%+) 100 UG/ML IN WATER

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

## Product Information

Chemical Purity Specification:  $\geq 98\%$

Labeled CAS Number: NA

Unlabeled CAS Number: 7601-89-0

MW\*: 130.4

Chemical Formula: NaCl<sup>+</sup>O<sub>4</sub>

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. Eckerley

Timothy J. Eckerley, 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
*	664919	CCV@25	Vial 71	1	Control	1	1.62672e6	25.50485
*	664923	QC@4.0	Vial 72	1	Control	2	3.26276e5	4.23719
*	664921	ICS@4.0	Vial 73	1	Control	3	2.26823e5	3.59795
*	664922	LMB	Vial 74	1	Control	4	0.00000	0.00000
*	1920034001		Vial 75	1	Sample	5	3.78721e5	5.76393
*	1920122001	100	Vial 76	1	Sample	6	3.81315e5	535.80529
*	1920123001		Vial 77	1	Sample	7	1.88703e6	27.30710
*	1920123002		Vial 78	1	Sample	8	0.00000	0.00000
*	664924	201232S	Vial 79	1	Sample	9	2.94719e5	4.12417
*	664925	201232D	Vial 80	1	Sample	10	2.98082e5	4.14318
*	1920123003		Vial 81	1	Sample	11	0.00000	0.00000
*	1920123004		Vial 82	1	Sample	12	0.00000	0.00000
*	1920123005		Vial 83	1	Sample	13	0.00000	0.00000
*	1920123006		Vial 84	1	Sample	14	0.00000	0.00000
*	664926	CCV@25	Vial 71	1	Control	15	1.58424e6	26.09295
*	1920571001		Vial 85	1	Sample	16	0.00000	0.00000
*	1920572001		Vial 86	1	Sample	17	0.00000	0.00000
*	1920581001	100	Vial 87	1	Sample	18	4.74247e6	6892.89270
*	664927	CCV@25	Vial 71	1	Control	19	1.56539e6	26.50991

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
*	664919	CCV@25	Vial 71	1	Control	1	4.82242e5	25.47735
*	664923	QC@4.0	Vial 72	1	Control	2	1.06930e5	4.52240
*	664921	ICS@4.0	Vial 73	1	Control	3	8.07927e4	4.14216
*	664922	LMB	Vial 74	1	Control	4	0.00000	0.00000
*	1920034001		Vial 75	1	Sample	5	1.32207e5	6.61445
*	1920122001	100	Vial 76	1	Sample	6	1.27974e5	590.20800
*	1920123001		Vial 77	1	Sample	7	5.71392e5	27.84268
*	1920123002		Vial 78	1	Sample	8	0.00000	0.00000
*	664924	201232S	Vial 79	1	Sample	9	9.30343e4	4.23661
*	664925	201232D	Vial 80	1	Sample	10	9.90502e4	4.47914
*	1920123003		Vial 81	1	Sample	11	0.00000	0.00000
*	1920123004		Vial 82	1	Sample	12	0.00000	0.00000
*	1920123005		Vial 83	1	Sample	13	0.00000	0.00000
*	1920123006		Vial 84	1	Sample	14	0.00000	0.00000
*	664926	CCV@25	Vial 71	1	Control	15	4.73538e5	26.27353
*	1920571001		Vial 85	1	Sample	16	0.00000	0.00000
*	1920572001		Vial 86	1	Sample	17	0.00000	0.00000
*	1920581001	100	Vial 87	1	Sample	18	1.37287e6	6775.22031
*	664927	CCV@25	Vial 71	1	Control	19	4.66031e5	26.59490

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
*	664919	CCV@25	Vial 71	1	Control	1	1.93813e5	5.00000
*	664923	QC@4.0	Vial 72	1	Control	2	2.53019e5	5.00000
*	664921	ICS@4.0	Vial 73	1	Control	3	2.08874e5	5.00000
*	664922	LMB	Vial 74	1	Control	4	2.28613e5	5.00000
*	1920034001		Vial 75	1	Sample	5	2.12986e5	5.00000
*	1920122001	100	Vial 76	1	Sample	6	2.31390e5	500.00000
*	1920123001		Vial 77	1	Sample	7	2.09097e5	5.00000
*	1920123002		Vial 78	1	Sample	8	2.14312e5	5.00000
*	664924	201232S	Vial 79	1	Sample	9	2.35117e5	5.00000
*	664925	201232D	Vial 80	1	Sample	10	2.36657e5	5.00000
*	1920123003		Vial 81	1	Sample	11	2.72320e5	5.00000
*	1920123004		Vial 82	1	Sample	12	2.70263e5	5.00000
*	1920123005		Vial 83	1	Sample	13	2.50554e5	5.00000
*	1920123006		Vial 84	1	Sample	14	2.77086e5	5.00000

Batch Report: C:\HPCHEM\1\DATA\23JUL19D\23JUL19S.B

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	664926	CCV@25	Vial 71	1	Control	15	1.84240e5	8.170	5.00000
*	1920571001		Vial 85	1	Sample	16	2.24657e5	7.814	5.00000
*	1920572001		Vial 86	1	Sample	17	2.04102e5	7.796	5.00000
*	1920581001	100	Vial 87	1	Sample	18	1.90565e5	8.391	500.00000
*	664927	CCV@25	Vial 71	1	Control	19	1.79008e5	8.198	5.00000

\*\*\* End of Report \*\*\*

## Sequence Table:

## Method and Injection Info Part:

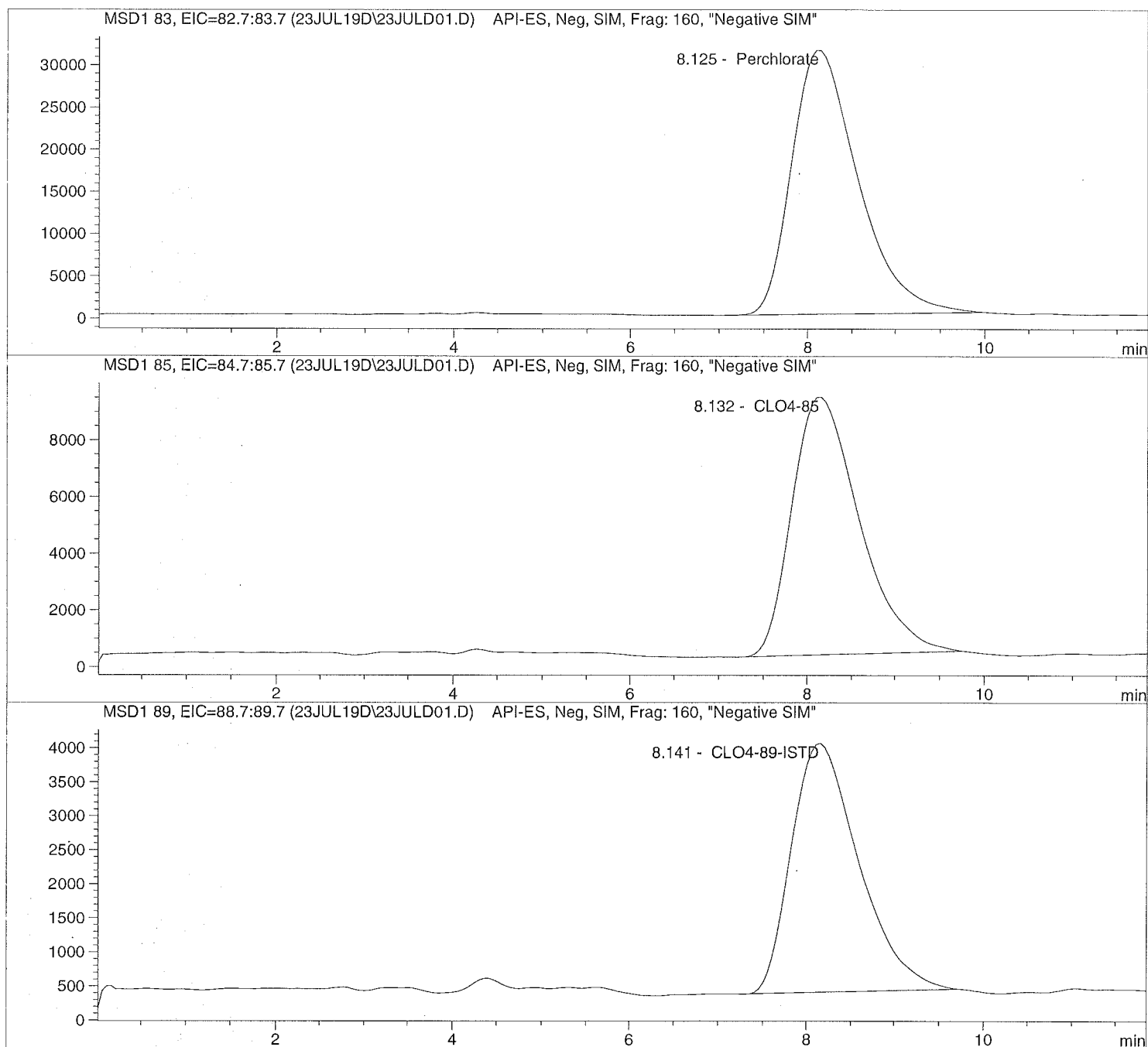
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	664919 CCV@25	CLO4-AQN	1	Ctrl Samp		
2	Vial 72	664923 QC@4.0	CLO4-AQN	1	Ctrl Samp		
3	Vial 73	664921 ICS@4.0	CLO4-AQN	1	Ctrl Samp		
4	Vial 74	664922 LMB	CLO4-AQN	1	Ctrl Samp		
5	Vial 75	1920034001	CLO4-AQN	1	Sample		
6	Vial 76	1920122001 100	CLO4-AQN	1	Sample		
7	Vial 77	1920123001	CLO4-AQN	1	Sample		
8	Vial 78	1920123002	CLO4-AQN	1	Sample		
9	Vial 79	664924 201232S	CLO4-AQN	1	Sample		
10	Vial 80	664925 201232D	CLO4-AQN	1	Sample		
11	Vial 81	1920123003	CLO4-AQN	1	Sample		
12	Vial 82	1920123004	CLO4-AQN	1	Sample		
13	Vial 83	1920123005	CLO4-AQN	1	Sample		
14	Vial 84	1920123006	CLO4-AQN	1	Sample		
15	Vial 71	664926 CCV@25	CLO4-AQN	1	Ctrl Samp		
16	Vial 85	1920571001	CLO4-AQN	1	Sample		
17	Vial 86	1920572001	CLO4-AQN	1	Sample		
18	Vial 87	1920581001 100	CLO4-AQN	1	Sample		
19	Vial 71	664927 CCV@25	CLO4-AQN	1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD01.D Sample Name: 664919 CCV@25

=====  
Injection Date: 7/23/2019 08:31:50 Seq Line: 1  
Sample Name: 664919 CCV@25 Location: Vial 71  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD01.D Sample Name: 664919 CCV@25

```

=====
Injection Date: 7/23/2019 08:31:50      Seq Line:      1
Sample Name:    664919  CCV@25          Location:      Vial 71
Acq Operator:   TNB                    Inj. No.:     1
                                           Inj. Vol.:    35 µl

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:      1.000000
Sample Amount:  25.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.125	PBA	1626721.4	25.5049	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.132	PBA	482242.2	25.4774	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.141	PBA	193813.0	5.0000	CLO4-89-ISTD

```

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

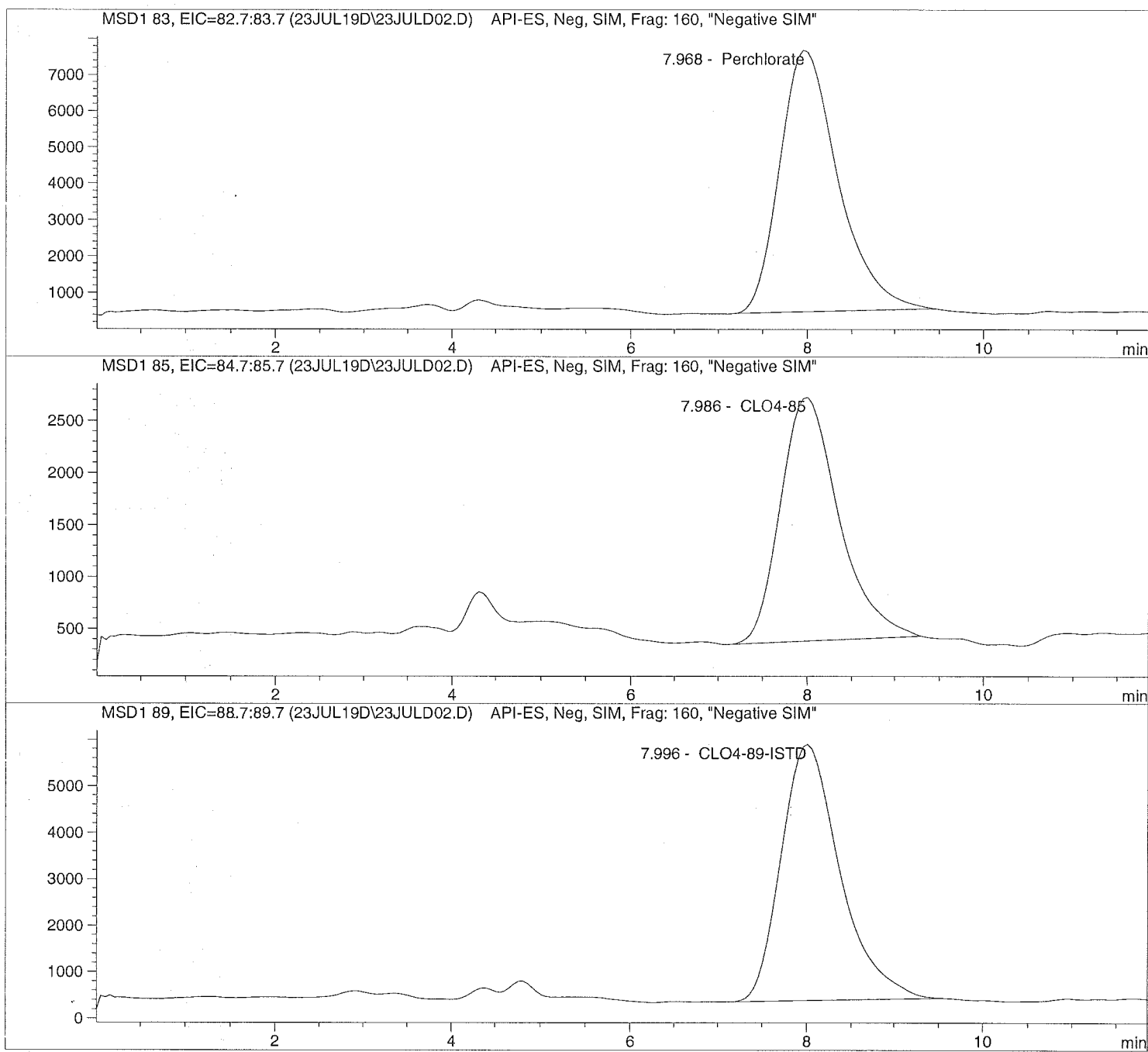
```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD02.D Sample Name: 664923 QC04.0

```
=====
Injection Date: 7/23/2019 08:47:43      Seq Line:      2
Sample Name:    664923  QC04.0          Location:      Vial 72
Acq Operator:   TNB                    Inj. No.:     1
                                           Inj. Vol.:    35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD02.D      Sample Name: 664923      QC@4.0

```

=====
Injection Date: 7/23/2019 08:47:43      Seq Line:                    2
Sample Name:     664923      QC@4.0                    Location:                    Vial 72
Acq Operator:    TNB                                                    Inj. No.:                    1
                                                                          Inj. Vol.:                    35 µl
=====

```

```

Acq. Method:        CLO4-AQN.M
Analysis Method:    C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:      4/12/2019 07:54:13
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:                                    Signal
Calib. Data Modified:    Fri, 12. Apr. 2019,07:52:58 am
Multiplier:              1.000000
Dilution:                1.000000
Sample Amount:            4.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.968	PBA	326275.9	4.2372	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.986	PBA	106930.0	4.5224	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.996	PBA	253018.7	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*



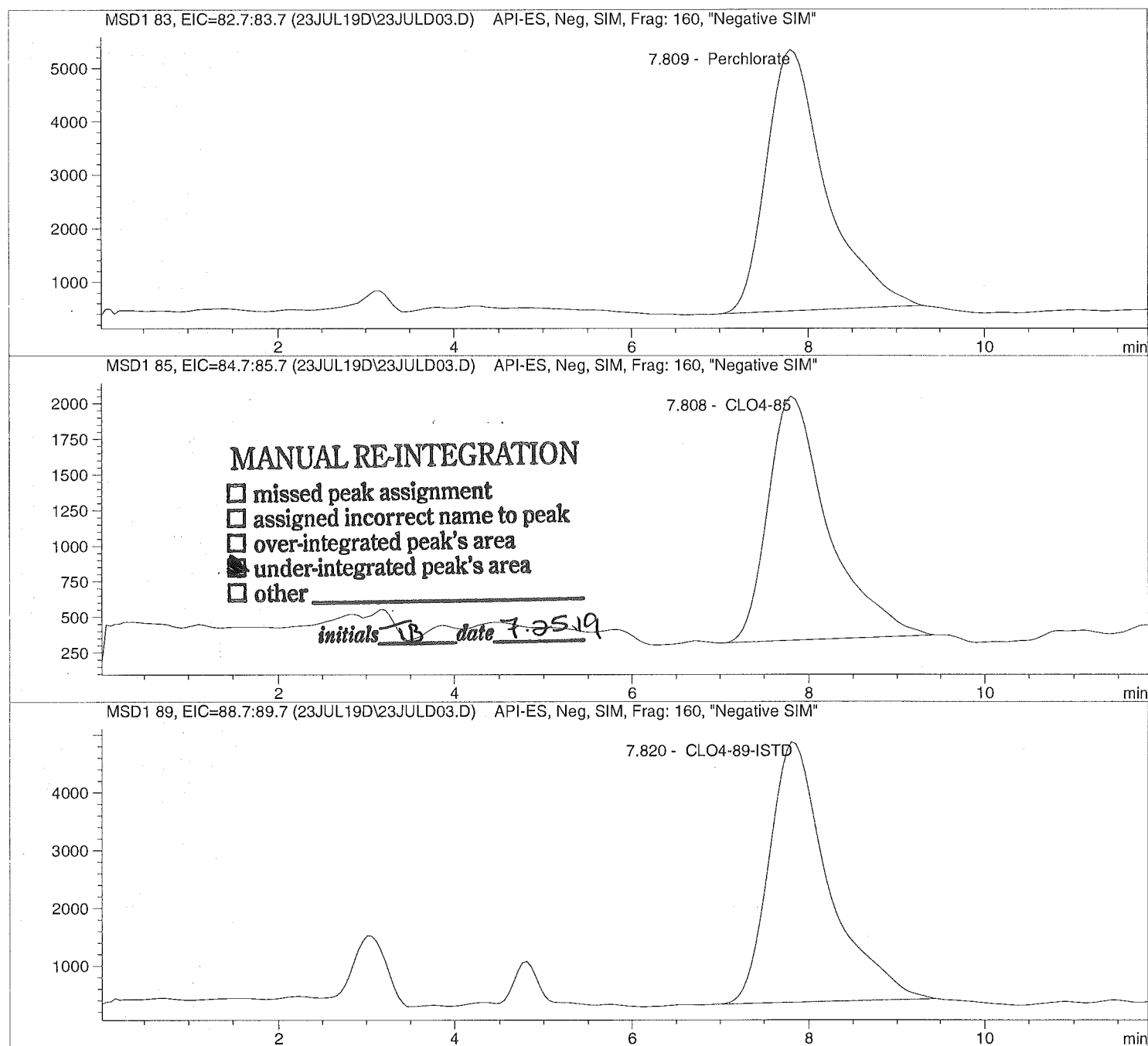
Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD03.D Sample Name: 664921 ICS@4.0

=====

Injection Date:	7/23/2019 09:01:39	Seq Line:	3
Sample Name:	664921 ICS@4.0	Location:	Vial 73
Acq Operator:	TNB	Inj. No.:	1
		Inj. Vol.:	35 $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD03.D      Sample Name: 664921    ICS@4.0

```
=====
Injection Date: 7/23/2019 09:01:39      Seq Line:            3
Sample Name:    664921    ICS@4.0            Location:            Vial 73
Acq Operator:   TNB                        Inj. No.:            1
                                          Inj. Vol.:           35 µl
=====
```

Acq. Method:        CLO4-AQN.M  
 Analysis Method:   C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed:      4/12/2019 07:54:13

Perchlorate analysis

=====

Sample Information

=====

Sorted By:            Signal  
 Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am  
 Multiplier:          1.000000  
 Dilution:            1.000000  
 Sample Amount:      4.000

=====

LCMS Results

=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.809	PBA	226823.0	3.5980	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.808	MM	80792.7	4.1422	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.820	PBA	208873.6	5.0000	CLO4-89-ISTD

=====

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD04.D

Sample Name: 664922 LMB

Injection Date: 7/23/2019 09:15:35

Seq Line: 4

Sample Name: 664922 LMB

Location: Vial 74

Acq Operator: TNB

Inj. No.: 1

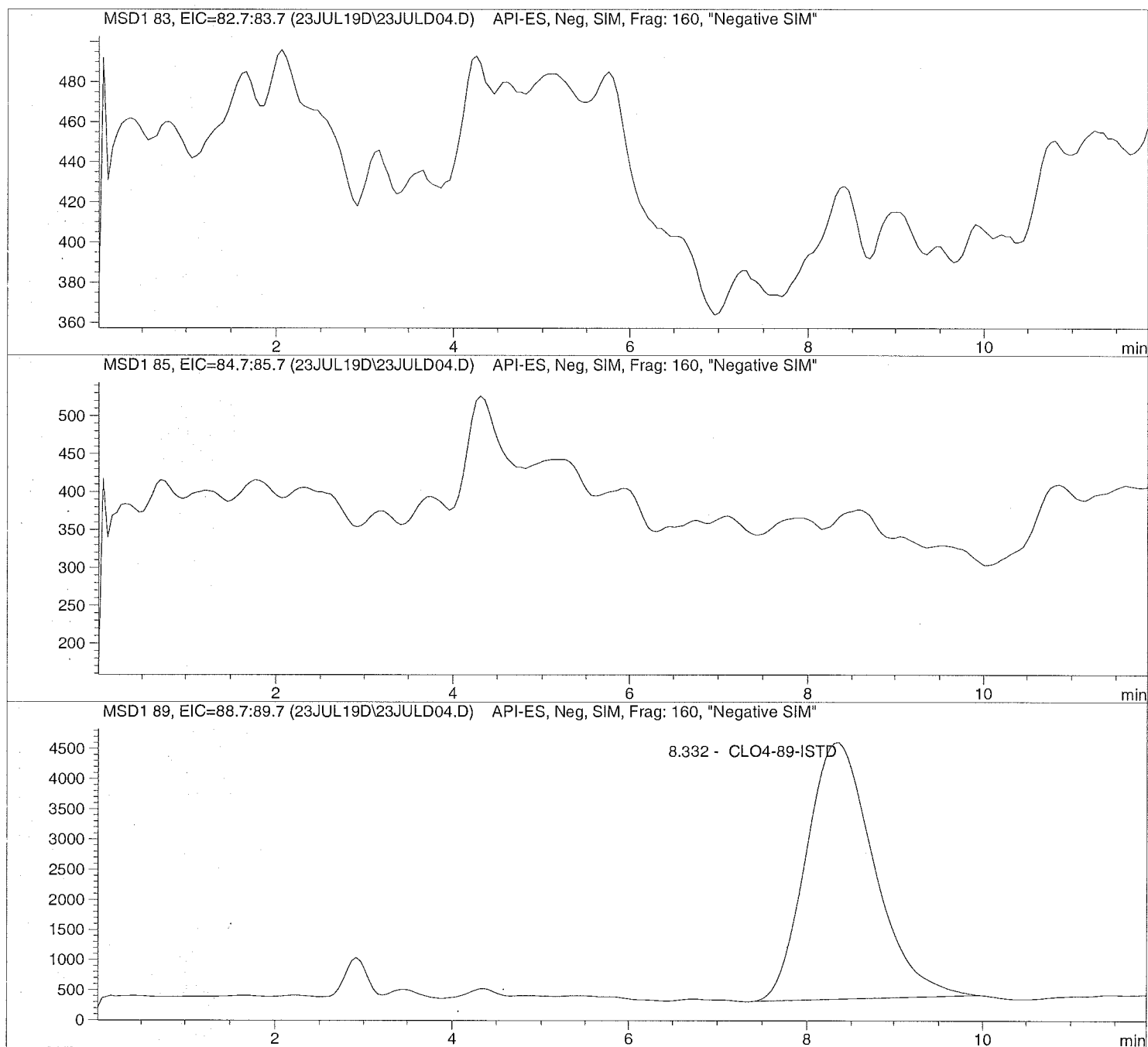
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

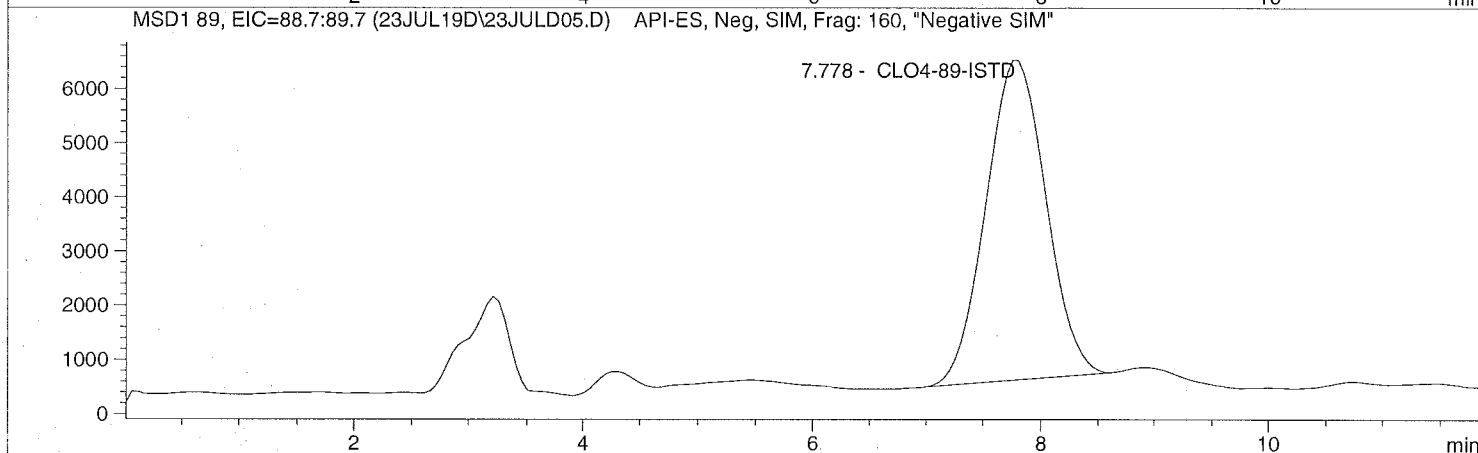
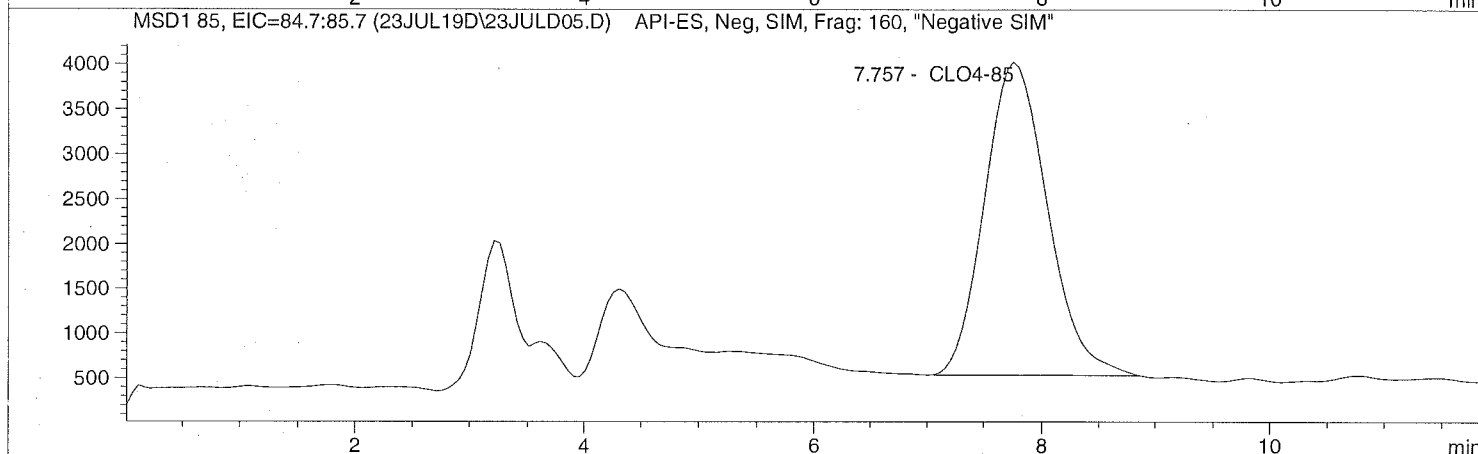
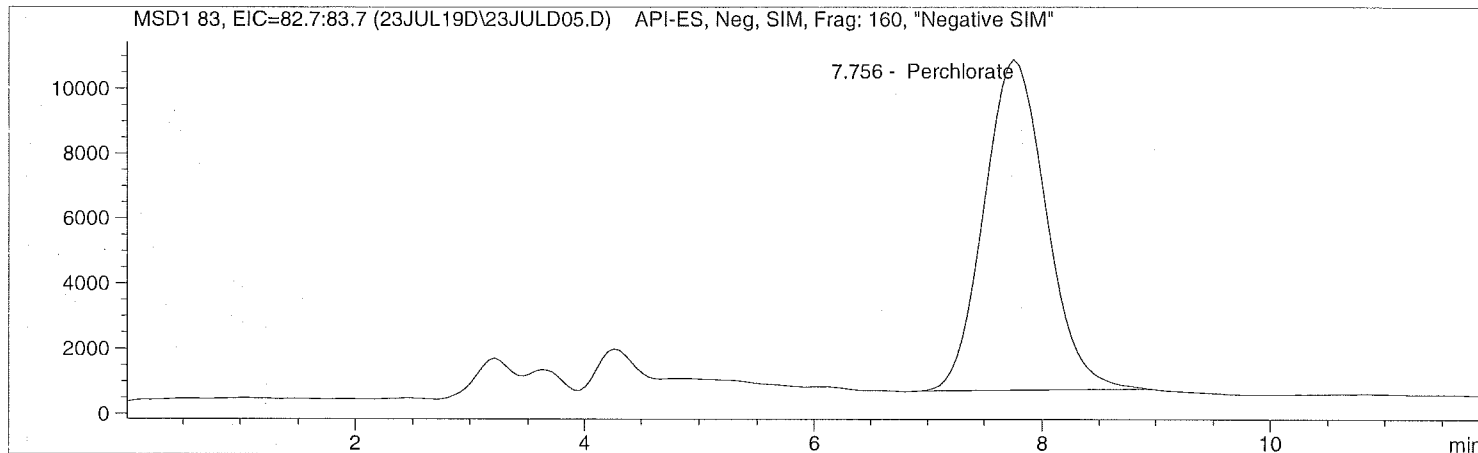




=====  
Injection Date: 7/23/2019 09:29:31                   Seq Line: 5  
Sample Name: 1920034001                            Location: Vial 75  
Acq Operator: TNB                                    Inj. No.: 1  
  Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date: 7/23/2019 09:29:31      Seq Line:          5
Sample Name:    1920034001              Location:          Vial 75
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.756	PBA	378721.2	5.7639	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.757	PBA	132206.6	6.6144	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.778	PBA	212985.8	5.0000	CLO4-89-ISTD

=====
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD06.D

Sample Name: 1920122001 100

Injection Date: 7/23/2019 09:43:25

Seq Line: 6

Sample Name: 1920122001 100

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

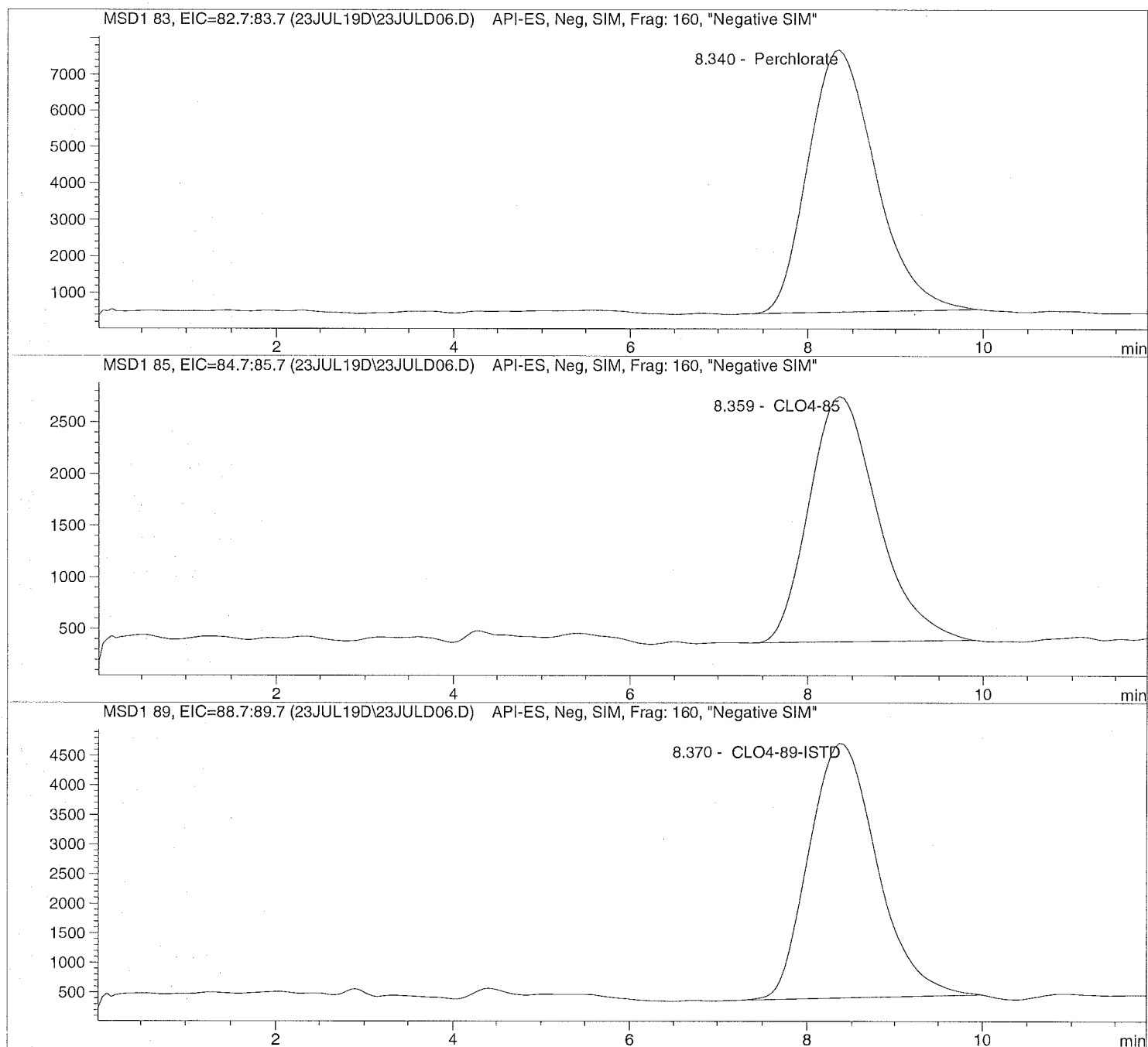
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





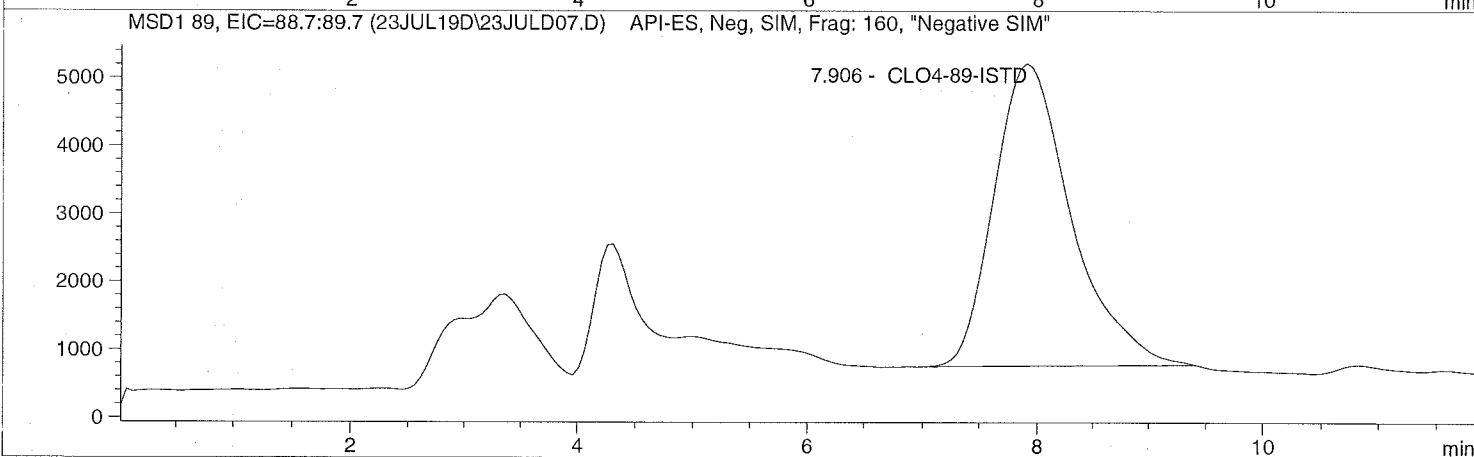
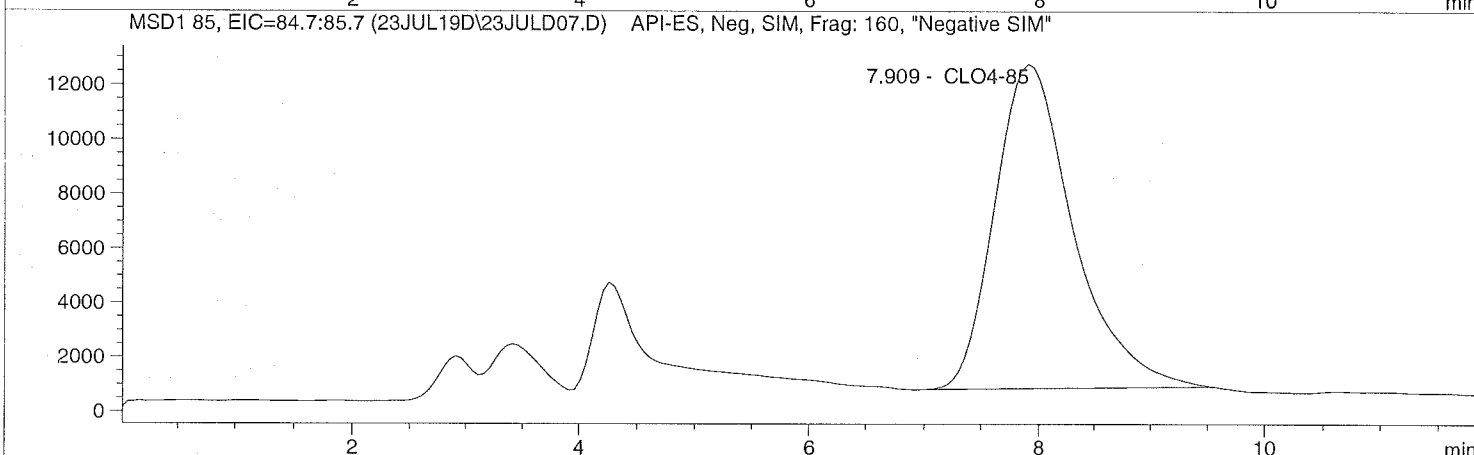
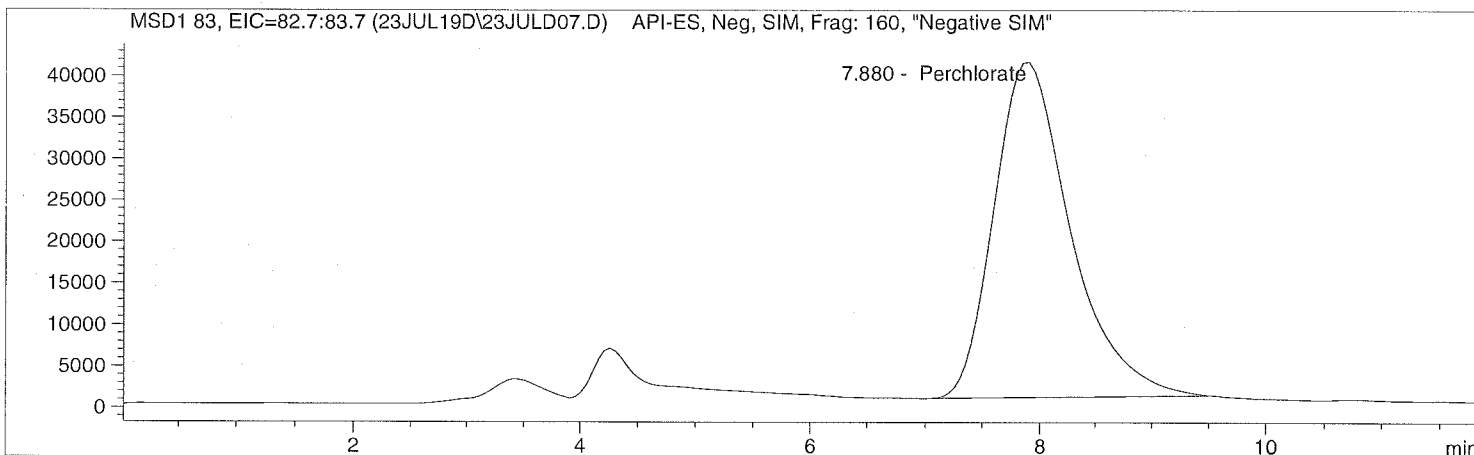


Injection Date: 7/23/2019 09:57:24  
Sample Name: 1920123001  
Acq Operator: TNB

Seq Line: 7  
Location: Vial 77  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date: 7/23/2019 09:57:24      Seq Line: 7
Sample Name: 1920123001                  Location: Vial 77
Acq Operator: TNB                        Inj. No.: 1
                                           Inj. Vol.: 35 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.880	PBA	1887029.5	27.3071	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.909	PBA	571391.9	27.8427	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.906	PBA	209097.0	5.0000	CLO4-89-ISTD

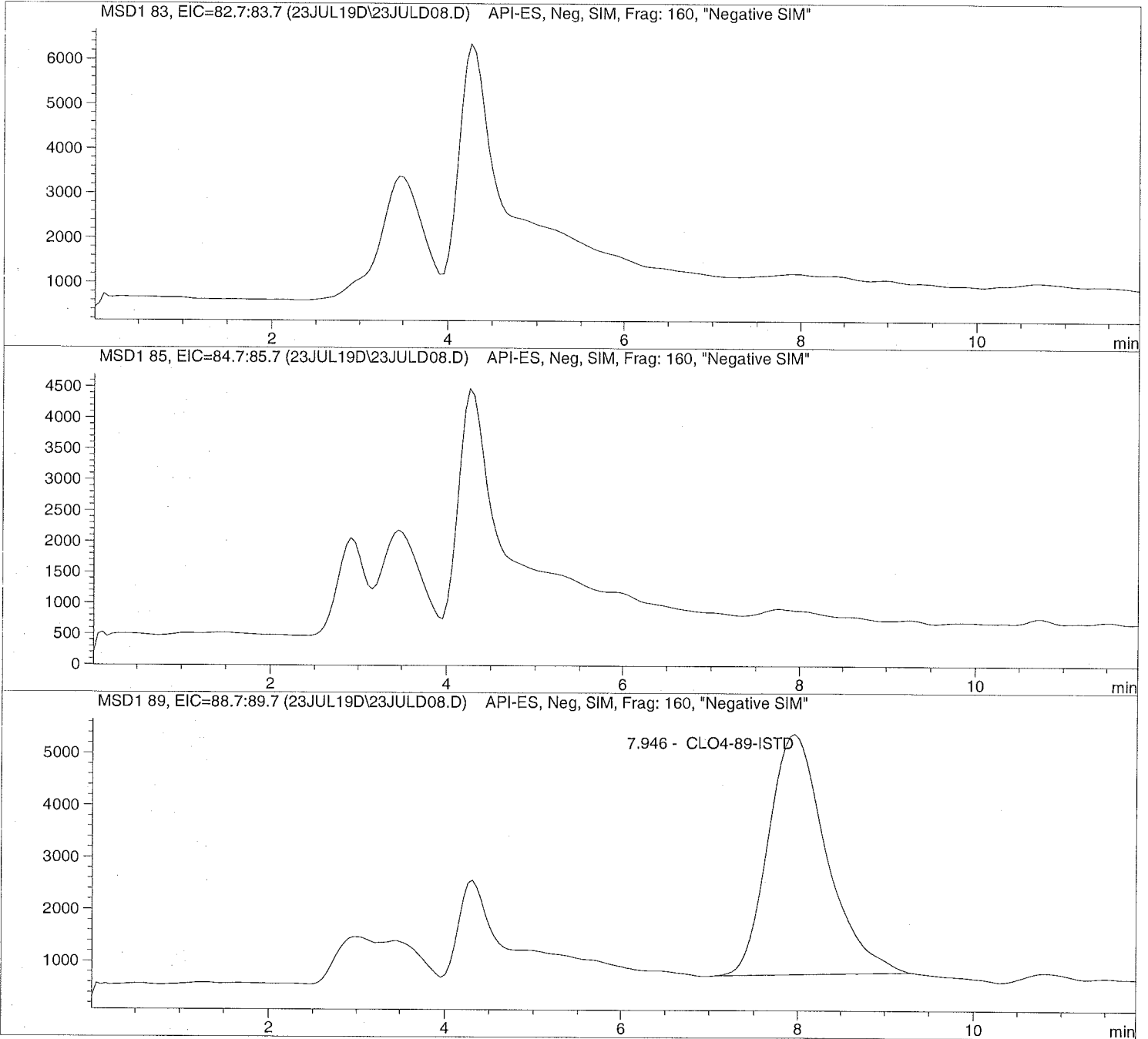
=====
\*\*\* End of Report \*\*\*

Injection Date: 7/23/2019 10:11:24  
Sample Name: 1920123002  
Acq Operator: TNB

Seq Line: 8  
Location: Vial 78  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date: 7/23/2019 10:11:24      Seq Line:      8
Sample Name:    1920123002              Location:      Vial 78
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.946	PBA	214312.1	5.0000	CLO4-89-ISTD

=====
\*\*\* End of Report \*\*\*
=====

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD09.D

Sample Name: 664924 201232S

Injection Date: 7/23/2019 10:25:26

Seq Line: 9

Sample Name: 664924 201232S

Location: Vial 79

Acq Operator: TNB

Inj. No.: 1

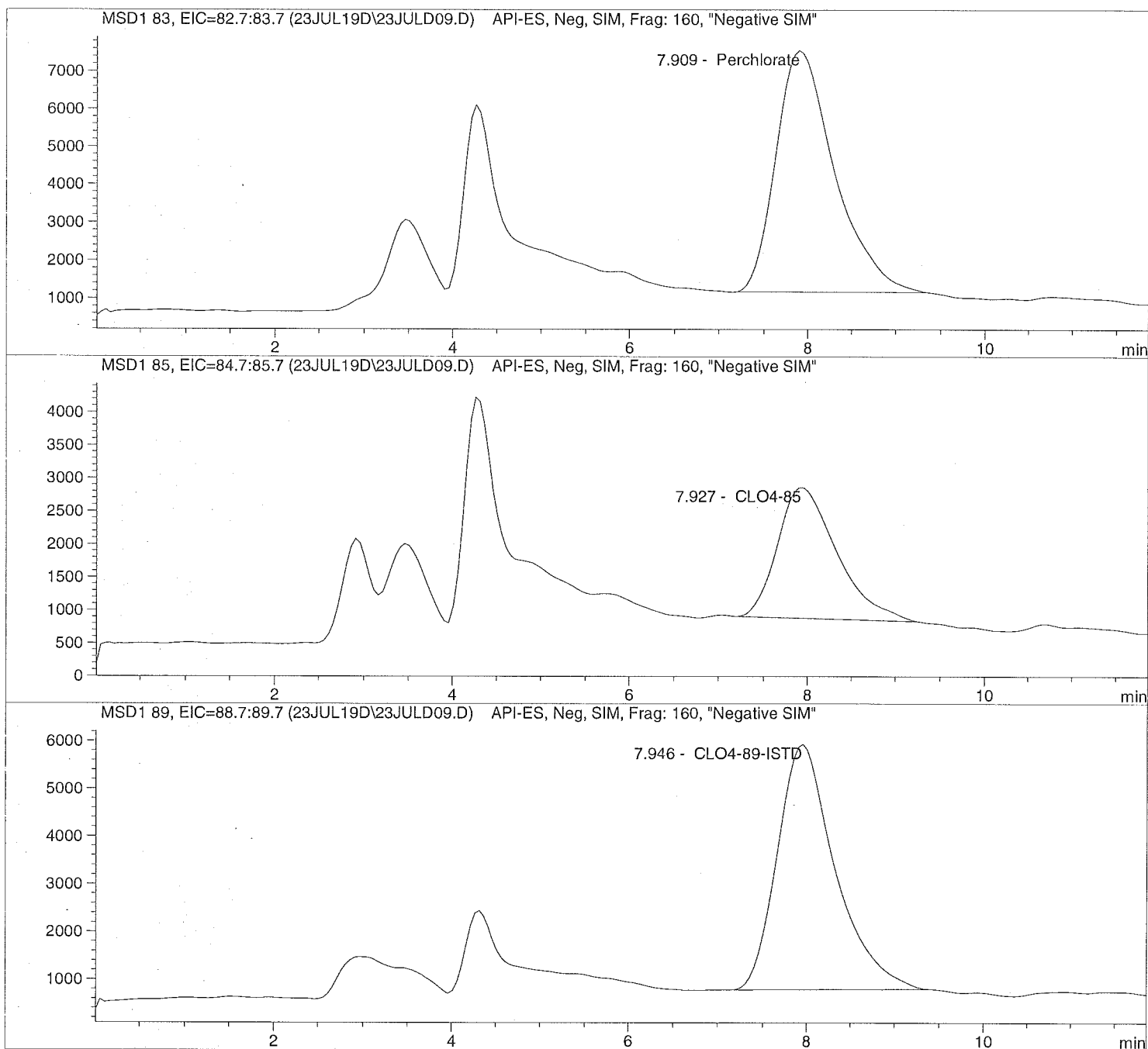
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD09.D Sample Name: 664924 201232S

```

=====
Injection Date: 7/23/2019 10:25:26      Seq Line:          9
Sample Name:    664924 201232S          Location:         Vial 79
Acq Operator:   TNB                     Inj. No.:        1
                                           Inj. Vol.:       35 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.909	PBA	294718.6	4.1242	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.927	PBA	93034.3	4.2366	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.946	PBA	235117.5	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD10.D

Sample Name: 664925 201232D

Injection Date: 7/23/2019 10:39:29

Seq Line: 10

Sample Name: 664925 201232D

Location: Vial 80

Acq Operator: TNB

Inj. No.: 1

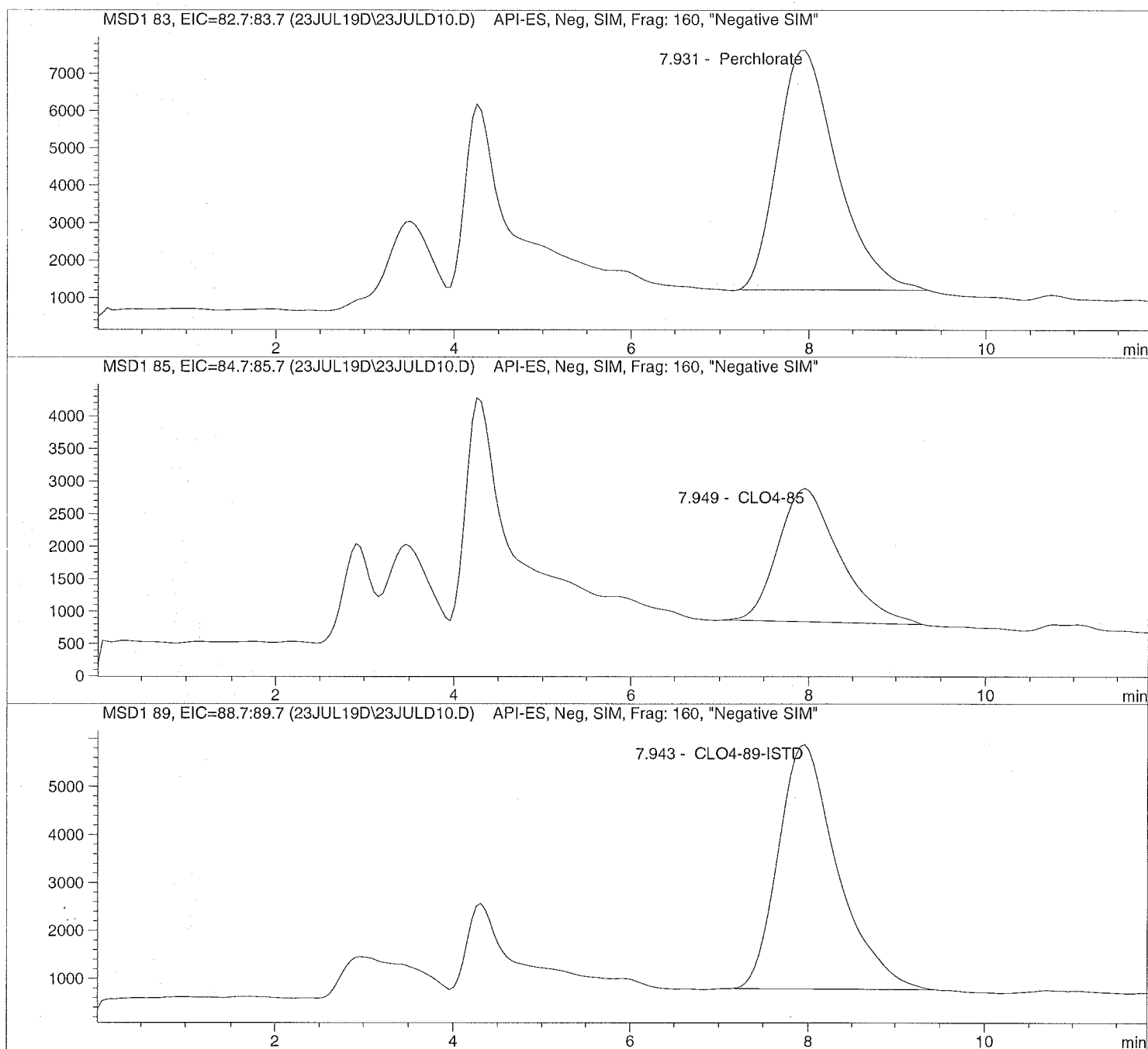
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





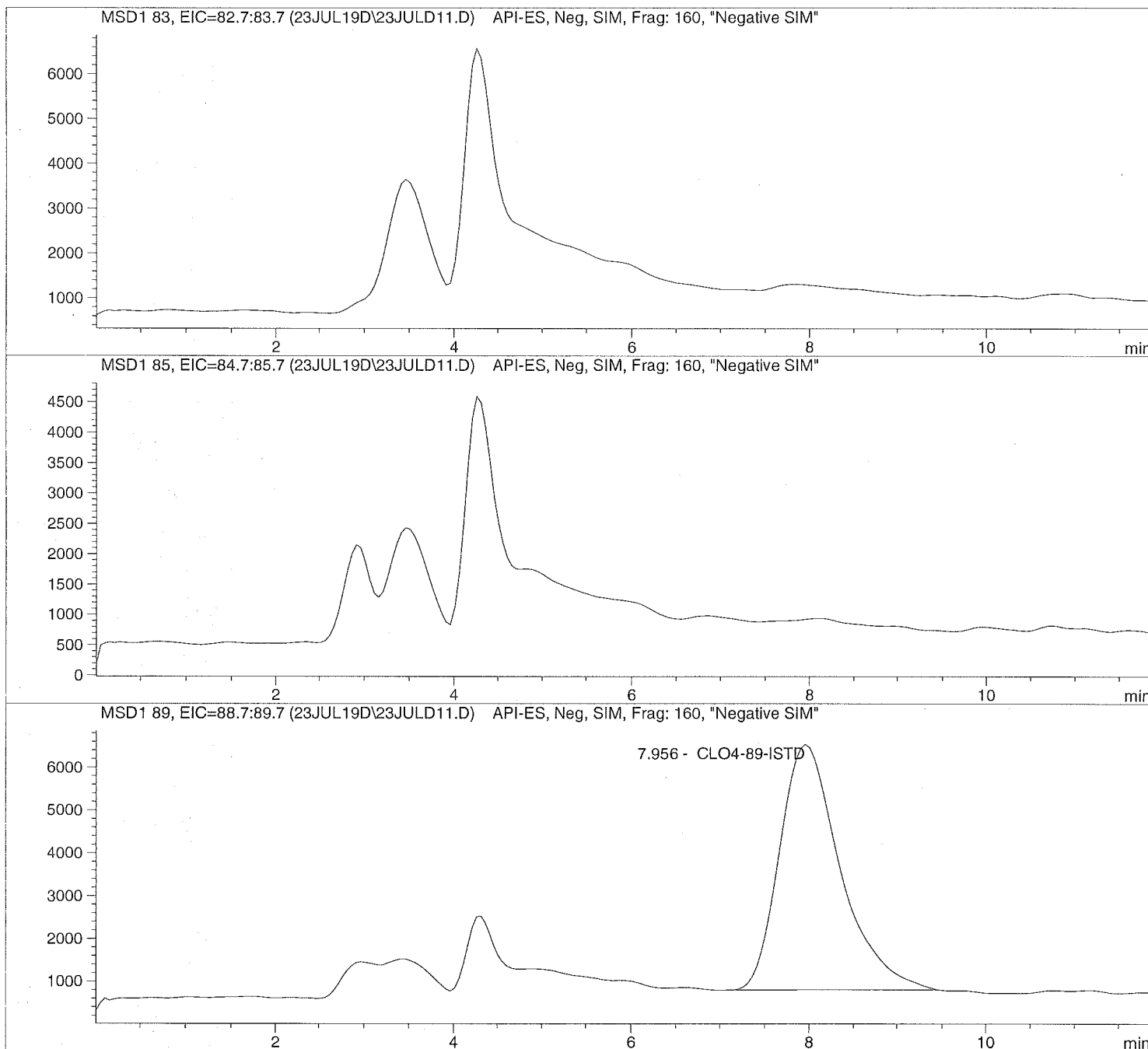


Injection Date: 7/23/2019 10:53:24  
Sample Name: 1920123003  
Acq Operator: TNB

Seq Line: 11  
Location: Vial 81  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====  
Injection Date: 7/23/2019 10:53:24      Seq Line:          11  
Sample Name:    1920123003              Location:         Vial 81  
Acq Operator:   TNB                     Inj. No.:        1  
                                           Inj. Vol.:       35 µl
```

```
Acq. Method:    CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed:   4/12/2019 07:54:13
```

## Perchlorate analysis

=====  
Sample Information  
=====

```
Sorted By:      Signal  
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am  
Multiplier:     1.000000  
Dilution:       1.000000  
Sample Amount:  0.000
```

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
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

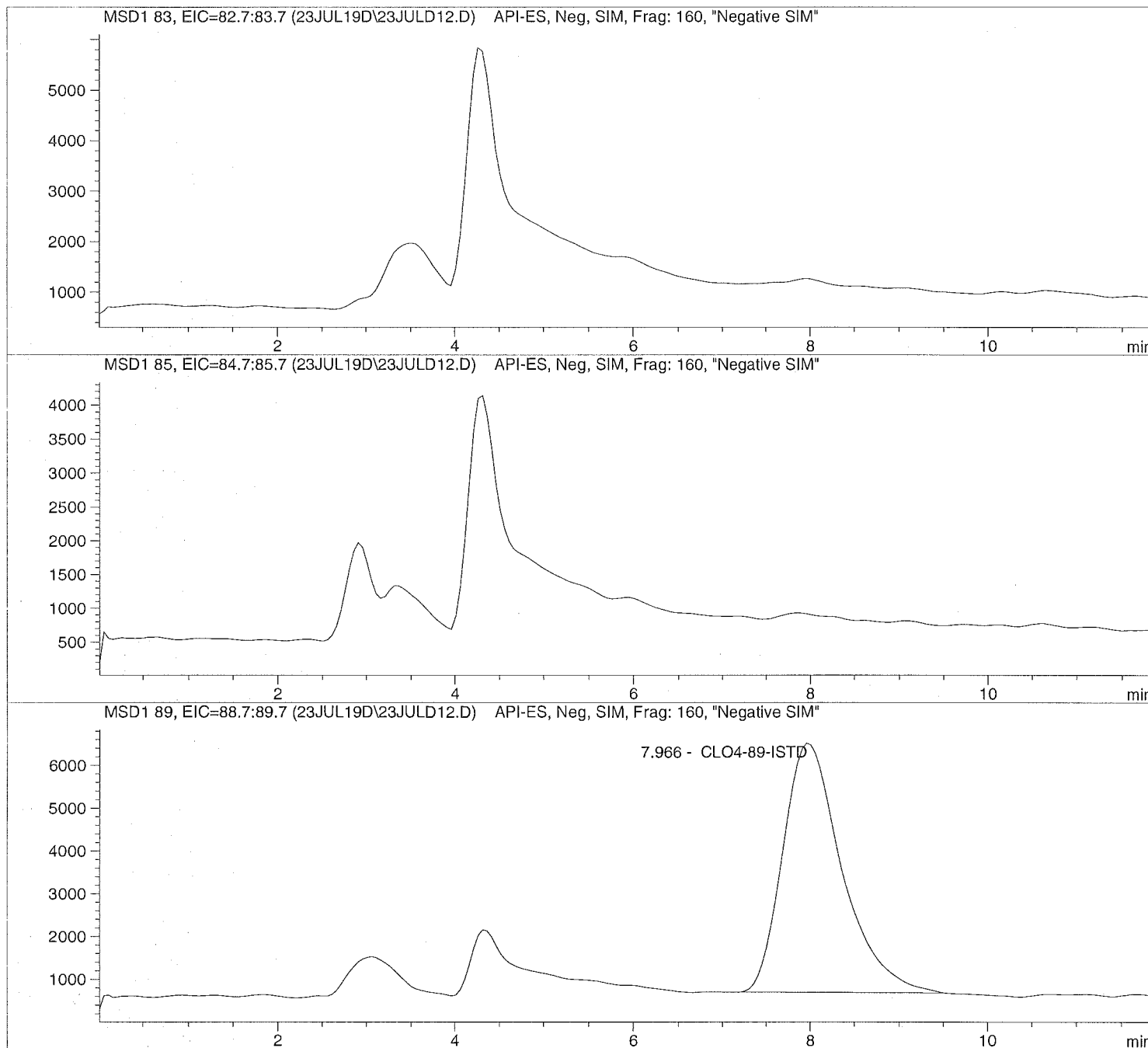
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.956	PBA	272319.7	5.0000	CLO4-89-ISTD

=====  
\*\*\* End of Report \*\*\*

=====  
Injection Date: 7/23/2019 11:07:17                   Seq Line:                   12  
Sample Name: 1920123004                            Location:                   Vial 82  
Acq Operator: TNB                                   Inj. No.:                   1  
  Inj. Vol.:                   35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====  
Injection Date: 7/23/2019 11:07:17      Seq Line:          12  
Sample Name:    1920123004              Location:          Vial 82  
Acq Operator:   TNB                     Inj. No.:         1  
                                           Inj. Vol.:        35 µl
```

```
Acq. Method:    CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed:   4/12/2019 07:54:13
```

## Perchlorate analysis

=====  
Sample Information  
=====

```
Sorted By:      Signal  
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am  
Multiplier:    1.000000  
Dilution:      1.000000  
Sample Amount: 0.000
```

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.966	PBA	270262.5	5.0000	CLO4-89-ISTD

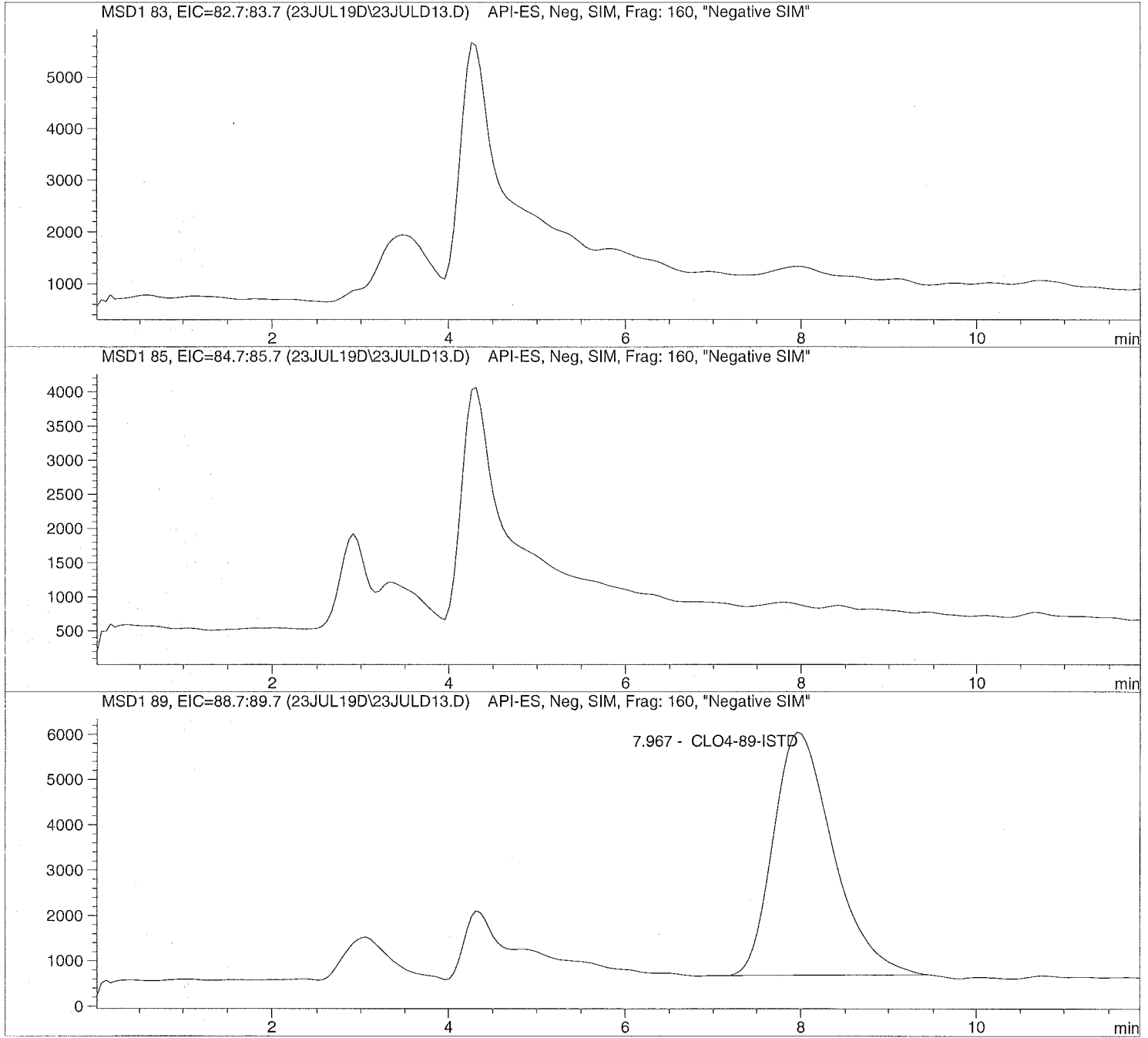
=====  
\*\*\* End of Report \*\*\*

Injection Date: 7/23/2019 11:21:18  
Sample Name: 1920123005  
Acq Operator: TNB

Seq Line: 13  
Location: Vial 83  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====  
Injection Date: 7/23/2019 11:21:18      Seq Line:          13  
Sample Name:    1920123005              Location:          Vial 83  
Acq Operator:   TNB                      Inj. No.:         1  
                                           Inj. Vol.:        35 µl
```

```
Acq. Method:    CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed:   4/12/2019 07:54:13
```

## Perchlorate analysis

=====  
Sample Information  
=====

```
Sorted By:      Signal  
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am  
Multiplier:     1.000000  
Dilution:       1.000000  
Sample Amount:  0.000
```

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

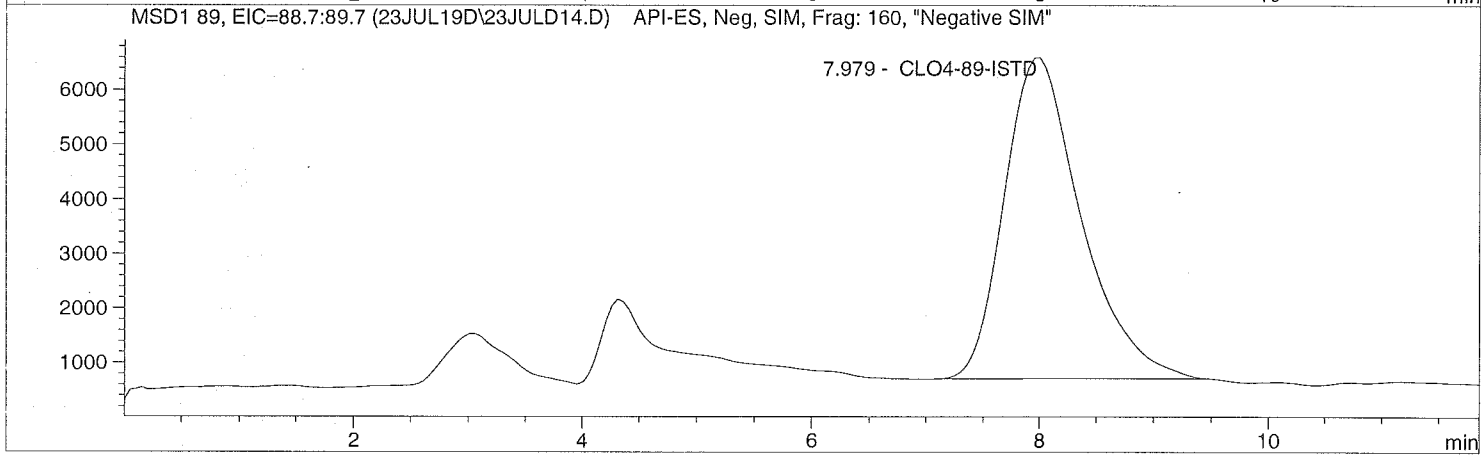
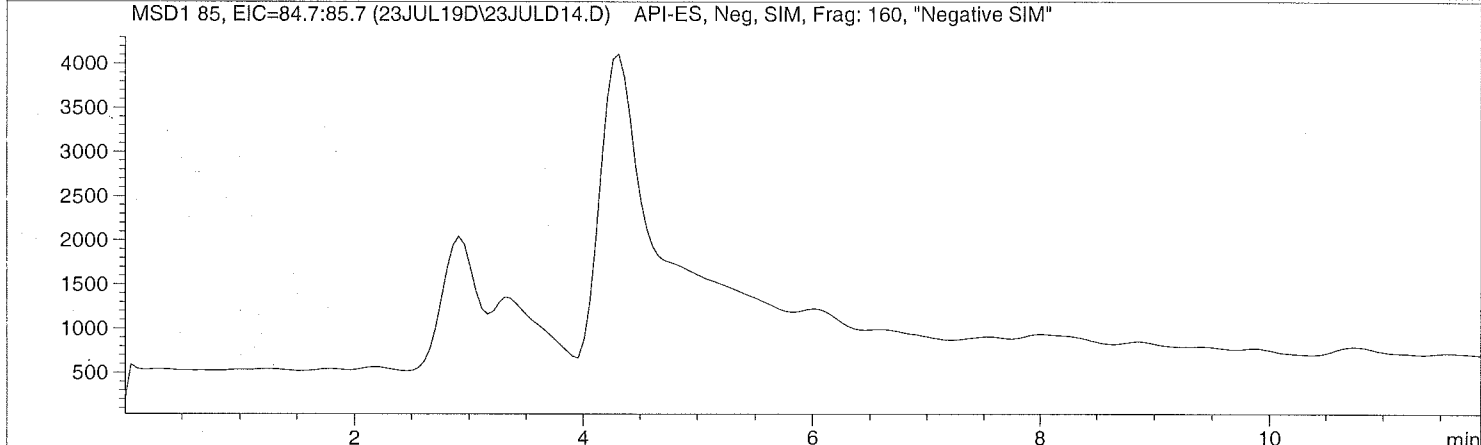
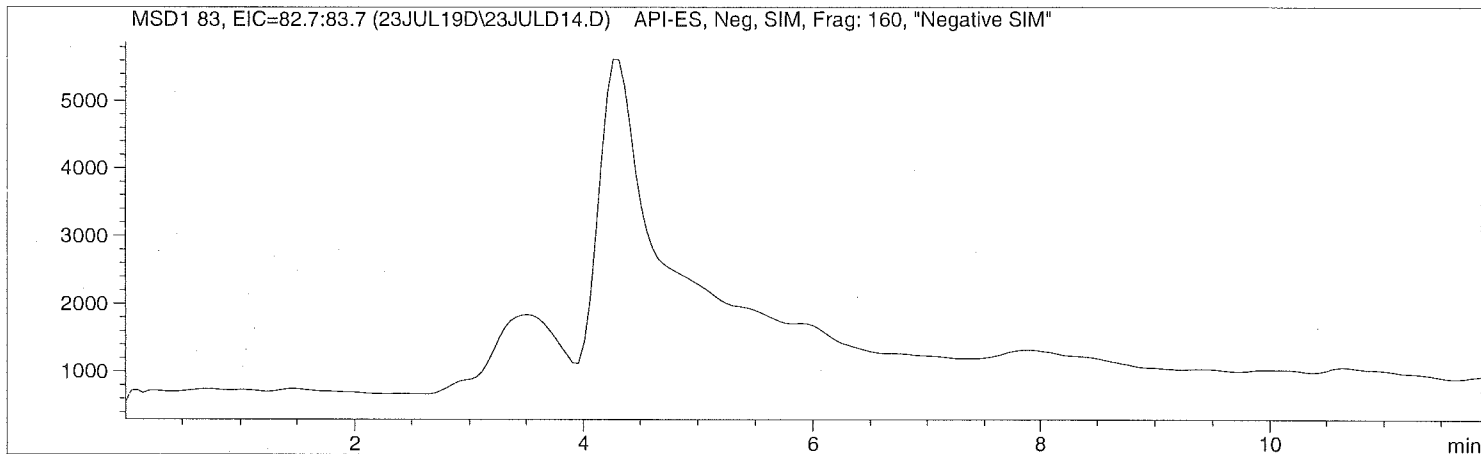
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.967	PBA	250553.8	5.0000	CLO4-89-ISTD

=====  
\*\*\* End of Report \*\*\*

=====  
Injection Date: 7/23/2019 11:35:11                   Seq Line:                   14  
Sample Name:        1920123006                    Location:                Vial 84  
Acq Operator:      TNB                            Inj. No.:                1  
  Inj. Vol.:               35 µl

Acq. Method:        CLO4-AQN.M  
Analysis Method:    C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed:       4/12/2019 07:54:13

Perchlorate analysis  
=====



```
=====
Injection Date: 7/23/2019 11:35:11      Seq Line:          14
Sample Name:    1920123006              Location:          Vial 84
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.979	PBA	277086.1	5.0000	CLO4-89-ISTD

=====
\*\*\* End of Report \*\*\*

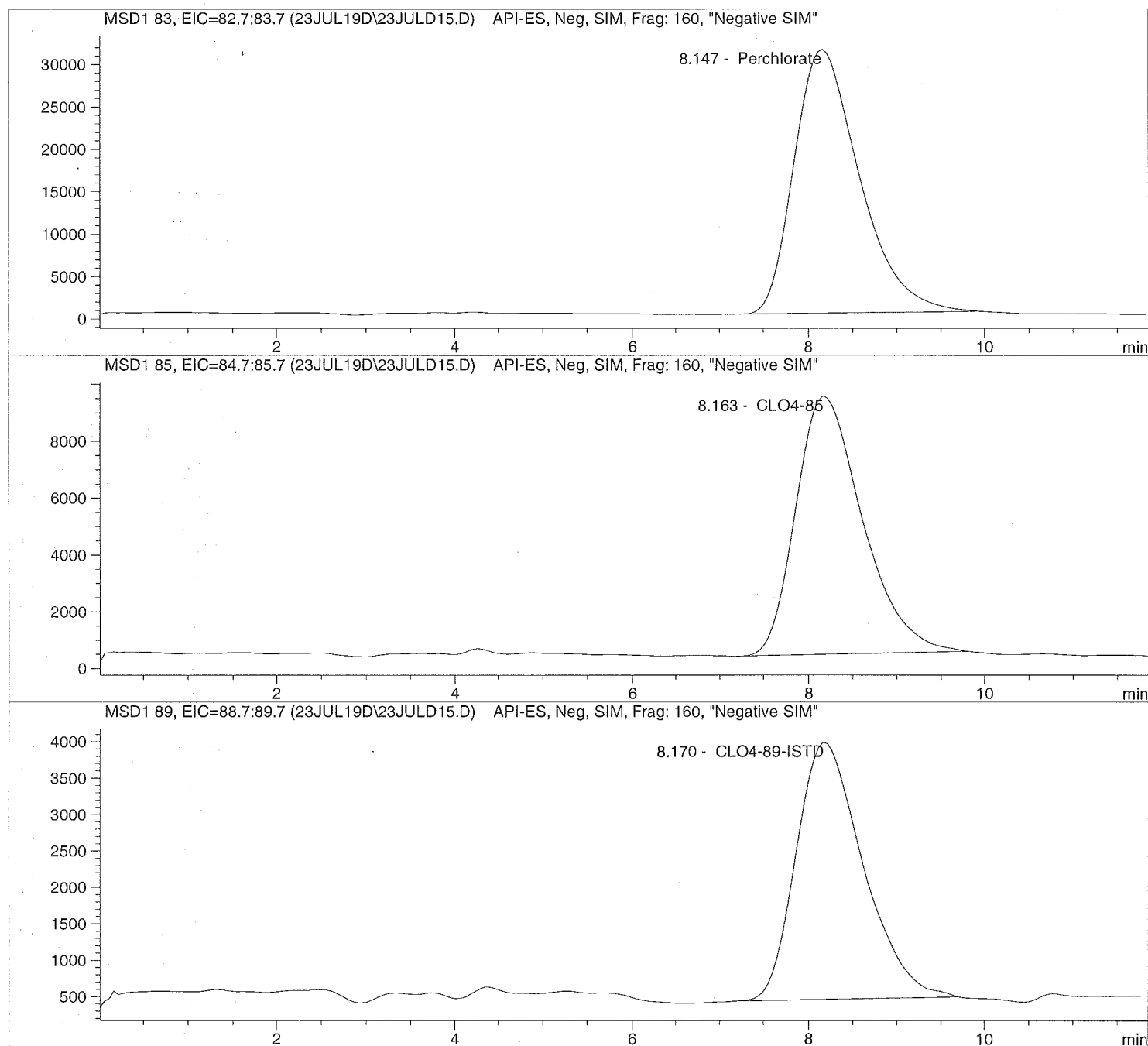


Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD15.D Sample Name: 664926 CCV@25

=====  
Injection Date: 7/23/2019 11:49:04 Seq Line: 15  
Sample Name: 664926 CCV@25 Location: Vial 71  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====



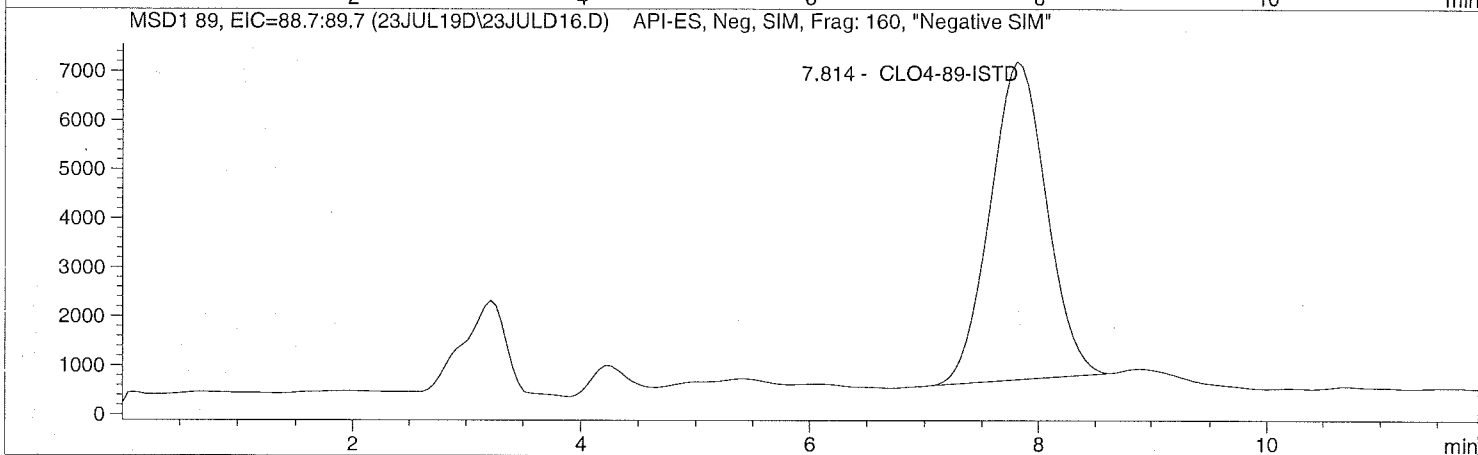
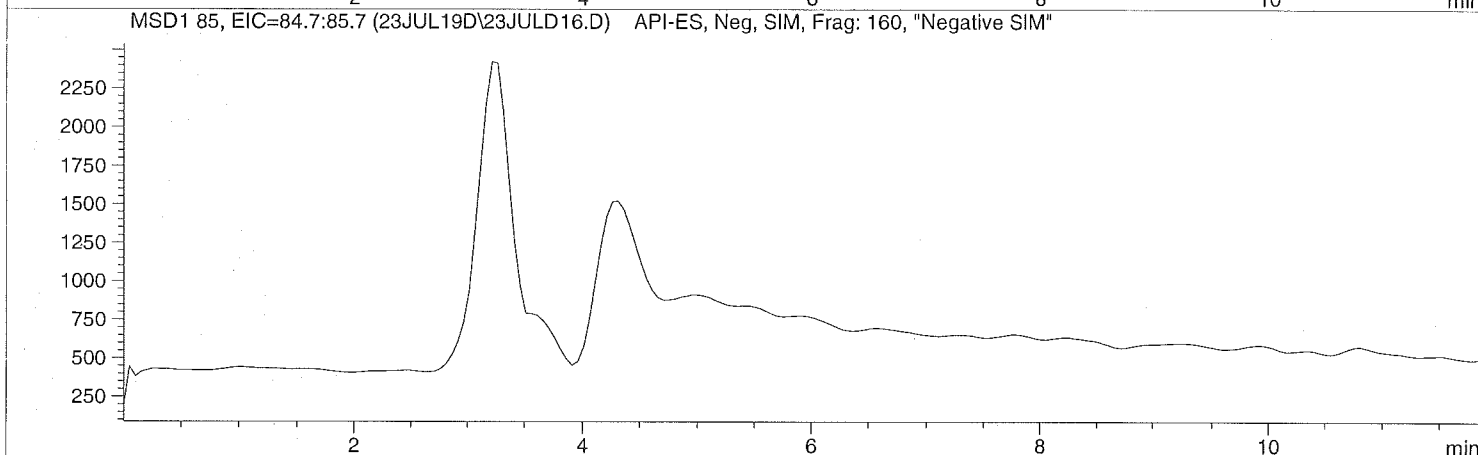
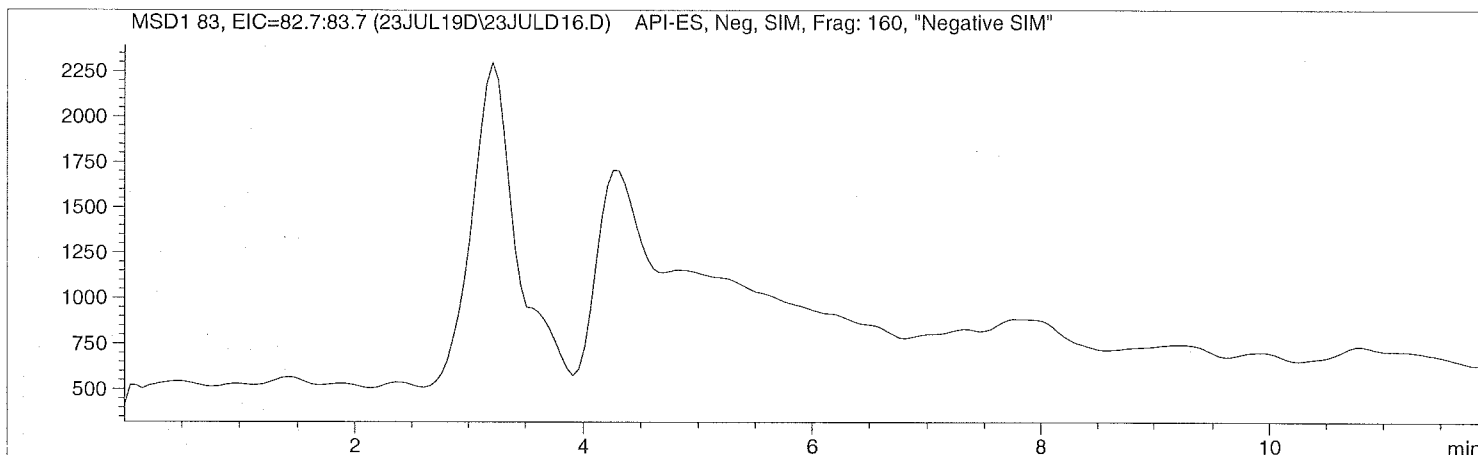


Injection Date: 7/23/2019 12:03:02  
Sample Name: 1920571001  
Acq Operator: TNB

Seq Line: 16  
Location: Vial 85  
Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date: 7/23/2019 12:03:02      Seq Line:          16
Sample Name:    1920571001              Location:          Vial 85
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
=====
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
=====
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

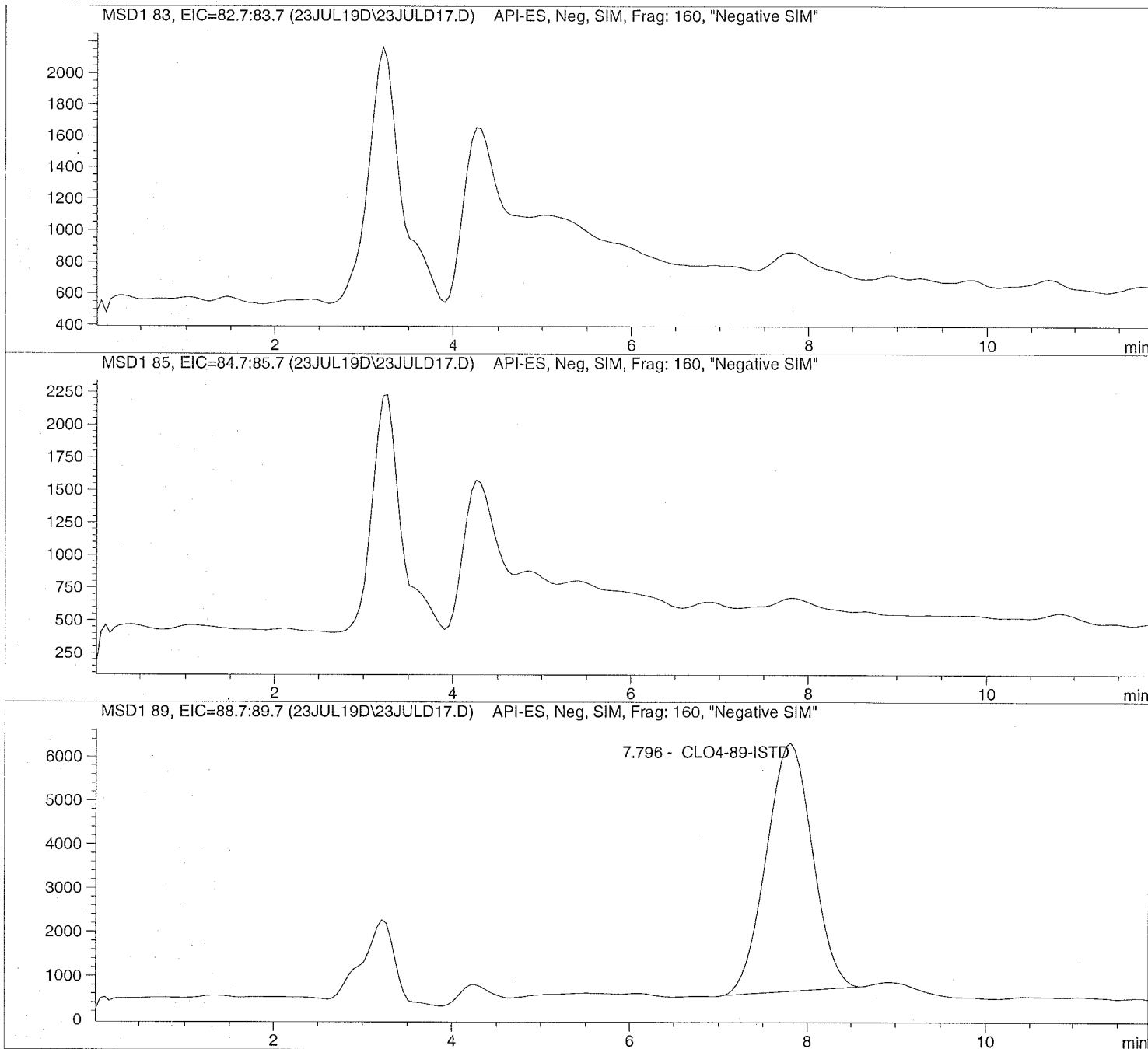
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.814	PBA	224656.6	5.0000	CLO4-89-ISTD

=====
\*\*\* End of Report \*\*\*
=====

=====  
Injection Date: 7/23/2019 12:16:58                   Seq Line:                   17  
Sample Name: 1920572001                            Location:                   Vial 86  
Acq Operator: TNB                                    Inj. No.:                   1  
  Inj. Vol.:                   35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



```
=====
Injection Date: 7/23/2019 12:16:58      Seq Line: 17
Sample Name: 1920572001                Location: Vial 86
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 35 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.796	PBA	204102.5	5.0000	CLO4-89-ISTD

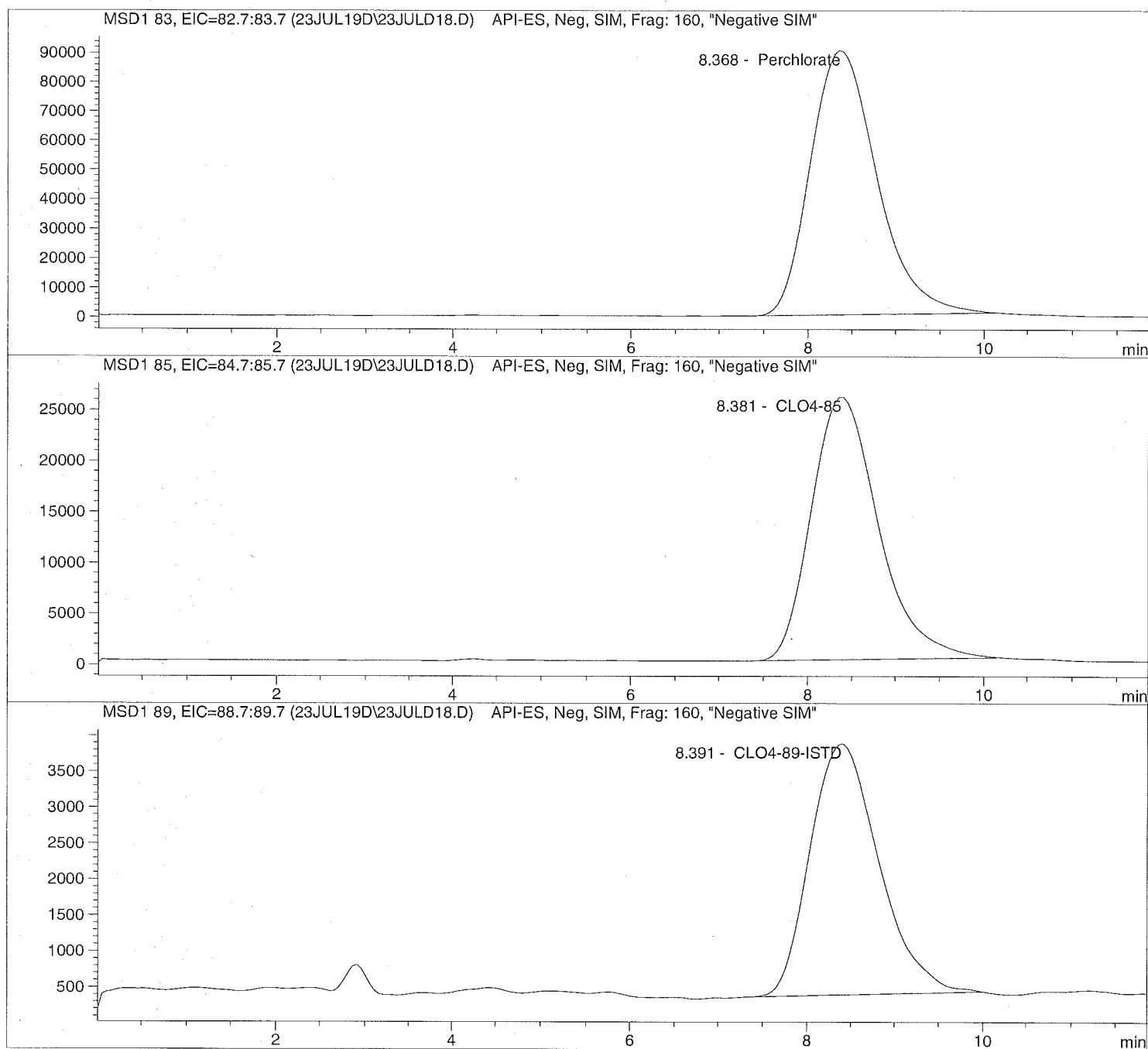
=====
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD18.D Sample Name: 1920581001 100

=====  
Injection Date: 7/23/2019 12:30:57 Seq Line: 18  
Sample Name: 1920581001 100 Location: Vial 87  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====



Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD18.D Sample Name: 1920581001 100

```
=====
Injection Date: 7/23/2019 12:30:57      Seq Line:      18
Sample Name:    1920581001 100          Location:      Vial 87
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    35 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
```

Perchlorate analysis

=====

Sample Information

=====

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       100.000000
Sample Amount:  0.000
```

=====

LCMS Results

=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.368	PBA	4742469.5	6892.8927	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.381	PBA	1372874.8	6775.2203	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.391	PBA	190565.5	500.0000	CLO4-89-ISTD

=====

\*\*\* End of Report \*\*\*

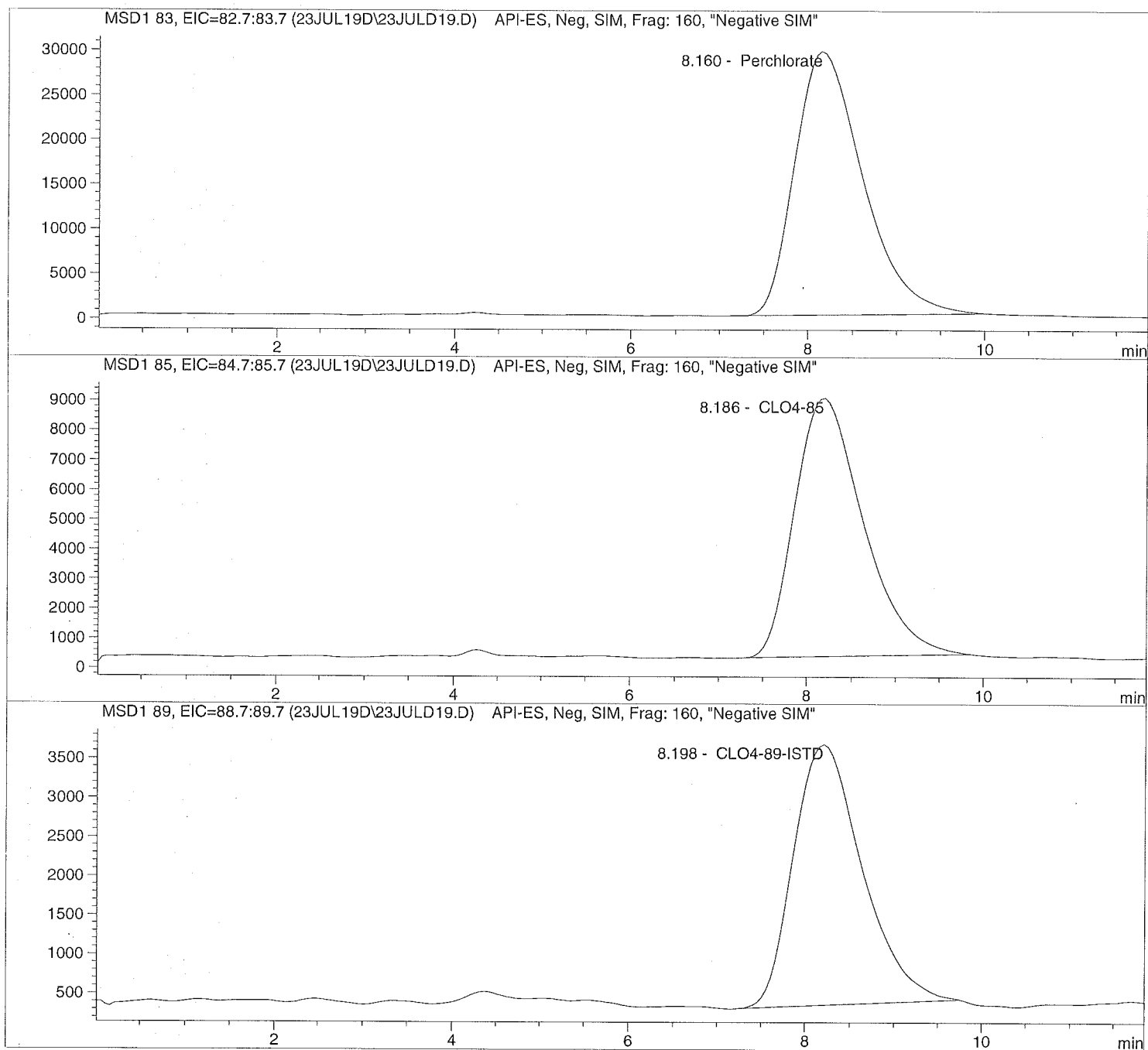


Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD19.D Sample Name: 664927 CCV025

Injection Date: 7/23/2019 12:44:47 Seq Line: 19  
Sample Name: 664927 CCV025 Location: Vial 71  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis







**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

## **Initial Calibration**

=====  
 Calibration Table  
 =====

Perchlorate

Calib. Data Modified : 3/19/2019 2:35:19 PM  
 Calculate : Internal Standard  
 Based on : Peak Area  
 Rel. Reference Window : 20.000 %  
 Abs. Reference Window : 0.000 min  
 Rel. Non-ref. Window : 20.000 %  
 Abs. Non-ref. Window : 0.000 min  
 Use Multiplier & Dilution Factor with ISTDs  
 Uncalibrated Peaks : not reported  
 Partial Calibration : No recalibration if peaks missing  
 Curve Type : Quadratic (some peaks differ, see below)  
 Origin : Ignored (some peaks differ, see below)  
 Weight : Linear (Amnt) (some peaks differ, see below)  
 Recalibration Settings:  
 Average Response : Average all calibrations  
 Average Retention Time: Floating Average New 75%

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

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

#	ISTD Amount	Name
1	5.00000	CLO4-89-ISTD

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

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp	Name
8.744	1 1	1.00000	7.76074e4	1.28854e-5	1	Perchlorate
	2	2.00000	1.35273e5	1.47849e-5		
	3	5.00000	3.37764e5	1.48033e-5		
	4	10.00000	6.83454e5	1.46316e-5		
	5	25.00000	2.08433e6	1.19943e-5		
	6	50.00000	4.13334e6	1.20968e-5		
	7	75.00000	5.99313e6	1.25143e-5		
8.755	2 1	1.00000	2.36780e4	4.22333e-5	1	CLO4-85
	2	2.00000	4.69486e4	4.25998e-5		
	3	5.00000	1.06124e5	4.71147e-5		
	4	10.00000	2.13523e5	4.68335e-5		
	5	25.00000	6.14295e5	4.06971e-5		
	6	50.00000	1.19814e6	4.17315e-5		
	7	75.00000	1.78355e6	4.20509e-5		
8.766	3 1	5.00000	2.73208e5	1.83011e-5	+I1	CLO4-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5		
	3	5.00000	2.33196e5	2.14412e-5		
	4	5.00000	2.34454e5	2.13262e-5		
	5	5.00000	2.50568e5	1.99547e-5		
	6	5.00000	2.30977e5	2.16472e-5		

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

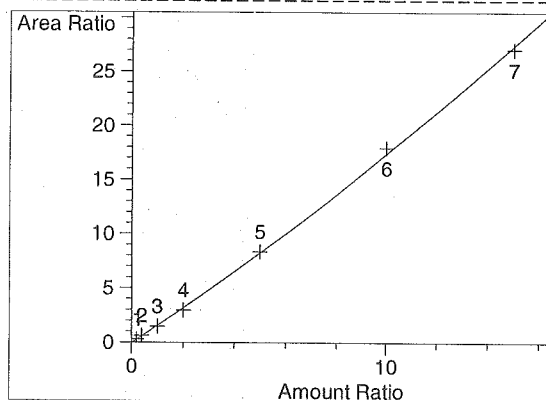
Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min  
 Curve Type : Linear  
 Origin : Included  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

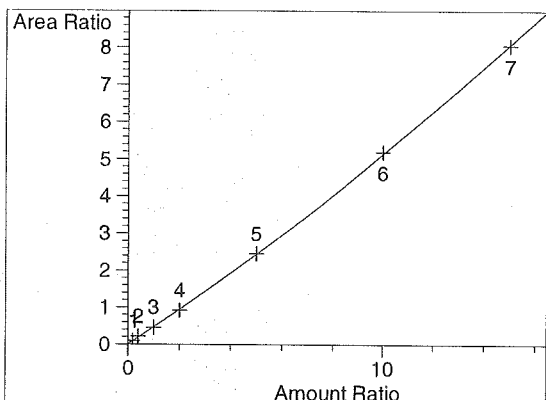
=====  
 Peak Sum Table  
 =====

\*\*\*No Entries in table\*\*\*  
 =====

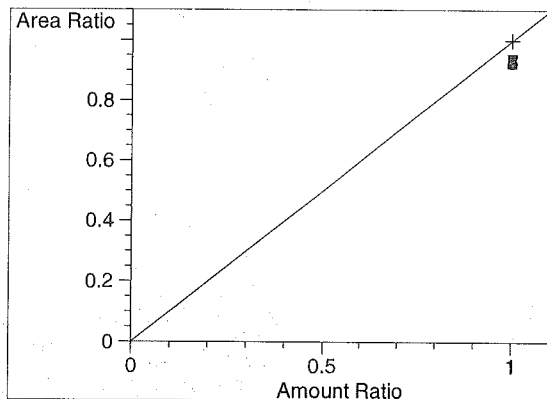
=====  
 Calibration Curves  
 =====



Perchlorate at exp. RT: 8.744  
 MSD1 83, EIC=82.7:83.7  
 Correlation: 0.99957  
 Residual Std. Dev.: 0.30744  
 Formula:  $y = ax^2 + bx + c$   
 a: 1.76988e-2  
 b: 1.56480  
 c: -4.92430e-2  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755  
 MSD1 85, EIC=84.7:85.7  
 Correlation: 0.99983  
 Residual Std. Dev.: 0.03473  
 Formula:  $y = ax^2 + bx + c$   
 a: 5.13396e-3  
 b: 4.62055e-1  
 c: 4.97209e-4  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766  
 MSD1 89, EIC=88.7:89.7  
 Correlation: 1.00000  
 Residual Std. Dev.: 0.00000  
 Formula:  $y = mx + b$   
 m: 1.00000  
 b: 0.00000  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

## Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

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

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	7.76074e4	8.744	1.06245
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	8.992	2.06969
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	8.586	4.73474
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	8.698	9.27727
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	8.451	25.29036
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	8.810	51.36844
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	8.586	74.16754
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	8.702	9.25940

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	8.755	9.30535e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	9.012	2.24255
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	8.602	4.86656
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	8.713	9.64312
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	8.468	25.12159
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	8.825	50.46721
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	8.603	74.72019
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	8.721	9.54024

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.73208e5	8.766	5.00000
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	9.012	5.00000
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	8.609	5.00000
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	8.716	5.00000
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	8.472	5.00000
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	8.825	5.00000
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	8.610	5.00000
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	8.725	5.00000

\*\*\* End of Report \*\*\*

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\MAR\19MAR19I.S

## Sequence Table:

## Method and Injection Info Part:

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



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

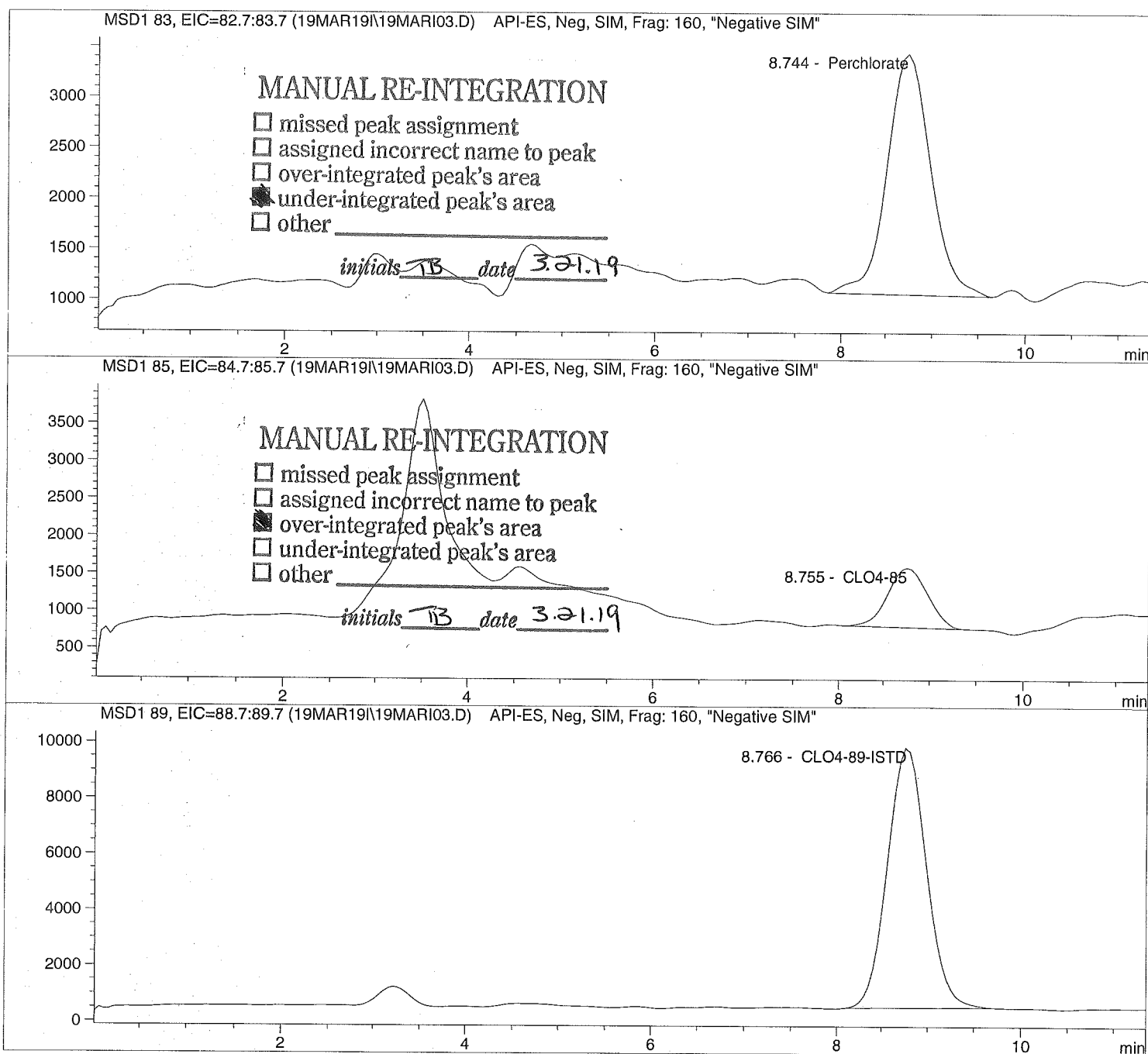
Inj. Vol.: 30 µl

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

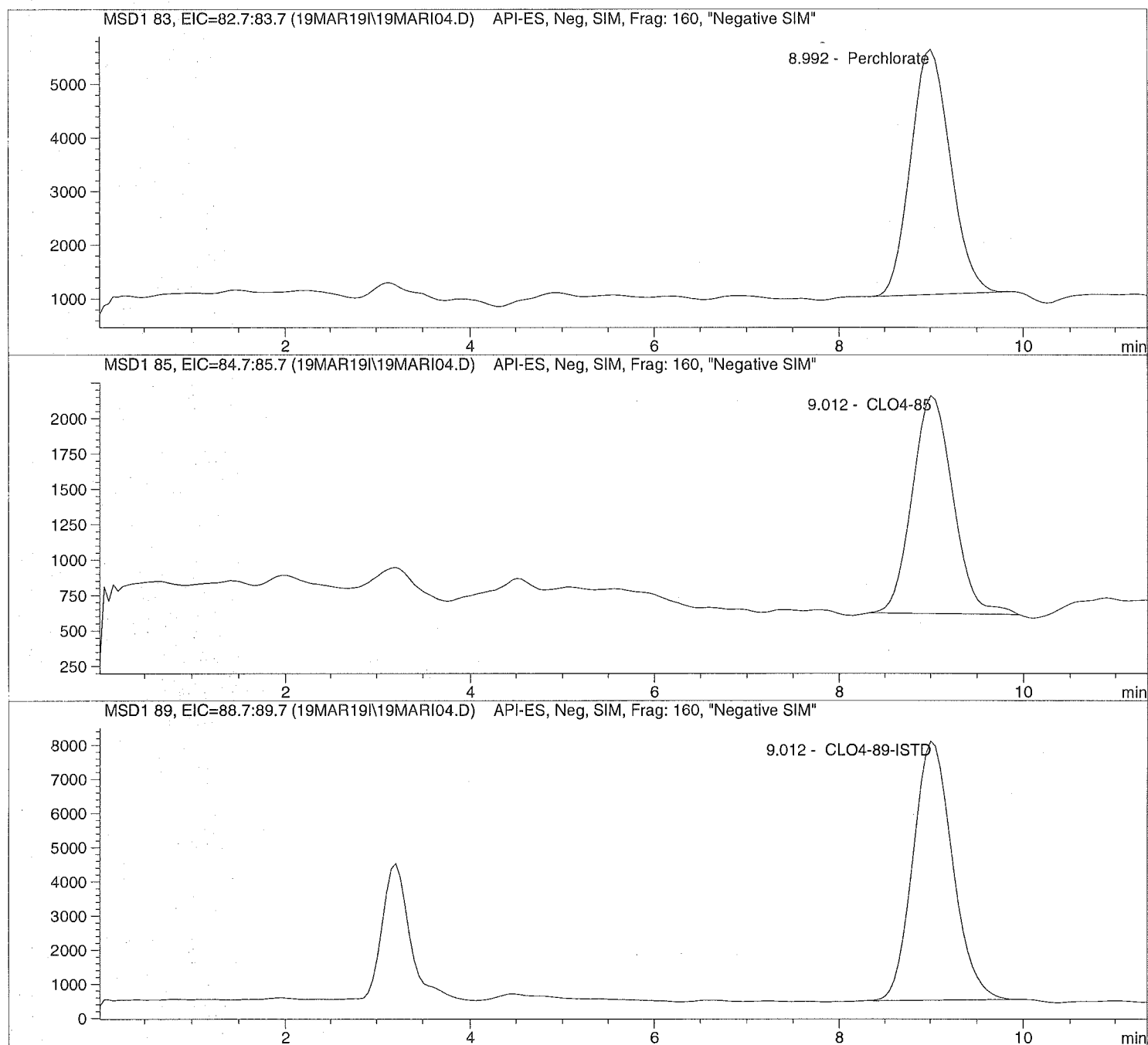
Inj. Vol.: 30 µl

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\19MAR19\19MARI05.D

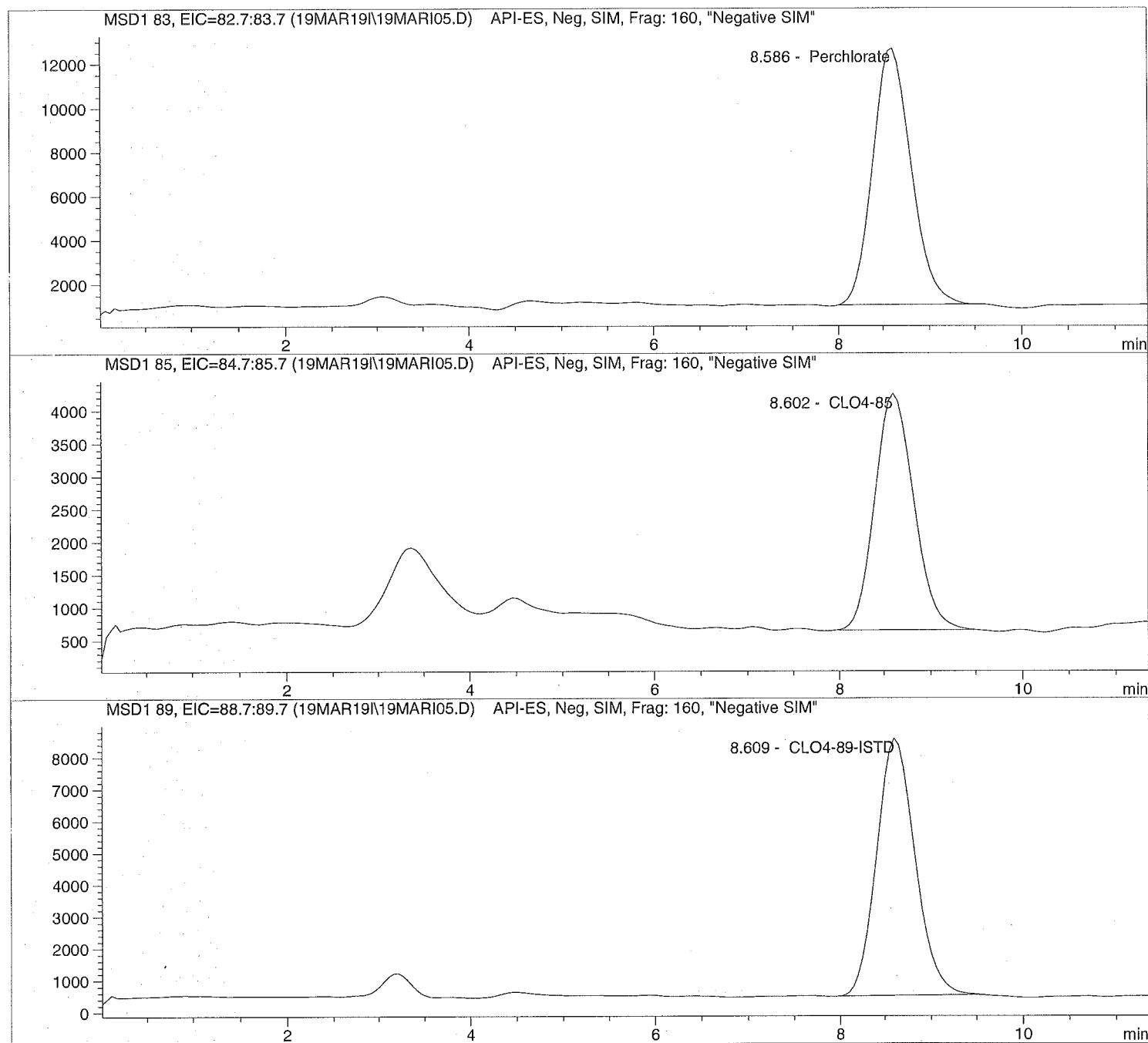
Sample Name: CLO4@ 5.0ug/L

Injection Date: 3/19/2019 10:06:16  
Sample Name: CLO4@ 5.0ug/L  
Acq Operator: TNB

Seq Line: 5  
Location: Vial 75  
Inj. No.: 1  
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI05.D Sample Name: CLO4@ 5.0ug/L

```

=====
Injection Date: 3/19/2019 10:06:16      Seq Line:          5
Sample Name:    CLO4@ 5.0ug/L           Location:          Vial 75
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:       30 µl
  
```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
  
```

Perchlorate analysis

Sample Information

```

Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  5.000
  
```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

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

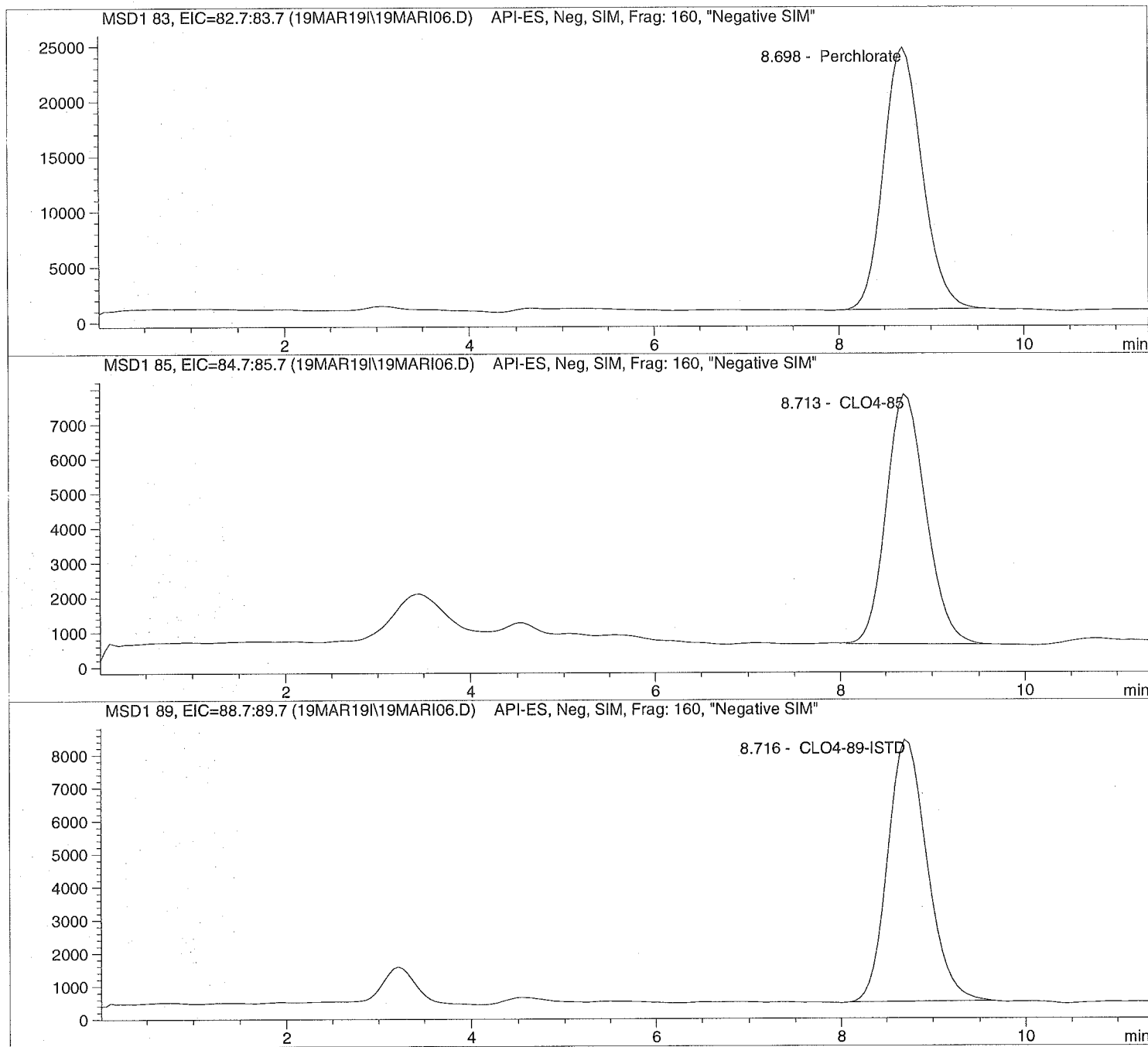
\*\*\* End of Report \*\*\*

Injection Date: 3/19/2019 10:19:32  
Sample Name: CLO4@ 10.ug/L  
Acq Operator: TNB

Seq Line: 6  
Location: Vial 76  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```

=====
Injection Date: 3/19/2019 10:19:32      Seq Line:          6
Sample Name:    CLO4@ 10.ug/L           Location:          Vial 76
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        30 µl

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  10.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.698	PBA	683454.4	9.2773	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

```

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

```

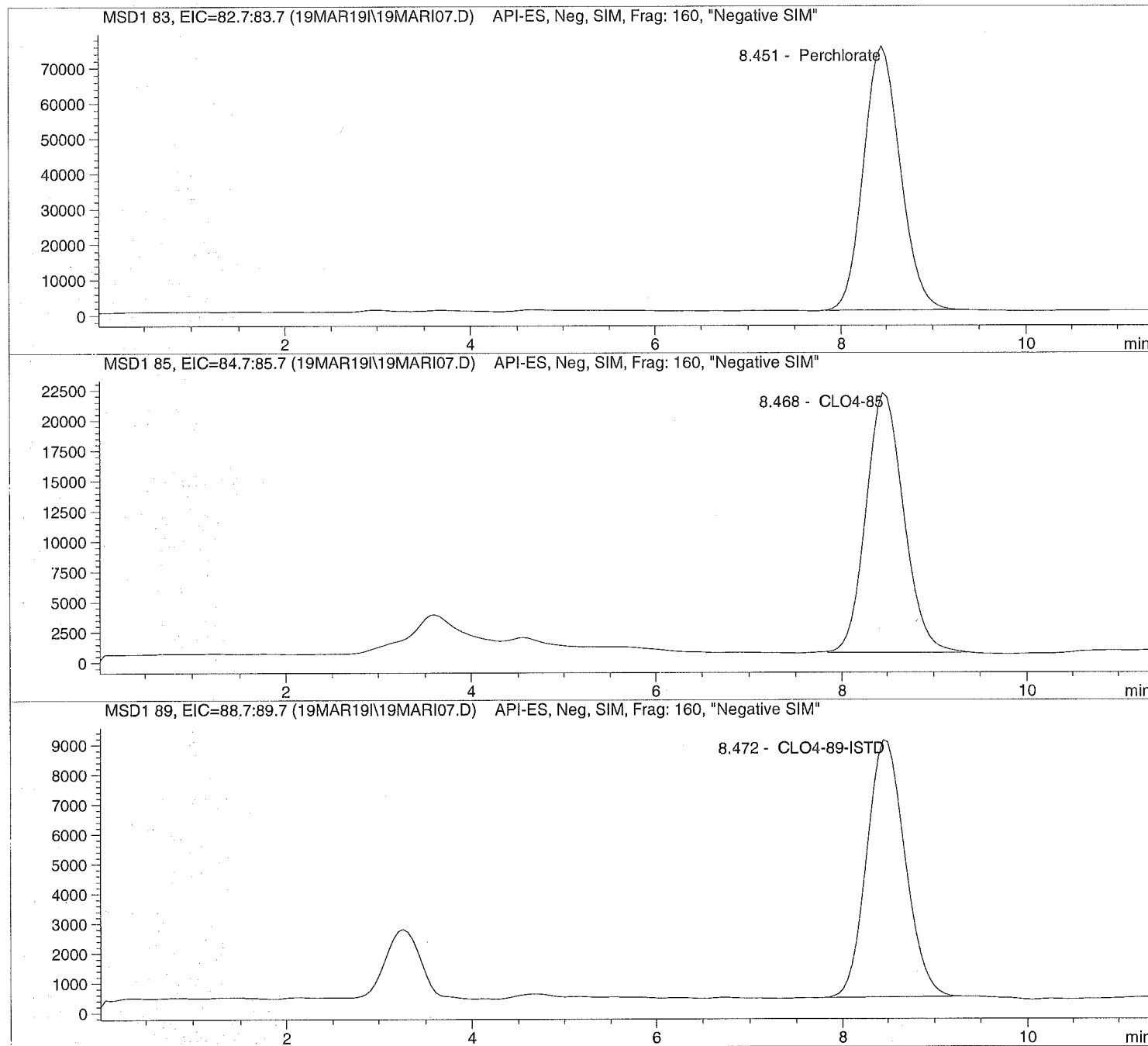


Injection Date: 3/19/2019 10:32:49  
Sample Name: CLO4@ 25.ug/L  
Acq Operator: TNB

Seq Line: 7  
Location: Vial 77  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



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

```

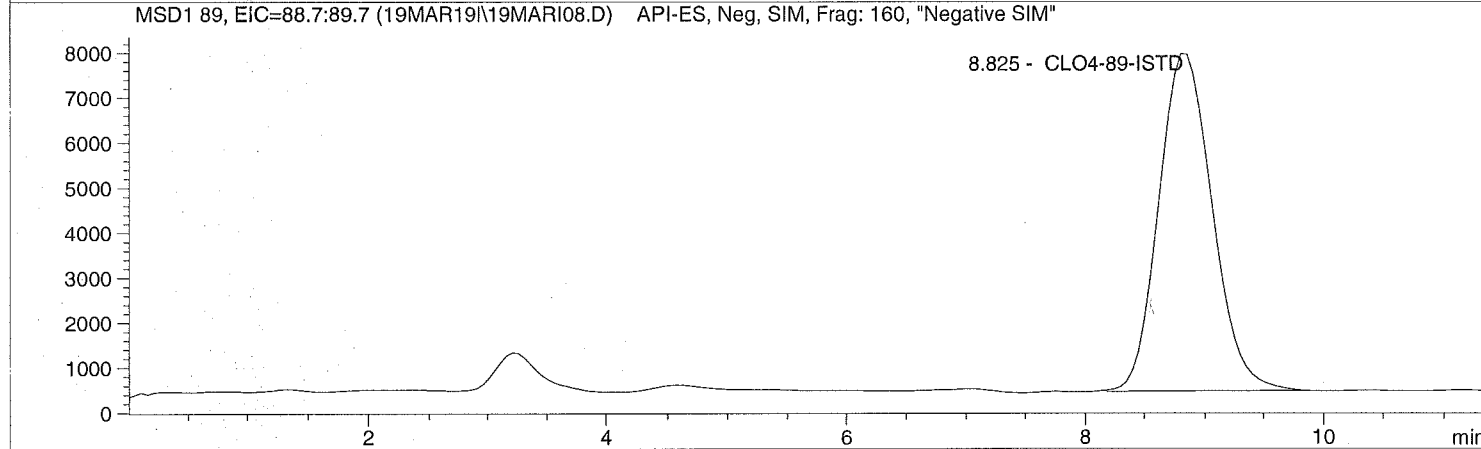
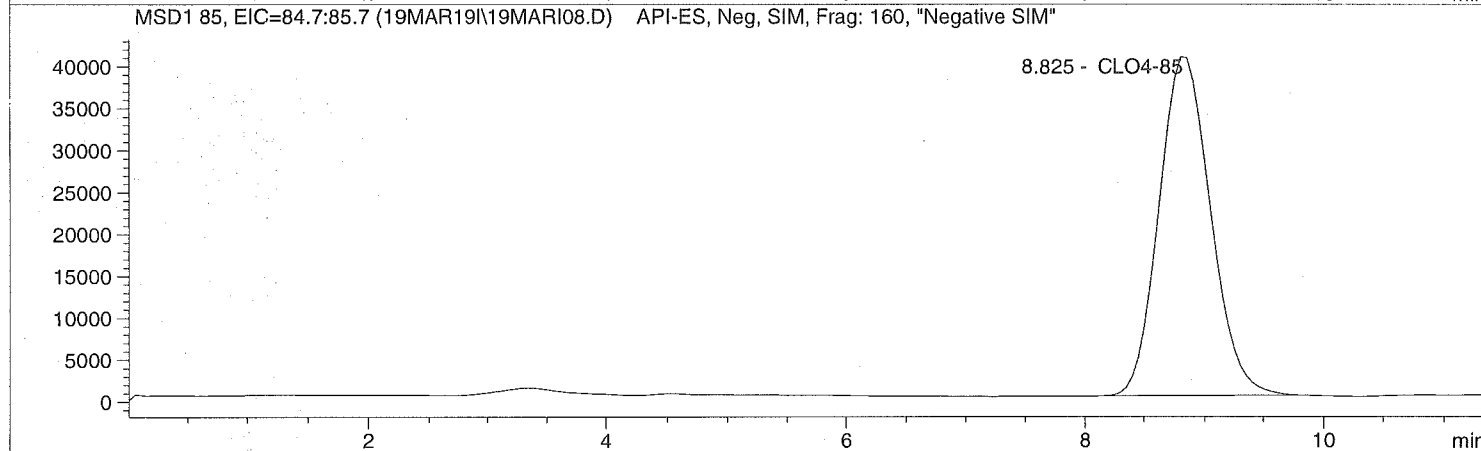
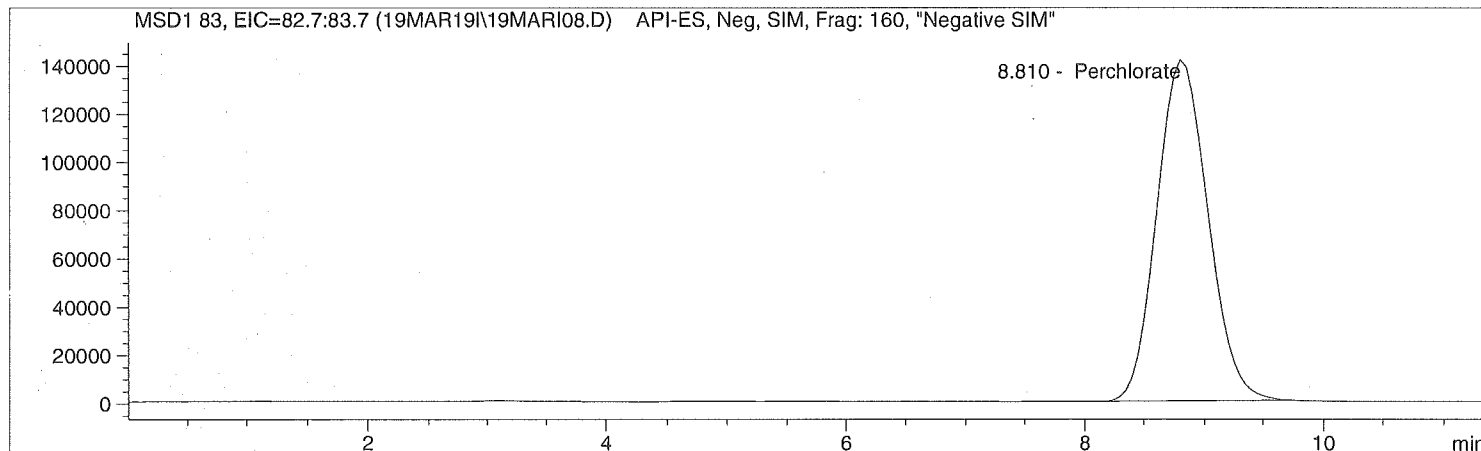
=====
*** End of Report ***
=====

```

=====  
Injection Date: 3/19/2019 10:46:05 Seq Line: 8  
Sample Name: CLO4@ 50.ug/L Location: Vial 78  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis  
=====



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI08.D Sample Name: CLO4@ 50.ug/L

```
=====
Injection Date: 3/19/2019 10:46:05      Seq Line:      8
Sample Name:    CLO4@ 50.ug/L           Location:      Vial 78
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    30 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
```

Perchlorate analysis

Sample Information

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  50.000
```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.810	PBA	4133340.5	51.3684	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

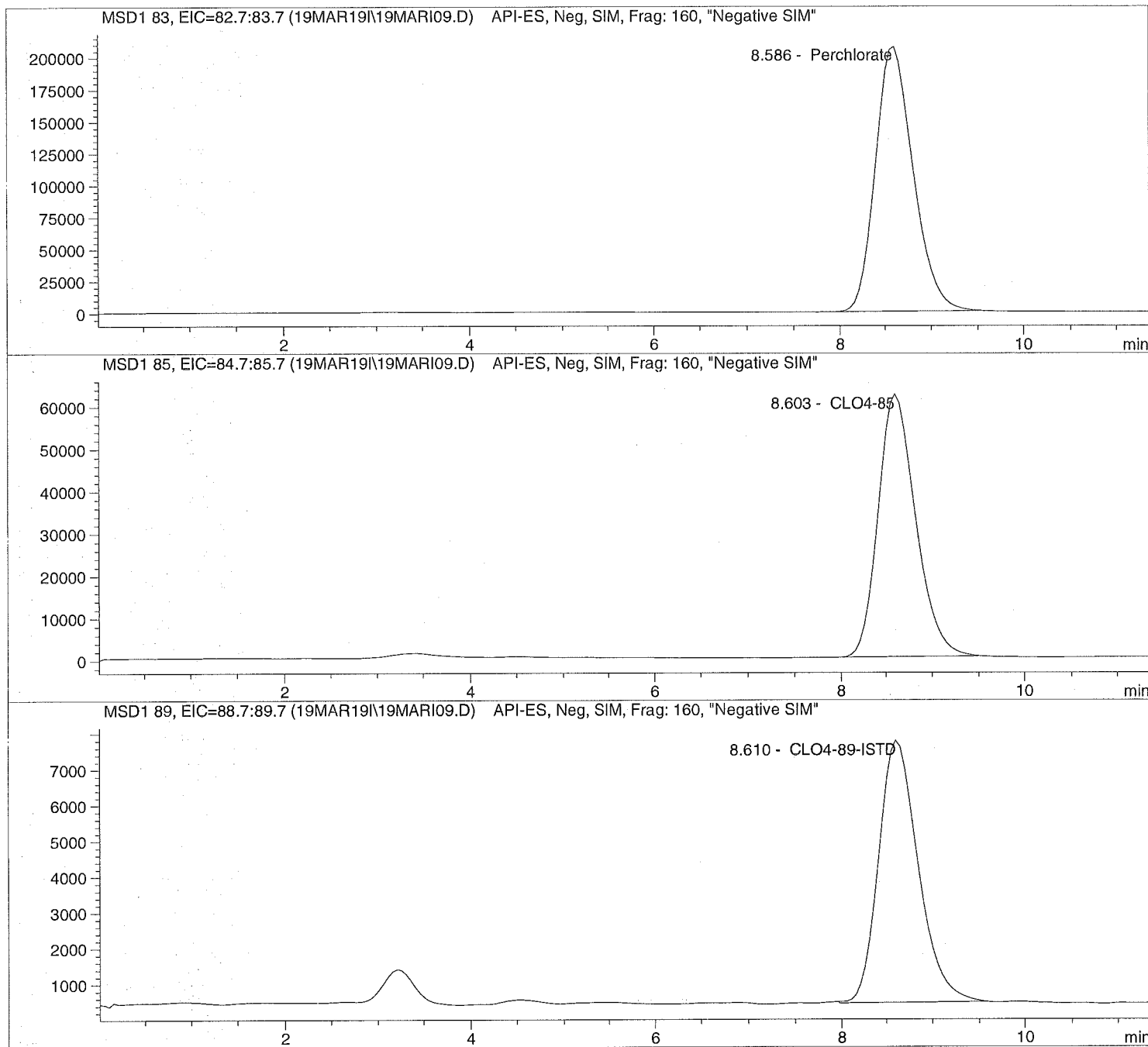
\*\*\* End of Report \*\*\*

Injection Date: 3/19/2019 10:59:22  
Sample Name: CLO4@ 75.ug/L  
Acq Operator: TNB

Seq Line: 9  
Location: Vial 79  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI09.D Sample Name: CLO4@ 75.ug/L

```

=====
Injection Date: 3/19/2019 10:59:22      Seq Line:          9
Sample Name:    CLO4@ 75.ug/L           Location:          Vial 79
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        30 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  75.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D

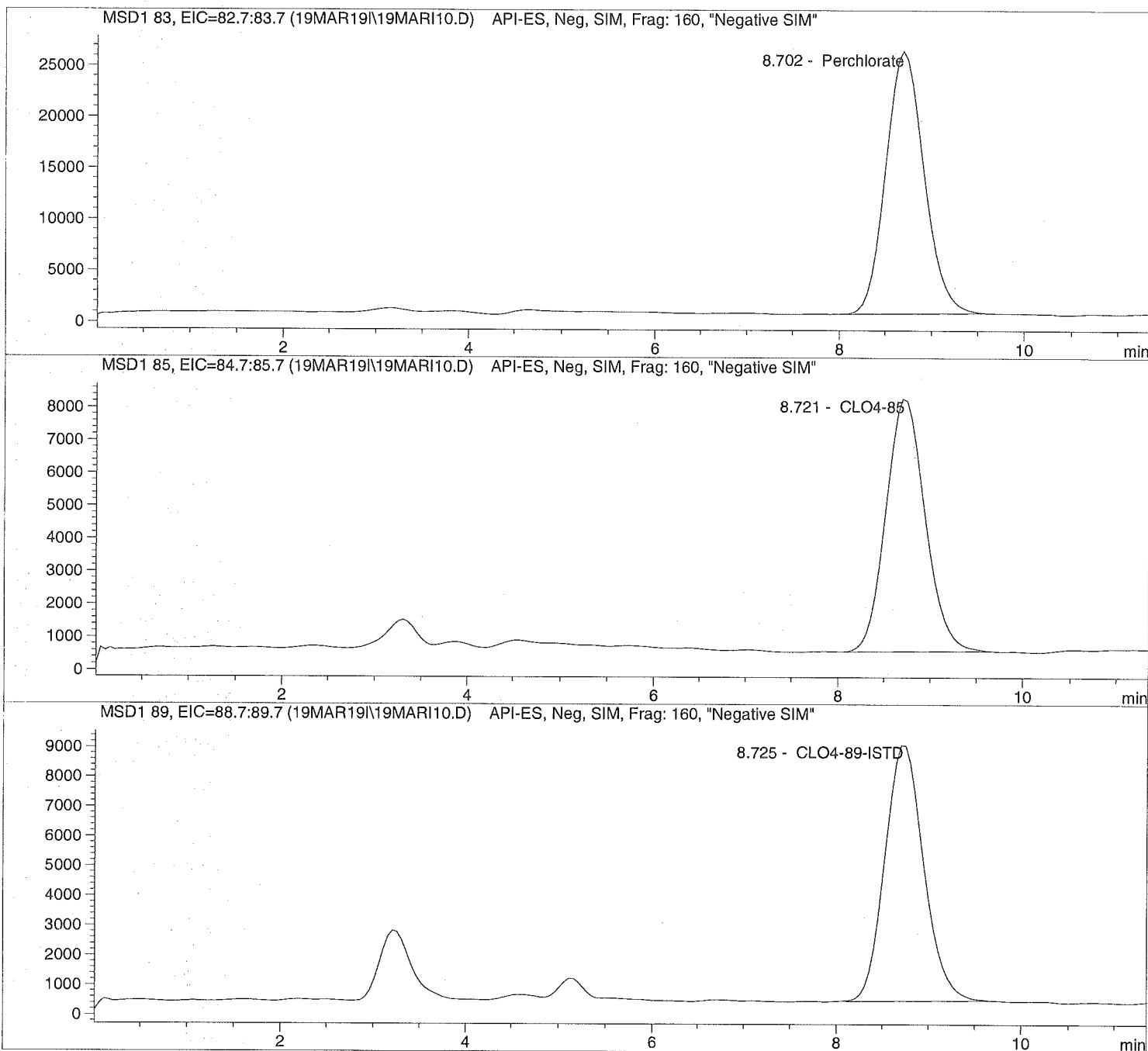
Sample Name: ICAL Verf@10ug/L

=====  
Injection Date: 3/19/2019 11:12:42  
Sample Name: ICAL Verf@10ug/L  
Acq Operator: TNB

=====  
Seq Line: 10  
Location: Vial 80  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D      Sample Name: ICAL Verf@10ug/L

```

=====
Injection Date: 3/19/2019 11:12:42      Seq Line:            10
Sample Name:    ICAL Verf@10ug/L          Location:            Vial 80
Acq Operator:   TNB                        Inj. No.:            1
                                             Inj. Vol.:           30 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:                    Signal
Calib. Data Modified:      Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:                1.000000
Dilution:                  1.000000
Sample Amount:             10.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*





**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

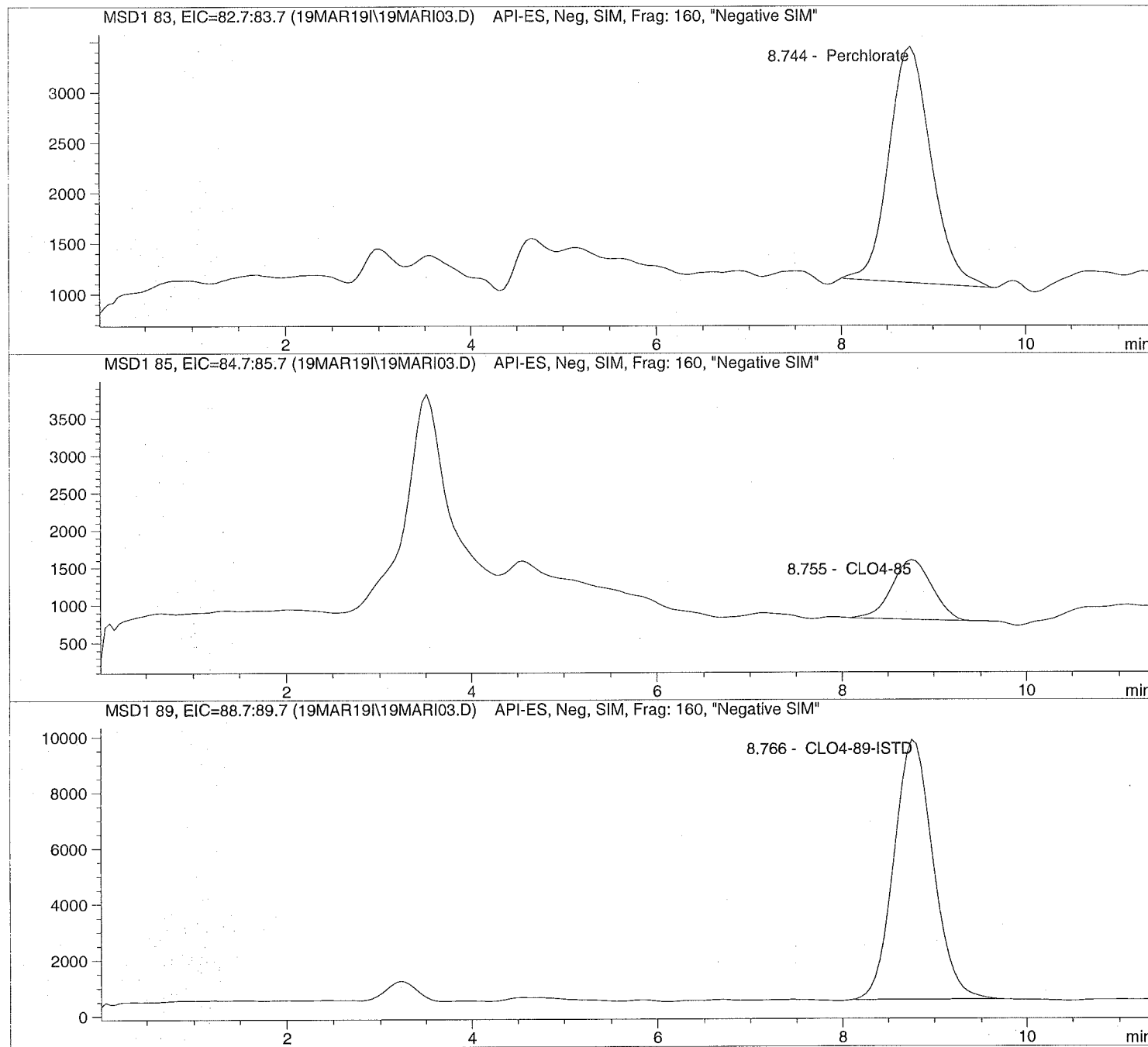
## **Unmodified**

Injection Date: 3/19/2019 09:39:40  
Sample Name: CLO4@ 1.0ug/L  
Acq Operator: TNB

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

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:38:25

Perchlorate analysis



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

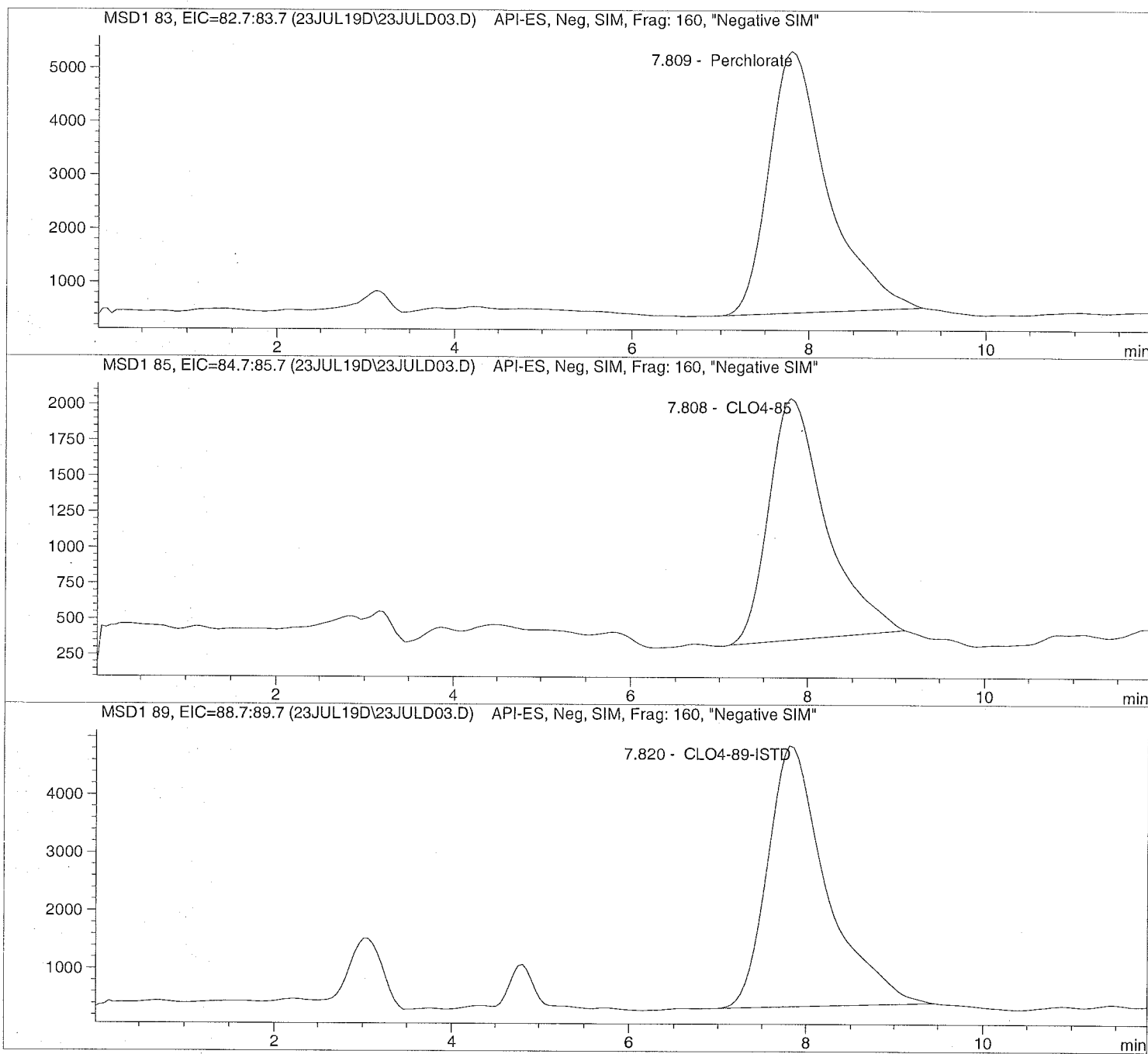
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\23JUL19D\23JULD03.D Sample Name: 664921 ICS@4.0

=====  
Injection Date: 7/23/2019 09:01:39 Seq Line: 3  
Sample Name: 664921 ICS@4.0 Location: Vial 73  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 35  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis  
=====







---

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

August 07, 2019

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

Work Order: **HS19071160**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia,

ALS Environmental received 2 sample(s) on Jul 24, 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval scribble.

Generated By: JUMOKE.LAWAL  
RJ Modashia  
Project Manager

ALS Houston, US

Date: 07-ago-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19071160

**SAMPLE SUMMARY**

---

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19071160-01	LH18/24-SP650_072319	Water		23-Jul-2019 14:00	24-Jul-2019 08:42	<input type="checkbox"/>
HS19071160-02	LH18/24-SP650_072319_BIX	Water		23-Jul-2019 14:00	24-Jul-2019 08:42	<input type="checkbox"/>

---

**ALS Houston, US**

Date: 07-Aug-19

**Client:** Bhate Environmental Associates, Inc.**CASE NARRATIVE****Project:** Longhorn GW Treatment Plant**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 Kelso, WA. Final report attached.

---

**WetChemistry by Method E365.3****Batch ID: R343302**

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

---

**WetChemistry by Method E350.3****Batch ID: R343234**

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



## ALS Houston, US

Date: 07-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_072319  
 Collection Date: 23-Jul-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19071160  
 Lab ID:HS19071160-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>								Analyst: MZD
	<b>Method:E350.3</b>							
Nitrogen, Ammonia (As N)	9.2		0.20	0.20	0.20	mg/L	1	29-Jul-2019 16:30
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3</b>								Analyst: MZD
	<b>Method:E365.3</b>							
Phosphorus, Total Orthophosphate (As P)	2.68		0.100	0.250	0.250	mg/L	10	25-Jul-2019 11:25
<b>SUBCONTRACT ANALYSIS - TOC ANALYSIS</b>								Analyst: SUBK
	<b>Method:NA</b>							
Subcontract Analysis	See Attached		0	0		NA	1	07-Aug-2019 18:05

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

## ALS Houston, US

Date: 07-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_072319\_BIX  
 Collection Date: 23-Jul-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19071160  
 Lab ID:HS19071160-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>		Analyst: SUB				
Subcontract Analysis	See Attached		0	0		NA	1	01-Aug-2019 18:58

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

ALS Houston, US

Date: 07-ago-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071160

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R343234 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS19071160-01	LH18/24-SP650_072319	23 Jul 2019 14:00			29 Jul 2019 16:30	1
<b>Batch ID:</b> R343302 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3			<b>Matrix:</b> Water	
HS19071160-01	LH18/24-SP650_072319	23 Jul 2019 14:00			25 Jul 2019 11:25	10
<b>Batch ID:</b> R343509 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS19071160-02	LH18/24-SP650_072319_BIX	23 Jul 2019 14:00			01 Aug 2019 18:58	1
<b>Batch ID:</b> R343844 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - TOC ANALYSIS			<b>Matrix:</b> Water	
HS19071160-01	LH18/24-SP650_072319	23 Jul 2019 14:00			07 Aug 2019 18:05	1

ALS Houston, US

Date: 07-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071160

**QC BATCH REPORT**

Batch ID:	R343234 ( 0 )	Instrument:	WetChem_HS	Method:	AMMONIA AS N BY E350.3(ISE)					
<b>MBLK</b>	Sample ID: <b>MBLK-343234</b>	Units:	mg/L	Analysis Date:	<b>29-Jul-2019 16:30</b>					
Client ID:	Run ID: <b>WetChem_HS_343234</b>	SeqNo:	<b>5185263</b>	PrepDate:	DF: <b>1</b>					
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
<b>LCS</b>	Sample ID: <b>LCS-343234</b>	Units:	mg/L	Analysis Date:	<b>29-Jul-2019 16:30</b>					
Client ID:	Run ID: <b>WetChem_HS_343234</b>	SeqNo:	<b>5185264</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.67	0.20	10	0	107	80 - 120				
<b>MS</b>	Sample ID: <b>HS19071066-02MS</b>	Units:	mg/L	Analysis Date:	<b>29-Jul-2019 16:30</b>					
Client ID:	Run ID: <b>WetChem_HS_343234</b>	SeqNo:	<b>5185266</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	9.28	0.20	10	0.376	89.0	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19071066-02MSD</b>	Units:	mg/L	Analysis Date:	<b>29-Jul-2019 16:30</b>					
Client ID:	Run ID: <b>WetChem_HS_343234</b>	SeqNo:	<b>5185267</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10	0.20	10	0.376	96.2	80 - 120	9.28	7.47	20	

The following samples were analyzed in this batch: HS19071160-01

ALS Houston, US

Date: 07-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071160

**QC BATCH REPORT**

Batch ID:	R343302 ( 0 )	Instrument:	UV-2450	Method:	ORTHO PHOSPHATE (PO4) AS P BY E365.3					
<b>MBLK</b>	Sample ID: <b>MBLK-343302</b>	Units: <b>mg/L</b>		Analysis Date: <b>25-Jul-2019 11:25</b>						
Client ID:	Run ID: <b>UV-2450_343302</b>	SeqNo: <b>5187198</b>		PrepDate:		DF: <b>1</b>				
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	
<b>LCS</b>	Sample ID: <b>LCS-343302</b>	Units: <b>mg/L</b>		Analysis Date: <b>25-Jul-2019 11:25</b>						
Client ID:	Run ID: <b>UV-2450_343302</b>	SeqNo: <b>5187199</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.239	0.0250	0.25	0	95.6	85 - 115				
<b>LCSD</b>	Sample ID: <b>LCSD-343302</b>	Units: <b>mg/L</b>		Analysis Date: <b>25-Jul-2019 11:25</b>						
Client ID:	Run ID: <b>UV-2450_343302</b>	SeqNo: <b>5189069</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.24	0.0250	0.25	0	96.0	85 - 115	0.239	0.418	20	
<b>MS</b>	Sample ID: <b>HS19071230-03MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>25-Jul-2019 11:25</b>						
Client ID:	Run ID: <b>UV-2450_343302</b>	SeqNo: <b>5187201</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.249	0.0250	0.25	0.008	96.4	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19071230-03MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>25-Jul-2019 11:25</b>						
Client ID:	Run ID: <b>UV-2450_343302</b>	SeqNo: <b>5187202</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.249	0.0250	0.25	0.008	96.4	80 - 120	0.249	0	20	

The following samples were analyzed in this batch: HS19071160-01

**ALS Houston, US**

Date: 07-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071160

**QUALIFIERS,  
ACRONYMS, UNITS**

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

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

---

**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

ALS Houston, US

Date: 07-ago-19

**Client:** Bhate Environmental Associates, Inc.**Project:** Longhorn GW Treatment Plant**Work Order:** HS19071160**SAMPLE TRACKING**

---

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19071160-01	LH18/24-SP650_072319	Login	24/07/2019 10:52:22	NDR	WET273
HS19071160-01	LH18/24-SP650_072319	Login	24/07/2019 10:52:22	NDR	WET273
HS19071160-01	LH18/24-SP650_072319	Login	24/07/2019 10:52:22	NDR	Sub
HS19071160-02	LH18/24-SP650_072319_BIX	Login	24/07/2019 10:52:22	NDR	Sub

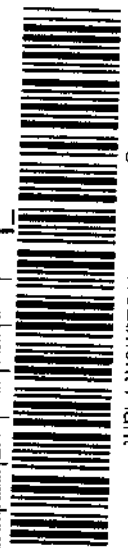
---





**CHAIN OF CUSTODY**

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

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001			<b>Analyses</b>										Remarks (Preservatives, etc.)		Bnate Environmental Associates, Inc. Longhorn GW Treatment Plant	<b>HS19071160</b>
<b>Job:</b> GROUNDWATER TREATMENT PLANT WEEKLY SAMPLES			MS / MSD No. OF CONTAINERS	AMMONIA-N TOTAL ORGANIC CARBON ORTHO-PHOSPHATE PERCHLORATE															
<b>Prepared By:</b> Scott Beesinger		P.O. Number																	
Field Sample I.D.	Sample Matrix	Date / Time																	
LH18/24-SP650_072319	Water	07/23/19 / 14:00	2	X	X												H2SO4		
LH18/24-SP650_072319	Water	07/23/19 / 14:00	1			X											NONE		
LH18/24-SP650_072319_BIX	Water	07/23/19 / 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
<i>Scott Beesinger</i>	07/23/19	14:30	<i>[Signature]</i>	7/24/19	08:42						

<b>For Lab Use Only</b>									
Received At Lab By:	Date	Time	Airbill No.	Opened By:	Date	Time	Temp of Container	Seal No.	Condition
<b>Remarks:</b>									

2555  
 330  
 #21  
 cl-0.0





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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

August 07, 2019

**Analytical Report for Service Request No: K1906842**

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

**RE: HS19071160**

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory July 25, 2019  
For your reference, these analyses have been assigned our service request number **K1906842**.

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](http://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](mailto:Kelley.Lovejoy@alsglobal.com).

Respectfully submitted,

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

For Kelley Lovejoy  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
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[www.alsglobal.com](http://www.alsglobal.com)

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## Acronyms

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

### Inorganic Data Qualifiers

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

### Metals Data Qualifiers

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

### Organic Data Qualifiers

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

### Additional Petroleum Hydrocarbon Specific Qualifiers

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

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

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

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.





## Case Narrative

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



**Client:** ALS Environmental - US  
**Project:** HS19071160  
**Sample Matrix:** Water

**Service Request:** K1906842  
**Date Received:** 07/25/2019

**CASE NARRATIVE**

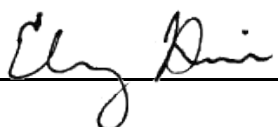
All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier level IV requested by the client.

**Sample Receipt:**

One water sample was received for analysis at ALS Environmental on 07/25/2019. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The sample was stored at minimum in accordance with the analytical method requirements.

**General Chemistry:**

No significant anomalies were noted with this analysis.

Approved by 

Date 08/07/2019



## Chain of Custody

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

K190684Z

00950660



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

### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11815

**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:** HS19071160  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19071160-01	LH18/24-SP650_072319	Water	23 Jul 2019 14:00
TOC Analysis for DOD Level IV			07 Aug 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]  
Received By: [Signature]  
Cooler ID(s): \_\_\_\_\_

Date/Time: 7/24/19 1800.  
Date/Time: 7.25.19 1010  
Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



PC KL

**Cooler Receipt and Preservation Form**

Client ALS Houston Service Request K19 06842

Received: 7.25.19 Opened: 7.25.19 By: NP Unloaded: 7.25.19 By: NP

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

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	NA	Tracking Number			NA	Filed
-0.4	-0.1			0.3	396	11815	1 of 2	4809	7836	1877		
-0.5	-0.3	1.2	1.4	0.2	371	11826	2 of 2	4809	7836	1880		
						11828						
						11829						

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

Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS19071160  
**Sample Matrix:** Water  
**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Service Request:** K1906842  
**Date Collected:** 07/23/19  
**Date Received:** 07/25/19  
**Units:** mg/L  
**Basis:** NA

**Carbon, Total Organic**

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
HS19071160-01	K1906842-001	<b>1.96</b>	0.50	0.20	0.07	1	07/28/19 02:08	
Method Blank	K1906842-MB	ND U	0.50	0.20	0.07	1	07/28/19 06:37	

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19071160  
**Sample Matrix:** Water

**Service Request:** K1906842  
**Date Analyzed:** 07/28/19  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Carbon, Total Organic**

**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 645180

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1906842-LCS	23.8	25.0	95	83-117



ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19071160

**Service Request:** K1906842

**Continuing Calibration Verification (CCV) Summary**

**Carbon, Total Organic**

**Analysis Method:** SM 5310 C

**Units:** mg/L

	<b>Analysis</b>		<b>Date</b>	<b>True</b>	<b>Measured</b>	<b>Percent</b>	<b>Acceptance Limits</b>
	<b>Lot</b>	<b>Lab Code</b>	<b>Analyzed</b>	<b>Value</b>	<b>Value</b>	<b>Recovery</b>	
CCV1	645180	KQ1910620-05	07/27/19 19:17	25.0	24.9	100	90-110
CCV2	645180	KQ1910620-06	07/28/19 01:10	25.0	23.5	94	90-110
CCV3	645180	KQ1910620-07	07/28/19 06:07	25.0	23.6	94	90-110
CCV4	645180	KQ1910620-08	07/28/19 11:05	25.0	24.2	97	90-110

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

Client: ALS Environmental - US  
Project: HS19071160

Service Request:K1906842

**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	645180	KQ1910620-09	07/27/19 19:32	0.50	0.20	0.07	ND	U
CCB2	645180	KQ1910620-10	07/28/19 01:25	0.50	0.20	0.07	ND	U
CCB3	645180	KQ1910620-11	07/28/19 06:22	0.50	0.20	0.07	ND	U
CCB4	645180	KQ1910620-12	07/28/19 11:19	0.50	0.20	0.07	ND	U



## Raw Data

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



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

Original  
 Work Request # ( ) <sup>6767, 6768, 6826</sup> K1906524, 6706, 6793, 6822, 6842, 6861, 6878, 6880  
 Tier: I II I II IV II II I  
 Date Analyzed: 7/28/19  
 Analyst: AB for BCD Run # TOC quad: 645183  
 Analysis: TOC / DOC TOC: 645180  
DOC: 645181

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  $\geq 0.995$ ?  yes/no/NA
7. MBs, CCVs, CCBs, LCSs, Dups, and Spikes, analyzed at proper frequency?  yes/no/NA
8. Are ICVs, CCVs, and CCBs all within acceptance limits?  yes/no/NA
9. Are results for methods blanks all ND?  yes/no/NA
10. Are all QC samples within acceptance criteria?  yes/no/NA  
(LCS % rec, MS/DMS % rec, DUP or MS/DMS RPDs, etc.)
11. Are all exceptions explained?  yes/no/NA
12. Have all applicable service requests been reviewed?  yes/no/NA
13. Are all samples labeled correctly?  yes/no/NA
14. Have all instructions on the service request been followed?  yes/no/NA  
(e.g. Special MRLs, QC on a specific sample, Form V)
15. Are detection limits and units reported correctly?  yes/no/NA
16. Is the unused space on the benchsheet crossed out?  yes/no/NA
17. Was analysis turned in by the due date? (n-2) (If not record SR#)  yes/no/NA

AB 7/30/19

COMMENTS:

10. K1906826-001/dup RPD is 13%  
- sample not homogenous.

Final Approved by: [Signature] Date: 7/30/19 DQREPORT

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 645183 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
K1906524-014	Carbon, Total Organic	N/A		Water		10 mL		1					7/27/19 21:53:00	N	I
KQ1910623-01	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/27/19 19:46:00	N	I
KQ1910623-02	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/27/19 19:46:00	N	I
KQ1910623-03	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/27/19 19:46:00	N	I
KQ1910623-04	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/27/19 19:46:00	N	I
KQ1910623-05	Carbon, Total Organic	LCS		Water	24.73 mg/L	10 mL	24.7 mg/L	1	0.07	0.50	99		7/27/19 20:42:00	N	I
KQ1910623-06	Carbon, Total Organic	LCS		Water	24.51 mg/L	10 mL	24.5 mg/L	1	0.07	0.50	98		7/27/19 20:42:00	N	I
KQ1910623-07	Carbon, Total Organic	LCS		Water	24.40 mg/L	10 mL	24.4 mg/L	1	0.07	0.50	98		7/27/19 20:42:00	N	I
KQ1910623-08	Carbon, Total Organic	LCS		Water	24.18 mg/L	10 mL	24.2 mg/L	1	0.07	0.50	97		7/27/19 20:42:00	N	I
KQ1910623-17	Carbon, Total Organic	CCV		Water	24.88 mg/L	10 mL	24.9 mg/L	1					7/27/19 19:17:00	N	I
KQ1910623-18	Carbon, Total Organic	CCV		Water	23.52 mg/L	10 mL	23.5 mg/L	1					7/28/19 01:10:00	N	I
KQ1910623-19	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/27/19 19:32:00	N	I
KQ1910623-20	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/28/19 01:25:00	N	I

33 of 127

OK for BCD  
7/30/19

# 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: 645180 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
K1906524-026	Carbon, Total Organic	N/A		Water		10 mL		1					7/27/19 23:44:00	N	I
K1906706-003	Carbon, Total Organic	N/A		Water	6.52 mg/L	10 mL	652 mg/L	100	7	50			7/28/19 04:28:00	N	II
K1906706-004	Carbon, Total Organic	N/A		Water	5.05 mg/L	10 mL	505 mg/L	100	7	50			7/28/19 04:56:00	N	II
K1906706-005	Carbon, Total Organic	N/A		Water	6.21 mg/L	10 mL	621 mg/L	100	7	50			7/28/19 05:25:00	N	II
K1906793-002	Carbon, Total Organic	N/A		Drinking Water	0.42 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/28/19 01:40:00	N	I
K1906822-001	Carbon, Total Organic	N/A		Water	1.35 mg/L	10 mL	1.35 mg/L	1	0.07	0.50			7/28/19 00:13:00	N	II
K1906842-001	Carbon, Total Organic	N/A		Water	1.96 mg/L	10 mL	1.96 mg/L	1	0.07	0.50			7/28/19 02:08:00	N	IV
K1906861-001	Carbon, Total Organic	N/A		Water	0.68 mg/L	10 mL	68 mg/L	100	7	50			7/28/19 03:04:00	N	II
K1906878-001	Carbon, Total Organic	N/A		Water	7.91 mg/L	10 mL	791 mg/L	100	7	50			7/28/19 03:32:00	N	II
K1906878-002	Carbon, Total Organic	N/A		Water	8.36 mg/L	10 mL	836 mg/L	100	7	50			7/28/19 04:00:00	N	II
K1906880-001	Carbon, Total Organic	N/A		Ocean Water	0.00 mg/L	10 mL	50 mg/L U	100	7	50			7/28/19 07:06:00	N	I
K1906880-002	Carbon, Total Organic	N/A		Ocean Water	0.00 mg/L	10 mL	50 mg/L U	100	7	50			7/28/19 07:34:00	N	I
K1906888-001	Carbon, Total Organic	N/A		Water	0.59 mg/L	10 mL	0.59 mg/L	1	0.07	0.50			7/28/19 02:36:00	N	I
KQ1910620-01	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/28/19 06:37:00	N	II
KQ1910620-02	Carbon, Total Organic	LCS		Water	23.76 mg/L	10 mL	23.8 mg/L	1	0.07	0.50	95		7/28/19 06:51:00	N	II
KQ1910620-03	Carbon, Total Organic	LODV		Water	0.02 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/27/19 23:44:00	N	II
KQ1910620-04	Carbon, Total Organic	LOQV		Water	0.42 mg/L	10 mL	0.423 mg/L J	1	0.07	0.50	85		7/27/19 23:59:00	N	II
KQ1910620-05	Carbon, Total Organic	CCV		Water	24.88 mg/L	10 mL	24.9 mg/L	1					7/27/19 19:17:00	N	II
KQ1910620-06	Carbon, Total Organic	CCV		Water	23.52 mg/L	10 mL	23.5 mg/L	1					7/28/19 01:10:00	N	II
KQ1910620-07	Carbon, Total Organic	CCV		Water	23.59 mg/L	10 mL	23.6 mg/L	1					7/28/19 06:07:00	N	II
KQ1910620-08	Carbon, Total Organic	CCV		Water	24.16 mg/L	10 mL	24.2 mg/L	1					7/28/19 11:05:00	N	II
KQ1910620-09	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/27/19 19:32:00	N	II
KQ1910620-10	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/28/19 01:25:00	N	II
KQ1910620-11	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/28/19 06:22:00	N	II
KQ1910620-12	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			7/28/19 11:19:00	N	II
KQ1910620-13	Carbon, Total Organic	MS	K1906822-001	Water	26.29 mg/L	10 mL	26.3 mg/L	1	0.07	0.50	100		7/28/19 00:41:00	N	II
KQ1910620-14	Carbon, Total Organic	DUP	K1906822-001	Water	1.31 mg/L	10 mL	1.31 mg/L	1	0.07	0.50		3	7/28/19 00:13:00	N	II

QB for BCD

7/30/19

# 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: 645181 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
K1906767-001	Carbon, Dissolved Organic (DOC)	N/A		Wastewater	12.84 mg/L	10 mL	12.8 mg/L	1	0.07	0.50			7/28/19 09:12:00	N	I
K1906768-001	Carbon, Dissolved Organic (DOC)	N/A		Water	15.47 mg/L	10 mL	15.5 mg/L	1	0.07	0.50			7/28/19 09:40:00	N	I
K1906768-002	Carbon, Dissolved Organic (DOC)	N/A		Water	6.50 mg/L	10 mL	6.50 mg/L	1	0.07	0.50			7/28/19 10:09:00	N	I
K1906826-001	Carbon, Dissolved Organic (DOC)	N/A		Surface Water	2.30 mg/L	10 mL	2.30 mg/L	1	0.07	0.50			7/28/19 10:37:00	N	II
KQ1910621-01	Carbon, Dissolved Organic (DOC)	MB		Wastewater	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			7/28/19 12:17:00	N	I
KQ1910621-02	Carbon, Dissolved Organic (DOC)	LCS		Wastewater	24.54 mg/L	10 mL	24.5 mg/L	1	0.07	0.50	98		7/28/19 12:31:00	N	I
KQ1910621-03	Carbon, Dissolved Organic (DOC)	CCV		Wastewater	23.59 mg/L	10 mL	23.6 mg/L	1					7/28/19 06:07:00	N	I
KQ1910621-04	Carbon, Dissolved Organic (DOC)	CCV		Wastewater	24.16 mg/L	10 mL	24.2 mg/L	1					7/28/19 11:05:00	N	I
KQ1910621-05	Carbon, Dissolved Organic (DOC)	CCV		Wastewater	24.25 mg/L	10 mL	24.3 mg/L	1					7/28/19 12:46:00	N	I
KQ1910621-06	Carbon, Dissolved Organic (DOC)	CCB		Wastewater	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			7/28/19 06:22:00	N	I
KQ1910621-07	Carbon, Dissolved Organic (DOC)	CCB		Wastewater	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			7/28/19 11:19:00	N	I
KQ1910621-08	Carbon, Dissolved Organic (DOC)	CCB		Wastewater	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			7/28/19 13:01:00	N	I
KQ1910621-09	Carbon, Dissolved Organic (DOC)	MS	K1906826-001	Surface Water	26.78 mg/L	10 mL	26.8 mg/L	1	0.07	0.50	98		7/28/19 11:34:00	N	II
KQ1910621-10	Carbon, Dissolved Organic (DOC)	DUP	K1906826-001	Surface Water	2.63 mg/L	10 mL	2.63 mg/L	1	0.07	0.50		13*	7/28/19 10:37:00	N	II

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

AB for BCD  
7/30/19



TOC quad: 645183  
 TOC: 645180  
 DOC: 645181

## Schedule: 07272019

Version: 3

Instrument: Fusion1

Last Saved by: Fusion1 (Fusion1)

Last Saved on: 2019/07/27 17:43 - Saturday

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps	Use	State
(Clean)	Clean	Clean		1	True	Ready
(Clean)	Clean	Clean		1	True	Ready
(Clean)	Clean	Clean		1	True	Ready
(Blank)	Blank	Reagent/Acid Blank		1	True	Ready
D	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
1	Sample	MB1	CAS_salt_010711 (CAS_salt_010711)	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	LOD	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
6	Sample	LOQ	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
7	Sample	K1906822-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
8	Sample	K1906822-001.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
9	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
10	Sample	K1906793-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K1906842-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	K1906888-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	K1906861-001.05 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K1906878-001.06 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1906878-002.06 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K1906706-003.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1906706-004.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1906706-005.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	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
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	K1906880-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K1906880-002.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
24	Sample	FB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
25	Sample	K1906767-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K1906768-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
27	Sample	K1906768-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
28	Sample	K1906826-001.05	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
29	Sample	K1906826-001.05 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
30	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
31	Sample	MB3	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [25.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
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 - 07272019

## Saturday, July 27, 2019 05:23 PM

(View - Repts, Unused Repts, Meta-Data, Signature, History)  
 Printed on 2019/07/30 09:08 - Tuesday

### Report Summary Information

Company Location: Gen Chem Lab  
 Schedule Name: 07272019  
 Instrument Name: Fusion1  
 Report Version: 1 of 1  
 Report Creation by Operators (schedule version): Fusion1 (Fusion1) (v2)  
 Fusion1 (Fusion1) (v3)  
 Comment:

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

### Report Results

Sample Type: Clean							From Schedule Version 2
Pos	Analysis Type	Sample ID			Start Time		
◆ (clean)		Clean			2019/07/27 17:23		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	13.83	17.37	3.54	49.66	05:23	
2	TC Clean	14.32	17.69	3.36	50.17	04:06	
3	TC Clean	2.24	5.49	3.25	50.08	03:48	
4	TC Clean	1.46	4.66	3.21	50.18	03:48	

Sample Type: Clean							From Schedule Version 3
Pos	Analysis Type	Sample ID			Start Time		
◆ (clean)		Clean			2019/07/27 17:45		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	1.04	4.23	3.19	49.51	05:13	
2	TC Clean	3.41	6.76	3.35	50.07	04:03	
3	TC Clean	1.46	4.71	3.25	50.21	03:50	
4	TC Clean	1.35	4.63	3.28	50.14	03:49	

Sample Type: Clean		From Schedule Version 3				
Pos	Analysis Type	Sample ID			Start Time	
♦ (clean)		Clean			2019/07/27 18:07	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.85	4.12	3.27	49.63	05:15
2	TC Clean	2.90	6.22	3.32	50.07	03:59
3	TC Clean	1.53	4.74	3.21	50.18	03:48
4	TC Clean	1.44	4.67	3.22	50.11	03:44

Sample Type: Blank (Creating v1280)		From Schedule Version 3				
Pos	Analysis Type	Sample ID			Start Time	
♦ (blank)		Reagent/Acid Blank			2019/07/27 18:29	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.67	4.00	3.33	49.64	05:12
2	TC Clean	3.01	6.39	3.38	50.18	04:03
3	TC Clean	1.60	4.95	3.34	50.15	03:56
4	TC Clean	1.30	4.85	3.55	50.21	03:55
5	Reagent Blank	2.98	6.50	3.52	50.19	05:05
6	Acid Blank	1.03	4.16	3.13	49.67	05:27

Sample Type: Sample		From Schedule Version 3						
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
♦ D	TOC	RB	0.1737 ppm	0.0000 ppm	0.0000%	2019/07/27 19:02		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1737	1.7371	9.89	13.18	3.28	50.20	10:31
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 8.7148 (IC) (v1280)		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)			

Sample Type: Check Standard --> CCV 25 ppm

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.8838 ppm (PASS)	0.0000 ppm	0%	2019/07/27 19:17

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.8838	248.8376	178.37	181.58	3.21	50.17	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 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/07/27 19:32

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.31	9.51	3.20	50.12	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 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/27 19:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.47	8.59	3.13	50.11	10:26
2	TOC	0.0000	0.0000	5.04	8.27	3.24	50.10	10:30
3	TOC	0.0000	0.0000	4.88	8.25	3.37	50.09	10:29
4	TOC	0.0000	0.0000	5.12	8.41	3.28	50.11	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7148 (IC) (v1280)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

**Sample Type:** Check Standard --> LCS From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	24.4565 ppm	0.2298 ppm	0.94%	2019/07/27 20:42

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.7333	247.3335	177.35	180.57	3.21	50.11	10:29
C	TOC	25.0 ppm	2	24.5091	245.0913	175.83	179.15	3.32	50.10	10:27
C	TOC	25.0 ppm	3	24.4032	244.0321	175.11	178.39	3.28	50.11	10:25
C	TOC	25.0 ppm	4	24.1805	241.8046	173.60	176.87	3.27	50.14	10:29

(PASS)

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos C</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	25 ppmC

**Sample Type:** Sample From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
2	TOC	ICS	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/27 21:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.84	10.03	3.19	50.15	10:29

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.7148 (IC) (v1280)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
3	TOC	LOD	0.0861 ppm	0.0252 ppm	29.3400%	2019/07/27 21:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0983	0.9829	9.38	12.49	3.11	50.18	10:25
2	TOC	0.0869	0.8694	9.30	12.53	3.23	50.17	10:30
3	TOC	0.1085	1.0845	9.45	12.69	3.24	50.19	10:28
4	TOC	0.0506	0.5055	9.06	12.35	3.29	50.22	10:28

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.7148 (IC) (v1280)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
4	TOC	LOQ	0.4145 ppm	0.0196 ppm	4.7200%	2019/07/27 22:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4088	4.0884	11.49	14.59	3.10	50.22	10:31
2	TOC	0.4421	4.4213	11.72	14.84	3.12	50.23	10:27
3	TOC	0.3960	3.9602	11.40	14.66	3.26	50.24	10:28
4	TOC	0.4110	4.1105	11.50	14.64	3.14	50.26	10:27

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.7148 (IC)	CAS_salt_010711	CAS_salt_010711

(v1280)

(v4)

(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
5	TOC	LOD	0.0230 ppm	0.0000 ppm	0.0000%	2019/07/27 23:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0230	0.2301	8.87	11.92	3.05	50.28	10:31

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
6	TOC	LOQ	0.4228 ppm	0.0000 ppm	0.0000%	2019/07/27 23:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4228	4.2283	11.58	14.69	3.10	50.29	10:31

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
7	TOC	K1906822-001.01	1.3279 ppm	0.0253 ppm	1.9100%	2019/07/28 00:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.3458	13.4579	17.85	20.98	3.13	50.31	10:31
2	TOC	1.3100	13.0999	17.61	20.91	3.31	50.32	10:25

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
8	TOC	K1906822-001.01 ms	26.2912 ppm	0.0000 ppm	0.0000%	2019/07/28 00:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.2912	262.9121	187.18	190.41	3.24	50.30	10:30

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
9	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/28 00:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.40	8.62	3.21	50.31	10:32

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

1:10 (TC) 8.7148 (IC) CAS\_salt\_010711 CAS\_salt\_010711  
(v1280) (v4) (v30)

**Sample Type:** Check Standard --> CCV 25 ppm From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity ( NA / NA )	23.5247 ppm (PASS)	0.0000 ppm	0%	2019/07/28 01:10

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.5247	235.2474	169.15	172.40	3.26	50.32	10:32

**Completion State** Success - Criteria met.  
**Success Action** Do Nothing  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)  
**STD Conc - Pos B** 50 ppmC

**Sample Type:** Check Standard --> CCB From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/07/28 01:25

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	4.87	8.11	3.24	50.34	10:33

**Completion State** Success - Criteria met.  
**Success Action** Do Nothing  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)  
**STD Conc - Pos D** 0 ppmC

**Sample Type:** Sample From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 10	TOC	K1906793-002.01	0.4158 ppm	0.0342 ppm	8.2200%	2019/07/28 01:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3916	3.9160	11.37	14.54	3.16	50.34	10:29
2	TOC	0.4399	4.3992	11.70	14.74	3.04	50.34	10:31

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 11	TOC	K1906842-001.01	1.9608 ppm	0.0176 ppm	0.9000%	2019/07/28 02:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.9732	19.7323	22.11	25.26	3.15	50.35	10:25
2	TOC	1.9483	19.4833	21.94	25.19	3.25	50.37	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
12	TOC	K1906888-001.01	0.5884 ppm	0.0117 ppm	1.9800%	2019/07/28 02:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5967	5.9667	12.76	15.85	3.09	50.39	10:25
2	TOC	0.5802	5.8017	12.65	15.81	3.16	50.40	10:25

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
13	TOC	K1906861-001.05 100x	0.6842 ppm	0.0117 ppm	1.7100%	2019/07/28 03:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6759	6.7593	13.30	16.46	3.16	50.42	10:28
2	TOC	0.6924	6.9243	13.42	16.81	3.39	50.42	10:25

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
14	TOC	K1906878-001.06 100x	7.9054 ppm	0.0322 ppm	0.4100%	2019/07/28 03:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.8827	78.8268	62.22	65.38	3.15	50.46	10:27
2	TOC	7.9282	79.2820	62.53	65.74	3.21	50.46	10:24

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
15	TOC	K1906878-002.06 100x	8.3604 ppm	0.1208 ppm	1.4500%	2019/07/28 04:00

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.4459	84.4588	66.04	69.27	3.22	50.47	10:29
2	TOC	8.2750	82.7499	64.89	68.06	3.17	50.51	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC)  
**Method** CAS\_salt\_010711  
**Calibration** CAS\_salt\_010711



(v1280) (v4) (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
16	TOC	K1906706-003.01 100x	6.5163 ppm	0.0213 ppm	0.3300%	2019/07/28 04:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.5313	65.3131	53.05	56.37	3.32	50.54	10:28
2	TOC	6.5013	65.0126	52.84	56.15	3.31	50.55	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	K1906706-004.01 100x	5.0465 ppm	0.0404 ppm	0.8000%	2019/07/28 04:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.0751	50.7505	43.16	46.42	3.26	50.55	10:30
2	TOC	5.0179	50.1789	42.78	46.14	3.37	50.58	10:29

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	K1906706-005.01 100x	6.2089 ppm	0.0499 ppm	0.8000%	2019/07/28 05:25

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.1736	61.7362	50.62	53.94	3.32	50.60	10:28
2	TOC	6.2442	62.4419	51.10	54.23	3.13	50.61	10:31

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
19	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/28 05:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.45	8.63	3.19	50.64	10:30

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

**Sample Type:** Check Standard --> CCV 25 ppm

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25	0 / infinity	23.5881	0.0000	0%	2019/07/28 06:07

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.5881	235.8808	169.58	172.77	3.20	50.63	10:34

ppm [25 ppm] ( NA / NA ) ppm (PASS) ppm

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

**Sample Type:** Check Standard --> CCB From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/07/28 06:22

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.07	8.36	3.29	50.64	10:29

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

**Sample Type:** Sample From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/28 06:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.53	7.52	3.00	50.67	10:30

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.7148 (IC) (v1280)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

**Sample Type:** Check Standard --> LCS From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity ( NA / NA )	23.7591 ppm (PASS)	0.0000 ppm	0%	2019/07/28 06:51

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	23.7591	237.5912	170.74	173.94	3.20	50.67	10:31

<b>Completion State</b> Success - Criteria met.	<b>Success Action</b> Do Nothing	<b>Method</b> CAS_salt_010711 (v4)	<b>Calibration</b> CAS_salt_010711 (v30)	<b>STD Conc - Pos C</b> 25 ppmC
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Sample Type: Sample

From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
21	TOC	K1906880-001.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/28 07:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.32	10.49	3.17	50.69	10:27
2	TOC	0.0000	0.0000	5.81	8.97	3.16	50.71	10:29

<b>Dilution</b> 1:10	<b>Blank Contribution</b> (TC) 8.7148 (IC) (v1280)	<b>Method</b> CAS_salt_010711 (v4)	<b>Calibration</b> CAS_salt_010711 (v30)
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Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
22	TOC	K1906880-002.01 100x	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/28 07:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.98	8.11	3.14	50.73	10:31
2	TOC	0.0000	0.0000	4.82	8.15	3.33	50.72	10:25

<b>Dilution</b> 1:10	<b>Blank Contribution</b> (TC) 8.7148 (IC) (v1280)	<b>Method</b> CAS_salt_010711 (v4)	<b>Calibration</b> CAS_salt_010711 (v30)
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Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
23	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/28 08:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.32	7.59	3.27	50.74	10:26
2	TOC	0.0000	0.0000	4.34	7.61	3.28	50.72	10:25
3	TOC	0.0000	0.0000	4.01	7.37	3.36	50.71	10:26
4	TOC	0.0000	0.0000	4.22	7.54	3.32	50.69	10:26

<b>Dilution</b> 1:10	<b>Blank Contribution</b> (TC) 8.7148 (IC) (v1280)	<b>Method</b> CAS_salt_010711 (v4)	<b>Calibration</b> CAS_salt_010711 (v30)
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Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
24	TOC	FB	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/28 08:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.50	7.73	3.22	50.67	10:30

<b>Dilution</b> 1:10	<b>Blank Contribution</b> (TC) 8.7148 (IC)	<b>Method</b> CAS_salt_010711	<b>Calibration</b> CAS_salt_010711
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(v1280) (v4) (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
25	TOC	K1906767-001.01	12.8401 ppm	0.0118 ppm	0.0900%	2019/07/28 09:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	12.8484	128.4840	95.93	99.16	3.23	50.63	10:26
2	TOC	12.8318	128.3175	95.82	99.14	3.32	50.62	10:30

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
26	TOC	K1906768-001.01	15.4715 ppm	0.1464 ppm	0.9500%	2019/07/28 09:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	15.3680	153.6801	113.03	116.20	3.17	50.60	10:28
2	TOC	15.5750	155.7500	114.44	117.70	3.27	50.59	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
27	TOC	K1906768-002.01	6.5048 ppm	0.2488 ppm	3.8200%	2019/07/28 10:09

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.6807	66.8069	54.06	57.28	3.22	50.57	10:27
2	TOC	6.3289	63.2889	51.68	54.85	3.17	50.55	10:25

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
28	TOC	K1906826-001.05	2.4658 ppm	0.2297 ppm	9.3200%	2019/07/28 10:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.3034	23.0337	24.35	27.60	3.25	50.53	10:30
2	TOC	2.6282	26.2821	26.56	29.78	3.22	50.50	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7148 (IC) (v1280)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

**Sample Type:** Check Standard --> CCV 25 ppm

From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
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♦	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.1629 ppm (PASS)	0.0000 ppm	0%	2019/07/28 11:05
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.1629	241.6293	173.48	176.72	3.24	50.48	10:30
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos B</b>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		50 ppmC		

**Sample Type:** Check Standard --> CCB From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time	
♦	D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/07/28 11:19
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.60	9.72	3.11	50.44	10:34
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos D</b>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		0 ppmC		

**Sample Type:** Sample From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
♦	29	TOC	K1906826-001.05 ms	26.7830 ppm	0.0000 ppm	0.0000%	2019/07/28 11:34	
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.7830	267.8296	190.52	193.67	3.15	50.41	10:31
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 8.7148 (IC) (v1280)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
♦	30	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/28 11:49	
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.18	10.41	3.23	50.38	10:24
2	TOC	0.0000	0.0000	6.83	9.97	3.14	50.36	10:23
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 8.7148 (IC) (v1280)		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
31	TOC	MB3	0.0000 ppm	0.0000 ppm	0.0000%	2019/07/28 12:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.28	8.50	3.22	50.33	10:33

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.7148 (IC) (v1280)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

**Sample Type:** Check Standard --> LCS From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
C	TOC	25.0000	1:1	[TOC] LCS [25.0 ppm]	0 / infinity (NA / NA)	24.5393 ppm (PASS)	0.0000 ppm	0%	2019/07/28 12:31

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.5393	245.3933	176.03	179.36	3.33	50.33	10:29

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos C</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	25 ppmC

**Sample Type:** Check Standard --> CCV 25 ppm From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.2500 ppm (PASS)	0.0000 ppm	0%	2019/07/28 12:46

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.2500	242.4999	174.07	177.34	3.27	50.30	10:31

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

**Sample Type:** Check Standard --> CCB From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
D	TOC	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/07/28 13:01

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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Type										
D	TOC	0 ppm	1	0.0000	0.0000	5.78	8.94	3.15	50.29	10:35
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos D</b>		
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
v1279	1.0543	1.0720	0.0000	0.0000	0.0000	2019/07/23 16:13	Fusion1 (Fusion1)
v1280	0.9930	1.0290	0.0000	0.0000	0.0000	2019/07/27 19:02	Fusion1 (Fusion1)

#### Calibrations

##### Name: CAS\_salt\_010711 (TOC)

Version: v30  
 Calibration curve formula: TOC:  $y = 6.788x + 9.463$   
 Ver Creation: 2019/03/05 17:42  
 $r^2$  value: TOC:  $r^2 = 0.99963$   
 Comment:  
 Operator: Fusion1 (Fusion1)  
 Basic Analysis Type: TOC

##### Basic Analysis Type: TOC

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

#### Methods

##### Name: CAS\_salt\_010711 (TOC)

Version: v4  
 Operator: Fusion1 (Fusion1)  
 Ver Creation: 2019/02/21 17:57  
 Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	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	2019/07/28 13:17





## Case Narrative

**Method:** 6850  
**Analysis:** Perchlorate  
**Analysis SOP:** LC-MS-CLO4  
**ALS WO ID(s):** 1921215; 1921707

**Client:** ALS Laboratories (Houston, TX)  
**Matrix:** Water  
**ELMS Batch (HBN):** 2278 (244766)

**General Set Information:** There were two 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  $^{18}\text{O}$  labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in quantitation.

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

**Holding Times:** Holding times were met for all analyses.

**Dilutions:** NA

**Method QC data:** The method blank (LMB 666457) was less than 1/2 the CRDL. The recovery for the LCS (666458) was within acceptable parameters.



**MS/MSD Analysis:** MS/MSD was performed on samples 1921707001 (Client ID: HBWT\_073019). 4.0 $\mu$ l of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4.0 $\mu$ g/L. The MS/MSD (666524/25) failed QC acceptance criteria for percent recoveries. The positive result of 1.1685 $\mu$ g/L for the parent sample was not subtracted from the MS/MSD results. MS/MSD passed QC criteria for the relative percent difference. The Matrix Spike and Matrix Spike duplicate 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  $\mu$ g/L. Results were calculated in  $\mu$ g/L by the equation  $(A) \times (B)$ ,

where: A = Analyte concentration from the standard curve ( $\mu$ g/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 5.1.1.1. The Reporting Limit Verification Standard (RLVS – 666455) is reported from the analysis of the Laboratory Control Sample (LCS – 666458) at a level of 4.0 $\mu$ g/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) along with datafile 01AUGD06.

Thomas Bosch                      August 01, 2019  
Analyst                                      Date



# ANALYTICAL REPORT

Report Date: August 01, 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: **34-1921215**

Project ID: HS19071160

Purchase Order: HS19071160

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_072319_BIX	1921215001	07/23/19	07/25/19	



## ANALYTICAL REPORT

Workorder: 34-1921215

Client: ALS Environmental  
(Houston)

Project Manager: Kevin W. Griffiths

## Analytical Results

Sample ID: <b>LH18/24-SP650_072319_BIX</b>	Sampling Site: NA	Collected: 07/23/2019				
Lab ID: 1921215001	Media: 125 mL Nalgene	Received: 07/25/2019				
Matrix: Water	Sampling Parameter: NA					
<b>Analysis Method - EPA 6850, DoD QSM</b>						
Preparation: Not Applicable	Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2278 (HBN: 244766) Analyzed: 08/01/2019 10:32	Instrument ID: LCMS04 Percent Solid: NA Report Basis: Wet				
<b>Analyte</b>	<b>Result (ug/L)</b>	<b>DL (ug/L)</b>	<b>LOD (ug/L)</b>	<b>LOQ (ug/L)</b>	<b>Dilution</b>	<b>Qual</b>
Perchlorate	42	1.0	2.0	4.0	1	

## 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 08/01/2019 13:22	/S/ Stephen Brose 08/01/2019 14:17

## Laboratory Contact Information

ALS Environmental  
960 W Levoy Drive  
Salt Lake City, Utah 84123Phone: (801) 266-7700  
Email: als@alst.com  
Web: www.alst.com



## ANALYTICAL REPORT

Workorder: 34-1921215

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

**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

00950694

## Analysis Information

**Workorder:** 1921215

**Limits:** Client SOW/Contract Specified  
**Basis:** DoD QSM

**Preparation:** NA  
**Batch:** NA  
**Prepared By:** NA

**Analysis:** EPA 6850, DoD QSM  
**Batch:** ELMS/2278 (HBN: 244766)  
**Analyzed By:** Thomas Bosch

## Blank

<b>LMB:</b> 666457 <b>Analyzed:</b> 08/01/2019 10:18 <b>Units:</b> ug/L			
Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

## Laboratory Control Sample

<b>LCS:</b> 666458 <b>Analyzed:</b> 08/01/2019 09:50 <b>Dilution:</b> 1 <b>Units:</b> ug/L				
Analyte	Result	Target	% Rec	QC Limits
Perchlorate	4.27	4.00	107	78.8   123.8

## Matrix Spike - Matrix Spike Duplicate

<b>Sample:</b> 1921707001 <b>Analyzed:</b> 08/01/2019 10:46 <b>Dilution:</b> 1 <b>Units:</b> ug/L			<b>MS:</b> 666524 <b>Analyzed:</b> 08/01/2019 11:09 <b>Dilution:</b> 1 <b>Units:</b> ug/L				<b>MSD:</b> 666525 <b>Analyzed:</b> 08/01/2019 11:23 <b>Dilution:</b> 1 <b>Units:</b> ug/L			
Analyte	Result	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
Perchlorate	1.20	5.16	4	# 129	78.8   123.8	5.06	# 127	1.81	0.0   20.0	

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

Analyst	Peer Review
/S/ Thomas Bosch 08/01/2019 13:24	/S/ Stephen Brose 08/01/2019 14:17

## 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

**ALS Environmental**  
CHAIN-OF-CUSTODY



Project / Job / Task: HS19071160		Split:		Workorder ID: 1921215		Level: ENV_LVL4		Requested Analysis	
Client: ALS Environmental (Houston)		Account: 8101		Matrix		Type: 125Poly		EPA 6850, D+D QSM	
Comments:		Sample ID		Lab ID		QC		Preservatives	
Collect Date/Time		Sample ID		Lab ID		QC		Containers	
1 07/23/2019 14:00		LH18/24-SP650_072319_BIX		1921215001		Water		ID(s) Count	
2								A 1	
3									
4									
5									
6									
7									
8									
9									
10									

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY				SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY			
Relinquished By: (Signature)		Date / Time		Prepared / Analyzed by:		Lab Notebook No.:	
Marie, Julie		07/25/2019 09:50		Date / Time:			
Received By: (Signature)		Date / Time		Reinquired By: (Signature)		Date / Time	
ALS Sample Receiving		08-21-19 16:20		Received By: (Signature)		Date / Time	
13B		08-21-19 08:20		Date / Time		Reason for Transfer / Storage Location	
T. B. Brad		T. B. Brad		Date / Time		Reason for Transfer / Storage Location	
Storage		Storage		Date / Time		Reason for Transfer / Storage Location	
Analysis		Analysis		Date / Time		Reason for Transfer / Storage Location	
R.33.1		R.33.1		Date / Time		Reason for Transfer / Storage Location	



1921215



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

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11816

**SUBCONTRACT TO:**

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

1921215

**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:** HS19071160  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19071160-02	LH18/24-SP650_072319_BIX	Water	23 Jul 2019 14:00
	SUB_Perch-6850		07 Aug 2019

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

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

Relinquished By:

Received By:

Cooler ID(s): \_\_\_\_\_

Date/Time: 7/24/19 1800

Date/Time: 7/25/19 09:50

Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle) 1921215

Client Name: <u>ALS Houston</u>		Project/Task/Site: _____				
Date/Time of Receipt: <u>7/25/19 09:50</u>		Number of Coolers Received: <u>1</u>				
Condition of Coolers: <u>Acceptable</u> /Unacceptable		Temperature Control: <u>Present</u> /Not Included				
Cooler Custody Seals: <u>Present</u> /Absent/NA		Location Temp Taken: <u>Control</u> /Between Samples				
Container Custody Seals: <u>Present</u> /Absent/NA		Are all temperatures within project specific guidelines? <u>Yes</u> /No/NA				
Ice Present: <u>Yes</u> /No/NA		VOA Headspace Present? <u>Yes</u> /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 <u>9786</u>	<u>4</u> °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By: Jaylynn Johnson Jaylynn Johnson 7/25/19

CLIENT-RELATED INFORMATION

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

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? Yes  No

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: \_\_\_\_\_ Returned to Sample Receipt by: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name Signature



Must Deliver Next Business Day  
Time and Tempature Sensitive!

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

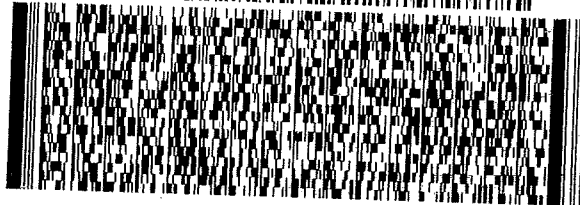
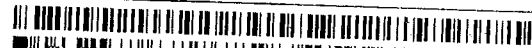
SHIP DATE: 24JUL19  
ACTWGT: 10.05 LB  
CAD: 300130/CAFE3211  
DIMS: 14x11x10 IN  
BILL THIRD PARTY

TO **PAUL POPE**  
**ALS LABORATORY GROUP**  
**960 WEST LEVOY DRIVE**

**SALT LAKE CITY UT 84123**

(800) 366-9135

REF: HS19071160 - RJ



**FedEx**  
Express



01050908011181F

TRK# 4809 7836 1905  
0201

THU - 25 JUL 3:00P  
STANDARD OVERNIGHT

**AX BTFA**

84123  
UT-US SLC



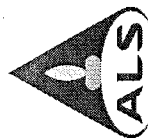
FORM 9 (2008) 504 0110 1119 1119

55102/46F9/104C

RTO  
PZ 0

907

1905  
07/25



# Batch Worklist

**Batch:** ELMS/ 2278      **Created:** 8/1/2019 08:07      **Instrument:** HBN: 244766  
**Rule:** EPA 6850, DoD QSM Water      **Analyst:** T. Bosch      **Status:** WP



**Workorder:** 1921215 [ENV\_LVL4]  
**Workorder:** 1921707 [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	666454	CCV for HBN 244766 [ELMS/2278]				CCV	3		E685041C3Q	5311		8/2/2019	
2	666455	RLVS for HBN 244766 [ELMS/2278]				RLVS	3		E685041C3Q	5311		8/2/2019	
3	666456	ICS for HBN 244766 [ELMS/2278]				ICS	3		E6850.D3Q	5311		8/2/2019	
4	666457	LMB for HBN 244766 [ELMS/2278]				LMB	3		E6850Q413Q	5311		8/2/2019	
5	666458	LCS for HBN 244766 [ELMS/2278]				LCS	3		E6850Q413Q	5311		8/2/2019	
6	1921215001	LH18/24-SP650_072319_BIX				SAMPLE	3	1921215001-A	E6850Q41.3	5480	8/20/2019	8/7/2019	
7	1921707001	HBWT_073019				SAMPLE	3	1921707001-A	E6850Q41.3	5480	8/27/2019	8/2/2019	
8	666524	HBWT_073019(1921707001MS)				MS	3		E6850Q413Q	5311		8/2/2019	
9	666525	HBWT_073019(1921707001MSD)				MSD	3		E6850Q413Q	5311		8/2/2019	
10	666461	CCV for HBN 244766 [ELMS/2278]				CCV	3		E685041C3Q	5311		8/2/2019	

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**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Analytical Documentation**

Analyst Write-upALS Work Order #'s & Sample #( )'s: 1921215 (001); 1921707 (001)ELMS Batch/HBN ID: 2278 (244766)Prep Date: 08/01/2019 Analysis Date: 08/01/2019 Analyst: T. BoschAnalyte: **Perchlorate** Matrix: **Water** Method: **6850**Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\AUG\01AUG19D.sReported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**SAMPLE PREPARATION/ANALYSIS:

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

**REAGENTS:** Eluent A1: 95% ASTM Type II water (ALS)/ 5% ACN (B&J Lot AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).  
Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

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

**CALIBRATION CURVE:** Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.M

**INSTRUMENT CONDITIONS:** Samples were analyzed with an Agilent 1100 LC/MSD system, in negative SIM mode, monitoring m/z 83, 85, and 89.

Instrument ID: LCMS04 Online Acquisition Method: CLO4-AQN.M Fragmentor: 160 Output Gain: 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 47516 was used for LCS 666458; Target = 4.0µg/L. ASTM type II water was used for LMB 666457.

**MS/MSD:** The Matrix Spike and duplicate (MS/MSD) were performed on sample 1921707001 (Client ID: HBWT\_073019). 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, except for the following. The MS/MSD (666524/25) failed QC acceptance criteria for percent recoveries. The positive result of 1.1685µg/L for the parent sample was not subtracted from the MS/MSD results. MS/MSD passed QC criteria for the relative percent difference. 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\AUG\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\244766-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATA\REVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 666455) is reported from the analysis of the Laboratory Control Sample (LCS – 666458) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03) along with datafile 01AUGD06.

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

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

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDG: ELMS: 2278 HBN: 244766		
Sample Set IDs if Applicable: 192215/1921707		
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	
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	
MFG Lot: 218065075		Amount: 100 mL	
Part ID: IC-PER-10X-1		Expires: 07/25/2020	
		Usable: No	
		Lab Lot: CLO4 STOCK	
Pos	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL





## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 INT

CLO4 INT			Description - 6850 Intermdt AccStd 10.ug/mL		
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



## STANDARD REPORT

## Working Standard - CLO4 QC WRK

CLO4 QC WRK		Description - 6850 QC WKG STD 100ug/L			
Standard: 47516		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC WRK 100.ug/L	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL	
Standard: 36748	Created By: Thomas Bosch	Amount: 100 mL	
MFG: Ultra Scientific	Create Date: 05/11/2017 01:05PM	Expires: 03/31/2020	
MFG Lot: CP-0860		Usable: Yes	
Part ID: ICC-013		Lab Lot: CLO4 QC STOCK	
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 QC INT

CLO4 QC INT		Description - 6850 QC Intrmdt Std-QC 10ug/mL			
Standard: 47515		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC INT 10.ug/mL	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020



## STANDARD REPORT

## Working Standard - CLO4ISTDWRK

CLO4ISTDWRK			Description - Perchlorate ISTD Wrk 1,000ug/L		
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		Verified By: Thomas Bosch		Usable: Yes	
Pipette ID: Not Provided		Verify Date:		Lab Lot: CLO4ISTDWRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L		
2	14797-73-0-89	Perchlorate 89	1000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK			Description - Perchlorate ISTD Stock
Standard: 43729		Created By: Thomas Bosch	Amount: 1 mL
MFG: Cambridge Isotope		Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026
MFG Lot: SDFE-012A		Verified By: Thomas Bosch	Usable: Yes
Part ID: OLM-7310-S		Verify Date:	Lab Lot: CLO4ISTDSTK
Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL





## Certificate of Analysis



### ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

#### Description:

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

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

Solvent: water (low TOC, < 50 ppb)

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

#### Traceability:

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

#### Estimation of Uncertainties:

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

#### Homogeneity:

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

#### Intended Use:

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

#### Instructions for Use:

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

#### Hazards:

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

#### Expiration of Certification:

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





# Certificate of Analysis



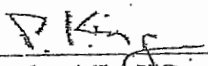
## ISO Guide 34 Reference Material

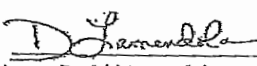
Product Number: ICC-013  
Lot Number: CP-0860

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

### Maintenance of Certification:

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

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

  
Daniel J. Lamendola  
Director of QA/QA



125 Market Street  
New Haven, CT 06513  
USA



AccuStandard®

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

# CERTIFICATE OF ANALYSIS



S 43659

AccuTrace™ Reference Standard

Catalog No: IC-PER-10X-1  
Description: Perchlorate Standard  
Element: Perchlorate (ClO<sub>4</sub>)  
SRM: Ind. Std.  
Lot: 218065075  
Matrix: Water  
Hazards: Refer to SDS for complete safety information

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



Signal Word: None

Component	SRM #	Prepared Concentration (µg/mL)
ClO <sub>4</sub> Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is ±0.24%.

The final solution was checked against an independent standard to verify its concentration.

We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.

All solutions are filtered through a 0.2 µm filter prior to being bottled.

All glassware used in preparation is Class A and calibrated regularly.

All weights are traceable through NIST, Test No. 822-275872-11

All bottles are triple rinsed with deionized water prior to use.

Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.

We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By:

*Meigan O'Leary*

Meigan O'Leary, Inorganic QC Manager



Cambridge Isotope Laboratories, Inc.

## Certificate of Analysis

Quality Standards:  
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

Product Name: PERCHLORIC ACID, SODIUM SALT  
(Isotopic Label & Enrichment Specification) (18O<sub>4</sub>, 90%+) 100 UG/ML IN WATER

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

## Product Information

Chemical Purity Specification:  $\geq 98\%$   
 Labeled CAS Number: NA  
 Unlabeled CAS Number: 7601-89-0  
 MW\*: 130.4  
 Chemical Formula: NaCl<sup>+</sup>O<sub>4</sub>  
 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

['#' ==&gt; Run has not been reprocessed with Batch Review Method

['\*' ==&gt; Run has been saved with batch file]

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount	
*	666454	CCV@25	Vial 71	1	Control	1	1.43517e6	8.056	25.42369
*	666458	QC@4.0	Vial 72	1	Control	2	2.80067e5	8.031	4.27330
*	666456	ICS@4.0	Vial 73	1	Control	3	2.35585e5	7.818	3.98575
*	666457	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1921215001		Vial 75	1	Sample	5	2.59136e6	7.648	42.46767
*	1921707001		Vial 78	1	Sample	6	6.15574e4	8.169	1.16852
*	666524	217071S	Vial 76	1	Sample	7	3.22916e5	8.155	5.15500
*	666525	217071D	Vial 77	1	Sample	8	3.17867e5	8.128	5.06261
*	664926	CCV@25	Vial 71	1	Control	9	1.46587e6	8.007	25.83393

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	666454	CCV@25	Vial 71	1	Control	1	4.40262e5	8.074	26.23333
*	666458	QC@4.0	Vial 72	1	Control	2	9.11033e4	8.055	4.52880
*	666456	ICS@4.0	Vial 73	1	Control	3	7.58458e4	7.814	4.16930
*	666457	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1921215001		Vial 75	1	Sample	5	7.95845e5	7.663	43.95110
*	1921707001		Vial 78	1	Sample	6	2.19050e4	8.203	1.21365
*	666524	217071S	Vial 76	1	Sample	7	1.06102e5	8.145	5.55409
*	666525	217071D	Vial 77	1	Sample	8	1.01890e5	8.153	5.31961
*	664926	CCV@25	Vial 71	1	Control	9	4.41541e5	8.019	26.20150

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	666454	CCV@25	Vial 71	1	Control	1	1.71571e5	8.082	5.00000
*	666458	QC@4.0	Vial 72	1	Control	2	2.15262e5	8.048	5.00000
*	666456	ICS@4.0	Vial 73	1	Control	3	1.94798e5	7.835	5.00000
*	666457	LMB	Vial 74	1	Control	4	2.19049e5	8.240	5.00000
*	1921215001		Vial 75	1	Sample	5	1.78490e5	7.668	5.00000
*	1921707001		Vial 78	1	Sample	6	1.93928e5	8.189	5.00000
*	666524	217071S	Vial 76	1	Sample	7	2.04006e5	8.165	5.00000
*	666525	217071D	Vial 77	1	Sample	8	2.04641e5	8.144	5.00000
*	664926	CCV@25	Vial 71	1	Control	9	1.72289e5	8.029	5.00000

\*\*\* End of Report \*\*\*

## Sequence Table:

## Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	666454	CCV@25	CLO4-AQN	1	Ctrl Samp	
2	Vial 72	666458	QC@4.0	CLO4-AQN	1	Ctrl Samp	
3	Vial 73	666456	ICS@4.0	CLO4-AQN	1	Ctrl Samp	
4	Vial 74	666457	LMB	CLO4-AQN	1	Ctrl Samp	
5	Vial 75	1921215001		CLO4-AQN	1	Sample	
6	Vial 78	1921707001		CLO4-AQN	1	Sample	
7	Vial 76	666524	217071S	CLO4-AQN	1	Sample	
8	Vial 77	666525	217071D	CLO4-AQN	1	Sample	
9	Vial 71	664926	CCV@25	CLO4-AQN	1	Ctrl Samp	

Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD01.D

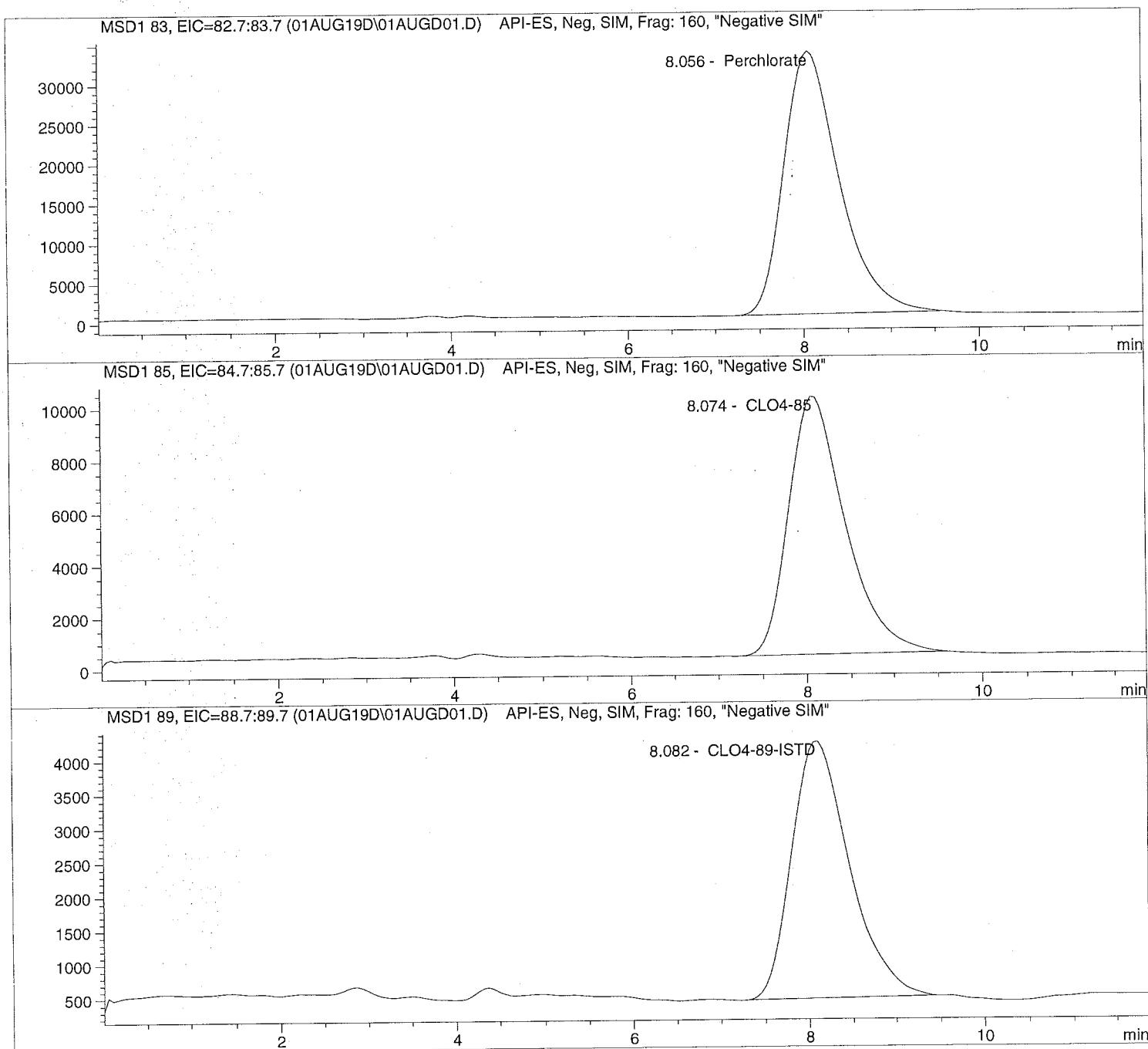
Sample Name: 666454 CCV@25

Injection Date: 8/01/2019 09:32:42  
Sample Name: 666454 CCV@25  
Acq Operator: TNB

Seq Line: 1  
Location: Vial 71  
Inj. No.: 1  
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD01.D Sample Name: 666454 CCV@25

```

=====
Injection Date: 8/01/2019 09:32:42      Seq Line: 1
Sample Name:    666454 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:   4/12/2019 07:54:13
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:    1.000000
Dilution:      1.000000
Sample Amount: 25.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.056	PBA	1435175.0	25.4237	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.074	PBA	440262.2	26.2333	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.082	PBA	171570.6	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*



Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD02.D      Sample Name: 666458    QC@4.0

=====  
Injection Date: 8/01/2019 09:50:57      Seq Line: 2  
Sample Name: 666458    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: 4/12/2019 07:54:13

Perchlorate analysis

=====  
Sample Information  
=====

Sorted By: Signal  
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am  
Multiplier: 1.000000  
Dilution: 1.000000  
Sample Amount: 4.000

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.031	PBA	280067.4	4.2733	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.055	BBA	91103.3	4.5288	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.048	PBA	215262.2	5.0000	CLO4-89-ISTD

=====  
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD03.D

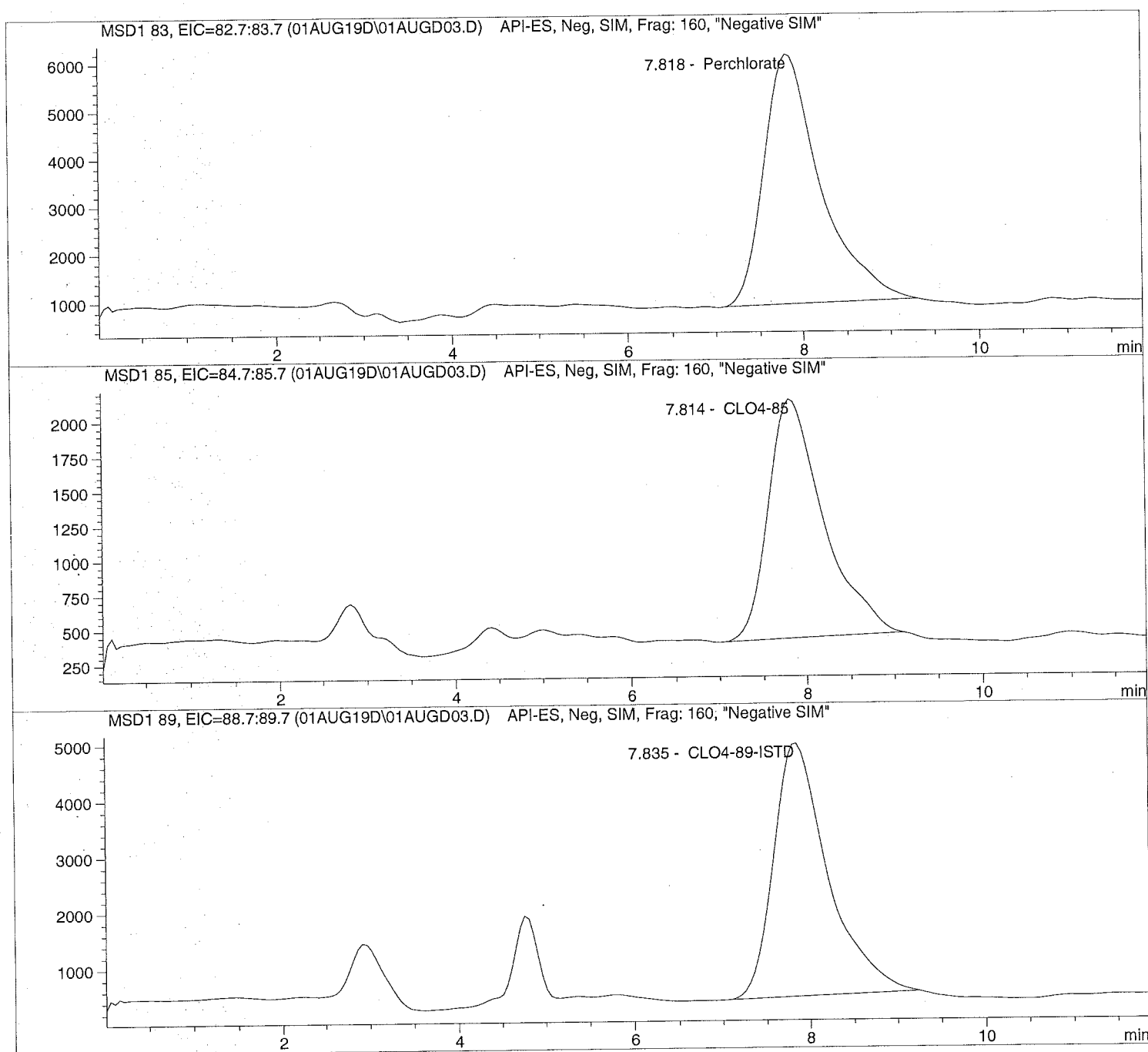
Sample Name: 666456 ICS@4.0

Injection Date: 8/01/2019 10:04:43  
Sample Name: 666456 ICS@4.0  
Acq Operator: TNB

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

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD03.D      Sample Name: 666456    ICS@4.0

=====  
Injection Date: 8/01/2019 10:04:43      Seq Line: 3  
Sample Name: 666456 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: 4/12/2019 07:54:13

Perchlorate analysis

=====  
Sample Information  
=====

Sorted By: Signal  
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am  
Multiplier: 1.000000  
Dilution: 1.000000  
Sample Amount: 4.000

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.818	PBA	235585.0	3.9858	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.814	PBA	75845.8	4.1693	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.835	PBA	194798.0	5.0000	CLO4-89-ISTD

=====  
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD04.D

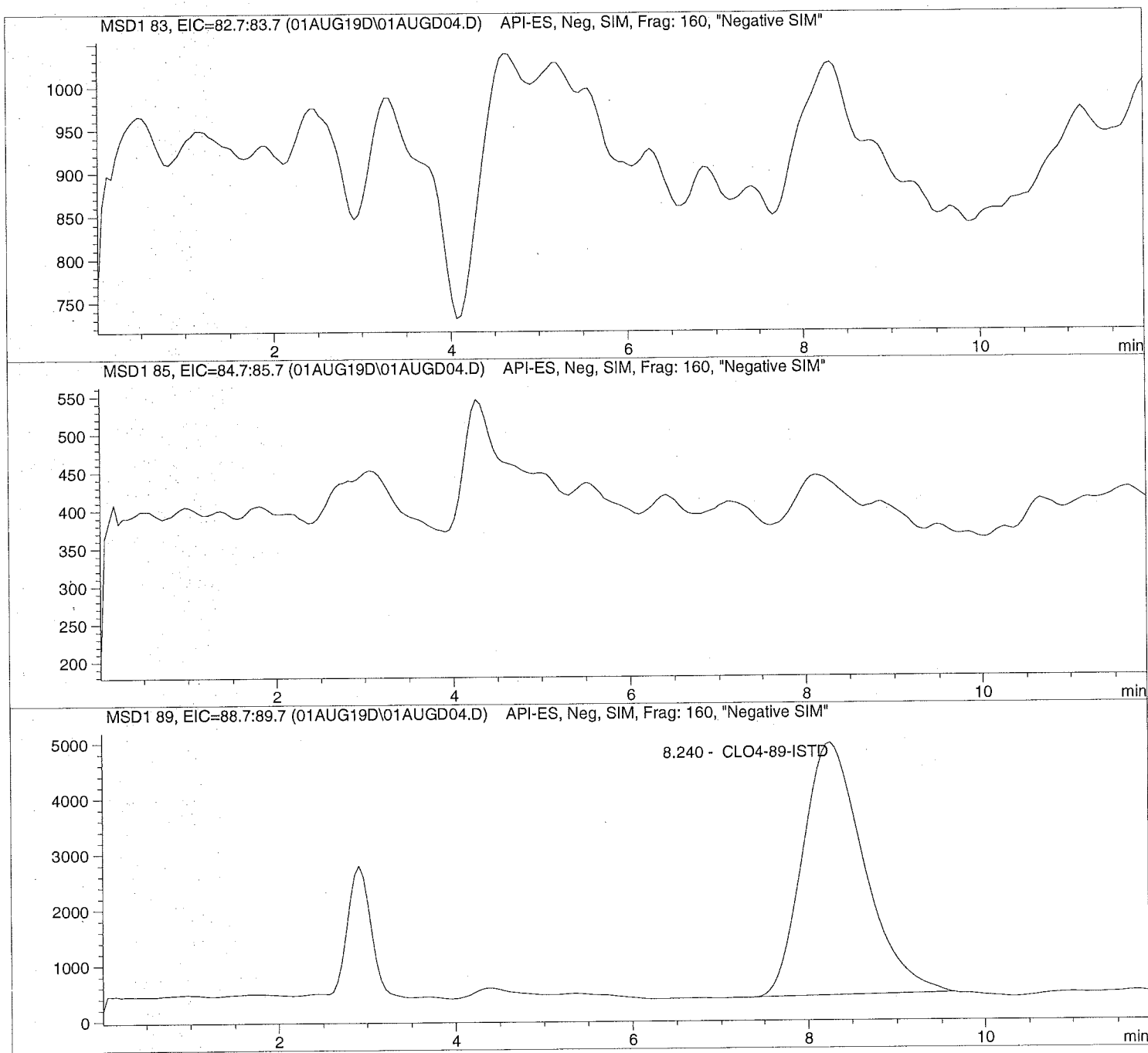
Sample Name: 666457 LMB

Injection Date: 8/01/2019 10:18:35  
Sample Name: 666457 LMB  
Acq Operator: TNB

Seq Line: 4  
Location: Vial 74  
Inj. No.: 1  
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD04.D      Sample Name: 666457    LMB

```

=====
Injection Date: 8/01/2019 10:18:35      Seq Line:            4
Sample Name:    666457    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:       4/12/2019 07:54:13
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:            Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:          1.000000
Dilution:            1.000000
Sample Amount:        0.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.240	PBA	219049.3	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD05.D

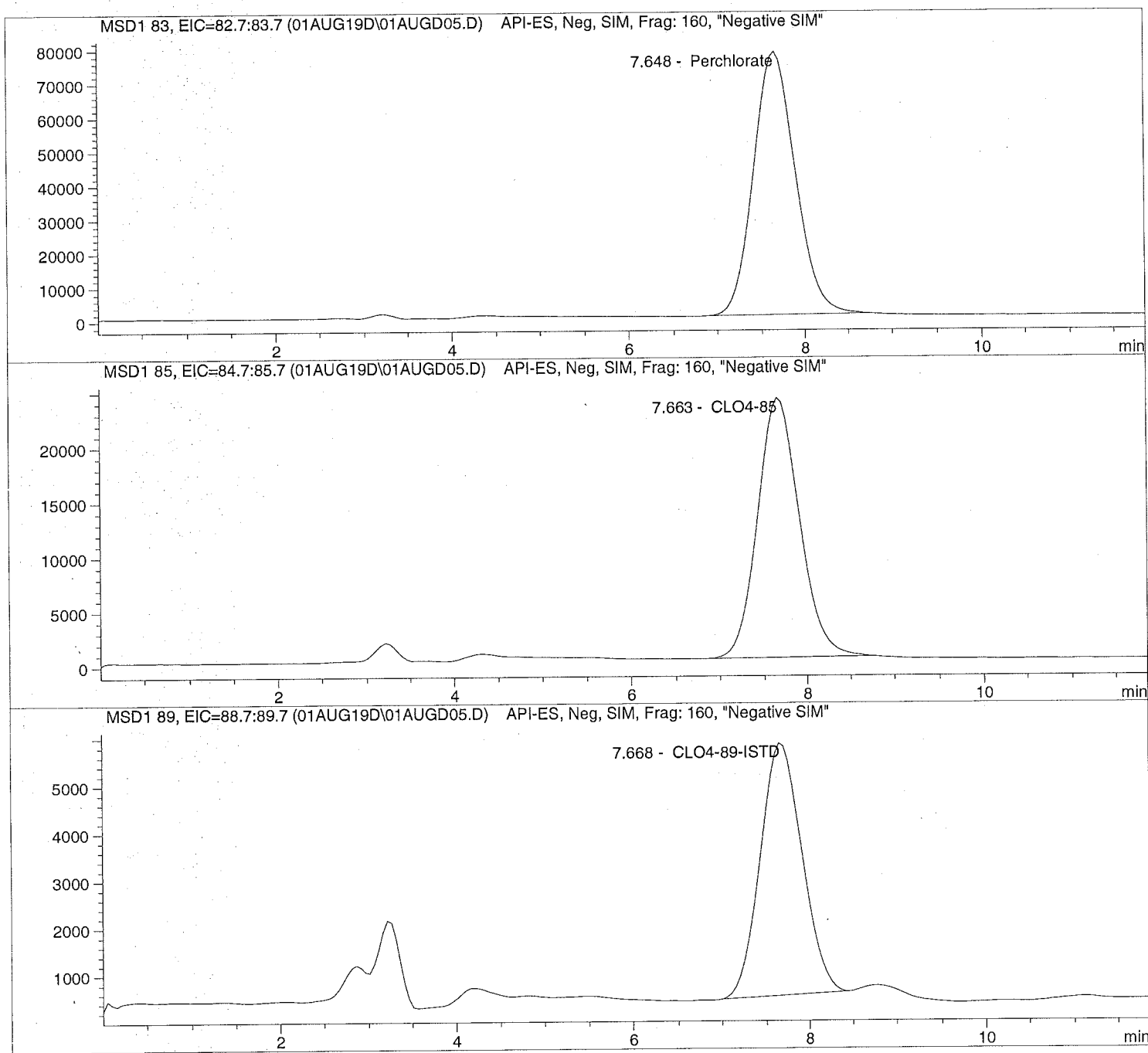
Sample Name: 1921215001

Injection Date: 8/01/2019 10:32:23  
Sample Name: 1921215001  
Acq Operator: TNB

Seq Line: 5  
Location: Vial 75  
Inj. No.: 1  
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD05.D Sample Name: 1921215001

```
=====
Injection Date: 8/01/2019 10:32:23      Seq Line:          5
Sample Name:    1921215001              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:   4/12/2019 07:54:13
```

Perchlorate analysis

Sample Information

```
Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000
```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.648	PBA	2591358.5	42.4677	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.663	PBA	795845.0	43.9511	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.668	PBA	178490.5	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD06.D

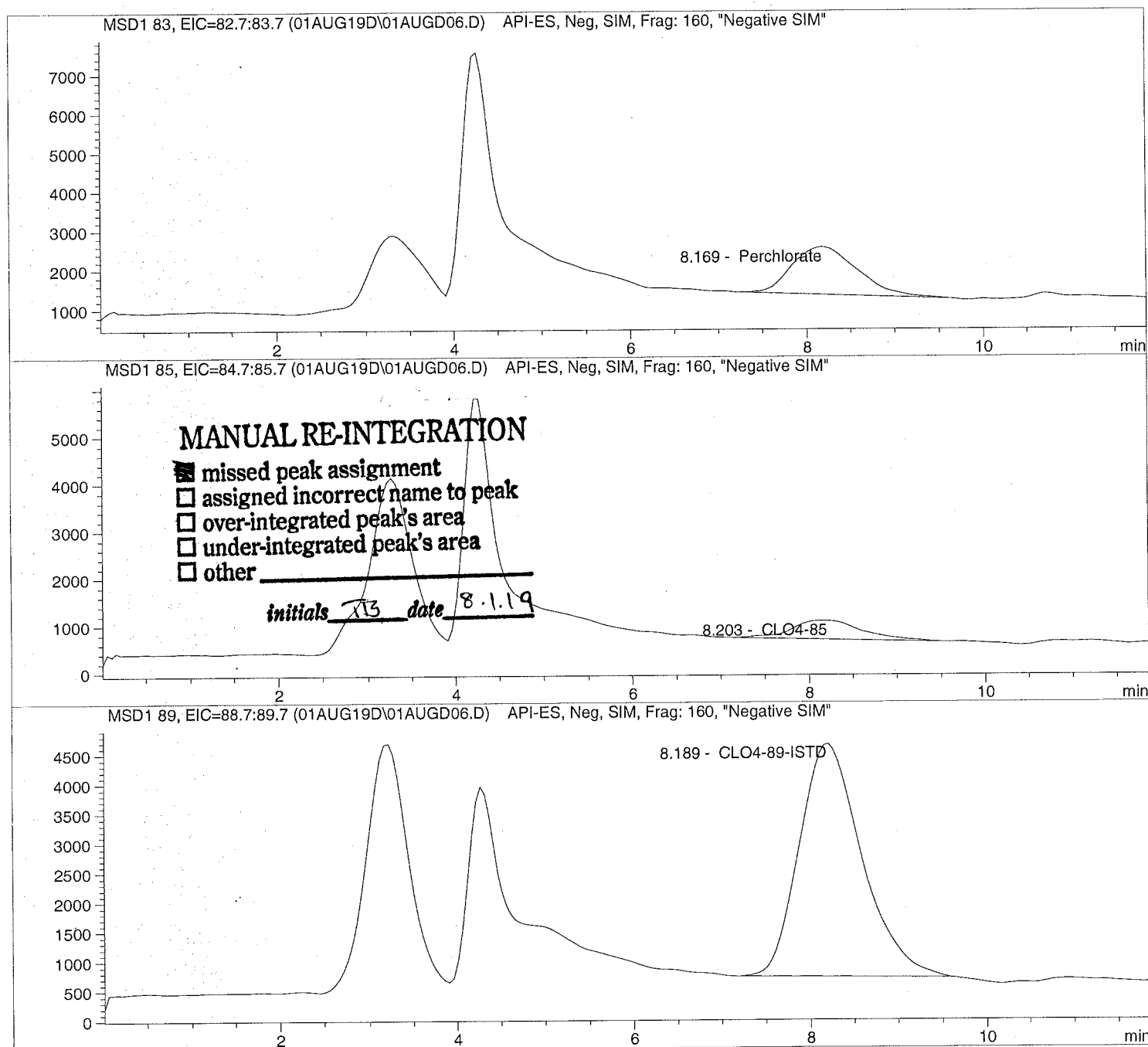
Sample Name: 1921707001

Injection Date: 8/01/2019 10:46:15  
 Sample Name: 1921707001  
 Acq Operator: TNB

Seq Line: 6  
 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: 4/12/2019 07:54:13

## Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD07.D

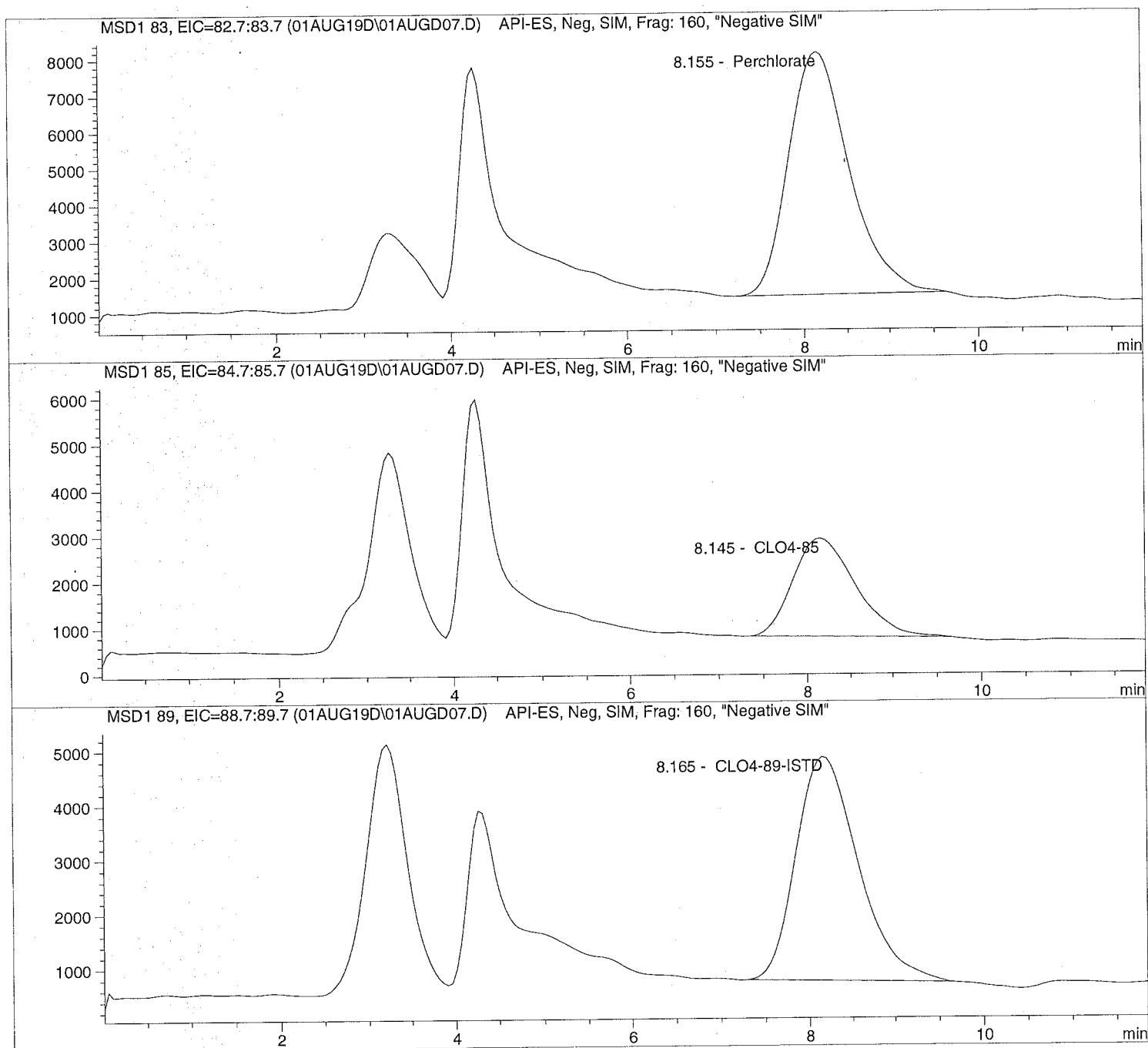
Sample Name: 666524 217071S

Injection Date: 8/01/2019 11:09:27  
Sample Name: 666524 217071S  
Acq Operator: TNB

Seq Line: 7  
Location: Vial 76  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD08.D

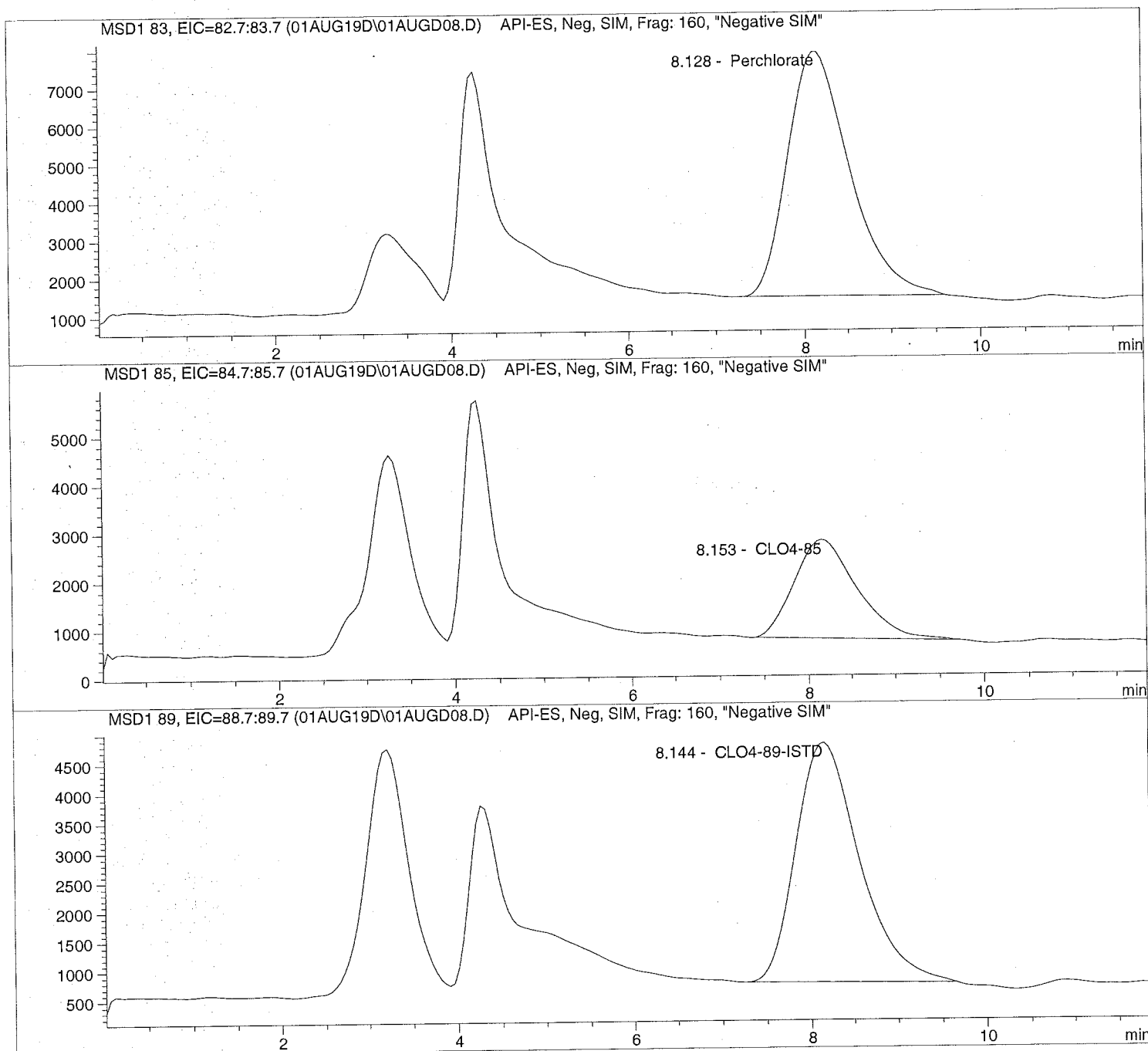
Sample Name: 666525 217071D

Injection Date: 8/01/2019 11:23:19  
Sample Name: 666525 217071D  
Acq Operator: TNB

Seq Line: 8  
Location: Vial 77  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD09.D

Sample Name: 664926 CCV@25

Injection Date: 8/01/2019 11:37:56

Seq Line: 9

Sample Name: 664926 CCV@25

Location: Vial 71

Acq Operator: TNB

Inj. No.: 1

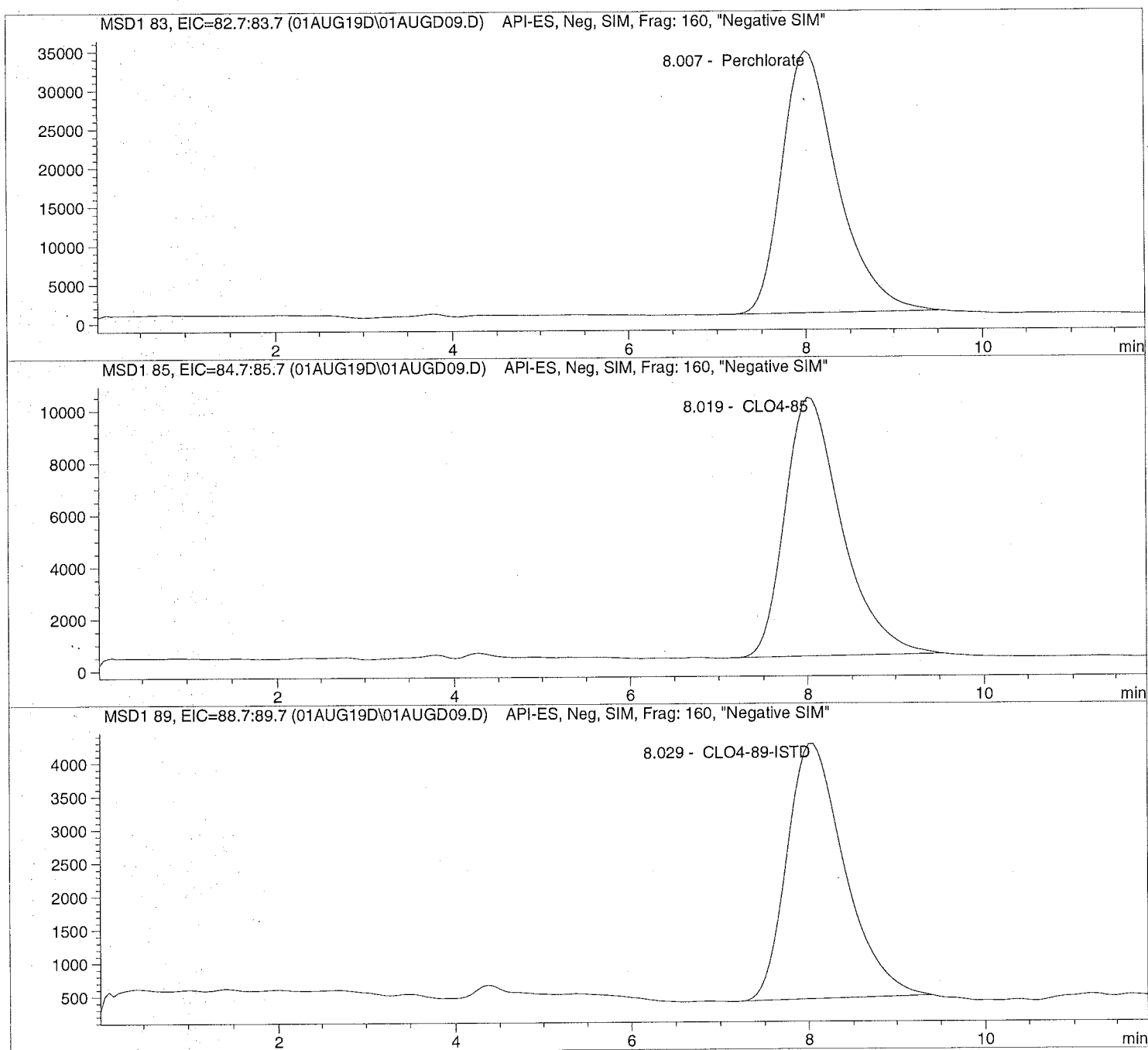
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD09.D Sample Name: 664926 CCV@25

=====  
 Injection Date: 8/01/2019 11:37:56 Seq Line: 9  
 Sample Name: 664926 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: 4/12/2019 07:54:13

Perchlorate analysis

=====  
 Sample Information  
 =====

Sorted By: Signal  
 Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am  
 Multiplier: 1.000000  
 Dilution: 1.000000  
 Sample Amount: 25.000

=====  
 LCMS Results  
 =====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.007	PBA	1465871.1	25.8339	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.019	PBA	441540.5	26.2015	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.029	PBA	172289.2	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

#	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	Amount	Area	Amt/Area	Ref Grp	Name
8.744	1	1.00000	7.76074e4	1.28854e-5	1	Perchlorate
	2	2.00000	1.35273e5	1.47849e-5		
	3	5.00000	3.37764e5	1.48033e-5		
	4	10.00000	6.83454e5	1.46316e-5		
	5	25.00000	2.08433e6	1.19943e-5		
	6	50.00000	4.13334e6	1.20968e-5		
	7	75.00000	5.99313e6	1.25143e-5		
8.755	2	1.00000	2.36780e4	4.22333e-5	1	CLO4-85
	2	2.00000	4.69486e4	4.25998e-5		
	3	5.00000	1.06124e5	4.71147e-5		
	4	10.00000	2.13523e5	4.68335e-5		
	5	25.00000	6.14295e5	4.06971e-5		
	6	50.00000	1.19814e6	4.17315e-5		
	7	75.00000	1.78355e6	4.20509e-5		
8.766	3	5.00000	2.73208e5	1.83011e-5	+I1	CLO4-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5		
	3	5.00000	2.33196e5	2.14412e-5		
	4	5.00000	2.34454e5	2.13262e-5		
	5	5.00000	2.50568e5	1.99547e-5		
	6	5.00000	2.30977e5	2.16472e-5		

RetTime	Lvl	Amount	Area	Amt/Area	Ref Grp Name
[min]	Sig				
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min  
Curve Type : Quadratic  
Origin : Ignored  
Calibration Level Weights:/  
Level 1 : 1  
Level 2 : 0.5  
Level 3 : 0.2  
Level 4 : 0.1  
Level 5 : 0.04  
Level 6 : 0.02  
Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min  
Curve Type : Quadratic  
Origin : Ignored  
Calibration Level Weights:/  
Level 1 : 1  
Level 2 : 0.5  
Level 3 : 0.2  
Level 4 : 0.1  
Level 5 : 0.04  
Level 6 : 0.02  
Level 7 : 0.013333

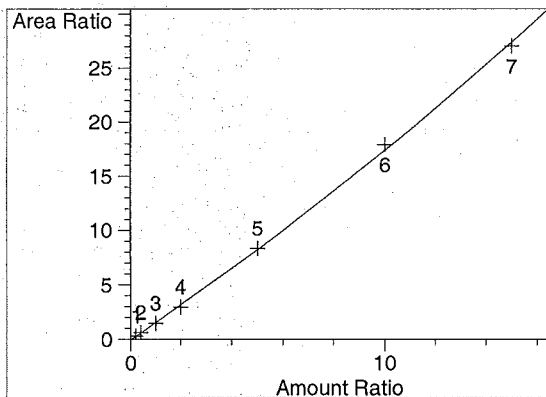
Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min  
Curve Type : Linear  
Origin : Included  
Calibration Level Weights:/  
Level 1 : 1  
Level 2 : 1  
Level 3 : 1  
Level 4 : 1  
Level 5 : 1  
Level 6 : 1  
Level 7 : 1

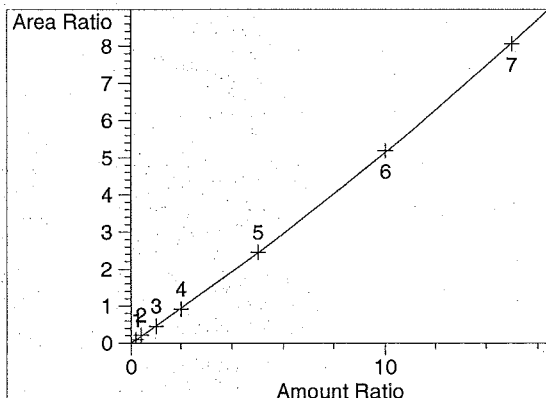
=====  
Peak Sum Table  
=====

\*\*\*No Entries in table\*\*\*  
=====

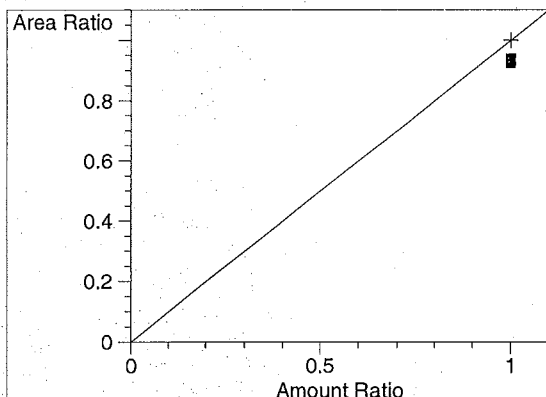
=====  
 Calibration Curves  
 =====



Perchlorate at exp. RT: 8.744  
 MSD1 83, EIC=82.7:83.7  
 Correlation: 0.99957  
 Residual Std. Dev.: 0.30744  
 Formula:  $y = ax^2 + bx + c$   
 a: 1.76988e-2  
 b: 1.56480  
 c: -4.92430e-2  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755  
 MSD1 85, EIC=84.7:85.7  
 Correlation: 0.99983  
 Residual Std. Dev.: 0.03473  
 Formula:  $y = ax^2 + bx + c$   
 a: 5.13396e-3  
 b: 4.62055e-1  
 c: 4.97209e-4  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766  
 MSD1 89, EIC=88.7:89.7  
 Correlation: 1.00000  
 Residual Std. Dev.: 0.00000  
 Formula:  $y = mx + b$   
 m: 1.00000  
 b: 0.00000  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

Batch Report: C:\HPCHEM\1\DATA\19MAR19I\19MAR19D.B

## Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

['#' ==&gt; Run has not been reprocessed with Batch Review Method

['\*' ==&gt; Run has been saved with batch file]

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	7.76074e4	8.744	1.06245
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	1.35273e5	8.992	2.06969
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	3.37764e5	8.586	4.73474
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	6.83454e5	8.698	9.27727
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.08433e6	8.451	25.29036
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	4.13334e6	8.810	51.36844
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	5.99313e6	8.586	74.16754
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	7.34719e5	8.702	9.25940

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.36780e4	8.755	9.30535e-1
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	4.69486e4	9.012	2.24255
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	1.06124e5	8.602	4.86656
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.13523e5	8.713	9.64312
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	6.14295e5	8.468	25.12159
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	1.19814e6	8.825	50.46721
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	1.78355e6	8.603	74.72019
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.27495e5	8.721	9.54024

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount
#*	CLO4@ 1.0ug/L	Vial 73	1	Control	3	2.73208e5	8.766	5.00000
#*	CLO4@ 2.0ug/L	Vial 74	1	Control	4	2.24886e5	9.012	5.00000
#*	CLO4@ 5.0ug/L	Vial 75	1	Control	5	2.33196e5	8.609	5.00000
#*	CLO4@ 10.ug/L	Vial 76	1	Control	6	2.34454e5	8.716	5.00000
#*	CLO4@ 25.ug/L	Vial 77	1	Control	7	2.50568e5	8.472	5.00000
#*	CLO4@ 50.ug/L	Vial 78	1	Control	8	2.30977e5	8.825	5.00000
#*	CLO4@ 75.ug/L	Vial 79	1	Control	9	2.21504e5	8.610	5.00000
#*	ICAL Verf@10ug/L	Vial 80	1	Control	10	2.52544e5	8.725	5.00000

\*\*\* End of Report \*\*\*

Sequence: C:\HPCHEM\1\SEQUENCE\CLO4\2019\MAR\19MAR19I.S

## Sequence Table:

## Method and Injection Info Part:

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

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

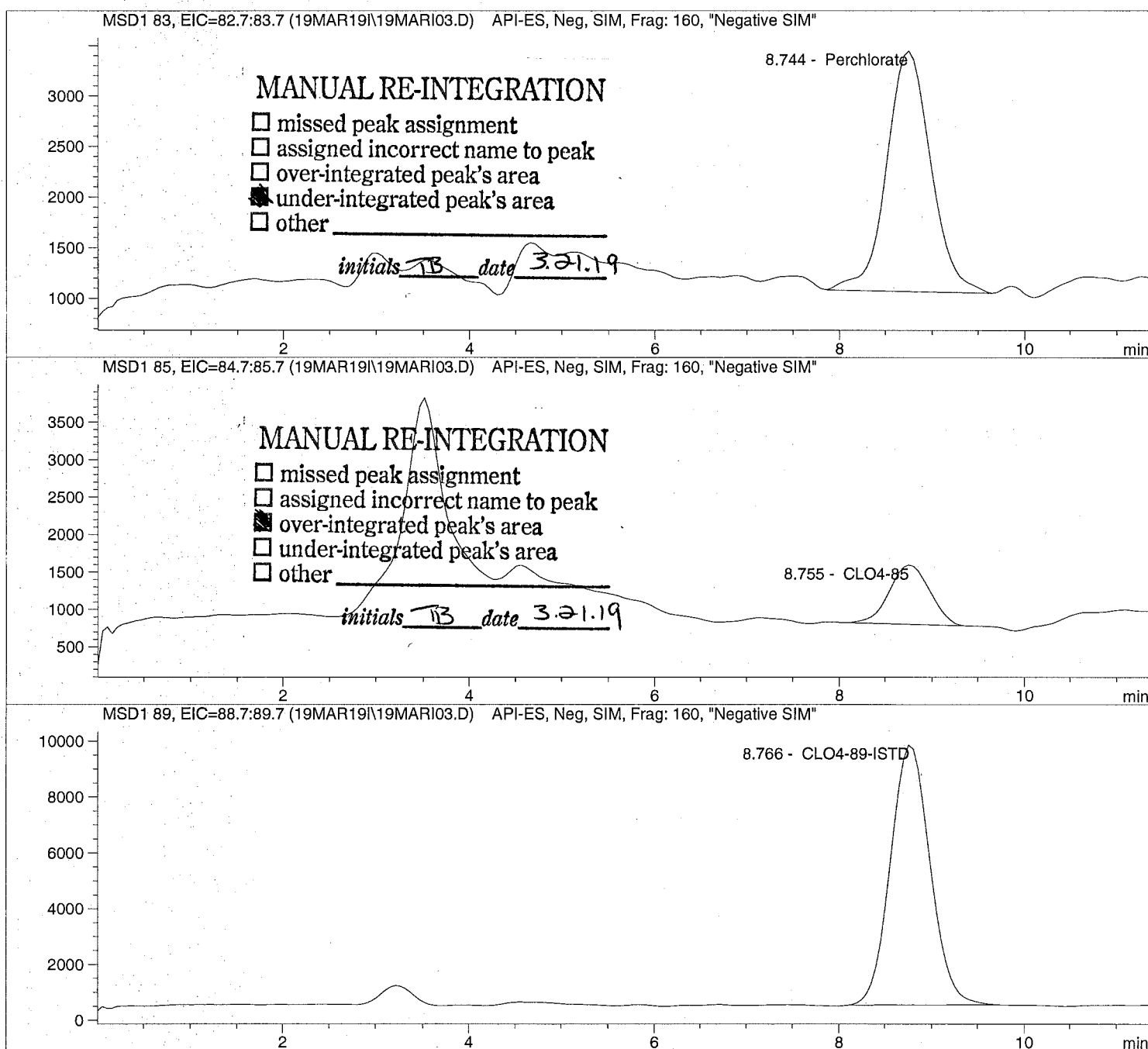
Inj. Vol.: 30 µl

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

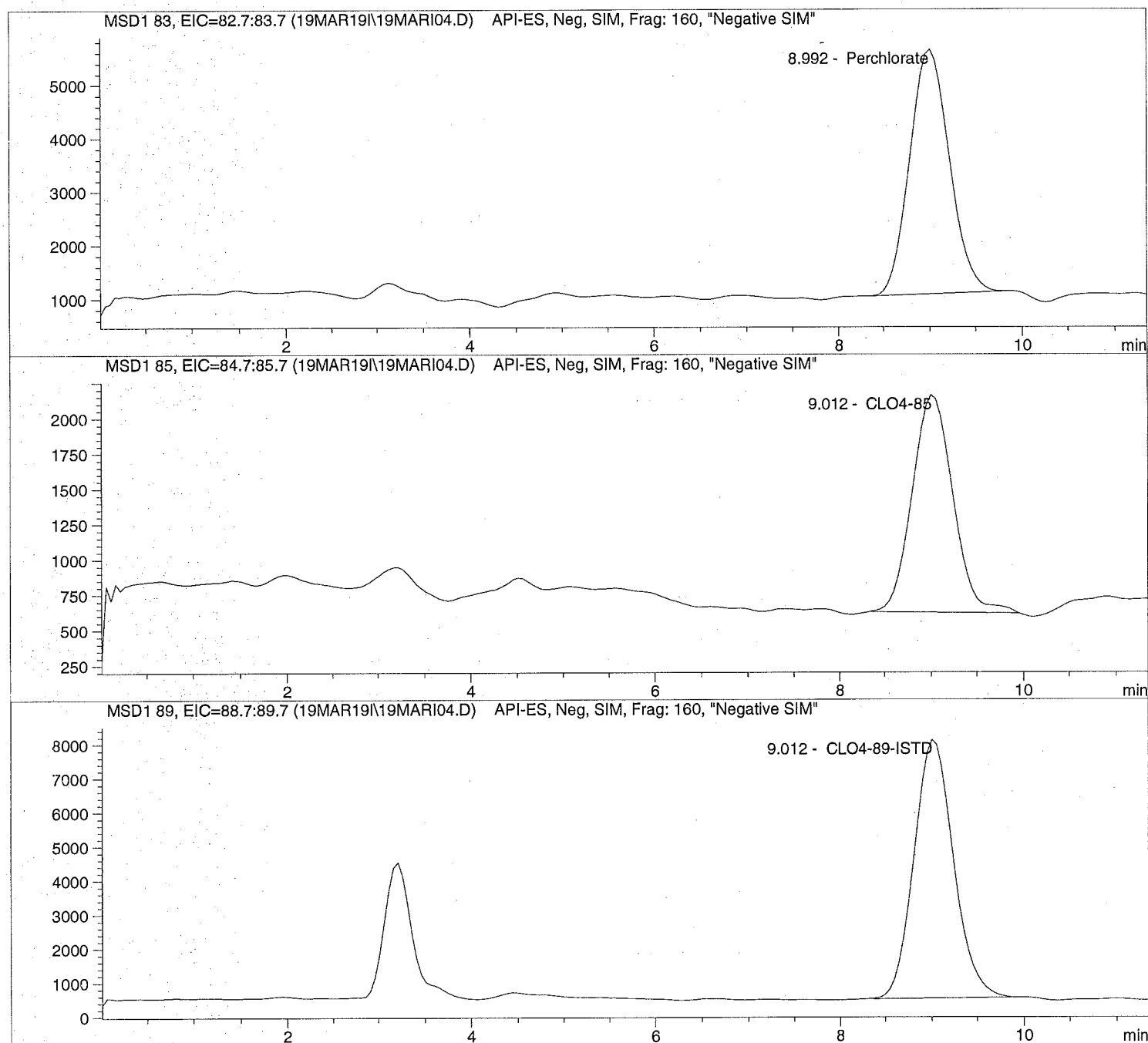
Inj. Vol.: 30 µl

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\19MAR19\19MARI05.D

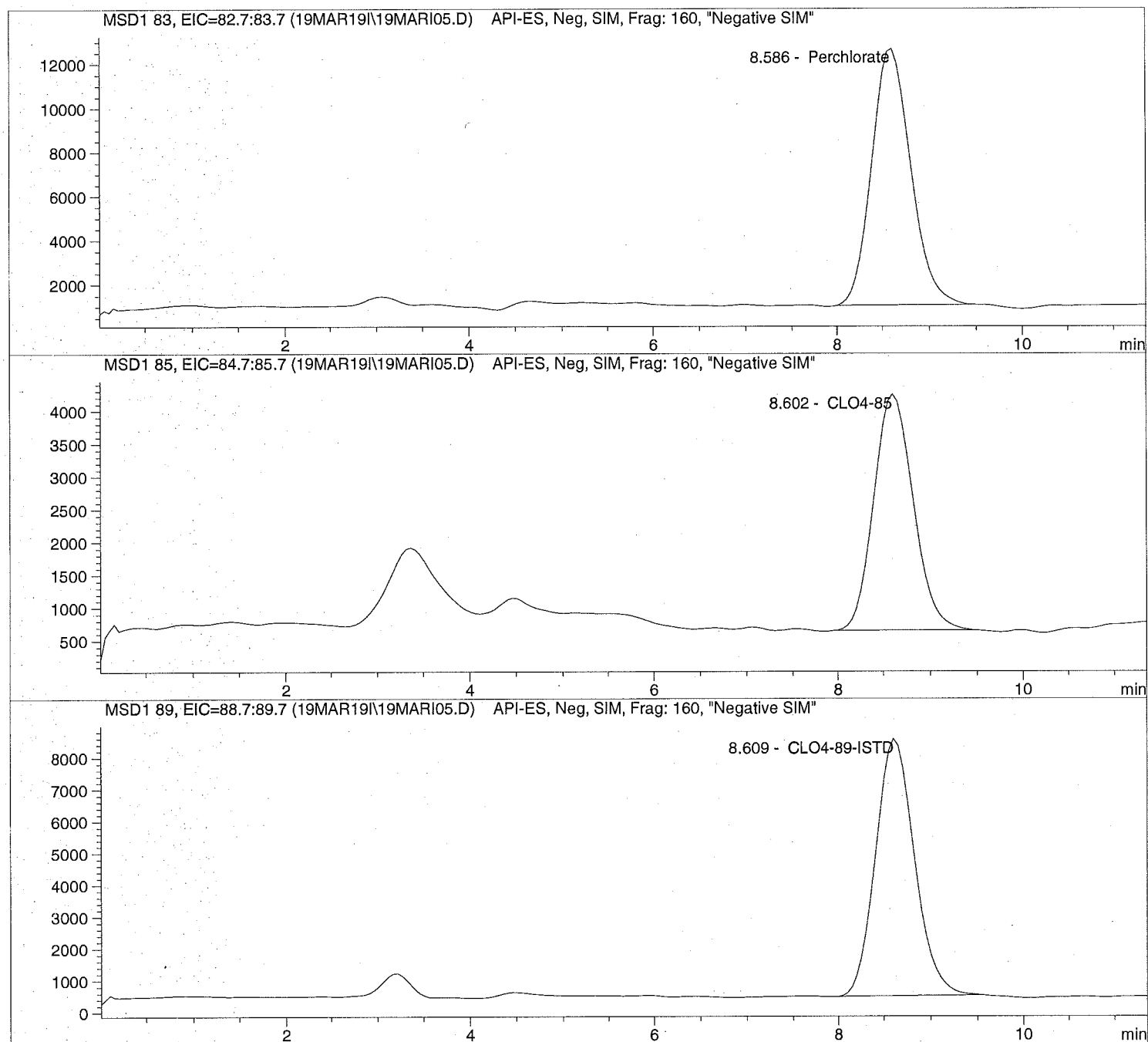
Sample Name: CLO4@ 5.0ug/L

Injection Date: 3/19/2019 10:06:16  
Sample Name: CLO4@ 5.0ug/L  
Acq Operator: TNB

Seq Line: 5  
Location: Vial 75  
Inj. No.: 1  
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\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\19MAR19\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

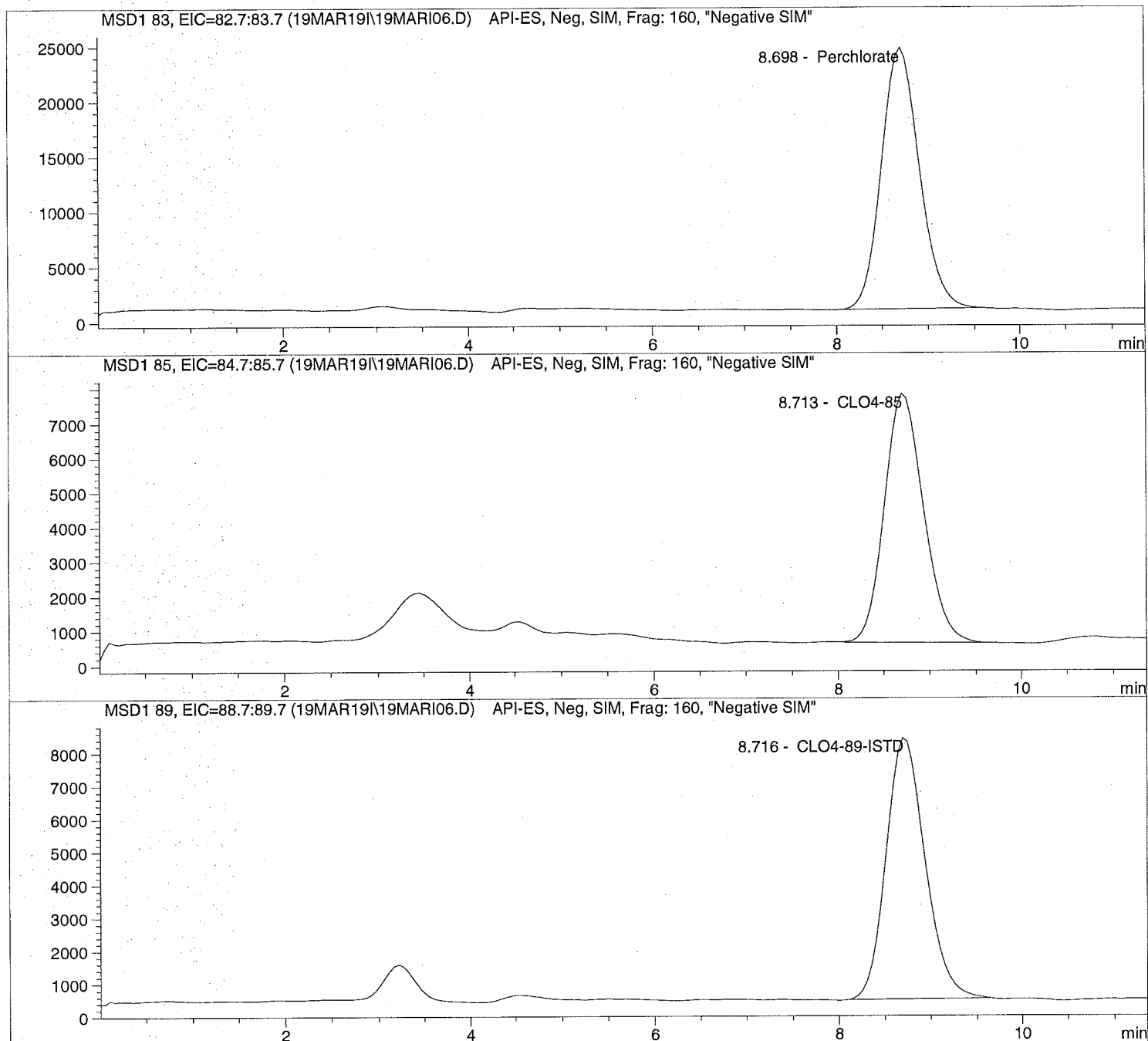
Inj. Vol.: 30 µl

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

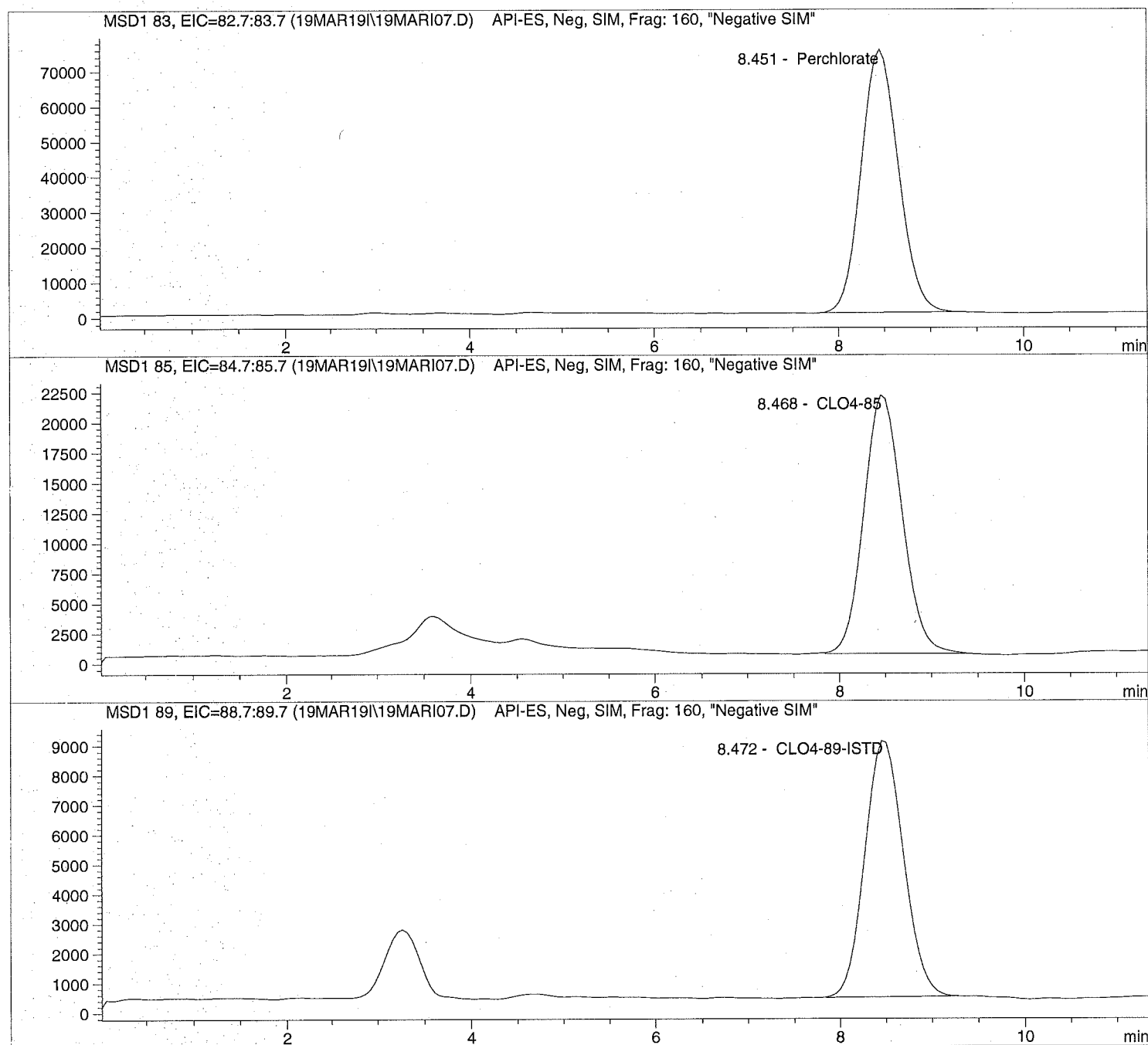
Sample Name: CLO4@ 25.ug/L

Injection Date: 3/19/2019 10:32:49  
Sample Name: CLO4@ 25.ug/L  
Acq Operator: TNB

Seq Line: 7  
Location: Vial 77  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

## Perchlorate analysis





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

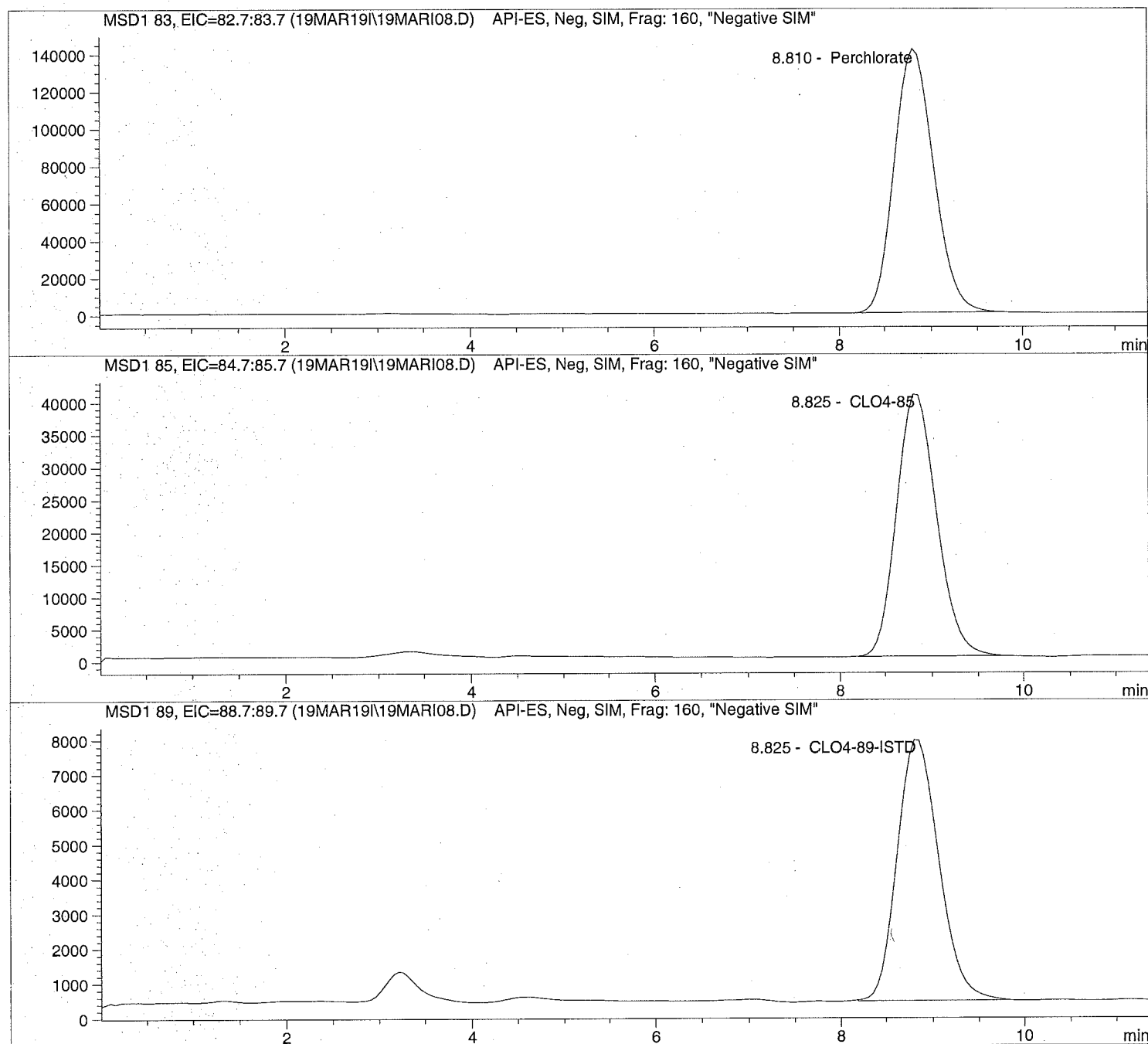
Inj. Vol.: 30 µl

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

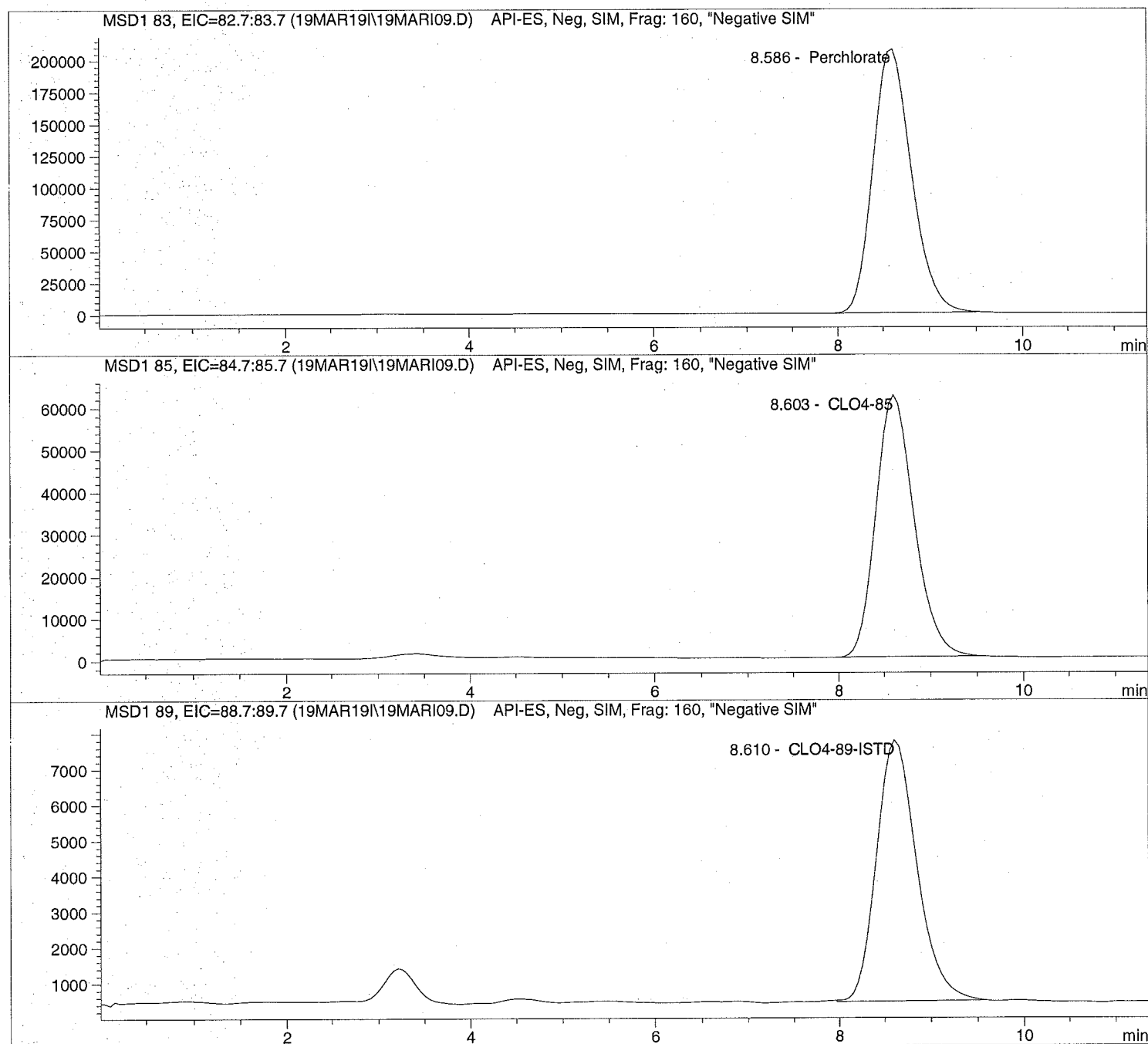
Sample Name: CLO4@ 75.ug/L

Injection Date: 3/19/2019 10:59:22  
Sample Name: CLO4@ 75.ug/L  
Acq Operator: TNB

Seq Line: 9  
Location: Vial 79  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI09.D Sample Name: CLO4@ 75.ug/L

```

=====
Injection Date: 3/19/2019 10:59:22      Seq Line:          9
Sample Name:    CLO4@ 75.ug/L           Location:          Vial 79
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        30 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  75.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

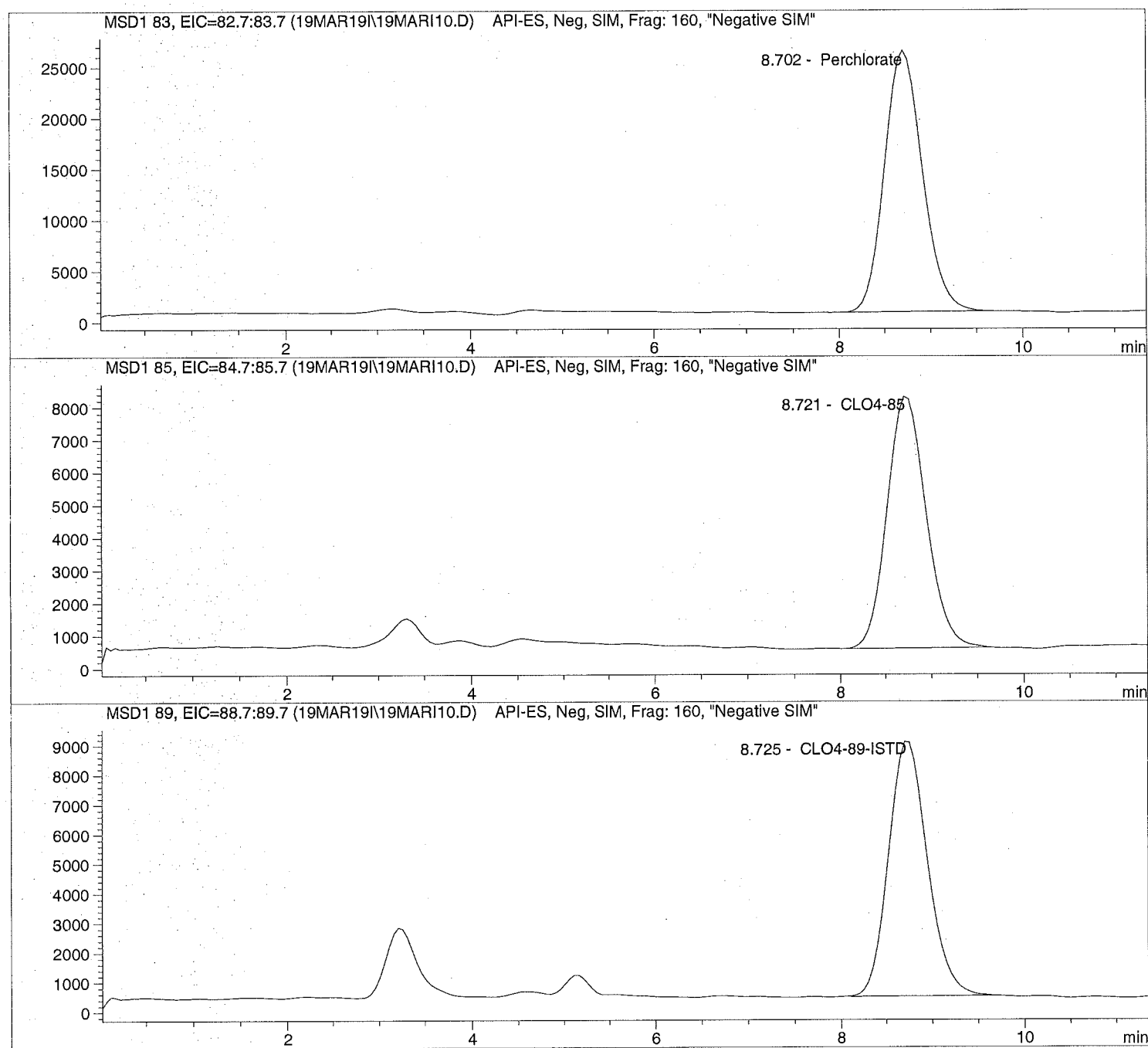
\*\*\* End of Report \*\*\*

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

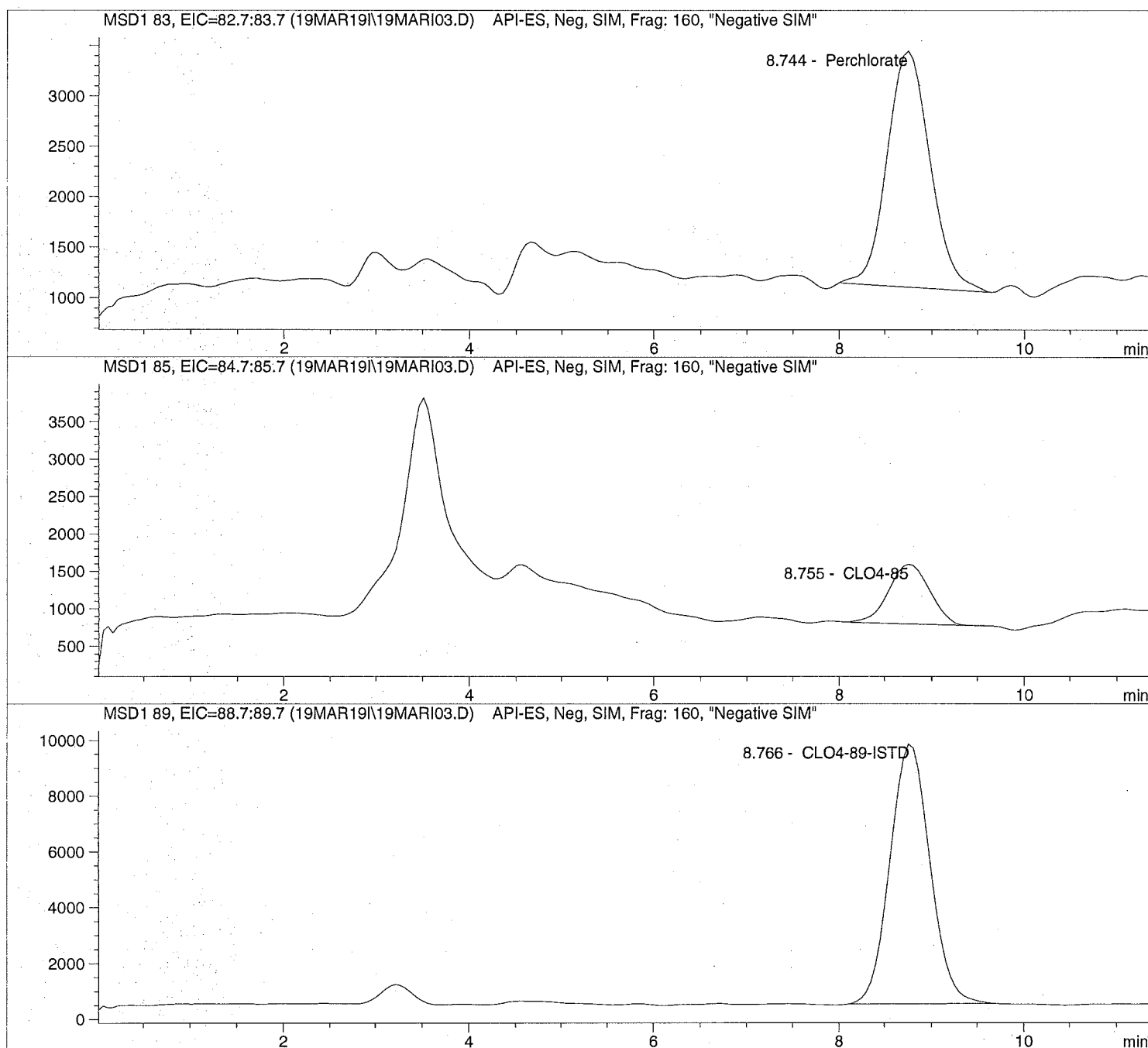
Inj. Vol.: 30  $\mu$ l

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 \*\*\*

Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD06.D

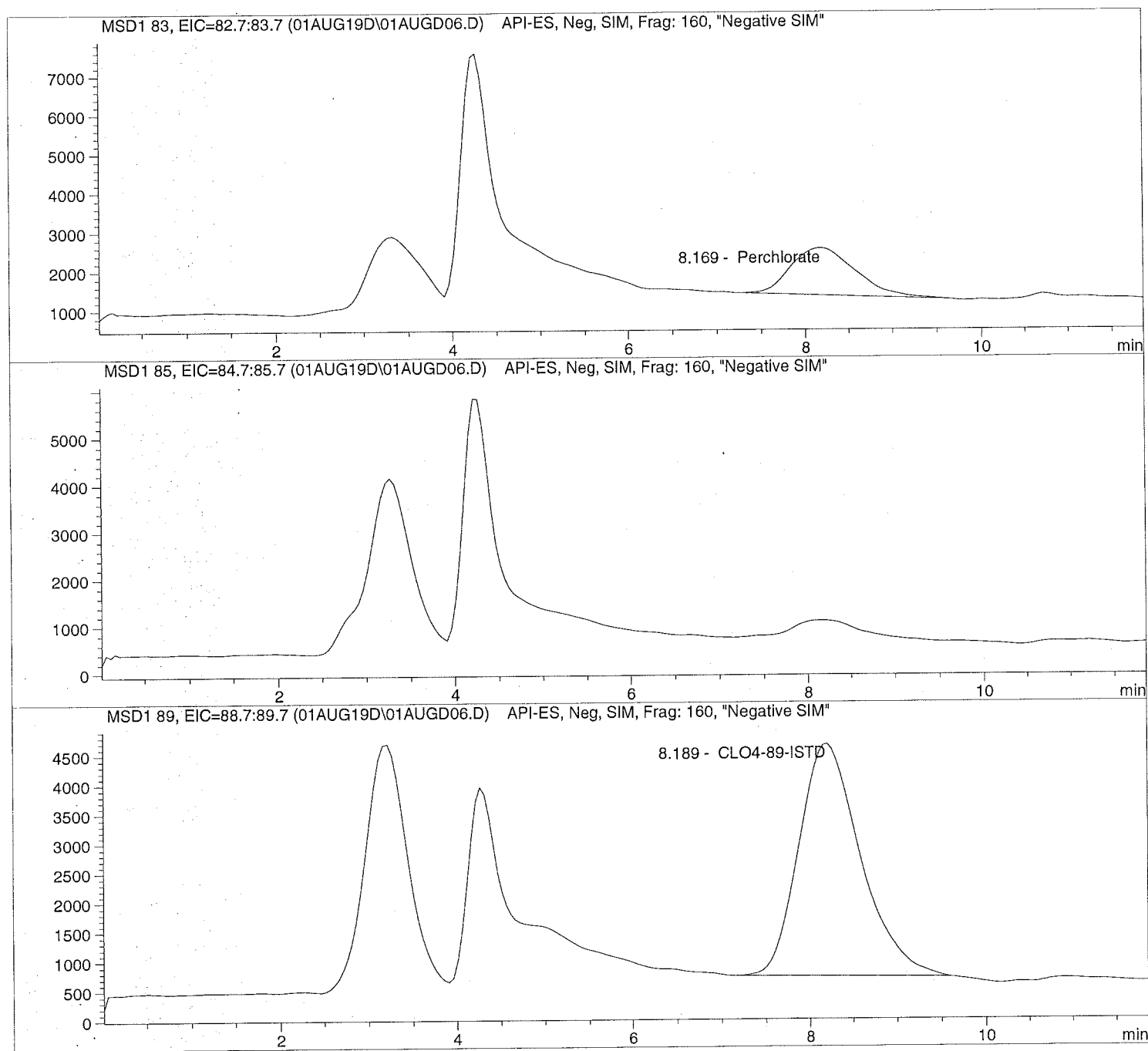
Sample Name: 1921707001

Injection Date: 8/01/2019 10:46:15  
Sample Name: 1921707001  
Acq Operator: TNB

Seq Line: 6  
Location: Vial 78  
Inj. No.: 1  
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\01AUG19D\01AUGD06.D Sample Name: 1921707001

=====  
Injection Date: 8/01/2019 10:46:15 Seq Line: 6  
Sample Name: 1921707001 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: 4/12/2019 07:54:13

Perchlorate analysis

=====  
Sample Information  
=====

Sorted By: Signal  
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am  
Multiplier: 1.000000  
Dilution: 1.000000  
Sample Amount: 0.000

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.169	PBA	61557.4	1.1685	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
8.189	PBA	193928.5	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

August 08, 2019

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

Work Order: **HS19071164**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia,

ALS Environmental received 2 sample(s) on Jul 24, 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval scribble.

Generated By: JUMOKE.LAWAL  
RJ Modashia  
Project Manager

ALS Houston, US

Date: 08-ago-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19071164

**SAMPLE SUMMARY**

---

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19071164-01	LH18/24-SP650_072319	Water		23-Jul-2019 14:00	24-Jul-2019 08:42	<input type="checkbox"/>
HS19071164-02	Trip Blank	Water	C&G- 040119-118	23-Jul-2019 00:00	24-Jul-2019 08:42	<input type="checkbox"/>

---

ALS Houston, US

Date: 08-Aug-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19071164

---

**CASE NARRATIVE**

---

**GCMS Volatiles by Method SW8260****Batch ID: R343013****Sample ID: CCV**

- Bromoform exceeded %D limits for CCV. Samples are ND for this compound.

**Sample ID: LH18/24-SP650\_072319 (HS19071164-01MS)**

- The recovery of the Matrix Spike (MS) associated to this analyte was outside of the established control limits. However, the LCS was within control limits. The failed recovery of the MS may be due to sample matrix interference.

**Sample ID: LH18/24-SP650\_072319 (HS19071164-01MSD)**

- The recovery of the Matrix Spike Duplicate (MSD) associated to this analyte was outside of the established control limits. However, the LCS was within control limits. The failed recovery of the MSD may be due to sample matrix interference.
- 

**WetChemistry by Method SW9056****Batch ID: R343851**

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

## ALS Houston, US

Date: 08-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_072319  
 Collection Date: 23-Jul-2019 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19071164  
 Lab ID:HS19071164-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	24-Jul-2019 16:54	
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	24-Jul-2019 16:54	
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	24-Jul-2019 16:54	
<b>Acetone</b>	<b>4.6</b>		<b>0.40</b>	<b>1.0</b>	<b>2.0</b>	<b>UG/L</b>	1	24-Jul-2019 16:54	
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	24-Jul-2019 16:54	
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	

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



## ALS Houston, US

Date: 08-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_072319  
 Collection Date: 23-Jul-2019 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19071164  
 Lab ID:HS19071164-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
<b>cis-1,2-Dichloroethene</b>	<b>2.1</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	24-Jul-2019 16:54	
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	24-Jul-2019 16:54	
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	24-Jul-2019 16:54	
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	24-Jul-2019 16:54	
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
<b>Trichloroethene</b>	<b>0.88</b>	<b>J</b>	<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	24-Jul-2019 16:54	
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:54	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>94.9</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	1	24-Jul-2019 16:54	
<i>Surr: 4-Bromofluorobenzene</i>	<i>101</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	1	24-Jul-2019 16:54	
<i>Surr: Dibromofluoromethane</i>	<i>93.5</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	1	24-Jul-2019 16:54	
<i>Surr: Toluene-d8</i>	<i>105</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	1	24-Jul-2019 16:54	
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>							Analyst: KMU
<b>Chloride</b>	<b>494</b>		<b>2.00</b>	<b>0</b>	<b>5.00</b>	<b>mg/L</b>	10	07-Aug-2019 16:55	
<b>Sulfate</b>	<b>32.3</b>		<b>2.00</b>	<b>0</b>	<b>5.00</b>	<b>mg/L</b>	10	07-Aug-2019 16:55	

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

## ALS Houston, US

Date: 08-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: Trip Blank  
 Collection Date: 23-Jul-2019 00:00

**ANALYTICAL REPORT**

WorkOrder:HS19071164  
 Lab ID:HS19071164-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	24-Jul-2019 16:30	
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	24-Jul-2019 16:30	
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	24-Jul-2019 16:30	
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	24-Jul-2019 16:30	
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	24-Jul-2019 16:30	
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	

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

## ALS Houston, US

Date: 08-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: Trip Blank  
 Collection Date: 23-Jul-2019 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19071164  
 Lab ID:HS19071164-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	24-Jul-2019 16:30	
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	24-Jul-2019 16:30	
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	24-Jul-2019 16:30	
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	24-Jul-2019 16:30	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>97.1</i>			<b>0</b>	<i>81-118</i>	<i>%REC</i>	<i>1</i>	<i>24-Jul-2019 16:30</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>101</i>			<b>0</b>	<i>85-114</i>	<i>%REC</i>	<i>1</i>	<i>24-Jul-2019 16:30</i>	
<i>Surr: Dibromofluoromethane</i>	<i>95.7</i>			<b>0</b>	<i>80-119</i>	<i>%REC</i>	<i>1</i>	<i>24-Jul-2019 16:30</i>	
<i>Surr: Toluene-d8</i>	<i>105</i>			<b>0</b>	<i>89-112</i>	<i>%REC</i>	<i>1</i>	<i>24-Jul-2019 16:30</i>	

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

ALS Houston, US

Date: 08-ago-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071164

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R343013 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS19071164-01	LH18/24-SP650_072319	23 Jul 2019 14:00			24 Jul 2019 16:54	1
HS19071164-02	Trip Blank	23 Jul 2019 00:00			24 Jul 2019 16:30	1
<b>Batch ID:</b> R343851 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> Water	
HS19071164-01	LH18/24-SP650_072319	23 Jul 2019 14:00			07 Aug 2019 16:55	10

ALS Houston, US

Date: 08-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071164

**QC BATCH REPORT**

Batch ID: R343013 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MBLK	Sample ID: VBLKW-190724	Units: UG/L			Analysis Date: 24-Jul-2019 13:43					
Client ID:	Run ID: VOA6_343013	SeqNo: 5179893	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	0.50	1.0								U
1,1,1-Trichloroethane	0.50	1.0								U
1,1,2,2-Tetrachloroethane	0.50	1.0								U
1,1,2-Trichloroethane	0.50	1.0								U
1,1-Dichloroethane	0.50	1.0								U
1,1-Dichloroethene	0.50	1.0								U
1,1-Dichloropropene	0.50	1.0								U
1,2,3-Trichlorobenzene	0.50	1.0								U
1,2,3-Trichloropropane	0.50	1.0								U
1,2,4-Trichlorobenzene	0.50	1.0								U
1,2,4-Trimethylbenzene	0.50	1.0								U
1,2-Dibromo-3-chloropropane	0.50	1.0								U
1,2-Dibromoethane	0.50	1.0								U
1,2-Dichlorobenzene	0.50	1.0								U
1,2-Dichloroethane	0.50	1.0								U
1,2-Dichloropropane	0.50	1.0								U
1,3,5-Trimethylbenzene	0.50	1.0								U
1,3-Dichlorobenzene	0.50	1.0								U
1,3-Dichloropropane	0.50	1.0								U
1,4-Dichlorobenzene	0.50	1.0								U
2,2-Dichloropropane	0.50	1.0								U
2-Butanone	1.0	2.0								U
2-Chlorotoluene	0.50	1.0								U
2-Hexanone	1.0	2.0								U
4-Chlorotoluene	0.50	1.0								U
4-Isopropyltoluene	0.50	1.0								U
4-Methyl-2-pentanone	1.0	2.0								U
Acetone	1.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U
Bromomethane	0.50	1.0								U

## ALS Houston, US

Date: 08-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071164

## QC BATCH REPORT

Batch ID: R343013 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MBLK	Sample ID: VBLKW-190724	Units: UG/L			Analysis Date: 24-Jul-2019 13:43					
Client ID:	Run ID: VOA6_343013	SeqNo: 5179893	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	1.0	2.0								U
Carbon tetrachloride	0.50	1.0								U
Chlorobenzene	0.50	1.0								U
Chloroethane	0.50	1.0								U
Chloroform	0.50	1.0								U
Chloromethane	0.50	1.0								U
cis-1,2-Dichloroethene	0.50	1.0								U
cis-1,3-Dichloropropene	0.50	1.0								U
Dibromochloromethane	0.50	1.0								U
Dibromomethane	0.50	1.0								U
Dichlorodifluoromethane	0.50	1.0								U
Ethylbenzene	0.50	1.0								U
Hexachlorobutadiene	1.0	1.0								U
Isopropylbenzene	0.50	1.0								U
m,p-Xylene	1.0	2.0								U
Methylene chloride	1.0	2.0								U
Naphthalene	0.50	1.0								U
n-Butylbenzene	0.50	1.0								U
n-Propylbenzene	0.50	1.0								U
o-Xylene	0.50	1.0								U
sec-Butylbenzene	0.50	1.0								U
Styrene	0.50	1.0								U
tert-Butylbenzene	0.50	1.0								U
Tetrachloroethene	0.50	1.0								U
Toluene	0.50	1.0								U
trans-1,2-Dichloroethene	0.50	1.0								U
trans-1,3-Dichloropropene	0.50	1.0								U
Trichloroethene	0.50	1.0								U
Trichlorofluoromethane	0.50	1.0								U
Vinyl chloride	0.50	1.0								U
Surr: 1,2-Dichloroethane-d4	50.76	1.0	50	0	102	81 - 118				
Surr: 4-Bromofluorobenzene	53.38	1.0	50	0	107	85 - 114				
Surr: Dibromofluoromethane	49.55	1.0	50	0	99.1	80 - 119				
Surr: Toluene-d8	55.76	1.0	50	0	112	89 - 112				

ALS Houston, US

Date: 08-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071164

**QC BATCH REPORT**

Batch ID: R343013 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS	Sample ID: VLCSW-190724	Units: UG/L			Analysis Date: 24-Jul-2019 12:55					
Client ID:	Run ID: VOA6_343013	SeqNo: 5179892	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	22.92	1.0	20	0	115	78 - 124				
1,1,1-Trichloroethane	20.01	1.0	20	0	100	74 - 131				
1,1,2,2-Tetrachloroethane	21.21	1.0	20	0	106	71 - 121				
1,1,2-Trichloroethane	22.12	1.0	20	0	111	80 - 119				
1,1-Dichloroethane	20.41	1.0	20	0	102	77 - 125				
1,1-Dichloroethene	17.55	1.0	20	0	87.7	71 - 131				
1,1-Dichloropropene	19.98	1.0	20	0	99.9	78 - 125				
1,2,3-Trichlorobenzene	18	1.0	20	0	90.0	69 - 129				
1,2,3-Trichloropropane	20.2	1.0	20	0	101	73 - 122				
1,2,4-Trichlorobenzene	18.78	1.0	20	0	93.9	69 - 130				
1,2,4-Trimethylbenzene	21.61	1.0	20	0	108	76 - 124				
1,2-Dibromo-3-chloropropane	20.3	1.0	20	0	102	62 - 128				
1,2-Dibromoethane	22.62	1.0	20	0	113	77 - 121				
1,2-Dichlorobenzene	21.78	1.0	20	0	109	80 - 119				
1,2-Dichloroethane	22.27	1.0	20	0	111	73 - 128				
1,2-Dichloropropane	22.15	1.0	20	0	111	78 - 122				
1,3,5-Trimethylbenzene	21.34	1.0	20	0	107	75 - 124				
1,3-Dichlorobenzene	21.85	1.0	20	0	109	80 - 119				
1,3-Dichloropropane	21.98	1.0	20	0	110	80 - 119				
1,4-Dichlorobenzene	21.12	1.0	20	0	106	79 - 118				
2,2-Dichloropropane	20.89	1.0	20	0	104	60 - 139				
2-Butanone	41.68	2.0	40	0	104	56 - 143				
2-Chlorotoluene	21.48	1.0	20	0	107	79 - 122				
2-Hexanone	42.27	2.0	40	0	106	57 - 139				
4-Chlorotoluene	21.41	1.0	20	0	107	78 - 122				
4-Isopropyltoluene	20.62	1.0	20	0	103	77 - 127				
4-Methyl-2-pentanone	42.05	2.0	40	0	105	67 - 130				
Acetone	46.15	2.0	40	0	115	39 - 160				
Benzene	21.04	1.0	20	0	105	79 - 120				
Bromobenzene	22.33	1.0	20	0	112	80 - 120				
Bromochloromethane	20.31	1.0	20	0	102	78 - 123				
Bromodichloromethane	21.97	1.0	20	0	110	79 - 125				
Bromoform	22.46	1.0	20	0	112	66 - 130				
Bromomethane	21.65	1.0	20	0	108	53 - 141				

## ALS Houston, US

Date: 08-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071164

## QC BATCH REPORT

Batch ID: R343013 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS	Sample ID: VLCSW-190724	Units: UG/L			Analysis Date: 24-Jul-2019 12:55					
Client ID:	Run ID: VOA6_343013	SeqNo: 5179892	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	39.92	2.0	40	0	99.8	64 - 133				
Carbon tetrachloride	19.17	1.0	20	0	95.8	72 - 136				
Chlorobenzene	22.18	1.0	20	0	111	82 - 118				
Chloroethane	18.13	1.0	20	0	90.6	60 - 138				
Chloroform	21.45	1.0	20	0	107	79 - 124				
Chloromethane	18.83	1.0	20	0	94.2	50 - 139				
cis-1,2-Dichloroethene	20.36	1.0	20	0	102	78 - 123				
cis-1,3-Dichloropropene	22.6	1.0	20	0	113	75 - 124				
Dibromochloromethane	22.51	1.0	20	0	113	74 - 126				
Dibromomethane	21.84	1.0	20	0	109	79 - 123				
Dichlorodifluoromethane	19.94	1.0	20	0	99.7	32 - 152				
Ethylbenzene	22.31	1.0	20	0	112	79 - 121				
Hexachlorobutadiene	21.47	1.0	20	0	107	66 - 134				
Isopropylbenzene	21.87	1.0	20	0	109	72 - 131				
m,p-Xylene	45.35	2.0	40	0	113	80 - 121				
Methylene chloride	20.17	2.0	20	0	101	74 - 124				
Naphthalene	17.45	1.0	20	0	87.3	61 - 128				
n-Butylbenzene	21.75	1.0	20	0	109	75 - 128				
n-Propylbenzene	20.75	1.0	20	0	104	76 - 126				
o-Xylene	22	1.0	20	0	110	78 - 122				
sec-Butylbenzene	20.2	1.0	20	0	101	77 - 126				
Styrene	23.14	1.0	20	0	116	78 - 123				
tert-Butylbenzene	20.63	1.0	20	0	103	78 - 124				
Tetrachloroethene	21.96	1.0	20	0	110	74 - 129				
Toluene	22.47	1.0	20	0	112	80 - 121				
trans-1,2-Dichloroethene	20.29	1.0	20	0	101	75 - 124				
trans-1,3-Dichloropropene	22.37	1.0	20	0	112	73 - 127				
Trichloroethene	21.3	1.0	20	0	107	79 - 123				
Trichlorofluoromethane	17.28	1.0	20	0	86.4	65 - 141				
Vinyl chloride	17.87	1.0	20	0	89.3	58 - 137				
Surr: 1,2-Dichloroethane-d4	44.49	1.0	50	0	89.0	81 - 118				
Surr: 4-Bromofluorobenzene	47.12	1.0	50	0	94.2	85 - 114				
Surr: Dibromofluoromethane	44.22	1.0	50	0	88.4	80 - 119				
Surr: Toluene-d8	45.93	1.0	50	0	91.9	89 - 112				



ALS Houston, US

Date: 08-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071164

**QC BATCH REPORT**

Batch ID: R343013 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS		Sample ID: HS19071164-01MS		Units: UG/L		Analysis Date: 24-Jul-2019 17:42				
Client ID: LH18/24-SP650_072319		Run ID: VOA6_343013		SeqNo: 5179902		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	21.51	1.0	20	0	108	78 - 124				
1,1,1-Trichloroethane	20.35	1.0	20	0	102	74 - 131				
1,1,2,2-Tetrachloroethane	19.24	1.0	20	0	96.2	71 - 121				
1,1,2-Trichloroethane	20.16	1.0	20	0	101	80 - 119				
1,1-Dichloroethane	19.63	1.0	20	0	98.2	77 - 125				
1,1-Dichloroethene	18.26	1.0	20	0	91.3	71 - 131				
1,1-Dichloropropene	21.31	1.0	20	0	107	78 - 125				
1,2,3-Trichlorobenzene	14.94	1.0	20	0	74.7	69 - 129				
1,2,3-Trichloropropane	17.78	1.0	20	0	88.9	73 - 122				
1,2,4-Trichlorobenzene	16.82	1.0	20	0	84.1	69 - 130				
1,2,4-Trimethylbenzene	21.94	1.0	20	0	110	76 - 124				
1,2-Dibromo-3-chloropropane	16.35	1.0	20	0	81.7	62 - 128				
1,2-Dibromoethane	19.98	1.0	20	0	99.9	77 - 121				
1,2-Dichlorobenzene	20.45	1.0	20	0	102	80 - 119				
1,2-Dichloroethane	25.89	1.0	20	0	129	73 - 128			S	
1,2-Dichloropropane	20.3	1.0	20	0	102	78 - 122				
1,3,5-Trimethylbenzene	22.16	1.0	20	0	111	75 - 124				
1,3-Dichlorobenzene	21.46	1.0	20	0	107	80 - 119				
1,3-Dichloropropane	19.89	1.0	20	0	99.4	80 - 119				
1,4-Dichlorobenzene	20.28	1.0	20	0	101	79 - 118				
2,2-Dichloropropane	20.57	1.0	20	0	103	60 - 139				
2-Butanone	35.15	2.0	40	0	87.9	56 - 143				
2-Chlorotoluene	21.46	1.0	20	0	107	79 - 122				
2-Hexanone	35.21	2.0	40	0	88.0	57 - 139				
4-Chlorotoluene	21.46	1.0	20	0	107	78 - 122				
4-Isopropyltoluene	22.68	1.0	20	0	113	77 - 127				
4-Methyl-2-pentanone	36.64	2.0	40	0	91.6	67 - 130				
Acetone	35.91	2.0	40	4.561	78.4	39 - 160				
Benzene	21.13	1.0	20	0	106	79 - 120				
Bromobenzene	21.25	1.0	20	0	106	80 - 120				
Bromochloromethane	19.06	1.0	20	0	95.3	78 - 123				
Bromodichloromethane	20.29	1.0	20	0	101	79 - 125				
Bromoform	19.62	1.0	20	0	98.1	66 - 130				
Bromomethane	17.76	1.0	20	0	88.8	53 - 141				

## ALS Houston, US

Date: 08-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071164

## QC BATCH REPORT

Batch ID: R343013 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS		Sample ID: HS19071164-01MS		Units: UG/L		Analysis Date: 24-Jul-2019 17:42				
Client ID: LH18/24-SP650_072319		Run ID: VOA6_343013		SeqNo: 5179902		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Carbon disulfide	41.51	2.0	40	0	104	64 - 133				
Carbon tetrachloride	20.93	1.0	20	0	105	72 - 136				
Chlorobenzene	21.25	1.0	20	0	106	82 - 118				
Chloroethane	32.97	1.0	20	0	165	60 - 138			S	
Chloroform	20.59	1.0	20	0	103	79 - 124				
Chloromethane	18.27	1.0	20	0	91.3	50 - 139				
cis-1,2-Dichloroethene	21.57	1.0	20	2.082	97.5	78 - 123				
cis-1,3-Dichloropropene	20.39	1.0	20	0	102	75 - 124				
Dibromochloromethane	20.49	1.0	20	0	102	74 - 126				
Dibromomethane	19.49	1.0	20	0	97.5	79 - 123				
Dichlorodifluoromethane	13.7	1.0	20	0	68.5	32 - 152				
Ethylbenzene	22.52	1.0	20	0	113	79 - 121				
Hexachlorobutadiene	21.16	1.0	20	0	106	66 - 134				
Isopropylbenzene	23.32	1.0	20	0	117	72 - 131				
m,p-Xylene	44.98	2.0	40	0	112	80 - 121				
Methylene chloride	19.02	2.0	20	0	95.1	74 - 124				
Naphthalene	13.9	1.0	20	0	69.5	61 - 128				
n-Butylbenzene	23.7	1.0	20	0	119	75 - 128				
n-Propylbenzene	22.09	1.0	20	0	110	76 - 126				
o-Xylene	21.54	1.0	20	0	108	78 - 122				
sec-Butylbenzene	22.79	1.0	20	0	114	77 - 126				
Styrene	21.67	1.0	20	0	108	78 - 123				
tert-Butylbenzene	22.69	1.0	20	0	113	78 - 124				
Tetrachloroethene	23.81	1.0	20	0	119	74 - 129				
Toluene	22.11	1.0	20	0	111	80 - 121				
trans-1,2-Dichloroethene	20.18	1.0	20	0	101	75 - 124				
trans-1,3-Dichloropropene	19.96	1.0	20	0	99.8	73 - 127				
Trichloroethene	22.21	1.0	20	0.8821	107	79 - 123				
Trichlorofluoromethane	17.71	1.0	20	0	88.6	65 - 141				
Vinyl chloride	17.27	1.0	20	0	86.3	58 - 137				
Surr: 1,2-Dichloroethane-d4	48.93	1.0	50	0	97.9	81 - 118				
Surr: 4-Bromofluorobenzene	51.85	1.0	50	0	104	85 - 114				
Surr: Dibromofluoromethane	48.13	1.0	50	0	96.3	80 - 119				
Surr: Toluene-d8	51.57	1.0	50	0	103	89 - 112				

ALS Houston, US

Date: 08-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071164

**QC BATCH REPORT**

Batch ID: R343013 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD		Sample ID: HS19071164-01MSD		Units: UG/L		Analysis Date: 24-Jul-2019 18:06				
Client ID: LH18/24-SP650_072319		Run ID: VOA6_343013		SeqNo: 5179903		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	21.51	1.0	20	0	108	78 - 124	21.51	0.00687	20	
1,1,1-Trichloroethane	20.39	1.0	20	0	102	74 - 131	20.35	0.183	20	
1,1,2,2-Tetrachloroethane	19.27	1.0	20	0	96.4	71 - 121	19.24	0.192	20	
1,1,2-Trichloroethane	20.21	1.0	20	0	101	80 - 119	20.16	0.246	20	
1,1-Dichloroethane	19.33	1.0	20	0	96.6	77 - 125	19.63	1.58	20	
1,1-Dichloroethene	17.69	1.0	20	0	88.4	71 - 131	18.26	3.2	20	
1,1-Dichloropropene	20.94	1.0	20	0	105	78 - 125	21.31	1.76	20	
1,2,3-Trichlorobenzene	14.34	1.0	20	0	71.7	69 - 129	14.94	4.07	20	
1,2,3-Trichloropropane	18.16	1.0	20	0	90.8	73 - 122	17.78	2.11	20	
1,2,4-Trichlorobenzene	15.89	1.0	20	0	79.5	69 - 130	16.82	5.7	20	
1,2,4-Trimethylbenzene	21.98	1.0	20	0	110	76 - 124	21.94	0.22	20	
1,2-Dibromo-3-chloropropane	16.32	1.0	20	0	81.6	62 - 128	16.35	0.186	20	
1,2-Dibromoethane	20.22	1.0	20	0	101	77 - 121	19.98	1.2	20	
1,2-Dichlorobenzene	20.59	1.0	20	0	103	80 - 119	20.45	0.664	20	
1,2-Dichloroethane	22.64	1.0	20	0	113	73 - 128	25.89	13.4	20	
1,2-Dichloropropane	20.42	1.0	20	0	102	78 - 122	20.3	0.552	20	
1,3,5-Trimethylbenzene	22.15	1.0	20	0	111	75 - 124	22.16	0.0306	20	
1,3-Dichlorobenzene	21.46	1.0	20	0	107	80 - 119	21.46	0.0336	20	
1,3-Dichloropropane	20.23	1.0	20	0	101	80 - 119	19.89	1.7	20	
1,4-Dichlorobenzene	20.54	1.0	20	0	103	79 - 118	20.28	1.25	20	
2,2-Dichloropropane	20.08	1.0	20	0	100	60 - 139	20.57	2.4	20	
2-Butanone	34.88	2.0	40	0	87.2	56 - 143	35.15	0.776	20	
2-Chlorotoluene	21.19	1.0	20	0	106	79 - 122	21.46	1.27	20	
2-Hexanone	36.07	2.0	40	0	90.2	57 - 139	35.21	2.43	20	
4-Chlorotoluene	21.5	1.0	20	0	108	78 - 122	21.46	0.212	20	
4-Isopropyltoluene	22.65	1.0	20	0	113	77 - 127	22.68	0.126	20	
4-Methyl-2-pentanone	37.18	2.0	40	0	93.0	67 - 130	36.64	1.47	20	
Acetone	37.2	2.0	40	4.561	81.6	39 - 160	35.91	3.53	20	
Benzene	20.74	1.0	20	0	104	79 - 120	21.13	1.84	20	
Bromobenzene	21.2	1.0	20	0	106	80 - 120	21.25	0.244	20	
Bromochloromethane	18.9	1.0	20	0	94.5	78 - 123	19.06	0.819	20	
Bromodichloromethane	20.36	1.0	20	0	102	79 - 125	20.29	0.337	20	
Bromoform	19.67	1.0	20	0	98.3	66 - 130	19.62	0.273	20	
Bromomethane	17.2	1.0	20	0	86.0	53 - 141	17.76	3.17	20	

ALS Houston, US

Date: 08-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071164

**QC BATCH REPORT**

Batch ID: R343013 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD	Sample ID: HS19071164-01MSD	Units: UG/L			Analysis Date: 24-Jul-2019 18:06					
Client ID: LH18/24-SP650_072319	Run ID: VOA6_343013	SeqNo: 5179903	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	41	2.0	40	0	102	64 - 133	41.51	1.24	20	
Carbon tetrachloride	20.49	1.0	20	0	102	72 - 136	20.93	2.1	20	
Chlorobenzene	21.35	1.0	20	0	107	82 - 118	21.25	0.47	20	
Chloroethane	33.09	1.0	20	0	165	60 - 138	32.97	0.355	20	S
Chloroform	20.22	1.0	20	0	101	79 - 124	20.59	1.78	20	
Chloromethane	16.35	1.0	20	0	81.8	50 - 139	18.27	11.1	20	
cis-1,2-Dichloroethene	21.26	1.0	20	2.082	95.9	78 - 123	21.57	1.45	20	
cis-1,3-Dichloropropene	20.7	1.0	20	0	104	75 - 124	20.39	1.53	20	
Dibromochloromethane	20.48	1.0	20	0	102	74 - 126	20.49	0.0666	20	
Dibromomethane	19.39	1.0	20	0	96.9	79 - 123	19.49	0.524	20	
Dichlorodifluoromethane	13.28	1.0	20	0	66.4	32 - 152	13.7	3.18	20	
Ethylbenzene	22.24	1.0	20	0	111	79 - 121	22.52	1.28	20	
Hexachlorobutadiene	20.75	1.0	20	0	104	66 - 134	21.16	1.93	20	
Isopropylbenzene	22.79	1.0	20	0	114	72 - 131	23.32	2.29	20	
m,p-Xylene	44.65	2.0	40	0	112	80 - 121	44.98	0.744	20	
Methylene chloride	19.01	2.0	20	0	95.0	74 - 124	19.02	0.0657	20	
Naphthalene	13.32	1.0	20	0	66.6	61 - 128	13.9	4.24	20	
n-Butylbenzene	23.64	1.0	20	0	118	75 - 128	23.7	0.235	20	
n-Propylbenzene	22.18	1.0	20	0	111	76 - 126	22.09	0.406	20	
o-Xylene	21.52	1.0	20	0	108	78 - 122	21.54	0.0993	20	
sec-Butylbenzene	22.61	1.0	20	0	113	77 - 126	22.79	0.8	20	
Styrene	21.77	1.0	20	0	109	78 - 123	21.67	0.459	20	
tert-Butylbenzene	22.47	1.0	20	0	112	78 - 124	22.69	0.96	20	
Tetrachloroethene	23.3	1.0	20	0	117	74 - 129	23.81	2.14	20	
Toluene	21.72	1.0	20	0	109	80 - 121	22.11	1.78	20	
trans-1,2-Dichloroethene	19.83	1.0	20	0	99.2	75 - 124	20.18	1.73	20	
trans-1,3-Dichloropropene	20.47	1.0	20	0	102	73 - 127	19.96	2.52	20	
Trichloroethene	21.95	1.0	20	0.8821	105	79 - 123	22.21	1.2	20	
Trichlorofluoromethane	17.21	1.0	20	0	86.0	65 - 141	17.71	2.9	20	
Vinyl chloride	16.22	1.0	20	0	81.1	58 - 137	17.27	6.24	20	
Surr: 1,2-Dichloroethane-d4	48.97	1.0	50	0	97.9	81 - 118	48.93	0.0794	20	
Surr: 4-Bromofluorobenzene	52.06	1.0	50	0	104	85 - 114	51.85	0.408	20	
Surr: Dibromofluoromethane	48.15	1.0	50	0	96.3	80 - 119	48.13	0.041	20	
Surr: Toluene-d8	51.52	1.0	50	0	103	89 - 112	51.57	0.106	20	

ALS Houston, US

Date: 08-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071164

**QC BATCH REPORT****Batch ID:** R343013 ( 0 )**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch: HS19071164-01 HS19071164-02

ALS Houston, US

Date: 08-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071164

**QC BATCH REPORT**

Batch ID: R343851 ( 0 )		Instrument: ICS2100		Method: ANIONS BY SW9056A						
<b>MBLK</b>	Sample ID: <b>WBLKW1-080719</b>	Units: <b>mg/L</b>			Analysis Date: <b>07-Aug-2019 15:21</b>					
Client ID:	Run ID: <b>ICS2100_343851</b>	SeqNo: <b>5200729</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	0	0.500							U	
Sulfate	0	0.500							U	
<b>LCS</b>	Sample ID: <b>WLCSW1-080719</b>	Units: <b>mg/L</b>			Analysis Date: <b>07-Aug-2019 15:36</b>					
Client ID:	Run ID: <b>ICS2100_343851</b>	SeqNo: <b>5200730</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	18.76	0.500	20	0	93.8	80 - 120				
Sulfate	18.62	0.500	20	0	93.1	80 - 120				
<b>LCSD</b>	Sample ID: <b>WLCSDW1-080719</b>	Units: <b>mg/L</b>			Analysis Date: <b>07-Aug-2019 15:50</b>					
Client ID:	Run ID: <b>ICS2100_343851</b>	SeqNo: <b>5200731</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	19.59	0.500	20	0	97.9	80 - 120	18.76	4.33	20	
Sulfate	19.45	0.500	20	0	97.2	80 - 120	18.62	4.36	20	
<b>MS</b>	Sample ID: <b>HS19080011-14MS</b>	Units: <b>mg/L</b>			Analysis Date: <b>07-Aug-2019 17:52</b>					
Client ID:	Run ID: <b>ICS2100_343851</b>	SeqNo: <b>5200737</b>		PrepDate:			DF: <b>50</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	1558	25.0	500	1044	103	80 - 120				
Sulfate	1357	25.0	500	839.7	103	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19080011-14MSD</b>	Units: <b>mg/L</b>			Analysis Date: <b>07-Aug-2019 18:06</b>					
Client ID:	Run ID: <b>ICS2100_343851</b>	SeqNo: <b>5200738</b>		PrepDate:			DF: <b>50</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	1454	25.0	500	1044	81.9	80 - 120	1558	6.88	20	
Sulfate	1273	25.0	500	839.7	86.6	80 - 120	1357	6.39	20	

The following samples were analyzed in this batch: HS19071164-01

**ALS Houston, US**

Date: 08-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071164

**QUALIFIERS,  
ACRONYMS, UNITS**

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

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

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020



ALS Houston, US

Date: 08-ago-19

**Client:** Bhate Environmental Associates, Inc.**Project:** Longhorn GW Treatment Plant**Work Order:** HS19071164**SAMPLE TRACKING**

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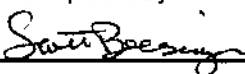

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19071164-01	LH18/24-SP650_072319	Login	24/07/2019 11:03:19	NDR	EXT035
HS19071164-01	LH18/24-SP650_072319	Login	24/07/2019 11:03:19	NDR	WET273
HS19071164-01	LH18/24-SP650_072319	Login	24/07/2019 11:03:19	NDR	MET032
HS19071164-01	LH18/24-SP650_072319	Login	24/07/2019 11:03:19	NDR	VOA153
HS19071164-02	Trip Blank	Login	24/07/2019 11:03:19	NDR	VOA153

---



**CHAIN OF CUSTODY**


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

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001		<b>Analyses</b>										Remarks (Preservatives, etc.)		Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant <b>HS19071164</b>								
<b>Job:</b> GROUNDWATER TREATMENT PLANT BI-WEEKLY SAMPLES			MS / MSD No. OF CONTAINERS	VOC	CHLORIDE, SULFATE																				
<b>Prepared By:</b> Scott Beesinger		P.O Number																							
Field Sample I.D.	Sample Matrix	Date / Time																							
LH18/24-SP650_072319	Water	07/23/19 / 14:00	3	3																HCL					
LH18/24-SP650_072319	Water	07/23/19 / 14:00	1		1															NONE					
Trip Blank	Water	07/23/19	2	2																HCL					
<b>Additional Remarks: STANDARD TAT ON ALL PARAMETERS.</b>																									
<b>Relinquished By:</b> 		Date 07/23/19	Time 14:30	<b>Received By:</b> 		Date 7/24/19	Time 08:42	<b>Relinquished By:</b>		Date	Time	<b>Received By:</b>		Date	Time										
<b>9 For Lab Use Only</b>																									
Received At Lab By:		Date	Time	Airbill No.	Opened By:		Date	Time	Temp of Container	Seal No.	Condition														
Remarks																									

610.  
 2555 3.30  
 \*25  
 01/20/00

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

**CUSTODY SEAL**

Date: 7/23/19	Time: 1430	Seal Broken By:
Name: Scott Williams		
Company: BHT		Date: 7/23/19

**FedEx**  
 TRK# 4809 7834 3262  
 0221

**AB SGRA**

WED - 24 JUL 10:30A  
 PRIORITY OVERNIGHT

77099  
 TX-US  
 IAH



FTD 162705 23JUL19 GCGA 560CZ/ABF9/BCBA



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

August 14, 2019

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

Work Order: **HS19071544**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia,

ALS Environmental received 2 sample(s) on Jul 31, 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval scribble.

Generated By: JUMOKE.LAWAL  
RJ Modashia  
Project Manager

ALS Houston, US

Date: 14-ago-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19071544

**SAMPLE SUMMARY**

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Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19071544-01	LH18/24-SP650_073019	Water		30-Jul-2019 14:00	31-Jul-2019 09:04	<input type="checkbox"/>
HS19071544-02	LH18/24-SP650_073019_BIX	Water		30-Jul-2019 14:00	31-Jul-2019 09:04	<input type="checkbox"/>

---

**ALS Houston, US**

Date: 14-Aug-19

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**Client:** Bhate Environmental Associates, Inc.

**CASE NARRATIVE**

**Project:** Longhorn GW Treatment Plant

**Work Order:**

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**Work Order Comments**

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

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**Work Order Comments**

- The analysis for TOC was subcontracted to ALS Environmental in Kelso WA. Final report attached.

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**WetChemistry by Method E350.3**

**Batch ID: R343678**

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

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**WetChemistry by Method E365.3**

**Batch ID: R343623**

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

## ALS Houston, US

Date: 14-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_073019  
 Collection Date: 30-Jul-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19071544  
 Lab ID:HS19071544-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>								Analyst: RG
	Method:E350.3							
Nitrogen, Ammonia (As N)	7.2		0.20	0.20	0.20	mg/L	1	05-Aug-2019 14:15
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3</b>								Analyst: MZD
	Method:E365.3							
Phosphorus, Total Orthophosphate (As P)	0.190		0.0100	0.0250	0.0250	mg/L	1	31-Jul-2019 15:51
<b>SUBCONTRACT ANALYSIS - TOC ANALYSIS</b>								Analyst: SUBK
	Method:NA							
Subcontract Analysis	See Attached		0	0		NA	1	09-Aug-2019 09:19

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



## ALS Houston, US

Date: 14-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_073019\_BIX  
 Collection Date: 30-Jul-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19071544  
 Lab ID:HS19071544-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>		Analyst: SUB				
Subcontract Analysis	See Attached		0	0		NA	1	14-Aug-2019 16:04

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

ALS Houston, US

Date: 14-ago-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071544

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R343623 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3			<b>Matrix:</b> Water	
HS19071544-01	LH18/24-SP650_073019	30 Jul 2019 14:00			31 Jul 2019 15:51	1
<b>Batch ID:</b> R343678 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS19071544-01	LH18/24-SP650_073019	30 Jul 2019 14:00			05 Aug 2019 14:15	1
<b>Batch ID:</b> R343936 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - TOC ANALYSIS			<b>Matrix:</b> Water	
HS19071544-01	LH18/24-SP650_073019	30 Jul 2019 14:00			09 Aug 2019 09:19	1
<b>Batch ID:</b> R344264 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS19071544-02	LH18/24-SP650_073019_BIX	30 Jul 2019 14:00			14 Aug 2019 16:04	1

ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071544

**QC BATCH REPORT**

Batch ID:	R343623 ( 0 )	Instrument:	UV-2450	Method:	ORTHO PHOSPHATE (PO4) AS P BY E365.3					
<b>MBLK</b>	Sample ID: <b>MBLK-343623</b>	Units: <b>mg/L</b>		Analysis Date: <b>31-Jul-2019 15:51</b>						
Client ID:	Run ID: <b>UV-2450_343623</b>	SeqNo: <b>5195283</b>		PrepDate:		DF: <b>1</b>				
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	
<b>LCS</b>	Sample ID: <b>LCS-343623</b>	Units: <b>mg/L</b>		Analysis Date: <b>31-Jul-2019 15:51</b>						
Client ID:	Run ID: <b>UV-2450_343623</b>	SeqNo: <b>5195284</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.241	0.0250	0.25	0	96.4	85 - 115				
<b>MS</b>	Sample ID: <b>HS19071512-02MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>31-Jul-2019 15:51</b>						
Client ID:	Run ID: <b>UV-2450_343623</b>	SeqNo: <b>5195293</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.259	0.0250	0.25	0	104	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19071512-02MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>31-Jul-2019 15:51</b>						
Client ID:	Run ID: <b>UV-2450_343623</b>	SeqNo: <b>5195294</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.264	0.0250	0.25	0	106	80 - 120	0.259	1.91	20	

The following samples were analyzed in this batch:

ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19071544

**QC BATCH REPORT**

Batch ID: R343678 ( 0 )		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)						
<b>MBLK</b>	Sample ID: <b>MBLK-R343678</b>	Units: <b>mg/L</b>			Analysis Date: <b>05-Aug-2019 14:15</b>					
Client ID:	Run ID: <b>WetChem_HS_343678</b>	SeqNo: <b>5196456</b>		PrepDate:			DF: <b>1</b>			
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	
<b>LCS</b>	Sample ID: <b>LCS-R343678</b>	Units: <b>mg/L</b>			Analysis Date: <b>05-Aug-2019 14:15</b>					
Client ID:	Run ID: <b>WetChem_HS_343678</b>	SeqNo: <b>5196455</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Nitrogen, Ammonia (As N)	10.23	0.20	10	0	102	80 - 120				
<b>MS</b>	Sample ID: <b>HS19080127-01MS</b>	Units: <b>mg/L</b>			Analysis Date: <b>05-Aug-2019 14:15</b>					
Client ID:	Run ID: <b>WetChem_HS_343678</b>	SeqNo: <b>5196458</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Nitrogen, Ammonia (As N)	12.56	0.20	10	2.708	98.5	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19080127-01MSD</b>	Units: <b>mg/L</b>			Analysis Date: <b>05-Aug-2019 14:15</b>					
Client ID:	Run ID: <b>WetChem_HS_343678</b>	SeqNo: <b>5196457</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Nitrogen, Ammonia (As N)	12.75	0.20	10	2.708	100	80 - 120	12.56	1.5	20	

The following samples were analyzed in this batch: HS19071544-01

**ALS Houston, US**

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** **HS19071544**

**QUALIFIERS,  
ACRONYMS, UNITS**

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

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

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

ALS Houston, US

Date: 14-ago-19

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**Client:** Bhate Environmental Associates, Inc.**Project:** Longhorn GW Treatment Plant**Work Order:** HS19071544**SAMPLE TRACKING**

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Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19071544-01	LH18/24-SP650_073019	Login	31/07/2019 14:30:57	JRM	WET259
HS19071544-01	LH18/24-SP650_073019	Login	31/07/2019 14:30:57	JRM	WET259
HS19071544-01	LH18/24-SP650_073019	Login	31/07/2019 14:30:57	JRM	Sub
HS19071544-02	LH18/24-SP650_073019_BIX	Login	31/07/2019 14:30:57	JRM	Sub

**Sample Receipt Checklist**

Client Name: Bhate Environmental  
 Work Order: HS19071544

Date/Time Received: **31-Jul-2019 09:04**  
 Received by: **PMG**

Checklist completed by: Jared R. Makan 31-Jul-2019  
 eSignature Date

Reviewed by: RJ Modashia 31-Jul-2019  
 eSignature Date

Matrices: **Water**

Carrier name: **ALS Courier**

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

Temperature(s)/Thermometer(s): 1.4c/1.4c UC/C IR25  
 Cooler(s)/Kit(s): 44510  
 Date/Time sample(s) sent to storage: 07/31/2019 14:35

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

pH adjusted by:

Login Notes:

Client Contacted: \_\_\_\_\_ Date Contacted: \_\_\_\_\_ Person Contacted: \_\_\_\_\_

Contacted By: \_\_\_\_\_ Regarding: \_\_\_\_\_

Comments:

Corrective Action:









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Kelso, WA 98626  
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F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

August 08, 2019

**Analytical Report for Service Request No: K1907002**

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

**RE: HS19071544**

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory August 01, 2019  
For your reference, these analyses have been assigned our service request number **K1907002**.

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](http://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](mailto:Kelley.Lovejoy@alsglobal.com).

Respectfully submitted,

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

for Kelley Lovejoy  
Project Manager



---

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## Table of Contents

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    General Chemistry

## Acronyms

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

### Inorganic Data Qualifiers

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

### Metals Data Qualifiers

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

### Organic Data Qualifiers

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

### Additional Petroleum Hydrocarbon Specific Qualifiers

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

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

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

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

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





**Client:** ALS Environmental - US  
**Project:** HS19071544  
**Sample Matrix:** Water

**Service Request:** K1907002  
**Date Received:** 08/01/2019

**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 08/01/2019. 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           Noel D. Davis          

Date           08/08/2019



## Chain of Custody

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



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

## Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11878

**SUBCONTRACT TO:**

ALS Environmental Kelso  
 1317 S. 13th Avenue  
 Kelso, WA 98626

**Phone:** +1 360 501 3312

*K1907002*

**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:** HS19071544  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19071544-01	LH18/24-SP650_073019	Water	30 Jul 2019 14:00
TOC Analysis for DOD Level IV			08 Aug 2019

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

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

Relinquished By: *J. M. Lawal*  
 Received By: *[Signature]*  
 Cooler ID(s): \_\_\_\_\_

Date/Time: *7/31/19 18:00*  
 Date/Time: *8/1/19 0945*  
 Temperature(s): \_\_\_\_\_



**Cooler Receipt and Preservation Form**

PC KL

07002

Client ALS Houston Service Request K19  
 Received: 8/1/19 Opened: 8/1/19 By: CG Unloaded: 8/1/19 By: CG

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

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
-0.5	-0.3	1.3	1.5	+0.2	390	11878	4809 7836 3893		

- Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA Y N
- 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
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
- Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N
- Were VOA vials received without headspace? Indicate in the table below. NA Y N
- Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

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

Notes, Discrepancies, & Resolutions: \_\_\_\_\_

**RUSH**



## General Chemistry

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

Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS19071544  
**Sample Matrix:** Water  
**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Service Request:** K1907002  
**Date Collected:** 07/30/19  
**Date Received:** 08/1/19  
**Units:** mg/L  
**Basis:** NA

**Carbon, Total Organic**

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_073019	K1907002-001	2.33	0.50	0.20	0.07	1	08/02/19 02:47	
Method Blank	K1907002-MB	ND U	0.50	0.20	0.07	1	08/01/19 17:52	

## ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19071544  
**Sample Matrix:** Water

**Service Request:** K1907002  
**Date Collected:** 07/30/19  
**Date Received:** 08/01/19  
**Date Analyzed:** 08/02/19

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** LH18/24-SP650\_073019  
**Lab Code:** K1907002-001

**Units:** mg/L  
**Basis:** NA

Analyte Name	Analysis Method	LOQ	LOD	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
						K1907002-001DUP Result			
Carbon, Total Organic	SM 5310 C	0.50	0.20	0.07	2.33	2.31	2.32	<1	10

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

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

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

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19071544  
**Sample Matrix:** Water

**Service Request:** K1907002  
**Date Analyzed:** 08/01/19  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Carbon, Total Organic**

**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 645651

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1907002-LCS	24.9	25.0	99	83-117



**Client:** ALS Environmental - US  
**Project:** HS19071544

**Service Request:** K1907002

### Continuing Calibration Verification (CCV) Summary

#### Carbon, Total Organic

**Analysis Method:** SM 5310 C

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	645651	KQ1910799-01	08/01/19 17:19	25.0	24.2	97	90-110
CCV2	645651	KQ1910799-02	08/01/19 21:56	25.0	24.2	97	90-110
CCV3	645651	KQ1910799-03	08/02/19 03:51	25.0	24.2	97	90-110

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19071544

**Service Request:** K1907002

**Continuing Calibration Blank (CCB) Summary**  
**Carbon, Total Organic**

**Analysis Method:** SM 5310 C

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>LOQ</b>	<b>LOD</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	645651	KQ1910799-04	08/01/19 17:36	0.50	0.20	0.07	ND	U
CCB2	645651	KQ1910799-05	08/01/19 22:13	0.50	0.20	0.07	ND	U
CCB3	645651	KQ1910799-06	08/02/19 04:07	0.50	0.20	0.07	ND	U



## Raw Data

**ALS Environmental—Kelso Laboratory**  
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[www.alsglobal.com](http://www.alsglobal.com)



## General Chemistry

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

Work Request # <sup>Original</sup> ( K1906880, 6915, 6947, 6999, 7002, 7004, 6971, 6972, 6970, 6997, T190127 )  
 Tier: I II II I IV II IV II II II IV  
 Date Analyzed: 8/1/19 TOC: 645651,  
645652,  
DOC: 645653,  
645654  
 Analyst: BCD Run # \_\_\_\_\_  
 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  $\geq 0.995$ ?  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: K1906880-1/10, 6971-12/12d report a high %RSD. However, these samples are less than 5x the MRL.  
K1906971-8 reports a low raw result, but this sample is dirty and requires a minimum dilution.  
K1906971-9 reads above calibration and has been sent for Rt.  
K1906971-10 reports a high %RSD due to dirty, non-homogeneous sample.

Final Approved by: [Signature] Date: 8/3/19 DQREPORT

# Analytical Results Summary

00950822

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 645651 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
K1906880-001	Carbon, Total Organic	N/A		Ocean Water	1.47 mg/L	10 ml	2.9 mg/L	2	0.2	1.0			8/1/19 18:43	N	I
K1906880-002	Carbon, Total Organic	N/A		Ocean Water	1.64 mg/L	10 ml	3.3 mg/L	2	0.2	1.0			8/1/19 19:15	N	I
K1906915-001	Carbon, Total Organic	N/A		Water	5.93 mg/L	10 ml	5.93 mg/L	1	0.07	0.50			8/2/19 01:10	N	II
K1906947-001	Carbon, Total Organic	N/A		Water	0.36 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/1/19 20:19	N	II
K1906947-002	Carbon, Total Organic	N/A		Water	0.39 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/1/19 21:24	N	II
K1906947-003	Carbon, Total Organic	N/A		Water	0.58 mg/L	10 ml	0.58 mg/L	1	0.07	0.50			8/1/19 22:29	N	II
K1906947-004	Carbon, Total Organic	N/A		Water	0.48 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/1/19 23:02	N	II
K1906947-005	Carbon, Total Organic	N/A		Water	0.42 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/1/19 23:34	N	II
K1906947-006	Carbon, Total Organic	N/A		Water	0.12 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/2/19 00:06	N	II
K1906947-007	Carbon, Total Organic	N/A		Water	0.60 mg/L	10 ml	0.60 mg/L	1	0.07	0.50			8/2/19 00:38	N	II
K1906989-003	Carbon, Total Organic	N/A		Drinking Water	0.14 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/2/19 02:14	N	I
K1907002-001	Carbon, Total Organic	N/A		Water	2.33 mg/L	10 ml	2.33 mg/L	1	0.07	0.50			8/2/19 02:47	N	IV
K1907004-002	Carbon, Total Organic	N/A		Water	25.02 mg/L	10 ml	25.0 mg/L	1	0.07	0.50			8/2/19 03:19	N	II
KQ1910799-01	Carbon, Total Organic	CCV		Ocean Water	24.21 mg/L	10 ml	24.2 mg/L	1					8/1/19 17:19	N	I
KQ1910799-02	Carbon, Total Organic	CCV		Ocean Water	24.22 mg/L	10 ml	24.2 mg/L	1					8/1/19 21:56	N	I
KQ1910799-03	Carbon, Total Organic	CCV		Ocean Water	24.22 mg/L	10 ml	24.2 mg/L	1					8/2/19 03:51	N	I
KQ1910799-04	Carbon, Total Organic	CCB		Ocean Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/1/19 17:36	N	I
KQ1910799-05	Carbon, Total Organic	CCB		Ocean Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/1/19 22:13	N	I
KQ1910799-06	Carbon, Total Organic	CCB		Ocean Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/2/19 04:07	N	I
KQ1910799-07	Carbon, Total Organic	MB		Ocean Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/1/19 17:52	N	I
KQ1910799-08	Carbon, Total Organic	LCS		Ocean Water	24.87 mg/L	10 ml	24.9 mg/L	1	0.07	0.50	99		8/1/19 18:09	N	I
KQ1910799-09	Carbon, Total Organic	MS	K1906947-001	Water	25.11 mg/L	10 ml	25.1 mg/L	1	0.07	0.50	100		8/1/19 20:51	N	II
KQ1910799-10	Carbon, Total Organic	DUP	K1906880-001	Ocean Water	1.68 mg/L	10 ml	3.4 mg/L	2	0.2	1.0		13*	8/1/19 18:43	N	I
KQ1910799-11	Carbon, Total Organic	DUP	K1906880-002	Ocean Water	1.54 mg/L	10 ml	3.1 mg/L	2	0.2	1.0		6	8/1/19 19:15	N	I
KQ1910799-12	Carbon, Total Organic	DUP	K1906947-001	Water	0.28 mg/L	10 ml	0.28 mg/L J	1	0.07	0.50		NC	8/1/19 20:19	N	II
KQ1910799-13	Carbon, Total Organic	DUP	K1906947-002	Water	0.39 mg/L	10 ml	0.39 mg/L J	1	0.07	0.50		NC	8/1/19 21:24	N	II
KQ1910799-14	Carbon, Total Organic	DUP	K1906947-003	Water	0.58 mg/L	10 ml	0.58 mg/L	1	0.07	0.50		<1	8/1/19 22:29	N	II

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

# Analytical Results Summary

00950823

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 645651 Method/Testcode: SM 5310 C/TOC T

<u>Lab Code</u>	<u>Target Analytes</u>	<u>QC</u>	<u>Parent Sample</u>	<u>Matrix</u>	<u>Raw Result</u>	<u>Sample Amt.</u>	<u>Final Result</u>	<u>Dil</u>	<u>MDL</u>	<u>PQL</u>	<u>% Rec</u>	<u>% RSD</u>	<u>Date Analyzed</u>	<u>QC?</u>	<u>Tier</u>
KQ1910799-15	Carbon, Total Organic	DUP	K1906947-004	Water	0.45 mg/L	10 ml	0.45 mg/L J	1	0.07	0.50		NC	8/1/19 23:02	N	II
KQ1910799-16	Carbon, Total Organic	DUP	K1906947-005	Water	0.39 mg/L	10 ml	0.39 mg/L J	1	0.07	0.50		NC	8/1/19 23:34	N	II
KQ1910799-17	Carbon, Total Organic	DUP	K1906947-006	Water	0.14 mg/L	10 ml	0.14 mg/L J	1	0.07	0.50		NC	8/2/19 00:06	N	II
KQ1910799-18	Carbon, Total Organic	DUP	K1906947-007	Water	0.60 mg/L	10 ml	0.60 mg/L	1	0.07	0.50		<1	8/2/19 00:38	N	II
KQ1910799-19	Carbon, Total Organic	DUP	K1906915-001	Water	6.07 mg/L	10 ml	6.07 mg/L	1	0.07	0.50		2	8/2/19 01:10	N	II
KQ1910799-20	Carbon, Total Organic	DUP	K1906989-003	Drinking Water	0.22 mg/L	10 ml	0.22 mg/L J	1	0.07	0.50		NC	8/2/19 02:14	N	I
KQ1910799-21	Carbon, Total Organic	DUP	K1907002-001	Water	2.31 mg/L	10 ml	2.31 mg/L	1	0.07	0.50		<1	8/2/19 02:47	N	IV
KQ1910799-22	Carbon, Total Organic	DUP	K1907004-002	Water	24.94 mg/L	10 ml	24.9 mg/L	1	0.07	0.50		<1	8/2/19 03:19	N	II

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

# Analytical Results Summary

00950824

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 645652 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
K1906971-002	Carbon, Total Organic	N/A		Water	3.97 mg/L	10 ml	3.97 mg/L	1	0.07	0.50			8/2/19 04:57	N	IV
K1906971-003	Carbon, Total Organic	N/A		Water	9.52 mg/L	10 ml	9.52 mg/L	1	0.07	0.50			8/2/19 05:30	N	IV
K1906971-004	Carbon, Total Organic	N/A		Water	8.30 mg/L	10 ml	8.30 mg/L	1	0.07	0.50			8/2/19 06:02	N	IV
K1906971-005	Carbon, Total Organic	N/A		Water	8.81 mg/L	10 ml	8.81 mg/L	1	0.07	0.50			8/2/19 06:34	N	IV
K1906971-006	Carbon, Total Organic	N/A		Water	11.98 mg/L	10 ml	12.0 mg/L	1	0.07	0.50			8/2/19 07:06	N	IV
K1906971-007	Carbon, Total Organic	N/A		Water	16.68 mg/L	10 ml	16.7 mg/L	1	0.07	0.50			8/2/19 07:38	N	IV
K1906971-008	Carbon, Total Organic	N/A		Water	0.44 mg/L	10 ml	44 mg/L J	100	7	50			8/2/19 08:10	N	IV
K1906971-009	Carbon, Total Organic	N/A		Water	59.80 mg/L	10 ml	59.8 mg/L	1	0.07	0.50			8/2/19 09:47	N	IV
K1906971-010	Carbon, Total Organic	N/A		Water	40.98 mg/L	10 ml	41.0 mg/L	1	0.07	0.50			8/2/19 10:19	Y	IV
K1906971-011	Carbon, Total Organic	N/A		Water	33.31 mg/L	10 ml	33.3 mg/L	1	0.07	0.50			8/2/19 11:24	N	IV
K1906971-012	Carbon, Total Organic	N/A		Water	1.19 mg/L	10 ml	1.19 mg/L	1	0.07	0.50			8/2/19 11:56	N	IV
KQ1910802-01	Carbon, Total Organic	CCV		Water	24.22 mg/L	10 ml	24.2 mg/L	1					8/2/19 03:51	N	IV
KQ1910802-02	Carbon, Total Organic	CCV		Water	24.07 mg/L	10 ml	24.1 mg/L	1					8/2/19 09:14	N	IV
KQ1910802-03	Carbon, Total Organic	CCV		Water	24.00 mg/L	10 ml	24.0 mg/L	1					8/2/19 14:09	N	IV
KQ1910802-04	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/2/19 04:07	N	IV
KQ1910802-05	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/2/19 09:30	N	IV
KQ1910802-06	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/2/19 14:25	N	IV
KQ1910802-07	Carbon, Total Organic	MB		Water	0.00 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/2/19 04:24	N	IV
KQ1910802-08	Carbon, Total Organic	LCS		Water	24.65 mg/L	10 ml	24.6 mg/L	1	0.07	0.50	99		8/2/19 04:41	N	IV
KQ1910802-09	Carbon, Total Organic	MS	K1906971-010	Water	28.63 mg/L	10 ml	573 mg/L	20	2	10	106		8/2/19 10:51	N	IV
KQ1910802-10	Carbon, Total Organic	DUP	K1906971-002	Water	3.83 mg/L	10 ml	3.83 mg/L	1	0.07	0.50		4	8/2/19 04:57	N	IV
KQ1910802-11	Carbon, Total Organic	DUP	K1906971-003	Water	9.26 mg/L	10 ml	9.26 mg/L	1	0.07	0.50		3	8/2/19 05:30	N	IV
KQ1910802-12	Carbon, Total Organic	DUP	K1906971-004	Water	8.27 mg/L	10 ml	8.27 mg/L	1	0.07	0.50		<1	8/2/19 06:02	N	IV
KQ1910802-13	Carbon, Total Organic	DUP	K1906971-005	Water	8.82 mg/L	10 ml	8.82 mg/L	1	0.07	0.50		<1	8/2/19 06:34	N	IV
KQ1910802-14	Carbon, Total Organic	DUP	K1906971-006	Water	11.96 mg/L	10 ml	12.0 mg/L	1	0.07	0.50		<1	8/2/19 07:06	N	IV
KQ1910802-15	Carbon, Total Organic	DUP	K1906971-007	Water	16.98 mg/L	10 ml	17.0 mg/L	1	0.07	0.50		2	8/2/19 07:38	N	IV
KQ1910802-16	Carbon, Total Organic	DUP	K1906971-008	Water	0.28 mg/L	10 ml	28 mg/L J	100	7	50		44*	8/2/19 08:10	N	IV
KQ1910802-17	Carbon, Total Organic	DUP	K1906971-009	Water	71.16 mg/L	10 ml	71.2 mg/L	1	0.07	0.50		17*	8/2/19 09:47	N	IV
KQ1910802-18	Carbon, Total Organic	DUP	K1906971-010	Water	36.45 mg/L	10 ml	36.4 mg/L	1	0.07	0.50		12*	8/2/19 10:19	N	IV
KQ1910802-19	Carbon, Total Organic	DUP	K1906971-011	Water	33.60 mg/L	10 ml	33.6 mg/L	1	0.07	0.50		<1	8/2/19 11:24	N	IV
KQ1910802-20	Carbon, Total Organic	DUP	K1906971-012	Water	0.27 mg/L	10 ml	0.27 mg/L J	1	0.07	0.50		126*	8/2/19 11:56	N	IV

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



# Analytical Results Summary

00950825

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 645653 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
K1906927-001	Carbon, Dissolved Organic (DOC)	N/A		Water	0.62 mg/L	10 ml	0.62 mg/L	1	0.07	0.50			8/2/19 15:47	N	II
K1906927-002	Carbon, Dissolved Organic (DOC)	N/A		Water	2.47 mg/L	10 ml	2.47 mg/L	1	0.07	0.50			8/2/19 16:20	N	II
K1906947-001	Carbon, Dissolved Organic (DOC)	N/A		Water	0.03 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/2/19 17:41	N	II
K1906947-002	Carbon, Dissolved Organic (DOC)	N/A		Water	0.16 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/2/19 18:13	N	II
K1906947-003	Carbon, Dissolved Organic (DOC)	N/A		Water	0.36 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/2/19 18:45	N	II
K1906947-004	Carbon, Dissolved Organic (DOC)	N/A		Water	0.34 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/2/19 19:51	N	II
K1906947-005	Carbon, Dissolved Organic (DOC)	N/A		Water	0.28 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/2/19 20:23	N	II
K1906947-006	Carbon, Dissolved Organic (DOC)	N/A		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/2/19 20:55	N	II
K1906947-007	Carbon, Dissolved Organic (DOC)	N/A		Water	0.42 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/2/19 21:27	N	II
K1906970-001	Carbon, Dissolved Organic (DOC)	N/A		Water	1.24 mg/L	10 ml	1.24 mg/L	1	0.07	0.50			8/2/19 12:28	Y	II
K1906970-002	Carbon, Dissolved Organic (DOC)	N/A		Water	0.25 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/2/19 13:34	N	II
K1906970-003	Carbon, Dissolved Organic (DOC)	N/A		Water	4.86 mg/L	10 ml	4.86 mg/L	1	0.07	0.50			8/2/19 15:15	N	II
K1906997-001	Carbon, Dissolved Organic (DOC)	N/A		Water	1.29 mg/L	10 ml	1.29 mg/L	1	0.07	0.50			8/2/19 16:52	N	II
KQ1910804-01	Carbon, Dissolved Organic (DOC)	CCV		Water	24.07 mg/L	10 ml	24.1 mg/L	1					8/2/19 09:14	N	II
KQ1910804-02	Carbon, Dissolved Organic (DOC)	CCV		Water	24.00 mg/L	10 ml	24.0 mg/L	1					8/2/19 14:09:00	N	II
KQ1910804-03	Carbon, Dissolved Organic (DOC)	CCV		Water	23.99 mg/L	10 ml	24.0 mg/L	1					8/2/19 19:17	N	II
KQ1910804-04	Carbon, Dissolved Organic (DOC)	CCV		Water	23.81 mg/L	10 ml	23.8 mg/L	1					8/3/19 00:41	N	II
KQ1910804-05	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/2/19 09:30	N	II
KQ1910804-06	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/2/19 14:25:00	N	II
KQ1910804-07	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/2/19 19:34	N	II
KQ1910804-08	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/3/19 00:57:00	N	II
KQ1910804-09	Carbon, Dissolved Organic (DOC)	MB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/2/19 14:42:00	N	II
KQ1910804-10	Carbon, Dissolved Organic (DOC)	LCS		Water	24.84 mg/L	10 ml	24.8 mg/L	1	0.07	0.50	99		8/2/19 14:59:00	N	II

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

# Analytical Results Summary

00950826

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 645653 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
KQ1910804-11	Carbon, Dissolved Organic (DOC)	MS	K1906970-001	Water	26.53 mg/L	10 ml	26.5 mg/L	1	0.07	0.50	101		8/2/19 13:01	N	II
KQ1910804-12	Carbon, Dissolved Organic (DOC)	DUP	K1906970-001	Water	1.13 mg/L	10 ml	1.13 mg/L	1	0.07	0.50		9	8/2/19 12:28	N	II
KQ1910804-13	Carbon, Dissolved Organic (DOC)	DUP	K1906970-002	Water	0.21 mg/L	10 ml	0.21 mg/L	J 1	0.07	0.50		NC	8/2/19 13:34	N	II
KQ1910804-14	Carbon, Dissolved Organic (DOC)	DUP	K1906970-003	Water	4.80 mg/L	10 ml	4.80 mg/L	1	0.07	0.50		1	8/2/19 15:15	N	II
KQ1910804-15	Carbon, Dissolved Organic (DOC)	DUP	K1906927-001	Water	0.57 mg/L	10 ml	0.57 mg/L	1	0.07	0.50		8	8/2/19 15:47	N	II
KQ1910804-16	Carbon, Dissolved Organic (DOC)	DUP	K1906927-002	Water	2.43 mg/L	10 ml	2.43 mg/L	1	0.07	0.50		2	8/2/19 16:20	N	II
KQ1910804-17	Carbon, Dissolved Organic (DOC)	DUP	K1906997-001	Water	1.31 mg/L	10 ml	1.31 mg/L	1	0.07	0.50		1	8/2/19 16:52	N	II
KQ1910804-18	Carbon, Dissolved Organic (DOC)	DUP	K1906947-001	Water	0.09 mg/L	10 ml	0.09 mg/L	J 1	0.07	0.50		NC	8/2/19 17:41	N	II
KQ1910804-19	Carbon, Dissolved Organic (DOC)	DUP	K1906947-002	Water	0.17 mg/L	10 ml	0.17 mg/L	J 1	0.07	0.50		NC	8/2/19 18:13	N	II
KQ1910804-20	Carbon, Dissolved Organic (DOC)	DUP	K1906947-003	Water	0.40 mg/L	10 ml	0.40 mg/L	J 1	0.07	0.50		NC	8/2/19 18:45	N	II
KQ1910804-21	Carbon, Dissolved Organic (DOC)	DUP	K1906947-004	Water	0.34 mg/L	10 ml	0.34 mg/L	J 1	0.07	0.50		NC	8/2/19 19:51	N	II
KQ1910804-22	Carbon, Dissolved Organic (DOC)	DUP	K1906947-005	Water	0.28 mg/L	10 ml	0.28 mg/L	J 1	0.07	0.50		NC	8/2/19 20:23	N	II
KQ1910804-23	Carbon, Dissolved Organic (DOC)	DUP	K1906947-006	Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50		NC	8/2/19 20:55	N	II
KQ1910804-24	Carbon, Dissolved Organic (DOC)	DUP	K1906947-007	Water	0.44 mg/L	10 ml	0.44 mg/L	J 1	0.07	0.50		NC	8/2/19 21:27	N	II

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

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 645654 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
KQ1910805-01	Carbon, Dissolved Organic (DOC)	CCV		Water	23.99 mg/L	10 ml	24.0 mg/L	1					8/3/19 19:17	N	IV
KQ1910805-02	Carbon, Dissolved Organic (DOC)	CCV		Water	23.81 mg/L	10 ml	23.8 mg/L	1					8/3/19 00:41	N	IV
KQ1910805-03	Carbon, Dissolved Organic (DOC)	CCV		Water	23.69 mg/L	10 ml	23.7 mg/L	1					8/3/19 06:04	N	IV
KQ1910805-04	Carbon, Dissolved Organic (DOC)	CCV		Water	23.96 mg/L	10 ml	24.0 mg/L	1					8/3/19 11:27:00	N	IV
KQ1910805-05	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/3/19 19:34	N	IV
KQ1910805-06	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/3/19 00:57	N	IV
KQ1910805-07	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/3/19 06:21	N	IV
KQ1910805-08	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/3/19 11:44:00	N	IV
KQ1910805-09	Carbon, Dissolved Organic (DOC)	MB		Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/3/19 01:14	N	IV
KQ1910805-10	Carbon, Dissolved Organic (DOC)	LCS		Water	24.63 mg/L	10 ml	24.6 mg/L	1	0.07	0.50	99		8/3/19 01:31	N	IV
KQ1910805-11	Carbon, Dissolved Organic (DOC)	MS	T1901271-001	Water	30.75 mg/L	10 ml	30.7 mg/L	1	0.07	0.50	103		8/3/19 22:31	N	IV
KQ1910805-12	Carbon, Dissolved Organic (DOC)	DUP	T1901271-001	Water	5.06 mg/L	10 ml	5.06 mg/L	1	0.07	0.50		<1	8/3/19 21:59	N	IV
KQ1910805-13	Carbon, Dissolved Organic (DOC)	DUP	T1901271-002	Water	5.23 mg/L	10 ml	5.23 mg/L	1	0.07	0.50		<1	8/3/19 23:04	N	IV
KQ1910805-14	Carbon, Dissolved Organic (DOC)	DUP	T1901271-003	Water	5.21 mg/L	10 ml	5.21 mg/L	1	0.07	0.50		3	8/3/19 23:36	N	IV
KQ1910805-15	Carbon, Dissolved Organic (DOC)	DUP	T1901271-004	Water	5.22 mg/L	10 ml	5.22 mg/L	1	0.07	0.50		<1	8/3/19 00:08	N	IV
KQ1910805-16	Carbon, Dissolved Organic (DOC)	DUP	T1901271-005	Water	5.16 mg/L	10 ml	5.16 mg/L	1	0.07	0.50		1	8/3/19 01:47	N	IV
KQ1910805-17	Carbon, Dissolved Organic (DOC)	DUP	T1901271-006	Water	5.16 mg/L	10 ml	5.16 mg/L	1	0.07	0.50		1	8/3/19 02:20	N	IV
KQ1910805-18	Carbon, Dissolved Organic (DOC)	DUP	T1901271-007	Water	5.25 mg/L	10 ml	5.25 mg/L	1	0.07	0.50		<1	8/3/19 02:52	N	IV
KQ1910805-19	Carbon, Dissolved Organic (DOC)	DUP	T1901271-008	Water	5.22 mg/L	10 ml	5.22 mg/L	1	0.07	0.50		<1	8/3/19 03:24	N	IV
KQ1910805-20	Carbon, Dissolved Organic (DOC)	DUP	T1901271-009	Water	5.09 mg/L	10 ml	5.09 mg/L	1	0.07	0.50		<1	8/3/19 03:56	N	IV
KQ1910805-21	Carbon, Dissolved Organic (DOC)	DUP	T1901271-010	Water	5.05 mg/L	10 ml	5.05 mg/L	1	0.07	0.50		<1	8/3/19 04:28	N	IV
KQ1910805-22	Carbon, Dissolved Organic (DOC)	DUP	T1901271-011	Water	4.97 mg/L	10 ml	4.97 mg/L	1	0.07	0.50		1	8/3/19 05:00	N	IV
KQ1910805-23	Carbon, Dissolved Organic (DOC)	DUP	T1901271-012	Water	5.07 mg/L	10 ml	5.07 mg/L	1	0.07	0.50		<1	8/3/19 05:32	N	IV

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

# Analytical Results Summary

00950828

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 645654 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
KQ1910805-24	Carbon, Dissolved Organic (DOC)	DUP	T1901271-013	Water	5.10 mg/L	10 ml	5.10 mg/L	1	0.07	0.50		<1	8/3/19 06:38	N	IV
KQ1910805-25	Carbon, Dissolved Organic (DOC)	DUP	T1901271-014	Water	5.19 mg/L	10 ml	5.19 mg/L	1	0.07	0.50		2	8/3/19 07:10:00	N	IV
KQ1910805-26	Carbon, Dissolved Organic (DOC)	DUP	T1901271-015	Water	5.24 mg/L	10 ml	5.24 mg/L	1	0.07	0.50		<1	8/3/19 07:42:00	N	IV
KQ1910805-27	Carbon, Dissolved Organic (DOC)	DUP	T1901271-016	Water	5.21 mg/L	10 ml	5.21 mg/L	1	0.07	0.50		<1	8/3/19 08:14:00	N	IV
KQ1910805-28	Carbon, Dissolved Organic (DOC)	DUP	T1901271-017	Water	5.28 mg/L	10 ml	5.28 mg/L	1	0.07	0.50		<1	8/3/19 08:46:00	N	IV
KQ1910805-29	Carbon, Dissolved Organic (DOC)	DUP	T1901271-018	Water	5.36 mg/L	10 ml	5.36 mg/L	1	0.07	0.50		1	8/3/19 09:19:00	N	IV
KQ1910805-30	Carbon, Dissolved Organic (DOC)	DUP	T1901271-019	Water	5.23 mg/L	10 ml	5.23 mg/L	1	0.07	0.50		<1	8/3/19 09:51:00	N	IV
KQ1910805-31	Carbon, Dissolved Organic (DOC)	DUP	T1901271-020	Water	5.29 mg/L	10 ml	5.29 mg/L	1	0.07	0.50		1	8/3/19 10:23:00	N	IV
T1901271-001	Carbon, Dissolved Organic (DOC)	N/A		Water	5.10 mg/L	10 ml	5.10 mg/L	1	0.07	0.50			8/3/19 21:59	N	IV
T1901271-002	Carbon, Dissolved Organic (DOC)	N/A		Water	5.21 mg/L	10 ml	5.21 mg/L	1	0.07	0.50			8/3/19 23:04	N	IV
T1901271-003	Carbon, Dissolved Organic (DOC)	N/A		Water	5.38 mg/L	10 ml	5.38 mg/L	1	0.07	0.50			8/3/19 23:36	N	IV
T1901271-004	Carbon, Dissolved Organic (DOC)	N/A		Water	5.24 mg/L	10 ml	5.24 mg/L	1	0.07	0.50			8/3/19 00:08	N	IV
T1901271-005	Carbon, Dissolved Organic (DOC)	N/A		Water	5.22 mg/L	10 ml	5.22 mg/L	1	0.07	0.50			8/3/19 01:47	N	IV
T1901271-006	Carbon, Dissolved Organic (DOC)	N/A		Water	5.23 mg/L	10 ml	5.23 mg/L	1	0.07	0.50			8/3/19 02:20	N	IV
T1901271-007	Carbon, Dissolved Organic (DOC)	N/A		Water	5.27 mg/L	10 ml	5.27 mg/L	1	0.07	0.50			8/3/19 02:52	N	IV
T1901271-008	Carbon, Dissolved Organic (DOC)	N/A		Water	5.20 mg/L	10 ml	5.20 mg/L	1	0.07	0.50			8/3/19 03:24	N	IV
T1901271-009	Carbon, Dissolved Organic (DOC)	N/A		Water	5.10 mg/L	10 ml	5.10 mg/L	1	0.07	0.50			8/3/19 03:56	N	IV
T1901271-010	Carbon, Dissolved Organic (DOC)	N/A		Water	5.02 mg/L	10 ml	5.02 mg/L	1	0.07	0.50			8/3/19 04:28	N	IV
T1901271-011	Carbon, Dissolved Organic (DOC)	N/A		Water	5.04 mg/L	10 ml	5.04 mg/L	1	0.07	0.50			8/3/19 05:00	N	IV
T1901271-012	Carbon, Dissolved Organic (DOC)	N/A		Water	5.03 mg/L	10 ml	5.03 mg/L	1	0.07	0.50			8/3/19 05:32	N	IV
T1901271-013	Carbon, Dissolved Organic (DOC)	N/A		Water	5.14 mg/L	10 ml	5.14 mg/L	1	0.07	0.50			8/3/19 06:38	N	IV
T1901271-014	Carbon, Dissolved Organic (DOC)	N/A		Water	5.31 mg/L	10 ml	5.31 mg/L	1	0.07	0.50			8/3/19 07:10	N	IV
T1901271-015	Carbon, Dissolved Organic (DOC)	N/A		Water	5.27 mg/L	10 ml	5.27 mg/L	1	0.07	0.50			8/3/19 07:42:00	N	IV

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

# Analytical Results Summary

00950829

**Instrument Name:** K-TOC-03

**Analyst:** BDITZLER

**Analysis Lot:** 645654 **Method/Testcode:** SM 5310 C/TOC D

<u>Lab Code</u>	<u>Target Analytes</u>	<u>QC</u>	<u>Parent Sample</u>	<u>Matrix</u>	<u>Raw Result</u>	<u>Sample Amt.</u>	<u>Final Result</u>	<u>Dil</u>	<u>MDL</u>	<u>PQL</u>	<u>% Rec</u>	<u>% RSD</u>	<u>Date Analyzed</u>	<u>QC?</u>	<u>Tier</u>
T1901271-016	Carbon, Dissolved Organic (DOC)	N/A		Water	5.23 mg/L	10 ml	5.23 mg/L	1	0.07	0.50			8/3/19 08:14:00	N	IV
T1901271-017	Carbon, Dissolved Organic (DOC)	N/A		Water	5.28 mg/L	10 ml	5.28 mg/L	1	0.07	0.50			8/3/19 08:46:00	N	IV
T1901271-018	Carbon, Dissolved Organic (DOC)	N/A		Water	5.29 mg/L	10 ml	5.29 mg/L	1	0.07	0.50			8/3/19 09:19:00	N	IV
T1901271-019	Carbon, Dissolved Organic (DOC)	N/A		Water	5.20 mg/L	10 ml	5.20 mg/L	1	0.07	0.50			8/3/19 09:51:00	N	IV
T1901271-020	Carbon, Dissolved Organic (DOC)	N/A		Water	5.34 mg/L	10 ml	5.34 mg/L	1	0.07	0.50			8/3/19 10:23:00	N	IV

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

TOC: 645651,  
645652  
DOC: 645653,  
645654

## Schedule: 08012019

Version: 7

Instrument: Fusion1

Last Saved by: Fusion1 (Fusion1)

Last Saved on: 2019/08/01 17:06 - Thursday

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps
(Clean)	Clean	Clean		1
(Clean)	Clean	Clean		1
(Clean)	Clean	Clean		1
(Blank)	Blank	Reagent/Acid Blank		1
D	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
1	Sample	MB1	Extended Reaction 021711 (Extended Reaction 021711)	1
C	Check Standard	[TOC] LCS ER [25.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
2	Sample	ICS	Extended Reaction 021711 (Extended Reaction 021711)	1
3	Sample	K1906880-001.01 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
4	Sample	K1906880-002.01 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
5	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	2
6	Sample	K1906947-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
7	Sample	K1906947-001.01 ms	Extended Reaction 021711 (Extended Reaction 021711)	1
8	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
9	Sample	K1906947-002.01	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
10	Sample	K1906947-003.01	Extended Reaction 021711 (Extended Reaction 021711)	2
11	Sample	K1906947-004.01	Extended Reaction 021711 (Extended Reaction 021711)	2
12	Sample	K1906947-005.01	Extended Reaction 021711 (Extended Reaction 021711)	2
13	Sample	K1906947-006.01	Extended Reaction 021711 (Extended Reaction 021711)	2
14	Sample	K1906947-007.01	Extended Reaction 021711 (Extended Reaction 021711)	2
15	Sample	K1906915-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
16	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	2
17	Sample	K1906989-003.07	Extended Reaction 021711 (Extended Reaction 021711)	2
18	Sample	K1907002-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
19	Sample	K1907004-002.04	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
20	Sample	MB2	Extended Reaction 021711 (Extended Reaction 021711)	1
C	Check Standard	[TOC] LCS ER [25.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
21	Sample	K1906971-002.14	Extended Reaction 021711 (Extended Reaction 021711)	2
22	Sample	K1906971-003.14	Extended Reaction 021711 (Extended Reaction 021711)	2
23	Sample	K1906971-004.14	Extended Reaction 021711 (Extended Reaction 021711)	2
24	Sample	K1906971-005.14	Extended Reaction 021711 (Extended Reaction 021711)	2
25	Sample	K1906971-006.14	Extended Reaction 021711 (Extended Reaction 021711)	2
26	Sample	K1906971-007.14	Extended Reaction 021711 (Extended Reaction 021711)	2
27	Sample	K1906971-008.14 100x	Extended Reaction 021711 (Extended Reaction 021711)	2
28	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
29	Sample	K1906971-009.14	Extended Reaction 021711 (Extended Reaction 021711)	2
30	Sample	K1906971-010.14	Extended Reaction 021711 (Extended Reaction 021711)	2
31	Sample	K1906971-010.14 ms 20x	Extended Reaction 021711 (Extended Reaction 021711)	1
32	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
33	Sample	K1906971-011.15	Extended Reaction 021711 (Extended Reaction 021711)	2
34	Sample	K1906971-012.14	Extended Reaction 021711 (Extended Reaction 021711)	2
35	Sample	K1906970-001.02 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
36	Sample	K1906970-001.02 ms doc	Extended Reaction 021711 (Extended Reaction 021711)	1
37	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
38	Sample	K1906970-002.02 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1

Printed on: August 3, 2019 12:15:18

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## Schedule: 08012019

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
39	Sample	MB3	Extended Reaction 021711 (Extended Reaction 021711)	1
C	Check Standard	[TOC] LCS ER [25.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
40	Sample	K1906970-003.02 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
41	Sample	K1906927-001.02 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
42	Sample	K1906927-002.02 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
43	Sample	K1906997-001.02 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
44	Sample	FB 8/1/19	Extended Reaction 021711 (Extended Reaction 021711)	1
45	Sample	K1906947-001.03 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
46	Sample	K1906947-002.03 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
47	Sample	K1906947-003.03 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
48	Sample	K1906947-004.03 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
49	Sample	K1906947-005.03 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
50	Sample	K1906947-006.03 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
51	Sample	K1906947-007.03 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
52	Sample	T1901271-001.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
53	Sample	T1901271-001.05 ms doc	Extended Reaction 021711 (Extended Reaction 021711)	1
54	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
55	Sample	T1901271-002.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
56	Sample	T1901271-003.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
57	Sample	T1901271-004.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
58	Sample	MB4	Extended Reaction 021711 (Extended Reaction 021711)	1
C	Check Standard	[TOC] LCS ER [25.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
59	Sample	T1901271-005.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
60	Sample	T1901271-006.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
61	Sample	T1901271-007.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
62	Sample	T1901271-008.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
63	Sample	T1901271-009.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
64	Sample	T1901271-010.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
65	Sample	T1901271-011.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
66	Sample	T1901271-012.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
67	Sample	T1901271-013.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
68	Sample	T1901271-014.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
69	Sample	T1901271-015.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
70	Sample	T1901271-016.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
71	Sample	T1901271-017.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
72	Sample	T1901271-018.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
73	Sample	T1901271-019.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
74	Sample	T1901271-020.05 doc	Extended Reaction 021711 (Extended Reaction 021711)	2
75	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1

# Fusion Report - 08012019

## Thursday, August 01, 2019 02:58 PM

(View - Repts, Unused Repts, Meta-Data, Signature, History)  
Printed on 2019/08/03 12:15 - Saturday

### Report Summary Information

Company Location: Gen Chem Lab  
 Schedule Name: 08012019  
 Instrument Name: Fusion1  
 Report Version: 1 of 1  
 Report Creation by Operators (schedule version): Fusion1 (Fusion1) (v2)  
 Fusion1 (Fusion1) (v3)  
 Fusion1 (Fusion1) (v4)  
 Fusion1 (Fusion1) (v5)  
 Fusion1 (Fusion1) (v6)  
 Fusion1 (Fusion1) (v7)

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

Comment:

### Report Results

Sample Type: Clean							From Schedule Version 2
Pos	Analysis Type	Sample ID			Start Time		
◆ (clean)		Clean			2019/08/01 14:58		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	12.81	18.74	5.93	49.57	05:21	
2	TC Clean	15.77	19.29	3.52	50.08	04:02	
3	TC Clean	2.47	5.98	3.51	50.16	03:49	
4	TC Clean	1.99	5.41	3.42	50.17	03:56	

Sample Type: Clean							From Schedule Version 3
Pos	Analysis Type	Sample ID			Start Time		
◆ (clean)		Clean			2019/08/01 15:20		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	13.44	16.77	3.32	49.67	05:19	
2	TC Clean	4.49	7.94	3.45	50.18	04:03	



3	TC Clean	2.06	5.41	3.35	50.14	03:47
4	TC Clean	1.58	4.88	3.30	50.18	03:48

**Sample Type:** Clean From Schedule Version 4

Pos	Analysis Type	Sample ID			Start Time	
♦ (clean)		Clean			2019/08/01 15:42	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	12.72	15.93	3.20	49.58	05:10
2	TC Clean	4.17	7.46	3.29	50.10	04:03
3	TC Clean	2.32	5.54	3.22	50.20	03:50
4	TC Clean	1.40	4.69	3.29	50.17	03:48

**Sample Type:** Blank (Creating v1281) From Schedule Version 5

Pos	Analysis Type	Sample ID			Start Time	
♦ (blank)		Reagent/Acid Blank			2019/08/01 16:04	
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	12.92	16.04	3.11	49.61	05:12
2	TC Clean	3.64	6.91	3.26	50.19	04:02
3	TC Clean	2.04	5.28	3.24	50.21	03:48
4	TC Clean	1.61	4.76	3.15	50.23	03:48
5	Reagent Blank	5.23	8.49	3.26	50.19	05:06
6	Acid Blank	1.41	4.68	3.27	49.66	05:28

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
♦ D	TOC	RB	0.0195 ppm	0.0000 ppm	0.0000%	2019/08/01 17:02		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0195	0.1947	10.54	13.82	3.28	50.32	12:31
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 10.3964 (IC) (v1281)		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		

**Sample Type:** Check Standard --> CCV 021711 From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊	B	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity ( NA / NA )	24.2103 ppm (PASS)	0.0000 ppm	0%	2019/08/01 17:19

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.2103	242.1031	184.76	188.04	3.28	50.33	12:34

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos B</b>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

**Sample Type:** Check Standard --> CCB 021711 From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊	D	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/01 17:36

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	10.80	14.09	3.28	50.35	12:32

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos D</b>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

**Sample Type:** Sample From Schedule Version 7

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
◊	1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/01 17:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.75	11.92	3.17	50.37	12:29

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 10.3964 (IC) (v1281)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> LCS ER From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊	C	25.0000	1:1	[TOC] LCS ER [25.0 ppm]	0 / infinity ( NA / NA )	24.8691 ppm (PASS)	0.0000 ppm	0%	2019/08/01 18:09

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.8691	248.6914	189.48	192.70	3.22	50.41	12:34

**Completion State** Success - Criteria met.  
**Success Action** Do Nothing  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)  
**STD Conc - Pos C** 25 ppmC

**Sample Type:** Sample

From Schedule Version 7

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
2	TOC	ICS	0.0889 ppm	0.0000 ppm	0.0000%	2019/08/01 18:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0889	0.8892	11.03	14.36	3.33	50.42	12:31

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
3	TOC	K1906880-001.01 2x	1.5714 ppm	0.1486 ppm	9.4600%	2019/08/01 18:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4663	14.6627	20.91	24.19	3.28	50.30	12:31
2	TOC	1.6764	16.7644	22.42	25.95	3.54	50.31	12:27

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
4	TOC	K1906880-002.01 2x	1.5910 ppm	0.0696 ppm	4.3800%	2019/08/01 19:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.6402	16.4018	22.16	25.45	3.29	50.27	12:27
2	TOC	1.5417	15.4172	21.45	24.76	3.30	50.22	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
5	TOC	RB	0.1340 ppm	0.1895 ppm	141.4200%	2019/08/01 19:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2680	2.6799	12.32	15.49	3.17	50.22	12:27
2	TOC	0.0000	0.0000	9.78	12.89	3.11	50.21	12:30

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
6	TOC	K1906947-001.01	0.3191 ppm	0.0612 ppm	19.1900%	2019/08/01 20:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3624	3.6241	13.00	16.08	3.08	50.18	12:28
2	TOC	0.2758	2.7580	12.37	15.69	3.32	50.12	12:26

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
7	TOC	K1906947-001.01 ms	25.1137 ppm	0.0000 ppm	0.0000%	2019/08/01 20:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	25.1137	251.1372	190.47	193.62	3.15	50.09	12:29

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
8	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/01 21:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.50	12.72	3.22	50.04	12:33

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
9	TOC	K1906947-002.01	0.3928 ppm	0.0022 ppm	0.5500%	2019/08/01 21:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3943	3.9435	13.22	16.30	3.08	50.03	12:28
2	TOC	0.3913	3.9128	13.20	16.36	3.16	50.07	12:29

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711

From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time

♦	B	TOC	25.0000	1:2	[TOC] CCB 021711 [25 ppm]	0 / infinity ( NA / NA )	24.2244 ppm (PASS)	0.0000 ppm	0%	2019/08/01 21:56
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Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.2244	242.2440	184.86	188.00	3.14	50.09	12:30

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos B</b>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

**Sample Type:** Check Standard --> CCB 021711 From Schedule Version 7

♦	D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/01 22:13
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Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	8.87	12.08	3.21	50.09	12:32

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos D</b>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

**Sample Type:** Sample From Schedule Version 7

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 10	TOC	K1906947-003.01	0.5814 ppm	0.0005 ppm	0.0800%	2019/08/01 22:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5818	5.8179	14.57	17.65	3.08	50.11	12:29
2	TOC	0.5811	5.8109	14.56	17.77	3.20	50.12	12:31

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 10.3964 (IC) (v1281)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 11	TOC	K1906947-004.01	0.4681 ppm	0.0208 ppm	4.4500%	2019/08/01 23:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4828	4.8277	13.86	17.13	3.27	50.12	12:27
2	TOC	0.4533	4.5334	13.65	17.09	3.44	50.15	12:28

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 10.3964 (IC) (v1281)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 12	TOC	K1906947-005.01	0.4053 ppm	0.0163 ppm	4.0100%	2019/08/01 23:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4168	4.1680	13.38	16.71	3.33	50.17	12:28
2	TOC	0.3938	3.9379	13.22	16.42	3.20	50.17	12:28

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 13	TOC	K1906947-006.01	0.1292 ppm	0.0104 ppm	8.0200%	2019/08/02 00:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1218	1.2183	11.27	14.41	3.14	50.18	12:30
2	TOC	0.1365	1.3648	11.38	14.43	3.05	50.20	12:29

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 14	TOC	K1906947-007.01	0.6042 ppm	0.0009 ppm	0.1500%	2019/08/02 00:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6048	6.0480	14.73	17.89	3.16	50.19	12:26
2	TOC	0.6035	6.0354	14.72	17.83	3.11	50.20	12:27

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 15	TOC	K1906915-001.01	5.9989 ppm	0.0955 ppm	1.5900%	2019/08/02 01:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.9314	59.3136	52.93	56.28	3.36	50.22	12:26
2	TOC	6.0664	60.6637	53.89	57.10	3.21	50.23	12:29

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 16	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/02 01:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.40	11.86	3.45	50.25	12:30

2	TOC	0.0000	0.0000	7.98	11.36	3.38	50.25	12:27
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**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	K1906989-003.07	0.1812 ppm	0.0605 ppm	33.3700%	2019/08/02 02:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1384	1.3843	11.39	14.84	3.45	50.25	12:26
2	TOC	0.2239	2.2392	12.00	15.22	3.21	50.26	12:29

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	K1907002-001.01	2.3172 ppm	0.0161 ppm	0.6900%	2019/08/02 02:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.3286	23.2858	27.09	30.36	3.27	50.23	12:27
2	TOC	2.3058	23.0585	26.93	30.37	3.44	50.26	12:26

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
19	TOC	K1907004-002.04	24.9762 ppm	0.0578 ppm	0.2300%	2019/08/02 03:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	25.0171	250.1707	189.78	193.11	3.34	50.31	12:25
2	TOC	24.9353	249.3534	189.19	192.65	3.46	50.27	12:27

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711

From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity ( NA / NA )	24.2184 ppm (PASS)	0.0000 ppm	0%	2019/08/02 03:51

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.2184	242.1840	184.82	188.17	3.35	50.26	12:31

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos B</b>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

**Sample Type:** Check Standard --> CCB 021711 From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊ D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/02 04:07

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	8.51	11.72	3.21	50.24	12:29

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos D</b>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

**Sample Type:** Sample From Schedule Version 7

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/02 04:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.77	10.87	3.10	50.24	12:34

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 10.3964 (IC) (v1281)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> LCS ER From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊ C	TOC	25.0000	1:1	[TOC] LCS ER [25.0 ppm]	0 / infinity ( NA / NA )	24.6466 ppm (PASS)	0.0000 ppm	0%	2019/08/02 04:41

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.6466	246.4656	187.89	190.88	3.00	50.23	12:30

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos C</b>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	25 ppmC

**Sample Type:** Sample From Schedule Version 7



Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
21	TOC	K1906971-002.14	3.9012 ppm	0.1024 ppm	2.6200%	2019/08/02 04:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.9736	39.7356	38.89	42.08	3.20	50.21	12:30
2	TOC	3.8288	38.2880	37.85	41.01	3.16	50.22	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
22	TOC	K1906971-003.14	9.3913 ppm	0.1832 ppm	1.9500%	2019/08/02 05:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.5209	95.2090	78.66	81.74	3.07	50.22	12:26
2	TOC	9.2618	92.6177	76.81	80.08	3.28	50.20	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
23	TOC	K1906971-004.14	8.2875 ppm	0.0226 ppm	0.2700%	2019/08/02 06:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.3035	83.0351	69.94	73.08	3.15	50.22	12:27
2	TOC	8.2716	82.7158	69.71	72.98	3.27	50.20	12:25

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
24	TOC	K1906971-005.14	8.8181 ppm	0.0082 ppm	0.0900%	2019/08/02 06:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.8123	88.1228	73.58	76.75	3.16	50.21	12:28
2	TOC	8.8239	88.2386	73.67	76.89	3.22	50.24	12:28

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
25	TOC	K1906971-006.14	11.9688 ppm	0.0180 ppm	0.1500%	2019/08/02 07:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	11.9816	119.8161	96.31	99.62	3.31	50.25	12:29

2	TOC	11.9561	119.5609	96.12	99.18	3.05	50.24	12:27
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**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
26	TOC	K1906971-007.14	16.8298 ppm	0.2132 ppm	1.2700%	2019/08/02 07:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	16.6790	166.7905	129.99	133.33	3.34	50.23	12:27
2	TOC	16.9806	169.8057	132.15	135.53	3.38	50.26	12:25

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
27	TOC	K1906971-008.14 100x	0.3626 ppm	0.1121 ppm	30.9200%	2019/08/02 08:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4419	4.4191	13.56	16.85	3.28	50.25	12:27
2	TOC	0.2833	2.8333	12.43	15.68	3.25	50.26	12:29

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
28	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/02 08:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.57	11.66	3.09	50.20	12:27
2	TOC	0.0000	0.0000	8.39	11.47	3.07	50.20	12:27

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711

From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity (NA / NA)	24.0743 ppm (PASS)	0.0000 ppm	0%	2019/08/02 09:14

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.0743	240.7433	183.78	186.98	3.19	50.19	12:30

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos B</u>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

**Sample Type:** Check Standard --> CCB 021711

From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊ D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/02 09:30

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	8.30	11.35	3.06	50.17	12:32

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos D</u>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

**Sample Type:** Sample

From Schedule Version 7

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 29	TOC	K1906971-009.14	65.4828 ppm	8.0339 ppm	12.2700%	2019/08/02 09:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	59.8020	598.0200	439.19	442.38	3.19	50.24	12:25
2	TOC	71.1636	711.6361	520.66	524.71	4.05	50.20	12:29

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3964 (IC) (v1281)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 30	TOC	K1906971-010.14	38.7130 ppm	3.2022 ppm	8.2700%	2019/08/02 10:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	40.9772	409.7723	304.22	308.09	3.87	50.22	12:26
2	TOC	36.4487	364.4869	271.74	275.28	3.54	50.25	12:28

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3964 (IC) (v1281)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 31	TOC	K1906971-010.14 ms 20x	28.6334 ppm	0.0000 ppm	0.0000%	2019/08/02 10:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	28.6334	286.3338	215.71	218.92	3.21	50.23	12:30

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
32	TOC	RB	0.9067 ppm	0.0000 ppm	0.0000%	2019/08/02 11:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9067	9.0674	16.90	20.16	3.26	50.24	12:29

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
33	TOC	K1906971-011.15	33.4541 ppm	0.2053 ppm	0.6100%	2019/08/02 11:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	33.3089	333.0892	249.23	252.24	3.00	50.20	12:28
2	TOC	33.5993	335.9929	251.31	254.49	3.17	50.24	12:27

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
34	TOC	K1906971-012.14	0.7309 ppm	0.6514 ppm	89.1100%	2019/08/02 11:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.1915	11.9153	18.94	22.21	3.27	50.21	12:29
2	TOC	0.2704	2.7036	12.34	15.54	3.21	50.23	12:25

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
35	TOC	K1906970-001.02 doc	1.1851 ppm	0.0734 ppm	6.1900%	2019/08/02 12:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.2370	12.3699	19.27	22.37	3.11	50.28	12:25
2	TOC	1.1332	11.3323	18.52	21.73	3.21	50.24	12:29

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
36	TOC	K1906970-001.02 ms doc	26.5280 ppm	0.0000 ppm	0.0000%	2019/08/02 13:01

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.5280	265.2802	200.61	203.76	3.15	50.24	12:31

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
37	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/02 13:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.03	12.22	3.19	50.26	12:28

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
38	TOC	K1906970-002.02 doc	0.2315 ppm	0.0321 ppm	13.8400%	2019/08/02 13:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2542	2.5419	12.22	15.41	3.19	50.26	14:02
2	TOC	0.2089	2.0886	11.89	15.15	3.26	50.22	13:10

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711

From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity (NA / NA)	24.0032 ppm (PASS)	0.0000 ppm	0%	2019/08/02 14:09

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.0032	240.0321	183.27	186.68	3.41	50.23	12:34

**Completion State** Success - Criteria met.  
**Success Action** Do Nothing  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)  
**STD Conc - Pos B** 50 ppmC

**Sample Type:** Check Standard --> CCB 021711

From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/02 14:25

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	7.91	11.26	3.35	50.27	12:34
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos D</b>		
Success - Criteria met.		Do Nothing		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		0 ppmC		

**Sample Type:** Sample From Schedule Version 7

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
39	TOC	MB3	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/02 14:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.32	10.45	3.13	50.24	12:31
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 10.3964 (IC) (v1281)		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		

**Sample Type:** Check Standard --> LCS ER From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
C	TOC	25.0000	1:1	[TOC] LCS ER [25.0 ppm]	0 / infinity (NA / NA)	24.8407 ppm (PASS)	0.0000 ppm	0%	2019/08/02 14:59

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.8407	248.4069	189.28	192.35	3.07	50.23	12:30
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos C</b>		
Success - Criteria met.		Do Nothing		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		25 ppmC		

**Sample Type:** Sample From Schedule Version 7

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
40	TOC	K1906970-003.02 doc	4.8292 ppm	0.0417 ppm	0.8600%	2019/08/02 15:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.8587	48.5874	45.24	48.54	3.31	50.22	12:30
2	TOC	4.7997	47.9975	44.81	48.03	3.21	50.26	12:26
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 10.3964 (IC) (v1281)		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
41	TOC	K1906927-001.02 doc	0.5917 ppm	0.0333 ppm	5.6300%	2019/08/02 15:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6153	6.1526	14.81	17.96	3.15	50.25	12:31
2	TOC	0.5681	5.6812	14.47	17.67	3.20	50.27	12:25

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
42	TOC	K1906927-002.02 doc	2.4533 ppm	0.0306 ppm	1.2500%	2019/08/02 16:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.4749	24.7488	28.14	31.42	3.28	50.25	12:28
2	TOC	2.4316	24.3164	27.83	31.13	3.30	50.26	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
43	TOC	K1906997-001.02 doc	1.3033 ppm	0.0131 ppm	1.0100%	2019/08/02 16:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.2940	12.9403	19.68	22.94	3.26	50.28	12:28
2	TOC	1.3126	13.1258	19.81	22.91	3.10	50.28	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
44	TOC	FB 8/1/19	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/02 17:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.63	10.66	3.04	50.28	12:32

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
45	TOC	K1906947-001.03 doc	0.0566 ppm	0.0429 ppm	75.7500%	2019/08/02 17:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0263	0.2630	10.58	13.94	3.36	50.23	12:27
2	TOC	0.0870	0.8697	11.02	14.32	3.30	50.24	12:27

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
46	TOC	K1906947-002.03 doc	0.1633 ppm	0.0103 ppm	6.2800%	2019/08/02 18:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1560	1.5600	11.52	14.91	3.40	50.32	12:29
2	TOC	0.1705	1.7051	11.62	14.94	3.32	50.25	12:26

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
47	TOC	K1906947-003.03 doc	0.3805 ppm	0.0313 ppm	8.2200%	2019/08/02 18:45

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3584	3.5837	12.97	16.31	3.34	50.23	12:27
2	TOC	0.4026	4.0258	13.28	16.52	3.23	50.19	12:27

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711 From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity ( NA / NA )	23.9884 ppm (PASS)	0.0000 ppm	0%	2019/08/02 19:17

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.9884	239.8842	183.17	186.59	3.42	50.19	12:29

**Completion State** Success - Criteria met.      **Success Action** Do Nothing      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)      **STD Conc - Pos B** 50 ppmC

**Sample Type:** Check Standard --> CCB 021711 From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/02 19:34

Pos	Base Analysis	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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Type											
D	TOC	0.0 ppm	1	0.0000	0.0000	7.72	10.96	3.24	50.16	12:31	

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos D</u>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

Sample Type: Sample

From Schedule Version 7

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
48	TOC	K1906947-004.03 doc	0.3365 ppm	0.0004 ppm	0.1200%	2019/08/02 19:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3362	3.3619	12.81	16.25	3.44	50.17	12:25
2	TOC	0.3367	3.3675	12.81	16.07	3.26	50.15	12:27

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3964 (IC) (v1281)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
49	TOC	K1906947-005.03 doc	0.2800 ppm	0.0000 ppm	0.0000%	2019/08/02 20:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2800	2.7999	12.40	15.75	3.35	50.16	12:27
2	TOC	0.2800	2.7999	12.40	15.61	3.21	50.15	12:29

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3964 (IC) (v1281)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
50	TOC	K1906947-006.03 doc	0.0021 ppm	0.0030 ppm	141.4200%	2019/08/02 20:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0043	0.0427	10.43	13.69	3.27	50.15	12:27
2	TOC	0.0000	0.0000	10.32	13.53	3.21	50.14	12:26

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3964 (IC) (v1281)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
51	TOC	K1906947-007.03 doc	0.4307 ppm	0.0176 ppm	4.0800%	2019/08/02 21:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4183	4.1834	13.40	16.71	3.31	50.17	12:27
2	TOC	0.4432	4.4316	13.57	16.82	3.24	50.18	12:31

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
52	TOC	T1901271-001.05 doc	5.0809 ppm	0.0235 ppm	0.4600%	2019/08/02 21:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.0975	50.9751	46.95	50.30	3.36	50.21	12:28
2	TOC	5.0643	50.6431	46.71	49.97	3.26	50.19	12:27

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
53	TOC	T1901271-001.05 ms doc	30.7481 ppm	0.0000 ppm	0.0000%	2019/08/02 22:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	30.7481	307.4808	230.87	234.09	3.22	50.20	12:30

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
54	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/02 22:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.12	11.45	3.32	50.23	12:30

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
55	TOC	T1901271-002.05 doc	5.2236 ppm	0.0154 ppm	0.2900%	2019/08/02 23:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2127	52.1270	47.77	50.94	3.17	50.23	12:28
2	TOC	5.2345	52.3446	47.93	51.13	3.20	50.21	12:27

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
56	TOC	T1901271-003.05 doc	5.2952 ppm	0.1188 ppm	2.2400%	2019/08/02 23:36

Rep	Base	ppm	µg	Adjusted	NDIR (Abs)	Baseline	Pressure	Run
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#	Analysis Type			(Abs)		(Abs)	(psig)	Time
1	TOC	5.3792	53.7922	48.97	52.27	3.30	50.24	12:29
2	TOC	5.2112	52.1117	47.76	51.09	3.33	50.24	12:24

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
57	TOC	T1901271-004.05 doc	5.2266 ppm	0.0160 ppm	0.3100%	2019/08/03 00:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2379	52.3795	47.95	51.19	3.23	50.25	12:24
2	TOC	5.2154	52.1535	47.79	51.11	3.32	50.25	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711

From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity ( NA / NA )	23.8089 ppm (PASS)	0.0000 ppm	0%	2019/08/03 00:41

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.8089	238.0893	181.88	185.10	3.21	50.27	12:31

**Completion State** Success - Criteria met.  
**Success Action** Do Nothing  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)  
**STD Conc - Pos B** 50 ppmC

**Sample Type:** Check Standard --> CCB 021711

From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/03 00:57

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	7.73	10.89	3.16	50.27	12:32

**Completion State** Success - Criteria met.  
**Success Action** Do Nothing  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)  
**STD Conc - Pos D** 0 ppmC

**Sample Type:** Sample

From Schedule Version 7

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
58	TOC	MB4	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/03 01:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.74	10.01	3.28	50.30	12:34

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3964 (IC) (v1281)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> LCS ER

From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
C	TOC	25.0000	1:1	[TOC] LCS ER [25.0 ppm]	0 / infinity (NA / NA)	24.6343 ppm (PASS)	0.0000 ppm	0%	2019/08/03 01:31

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.6343	246.3428	187.80	191.04	3.24	50.30	12:32

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos C</u>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	25 ppmC

**Sample Type:** Sample

From Schedule Version 7

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
59	TOC	T1901271-005.05 doc	5.1900 ppm	0.0429 ppm	0.8300%	2019/08/03 01:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2204	52.2037	47.83	51.14	3.31	50.33	12:27
2	TOC	5.1597	51.5971	47.39	50.52	3.13	50.32	12:29

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3964 (IC) (v1281)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
60	TOC	T1901271-006.05 doc	5.1935 ppm	0.0470 ppm	0.9100%	2019/08/03 02:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2268	52.2679	47.87	51.05	3.17	50.34	12:28
2	TOC	5.1603	51.6026	47.40	50.51	3.11	50.35	12:25

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3964 (IC)	Extended Reaction	Extended Reaction

(v1281)

021711 (v4)

021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
61	TOC	T1901271-007.05 doc	5.2585 ppm	0.0117 ppm	0.2200%	2019/08/03 02:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2668	52.6682	48.16	51.42	3.26	50.38	12:27
2	TOC	5.2502	52.5022	48.04	51.43	3.39	50.39	12:29

Dilution

1:10

Blank Contribution(TC) 10.3964 (IC)  
(v1281)MethodExtended Reaction  
021711 (v4)CalibrationExtended Reaction  
021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
62	TOC	T1901271-008.05 doc	5.2105 ppm	0.0149 ppm	0.2900%	2019/08/03 03:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2000	52.0001	47.68	50.94	3.26	50.42	12:31
2	TOC	5.2211	52.2107	47.83	51.03	3.20	50.42	12:26

Dilution

1:10

Blank Contribution(TC) 10.3964 (IC)  
(v1281)MethodExtended Reaction  
021711 (v4)CalibrationExtended Reaction  
021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
63	TOC	T1901271-009.05 doc	5.0919 ppm	0.0068 ppm	0.1300%	2019/08/03 03:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.0967	50.9667	46.94	50.19	3.25	50.43	12:29
2	TOC	5.0870	50.8705	46.87	50.14	3.27	50.47	12:29

Dilution

1:10

Blank Contribution(TC) 10.3964 (IC)  
(v1281)MethodExtended Reaction  
021711 (v4)CalibrationExtended Reaction  
021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
64	TOC	T1901271-010.05 doc	5.0351 ppm	0.0198 ppm	0.3900%	2019/08/03 04:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.0211	50.2108	46.40	49.58	3.18	50.49	12:28
2	TOC	5.0491	50.4911	46.60	49.78	3.18	50.49	12:26

Dilution

1:10

Blank Contribution(TC) 10.3964 (IC)  
(v1281)MethodExtended Reaction  
021711 (v4)CalibrationExtended Reaction  
021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
65	TOC	T1901271-011.05 doc	5.0085 ppm	0.0495 ppm	0.9900%	2019/08/03 05:00

Rep	Base	ppm	µg	Adjusted	NDIR (Abs)	Baseline	Pressure	Run
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#	Analysis Type			(Abs)		(Abs)	(psig)	Time
1	TOC	5.0435	50.4353	46.56	49.77	3.21	50.52	12:32
2	TOC	4.9735	49.7352	46.06	49.23	3.17	50.52	12:25

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
66	TOC	T1901271-012.05 doc	5.0519 ppm	0.0278 ppm	0.5500%	2019/08/03 05:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.0322	50.3224	46.48	49.59	3.11	50.57	12:28
2	TOC	5.0716	50.7157	46.76	50.04	3.28	50.55	12:26

**Dilution** 1:10      **Blank Contribution** (TC) 10.3964 (IC) (v1281)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711

From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity ( NA / NA )	23.6859 ppm (PASS)	0.0000 ppm	0%	2019/08/03 06:04

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.6859	236.8593	181.00	184.27	3.27	50.57	12:29

**Completion State** Success - Criteria met.      **Success Action** Do Nothing      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)      **STD Conc - Pos B** 50 ppmC

**Sample Type:** Check Standard --> CCB 021711

From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/03 06:21

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	7.35	10.72	3.37	50.60	12:28

**Completion State** Success - Criteria met.      **Success Action** Do Nothing      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)      **STD Conc - Pos D** 0 ppmC

Sample Type: Sample

From Schedule Version 7

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
67	TOC	T1901271-013.05 doc	5.1191 ppm	0.0227 ppm	0.4400%	2019/08/03 06:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.1352	51.3516	47.22	50.39	3.17	50.60	12:27
2	TOC	5.1031	51.0308	46.99	50.28	3.29	50.62	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
68	TOC	T1901271-014.05 doc	5.2488 ppm	0.0820 ppm	1.5600%	2019/08/03 07:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.3067	53.0670	48.45	51.70	3.25	50.65	12:23
2	TOC	5.1908	51.9081	47.62	51.03	3.41	50.62	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
69	TOC	T1901271-015.05 doc	5.2565 ppm	0.0189 ppm	0.3600%	2019/08/03 07:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2699	52.6988	48.18	51.56	3.38	50.65	12:32
2	TOC	5.2431	52.4311	47.99	51.15	3.16	50.65	12:27

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
70	TOC	T1901271-016.05 doc	5.2183 ppm	0.0132 ppm	0.2500%	2019/08/03 08:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2276	52.2763	47.88	51.00	3.12	50.60	12:27
2	TOC	5.2089	52.0894	47.75	51.09	3.35	50.61	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
71	TOC	T1901271-017.05 doc	5.2805 ppm	0.0026 ppm	0.0500%	2019/08/03 08:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
-------	--------------------	-----	----	----------------	------------	----------------	-----------------	----------

1	TOC	5.2787	52.7867	48.25	51.47	3.23	50.57	12:24
2	TOC	5.2823	52.8230	48.27	51.64	3.37	50.58	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
72	TOC	T1901271-018.05 doc	5.3258 ppm	0.0467 ppm	0.8800%	2019/08/03 09:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2928	52.9276	48.35	51.54	3.19	50.52	12:26
2	TOC	5.3589	53.5886	48.82	52.04	3.22	50.50	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
73	TOC	T1901271-019.05 doc	5.2124 ppm	0.0179 ppm	0.3400%	2019/08/03 09:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.1997	51.9973	47.68	50.80	3.12	50.48	12:28
2	TOC	5.2251	52.2512	47.86	50.91	3.04	50.41	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
74	TOC	T1901271-020.05 doc	5.3154 ppm	0.0390 ppm	0.7300%	2019/08/03 10:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.3430	53.4296	48.71	51.93	3.23	50.41	12:31
2	TOC	5.2879	52.8787	48.31	51.62	3.31	50.33	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
75	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/03 10:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.23	10.44	3.20	50.31	12:29
2	TOC	0.0000	0.0000	8.36	11.41	3.06	50.33	12:24

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3964 (IC) (v1281)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)



**Sample Type:** Check Standard --> CCV 021711 From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆ B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity ( NA / NA )	23.9589 ppm (PASS)	0.0000 ppm	0%	2019/08/03 11:27

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.9589	239.5886	182.96	186.19	3.24	50.24	12:32

**Completion State**      **Success Action**      **Method**      **Calibration**      **STD Conc - Pos B**  
 Success - Criteria met.      Do Nothing      Extended Reaction 021711 (v4)      Extended Reaction 021711 (v27)      50 ppmC

**Sample Type:** Check Standard --> CCB 021711 From Schedule Version 7

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆ D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/03 11:44

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	7.81	10.99	3.18	50.24	12:33

**Completion State**      **Success Action**      **Method**      **Calibration**      **STD Conc - Pos D**  
 Success - Criteria met.      Do Nothing      Extended Reaction 021711 (v4)      Extended Reaction 021711 (v27)      0 ppmC

### Meta Data Used in this Report

#### Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1280	0.9930	1.0290	0.0000	0.0000	0.0000	2019/07/27 19:02	Fusion1 (Fusion1)
v1281	1.7437	1.4080	0.0000	0.0000	0.0000	2019/08/01 16:37	Fusion1 (Fusion1)

#### Calibrations

Name: Extended Reaction 021711 (TOC)	
Version: v27	Calibration curve formula: TOC: $y = 7.170x + 11.164$

Ver Creation: 2019/03/11 21:51 r<sup>2</sup> value: TOC: r<sup>2</sup> = 0.99991  
 Comment:  
 Operator: Fusion1 (Fusion1)  
 Basic Analysis Type TOC

**Basic Analysis Type:** TOC

Sample ID	Y Raw Value	X Expected	Message	End Time
0.0 ppm	10.4100	0.0000		2019/03/11 20:12
0.50 ppm	14.7740	0.5000		2019/03/11 20:28
1.00 ppm	18.0020	1.0000		2019/03/11 20:44
5.00 ppm	47.2310	5.0000		2019/03/11 21:01
10.0 ppm	85.1320	10.0000		2019/03/11 21:17
25.0 ppm	188.5200	25.0000		2019/03/11 21:33
50.0 ppm	370.1610	50.0000		2019/03/11 21:49

**Methods****Name:** Extended Reaction 021711 (TOC)

Version: v4 Operator: Fusion1 (Fusion1)  
 Ver Creation: 2019/01/31 11:21  
 Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	ICSpurgeRinseVolume	12.0 ml
UVReactorPrerinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPrerinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPrerinses	1	SyringeSpeedWaste	10
ICSpurgeTime	1.00 mins	SyringeSpeedAcid	7
DetectorSweepFlow	500 ml/min	SyringeSpeedReagent	7
PreSpurgeTime	4.00 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

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### Acceptance / Approval

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#### Electronic Signatures

Report Version	User Name	Acceptance	Reason	Date
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### Report History

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#### Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/08/03 12:03

StarLIMS Run: 645651, 645652, 645653, 645654  
 Analysis: TOC/DOC  
 Method: 415.1, SM 5310 C, 9060, 9060A

CCV: 11-GEN-05-79K 50 ppm      LCS: 11-GEN-05-79J 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-74A

ICS TV: 25.0 ppm                      ICS % R = 2

Spike ID: 11-GEN-05-79K              0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-77J

21 % H3PO4: 11-GEN-05-79H

Equipment ID: K-TOC-03

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

FILTER ID: N/A

Analyzed By: <u>BCP</u>	Date Analyzed: <u>8/11/19</u>
Reviewed By: <u>[Signature]</u>	Date Reviewed: <u>8/23/19</u>



## Case Narrative

**Method:** 6850  
**Analysis:** Perchlorate  
**Analysis SOP:** LC-MS-CLO4  
**ALS WO ID(s):** 1922027; 1922715; 1923027

**Client:** ALS Laboratories (Houston, TX)  
**Matrix:** Water  
**ELMS Batch (HBN):** 2281 (245600)

**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  $^{18}\text{O}$  labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in quantitation.

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

**Holding Times:** Holding times were met for all analyses.

**Dilutions:** NA

**Method QC data:** The method blank (LMB 668347) was less than 1/2 the CRDL. The recovery for the LCS (668348) was within acceptable parameters.



**MS/MSD Analysis:** MS/MSD was performed on samples 1922027001 (Client ID: LH18/24-SP650\_073019\_BIX). 4.0 $\mu$ l of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4. $\mu$ g/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  $\mu$ g/L. Results were calculated in  $\mu$ g/L by the equation (A)x(B),

where: A = Analyte concentration from the standard curve ( $\mu$ g/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 – 668345) is reported from the analysis of the Laboratory Control Sample (LCS – 668348) at a level of 4.0 $\mu$ g/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) along with datafiles 14AUGD05-08.

Thomas Bosch      August 14, 2019  
Analyst                      Date



## ANALYTICAL REPORT

Report Date: August 14, 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: **34-1922027**

Project ID: HS19071544

Purchase Order: HS19071544

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_073019_BIX	1922027001	07/30/19	08/01/19	

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## ANALYTICAL REPORT

Workorder: 34-1922027

Client: ALS Environmental  
(Houston)

Project Manager: Kevin W. Griffiths

## Analytical Results

Sample ID: <b>LH18/24-SP650_073019_BIX</b>	Sampling Site: NA	Collected: 07/30/2019				
Lab ID: 1922027001	Media: 125 mL Nalgene	Received: 08/01/2019				
Matrix: Water	Sampling Parameter: NA					
<b>Analysis Method - EPA 6850, DoD QSM</b>						
Preparation: Not Applicable	Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2281 (HBN: 245600) Analyzed: 08/14/2019 09:25	Instrument ID: LCMS04 Percent Solid: NA Report Basis: Wet				
<b>Analyte</b>	<b>Result (ug/L)</b>	<b>DL (ug/L)</b>	<b>LOD (ug/L)</b>	<b>LOQ (ug/L)</b>	<b>Dilution</b>	<b>Qual</b>
Perchlorate	ND	1.0	2.0	4.0	1	U

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

Method	Analyst	Peer Review
EPA 6850, DoD QSM	/S/ Thomas Bosch 08/14/2019 12:01	/S/ Stephen Brose 08/14/2019 14:07

## Laboratory Contact Information

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

Phone: (801) 266-7700  
Email: als@alst.com  
Web: www.alst.com





## ANALYTICAL REPORT

**Workorder:** 34-1922027

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

### 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

00950866

## Analysis Information

**Workorder:** 1922027

**Limits:** Client SOW/Contract Specified  
**Basis:** DoD QSM

**Preparation:** NA  
**Batch:** NA  
**Prepared By:** NA

**Analysis:** EPA 6850, DoD QSM  
**Batch:** ELMS/2281 (HBN: 245600)  
**Analyzed By:** Thomas Bosch

## Blank

<b>LMB:</b> 668347 <b>Analyzed:</b> 08/14/2019 09:11 <b>Units:</b> ug/L			
Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

## Laboratory Control Sample

<b>LCS:</b> 668348 <b>Analyzed:</b> 08/14/2019 08:43 <b>Dilution:</b> 1 <b>Units:</b> ug/L				
Analyte	Result	Target	% Rec	QC Limits
Perchlorate	4.00	4.00	100	78.8   123.8

## Matrix Spike - Matrix Spike Duplicate

<b>Sample:</b> 1922027001 <b>Analyzed:</b> 08/14/2019 09:25 <b>Dilution:</b> 1 <b>Units:</b> ug/L		<b>MS:</b> 668349 <b>Analyzed:</b> 08/14/2019 09:39 <b>Dilution:</b> 1 <b>Units:</b> ug/L				<b>MSD:</b> 668350 <b>Analyzed:</b> 08/14/2019 09:54 <b>Dilution:</b> 1 <b>Units:</b> ug/L			
Analyte	Result	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Perchlorate	ND	3.69	4	92.2	78.8   123.8	3.63	90.7	1.61	0.0   20.0

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

Analyst	Peer Review
/S/ Thomas Bosch 08/14/2019 12:06	/S/ Stephen Brose 08/14/2019 14:07

## Symbols and Definitions

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

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



**ALS Environmental**  
**CHAIN-OF-CUSTODY**

Project / Job / Task: HS19071544		Split:		Workorder ID: 1922027		Level: ENV_LVL4		Requested Analysis	
Client: ALS Environmental (Houston)				Account: 8101		Type: 125Poly			
Comments:									
Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	ID(s)	Containers	Count	
1	07/30/2019 14:00	LH18/24-SP650_073019_BIX	1922027001		Water	A		1	A
2									
3									
4									
5									
6									
7									
8									
9									
10									

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY					SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY				
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location	Sample Prep / Analysis for: Prepared / Analyzed by:	Lab Notebook No.:	Received By: (Signature)	Date / Time	Reason for Transfer / Storage Location	
<i>Julie Warrick</i>	08/07/2019 09:41	ALS Sample Receiving	Sample Login						
<i>R.33.1</i>	8.13.19/14:00	<i>143</i>	<i>storage</i>						
		<i>T. Burch</i>	<i>cloh analysis</i>						



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18698/#2

### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11879

**SUBCONTRACT TO:**

1922027

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

**Phone:** +1 801 266 7700

**CUSTOMER INFORMATION:**

**Company:** ALS Houston  
**Contact:** RJ Modashia  
**Address:** 10450 Standliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RJ.Modashia@alsglobal.com  
**Alternate Contact:** Jumoke M. Lawal  
**Email:** jumoke.lawal@alsglobal.com

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Standliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS19071544  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19071544-02	LH18/24-SP650_073019_BIX	Water	30 Jul 2019 14:00
SUB_Perch-6850			08 Aug 2019

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

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

Relinquished By: J. Modashia  
Received By: Jumoke Lawal  
Cooler ID(s): \_\_\_\_\_

Date/Time: 7/31/19 18:00  
Date/Time: 8.1.19 0941  
Temperature(s): \_\_\_\_\_

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS HOUSTON Project/Task/Site: 1922027  
 Date/Time of Receipt: 8.1.19 0941 Number of Coolers Received: (1)

Condition of Coolers: Acceptable/Unacceptable Temperature Control: Present/Not Included  
 Cooler Custody Seals: Present/Absent/NA  
 Container Custody Seals: Intact/Broken/NA Location Temp Taken: Control/Between Samples  
 Ice Present: Yes/No/NA Are all temperatures within project specific guidelines? 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 <u>9799</u>	<u>3</u> °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By: [Signature] Signature GAYLEEN COATES Printed Name 8.1.19 Date

CLIENT-RELATED INFORMATION

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

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES  NO

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: \_\_\_\_\_ Returned to Sample Receipt by: \_\_\_\_\_ Date: \_\_\_\_\_  
Printed Name Signature



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

ORIGIN ID: SCRA (281) 530-5656  
CLIENT SERVICES  
ALS LABORATORY GROUP  
10450 STANCLIFF ROAD  
SUITE 210  
HOUSTON, TX 77099  
UNITED STATES US

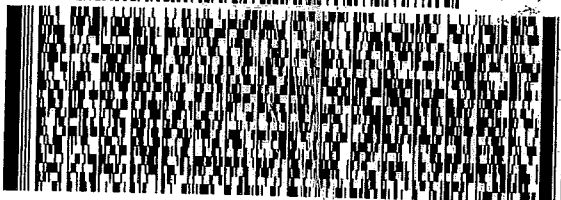
SHIP DATE: 31JUL19  
ACTWT: 18.95 LB  
CAD: 300130/CAFE3211  
DIMS: 19x16x13 IN  
BILL THIRD PARTY

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

**SALT LAKE CITY UT 84123**

(801) 266-7700

REF: HS19071495/1498/1544 AN RJ



**FedEx  
Express**



01050908080111181J

TRK# 4809 7836 3908  
0201

**THU - 01 AUG 3:00P  
STANDARD OVERNIGHT**

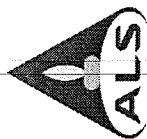
**AX BTFA**

**84123  
UT-US SLC**



Part #: 150469-434 RT2 EXP 02/20  
55102/FES1/104C

# Batch Worklist



Batch: ELMS/ 2281

Rule: EPA 6850, DoD QSM Water

Created: 8/14/2019 07.41  
Analyst: T. Bosch

Instrument: LCMS04  
Status: WP

HBN: 245600



Workorder: 1922027 [ENV\_LVL4]  
Workorder: 1922715 [ENV\_LVL4]  
Workorder: 1923027 [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	668344	CCV for HBN 245600 [ELMS/2281]				CCV	3		E685041C3Q	5311	8/14/2019	8/14/2019	8/14/2019
2	668348	LCS for HBN 245600 [ELMS/2281]				LCS	3		E6850Q413Q	5311	8/14/2019	8/14/2019	8/14/2019
3	668346	ICS for HBN 245600 [ELMS/2281]				ICS	3		E6850.D3Q	5311	8/14/2019	8/14/2019	8/14/2019
4	668347	LMB for HBN 245600 [ELMS/2281]				LMB	3		E6850Q413Q	5311	8/14/2019	8/14/2019	8/14/2019
5	1922027001	LH18/24-SP650_073019_BIX				SAMPLE	3	1922027001-A	E6850Q41.3	5480	8/27/2019	8/14/2019	8/14/2019
6	668349	LH18/24-SP650...(1922027001MS)				MS	3		E6850Q413Q	5311	8/14/2019	8/14/2019	8/14/2019
7	668350	LH18/24-SP65...(1922027001MSD)				MSD	3		E6850Q413Q	5311	8/14/2019	8/14/2019	8/14/2019
8	1922715001	LH18/24-SP650_080619_BIX				SAMPLE	3	1922715001-A	E6850Q41.3	5480	9/3/2019	8/22/2019	8/14/2019
9	1923027001	18WW19_080819				SAMPLE	3	1923027001-A	E6850Q41.3	5480	9/5/2019	8/26/2019	8/14/2019
10	1923027002	18WW20_080819				SAMPLE	3	1923027002-A	E6850Q41.3	5480	9/5/2019	8/26/2019	8/14/2019
11	668345	RLVS for HBN 245600 [ELMS/2281]				RLVS	3		E685041C3Q	5311	8/14/2019	8/14/2019	8/14/2019
12	668351	CCV for HBN 245600 [ELMS/2281]				CCV	3		E685041C3Q	5311	8/14/2019	8/14/2019	8/14/2019

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**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

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# **Analytical Documentation**



Analyst Write-up

ALS Work Order #'s &amp; Sample #( )'s: 1922027 (001); 1922715 (001); 1923027 (001)

ELMS Batch/HBN ID: 2281 (245600)

Prep Date: 08/13/2019 Analysis Date: 08/14/2019 Analyst: T. Bosch

Analyte: **Perchlorate** Matrix: **Water** Method: **6850**

Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\AUG\14AUG19D.s

Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**SAMPLE PREPARATION/ANALYSIS:

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

**REAGENTS:** Eluent A1: 95% ASTM Type II water (ALS)/ 5% ACN (B&J Lot AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).  
Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

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

**CALIBRATION CURVE:** Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.M

**INSTRUMENT CONDITIONS:** Samples were analyzed with an Agilent 1100 LC/MSD system, in negative SIM mode, monitoring m/z 83, 85, and 89.

**Instrument ID:** LCMS04 Online Acquisition Method: CLO4-AQN.M Fragmentor: 160 Output Gain: 10 Injection Volume: 50µL  
Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

FLOW GRADIENT:

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

**QC DATA:** 4.0µL of QC Solution Horizon ID 47516 was used for LCS 668348; Target = 4.0µg/L. ASTM type II water was used for LMB 668347.

**MS/MSD:** The Matrix Spike and duplicate (MS/MSD) were performed on sample 1922027001 (Client ID: LH18/24-SP650\_073019\_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\AUG\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alslts013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\245600-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 668345) is reported from the analysis of the Laboratory Control Sample (LCS – 668348) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03) along with datafiles 14AUG05-08.

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

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

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
<u>Batch(es)/SDG: ELMS: 2281 HBN: 245600</u>		
<u>Sample Set IDs if Applicable: 1922027/1922715/1923027</u>		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SB
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR#</u>	—	—
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB



## STANDARD REPORT

## Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850.WKG Std:100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	0.1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 STOCK

CLO4 STOCK		Description - 6850 Stock AccStd 1,000ug/mL	
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 INT

CLO4 INT			Description - 6850 Intermdt AccStd 10.ug/mL		
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



## STANDARD REPORT

## Working Standard - CLO4 QC WRK

CLO4 QC WRK		Description - 6850 QC WKG STD 100ug/L			
Standard: 47516		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC WRK 100.ug/L	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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





## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL	
Standard: 36748	Created By: Thomas Bosch	Amount: 100 mL	
MFG: Ultra Scientific	Create Date: 05/11/2017 01:05PM	Expires: 03/31/2020	
MFG Lot: CP-0860		Usable: Yes	
Part ID: ICC-013		Lab Lot: CLO4 QC STOCK	
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 QC INT

CLO4 QC INT			Description - 6850 QC Intrmdt Std-QC 10ug/mL		
Standard: 47515		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC INT 10.ug/mL	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020



## STANDARD REPORT

## Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		Verified By: Thomas Bosch		Usable: Yes	
Pipette ID: Not Provided		Verify Date:		Lab Lot: CLO4ISTDWRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L		
2	14797-73-0-89	Perchlorate 89	1000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK		Description - Perchlorate ISTD Stock	
Standard: 43729	Created By: Thomas Bosch	Amount: 1 mL	
MFG: Cambridge Isotope	Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026	
MFG Lot: SDFF-012A	Verified By: Thomas Bosch	Usable: Yes	
Part ID: OLM-7310-S	Verify Date:	Lab Lot: CLO4ISTDSTK	
Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL



# Certificate of Analysis



## ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

### Description:

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

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

Solvent: water (low TOC, <50 ppb)

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

### Traceability:

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

### Estimation of Uncertainties:

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

### Homogeneity:

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

### Intended Use:

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

### Instructions for Use:

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

### Hazards:

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

### Expiration of Certification:

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





# Certificate of Analysis



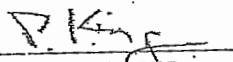
## ISO Guide 34 Reference Material

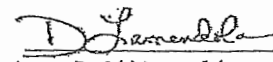
Product Number: ICC-013  
Lot Number: CP-0860

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

### Maintenance of Certification:

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

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

  
Daniel J. Lamendola  
Director of QMRA



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<sub>4</sub>)  
SRM: Ind. Std.  
Lot: 218065075  
Matrix: Water  
Hazards: Refer to SDS for complete safety information

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



Signal Word: None

Component	SRM #	Prepared Concentration (µg/mL)
ClO <sub>4</sub> Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is ±0.24%.

The final solution was checked against an independent standard to verify its concentration.

We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.

All solutions are filtered through a 0.2 µm filter prior to being bottled.

All glassware used in preparation is Class A and calibrated regularly.

All weights are traceable through NIST Test No. 822-275872-11

All bottles are triple rinsed with deionized water prior to use.

Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.

We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By:

*Meigan O'Leary*

Meigan O'Leary, Inorganic QC Manager

Cambridge Isotope Laboratories, Inc.

## Certificate of Analysis

Quality Standards:  
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

## Product Information

Chemical Purity Specification:  $\geq 98\%$

Labeled CAS Number: NA

Unlabeled CAS Number: 7601-89-0

MW\*: 130.4

Chemical Formula:  $\text{NaCl}^*\text{O}_4$

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

Stability: See storage and expiration date.

## Certification

Cambridge Isotope Laboratories, Inc. guarantees that this material meets or exceeds the specifications stated. Absolute identity as well as chemical and isotopic purities are assured by the use of unambiguous synthetic routes and multiple chemical analyses whenever possible. Results are representative of QC testing at time of release from Quality Control unless otherwise stated.

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

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

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

Approved by: T. J. Eckersley

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

## Quality Control Tests and Results

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





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**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

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# Raw Data

## Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

['#' ==&gt; Run has not been reprocessed with Batch Review Method

['\*' ==&gt; Run has been saved with batch file]

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount	
*	668344	CCV@25	Vial 71	1	Control	1	1.41705e6	7.940	23.98275
*	668348	QC@4.0	Vial 72	1	Control	2	2.54232e5	7.968	4.00063
*	668346	ICS@4.0	Vial 73	1	Control	3	1.69006e5	7.781	3.16133
*	668347	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1922027001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	668349	220271S	Vial 76	1	Sample	6	1.85325e5	7.618	3.68787
*	668350	220271D	Vial 77	1	Sample	7	1.87103e5	7.610	3.62903
*	1922715001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1923027001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1923027002		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	668351	CCV@25	Vial 71	1	Control	11	1.38922e6	7.982	23.06424

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	668344	CCV@25	Vial 71	1	Control	1	4.43367e5	7.960	25.20664
*	668348	QC@4.0	Vial 72	1	Control	2	8.12716e4	7.989	4.15621
*	668346	ICS@4.0	Vial 73	1	Control	3	6.47272e4	7.805	3.88663
*	668347	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1922027001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	668349	220271S	Vial 76	1	Sample	6	6.51794e4	7.628	4.19725
*	668350	220271D	Vial 77	1	Sample	7	6.53175e4	7.615	4.09697
*	1922715001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1923027001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1923027002		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	668351	CCV@25	Vial 71	1	Control	11	4.40722e5	7.997	24.55800

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	668344	CCV@25	Vial 71	1	Control	1	1.80205e5	7.960	5.00000
*	668348	QC@4.0	Vial 72	1	Control	2	2.09396e5	7.994	5.00000
*	668346	ICS@4.0	Vial 73	1	Control	3	1.78427e5	7.807	5.00000
*	668347	LMB	Vial 74	1	Control	4	2.39409e5	8.172	5.00000
*	1922027001		Vial 75	1	Sample	5	1.62744e5	7.641	5.00000
*	668349	220271S	Vial 76	1	Sample	6	1.66279e5	7.631	5.00000
*	668350	220271D	Vial 77	1	Sample	7	1.70743e5	7.634	5.00000
*	1922715001		Vial 78	1	Sample	8	1.55455e5	7.625	5.00000
*	1923027001		Vial 79	1	Sample	9	2.03712e5	7.859	5.00000
*	1923027002		Vial 80	1	Sample	10	2.10021e5	7.856	5.00000
*	668351	CCV@25	Vial 71	1	Control	11	1.84112e5	7.983	5.00000

\*\*\* End of Report \*\*\*

## Sequence Table:

## Method and Injection Info Part:

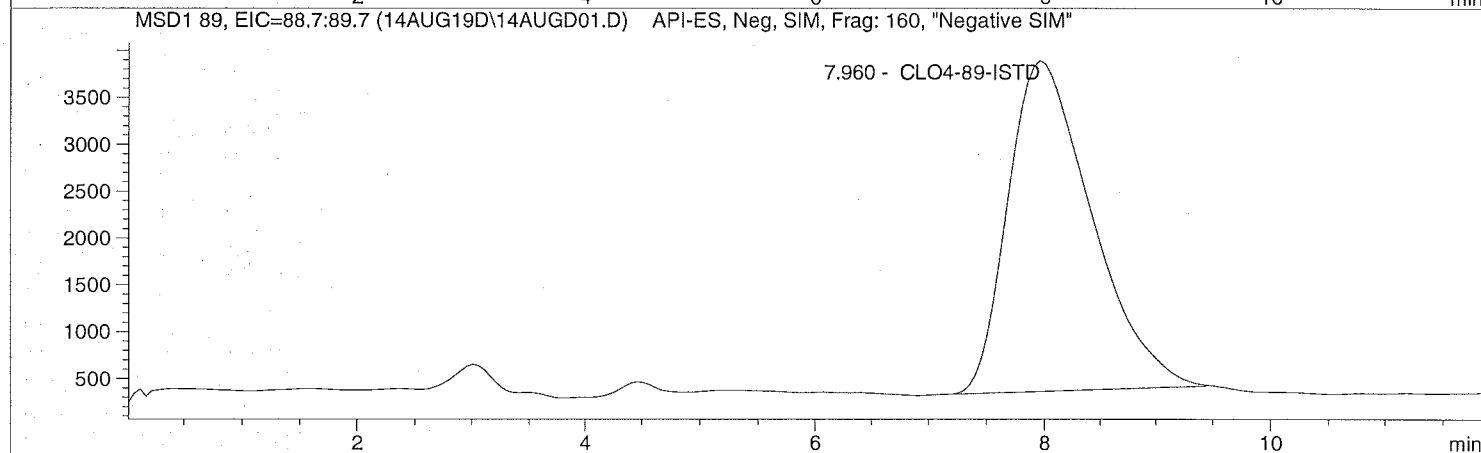
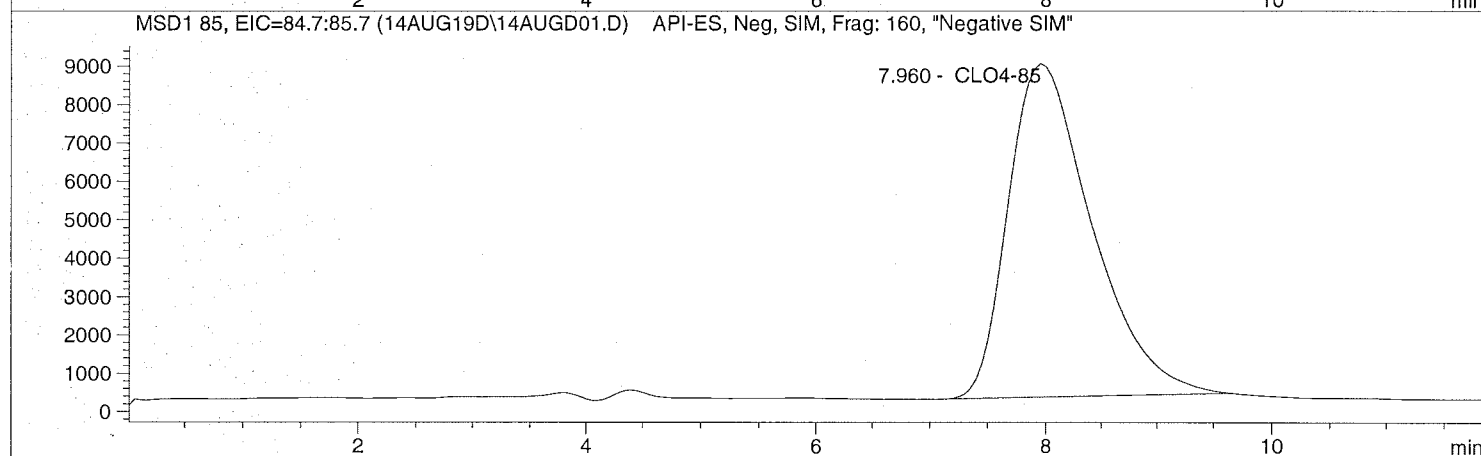
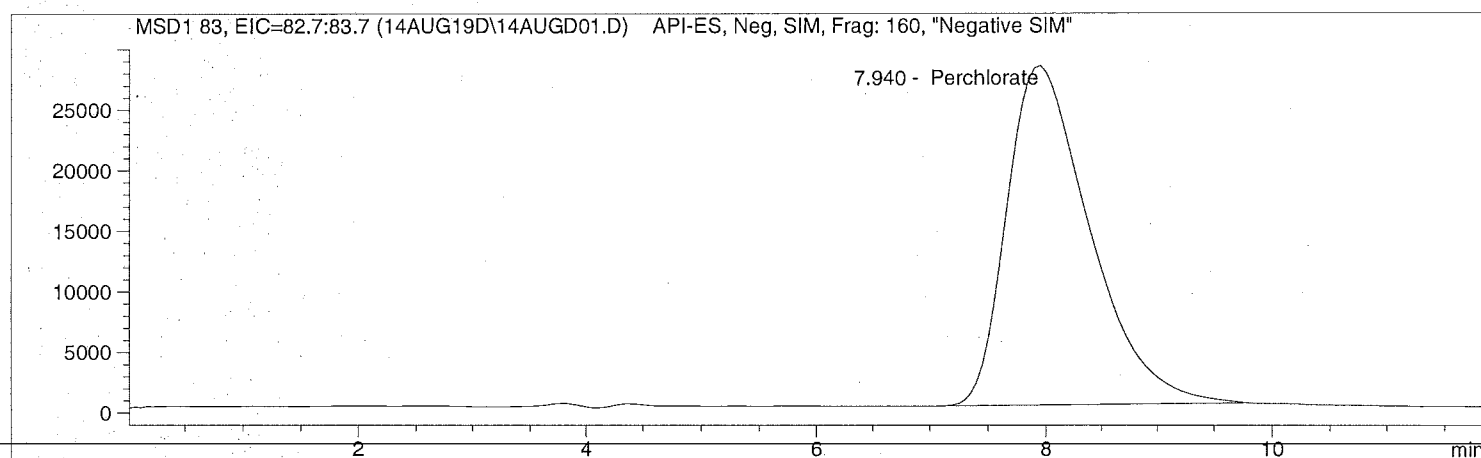
Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	668344	CCV@25	CLO4-AQN 1	Ctrl Samp		
2	Vial 72	668348	QC@4.0	CLO4-AQN 1	Ctrl Samp		
3	Vial 73	668346	ICS@4.0	CLO4-AQN 1	Ctrl Samp		
4	Vial 74	668347	LMB	CLO4-AQN 1	Ctrl Samp		
5	Vial 75	1922027001		CLO4-AQN 1	Sample		
6	Vial 76	668349	220271S	CLO4-AQN 1	Sample		
7	Vial 77	668350	220271D	CLO4-AQN 1	Sample		
8	Vial 78	1922715001		CLO4-AQN 1	Sample		
9	Vial 79	1923027001		CLO4-AQN 1	Sample		
10	Vial 80	1923027002		CLO4-AQN 1	Sample		
11	Vial 71	668351	CCV@25	CLO4-AQN 1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD01.D Sample Name: 668344 CCV@25

=====  
Injection Date: 8/14/2019 08:28:02 Seq Line: 1  
Sample Name: 668344 CCV@25 Location: Vial 71  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD01.D Sample Name: 668344 CCV@25

```

=====
Injection Date: 8/14/2019 08:28:02      Seq Line: 1
Sample Name: 668344 CCV@25             Location: Vial 71
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

## Perchlorate analysis

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=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 25.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.940	PBA	1417055.0	23.9827	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.960	PBA	443367.1	25.2066	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.960	PBA	180205.1	5.0000	CLO4-89-ISTD

```

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*** End of Report ***

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD02.D

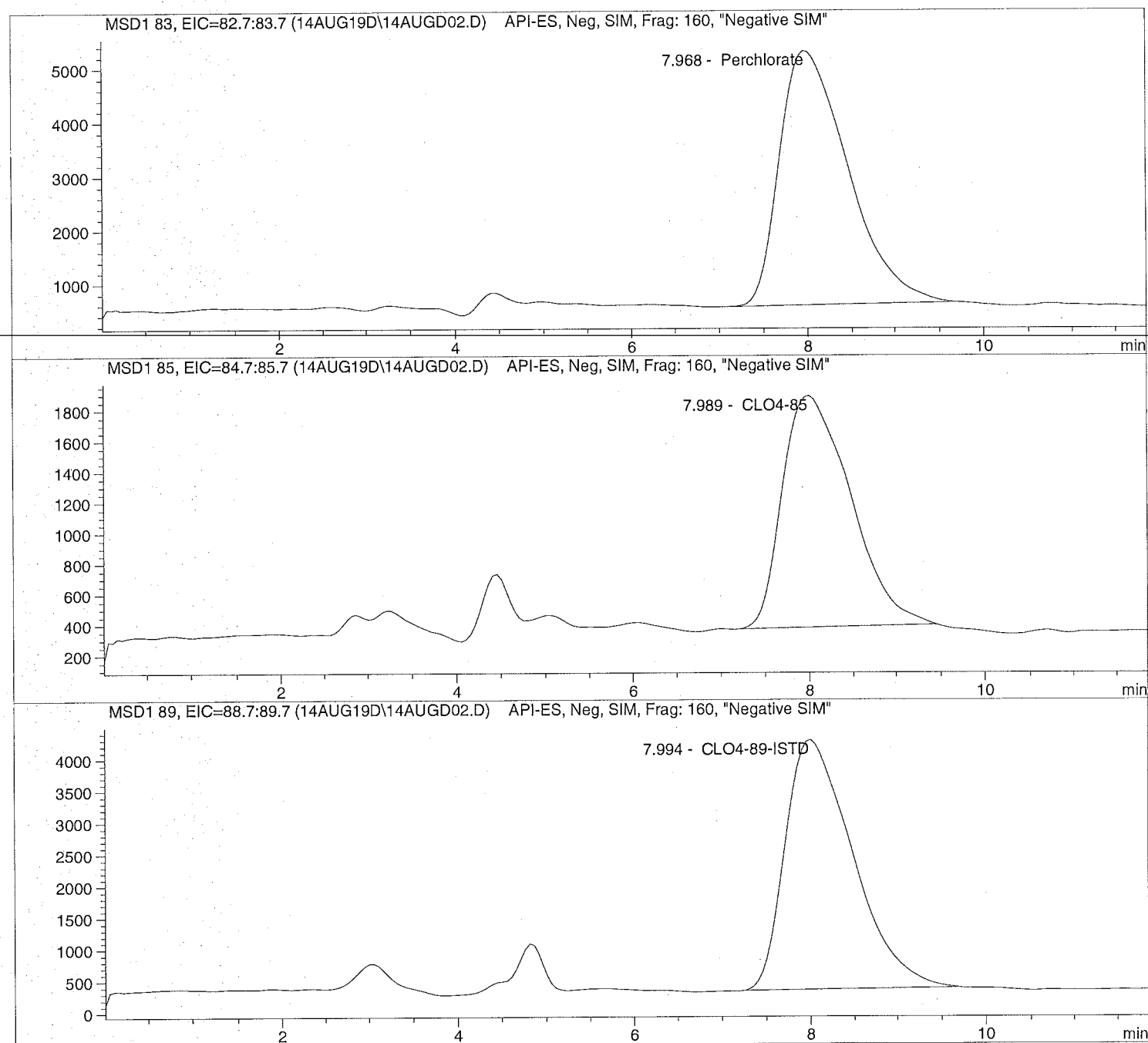
Sample Name: 668348 QC@4.0

=====  
Injection Date: 8/14/2019 08:43:08  
Sample Name: 668348 QC@4.0  
Acq Operator: TNB

Seq Line: 2  
Location: Vial 72  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



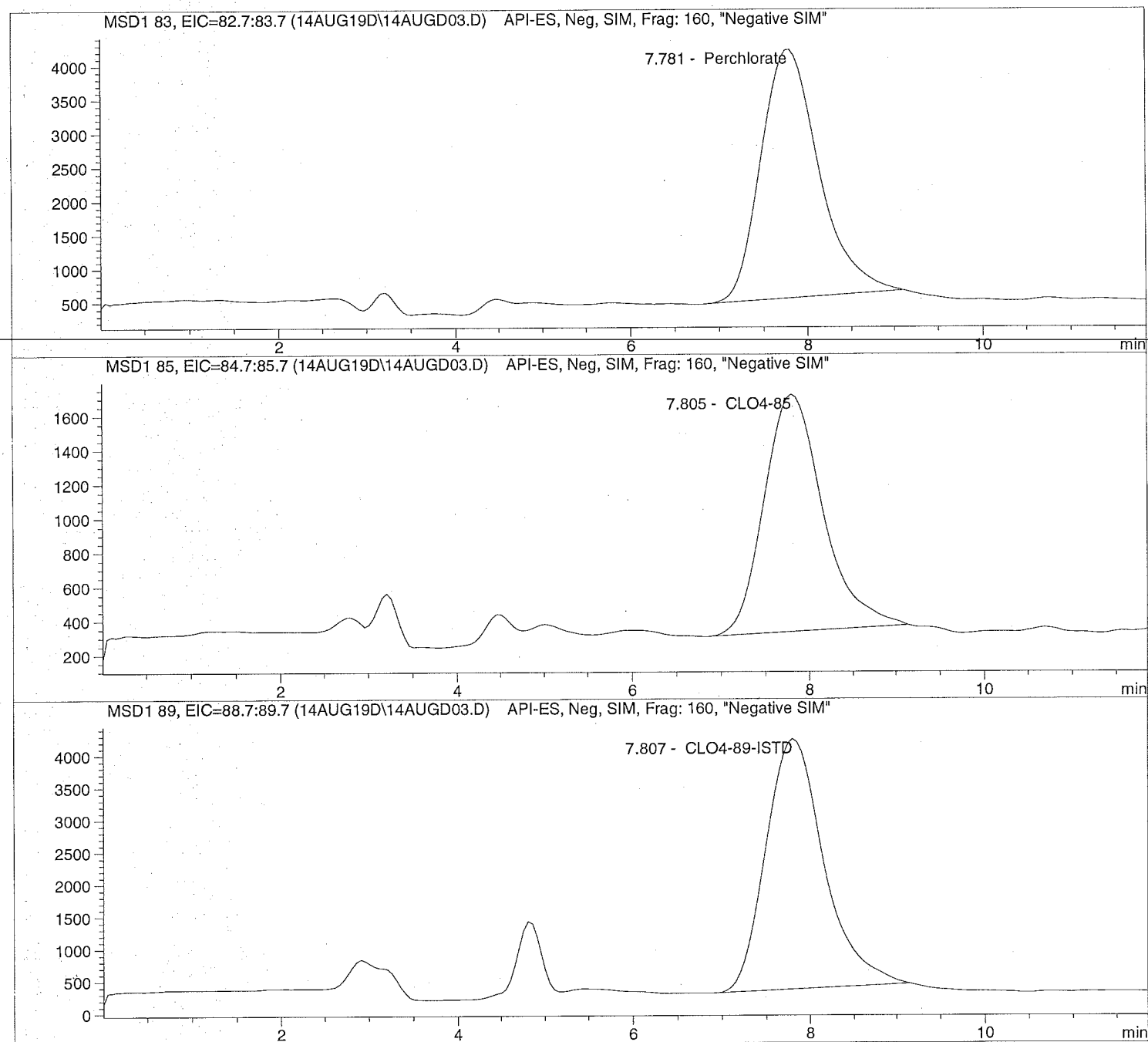


Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD03.D Sample Name: 668346 ICS@4.0

=====  
Injection Date: 8/14/2019 08:57:20 Seq Line: 3  
Sample Name: 668346 ICS@4.0 Location: Vial 73  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD03.D      Sample Name: 668346    ICS@4.0

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=====
Injection Date: 8/14/2019 08:57:20      Seq Line: 3
Sample Name: 668346 ICS@4.0            Location: Vial 73
Acq Operator: TNB                        Inj. No.: 1
                                         Inj. Vol.: 50 µl
=====

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Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

Perchlorate analysis

Sample Information

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=====
Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000
=====

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LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.781	PBA	169005.6	3.1613	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.805	PBA	64727.2	3.8866	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.807	PBA	178426.7	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD04.D

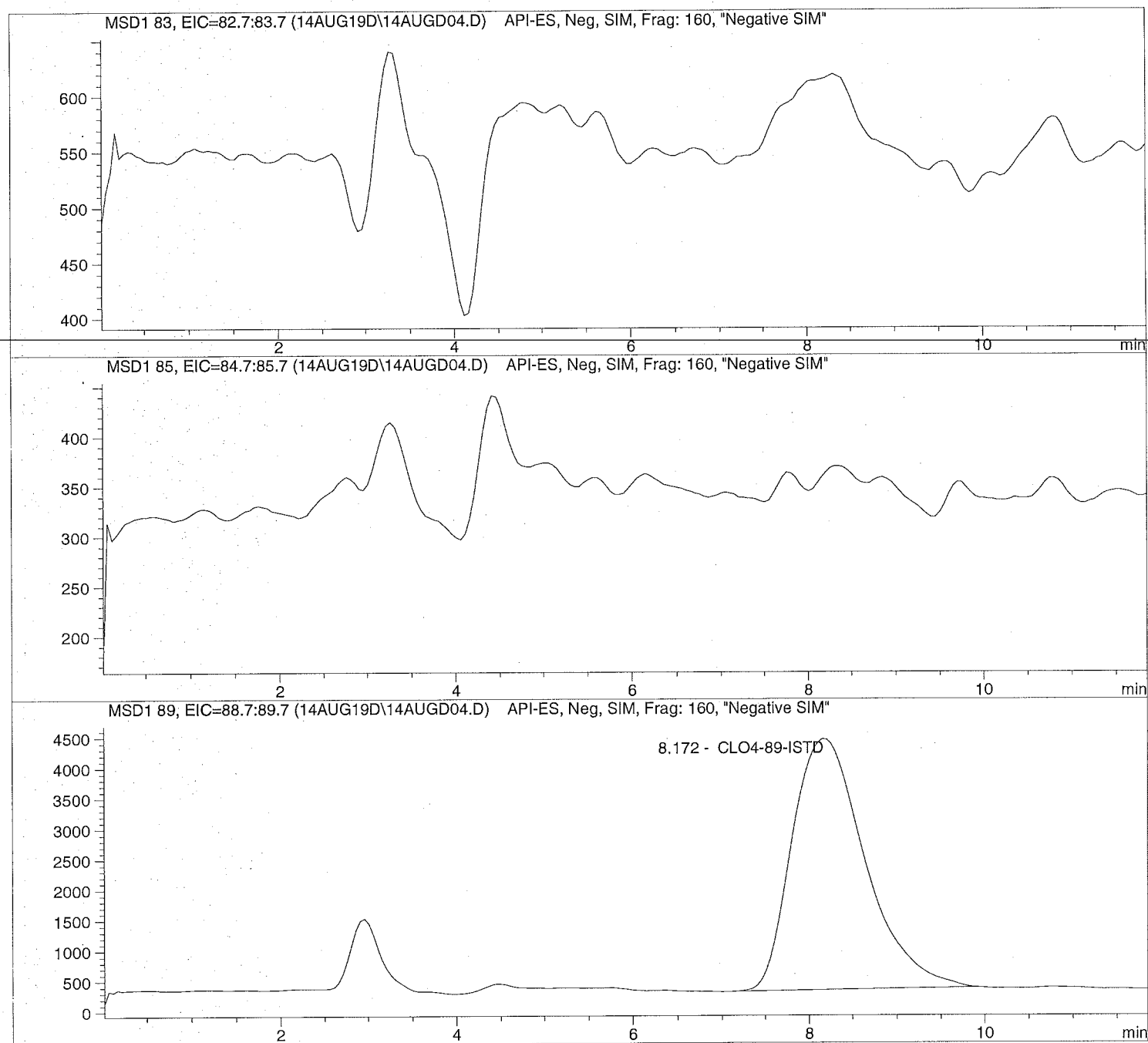
Sample Name: 668347 LMB

=====  
Injection Date: 8/14/2019 09:11:36  
Sample Name: 668347 LMB  
Acq Operator: TNB

Seq Line: 4  
Location: Vial 74  
Inj. No.: 1  
Inj. Vol.: 50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD04.D Sample Name: 668347 LMB

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=====
Injection Date: 8/14/2019 09:11:36      Seq Line: 4
Sample Name: 668347 LMB                 Location: Vial 74
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

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## Perchlorate analysis

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=====
Sample Information
=====

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```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.172	PBA	239408.7	5.0000	CLO4-89-ISTD

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*** End of Report ***

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Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD05.D

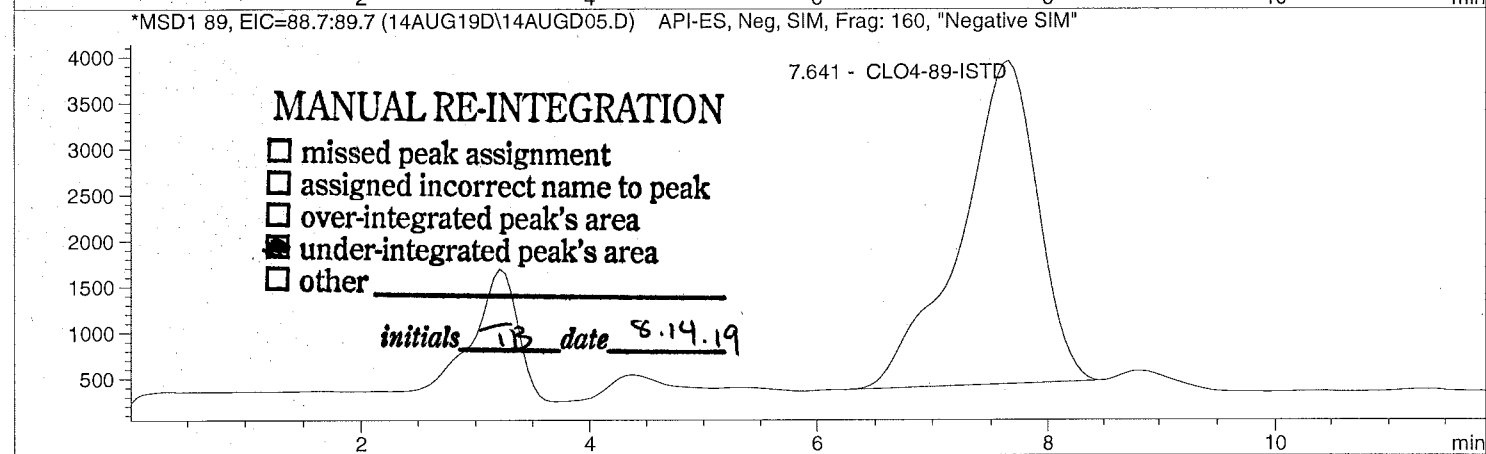
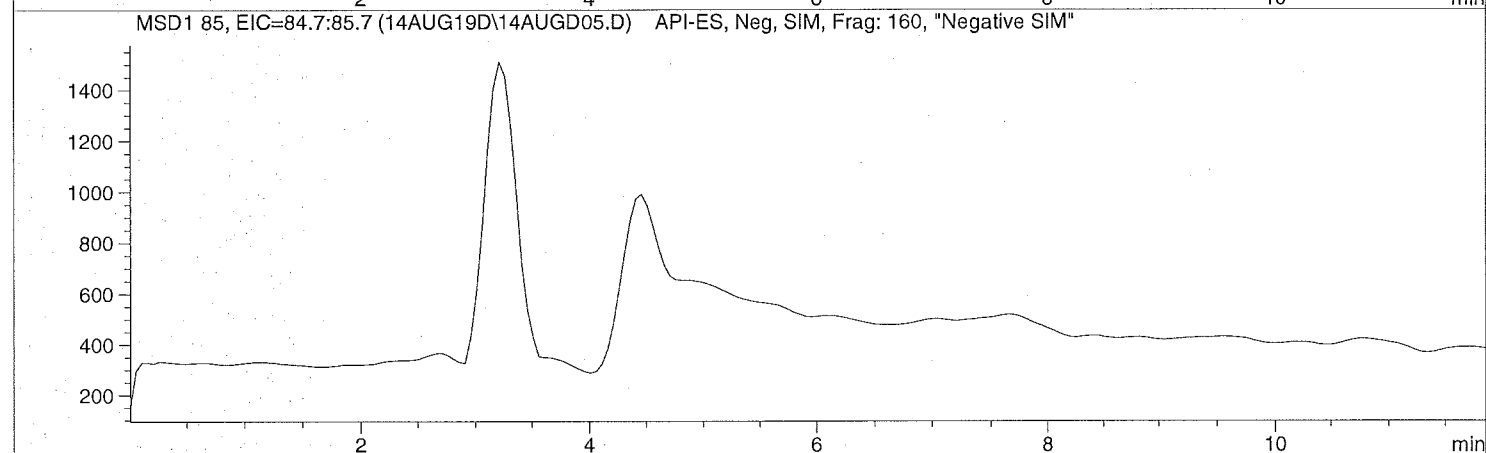
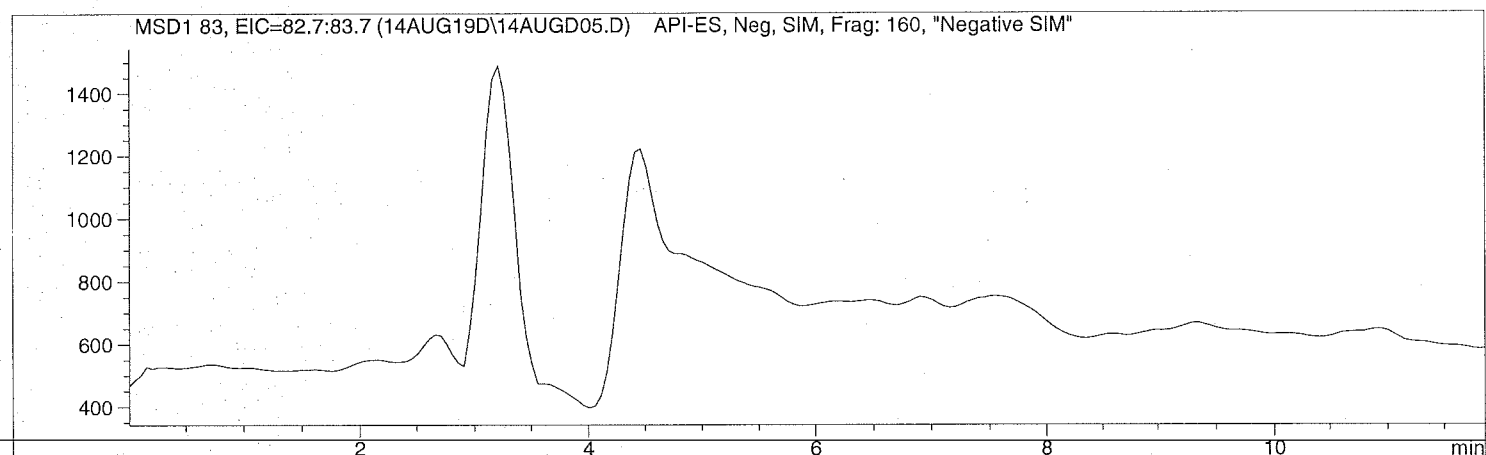
Sample Name: 1922027001

Injection Date: 8/14/2019 09:25:46  
 Sample Name: 1922027001  
 Acq Operator: TNB

Seq Line: 5  
 Location: Vial 75  
 Inj. No.: 1  
 Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD05.D Sample Name: 1922027001

```

=====
Injection Date: 8/14/2019 09:25:46      Seq Line: 5
Sample Name: 1922027001                Location: Vial 75
Acq Operator: TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

## Perchlorate analysis

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=====
                          Sample Information
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Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

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=====
                          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
7.641	MM	162744.4	5.0000	CLO4-89-ISTD

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*** End of Report ***

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD06.D

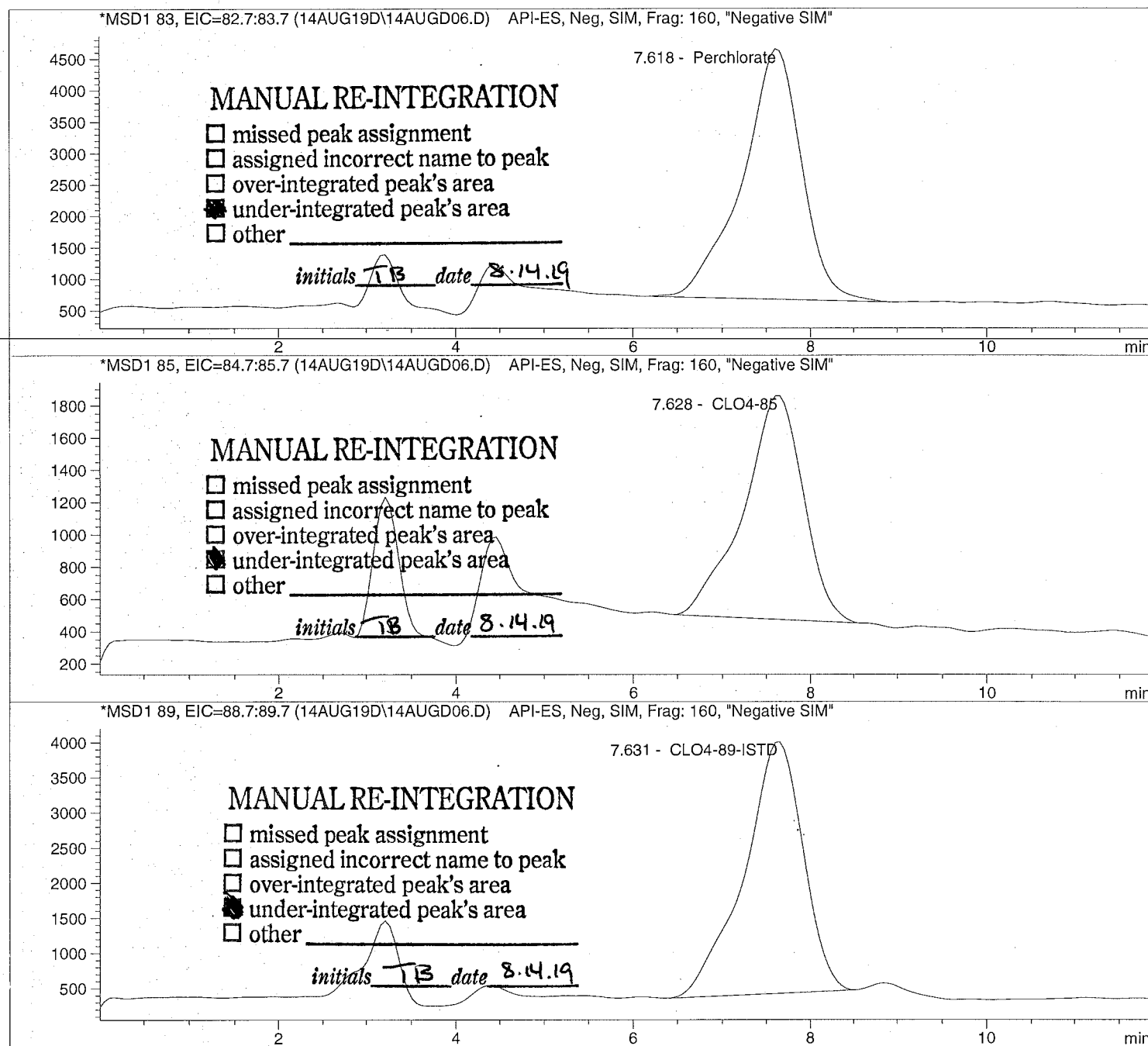
Sample Name: 668349 220271S

Injection Date: 8/14/2019 09:39:59  
Sample Name: 668349 220271S  
Acq Operator: TNB

Seq Line: 6  
Location: Vial 76  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD06.D Sample Name: 668349 220271S

```

=====
Injection Date: 8/14/2019 09:39:59 Seq Line: 6
Sample Name: 668349 220271S Location: Vial 76
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

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## Perchlorate analysis

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=====
Sample Information
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Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.618	MM	185324.7	3.6879	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.628	MM	65179.4	4.1973	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.631	MM	166279.3	5.0000	CLO4-89-ISTD

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*** End of Report ***

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD07.D

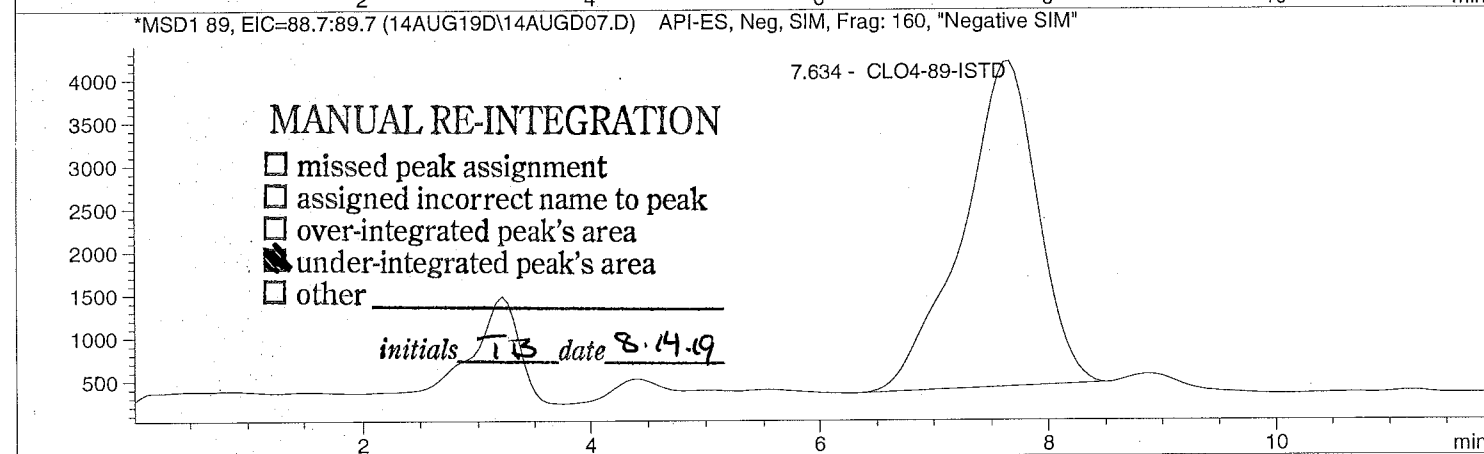
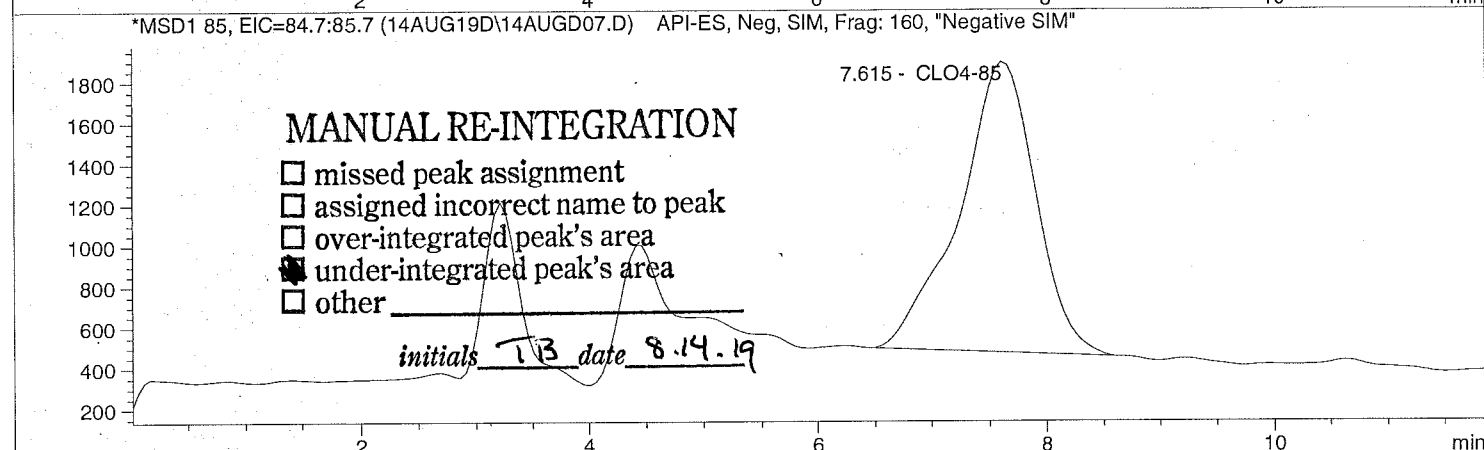
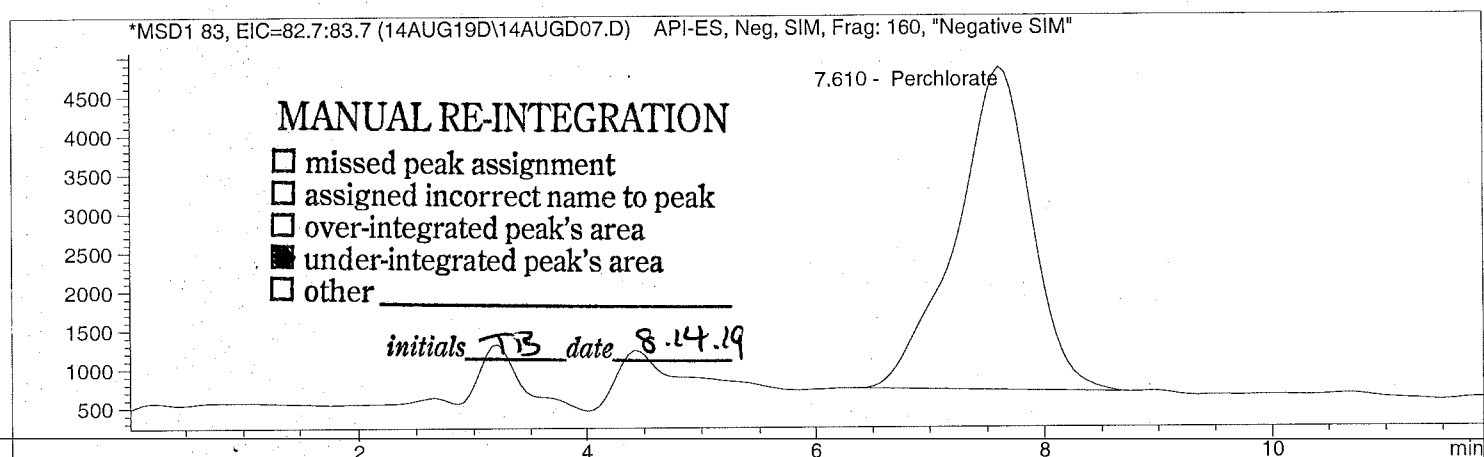
Sample Name: 668350 220271D

Injection Date: 8/14/2019 09:54:13  
 Sample Name: 668350 220271D  
 Acq Operator: TNB

Seq Line: 7  
 Location: Vial 77  
 Inj. No.: 1  
 Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD07.D Sample Name: 668350 220271D

```

=====
Injection Date: 8/14/2019 09:54:13      Seq Line: 7
Sample Name: 668350 220271D           Location: Vial 77
Acq Operator: TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.610	MM	187102.7	3.6290	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.615	MM	65317.5	4.0970	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.634	MM	170742.6	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD08.D

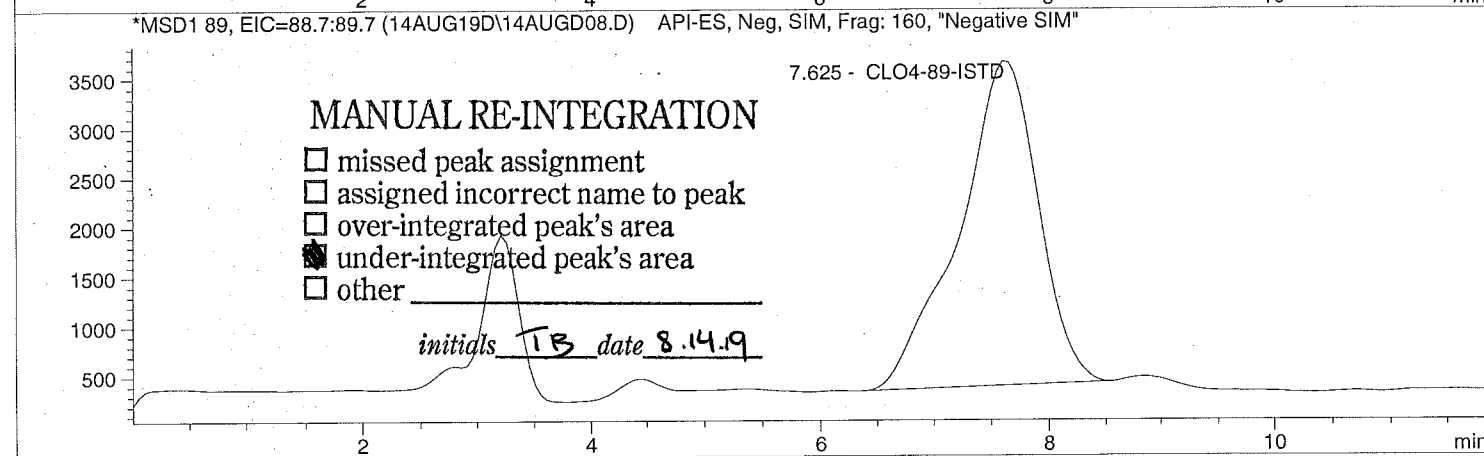
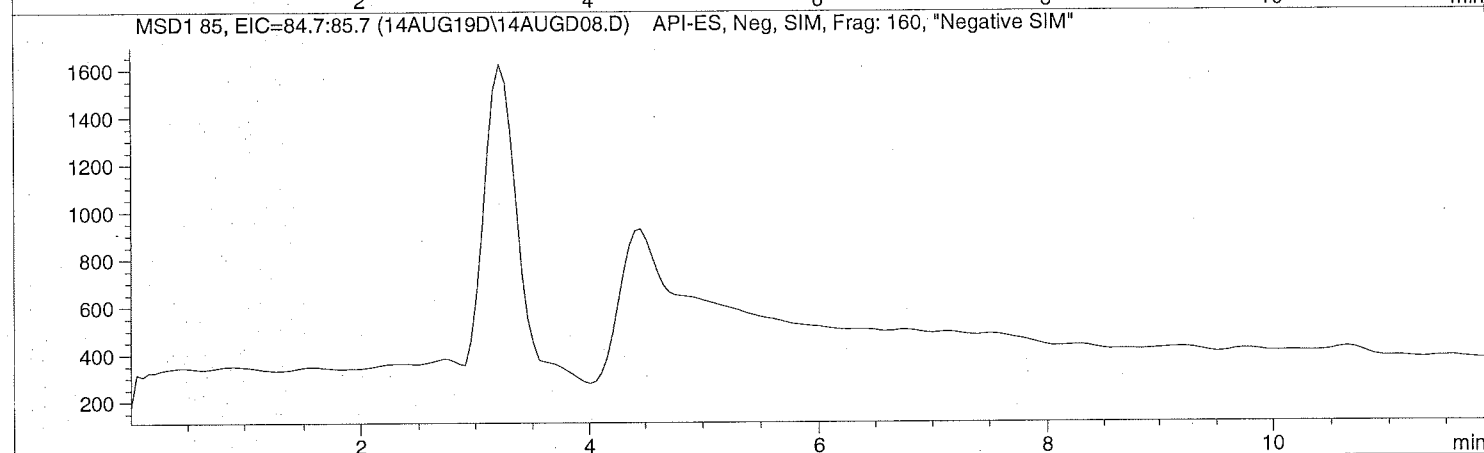
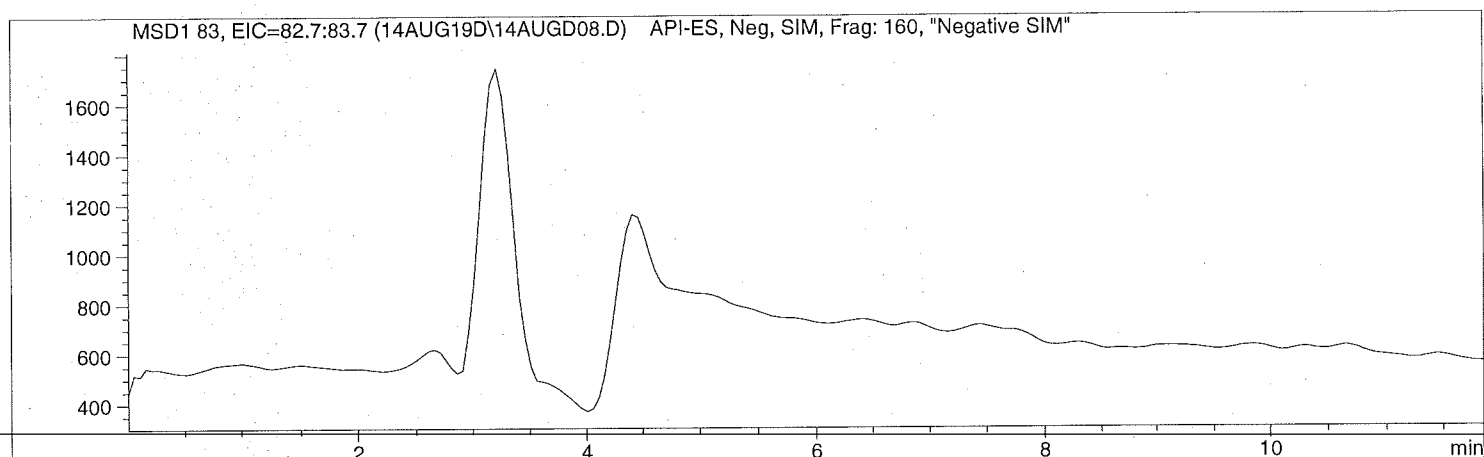
Sample Name: 1922715001

Injection Date: 8/14/2019 10:08:31  
 Sample Name: 1922715001  
 Acq Operator: TNB

Seq Line: 8  
 Location: Vial 78  
 Inj. No.: 1  
 Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD08.D Sample Name: 1922715001

```

=====
Injection Date: 8/14/2019 10:08:31      Seq Line: 8
Sample Name: 1922715001                Location: Vial 78
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.625	MM	155455.2	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD09.D

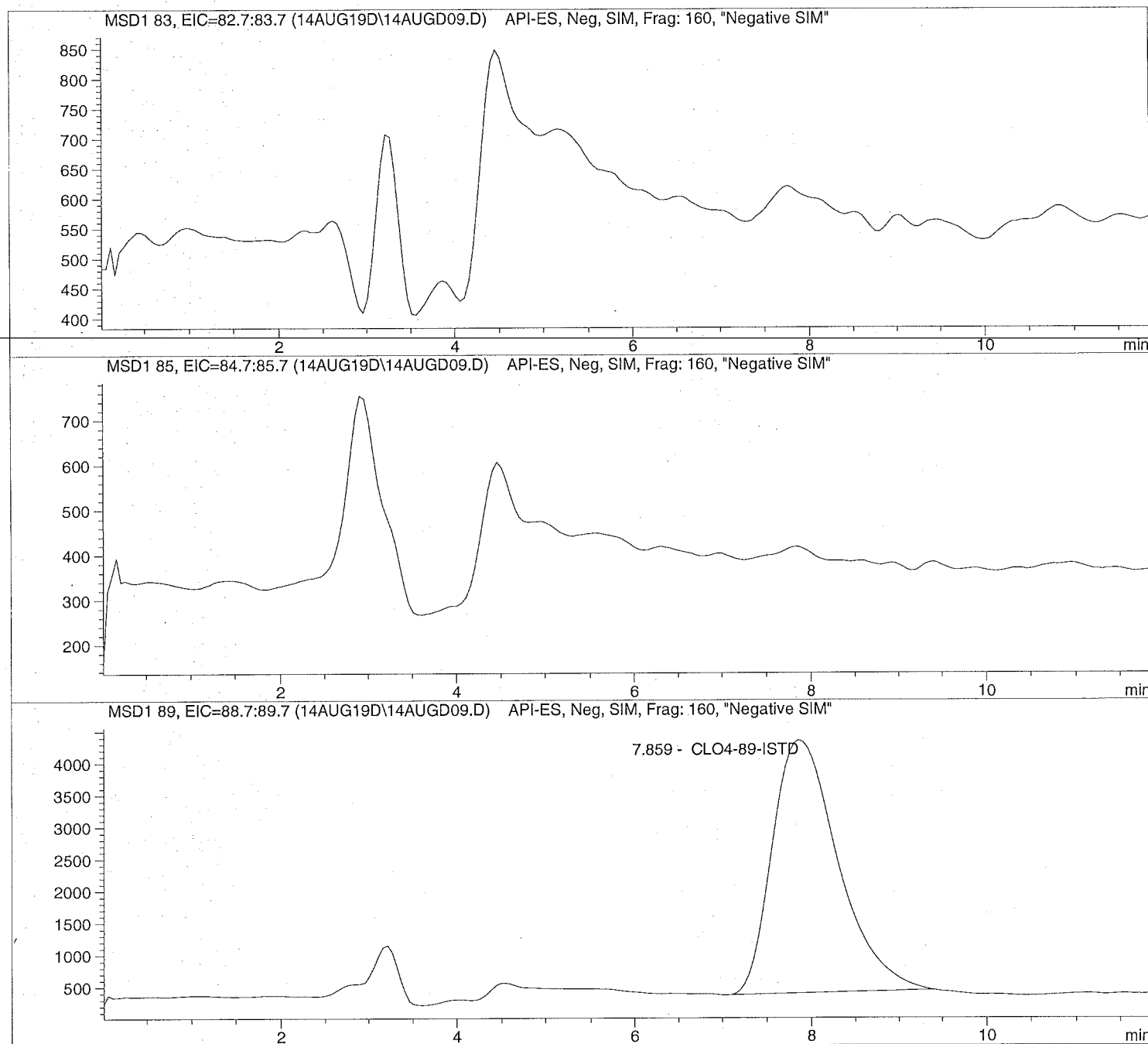
Sample Name: 1923027001

=====  
Injection Date: 8/14/2019 10:22:43  
Sample Name: 1923027001  
Acq Operator: TNB

Seq Line: 9  
Location: Vial 79  
Inj. No.: 1  
Inj. Vol.: 50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD09.D Sample Name: 1923027001

```

=====
Injection Date: 8/14/2019 10:22:43 Seq Line: 9
Sample Name: 1923027001 Location: Vial 79
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.859	PBA	203712.1	5.0000	CLO4-89-ISTD

```

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

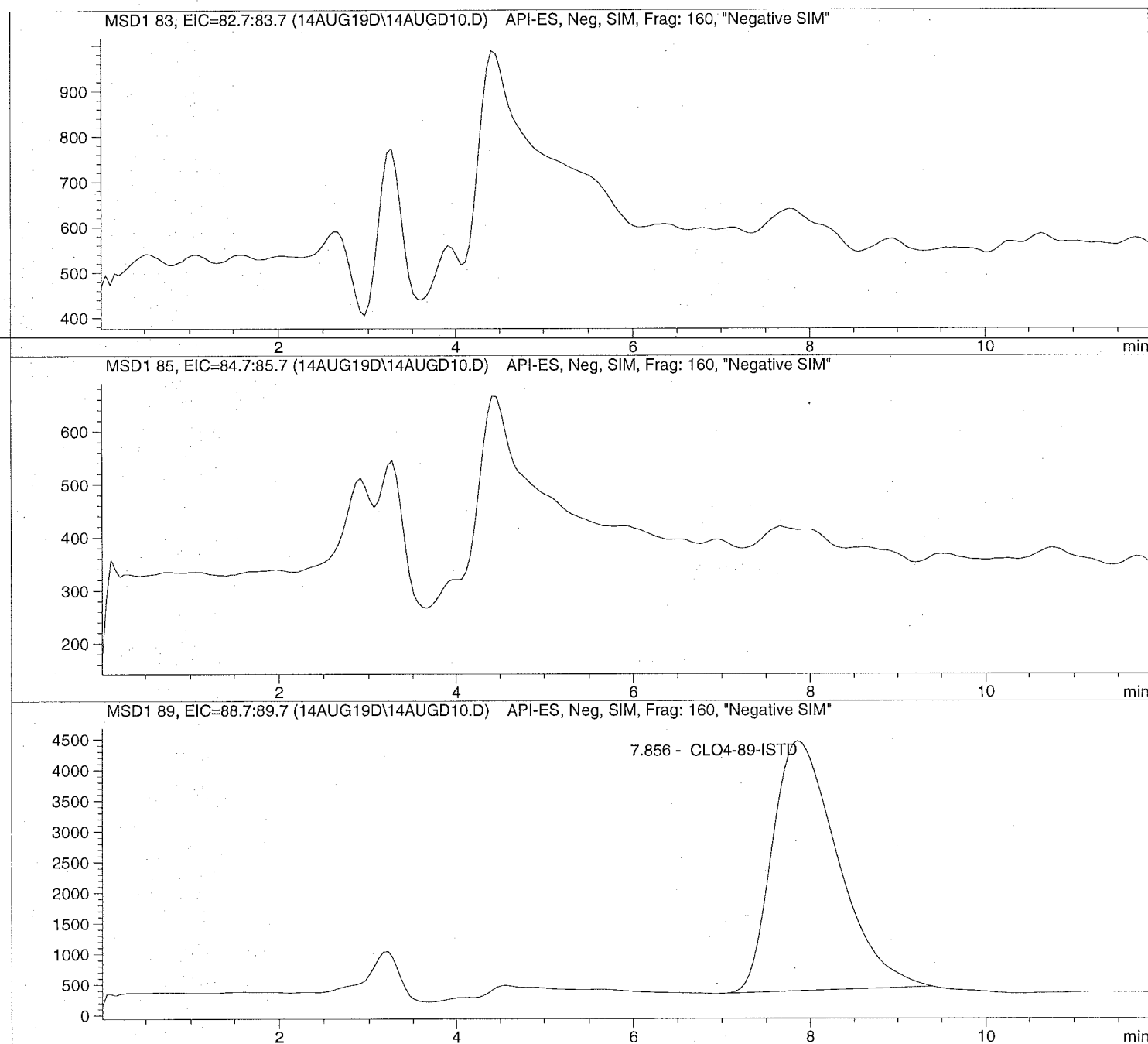
```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD10.D Sample Name: 1923027002

```
=====
Injection Date: 8/14/2019 10:36:56      Seq Line: 10
Sample Name: 1923027002                 Location: Vial 80
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13
```

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD10.D Sample Name: 1923027002

```

=====
Injection Date: 8/14/2019 10:36:56      Seq Line: 10
Sample Name: 1923027002                Location: Vial 80
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.856	PBA	210021.3	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD11.D

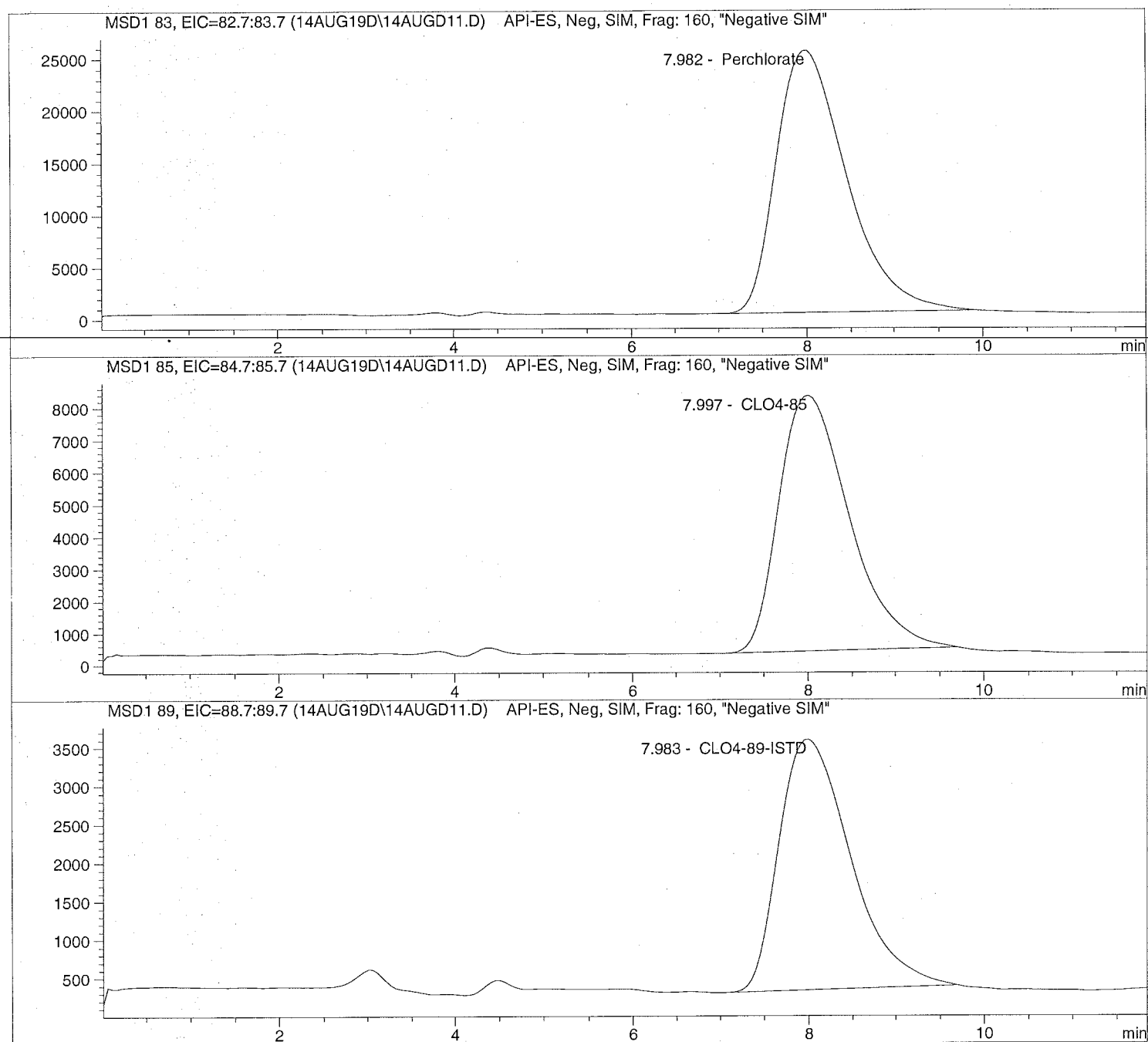
Sample Name: 668351 CCV@25

=====  
Injection Date: 8/14/2019 10:55:23  
Sample Name: 668351 CCV@25  
Acq Operator: TNB

Seq Line: 11  
Location: Vial 71  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD11.D Sample Name: 668351 CCV@25

```

=====
Injection Date: 8/14/2019 10:55:23 Seq Line: 11
Sample Name: 668351 CCV@25 Location: Vial 71
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 25.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.982	PBA	1389218.6	23.0642	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.997	PBA	440722.5	24.5580	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.983	PBA	184111.7	5.0000	CLO4-89-ISTD

```

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

```



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

---

# Raw Data

## Initial Calibration

=====  
 Calibration Table  
 =====

Perchlorate

Calib. Data Modified : 3/19/2019 2:35:19 PM

Calculate : Internal Standard  
 Based on : Peak Area

Rel. Reference Window : 20.000 %  
 Abs. Reference Window : 0.000 min  
 Rel. Non-ref. Window : 20.000 %  
 Abs. Non-ref. Window : 0.000 min

Use Multiplier & Dilution Factor with ISTDs  
 Uncalibrated Peaks : not reported  
 Partial Calibration : No recalibration if peaks missing

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

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

-----  
 Calibration Report Options :

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

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

ISTD ISTD Amount Name

#	ISTD Amount	Name
1	5.00000	CLO4-89-ISTD

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

RetTime [min]	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
8.744	1	1.00000	7.76074e4	1.28854e-5	1		Perchlorate
		2.00000	1.35273e5	1.47849e-5			
		5.00000	3.37764e5	1.48033e-5			
		10.00000	6.83454e5	1.46316e-5			
		25.00000	2.08433e6	1.19943e-5			
		50.00000	4.13334e6	1.20968e-5			
		75.00000	5.99313e6	1.25143e-5			
8.755	2	1.00000	2.36780e4	4.22333e-5	1		CLO4-85
		2.00000	4.69486e4	4.25998e-5			
		5.00000	1.06124e5	4.71147e-5			
		10.00000	2.13523e5	4.68335e-5			
		25.00000	6.14295e5	4.06971e-5			
		50.00000	1.19814e6	4.17315e-5			
		75.00000	1.78355e6	4.20509e-5			
8.766	3	5.00000	2.73208e5	1.83011e-5	+I1		CLO4-89-ISTD
		5.00000	2.24886e5	2.22335e-5			
		5.00000	2.33196e5	2.14412e-5			
		5.00000	2.34454e5	2.13262e-5			
		5.00000	2.50568e5	1.99547e-5			
		5.00000	2.30977e5	2.16472e-5			

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

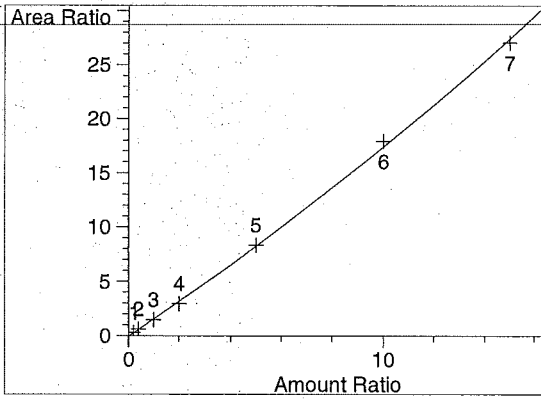
Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min  
 Curve Type : Linear  
 Origin : Included  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

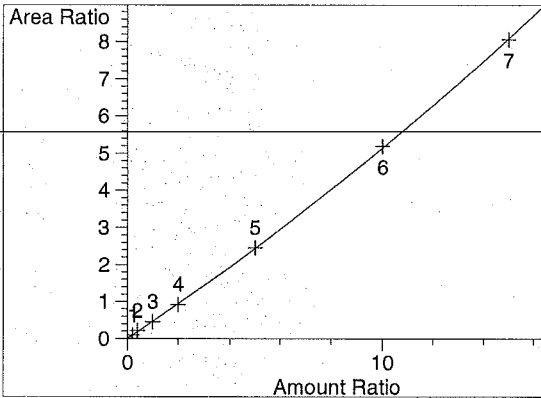
=====  
 Peak Sum Table  
 =====

\*\*\*No Entries in table\*\*\*  
 =====

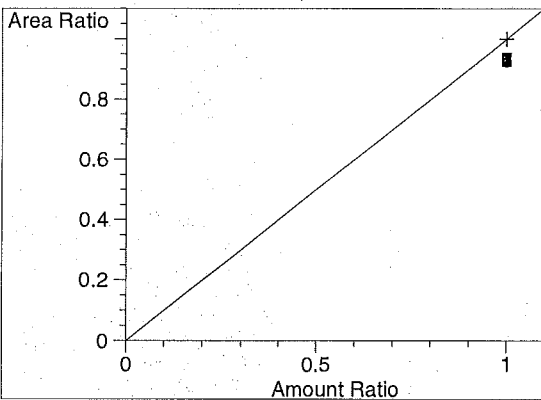
=====  
 Calibration Curves  
 =====



Perchlorate at exp. RT: 8.744  
 MSD1 83, EIC=82.7:83.7  
 Correlation: 0.99957  
 Residual Std. Dev.: 0.30744  
 Formula:  $y = ax^2 + bx + c$   
 a: 1.76988e-2  
 b: 1.56480  
 c: -4.92430e-2  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755  
 MSD1 85, EIC=84.7:85.7  
 Correlation: 0.99983  
 Residual Std. Dev.: 0.03473  
 Formula:  $y = ax^2 + bx + c$   
 a: 5.13396e-3  
 b: 4.62055e-1  
 c: 4.97209e-4  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766  
 MSD1 89, EIC=88.7:89.7  
 Correlation: 1.00000  
 Residual Std. Dev.: 0.00000  
 Formula:  $y = mx + b$   
 m: 1.00000  
 b: 0.00000  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

['#' ==&gt; Run has not been reprocessed with Batch Review Method

['\*' ==&gt; 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

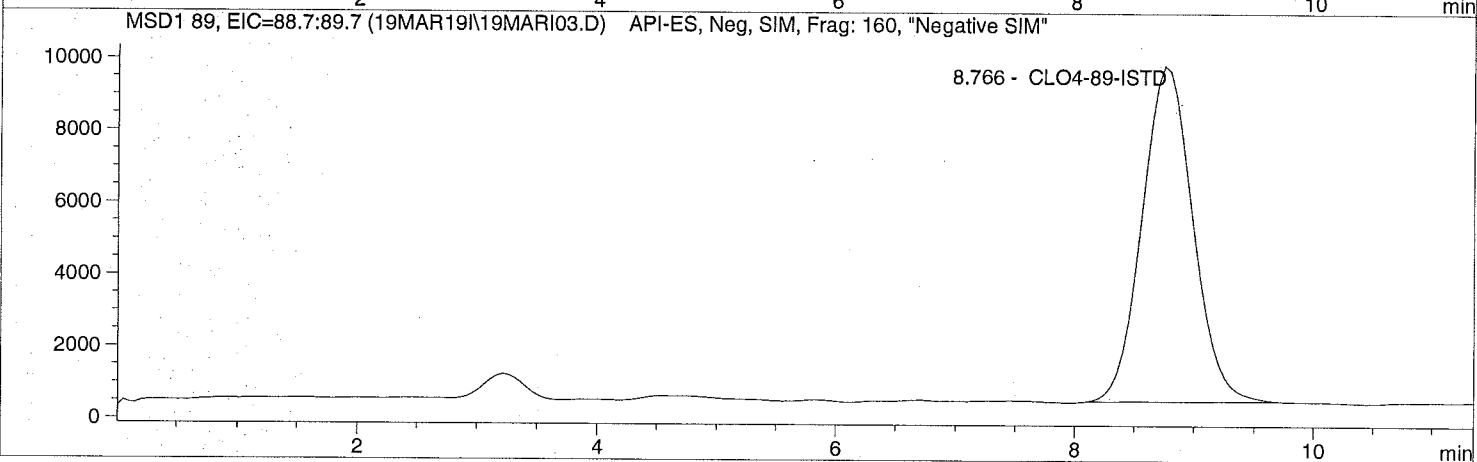
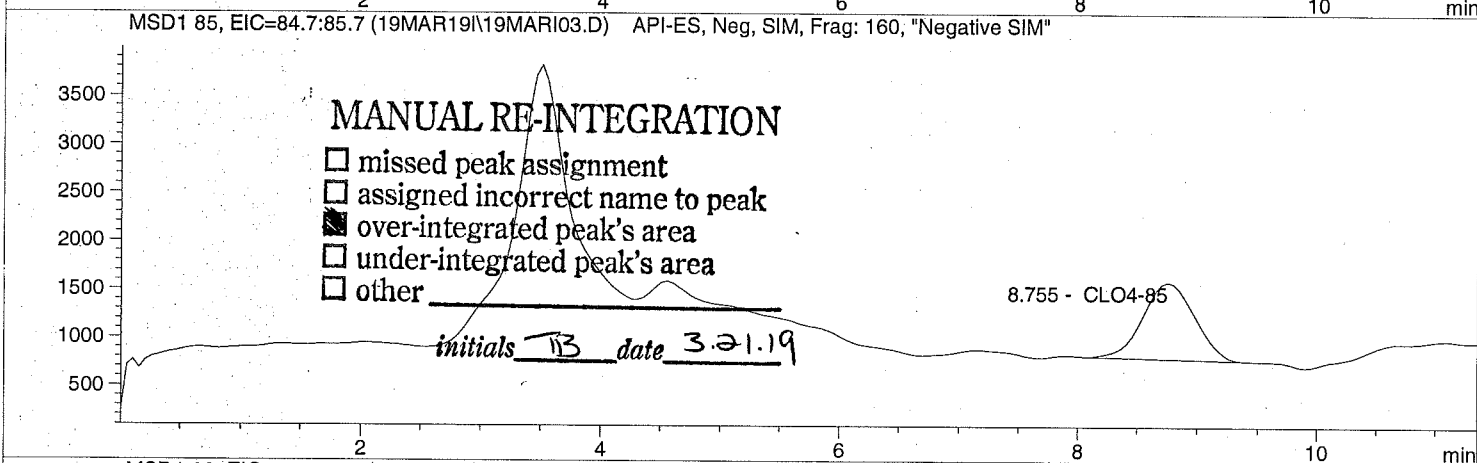
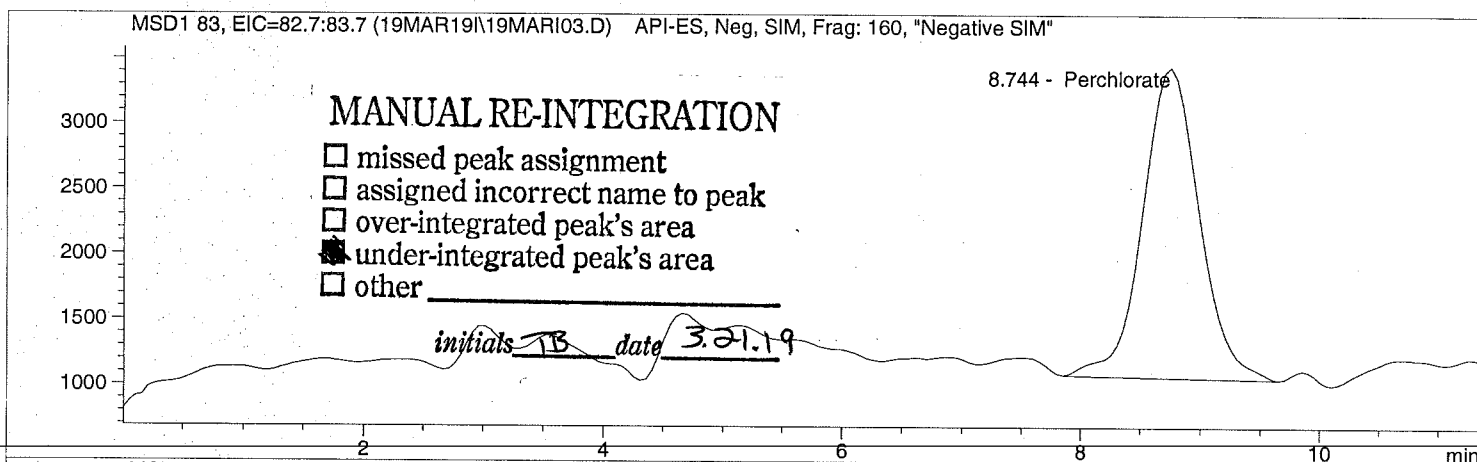
Inj. Vol.: 30 µl

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

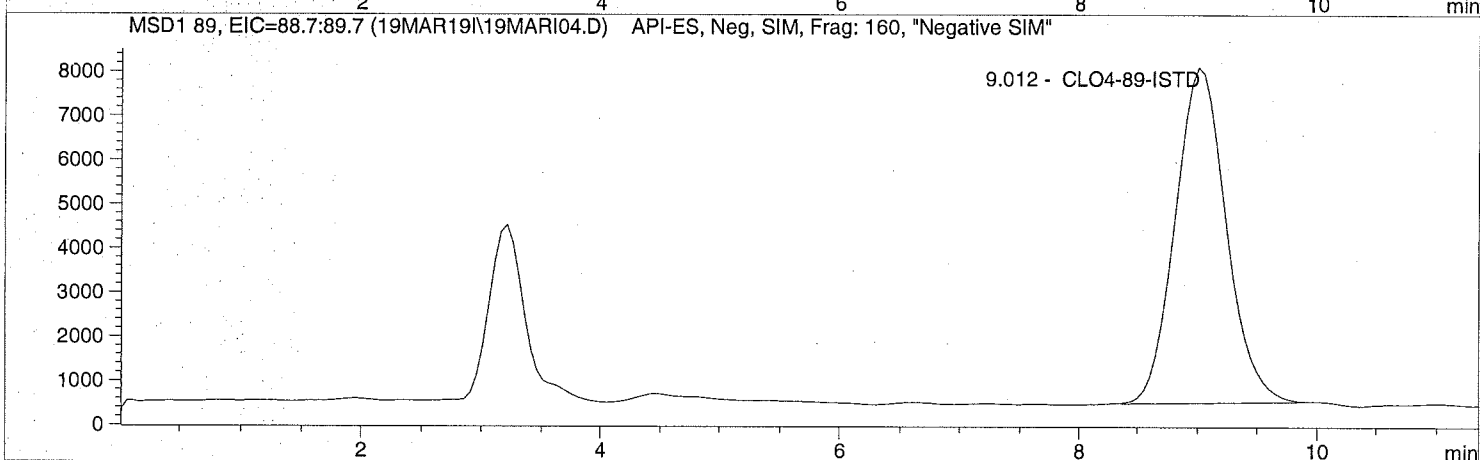
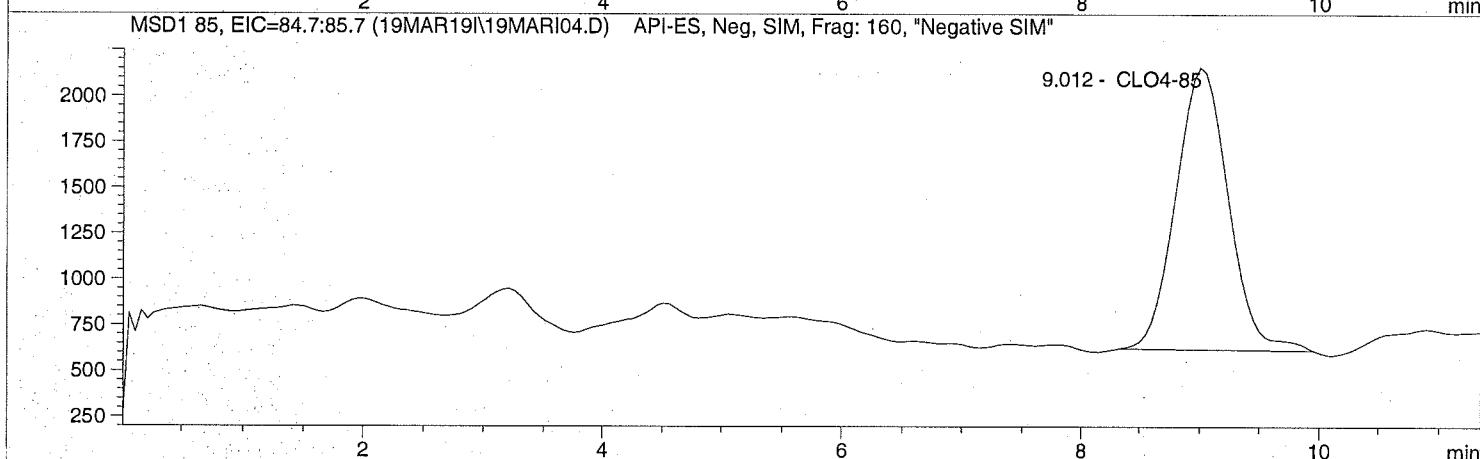
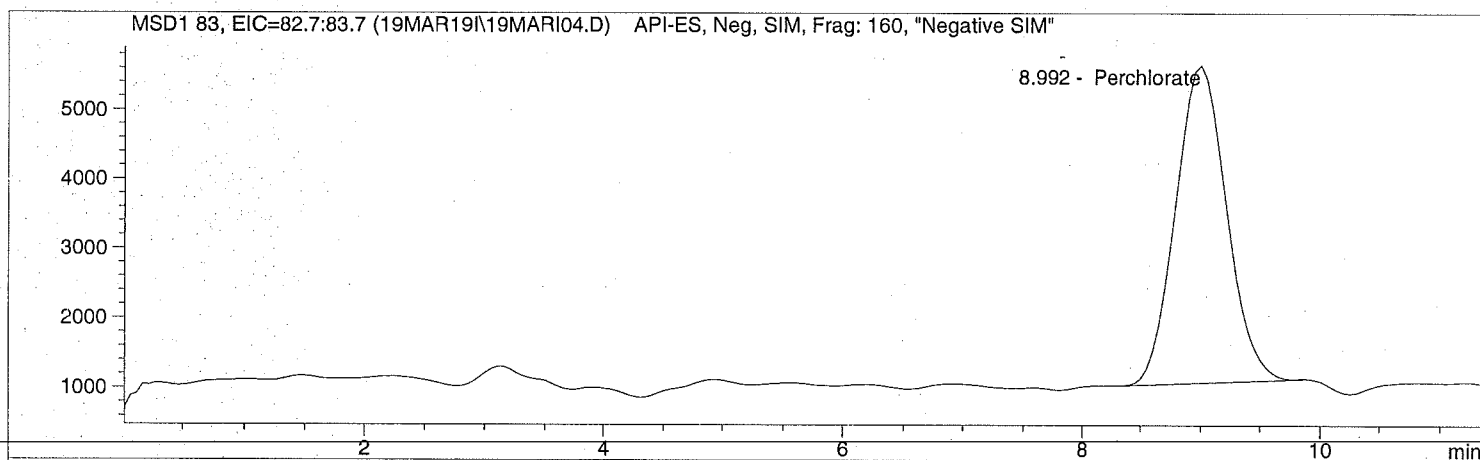
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\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

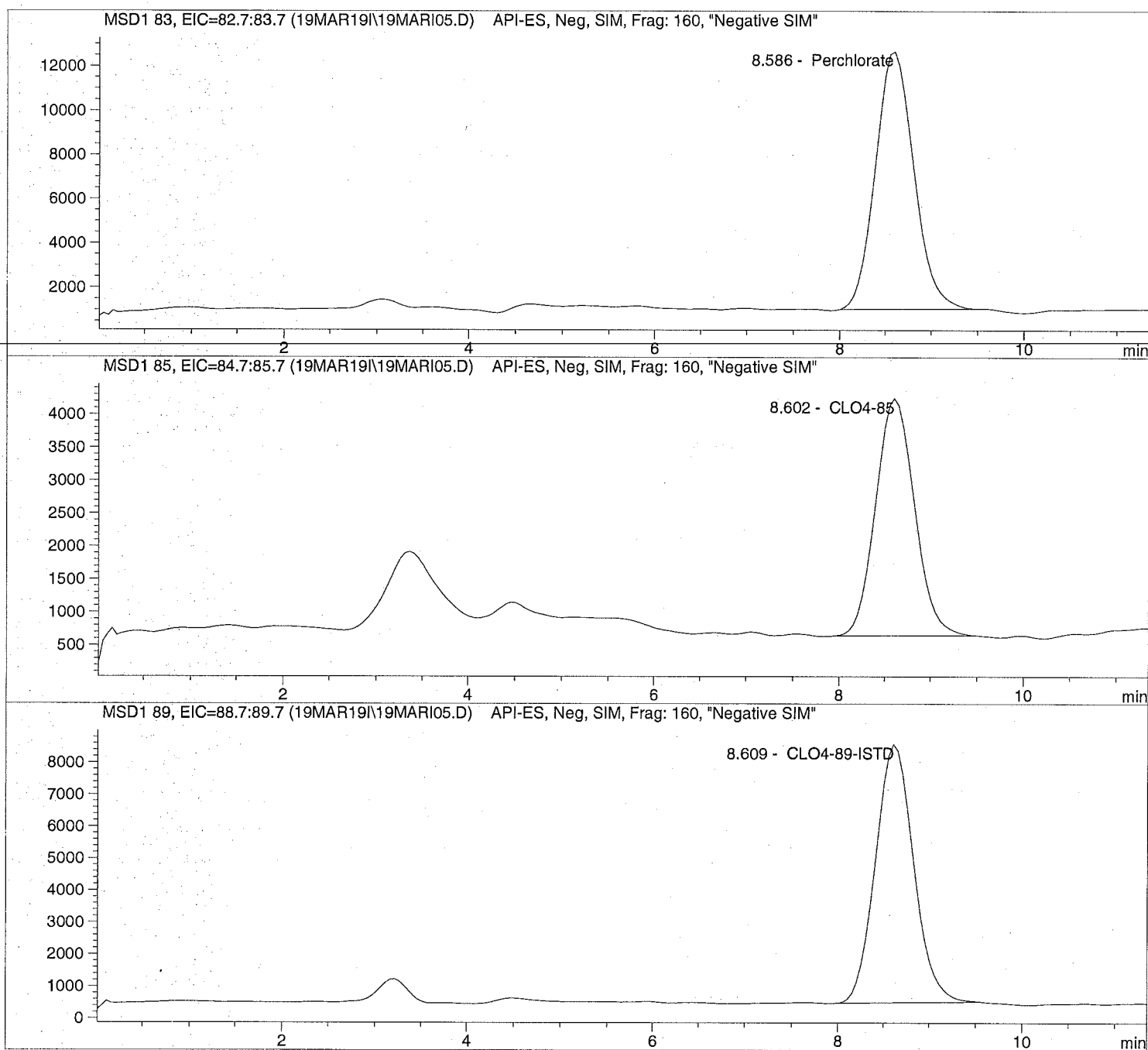
Sample Name: CLO4@ 5.0ug/L

=====  
Injection Date: 3/19/2019 10:06:16  
Sample Name: CLO4@ 5.0ug/L  
Acq Operator: TNB

Seq Line: 5  
Location: Vial 75  
Inj. No.: 1  
Inj. Vol.: 30 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI05.D Sample Name: CLO4@ 5.0ug/L

```

=====
Injection Date: 3/19/2019 10:06:16      Seq Line:      5
Sample Name:    CLO4@ 5.0ug/L           Location:      Vial 75
Acq Operator:  TNB                      Inj. No.:     1
                                           Inj. Vol.:    30 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:    1.000000
Dilution:      1.000000
Sample Amount: 5.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

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

```

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

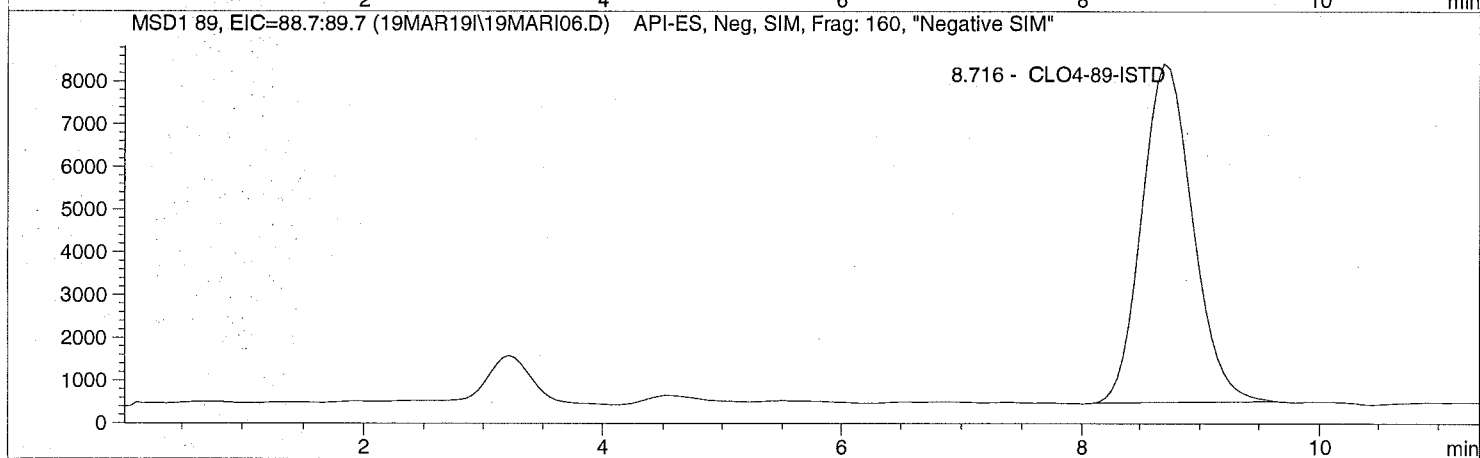
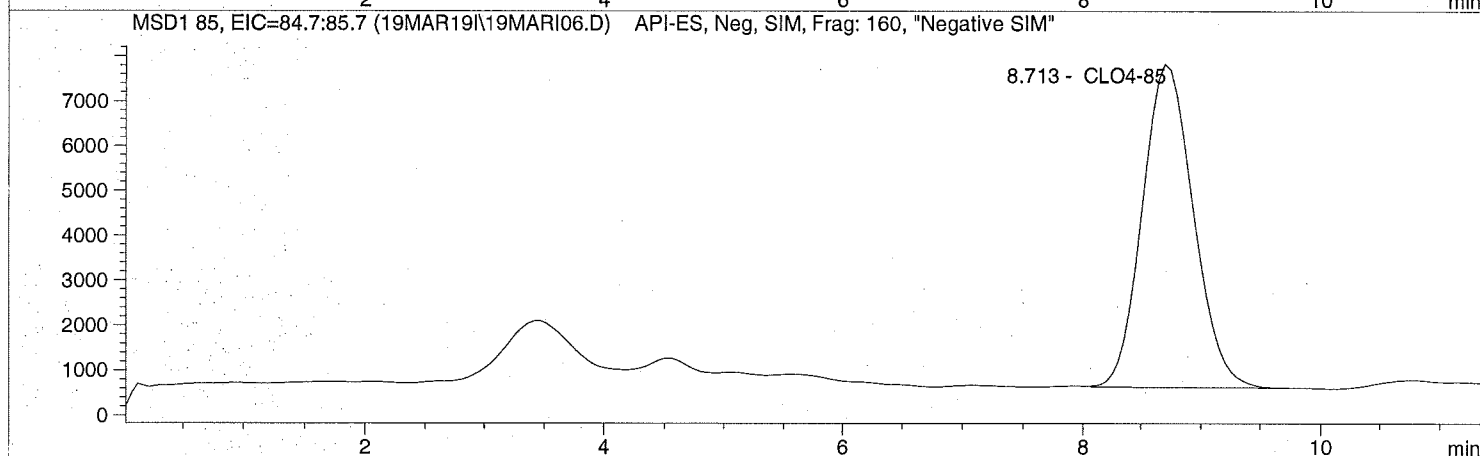
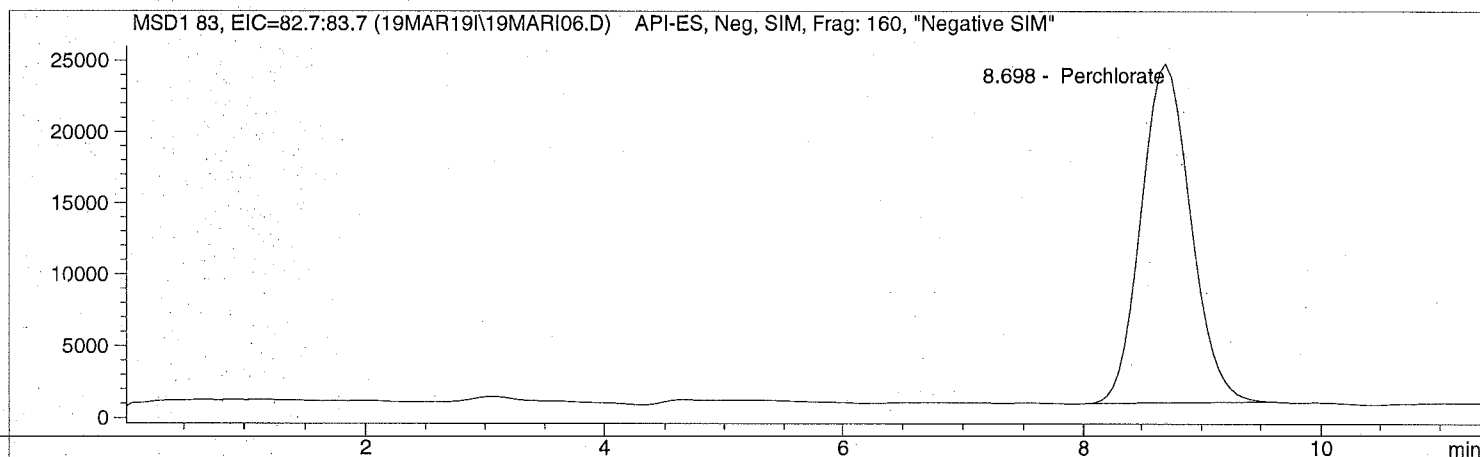
```

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\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

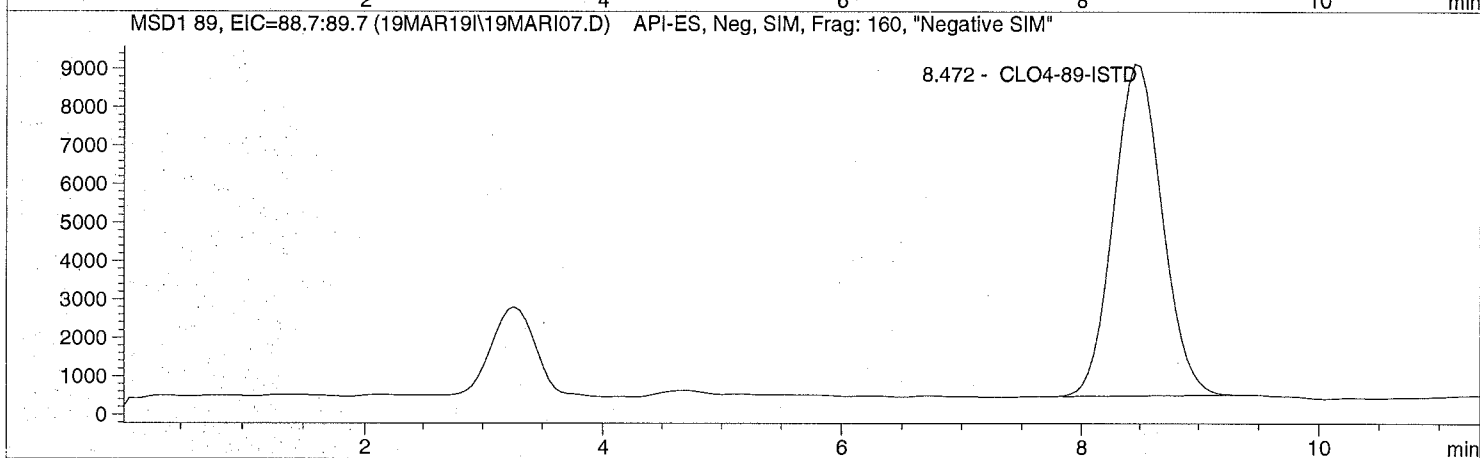
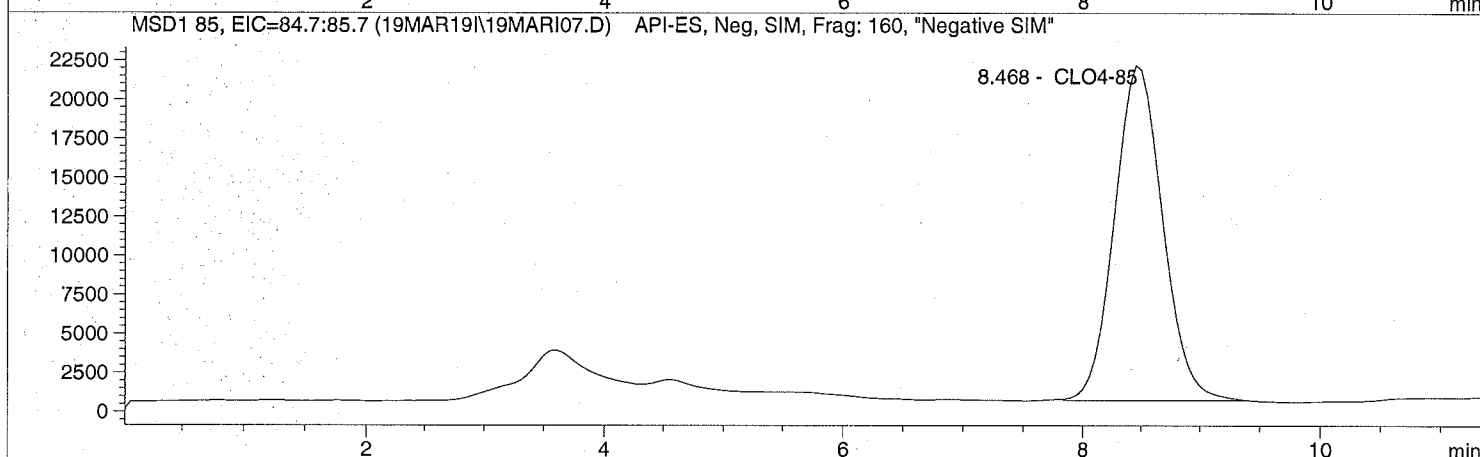
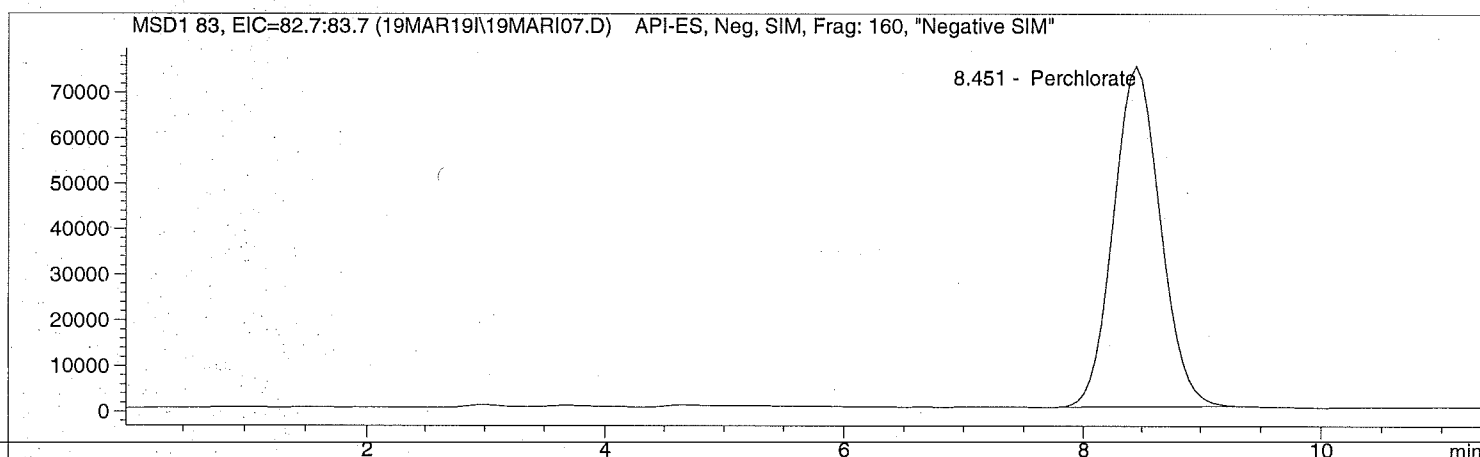
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\19MAR19I\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\19MAR19\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

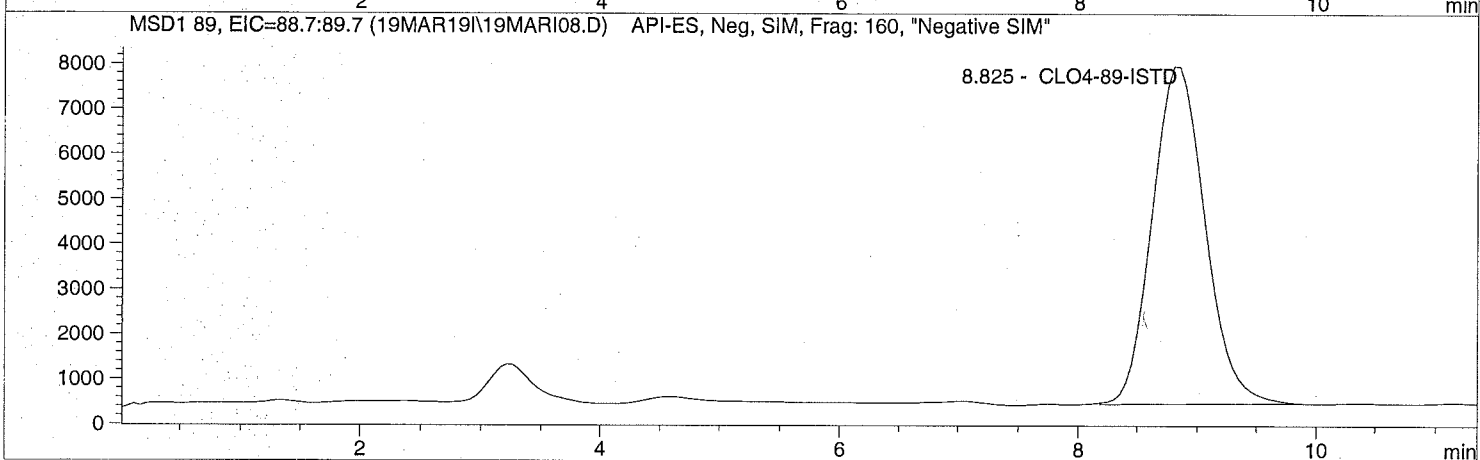
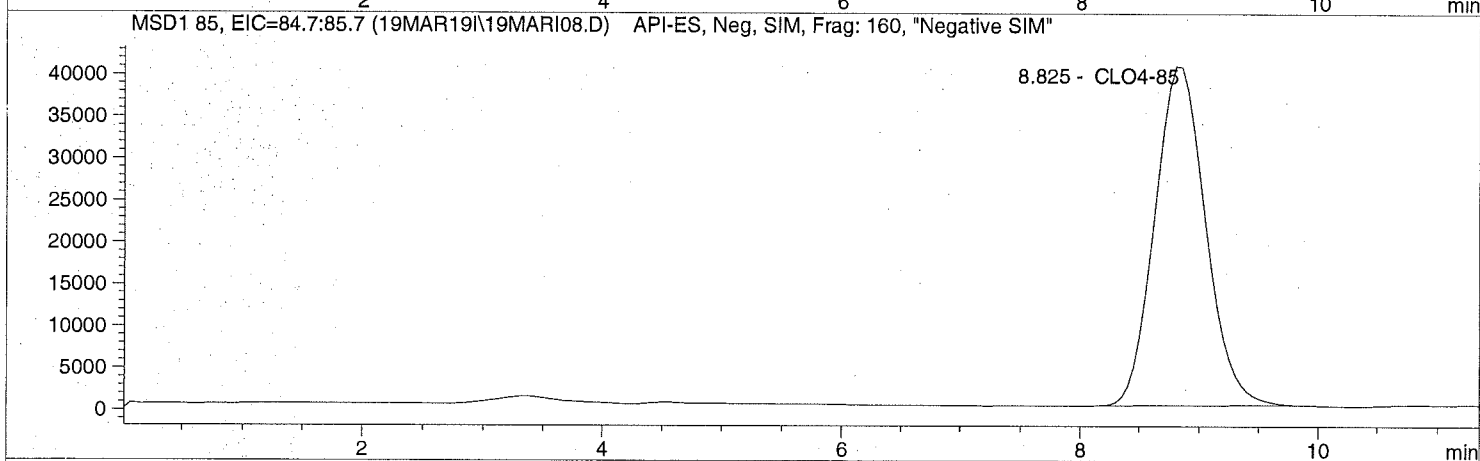
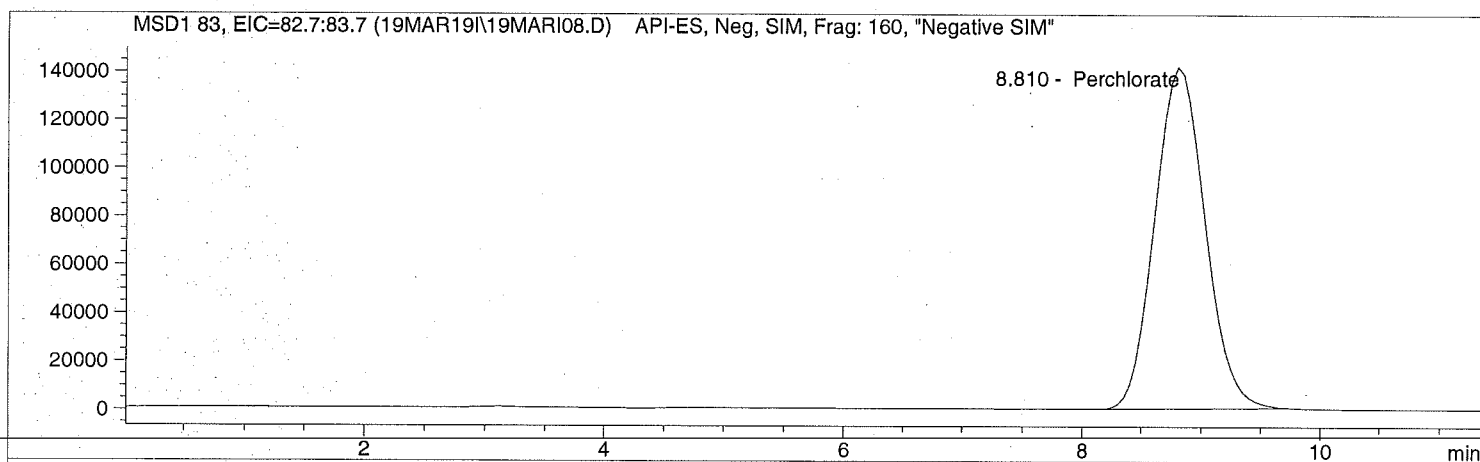
Inj. Vol.: 30 µl

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

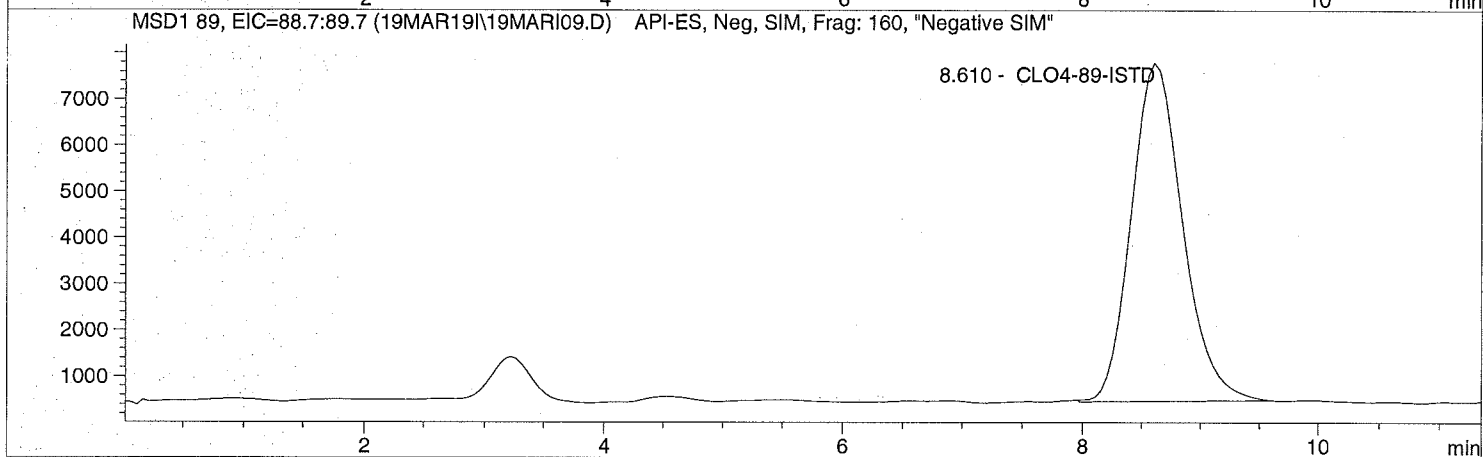
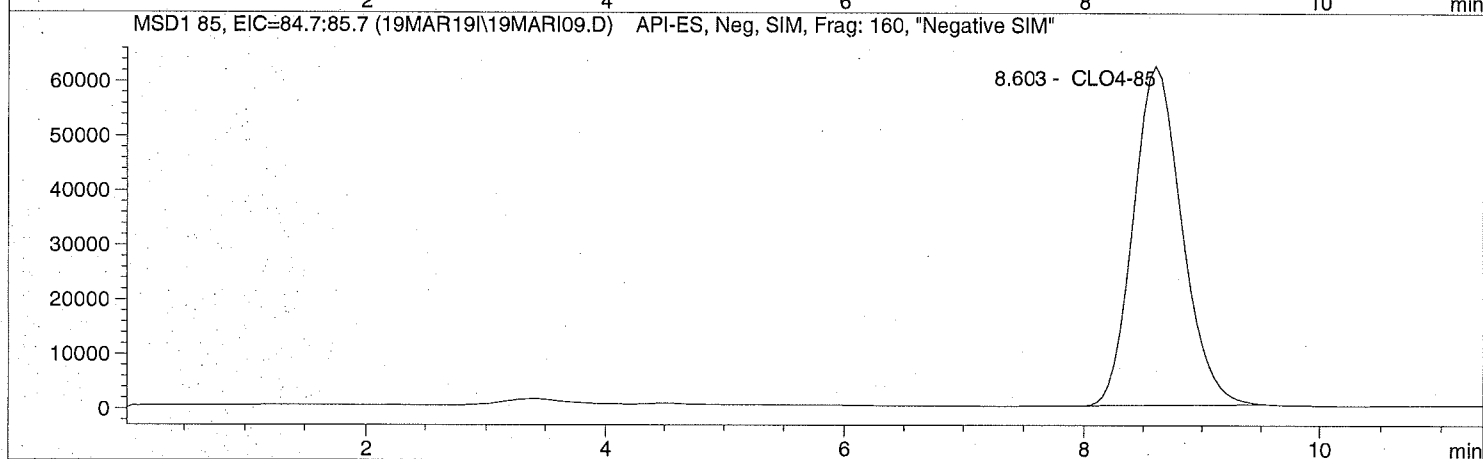
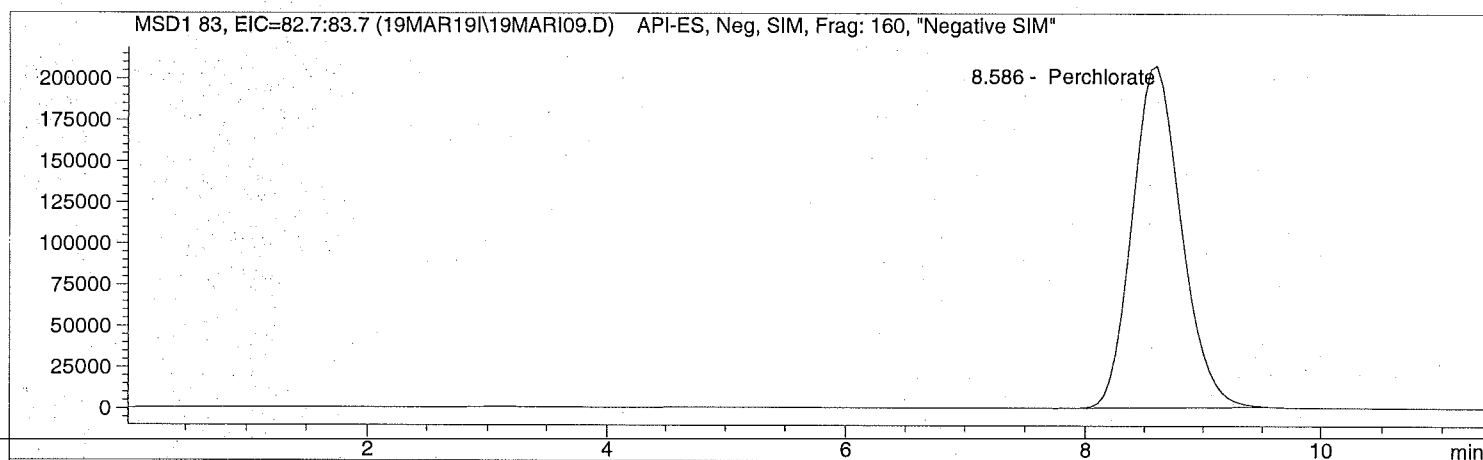
Inj. Vol.: 30 µl

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

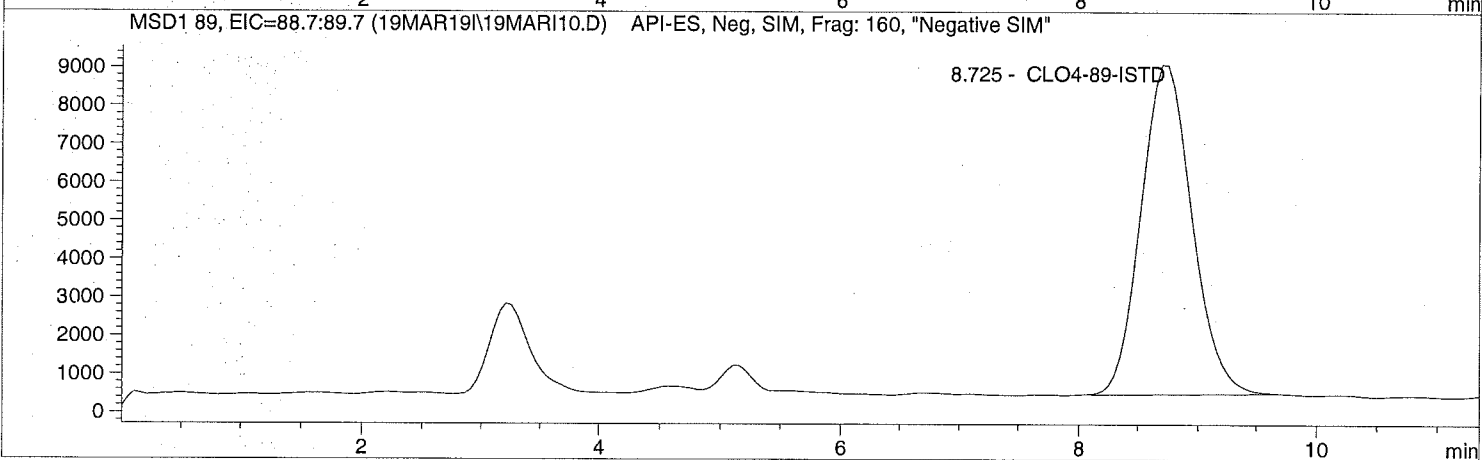
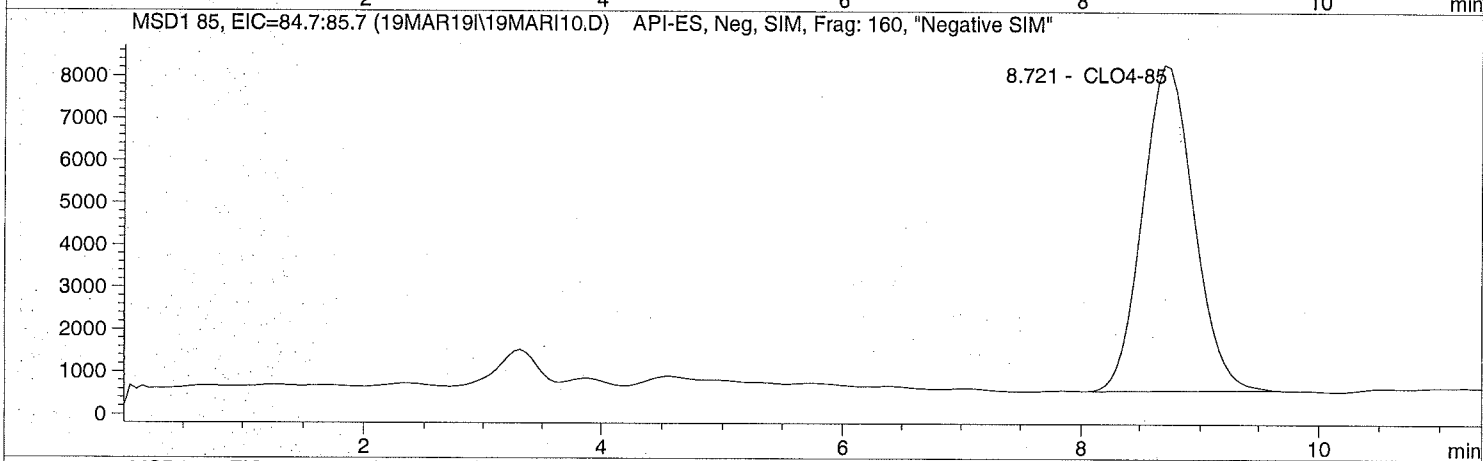
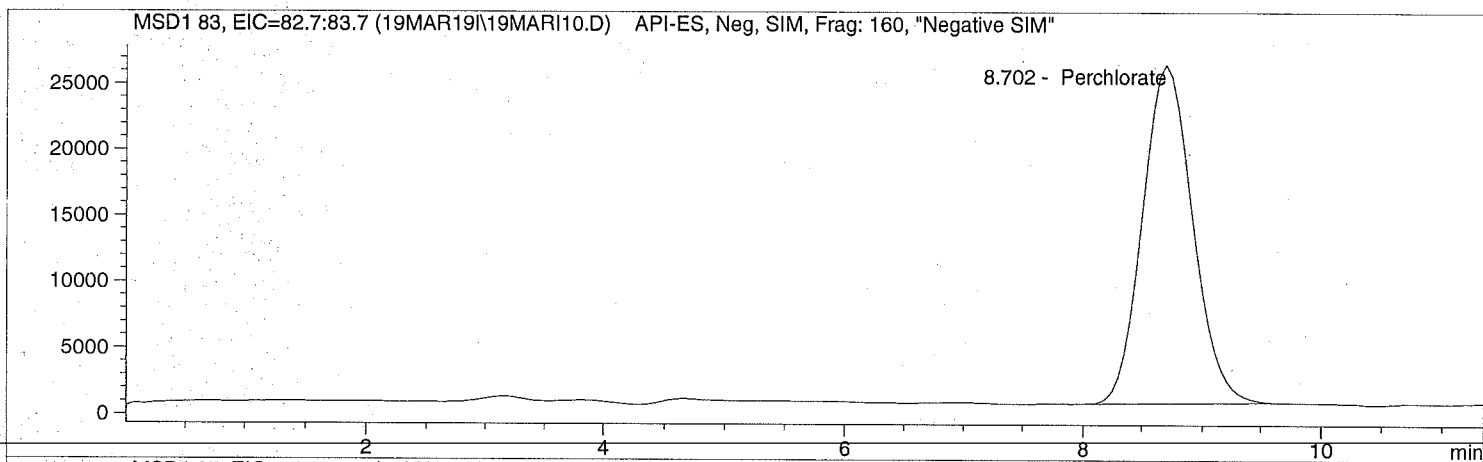
Inj. Vol.: 30 µl

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

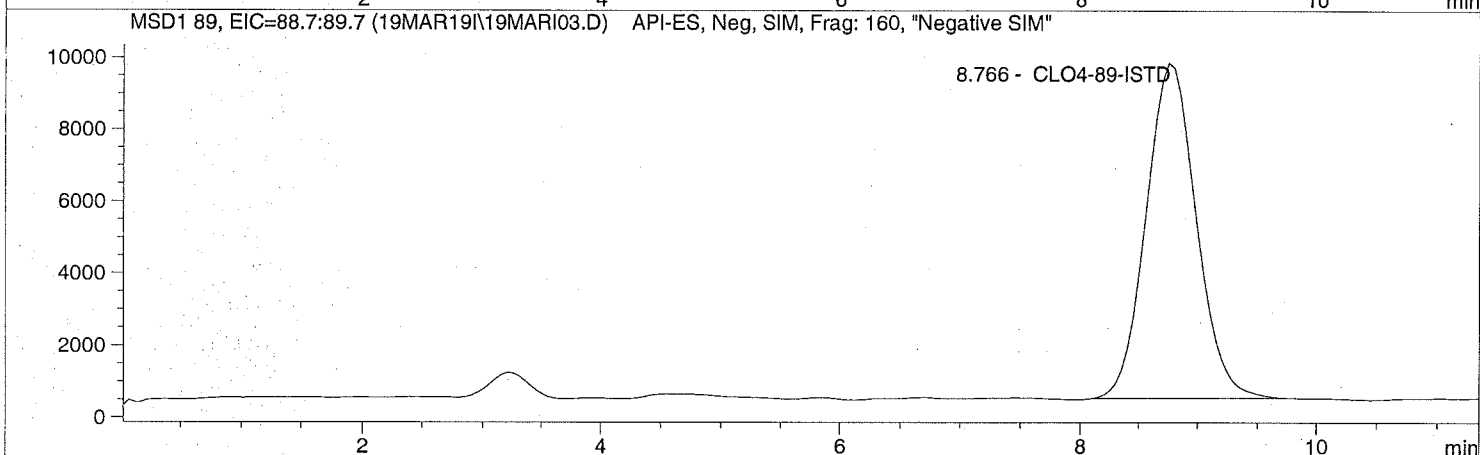
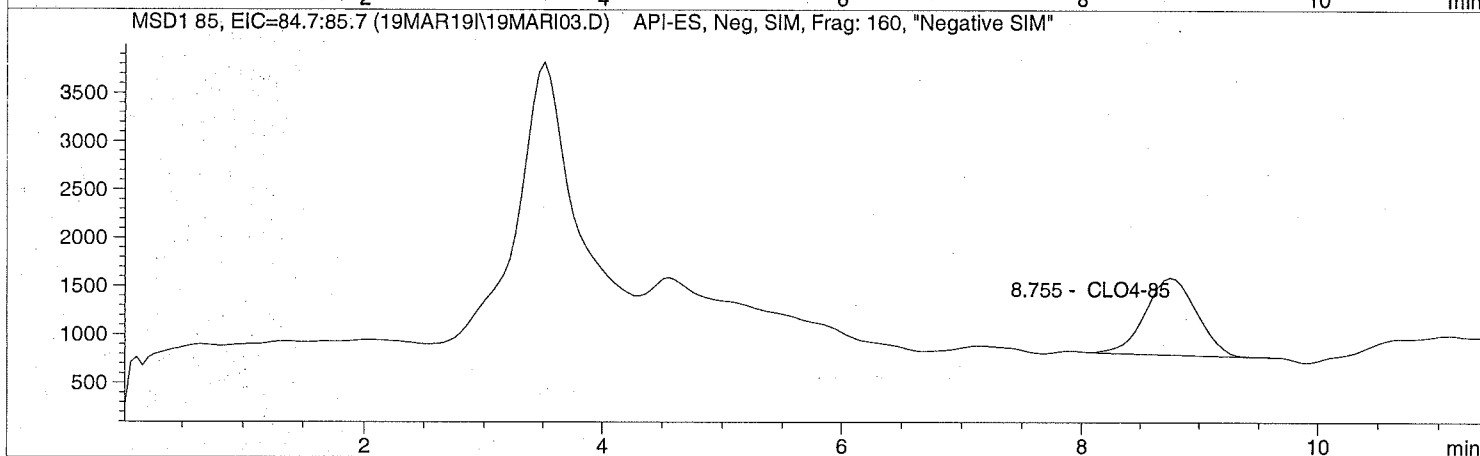
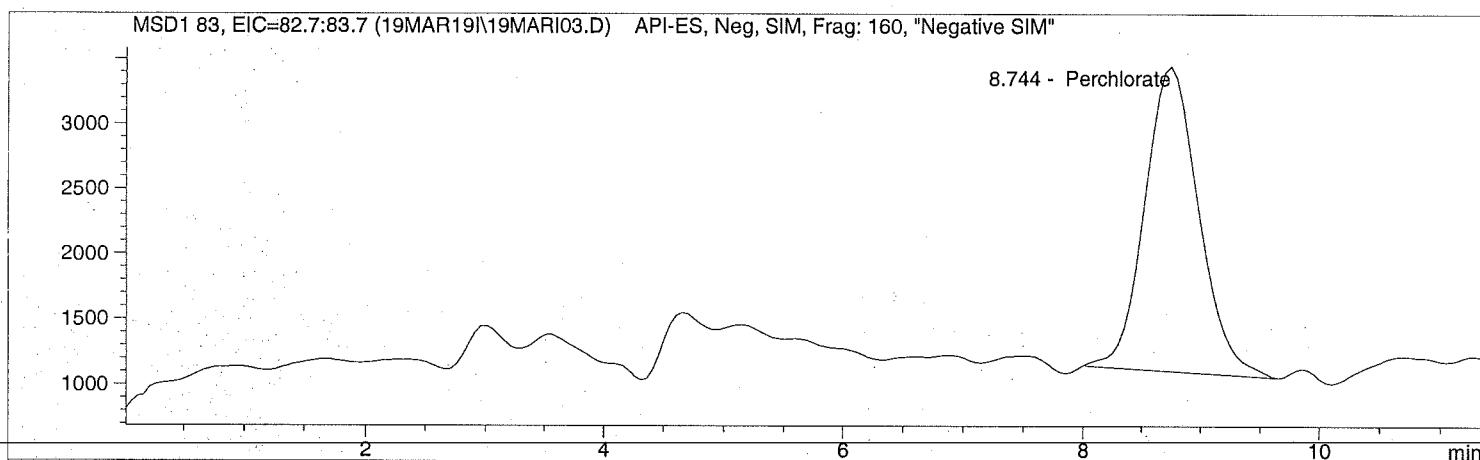
Inj. Vol.: 30 µl

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 ***

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD05.D

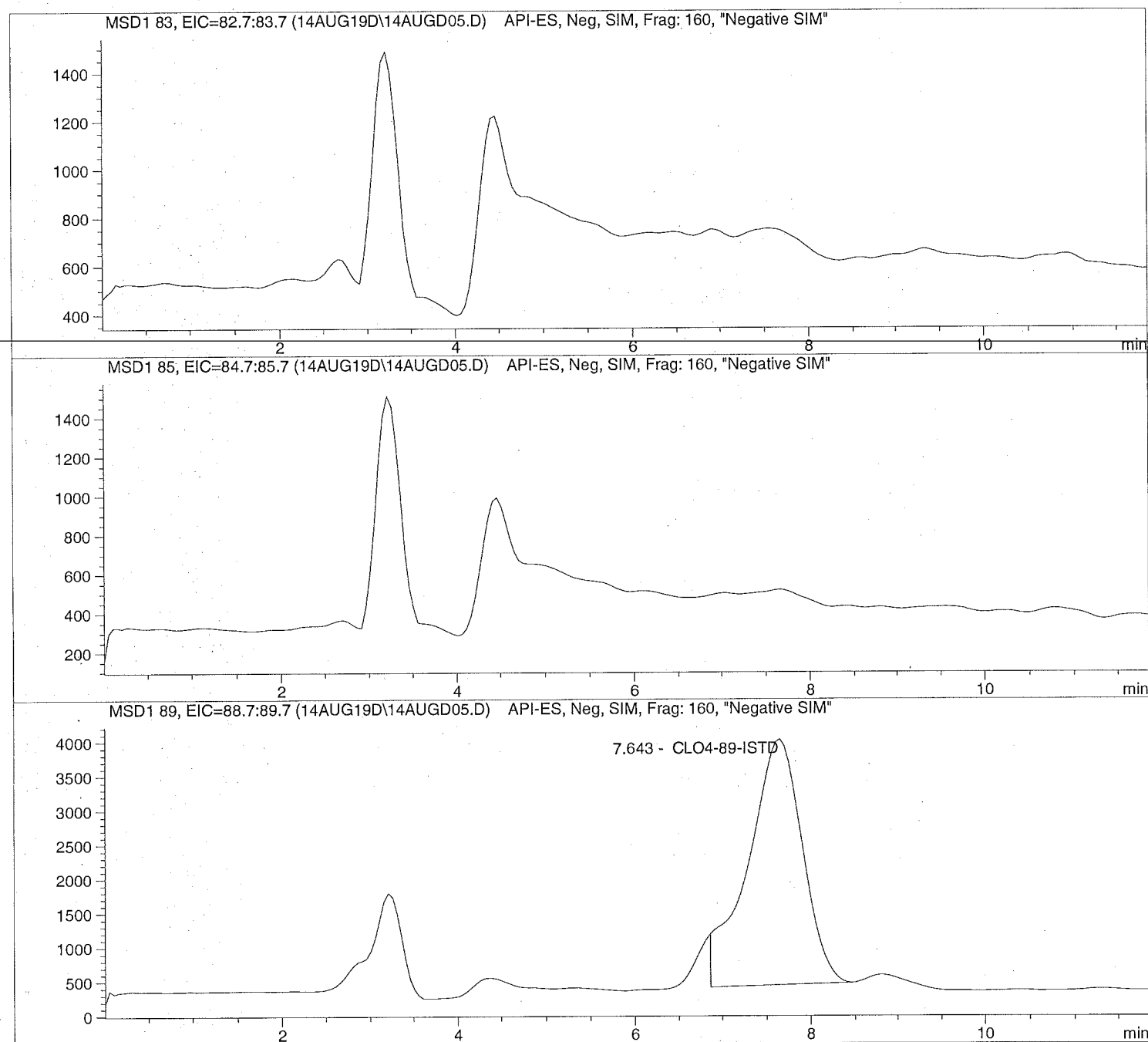
Sample Name: 1922027001

Injection Date: 8/14/2019 09:25:46  
Sample Name: 1922027001  
Acq Operator: TNB

Seq Line: 5  
Location: Vial 75  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD05.D Sample Name: 1922027001

```

=====
Injection Date: 8/14/2019 09:25:46      Seq Line:          5
Sample Name:    1922027001              Location:         Vial 75
Acq Operator:   TNB                     Inj. No.:        1
                                           Inj. Vol.:       50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:    1.000000
Dilution:      1.000000
Sample Amount: 0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.643	BBA	153964.0	5.0000	CLO4-89-ISTD

```

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

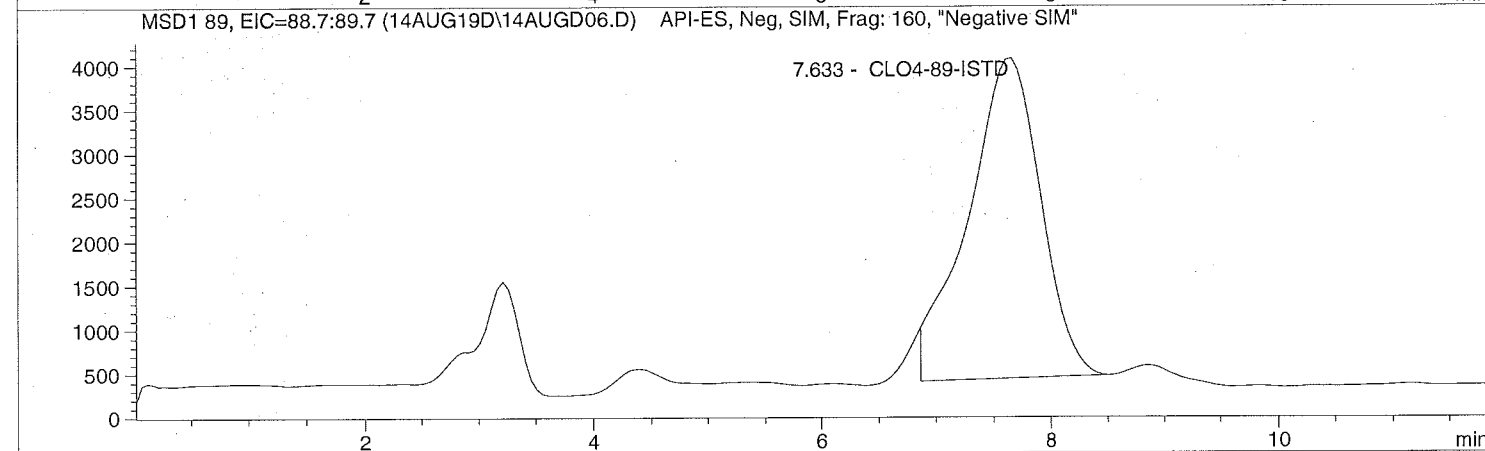
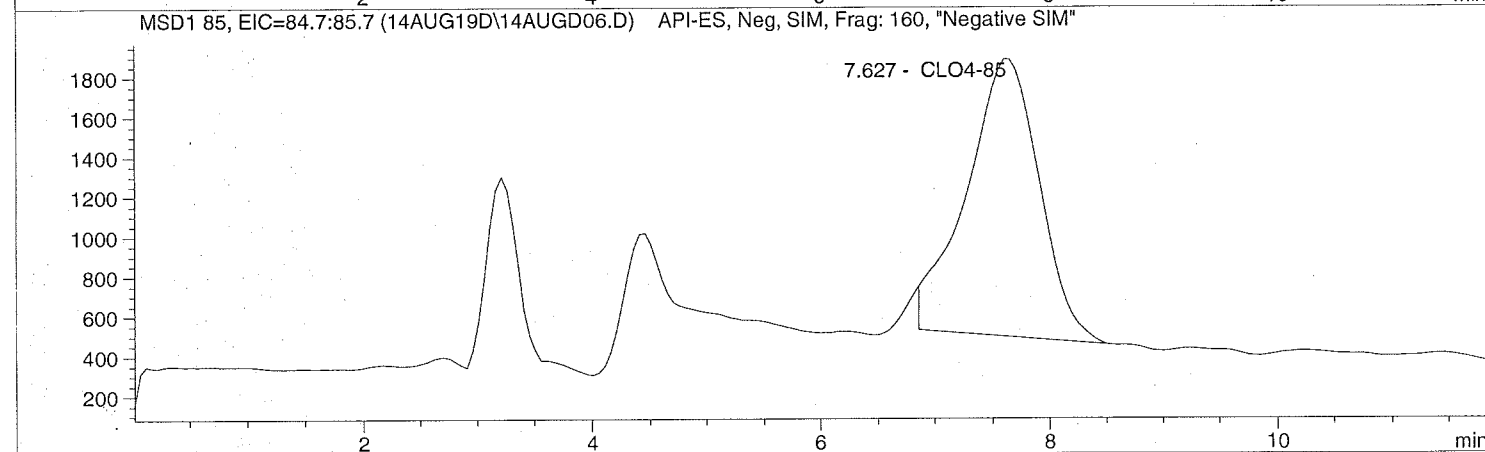
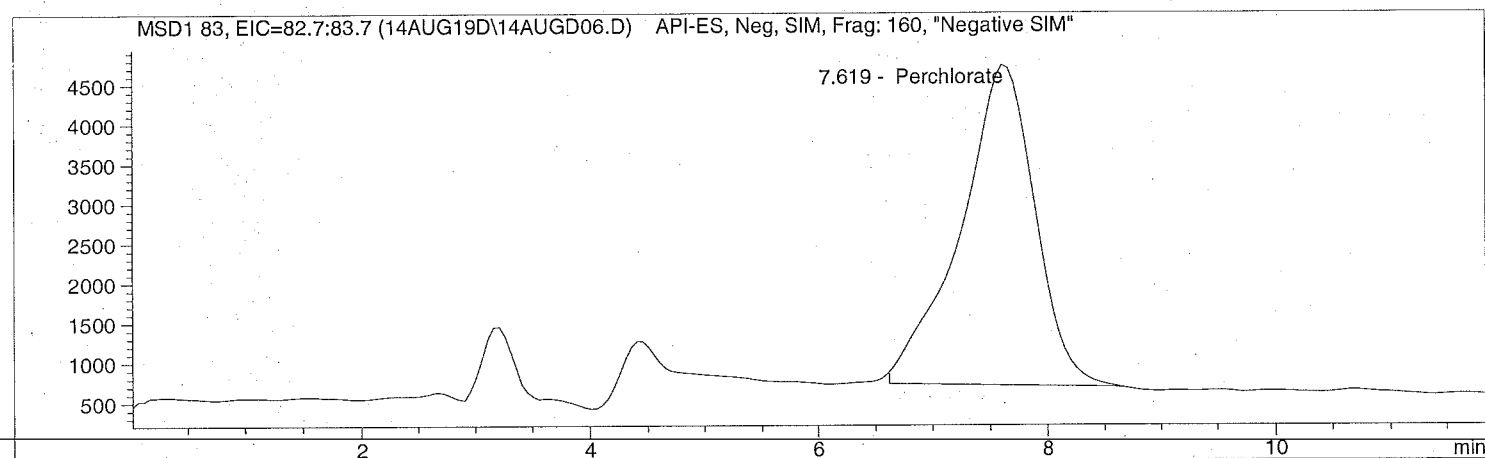
```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD06.D Sample Name: 668349 220271S

=====  
Injection Date: 8/14/2019 09:39:59 Seq Line: 6  
Sample Name: 668349 220271S Location: Vial 76  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD06.D Sample Name: 668349 220271S

```

=====
Injection Date: 8/14/2019 09:39:59      Seq Line: 6
Sample Name: 668349 220271S           Location: Vial 76
Acq Operator: TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.619	BBA	180213.1	3.7183	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.627	BBA	61346.3	4.0986	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.633	BBA	160298.6	5.0000	CLO4-89-ISTD

```

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

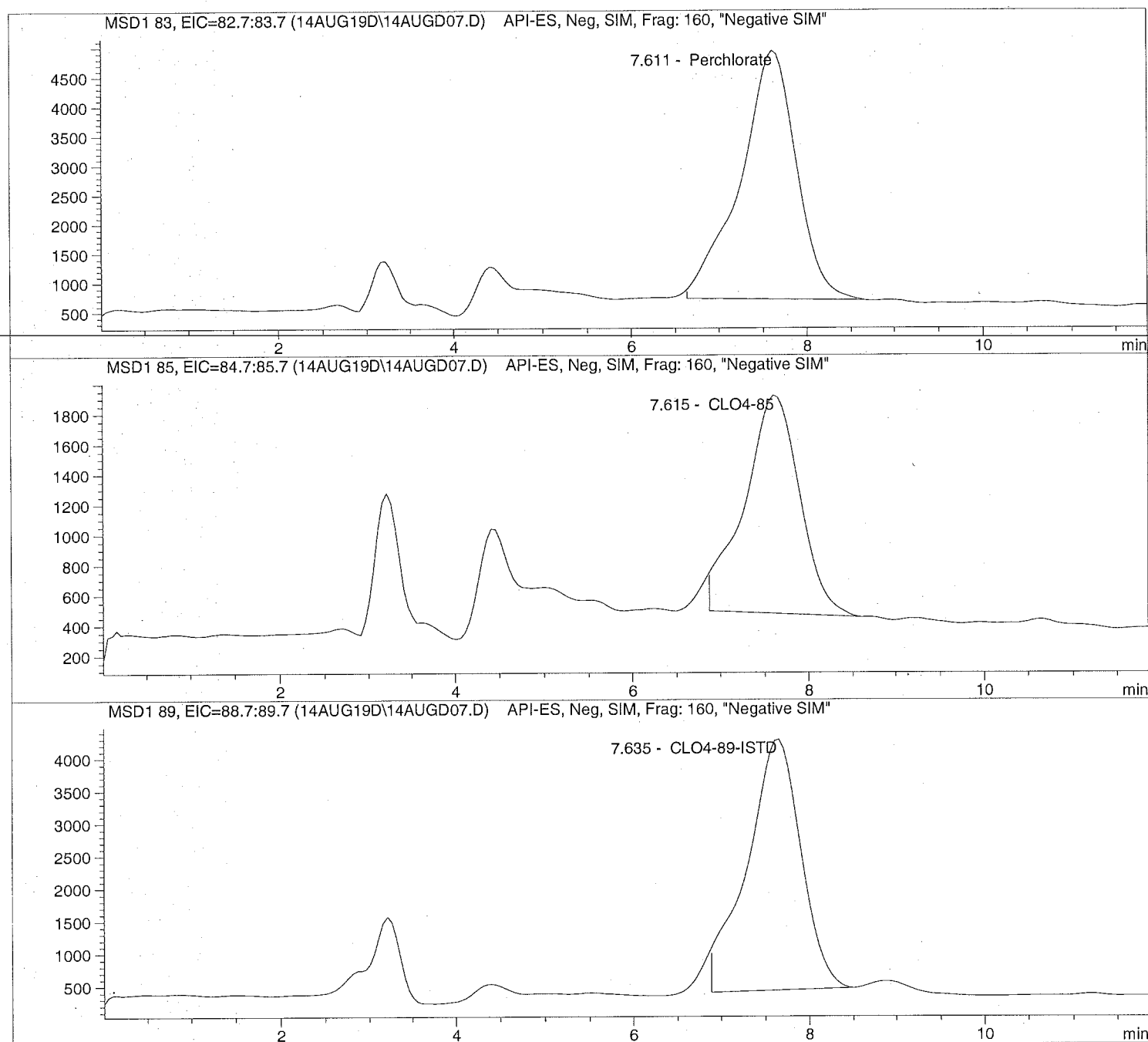
```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD07.D Sample Name: 668350 220271D

=====  
Injection Date: 8/14/2019 09:54:13 Seq Line: 7  
Sample Name: 668350 220271D Location: Vial 77  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD07.D Sample Name: 668350 220271D

```

=====
Injection Date: 8/14/2019 09:54:13      Seq Line: 7
Sample Name: 668350 220271D            Location: Vial 77
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.611	BBA	186832.0	3.7710	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.615	BBA	62944.2	4.1167	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.635	BBA	163743.1	5.0000	CLO4-89-ISTD

```

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

```

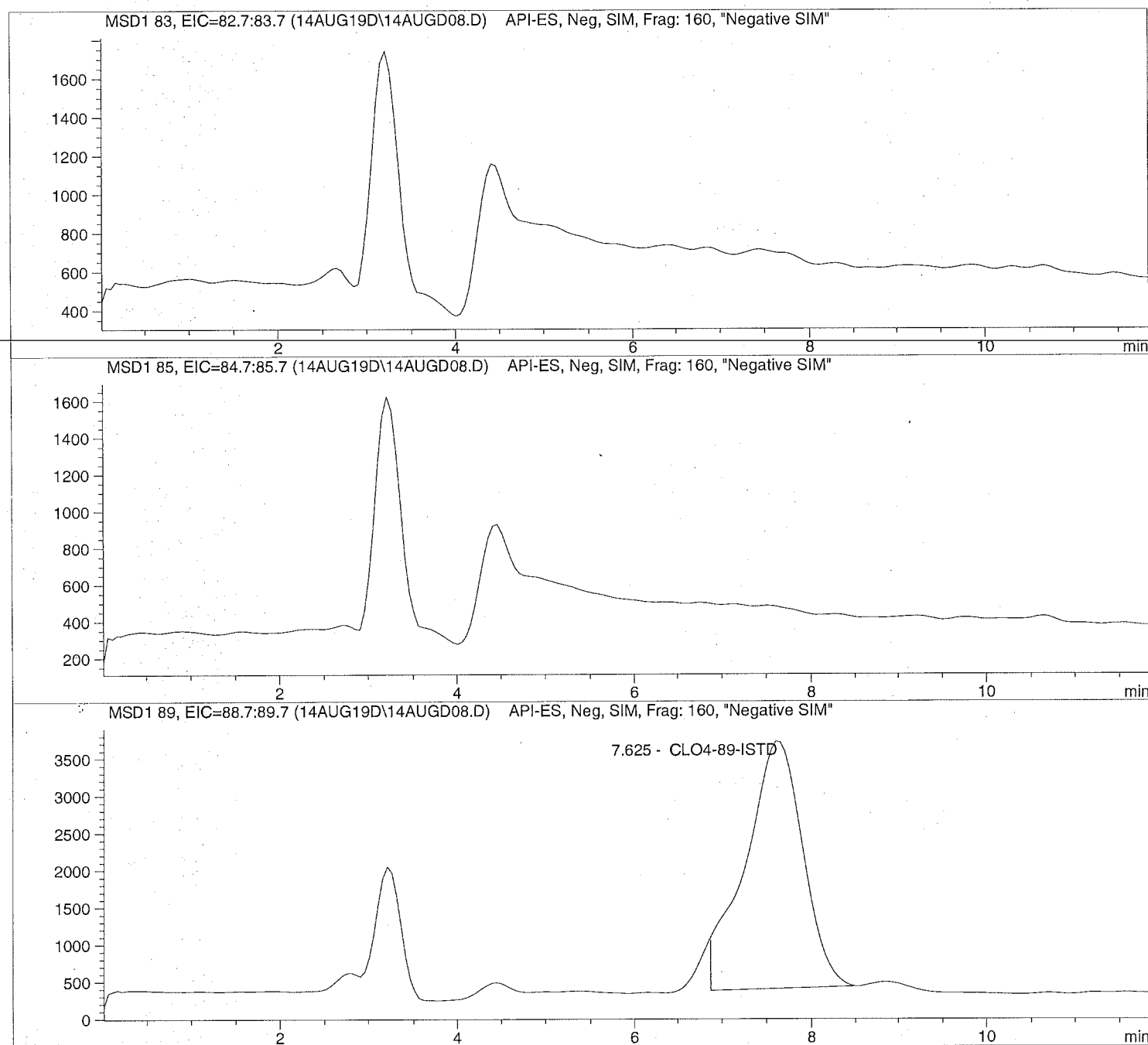


Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD08.D Sample Name: 1922715001

```
=====
Injection Date: 8/14/2019 10:08:31      Seq Line:      8
Sample Name:    1922715001              Location:      Vial 78
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13
```

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD08.D Sample Name: 1922715001

```

=====
Injection Date: 8/14/2019 10:08:31      Seq Line:      8
Sample Name:   1922715001              Location:      Vial 78
Acq Operator:  TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:    1.000000
Dilution:      1.000000
Sample Amount: 0.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.625	BBA	148522.8	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

August 21, 2019

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

Work Order: **HS19080284**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia,

ALS Environmental received 2 sample(s) on Aug 07, 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval.

Generated By: JUMOKE.LAWAL  
RJ Modashia  
Project Manager

ALS Houston, US

Date: 21-ago-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19080284

**SAMPLE SUMMARY**

---

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19080284-01	LH18/24-SP650_080619	Water		06-Aug-2019 14:00	07-Aug-2019 08:50	<input type="checkbox"/>
HS19080284-02	LH18/24-SP650_080619_BIX	Water		06-Aug-2019 14:00	07-Aug-2019 08:50	<input type="checkbox"/>

---

**ALS Houston, US**

Date: 21-Aug-19

**Client:** Bhate Environmental Associates, Inc.**CASE NARRATIVE****Project:** Longhorn GW Treatment Plant**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 Kelso, WA. Final report attached.

---

**WetChemistry by Method E350.3****Batch ID: R343976**

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

---

**WetChemistry by Method E365.3****Batch ID: R343930**

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

## ALS Houston, US

Date: 21-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_080619  
 Collection Date: 06-Aug-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19080284  
 Lab ID:HS19080284-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>								Analyst: RG
Nitrogen, Ammonia (As N)	11		0.20	0.20	0.20	mg/L	1	09-Aug-2019 11:30
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3</b>								Analyst: MZD
Phosphorus, Total Orthophosphate (As P)	3.16		0.100	0.250	0.250	mg/L	10	08-Aug-2019 11:40
<b>SUBCONTRACT ANALYSIS - TOC ANALYSIS</b>								Analyst: SUBK
Subcontract Analysis	See Attached		0	0		NA	1	21-Aug-2019 09:17

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

**ALS Houston, US**

Date: 21-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_080619\_BIX  
 Collection Date: 06-Aug-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19080284  
 Lab ID:HS19080284-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>		Analyst: SUB				
Subcontract Analysis	See Attached		0	0		NA	1	14-Aug-2019 16:04

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

ALS Houston, US

Date: 21-ago-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080284

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R343930 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3			<b>Matrix:</b> Water	
HS19080284-01	LH18/24-SP650_080619	06 Aug 2019 14:00			08 Aug 2019 11:40	10
<b>Batch ID:</b> R343976 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS19080284-01	LH18/24-SP650_080619	06 Aug 2019 14:00			09 Aug 2019 11:30	1
<b>Batch ID:</b> R344264 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS19080284-02	LH18/24-SP650_080619_BIX	06 Aug 2019 14:00			14 Aug 2019 16:04	1
<b>Batch ID:</b> R344639 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - TOC ANALYSIS			<b>Matrix:</b> Water	
HS19080284-01	LH18/24-SP650_080619	06 Aug 2019 14:00			21 Aug 2019 09:17	1



ALS Houston, US

Date: 21-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080284

**QC BATCH REPORT**

Batch ID:	R343930 ( 0 )	Instrument:	UV-2450	Method:	ORTHO PHOSPHATE (PO4) AS P BY E365.3					
<b>MBLK</b>	Sample ID: <b>MBLK-R343930</b>	Units: <b>mg/L</b>		Analysis Date: <b>08-Aug-2019 11:40</b>						
Client ID:	Run ID: <b>UV-2450_343930</b>	SeqNo: <b>5202285</b>	PrepDate:	DF: <b>1</b>						
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	
<b>LCS</b>	Sample ID: <b>LCS-R343930</b>	Units: <b>mg/L</b>		Analysis Date: <b>08-Aug-2019 11:40</b>						
Client ID:	Run ID: <b>UV-2450_343930</b>	SeqNo: <b>5202284</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.239	0.0250	0.25	0	95.6	85 - 115				
<b>MS</b>	Sample ID: <b>HS19080284-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>08-Aug-2019 11:40</b>						
Client ID: <b>LH18/24-SP650_080619</b>	Run ID: <b>UV-2450_343930</b>	SeqNo: <b>5202287</b>	PrepDate:	DF: <b>10</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	5.48	0.250	2.5	3.16	92.8	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19080284-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>08-Aug-2019 11:40</b>						
Client ID: <b>LH18/24-SP650_080619</b>	Run ID: <b>UV-2450_343930</b>	SeqNo: <b>5202286</b>	PrepDate:	DF: <b>10</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	5.31	0.250	2.5	3.16	86.0	80 - 120	5.48	3.15	20	

The following samples were analyzed in this batch:

ALS Houston, US

Date: 21-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080284

**QC BATCH REPORT**

Batch ID: R343976 ( 0 )		Instrument: WetChem_HS		Method: AMMONIA AS N BY E350.3(ISE)					
<b>MBLK</b>	Sample ID: <b>MBLK-R343976</b>	Units: <b>mg/L</b>		Analysis Date: <b>09-Aug-2019 11:30</b>					
Client ID:	Run ID: <b>WetChem_HS_343976</b>	SeqNo: <b>5203284</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Nitrogen, Ammonia (As N)	0.20	0.20							U
<b>LCS</b>	Sample ID: <b>LCS-R343976</b>	Units: <b>mg/L</b>		Analysis Date: <b>09-Aug-2019 11:30</b>					
Client ID:	Run ID: <b>WetChem_HS_343976</b>	SeqNo: <b>5203283</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Nitrogen, Ammonia (As N)	10.19	0.20	10	0	102	80 - 120			
<b>MS</b>	Sample ID: <b>HS19080263-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>09-Aug-2019 11:30</b>					
Client ID:	Run ID: <b>WetChem_HS_343976</b>	SeqNo: <b>5203286</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Nitrogen, Ammonia (As N)	10.92	0.20	10	1.002	99.2	80 - 120			
<b>MSD</b>	Sample ID: <b>HS19080263-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>09-Aug-2019 11:30</b>					
Client ID:	Run ID: <b>WetChem_HS_343976</b>	SeqNo: <b>5203285</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Nitrogen, Ammonia (As N)	10.89	0.20	10	1.002	98.9	80 - 120	10.92	0.275	20

The following samples were analyzed in this batch: HS19080284-01

**ALS Houston, US**

Date: 21-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** **HS19080284**

**QUALIFIERS,  
ACRONYMS, UNITS**

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

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

---

**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

---

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

ALS Houston, US

Date: 21-ago-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19080284

---

**SAMPLE TRACKING**

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Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19080284-01	LH18/24-SP650_080619	Login	07/08/2019 10:48:03	JRM	WET103
HS19080284-01	LH18/24-SP650_080619	Login	07/08/2019 10:48:03	JRM	WET103
HS19080284-01	LH18/24-SP650_080619	Login	07/08/2019 10:48:03	JRM	Sub
HS19080284-02	LH18/24-SP650_080619_BIX	Login	07/08/2019 10:48:03	JRM	Sub

---

**Sample Receipt Checklist**

Client Name: Bhate Environmental  
 Work Order: HS19080284

Date/Time Received: **07-Aug-2019 08:50**  
 Received by: **JRM**

Checklist completed by: Jared R. Makan 7-Aug-2019  
 eSignature Date

Reviewed by: RJ Modashia 7-Aug-2019  
 eSignature Date

Matrices: **Water**

Carrier name: **FedEx Priority Overnight**

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

Temperature(s)/Thermometer(s): 0.7c/0.7c UC/C IR25  
 Cooler(s)/Kit(s): 44179  
 Date/Time sample(s) sent to storage: 08/07/2019 10:50

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

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:  
 Contacted By: Regarding:

Comments:

Corrective Action:



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 / GWTP Weekly

Client Name: \_\_\_\_\_

Collected by: Scott Beesinger

Sample Analysis Requested <sup>(1)</sup>

Quality Assurance Samples <sup>(2)</sup>

Field Sample ID (30 Characters Max)	ERPIMS LOCID (15 Characters Max)	Date Collected (dd-mm-YYYY)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	SA Code (1)	Sample Number (2)	Sample Matrix <sup>(3)</sup>	Number of Containers	Sample Analysis Requested <sup>(1)</sup>			Quality Assurance Samples <sup>(2)</sup>			Cooler ID
									Ammonia-N	Ortho Phosphate	Pelvic CAT	Ambient Blank Lot Control Number	Equipment Blank Lot Control Number	Trip Blank Lot Control Number	
LHAAP24-SP650	080619	06 AUG 2019	1400	-	N	WG	4	TDC	X	X	X				
LHAAP24-SP650-030619-BIX		06 AUG 2019	1400	-	N	WG	1				X				

**HS19080284**

Bhate Environmental Associates, Inc.  
 Longhorn GW Treatment Plant



COMMENTS:

STANDARD TAT

Custody Transfers Prior to Receipt by Laboratory

Relinquished By (Signed)	Date	Time	Received by (Signed)	Date	Time
<u>Scott Beesinger</u>	<u>8/6/19</u>	<u>1430</u>	<u>JM</u>	<u>8/21/19</u>	<u>08:50</u>

Delivered Directly to Lab: \_\_\_\_\_ Shipped \_\_\_\_\_

Method of Shipment: \_\_\_\_\_

Fed \_\_\_\_\_ Ex \_\_\_\_\_ Airbill \_\_\_\_\_ Number: \_\_\_\_\_


Analytical Lab: ALS 10450 Standard Rd. Suite 210 Houston, TX 77036 (MI) 510-5656

Lab Receipt #: \_\_\_\_\_ Delivery Date/Time: \_\_\_\_\_

ATTN: SONIA WEST

- Chain of Custody Number = date collected + custody number (e.g. 09-02-1999-01)
- Sample Type (SA) Codes: N = Normal Sample, TB = Trip Blank (-) Sample, FD = Field Duplicate (-) Samples, FR = Field Replicate (-) Samples, EB = Equipment Blank (-) Samples, MS = Matrix Spike, SD = Matrix Spike Duplicate, AB = Ambient Blank (-)
- 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.)
- Matrix Codes: SG = Soil Gas, WG = Groundwater, WS = Surface Water, SO = Soil, SE = Sediment, SL = Sludge, SS = Surface Soil Samples, WQ = Aqueous Blank Samples (r/b, equipment, ambient, etc), SQ = Soil Blanks
- Sample Analysis Requested: Analytical method requested and number of containers provided for each.
- 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

44179  
 070  
 #25 C/F 000  
 13 of 160

 <b>ALS</b> 10450 Stancilff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTODY S</b>	
	Date: 8/6/19	Time: 1
	Name: Scott B. Kelly	
	Company: BHATY	

<b>SEAL</b>	Seal Broken By:
1450	SM
1668	Date:
	8/9/19

TRK# 4809 7834 3300  
 0221, RETURNS MON - SAT  
 PRIORITY OVERNIGHT

**FedEx**  
 TRK# 4809 7834 3300  
 0221, 77099  
 WED - 07 AUG 10:30A  
 PRIORITY OVERNIGHT

**AB SGRA**  
 77099  
 TX-US  
 IAH



110 162785 06AUG19 06GA 568C2/1551/BCBA





---

ALS Environmental  
ALS Group USA, Corp  
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Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

August 20, 2019

**Analytical Report for Service Request No: K1907276**

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

**RE: HS19080284**

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory August 08, 2019  
For your reference, these analyses have been assigned our service request number **K1907276**.

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](http://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](mailto:Kelley.Lovejoy@alsglobal.com).

Respectfully submitted,

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

for Kelley Lovejoy  
Project Manager



---

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

## Table of Contents

Acronyms

Qualifiers

State Certifications, Accreditations, And Licenses

Case Narrative

Chain of Custody

General Chemistry

Raw Data

    General Chemistry

## Acronyms

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

### Inorganic Data Qualifiers

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

### Metals Data Qualifiers

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

### Organic Data Qualifiers

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

### Additional Petroleum Hydrocarbon Specific Qualifiers

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

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

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

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

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



**Client:** ALS Environmental - US  
**Project:** HS19080284  
**Sample Matrix:** Water

**Service Request:** K1907276  
**Date Received:** 08/08/2019

**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 08/08/2019. 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           Noel D. Darr          

Date           08/20/2019



## Chain of Custody

**ALS Environmental—Kelso Laboratory**  
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Phone (360)577- 7222 Fax (360)636-1 068  
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Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

101907276

### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11928

**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:** HS19080284  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19080284-01	LH18/24-SP650_080619	Water	06 Aug 2019 14:00
TOC Analysis for DOD Level IV			21 Aug 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. WALKER  
Received By: [Signature]  
Cooler ID(s): \_\_\_\_\_

Date/Time: 8/7/19 18:00  
Date/Time: 8/8/19 1030  
Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



PC Kelly

**Cooler Receipt and Preservation Form**

Client ALS Houston Service Request K19 07276

Received: 8/8/19 Opened: 8/8/19 By: UU Unloaded: 8/8/19 By: UU

- Samples were received via?  USPS  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- Samples were received in: (circle)  Cooler  Box  Envelope  Other  NA
- 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
-0.4	-0.2	0.8	1.0	+0.2	385	11928	4809 7836 5705	

- Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
- 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
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA  Y  N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA  Y  N
- Were VOA vials received without headspace? *Indicate in the table below.*  NA  Y  N
- 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:*

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## General Chemistry

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1317 South 13th Avenue, Kelso, WA 98626  
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[www.alsglobal.com](http://www.alsglobal.com)

Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS19080284  
**Sample Matrix:** Water  
**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Service Request:** K1907276  
**Date Collected:** 08/6/19  
**Date Received:** 08/8/19  
**Units:** mg/L  
**Basis:** NA

**Carbon, Total Organic**

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_080619	K1907276-001	2.25	0.50	0.20	0.07	1	08/14/19 14:51	
Method Blank	K1907276-MB	ND U	0.50	0.20	0.07	1	08/14/19 12:01	

## ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19080284  
**Sample Matrix:** Water

**Service Request:** K1907276  
**Date Collected:** 08/06/19  
**Date Received:** 08/08/19  
**Date Analyzed:** 08/14/19

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** LH18/24-SP650\_080619  
**Lab Code:** K1907276-001

**Units:** mg/L  
**Basis:** NA

Analyte Name	Analysis Method	LOQ	LOD	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
						K1907276-001DUP Result			
Carbon, Total Organic	SM 5310 C	0.50	0.20	0.07	2.25	2.18	2.22	3	10

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

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

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

ALS Group USA, Corp.  
dba ALS Environmental

## QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19080284  
**Sample Matrix:** Water

**Service Request:** K1907276  
**Date Analyzed:** 08/14/19  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Carbon, Total Organic**

**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 647136

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1907276-LCS	24.3	25.0	97	83-117

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19080284

**Service Request:** K1907276

### Continuing Calibration Verification (CCV) Summary

#### Carbon, Total Organic

**Analysis Method:** SM 5310 C

**Units:** mg/L

	Analysis		Date	True	Measured	Percent	Acceptance
	Lot	Lab Code	Analyzed	Value	Value	Recovery	Limits
CCV1	647136	KQ1911607-03	08/14/19 04:17	25.0	23.9	96	90-110
CCV2	647136	KQ1911607-04	08/14/19 11:32	25.0	23.9	95	90-110
CCV3	647136	KQ1911607-05	08/14/19 16:15	25.0	23.6	94	90-110
CCV4	647136	KQ1911607-06	08/14/19 20:59	25.0	24.4	97	90-110

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19080284

**Service Request:** K1907276

**Continuing Calibration Blank (CCB) Summary**  
**Carbon, Total Organic**

**Analysis Method:** SM 5310 C

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>LOQ</b>	<b>LOD</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	647136	KQ1911607-07	08/14/19 04:32	0.50	0.20	0.07	ND	U
CCB2	647136	KQ1911607-08	08/14/19 11:47	0.50	0.20	0.07	ND	U
CCB3	647136	KQ1911607-09	08/14/19 16:30	0.50	0.20	0.07	ND	U
CCB4	647136	KQ1911607-10	08/14/19 21:13	0.50	0.20	0.07	ND	U





## Raw Data

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## General Chemistry

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## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 647138 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
KQ1911609-01	Carbon, Dissolved Organic MB (DOC)			Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/15/19 06:54:00	N	IV
KQ1911609-02	Carbon, Dissolved Organic LCS (DOC)			Water	24.52 mg/L	10 mL	24.5 mg/L	1	0.07	0.50	98		8/15/19 07:09:00	N	IV
KQ1911609-03	Carbon, Dissolved Organic CCV (DOC)			Water	23.68 mg/L	10 mL	23.7 mg/L	1			95		8/15/19 01:42:00	N	IV
KQ1911609-04	Carbon, Dissolved Organic CCV (DOC)			Water	23.27 mg/L	10 mL	23.3 mg/L	1			93		8/15/19 06:25:00	N	IV
KQ1911609-05	Carbon, Dissolved Organic CCV (DOC)			Water	23.44 mg/L	10 mL	23.4 mg/L	1			94		8/15/19 11:09:00	N	IV
KQ1911609-06	Carbon, Dissolved Organic CCV (DOC)			Water	23.40 mg/L	10 mL	23.4 mg/L	1			94		8/15/19 15:51:00	N	IV
KQ1911609-07	Carbon, Dissolved Organic CCB (DOC)			Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/15/19 01:56:00	N	IV
KQ1911609-08	Carbon, Dissolved Organic CCB (DOC)			Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/15/19 06:40:00	N	IV
KQ1911609-09	Carbon, Dissolved Organic CCB (DOC)			Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/15/19 11:23:00	N	IV
KQ1911609-10	Carbon, Dissolved Organic CCB (DOC)			Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/15/19 16:06:00	N	IV
KQ1911609-11	Carbon, Dissolved Organic MS (DOC)		T1901331-021	Water	30.79 mg/L	10 mL	30.8 mg/L	1	0.07	0.50	102		8/15/19 05:55:00	N	IV
KQ1911609-12	Carbon, Dissolved Organic DUP (DOC)		T1901331-021	Water	5.12 mg/L	10 mL	5.12 mg/L	1	0.07	0.50		1	8/15/19 05:27:00	N	IV
KQ1911609-13	Carbon, Dissolved Organic DUP (DOC)		T1901331-022	Water	4.37 mg/L	10 mL	4.37 mg/L	1	0.07	0.50		<1	8/15/19 07:24:00	N	IV
KQ1911609-14	Carbon, Dissolved Organic DUP (DOC)		T1901331-023	Water	5.07 mg/L	10 mL	5.07 mg/L	1	0.07	0.50		<1	8/15/19 07:52:00	N	IV
KQ1911609-15	Carbon, Dissolved Organic DUP (DOC)		T1901331-024	Water	5.07 mg/L	10 mL	5.07 mg/L	1	0.07	0.50		2	8/15/19 08:20:00	N	IV
KQ1911609-16	Carbon, Dissolved Organic DUP (DOC)		T1901331-025	Water	5.19 mg/L	10 mL	5.19 mg/L	1	0.07	0.50		<1	8/15/19 08:48:00	N	IV
KQ1911609-17	Carbon, Dissolved Organic DUP (DOC)		T1901331-026	Water	5.12 mg/L	10 mL	5.12 mg/L	1	0.07	0.50		<1	8/15/19 09:16:00	N	IV
KQ1911609-18	Carbon, Dissolved Organic DUP (DOC)		T1901331-027	Water	5.21 mg/L	10 mL	5.21 mg/L	1	0.07	0.50		<1	8/15/19 09:44:00	N	IV
KQ1911609-19	Carbon, Dissolved Organic DUP (DOC)		T1901331-028	Water	4.97 mg/L	10 mL	4.97 mg/L	1	0.07	0.50		1	8/15/19 10:12:00	N	IV
KQ1911609-20	Carbon, Dissolved Organic DUP (DOC)		T1901331-029	Water	5.14 mg/L	10 mL	5.14 mg/L	1	0.07	0.50		2	8/15/19 10:40:00	N	IV
KQ1911609-21	Carbon, Dissolved Organic DUP (DOC)		T1901331-030	Water	5.11 mg/L	10 mL	5.11 mg/L	1	0.07	0.50		<1	8/15/19 11:38:00	N	IV
KQ1911609-22	Carbon, Dissolved Organic DUP (DOC)		T1901331-031	Water	4.46 mg/L	10 mL	4.46 mg/L	1	0.07	0.50		2	8/15/19 12:06:00	N	IV
KQ1911609-23	Carbon, Dissolved Organic DUP (DOC)		T1901331-032	Water	5.18 mg/L	10 mL	5.18 mg/L	1	0.07	0.50		1	8/15/19 12:34:00	N	IV

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

CES 8/16/19

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 647138 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
KQ1911609-24	Carbon, Dissolved Organic (DOC)	DUP	T1901331-033	Water	5.15 mg/L	10 mL	5.15 mg/L	1	0.07	0.50		1	8/15/19 13:03:00	N	IV
KQ1911609-25	Carbon, Dissolved Organic (DOC)	DUP	T1901331-034	Water	4.27 mg/L	10 mL	4.27 mg/L	1	0.07	0.50		<1	8/15/19 13:31:00	N	IV
KQ1911609-26	Carbon, Dissolved Organic (DOC)	DUP	T1901331-035	Water	2.72 mg/L	10 mL	2.72 mg/L	1	0.07	0.50		4	8/15/19 13:59:00	N	IV
KQ1911609-27	Carbon, Dissolved Organic (DOC)	DUP	T1901331-036	Water	3.87 mg/L	10 mL	3.87 mg/L	1	0.07	0.50		<1	8/15/19 14:27:00	N	IV
T1901331-021	Carbon, Dissolved Organic (DOC)	N/A		Water	5.19 mg/L	10 mL	5.19 mg/L	1	0.07	0.50			8/15/19 05:27:00	N	IV
T1901331-022	Carbon, Dissolved Organic (DOC)	N/A		Water	4.41 mg/L	10 mL	4.41 mg/L	1	0.07	0.50			8/15/19 07:24:00	N	IV
T1901331-023	Carbon, Dissolved Organic (DOC)	N/A		Water	5.07 mg/L	10 mL	5.07 mg/L	1	0.07	0.50			8/15/19 07:52:00	N	IV
T1901331-024	Carbon, Dissolved Organic (DOC)	N/A		Water	5.19 mg/L	10 mL	5.19 mg/L	1	0.07	0.50			8/15/19 08:20:00	N	IV
T1901331-025	Carbon, Dissolved Organic (DOC)	N/A		Water	5.18 mg/L	10 mL	5.18 mg/L	1	0.07	0.50			8/15/19 08:48:00	N	IV
T1901331-026	Carbon, Dissolved Organic (DOC)	N/A		Water	5.12 mg/L	10 mL	5.12 mg/L	1	0.07	0.50			8/15/19 09:16:00	N	IV
T1901331-027	Carbon, Dissolved Organic (DOC)	N/A		Water	5.19 mg/L	10 mL	5.19 mg/L	1	0.07	0.50			8/15/19 09:44:00	N	IV
T1901331-028	Carbon, Dissolved Organic (DOC)	N/A		Water	5.04 mg/L	10 mL	5.04 mg/L	1	0.07	0.50			8/15/19 10:12:00	N	IV
T1901331-029	Carbon, Dissolved Organic (DOC)	N/A		Water	5.22 mg/L	10 mL	5.22 mg/L	1	0.07	0.50			8/15/19 10:40:00	N	IV
T1901331-030	Carbon, Dissolved Organic (DOC)	N/A		Water	5.09 mg/L	10 mL	5.09 mg/L	1	0.07	0.50			8/15/19 11:38:00	N	IV
T1901331-031	Carbon, Dissolved Organic (DOC)	N/A		Water	4.54 mg/L	10 mL	4.54 mg/L	1	0.07	0.50			8/15/19 12:06:00	N	IV
T1901331-032	Carbon, Dissolved Organic (DOC)	N/A		Water	5.12 mg/L	10 mL	5.12 mg/L	1	0.07	0.50			8/15/19 12:34:00	N	IV
T1901331-033	Carbon, Dissolved Organic (DOC)	N/A		Water	5.22 mg/L	10 mL	5.22 mg/L	1	0.07	0.50			8/15/19 13:03:00	N	IV
T1901331-034	Carbon, Dissolved Organic (DOC)	N/A		Water	4.26 mg/L	10 mL	4.26 mg/L	1	0.07	0.50			8/15/19 13:31:00	N	IV
T1901331-035	Carbon, Dissolved Organic (DOC)	N/A		Water	2.83 mg/L	10 mL	2.83 mg/L	1	0.07	0.50			8/15/19 13:59:00	N	IV
T1901331-036	Carbon, Dissolved Organic (DOC)	N/A		Water	3.87 mg/L	10 mL	3.87 mg/L	1	0.07	0.50			8/15/19 14:27:00	N	IV

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

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 647135 Method/Testcode: 9060A/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1907144-001	Carbon, Total Organic (TOC)	N/A		Water	8.59 mg/L	10 mL	8.59 mg/L	1		0.50			8/14/19 02:26:00	N	IV
K1907144-002	Carbon, Total Organic (TOC)	N/A		Water	9.01 mg/L	10 mL	9.01 mg/L	1		0.50			8/14/19 03:22:00	N	IV
K1907145-001	Carbon, Total Organic (TOC)	N/A		Water	12.25 mg/L	10 mL	12.2 mg/L	1		0.50			8/13/19 22:29:00	Y	IV
K1907145-002	Carbon, Total Organic (TOC)	N/A		Water	8.95 mg/L	10 mL	17.9 mg/L	2		1.0			8/14/19 00:35:00	N	IV
K1907145-003	Carbon, Total Organic (TOC)	N/A		Water	6.22 mg/L	10 mL	6.22 mg/L	1		0.50			8/14/19 01:30:00	N	IV
K1907284-001	Carbon, Total Organic (TOC)	N/A		Water	7.67 mg/L	10 mL	7.67 mg/L	1		0.50			8/14/19 04:47:00	N	IV
K1907284-002	Carbon, Total Organic (TOC)	N/A		Water	4.74 mg/L	10 mL	4.74 mg/L	1		0.50			8/14/19 05:43:00	N	IV
K1907284-003	Carbon, Total Organic (TOC)	N/A		Water	4.01 mg/L	10 mL	4.01 mg/L	1		0.50			8/14/19 06:38:00	N	IV
K1907284-004	Carbon, Total Organic (TOC)	N/A		Water	4.64 mg/L	10 mL	37.1 mg/L	8		4.0			8/14/19 07:34:00	N	IV
K1907284-005	Carbon, Total Organic (TOC)	N/A		Water	4.52 mg/L	10 mL	36.2 mg/L	8		4.0			8/14/19 08:30:00	N	IV
KQ1911605-01	Carbon, Total Organic (TOC)	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1		0.50			8/13/19 20:22:00	N	IV
KQ1911605-02	Carbon, Total Organic (TOC)	LCS		Water	24.56 mg/L	10 mL	24.6 mg/L	1		0.50	98		8/13/19 21:18:00	N	IV
KQ1911605-03	Carbon, Total Organic (TOC)	CCV		Water	24.08 mg/L	10 mL	24.1 mg/L	1					8/13/19 19:53:00	N	IV
KQ1911605-04	Carbon, Total Organic (TOC)	CCV		Water	23.94 mg/L	10 mL	23.9 mg/L	1					8/14/19 04:17:00	N	IV
KQ1911605-05	Carbon, Total Organic (TOC)	CCV		Water	23.85 mg/L	10 mL	23.9 mg/L	1					8/14/19 11:32:00	N	IV
KQ1911605-06	Carbon, Total Organic (TOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1		0.50			8/13/19 20:08:00	N	IV
KQ1911605-07	Carbon, Total Organic (TOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1		0.50			8/14/19 04:32:00	N	IV
KQ1911605-08	Carbon, Total Organic (TOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1		0.50			8/14/19 11:47:00	N	IV
KQ1911605-26	Carbon, Total Organic (TOC)	MS	K1907145-001	Water	30.72 mg/L	10 mL	61.4 mg/L	2		1.0	98		8/13/19 23:25:00	N	IV
KQ1911605-27	Carbon, Total Organic (TOC)	MS	K1907145-001	Water	30.92 mg/L	10 mL	61.8 mg/L	2		1.0	99		8/13/19 23:25:00	N	IV
KQ1911605-28	Carbon, Total Organic (TOC)	MS	K1907145-001	Water	31.08 mg/L	10 mL	62.2 mg/L	2		1.0	100		8/13/19 23:25:00	N	IV
KQ1911605-29	Carbon, Total Organic (TOC)	MS	K1907145-001	Water	30.96 mg/L	10 mL	61.9 mg/L	2		1.0	99		8/13/19 23:25:00	N	IV
KQ1911605-30	Carbon, Total Organic (TOC)	DUP	K1907145-001	Water	12.24 mg/L	10 mL	12.2 mg/L	1		0.50		<1	8/13/19 22:29:00	N	IV

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## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 647135 Method/Testcode: 9060A/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	PQL	% Rec	% RSD	Date Analyzed	QC?	Tier
KQ1911605-31	Carbon, Total Organic (TOC)	TRP	K1907145-001	Water	12.25 mg/L	10 mL	12.3 mg/L	1		0.50		<1	8/13/19 22:29:00	N	IV
KQ1911605-32	Carbon, Total Organic (TOC)	QUAD	K1907145-001	Water	12.24 mg/L	10 mL	12.2 mg/L	1		0.50		<1	8/13/19 22:29:00	N	IV
KQ1911605-33	Carbon, Total Organic (TOC)	DUP	K1907145-002	Water	9.03 mg/L	10 mL	18.1 mg/L	2		1.0		<1	8/14/19 00:35:00	N	IV
KQ1911605-34	Carbon, Total Organic (TOC)	TRP	K1907145-002	Water	9.02 mg/L	10 mL	18.0 mg/L	2		1.0		<1	8/14/19 00:35:00	N	IV
KQ1911605-35	Carbon, Total Organic (TOC)	QUAD	K1907145-002	Water	9.05 mg/L	10 mL	18.1 mg/L	2		1.0		<1	8/14/19 00:35:00	N	IV
KQ1911605-36	Carbon, Total Organic (TOC)	DUP	K1907145-003	Water	6.09 mg/L	10 mL	6.09 mg/L	1		0.50		2	8/14/19 01:30:00	N	IV
KQ1911605-37	Carbon, Total Organic (TOC)	TRP	K1907145-003	Water	6.09 mg/L	10 mL	6.09 mg/L	1		0.50		1	8/14/19 01:30:00	N	IV
KQ1911605-38	Carbon, Total Organic (TOC)	QUAD	K1907145-003	Water	6.13 mg/L	10 mL	6.13 mg/L	1		0.50		<1	8/14/19 01:30:00	N	IV
KQ1911605-39	Carbon, Total Organic (TOC)	DUP	K1907144-002	Water	8.79 mg/L	10 mL	8.79 mg/L	1		0.50		2	8/14/19 03:22:00	N	IV
KQ1911605-40	Carbon, Total Organic (TOC)	TRP	K1907144-002	Water	8.75 mg/L	10 mL	8.75 mg/L	1		0.50		2	8/14/19 03:22:00	N	IV
KQ1911605-41	Carbon, Total Organic (TOC)	QUAD	K1907144-002	Water	8.79 mg/L	10 mL	8.79 mg/L	1		0.50		1	8/14/19 03:22:00	N	IV
KQ1911605-42	Carbon, Total Organic (TOC)	DUP	K1907284-001	Water	7.59 mg/L	10 mL	7.59 mg/L	1		0.50		<1	8/14/19 04:47:00	N	IV
KQ1911605-43	Carbon, Total Organic (TOC)	TRP	K1907284-001	Water	7.66 mg/L	10 mL	7.66 mg/L	1		0.50		<1	8/14/19 04:47:00	N	IV
KQ1911605-44	Carbon, Total Organic (TOC)	QUAD	K1907284-001	Water	7.62 mg/L	10 mL	7.62 mg/L	1		0.50		<1	8/14/19 04:47:00	N	IV
KQ1911605-45	Carbon, Total Organic (TOC)	DUP	K1907284-002	Water	4.68 mg/L	10 mL	4.68 mg/L	1		0.50		1	8/14/19 05:43:00	N	IV
KQ1911605-46	Carbon, Total Organic (TOC)	TRP	K1907284-002	Water	4.64 mg/L	10 mL	4.64 mg/L	1		0.50		1	8/14/19 05:43:00	N	IV
KQ1911605-47	Carbon, Total Organic (TOC)	QUAD	K1907284-002	Water	4.65 mg/L	10 mL	4.65 mg/L	1		0.50		<1	8/14/19 05:43:00	N	IV
KQ1911605-48	Carbon, Total Organic (TOC)	DUP	K1907284-003	Water	3.99 mg/L	10 mL	3.99 mg/L	1		0.50		<1	8/14/19 06:38:00	N	IV
KQ1911605-49	Carbon, Total Organic (TOC)	TRP	K1907284-003	Water	3.96 mg/L	10 mL	3.96 mg/L	1		0.50		<1	8/14/19 06:38:00	N	IV
KQ1911605-50	Carbon, Total Organic (TOC)	QUAD	K1907284-003	Water	4.02 mg/L	10 mL	4.02 mg/L	1		0.50		<1	8/14/19 06:38:00	N	IV
KQ1911605-51	Carbon, Total Organic (TOC)	DUP	K1907284-004	Water	4.62 mg/L	10 mL	37.0 mg/L	8		4.0		<1	8/14/19 07:34:00	N	IV
KQ1911605-52	Carbon, Total Organic (TOC)	TRP	K1907284-004	Water	4.64 mg/L	10 mL	37.1 mg/L	8		4.0		<1	8/14/19 07:34:00	N	IV
KQ1911605-53	Carbon, Total Organic (TOC)	QUAD	K1907284-004	Water	4.69 mg/L	10 mL	37.5 mg/L	8		4.0		<1	8/14/19 07:34:00	N	IV

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## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 647135 Method/Testcode: 9060A/TOC T

<u>Lab Code</u>	<u>Target Analytes</u>	<u>QC</u>	<u>Parent Sample</u>	<u>Matrix</u>	<u>Raw Result</u>	<u>Sample Amt.</u>	<u>Final Result</u>	<u>Dil</u>	<u>MDL</u>	<u>PQL</u>	<u>% Rec</u>	<u>% RSD</u>	<u>Date Analyzed</u>	<u>QC?</u>	<u>Tier</u>
KQ1911605-54	Carbon, Total Organic (TOC)	DUP	K1907284-005	Water	4.55 mg/L	10 mL	36.4 mg/L	8		4.0		<1	8/14/19 08:30:00	N	IV
KQ1911605-55	Carbon, Total Organic (TOC)	TRP	K1907284-005	Water	4.53 mg/L	10 mL	36.3 mg/L	8		4.0		<1	8/14/19 08:30:00	N	IV
KQ1911605-56	Carbon, Total Organic (TOC)	QUAD	K1907284-005	Water	4.56 mg/L	10 mL	36.5 mg/L	8		4.0		<1	8/14/19 08:30:00	N	IV
KQ1911605-57	Carbon, Total Organic (TOC)	DUP	K1907144-001	Water	8.58 mg/L	10 mL	8.58 mg/L	1		0.50		<1	8/14/19 02:26:00	N	IV
KQ1911605-58	Carbon, Total Organic (TOC)	TRP	K1907144-001	Water	8.54 mg/L	10 mL	8.54 mg/L	1		0.50		<1	8/14/19 02:26:00	N	IV
KQ1911605-59	Carbon, Total Organic (TOC)	QUAD	K1907144-001	Water	8.50 mg/L	10 mL	8.50 mg/L	1		0.50		<1	8/14/19 02:26:00	N	IV

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



## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 647136 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
K1907166-001	Carbon, Total Organic	N/A		Drinking Water	0.41 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/14/19 09:25:00	N	I
K1907235-001	Carbon, Total Organic	N/A		Ground Water	2.50 mg/L	10 mL	2.50 mg/L	1	0.07	0.50			8/14/19 10:36:00	N	IV
K1907235-002	Carbon, Total Organic	N/A		Ground Water	2.66 mg/L	10 mL	2.66 mg/L	1	0.07	0.50			8/14/19 11:04:00	N	IV
K1907235-003	Carbon, Total Organic	N/A		Ground Water	0.85 mg/L	10 mL	0.85 mg/L	1	0.07	0.50			8/14/19 12:30:00	N	IV
K1907235-004	Carbon, Total Organic	N/A		Ground Water	0.92 mg/L	10 mL	0.92 mg/L	1	0.07	0.50			8/14/19 12:59:00	N	IV
K1907274-001	Carbon, Total Organic	N/A		Ground Water	0.56 mg/L	10 mL	0.56 mg/L	1	0.07	0.50			8/14/19 13:27:00	N	IV
K1907274-002	Carbon, Total Organic	N/A		Ground Water	0.93 mg/L	10 mL	0.93 mg/L	1	0.07	0.50			8/14/19 13:55:00	N	IV
K1907274-003	Carbon, Total Organic	N/A		Ground Water	0.94 mg/L	10 mL	0.94 mg/L	1	0.07	0.50			8/14/19 14:23:00	N	IV
K1907276-001	Carbon, Total Organic	N/A		Water	2.25 mg/L	10 mL	2.25 mg/L	1	0.07	0.50			8/14/19 14:51:00	N	IV
K1907382-001	Carbon, Total Organic	N/A		Water	1.54 mg/L	10 mL	1.54 mg/L	1	0.07	0.50			8/14/19 15:19:00	N	II
K1907383-001	Carbon, Total Organic	N/A		Water	0.29 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/14/19 15:47:00	N	II
K1907383-002	Carbon, Total Organic	N/A		Water	0.85 mg/L	10 mL	0.85 mg/L	1	0.07	0.50			8/14/19 16:45:00	N	II
K1907383-003	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/14/19 17:13:00	N	II
K1907383-004	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/14/19 17:41:00	N	II
KQ1911607-01	Carbon, Total Organic	MB		Drinking Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/14/19 12:01:00	N	I
KQ1911607-02	Carbon, Total Organic	LCS		Drinking Water	24.30 mg/L	10 mL	24.3 mg/L	1	0.07	0.50	97		8/14/19 12:16:00	N	I
KQ1911607-03	Carbon, Total Organic	CCV		Drinking Water	23.94 mg/L	10 mL	23.9 mg/L	1					8/14/19 04:17:00	N	I
KQ1911607-04	Carbon, Total Organic	CCV		Drinking Water	23.85 mg/L	10 mL	23.9 mg/L	1					8/14/19 11:32:00	N	I
KQ1911607-05	Carbon, Total Organic	CCV		Drinking Water	23.62 mg/L	10 mL	23.6 mg/L	1					8/14/19 16:15:00	N	I
KQ1911607-06	Carbon, Total Organic	CCV		Drinking Water	24.36 mg/L	10 mL	24.4 mg/L	1					8/14/19 20:59:00	N	I
KQ1911607-07	Carbon, Total Organic	CCB		Drinking Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/14/19 04:32:00	N	I
KQ1911607-08	Carbon, Total Organic	CCB		Drinking Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/14/19 11:47:00	N	I
KQ1911607-09	Carbon, Total Organic	CCB		Drinking Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/14/19 16:30:00	N	I
KQ1911607-10	Carbon, Total Organic	CCB		Drinking Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/14/19 21:13:00	N	I
KQ1911607-11	Carbon, Total Organic	DUP	K1907166-001	Drinking Water	0.39 mg/L	10 mL	0.39 mg/L J	1	0.07	0.50		NC	8/14/19 09:25:00	N	I
KQ1911607-12	Carbon, Total Organic	MS	K1907166-001	Drinking Water	26.15 mg/L	10 mL	26.1 mg/L	1	0.07	0.50	105		8/14/19 09:53:00	N	I
KQ1911607-13	Carbon, Total Organic	DUP	K1907235-001	Ground Water	3.10 mg/L	10 mL	3.10 mg/L	1	0.07	0.50		22*	8/14/19 10:36:00	N	IV

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

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 647136 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
KQ1911607-14	Carbon, Total Organic	DUP	K1907235-002	Ground Water	2.59 mg/L	10 mL	2.59 mg/L	1	0.07	0.50		3	8/14/19 11:04:00	N	IV
KQ1911607-15	Carbon, Total Organic	DUP	K1907235-003	Ground Water	0.86 mg/L	10 mL	0.86 mg/L	1	0.07	0.50		1	8/14/19 12:30:00	N	IV
KQ1911607-16	Carbon, Total Organic	DUP	K1907235-004	Ground Water	0.92 mg/L	10 mL	0.92 mg/L	1	0.07	0.50		<1	8/14/19 12:59:00	N	IV
KQ1911607-17	Carbon, Total Organic	DUP	K1907274-001	Ground Water	0.51 mg/L	10 mL	0.51 mg/L	1	0.07	0.50		9	8/14/19 13:27:00	N	IV
KQ1911607-18	Carbon, Total Organic	DUP	K1907274-002	Ground Water	0.94 mg/L	10 mL	0.94 mg/L	1	0.07	0.50		1	8/14/19 13:55:00	N	IV
KQ1911607-19	Carbon, Total Organic	DUP	K1907274-003	Ground Water	1.01 mg/L	10 mL	1.01 mg/L	1	0.07	0.50		7	8/14/19 14:23:00	N	IV
KQ1911607-20	Carbon, Total Organic	DUP	K1907276-001	Water	2.18 mg/L	10 mL	2.18 mg/L	1	0.07	0.50		3	8/14/19 14:51:00	N	IV
KQ1911607-21	Carbon, Total Organic	DUP	K1907382-001	Water	1.46 mg/L	10 mL	1.46 mg/L	1	0.07	0.50		6	8/14/19 15:19:00	N	II
KQ1911607-22	Carbon, Total Organic	DUP	K1907383-001	Water	0.37 mg/L	10 mL	0.37 mg/L	J 1	0.07	0.50		NC	8/14/19 15:47:00	N	II
KQ1911607-23	Carbon, Total Organic	DUP	K1907383-002	Water	0.78 mg/L	10 mL	0.78 mg/L	1	0.07	0.50		8	8/14/19 16:45:00	N	II
KQ1911607-24	Carbon, Total Organic	DUP	K1907383-003	Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50		NC	8/14/19 17:13:00	N	II
KQ1911607-25	Carbon, Total Organic	DUP	K1907383-004	Water	0.06 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50		NC	8/14/19 17:41:00	N	II

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## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 647137 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
KQ1911608-01	Carbon, Dissolved Organic (DOC)	MB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			8/14/19 21:28:00	N	IV
KQ1911608-02	Carbon, Dissolved Organic (DOC)	LCS		Water	25.02 mg/L	10 mL	25.0 mg/L	1	0.07	0.50	100		8/15/19 21:43:00	N	IV
KQ1911608-03	Carbon, Dissolved Organic (DOC)	CCV		Water	23.62 mg/L	10 mL	23.6 mg/L	1					8/14/19 16:15:00	N	IV
KQ1911608-04	Carbon, Dissolved Organic (DOC)	CCV		Water	24.36 mg/L	10 mL	24.4 mg/L	1					8/14/19 20:59:00	N	IV
KQ1911608-05	Carbon, Dissolved Organic (DOC)	CCV		Water	23.68 mg/L	10 mL	23.7 mg/L	1					8/15/19 01:42:00	N	IV
KQ1911608-06	Carbon, Dissolved Organic (DOC)	CCV		Water	23.27 mg/L	10 mL	23.3 mg/L	1					8/15/19 06:25:00	N	IV
KQ1911608-07	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			8/14/19 16:30:00	N	IV
KQ1911608-08	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			8/14/19 21:13:00	N	IV
KQ1911608-09	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			8/15/19 01:56:00	N	IV
KQ1911608-10	Carbon, Dissolved Organic (DOC)	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			8/15/19 06:40:00	N	IV
KQ1911608-11	Carbon, Dissolved Organic (DOC)	MS	T1901331-001	Water	21.75 mg/L	10 mL	43.5 mg/L	2	0.2	1.0	84		8/14/19 18:37:00	N	IV
KQ1911608-12	Carbon, Dissolved Organic (DOC)	DUP	T1901331-001	Water	1.65 mg/L	10 mL	1.65 mg/L	1	0.07	0.50		2	8/14/19 18:09:00	N	IV
KQ1911608-13	Carbon, Dissolved Organic (DOC)	DUP	T1901331-002	Water	2.13 mg/L	10 mL	2.13 mg/L	1	0.07	0.50		2	8/14/19 19:06:00	N	IV
KQ1911608-14	Carbon, Dissolved Organic (DOC)	DUP	T1901331-003	Water	2.59 mg/L	10 mL	2.59 mg/L	1	0.07	0.50		5	8/14/19 19:34:00	N	IV
KQ1911608-15	Carbon, Dissolved Organic (DOC)	DUP	T1901331-004	Water	0.54 mg/L	10 mL	0.54 mg/L	1	0.07	0.50		6	8/14/19 20:02:00	N	IV
KQ1911608-16	Carbon, Dissolved Organic (DOC)	DUP	T1901331-005	Water	0.57 mg/L	10 mL	0.57 mg/L	1	0.07	0.50		8	8/14/19 20:30:00	N	IV
KQ1911608-17	Carbon, Dissolved Organic (DOC)	DUP	T1901331-006	Water	0.52 mg/L	10 mL	0.52 mg/L	1	0.07	0.50		9	8/14/19 21:57:00	N	IV
KQ1911608-18	Carbon, Dissolved Organic (DOC)	DUP	T1901331-007	Water	2.89 mg/L	10 mL	2.89 mg/L	1	0.07	0.50		1	8/14/19 22:25:00	N	IV
KQ1911608-19	Carbon, Dissolved Organic (DOC)	DUP	T1901331-008	Water	3.28 mg/L	10 mL	3.28 mg/L	1	0.07	0.50		<1	8/14/19 22:53:00	N	IV
KQ1911608-20	Carbon, Dissolved Organic (DOC)	DUP	T1901331-009	Water	3.82 mg/L	10 mL	3.82 mg/L	1	0.07	0.50		<1	8/14/19 23:21:00	N	IV
KQ1911608-21	Carbon, Dissolved Organic (DOC)	DUP	T1901331-010	Water	0.51 mg/L	10 mL	0.51 mg/L	1	0.07	0.50		NC	8/14/19 23:49:00	N	IV
KQ1911608-22	Carbon, Dissolved Organic (DOC)	DUP	T1901331-011	Water	0.66 mg/L	10 mL	0.66 mg/L	1	0.07	0.50		4	8/15/19 00:17:00	N	IV
KQ1911608-23	Carbon, Dissolved Organic (DOC)	DUP	T1901331-012	Water	1.14 mg/L	10 mL	1.14 mg/L	1	0.07	0.50		8	8/15/19 00:45:00	N	IV

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

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 647137 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
KQ1911608-24	Carbon, Dissolved Organic (DOC)	DUP	T1901331-013	Water	4.49 mg/L	10 mL	4.49 mg/L	1	0.07	0.50		<1	8/15/19 01:14:00	N	IV
KQ1911608-25	Carbon, Dissolved Organic (DOC)	DUP	T1901331-014	Water	4.67 mg/L	10 mL	4.67 mg/L	1	0.07	0.50		<1	8/15/19 02:11:00	N	IV
KQ1911608-26	Carbon, Dissolved Organic (DOC)	DUP	T1901331-015	Water	4.96 mg/L	10 mL	4.96 mg/L	1	0.07	0.50		<1	8/15/19 02:39:00	N	IV
KQ1911608-27	Carbon, Dissolved Organic (DOC)	DUP	T1901331-016	Water	1.60 mg/L	10 mL	1.60 mg/L	1	0.07	0.50		9	8/15/19 03:07:00	N	IV
KQ1911608-28	Carbon, Dissolved Organic (DOC)	DUP	T1901331-017	Water	1.66 mg/L	10 mL	1.66 mg/L	1	0.07	0.50		6	8/15/19 03:35:00	N	IV
KQ1911608-29	Carbon, Dissolved Organic (DOC)	DUP	T1901331-018	Water	3.89 mg/L	10 mL	3.89 mg/L	1	0.07	0.50		<1	8/15/19 04:03:00	N	IV
KQ1911608-30	Carbon, Dissolved Organic (DOC)	DUP	T1901331-019	Water	5.15 mg/L	10 mL	5.15 mg/L	1	0.07	0.50		<1	8/15/19 04:31:00	N	IV
KQ1911608-31	Carbon, Dissolved Organic (DOC)	DUP	T1901331-020	Water	5.17 mg/L	10 mL	5.17 mg/L	1	0.07	0.50		<1	8/15/19 04:59:00	N	IV
T1901331-001	Carbon, Dissolved Organic (DOC)	N/A		Water	1.62 mg/L	10 mL	1.62 mg/L	1	0.07	0.50			8/14/19 18:09:00	N	IV
T1901331-002	Carbon, Dissolved Organic (DOC)	N/A		Water	2.18 mg/L	10 mL	2.18 mg/L	1	0.07	0.50			8/14/19 19:06:00	N	IV
T1901331-003	Carbon, Dissolved Organic (DOC)	N/A		Water	2.47 mg/L	10 mL	2.47 mg/L	1	0.07	0.50			8/14/19 19:34:00	N	IV
T1901331-004	Carbon, Dissolved Organic (DOC)	N/A		Water	0.51 mg/L	10 mL	0.51 mg/L	1	0.07	0.50			8/14/19 20:02:00	N	IV
T1901331-005	Carbon, Dissolved Organic (DOC)	N/A		Water	0.53 mg/L	10 mL	0.53 mg/L	1	0.07	0.50			8/14/19 20:30:00	N	IV
T1901331-006	Carbon, Dissolved Organic (DOC)	N/A		Water	0.57 mg/L	10 mL	0.57 mg/L	1	0.07	0.50			8/14/19 21:57:00	N	IV
T1901331-007	Carbon, Dissolved Organic (DOC)	N/A		Water	2.86 mg/L	10 mL	2.86 mg/L	1	0.07	0.50			8/14/19 22:25:00	N	IV
T1901331-008	Carbon, Dissolved Organic (DOC)	N/A		Water	3.29 mg/L	10 mL	3.29 mg/L	1	0.07	0.50			8/14/19 22:53:00	N	IV
T1901331-009	Carbon, Dissolved Organic (DOC)	N/A		Water	3.81 mg/L	10 mL	3.81 mg/L	1	0.07	0.50			8/14/19 23:21:00	N	IV
T1901331-010	Carbon, Dissolved Organic (DOC)	N/A		Water	0.50 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/14/19 23:49:00	N	IV
T1901331-011	Carbon, Dissolved Organic (DOC)	N/A		Water	0.64 mg/L	10 mL	0.64 mg/L	1	0.07	0.50			8/15/19 00:17:00	N	IV
T1901331-012	Carbon, Dissolved Organic (DOC)	N/A		Water	1.24 mg/L	10 mL	1.24 mg/L	1	0.07	0.50			8/15/19 00:45:00	N	IV
T1901331-013	Carbon, Dissolved Organic (DOC)	N/A		Water	4.51 mg/L	10 mL	4.51 mg/L	1	0.07	0.50			8/15/19 01:14:00	N	IV
T1901331-014	Carbon, Dissolved Organic (DOC)	N/A		Water	4.70 mg/L	10 mL	4.70 mg/L	1	0.07	0.50			8/15/19 02:11:00	N	IV
T1901331-015	Carbon, Dissolved Organic (DOC)	N/A		Water	4.99 mg/L	10 mL	4.99 mg/L	1	0.07	0.50			8/15/19 02:39:00	N	IV

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

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 647137 Method/Testcode: SM 5310 C/TOC D

<u>Lab Code</u>	<u>Target Analytes</u>	<u>QC</u>	<u>Parent Sample</u>	<u>Matrix</u>	<u>Raw Result</u>	<u>Sample Amt.</u>	<u>Final Result</u>	<u>Dil</u>	<u>MDL</u>	<u>PQL</u>	<u>% Rec</u>	<u>% RSD</u>	<u>Date Analyzed</u>	<u>QC?</u>	<u>Tier</u>
T1901331-016	Carbon, Dissolved Organic (DOC)	N/A		Water	1.76 mg/L	10 mL	1.76 mg/L	1	0.07	0.50			8/15/19 03:07:00	N	IV
T1901331-017	Carbon, Dissolved Organic (DOC)	N/A		Water	1.76 mg/L	10 mL	1.76 mg/L	1	0.07	0.50			8/15/19 03:35:00	N	IV
T1901331-018	Carbon, Dissolved Organic (DOC)	N/A		Water	3.91 mg/L	10 mL	3.91 mg/L	1	0.07	0.50			8/15/19 04:03:00	N	IV
T1901331-019	Carbon, Dissolved Organic (DOC)	N/A		Water	5.15 mg/L	10 mL	5.15 mg/L	1	0.07	0.50			8/15/19 04:31:00	N	IV
T1901331-020	Carbon, Dissolved Organic (DOC)	N/A		Water	5.21 mg/L	10 mL	5.21 mg/L	1	0.07	0.50			8/15/19 04:59:00	N	IV

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

TOC: 647135  
647136  
DOC: 647137  
647138

## Schedule: 08132019

Version: 6

Instrument: Fusion1

Last Saved by: Fusion1 (Fusion1)

Last Saved on: 2019/08/13 19:09 - Tuesday

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps	Use	State
(Clean)	Clean	Clean		1	True	Ready
(Clean)	Clean	Clean		1	True	Ready
(Clean)	Clean	Clean		1	True	Ready
(Blank)	Blank	Reagent/Acid Blank		1	True	Ready
D	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
1	Sample	MB1	CAS_salt_010711 (CAS_salt_010711)	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	K1907145-001.07	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
4	Sample	K1907145-001.07 ms 2x	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
5	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
6	Sample	K1907145-002.02 2x	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
7	Sample	K1907145-003.02	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
8	Sample	K1907144-001.02	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
9	Sample	K1907144-002.02	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	K1907284-001.02	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
11	Sample	K1907284-002.02	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
12	Sample	K1907284-003.02	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
13	Sample	K1907284-004.02 8x	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
14	Sample	K1907284-005.02 8x	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
15	Sample	K1907166-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K1907166-001.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
17	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1907235-001.02	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	Sample	K1907235-002.02	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	K1907235-003.02	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K1907235-004.02	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	K1907274-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K1907274-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K1907274-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K1907276-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
27	Sample	K1907382-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
28	Sample	K1907383-001.01	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	K1907383-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1907383-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
31	Sample	K1907383-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
32	Sample	T1901331-001.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
33	Sample	T1901331-001.05 ms doc 2x	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
34	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
35	Sample	T1901331-002.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
36	Sample	T1901331-003.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
37	Sample	T1901331-004.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
38	Sample	T1901331-005.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready

Printed on: August 15, 2019 17:44:01

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## Schedule: 08132019

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps	Use	State
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
39	Sample	MB3	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [25.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
40	Sample	T1901331-006.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
41	Sample	T1901331-007.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
42	Sample	T1901331-008.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
43	Sample	T1901331-009.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
44	Sample	T1901331-010.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
45	Sample	T1901331-011.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
46	Sample	T1901331-012.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
47	Sample	T1901331-013.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
48	Sample	T1901331-014.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
49	Sample	T1901331-015.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
50	Sample	T1901331-016.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
51	Sample	T1901331-017.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
52	Sample	T1901331-018.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
53	Sample	T1901331-019.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
54	Sample	T1901331-020.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
55	Sample	T1901331-021.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
56	Sample	T1901331-021.05 ms doc	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
57	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
58	Sample	MB4	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [25.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
59	Sample	T1901331-022.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
60	Sample	T1901331-023.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
61	Sample	T1901331-024.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
62	Sample	T1901331-025.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
63	Sample	T1901331-026.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
64	Sample	T1901331-027.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
65	Sample	T1901331-028.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
66	Sample	T1901331-029.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
67	Sample	T1901331-030.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
68	Sample	T1901331-031.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
69	Sample	T1901331-032.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
70	Sample	T1901331-033.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
71	Sample	T1901331-034.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
72	Sample	T1901331-035.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
73	Sample	T1901331-036.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
74	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
75	Sample	Lot check 190516	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	

StarLIMS Run: 647138, 647137, 647135, 647136  
 Analysis: DOC/TOC  
 Method: SM 5310 C, 9060A

CCV: 11-GEN-05-79K 50 ppm      LCS: 11-GEN-05-79J 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-74A

ICS TV: 25.0 ppm                      ICS % R = 2

Spike ID: 11-GEN-05-77J              0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-79O

21 % H3PO4: 11-GEN-05-80A

Equipment ID: K-TOC-03

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

FILTER ID: N/A

Analyzed By: <u>CES</u>	Date Analyzed: <u>8/15/19</u>
Reviewed By: <u>[Signature]</u>	Date Reviewed: <u>8/16/19</u>



# Fusion Report - 08132019

## Tuesday, August 13, 2019 05:58 PM

(View - Repts, Unused Repts, Meta-Data, Signature, History)  
Printed on 2019/08/15 17:44 - Thursday

### Report Summary Information

Company Location: Gen Chem Lab  
 Schedule Name: 08132019  
 Instrument Name: Fusion1  
 Report Version: 1 of 1  
 Report Creation by Operators (schedule version): Fusion1 (Fusion1) (v1)  
 Fusion1 (Fusion1) (v2)  
 Fusion1 (Fusion1) (v3)  
 Fusion1 (Fusion1) (v5)  
 Fusion1 (Fusion1) (v6)  
 Comment:

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

### Report Results

Sample Type: Clean							From Schedule Version 1
Pos	Analysis Type	Sample ID			Start Time		
◆ (clean)		Clean			2019/08/13 17:58		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	12.23	17.62	5.39	49.52	05:19	
2	TC Clean	14.45	17.83	3.38	50.18	04:03	
3	TC Clean	4.21	7.69	3.47	50.18	03:48	
4	TC Clean	3.03	6.44	3.41	50.13	03:46	

Sample Type: Clean							From Schedule Version 2
Pos	Analysis Type	Sample ID			Start Time		
◆ (clean)		Clean			2019/08/13 18:20		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	11.15	14.57	3.43	49.49	05:12	
2	TC Clean	9.19	12.58	3.39	50.12	04:02	
3	TC Clean	5.21	8.67	3.47	50.21	03:46	

4	TC Clean	3.70	7.06	3.36	50.26	03:48
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**Sample Type:** Clean From Schedule Version 3

Pos	Analysis Type	Sample ID	Start Time
◆ (clean)		Clean	2019/08/13 18:42

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	10.81	14.16	3.36	49.71	05:07
2	TC Clean	6.25	9.60	3.35	50.18	04:04
3	TC Clean	3.61	7.16	3.55	50.23	03:45
4	TC Clean	2.76	6.13	3.38	50.17	03:46

**Sample Type:** Blank (Creating v1284) From Schedule Version 5

Pos	Analysis Type	Sample ID	Start Time
◆ (blank)		Reagent/Acid Blank	2019/08/13 19:05

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	10.85	14.22	3.37	49.55	05:12
2	TC Clean	5.97	9.31	3.34	50.19	04:04
3	TC Clean	3.05	6.43	3.38	50.20	03:47
4	TC Clean	2.42	5.81	3.38	50.12	03:52
5	Reagent Blank	3.95	7.18	3.23	50.18	05:04
6	Acid Blank	1.44	4.66	3.23	49.61	05:24

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆ D	TOC	RB	0.3158 ppm	0.0000 ppm	0.0000%	2019/08/13 19:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3158	3.1579	10.92	14.23	3.30	50.08	10:31

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.7794 (IC) (v1284)	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)	24.0809 ppm (PASS)	0.0000 ppm	0%	2019/08/13 19:53

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.0809	240.8087	172.92	176.23	3.31	50.13	10:29

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

**Sample Type:** Check Standard --> CCB From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/13 20:08

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.08	10.50	3.42	50.11	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 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/13 20:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.18	9.53	3.35	50.12	10:28
2	TOC	0.0000	0.0000	6.42	9.79	3.37	50.10	10:26
3	TOC	0.0000	0.0000	5.72	9.09	3.37	50.12	10:27
4	TOC	0.0000	0.0000	5.94	9.00	3.06	50.11	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7794 (IC) (v1284)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

**Sample Type:** Check Standard --> LCS From Schedule Version 6

Concentration	Min / Max

Pos	BAT	(ppm)	Dil	Sample ID	(% dev)	Result	Std. Dev.	RSD	Start Time	
♦	C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	24.5556 ppm (PASS)	0.0898 ppm	0.37%	2019/08/13 21:18

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.5038	245.0382	175.79	179.06	3.26	50.10	10:28
C	TOC	25.0 ppm	2	24.5673	245.6732	176.22	179.39	3.16	50.08	10:26
C	TOC	25.0 ppm	3	24.4744	244.7436	175.59	178.80	3.20	50.09	10:27
C	TOC	25.0 ppm	4	24.6771	246.7707	176.97	180.27	3.31	50.08	10:25

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos C</b>
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	
♦	2	TOC	ICS	0.4496 ppm	0.0000 ppm	0.0000%	2019/08/13 22:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4496	4.4956	11.83	15.28	3.45	50.10	10:32

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.7794 (IC) (v1284)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
♦	3	TOC	K1907145-001.07	12.2454 ppm	0.0079 ppm	0.0600%	2019/08/13 22:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	12.2497	122.4975	91.93	95.25	3.32	50.10	10:27
2	TOC	12.2437	122.4371	91.89	95.17	3.28	50.12	10:24
3	TOC	12.2531	122.5314	91.95	95.25	3.30	50.14	10:26
4	TOC	12.2352	122.3516	91.83	95.13	3.30	50.11	10:29

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.7794 (IC) (v1284)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
♦	4	TOC	K1907145-001.07 ms 2x	30.9202 ppm	0.1526 ppm	0.4900%	2019/08/13 23:25

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	30.9616	309.6161	218.94	222.21	3.27	50.14	10:29
2	TOC	31.0842	310.8418	219.78	223.09	3.32	50.14	10:25
3	TOC	30.9179	309.1785	218.65	222.05	3.40	50.14	10:30

4	TOC	30.7171	307.1706	217.28	220.53	3.25	50.17	10:27
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**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
5	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/14 00:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.64	9.99	3.34	50.19	10:34

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
6	TOC	K1907145-002.02 2x	9.0108 ppm	0.0411 ppm	0.4600%	2019/08/14 00:35

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.9514	89.5140	69.54	72.80	3.26	50.19	10:28
2	TOC	9.0262	90.2624	70.05	73.32	3.27	50.22	10:25
3	TOC	9.0200	90.2005	70.01	73.47	3.46	50.22	10:26
4	TOC	9.0455	90.4554	70.18	73.62	3.44	50.25	10:30

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
7	TOC	K1907145-003.02	6.1331 ppm	0.0584 ppm	0.9500%	2019/08/14 01:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.2177	62.1773	50.98	54.26	3.28	50.27	10:26
2	TOC	6.0944	60.9442	50.15	53.47	3.32	50.26	10:28
3	TOC	6.0941	60.9413	50.15	53.52	3.38	50.26	10:23
4	TOC	6.1261	61.2609	50.36	53.71	3.35	50.28	10:29

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
8	TOC	K1907144-001.02	8.5535 ppm	0.0398 ppm	0.4700%	2019/08/14 02:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.5881	85.8811	67.08	70.51	3.43	50.28	10:24
2	TOC	8.5803	85.8030	67.02	70.41	3.38	50.30	10:30
3	TOC	8.5446	85.4465	66.78	70.07	3.29	50.31	10:27
4	TOC	8.5009	85.0089	66.48	69.90	3.41	50.32	10:28

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
9	TOC	K1907144-002.02	8.8362 ppm	0.1188 ppm	1.3400%	2019/08/14 03:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.0122	90.1224	69.95	73.16	3.20	50.34	10:27
2	TOC	8.7923	87.9229	68.46	71.73	3.27	50.36	10:26
3	TOC	8.7519	87.5193	68.19	71.59	3.41	50.36	10:25
4	TOC	8.7882	87.8817	68.43	71.67	3.23	50.37	10:28

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** 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 )	23.9417 ppm (PASS)	0.0000 ppm	0%	2019/08/14 04:17

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.9417	239.4165	171.98	175.31	3.34	50.37	10:33

**Completion State** Success - Criteria met.      **Success Action** Do Nothing      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)      **STD Conc - Pos B** 50 ppmC

**Sample Type:** Check Standard --> CCB From Schedule Version 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 )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/14 04:32

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.18	9.59	3.41	50.40	10:34

**Completion State** Success - Criteria met.      **Success Action** Do Nothing      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)      **STD Conc - Pos D** 0 ppmC

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
10	TOC	K1907284-001.02	7.6325 ppm	0.0339 ppm	0.4400%	2019/08/14 04:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.6657	76.6574	60.81	64.15	3.34	50.41	10:30
2	TOC	7.5933	75.9325	60.32	63.57	3.25	50.41	10:28
3	TOC	7.6553	76.5528	60.74	64.09	3.35	50.41	10:28
4	TOC	7.6158	76.1579	60.48	63.70	3.23	50.44	10:30

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
11	TOC	K1907284-002.02	4.6789 ppm	0.0442 ppm	0.9400%	2019/08/14 05:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.7408	47.4084	40.96	44.32	3.36	50.47	10:26
2	TOC	4.6799	46.7985	40.55	43.86	3.32	50.47	10:28
3	TOC	4.6432	46.4317	40.30	43.59	3.29	50.47	10:28
4	TOC	4.6517	46.5171	40.36	43.62	3.26	50.47	10:27

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
12	TOC	K1907284-003.02	3.9965 ppm	0.0249 ppm	0.6200%	2019/08/14 06:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.0073	40.0734	35.98	39.25	3.27	50.50	10:26
2	TOC	3.9945	39.9452	35.89	39.10	3.20	50.50	10:27
3	TOC	3.9630	39.6299	35.68	38.96	3.28	50.51	10:30
4	TOC	4.0213	40.2133	36.08	39.45	3.37	50.53	10:25

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
13	TOC	K1907284-004.02 8x	4.6472 ppm	0.0317 ppm	0.6800%	2019/08/14 07:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.6367	46.3669	40.25	43.82	3.56	50.54	10:31
2	TOC	4.6205	46.2048	40.14	43.27	3.13	50.52	10:29
3	TOC	4.6385	46.3846	40.26	43.66	3.39	50.56	10:28
4	TOC	4.6933	46.9326	40.64	43.97	3.33	50.59	10:25

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

1:10 (TC) 8.7794 (IC) CAS\_salt\_010711 CAS\_salt\_010711  
(v1284) (v4) (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
14	TOC	K1907284-005.02 8x	4.5431 ppm	0.0182 ppm	0.4000%	2019/08/14 08:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.5218	45.2178	39.47	42.87	3.40	50.49	10:26
2	TOC	4.5543	45.5434	39.69	42.85	3.15	50.53	10:30
3	TOC	4.5347	45.3474	39.56	42.84	3.28	50.46	10:29
4	TOC	4.5617	45.6170	39.74	42.94	3.19	50.42	10:30

Dilution 1:10 Blank Contribution (TC) 8.7794 (IC) (v1284) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
15	TOC	K1907166-001.01	0.3970 ppm	0.0144 ppm	3.6200%	2019/08/14 09:25

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4071	4.0713	11.54	14.63	3.08	50.42	10:27
2	TOC	0.3868	3.8680	11.40	14.59	3.19	50.38	10:24

Dilution 1:10 Blank Contribution (TC) 8.7794 (IC) (v1284) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
16	TOC	K1907166-001.01 ms	26.1465 ppm	0.0000 ppm	0.0000%	2019/08/14 09:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.1465	261.4645	186.26	189.49	3.23	50.36	10:31

Dilution 1:10 Blank Contribution (TC) 8.7794 (IC) (v1284) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/14 10:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.06	9.34	3.28	50.33	10:30
2	TOC	0.0000	0.0000	6.00	9.28	3.27	50.44	10:28

Dilution 1:10 Blank Contribution (TC) 8.7794 (IC) (v1284) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	K1907235-001.02	2.8002 ppm	0.4286 ppm	15.3000%	2019/08/14 10:36



Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.4972	24.9716	25.73	29.05	3.32	50.42	10:26
2	TOC	3.1032	31.0323	29.84	32.92	3.08	50.47	10:25
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 8.7794 (IC) (v1284)		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)			
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
19	TOC	K1907235-002.02	2.6271 ppm	0.0531 ppm	2.0200%	2019/08/14 11:04		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.6647	26.6466	26.87	30.24	3.37	50.43	10:27
2	TOC	2.5895	25.8953	26.36	29.84	3.48	50.48	10:31
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 8.7794 (IC) (v1284)		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)	23.8538 ppm (PASS)	0.0000 ppm	0%	2019/08/14 11:32	
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.8538	238.5385	171.38	174.75	3.37	50.63	10:30
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos B</u>				
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC				

**Sample Type:** Check Standard --> CCB From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/14 11:47	
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.28	9.55	3.28	50.66	10:34
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos D</u>				
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC				

**Sample Type:** Sample

From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/14 12:01

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.36	8.57	3.22	50.60	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7794 (IC) (v1284)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

**Sample Type:** Check Standard --> LCS

From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	24.2958 ppm (PASS)	0.0000 ppm	0%	2019/08/14 12:16

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.2958	242.9581	174.38	177.72	3.34	50.58	10:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos C
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	25 ppmC

**Sample Type:** Sample

From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
21	TOC	K1907235-003.02	0.8505 ppm	0.0078 ppm	0.9200%	2019/08/14 12:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8450	8.4496	14.52	18.00	3.48	50.57	10:27
2	TOC	0.8560	8.5601	14.59	17.75	3.16	50.56	10:31

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7794 (IC) (v1284)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
22	TOC	K1907235-004.02	0.9212 ppm	0.0028 ppm	0.3100%	2019/08/14 12:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9192	9.1921	15.02	18.27	3.25	50.53	10:30
2	TOC	0.9232	9.2319	15.05	18.37	3.32	50.51	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7794 (IC)	CAS_salt_010711	CAS_salt_010711

(v1284)

(v4)

(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
23	TOC	K1907274-001.01	0.5341 ppm	0.0350 ppm	6.5500%	2019/08/14 13:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5589	5.5887	12.57	15.79	3.21	50.46	10:30
2	TOC	0.5094	5.0937	12.24	15.70	3.46	50.49	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
24	TOC	K1907274-002.01	0.9374 ppm	0.0074 ppm	0.7900%	2019/08/14 13:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9322	9.3218	15.11	18.50	3.39	50.48	10:28
2	TOC	0.9426	9.4264	15.18	18.63	3.46	50.46	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
25	TOC	K1907274-003.01	0.9731 ppm	0.0490 ppm	5.0300%	2019/08/14 14:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9385	9.3851	15.15	18.53	3.38	50.47	10:27
2	TOC	1.0078	10.0775	15.62	18.89	3.27	50.51	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
26	TOC	K1907276-001.01	2.2153 ppm	0.0508 ppm	2.2900%	2019/08/14 14:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.2513	22.5128	24.06	27.33	3.27	50.45	10:28
2	TOC	2.1794	21.7939	23.57	26.80	3.23	50.41	10:32

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
27	TOC	K1907382-001.01	1.4974 ppm	0.0598 ppm	3.9900%	2019/08/14 15:19

Rep	Base	ppm	µg	Adjusted	NDIR (Abs)	Baseline	Pressure	Run
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#	Analysis Type			(Abs)		(Abs)	(psig)	Time
1	TOC	1.5397	15.3972	19.23	22.57	3.34	50.46	10:31
2	TOC	1.4552	14.5516	18.66	21.96	3.31	50.43	10:28

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
28	TOC	K1907383-001.01	0.3285 ppm	0.0576 ppm	17.5300%	2019/08/14 15:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2878	2.8780	10.73	14.10	3.37	50.46	10:30
2	TOC	0.3693	3.6927	11.29	14.55	3.27	50.42	10:26

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** 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)	23.6193 ppm (PASS)	0.0000 ppm	0%	2019/08/14 16:15

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.6193	236.1932	169.79	172.95	3.16	50.41	10:30

**Completion State** Success - Criteria met.      **Success Action** Do Nothing      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)      **STD Conc - Pos B** 50 ppmC

**Sample Type:** Check Standard --> CCB

From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/14 16:30

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.80	9.05	3.25	50.40	10:36

**Completion State** Success - Criteria met.      **Success Action** Do Nothing      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)      **STD Conc - Pos D** 0 ppmC

Sample Type: Sample

From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
29	TOC	K1907383-002.01	0.8131 ppm	0.0452 ppm	5.5600%	2019/08/14 16:45

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8451	8.4511	14.52	17.74	3.23	50.43	10:28
2	TOC	0.7812	7.8117	14.08	17.46	3.37	50.40	10:27

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
30	TOC	K1907383-003.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/14 17:13

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.08	11.47	3.40	50.41	10:25
2	TOC	0.0000	0.0000	7.94	11.42	3.48	50.41	10:24

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
31	TOC	K1907383-004.01	0.0307 ppm	0.0434 ppm	141.4200%	2019/08/14 17:41

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.43	11.84	3.41	50.45	10:28
2	TOC	0.0614	0.6137	9.20	12.28	3.08	50.43	10:24

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
32	TOC	T1901331-001.05 doc	1.6386 ppm	0.0198 ppm	1.2100%	2019/08/14 18:09

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.6246	16.2458	19.81	23.15	3.34	50.46	10:25
2	TOC	1.6526	16.5257	20.00	23.30	3.31	50.45	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
33	TOC	T1901331-001.05 ms doc 2x	21.7509 ppm	0.0000 ppm	0.0000%	2019/08/14 18:37

Rep	Base	ppm	µg	Adjusted	NDIR (Abs)	Baseline	Pressure	Run
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#	Analysis Type			(Abs)		(Abs)	(psig)	Time
1	TOC	21.7509	217.5086	156.42	159.77	3.34	50.43	10:30

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
34	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/14 18:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.76	9.15	3.39	50.38	10:34

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
35	TOC	T1901331-002.05 doc	2.1533 ppm	0.0367 ppm	1.7000%	2019/08/14 19:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.1792	21.7924	23.57	26.84	3.27	50.30	10:25
2	TOC	2.1274	21.2738	23.22	26.60	3.38	50.24	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
36	TOC	T1901331-003.05 doc	2.5274 ppm	0.0860 ppm	3.4000%	2019/08/14 19:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.4665	24.6652	25.52	28.98	3.46	50.18	10:29
2	TOC	2.5882	25.8820	26.35	29.65	3.30	50.16	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
37	TOC	T1901331-004.05 doc	0.5220 ppm	0.0236 ppm	4.5300%	2019/08/14 20:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5052	5.0524	12.21	15.40	3.19	50.13	10:32
2	TOC	0.5387	5.3868	12.44	15.51	3.07	50.13	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
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38	TOC	T1901331-005.05 doc	0.5488 ppm	0.0303 ppm	5.5200%	2019/08/14 20:30		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5273	5.2734	12.36	15.64	3.28	50.12	10:32
2	TOC	0.5702	5.7021	12.65	15.83	3.18	50.10	10:30
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>	<b>Calibration</b>			
1:10		(TC) 8.7794 (IC) (v1284)		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)	24.3640 ppm (PASS)	0.0000 ppm	0%	2019/08/14 20:59

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.3640	243.6402	174.84	178.13	3.29	50.11	10:33

<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos B</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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/14 21:13

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.70	9.11	3.41	50.11	10:31

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

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
39	TOC	MB3	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/14 21:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.97	8.33	3.36	50.10	10:32

<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>	<b>Calibration</b>			
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1:10 (TC) 8.7794 (IC) CAS\_salt\_010711 CAS\_salt\_010711  
(v1284) (v4) (v30)

**Sample Type:** Check Standard --> LCS

From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊ C	TOC	25.0000	1:1	[TOC] LCS [25.0 ppm]	0 / infinity (NA / NA)	25.0172 ppm (PASS)	0.0000 ppm	0%	2019/08/14 21:43

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	25.0172	250.1724	179.28	182.63	3.36	50.11	10:33

**Completion State** Success - Criteria met.  
**Success Action** Do Nothing  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)  
**STD Conc - Pos C** 25 ppmC

**Sample Type:** Sample

From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 40	TOC	T1901331-006.05 doc	0.5444 ppm	0.0344 ppm	6.3100%	2019/08/14 21:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5687	5.6874	12.64	16.22	3.58	50.17	10:27
2	TOC	0.5201	5.2012	12.31	15.65	3.34	50.17	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 41	TOC	T1901331-007.05 doc	2.8722 ppm	0.0204 ppm	0.7100%	2019/08/14 22:25

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.8578	28.5780	28.18	31.63	3.46	50.19	10:25
2	TOC	2.8867	28.8667	28.37	31.83	3.45	50.22	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 42	TOC	T1901331-008.05 doc	3.2852 ppm	0.0006 ppm	0.0200%	2019/08/14 22:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.2856	32.8561	31.08	34.41	3.32	50.24	10:29
2	TOC	3.2847	32.8473	31.08	34.33	3.25	50.25	10:27



**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
43	TOC	T1901331-009.05 doc	3.8142 ppm	0.0063 ppm	0.1600%	2019/08/14 23:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.8098	38.0978	34.64	37.97	3.33	50.26	10:24
2	TOC	3.8186	38.1862	34.70	37.89	3.19	50.27	10:25

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
44	TOC	T1901331-010.05 doc	0.5024 ppm	0.0078 ppm	1.5600%	2019/08/14 23:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4968	4.9685	12.15	15.45	3.29	50.27	10:26
2	TOC	0.5079	5.0789	12.23	15.63	3.40	50.29	10:27

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
45	TOC	T1901331-011.05 doc	0.6490 ppm	0.0176 ppm	2.7100%	2019/08/15 00:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6365	6.3651	13.10	16.55	3.45	50.32	10:27
2	TOC	0.6614	6.6140	13.27	16.55	3.28	50.32	10:29

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
46	TOC	T1901331-012.05 doc	1.1911 ppm	0.0676 ppm	5.6800%	2019/08/15 00:45

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.2389	12.3890	17.19	20.61	3.42	50.32	10:31
2	TOC	1.1433	11.4329	16.54	19.94	3.40	50.34	10:26

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
47	TOC	T1901331-013.05 doc	4.4992 ppm	0.0095 ppm	0.2100%	2019/08/15 01:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.5059	45.0587	39.36	42.76	3.40	50.37	10:26
2	TOC	4.4925	44.9246	39.27	42.64	3.37	50.37	10:24
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 8.7794 (IC) (v1284)		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)	23.6803 ppm (PASS)	0.0000 ppm	0%	2019/08/15 01:42	
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.6803	236.8031	170.20	173.51	3.30	50.39	10:32
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos B</u>				
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC				

**Sample Type:** Check Standard --> CCB From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/15 01:56	
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.42	8.69	3.27	50.40	10:29
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos D</u>				
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC				

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
♦ 48	TOC	T1901331-014.05 doc	4.6869 ppm	0.0233 ppm	0.5000%	2019/08/15 02:11		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.7034	47.0342	40.71	43.91	3.20	50.40	10:28
2	TOC	4.6704	46.7042	40.48	43.80	3.31	50.42	10:26
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			

1:10 (TC) 8.7794 (IC) CAS\_salt\_010711 CAS\_salt\_010711  
(v1284) (v4) (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
49	TOC	T1901331-015.05 doc	4.9758 ppm	0.0229 ppm	0.4600%	2019/08/15 02:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.9920	49.9202	42.66	45.94	3.27	50.43	10:28
2	TOC	4.9596	49.5961	42.44	45.69	3.24	50.45	10:26

Dilution 1:10 Blank Contribution (TC) 8.7794 (IC) (v1284) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
50	TOC	T1901331-016.05 doc	1.6777 ppm	0.1103 ppm	6.5800%	2019/08/15 03:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.7557	17.5570	20.70	23.96	3.26	50.44	10:29
2	TOC	1.5997	15.9968	19.64	23.19	3.55	50.45	10:27

Dilution 1:10 Blank Contribution (TC) 8.7794 (IC) (v1284) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
51	TOC	T1901331-017.05 doc	1.7142 ppm	0.0704 ppm	4.1100%	2019/08/15 03:35

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.7639	17.6395	20.75	24.05	3.29	50.46	10:27
2	TOC	1.6644	16.6436	20.08	23.29	3.21	50.48	10:32

Dilution 1:10 Blank Contribution (TC) 8.7794 (IC) (v1284) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
52	TOC	T1901331-018.05 doc	3.8977 ppm	0.0135 ppm	0.3500%	2019/08/15 04:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.9073	39.0731	35.30	38.62	3.32	50.49	10:25
2	TOC	3.8882	38.8815	35.17	38.59	3.41	50.49	10:27

Dilution 1:10 Blank Contribution (TC) 8.7794 (IC) (v1284) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
53	TOC	T1901331-019.05 doc	5.1501 ppm	0.0013 ppm	0.0200%	2019/08/15 04:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.1510	51.5098	43.74	47.17	3.42	50.51	10:26
2	TOC	5.1492	51.4921	43.73	47.21	3.47	50.50	10:24

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
54	TOC	T1901331-020.05 doc	5.1889 ppm	0.0324 ppm	0.6200%	2019/08/15 04:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2118	52.1183	44.16	47.36	3.20	50.53	10:31
2	TOC	5.1660	51.6601	43.85	47.11	3.26	50.53	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
55	TOC	T1901331-021.05 doc	5.1566 ppm	0.0479 ppm	0.9300%	2019/08/15 05:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.1905	51.9046	44.01	47.13	3.12	50.54	10:27
2	TOC	5.1227	51.2270	43.55	46.79	3.24	50.55	10:27

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
56	TOC	T1901331-021.05 ms doc	30.7948 ppm	0.0000 ppm	0.0000%	2019/08/15 05:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	30.7948	307.9484	217.81	221.21	3.39	50.58	10:31

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
57	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/15 06:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.07	9.27	3.20	50.55	10:33

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** 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)	23.2691 ppm (PASS)	0.0000 ppm	0%	2019/08/15 06:25

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.2691	232.6914	167.41	170.70	3.29	50.55	10:29

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos B</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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/15 06:40

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.14	8.39	3.25	50.59	10:32

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

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 58	TOC	MB4	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/15 06:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.38	7.65	3.27	50.57	10:31

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.7794 (IC) (v1284)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

**Sample Type:** Check Standard --> LCS From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ C	TOC	25.0000	1:1	[TOC] LCS [25.0 ppm]	0 / infinity (NA / NA)	24.5197 ppm (PASS)	0.0000 ppm	0%	2019/08/15 07:09

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.5197	245.1974	175.90	179.22	3.32	50.57	10:32

**Completion State** Success - Criteria met.  
**Success Action** Do Nothing  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)  
**STD Conc - Pos C** 25 ppmC

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
59	TOC	T1901331-022.05 doc	4.3889 ppm	0.0300 ppm	0.6800%	2019/08/15 07:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.4101	44.1011	38.71	42.04	3.33	50.56	10:27
2	TOC	4.3677	43.6768	38.43	41.65	3.22	50.58	10:27

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
60	TOC	T1901331-023.05 doc	5.0732 ppm	0.0017 ppm	0.0300%	2019/08/15 07:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.0744	50.7438	43.22	46.64	3.42	50.58	10:28
2	TOC	5.0720	50.7202	43.21	46.59	3.39	50.58	10:25

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
61	TOC	T1901331-024.05 doc	5.1299 ppm	0.0827 ppm	1.6100%	2019/08/15 08:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.1884	51.8840	44.00	47.25	3.25	50.53	10:30
2	TOC	5.0714	50.7143	43.20	46.65	3.44	50.53	10:30

**Dilution** 1:10  
**Blank Contribution** (TC) 8.7794 (IC) (v1284)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
62	TOC	T1901331-025.05 doc	5.1841 ppm	0.0073 ppm	0.1400%	2019/08/15 08:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.1790	51.7897	43.93	47.30	3.37	50.52	10:29
2	TOC	5.1893	51.8929	44.00	47.41	3.41	50.53	10:29

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
63	TOC	T1901331-026.05 doc	5.1189 ppm	0.0020 ppm	0.0400%	2019/08/15 09:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.1203	51.2034	43.54	46.84	3.31	50.55	10:25
2	TOC	5.1175	51.1754	43.52	46.68	3.16	50.52	10:27

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
64	TOC	T1901331-027.05 doc	5.1991 ppm	0.0193 ppm	0.3700%	2019/08/15 09:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.1855	51.8545	43.98	47.28	3.30	50.50	10:24
2	TOC	5.2127	52.1271	44.16	47.29	3.13	50.48	10:26

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
65	TOC	T1901331-028.05 doc	5.0031 ppm	0.0497 ppm	0.9900%	2019/08/15 10:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.0383	50.3828	42.98	46.46	3.48	50.46	10:27
2	TOC	4.9680	49.6801	42.50	45.88	3.38	50.45	10:25

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
66	TOC	T1901331-029.05 doc	5.1780 ppm	0.0605 ppm	1.1700%	2019/08/15 10:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2208	52.2081	44.22	47.44	3.22	50.41	10:29
2	TOC	5.1352	51.3522	43.64	46.85	3.21	50.41	10:27

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** 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)	23.4380 ppm (PASS)	0.0000 ppm	0%	2019/08/15 11:09

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.4380	234.3796	168.56	172.00	3.44	50.39	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 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/15 11:23

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.47	8.71	3.24	50.37	10:34

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

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 67	TOC	T1901331-030.05 doc	5.1021 ppm	0.0145 ppm	0.2800%	2019/08/15 11:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.0919	50.9191	43.34	46.63	3.28	50.36	10:31
2	TOC	5.1124	51.1238	43.48	46.75	3.27	50.34	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.7794 (IC) (v1284)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 68	TOC	T1901331-031.05 doc	4.5003 ppm	0.0581 ppm	1.2900%	2019/08/15 12:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.5414	45.4137	39.61	42.86	3.26	50.34	10:30
2	TOC	4.4592	44.5917	39.05	42.37	3.32	50.34	10:32

Dilution	Blank Contribution	Method	Calibration
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1:10 (TC) 8.7794 (IC) CAS\_salt\_010711 CAS\_salt\_010711  
(v1284) (v4) (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
69	TOC	T1901331-032.05 doc	5.1514 ppm	0.0389 ppm	0.7500%	2019/08/15 12:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.1239	51.2387	43.56	46.85	3.29	50.35	10:27
2	TOC	5.1788	51.7883	43.93	47.22	3.28	50.29	10:28

Dilution 1:10 Blank Contribution (TC) 8.7794 (IC) (v1284) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
70	TOC	T1901331-033.05 doc	5.1841 ppm	0.0515 ppm	0.9900%	2019/08/15 13:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2205	52.2052	44.22	47.42	3.21	50.33	10:29
2	TOC	5.1477	51.4774	43.72	47.01	3.29	50.29	10:25

Dilution 1:10 Blank Contribution (TC) 8.7794 (IC) (v1284) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
71	TOC	T1901331-034.05 doc	4.2682 ppm	0.0058 ppm	0.1400%	2019/08/15 13:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.2641	42.6411	37.72	40.96	3.24	50.33	10:29
2	TOC	4.2724	42.7236	37.78	41.14	3.36	50.33	10:31

Dilution 1:10 Blank Contribution (TC) 8.7794 (IC) (v1284) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
72	TOC	T1901331-035.05 doc	2.7757 ppm	0.0778 ppm	2.8000%	2019/08/15 13:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.8307	28.3069	27.99	31.31	3.32	50.30	10:28
2	TOC	2.7206	27.2064	27.25	30.49	3.25	50.32	10:27

Dilution 1:10 Blank Contribution (TC) 8.7794 (IC) (v1284) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
73	TOC	T1901331-036.05 doc	3.8678 ppm	0.0002 ppm	0.0100%	2019/08/15 14:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.8680	38.6797	35.04	38.23	3.19	50.37	10:27
2	TOC	3.8677	38.6768	35.03	38.37	3.34	50.32	10:28

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
74	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/15 14:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.17	8.44	3.27	50.34	10:29
2	TOC	0.0000	0.0000	6.35	9.64	3.29	50.37	10:29

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
75	TOC	Lot check 190516	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/15 15:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.71	8.03	3.32	50.36	10:28
2	TOC	0.0000	0.0000	4.58	8.12	3.54	50.34	10:25

**Dilution** 1:10      **Blank Contribution** (TC) 8.7794 (IC) (v1284)      **Method** CAS\_salt\_010711 (v4)      **Calibration** 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 )	23.4044 ppm (PASS)	0.0000 ppm	0%	2019/08/15 15:51

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.4044	234.0438	168.33	171.56	3.23	50.36	10:30

**Completion State** Success - Criteria met.      **Success Action** Do Nothing      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)      **STD Conc - Pos B** 50 ppmC

**Sample Type:** Check Standard --> CCB From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/15 16:06
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	5.19	8.61	3.42	50.37	10:31
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos D</b>		
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
v1283	2.0090	1.4730	0.0000	0.0000	0.0000	2019/08/08 17:50	Fusion1 (Fusion1)
v1284	1.3160	1.4350	0.0000	0.0000	0.0000	2019/08/13 19:38	Fusion1 (Fusion1)

#### Calibrations

##### Name: CAS\_salt\_010711 (TOC)

Version: v30  
 Calibration curve formula: TOC:  $y = 6.788x + 9.463$   
 Ver Creation: 2019/03/05 17:42  
 $r^2$  value: TOC:  $r^2 = 0.99963$   
 Comment:  
 Operator: Fusion1 (Fusion1)  
 Basic Analysis Type: TOC

##### Basic Analysis Type: TOC

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

#### Methods

Name: CAS\_salt\_010711 (TOC)

Version: v4 Operator: Fusion1 (Fusion1)  
 Ver Creation: 2019/02/21 17:57  
 Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	ICSpurgeRinseVolume	12.0 ml
UVReactorPrerinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPrerinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPrerinses	1	SyringeSpeedWaste	10
ICSpurgeTime	1.00 mins	SyringeSpeedAcid	7
DetectorSweepFlow	500 ml/min	SyringeSpeedReagent	7
PreSpurgeTime	2.00 mins	SyringeSpeedDIWater	7
SystemFlow	500 ml/min	NDIRPressurization	60 psig
		SyringeSpeedSampleDispense	5
		SyringeSpeedSampleAspirate	4
		SyringeSpeedUVDispense	5
		SyringeSpeedUVAspirate	5
		SyringeSpeedICDispense	5
		SyringeSpeedICAspirate	5
		NDIRPressureStabilize	1.75 min
		SampleMixing	Off
		SampleMixingCycles	1
		SampleMixingVolume	10.0
		LowLevelFilterNDIR	Off

### Acceptance / Approval

#### Electronic Signatures

Report Version	User Name	Acceptance	Reason	Date

### Report History

#### Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/08/15 16:24



## Case Narrative

**Method:** 6850  
**Analysis:** Perchlorate  
**Analysis SOP:** LC-MS-CLO4  
**ALS WO ID(s):** 1922027; 1922715; 1923027

**Client:** ALS Laboratories (Houston, TX)  
**Matrix:** Water  
**ELMS Batch (HBN):** 2281 (245600)

**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  $^{18}\text{O}$  labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in quantitation.

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

**Holding Times:** Holding times were met for all analyses.

**Dilutions:** NA

**Method QC data:** The method blank (LMB 668347) was less than 1/2 the CRDL. The recovery for the LCS (668348) was within acceptable parameters.





## ANALYTICAL REPORT

Report Date: August 14, 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: **34-1922715**

Project ID: HS19080284

Purchase Order: HS19080284

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_080619_BIX	1922715001	08/06/19	08/09/19	

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992

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## ANALYTICAL REPORT

Workorder: 34-1922715

Client: ALS Environmental  
(Houston)

Project Manager: Kevin W. Griffiths

## Analytical Results

Sample ID: <b>LH18/24-SP650_080619_BIX</b>	Sampling Site: NA	Collected: 08/06/2019				
Lab ID: 1922715001	Media: 125 mL Nalgene	Received: 08/09/2019				
Matrix: Water	Sampling Parameter: NA					
<b>Analysis Method - EPA 6850, DoD QSM</b>						
Preparation: Not Applicable	Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2281 (HBN: 245600) Analyzed: 08/14/2019 10:08	Instrument ID: LCMS04 Percent Solid: NA Report Basis: Wet				
<b>Analyte</b>	<b>Result (ug/L)</b>	<b>DL (ug/L)</b>	<b>LOD (ug/L)</b>	<b>LOQ (ug/L)</b>	<b>Dilution</b>	<b>Qual</b>
Perchlorate	ND	1.0	2.0	4.0	1	U

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

Method	Analyst	Peer Review
EPA 6850, DoD QSM	/S/ Thomas Bosch 08/14/2019 12:01	/S/ Stephen Brose 08/14/2019 14:07

## Laboratory Contact Information

ALS Environmental  
960 W Levoy Drive  
Salt Lake City, Utah 84123Phone: (801) 266-7700  
Email: als@alst.com  
Web: www.alst.com





## ANALYTICAL REPORT

Workorder: 34-1922715

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

**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

00951026

## Analysis Information

**Workorder:** 1922715

**Limits:** Client SOW/Contract Specified  
**Basis:** DoD QSM

**Preparation:** NA  
**Batch:** NA  
**Prepared By:** NA

**Analysis:** EPA 6850, DoD QSM  
**Batch:** ELMS/2281 (HBN: 245600)  
**Analyzed By:** Thomas Bosch

## Blank

<b>LMB:</b> 668347 <b>Analyzed:</b> 08/14/2019 09:11 <b>Units:</b> ug/L			
Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

## Laboratory Control Sample

<b>LCS:</b> 668348 <b>Analyzed:</b> 08/14/2019 08:43 <b>Dilution:</b> 1 <b>Units:</b> ug/L				
Analyte	Result	Target	% Rec	QC Limits
Perchlorate	4.00	4.00	100	78.8   123.8

## Matrix Spike - Matrix Spike Duplicate

<b>Sample:</b> 1922027001 <b>Analyzed:</b> 08/14/2019 09:25 <b>Dilution:</b> 1 <b>Units:</b> ug/L		<b>MS:</b> 668349 <b>Analyzed:</b> 08/14/2019 09:39 <b>Dilution:</b> 1 <b>Units:</b> ug/L				<b>MSD:</b> 668350 <b>Analyzed:</b> 08/14/2019 09:54 <b>Dilution:</b> 1 <b>Units:</b> ug/L			
Analyte	Result	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Perchlorate	ND	3.69	4	92.2	78.8   123.8	3.63	90.7	1.61	0.0   20.0

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

Analyst	Peer Review
/S/ Thomas Bosch 08/14/2019 12:06	/S/ Stephen Brose 08/14/2019 14:07

## Symbols and Definitions

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

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



**ALS Environmental**  
**CHAIN-OF-CUSTODY**

Project / Job / Task: HS19080284		Split:		Workorder ID: 1922715		Level: ENV_LVL4		Requested Analysis	
Client: ALS Environmental (Houston)		Account: 8101		Type: 125Poly		Preservatives		EP A 8850, DxD QSM	
Comments:									
Item	Collect Date/Time	Sample ID	Lab ID	QC	Matrix	ID(s)	Containers	Count	
1	08/06/2019 14:00	LH18/24-SP650_080619_BIX	1922715001		Water	A		1	A
2									
3									
4									
5									
6									
7									
8									
9									
10									

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY					SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY				
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location	Sample Prep / Analysis for: Prepared / Analyzed by:	Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Reason for Transfer / Storage Location	Lab Notebook No.:
Wraith, Julie	08/09/2019 09:28	ALS Sample Receiving	Sample Login						
<i>Julie Wraith</i>	<i>8/19/19 15:00</i>	<i>14B</i>	<i>storage</i>						
<i>R.33-1</i>	<i>8/13/19 14:00</i>	<i>T. Bush</i>	<i>closet analysis</i>						



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### Subcontract Chain of Custody

18698/#2

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11929

**SUBCONTRACT TO:**

1922715

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:** HS19080284  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1.	HS19080284-02	LH18/24-SP650_080619_BIX Water	06 Aug 2019 14:00
	SUB_Perch-6850		21 Aug 2019

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

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

Relinquished By: \_\_\_\_\_  
Received By: *[Signature]*  
Cooler ID(s): \_\_\_\_\_

Date/Time: 8/8/19 1800  
Date/Time: 08-09-19 9:18  
Temperature(s): \_\_\_\_\_

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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: ALS Houston Project/Task/Site: 1922715  
 Date/Time of Receipt: 08-09-19 Number of Coolers Received: 1

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

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

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 <u>9819</u>	<u>5</u> °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By: [Signature] T. Santasepp 08-09-19  
Signature Printed Name Date

CLIENT-RELATED INFORMATION

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

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? Yes  No

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: \_\_\_\_\_ Returned to Sample Receipt by: \_\_\_\_\_ Date: \_\_\_\_\_  
Printed Name Signature

Must Deliver Next Business Day  
Time and Temperature Sensitive



Part # 159459-432 RIT2 EXP 02/20

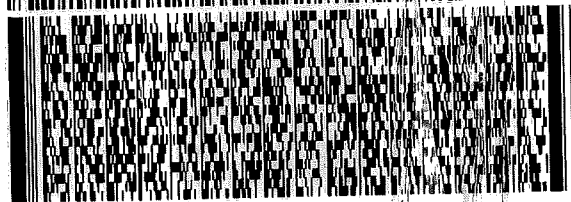
ORIGIN ID:SGRA (281) 530-5656  
CLIENT SERVICES  
ALS LABORATORY GROUP  
10450 STANCLIFF ROAD  
SUITE 210  
HOUSTON, TX 77099  
UNITED STATES US

SHIP DATE: 08AUG19  
ACTWT: 8.95 LB  
CAD: 300130/CAFE3211  
DIMS: 14x11x10 IN  
BILL THIRD PARTY

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

**SALT LAKE CITY UT 84123**

(801) 286-7700  
REF: HS19080284 - RJ



**FedEx**  
Express

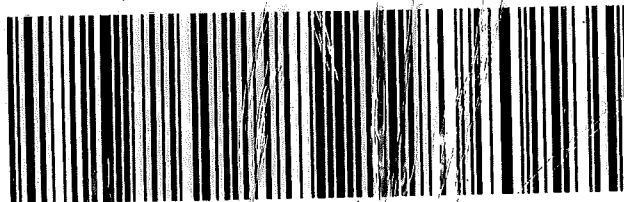


TRK# 4809 7836 6220  
0201

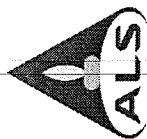
**FRI - 09 AUG 3:00P**  
**STANDARD OVERNIGHT**

**AX BTFA**

**84123**  
**UT-US SLC**



# Batch Worklist



Batch: ELMS/ 2281

Rule: EPA 6850, DoD QSM Water

Created: 8/14/2019 07.41  
Analyst: T. Bosch

Instrument: LCMS04  
Status: WP

HBN: 245600



Workorder: 1922027 [ENV\_LVL4]  
Workorder: 1922715 [ENV\_LVL4]  
Workorder: 1923027 [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	668344	CCV for HBN 245600 [ELMS/2281]				CCV	3		E685041C3Q	5311	8/14/2019	8/14/2019	8/14/2019
2	668348	LCS for HBN 245600 [ELMS/2281]				LCS	3		E6850Q413Q	5311	8/14/2019	8/14/2019	8/14/2019
3	668346	ICS for HBN 245600 [ELMS/2281]				ICS	3		E6850.D3Q	5311	8/14/2019	8/14/2019	8/14/2019
4	668347	LMB for HBN 245600 [ELMS/2281]				LMB	3		E6850Q413Q	5311	8/14/2019	8/14/2019	8/14/2019
5	1922027001	LH18/24-SP650_073019_BIX				SAMPLE	3	1922027001-A	E6850Q41.3	5480	8/27/2019	8/14/2019	8/14/2019
6	668349	LH18/24-SP650...(1922027001MS)				MS	3		E6850Q413Q	5311	8/14/2019	8/14/2019	8/14/2019
7	668350	LH18/24-SP65...(1922027001MSD)				MSD	3		E6850Q413Q	5311	8/14/2019	8/14/2019	8/14/2019
8	1922715001	LH18/24-SP650_080619_BIX				SAMPLE	3	1922715001-A	E6850Q41.3	5480	9/3/2019	8/22/2019	8/14/2019
9	1923027001	18WW19_080819				SAMPLE	3	1923027001-A	E6850Q41.3	5480	9/5/2019	8/26/2019	8/14/2019
10	1923027002	18WW20_080819				SAMPLE	3	1923027002-A	E6850Q41.3	5480	9/5/2019	8/26/2019	8/14/2019
11	668345	RLVS for HBN 245600 [ELMS/2281]				RLVS	3		E685041C3Q	5311	8/14/2019	8/14/2019	8/14/2019
12	668351	CCV for HBN 245600 [ELMS/2281]				CCV	3		E685041C3Q	5311	8/14/2019	8/14/2019	8/14/2019

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**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

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# **Analytical Documentation**



Analyst Write-up

ALS Work Order #'s &amp; Sample #( )'s: 1922027 (001); 1922715 (001); 1923027 (001)

ELMS Batch/HBN ID: 2281 (245600)

Prep Date: 08/13/2019 Analysis Date: 08/14/2019 Analyst: T. Bosch

Analyte: **Perchlorate** Matrix: **Water** Method: **6850**

Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\AUG\14AUG19D.s

Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**SAMPLE PREPARATION/ANALYSIS:

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

**REAGENTS:** Eluent A1: 95% ASTM Type II water (ALS)/ 5% ACN (B&J Lot AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).  
Eluent B1: 95% ACN (B&J Lot AH015-4)/ 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

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

**CALIBRATION CURVE:** Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.M

**INSTRUMENT CONDITIONS:** Samples were analyzed with an Agilent 1100 LC/MSD system, in negative SIM mode, monitoring m/z 83, 85, and 89.

Instrument ID: LCMS04 Online Acquisition Method: CLO4-AQN.M Fragmentor: 160 Output Gain: 10 Injection Volume: 50µL  
Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

FLOW GRADIENT:

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

**QC DATA:** 4.0µL of QC Solution Horizon ID 47516 was used for LCS 668348; Target = 4.0µg/L. ASTM type II water was used for LMB 668347.

**MS/MSD:** The Matrix Spike and duplicate (MS/MSD) were performed on sample 1922027001 (Client ID: LH18/24-SP650\_073019\_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: \\ALS\TWS013\LCMS\LCMS04\2019\AUG\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\als\TWS013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\245600-DoD-ALS-Hstn LCMS4 or through \\ALS\TWS013\DATA\VIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 668345) is reported from the analysis of the Laboratory Control Sample (LCS – 668348) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03) along with datafiles 14AUG05-08.

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

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

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
<u>Batch(es)/SDG: ELMS: 2281 HBN: 245600</u>		
<u>Sample Set IDs if Applicable: 1922027/1922715/1923027</u>		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SB
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR#</u>	—	—
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB



## STANDARD REPORT

## Working Standard - CLO4 WRK

CLO4 WRK		Description - 6850.WKG Std:100.ug/L			
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	0.1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

<b>CLO4 STOCK</b>		Description - 6850 Stock AccStd 1,000ug/mL	
Standard: 43659	Created By: Thomas Bosch	Amount: 100 mL	
MFG: AccuStandard	Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020	
MFG Lot: 218065075		Usable: No	
Part ID: IC-PER-10X-1		Lab Lot: CLO4 STOCK	
Pos	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 INT

CLO4 INT			Description - 6850 Intermdt AccStd 10.ug/mL		
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



## STANDARD REPORT

## Working Standard - CLO4 QC WRK

CLO4 QC WRK		Description - 6850 QC WKG STD 100ug/L			
Standard: 47516		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC WRK 100.ug/L	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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





## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL	
Standard: 36748	Created By: Thomas Bosch	Amount: 100 mL	
MFG: Ultra Scientific	Create Date: 05/11/2017 01:05PM	Expires: 03/31/2020	
MFG Lot: CP-0860		Usable: Yes	
Part ID: ICC-013		Lab Lot: CLO4 QC STOCK	
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 QC INT

CLO4 QC INT		Description - 6850 QC Intrmdt Std-QC 10ug/mL			
Standard: 47515		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC INT 10.ug/mL	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020



## STANDARD REPORT

## Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		Verified By: Thomas Bosch		Usable: Yes	
Pipette ID: Not Provided		Verify Date:		Lab Lot: CLO4ISTDWRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L		
2	14797-73-0-89	Perchlorate 89	1000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



## STANDARD REPORT

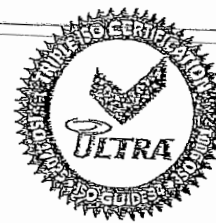
## Constituent

## Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK		Description - Perchlorate ISTD Stock	
Standard: 43729	Created By: Thomas Bosch	Amount: 1 mL	
MFG: Cambridge Isotope	Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026	
MFG Lot: SDFF-012A	Verified By: Thomas Bosch	Usable: Yes	
Part ID: OLM-7310-S	Verify Date:	Lab Lot: CLO4ISTDSTK	
Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL



## Certificate of Analysis



### ISO Guide 34 Reference Material

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

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

Product Name: Perchlorate IC Standard

#### Description:

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

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

Solvent: water (low TOC, <50 ppb)

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

#### Traceability:

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

#### Estimation of Uncertainties:

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

#### Homogeneity:

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

#### Intended Use:

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

#### Instructions for Use:

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

#### Hazards:

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

#### Expiration of Certification:

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





# Certificate of Analysis



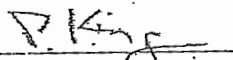
## ISO Guide 34 Reference Material

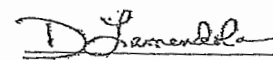
Product Number: ICC-013  
Lot Number: CP-0860

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

### Maintenance of Certification:

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

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

  
Daniel J. Lamendola  
Director of QMRA



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<sub>4</sub>)  
SRM: Ind. Std.  
Lot: 218065075  
Matrix: Water  
Hazards: Refer to SDS for complete safety information

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



Signal Word: None

Component	SRM #	Prepared Concentration (µg/mL)
ClO <sub>4</sub> Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is ±0.24%.

The final solution was checked against an independent standard to verify its concentration.

We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.

All solutions are filtered through a 0.2 µm filter prior to being bottled.

All glassware used in preparation is Class A and calibrated regularly.

All weights are traceable through NIST Test No. 822-275872-11

All bottles are triple rinsed with deionized water prior to use.

Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.

We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By:

*Meigan O'Leary*

Meigan O'Leary, Inorganic QC Manager



Cambridge Isotope Laboratories, Inc.

## Certificate of Analysis

Quality Standards:  
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

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

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

## Product Information

Chemical Purity Specification:  $\geq 98\%$

Labeled CAS Number: NA

Unlabeled CAS Number: 7601-89-0

MW\*: 130.4

Chemical Formula:  $\text{NaCl}^*\text{O}_4$

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

Stability: See storage and expiration date.

## Certification

Cambridge Isotope Laboratories, Inc. guarantees that this material meets or exceeds the specifications stated. Absolute identity as well as chemical and isotopic purities are assured by the use of unambiguous synthetic routes and multiple chemical analyses whenever possible. Results are representative of QC testing at time of release from Quality Control unless otherwise stated.

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

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

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

Approved by: T. J. Eckersley

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

## Quality Control Tests and Results

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





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**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

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# Raw Data

## Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

['#' ==&gt; Run has not been reprocessed with Batch Review Method

['\*' ==&gt; Run has been saved with batch file]

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount	
*	668344	CCV@25	Vial 71	1	Control	1	1.41705e6	7.940	23.98275
*	668348	QC@4.0	Vial 72	1	Control	2	2.54232e5	7.968	4.00063
*	668346	ICS@4.0	Vial 73	1	Control	3	1.69006e5	7.781	3.16133
*	668347	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1922027001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	668349	220271S	Vial 76	1	Sample	6	1.85325e5	7.618	3.68787
*	668350	220271D	Vial 77	1	Sample	7	1.87103e5	7.610	3.62903
*	1922715001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1923027001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1923027002		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	668351	CCV@25	Vial 71	1	Control	11	1.38922e6	7.982	23.06424

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	668344	CCV@25	Vial 71	1	Control	1	4.43367e5	7.960	25.20664
*	668348	QC@4.0	Vial 72	1	Control	2	8.12716e4	7.989	4.15621
*	668346	ICS@4.0	Vial 73	1	Control	3	6.47272e4	7.805	3.88663
*	668347	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1922027001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	668349	220271S	Vial 76	1	Sample	6	6.51794e4	7.628	4.19725
*	668350	220271D	Vial 77	1	Sample	7	6.53175e4	7.615	4.09697
*	1922715001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1923027001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1923027002		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	668351	CCV@25	Vial 71	1	Control	11	4.40722e5	7.997	24.55800

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	668344	CCV@25	Vial 71	1	Control	1	1.80205e5	7.960	5.00000
*	668348	QC@4.0	Vial 72	1	Control	2	2.09396e5	7.994	5.00000
*	668346	ICS@4.0	Vial 73	1	Control	3	1.78427e5	7.807	5.00000
*	668347	LMB	Vial 74	1	Control	4	2.39409e5	8.172	5.00000
*	1922027001		Vial 75	1	Sample	5	1.62744e5	7.641	5.00000
*	668349	220271S	Vial 76	1	Sample	6	1.66279e5	7.631	5.00000
*	668350	220271D	Vial 77	1	Sample	7	1.70743e5	7.634	5.00000
*	1922715001		Vial 78	1	Sample	8	1.55455e5	7.625	5.00000
*	1923027001		Vial 79	1	Sample	9	2.03712e5	7.859	5.00000
*	1923027002		Vial 80	1	Sample	10	2.10021e5	7.856	5.00000
*	668351	CCV@25	Vial 71	1	Control	11	1.84112e5	7.983	5.00000

\*\*\* End of Report \*\*\*

## Sequence Table:

## Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	668344	CCV@25	CLO4-AQN 1	Ctrl Samp		
2	Vial 72	668348	QC@4.0	CLO4-AQN 1	Ctrl Samp		
3	Vial 73	668346	ICS@4.0	CLO4-AQN 1	Ctrl Samp		
4	Vial 74	668347	LMB	CLO4-AQN 1	Ctrl Samp		
5	Vial 75	1922027001		CLO4-AQN 1	Sample		
6	Vial 76	668349	220271S	CLO4-AQN 1	Sample		
7	Vial 77	668350	220271D	CLO4-AQN 1	Sample		
8	Vial 78	1922715001		CLO4-AQN 1	Sample		
9	Vial 79	1923027001		CLO4-AQN 1	Sample		
10	Vial 80	1923027002		CLO4-AQN 1	Sample		
11	Vial 71	668351	CCV@25	CLO4-AQN 1	Ctrl Samp		

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD01.D

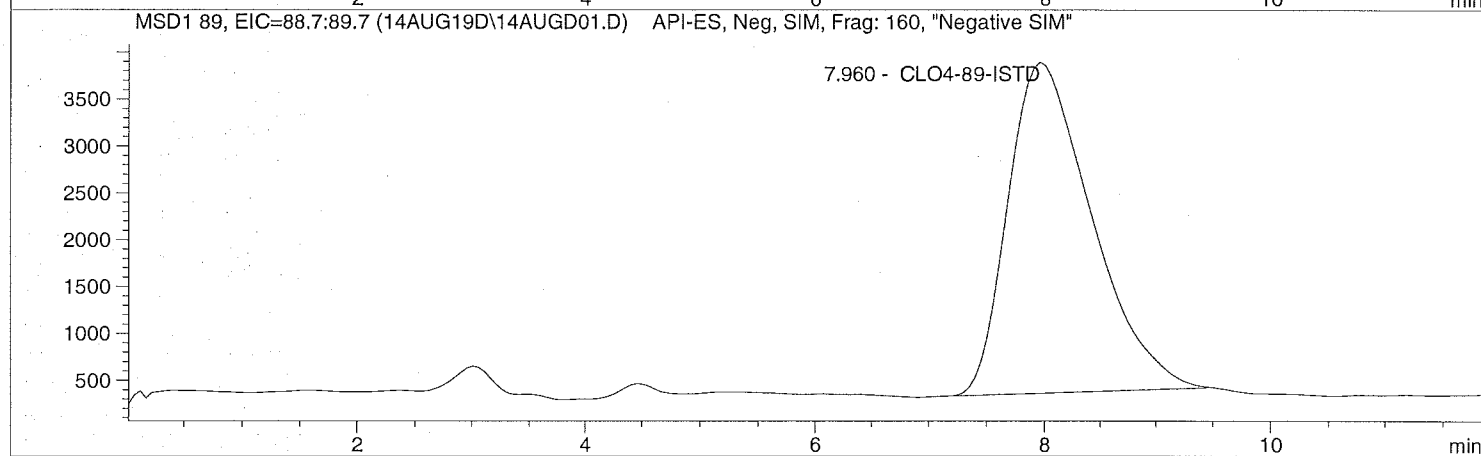
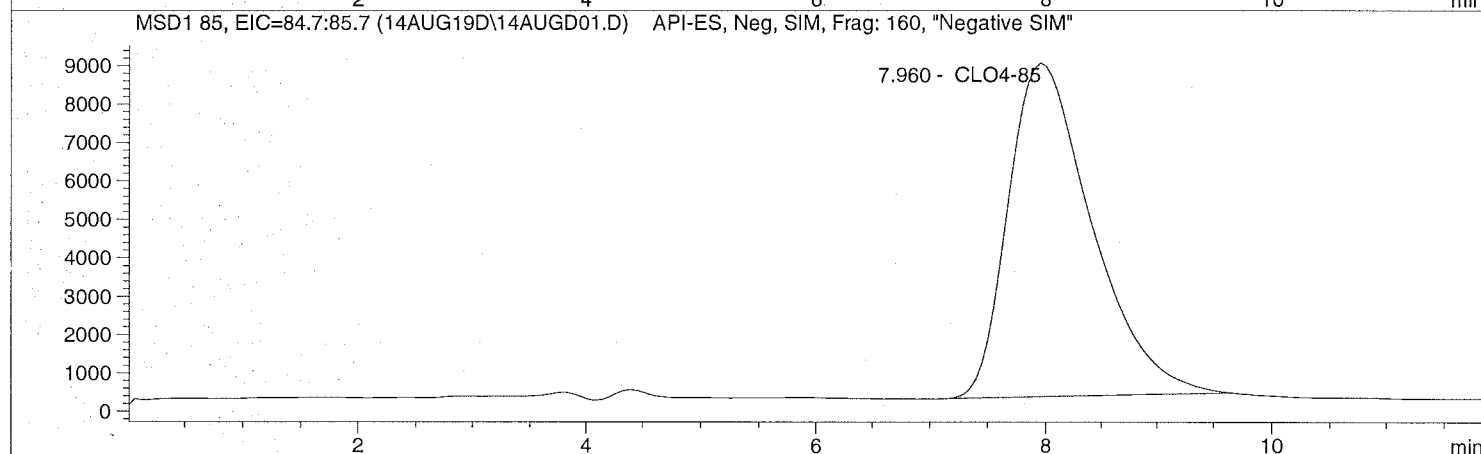
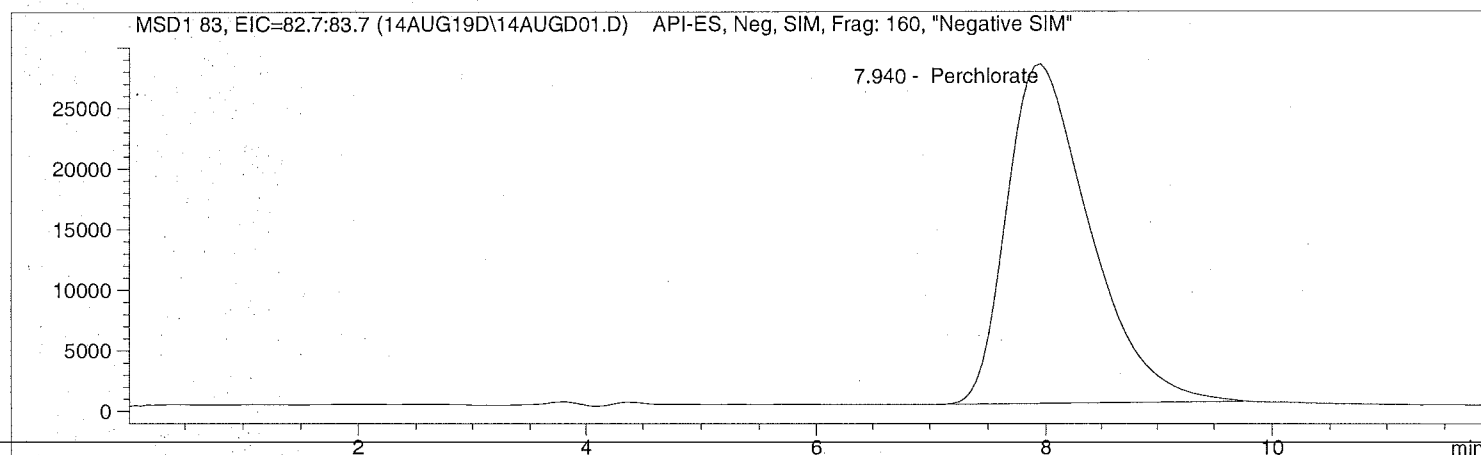
Sample Name: 668344 CCV@25

=====  
Injection Date: 8/14/2019 08:28:02  
Sample Name: 668344 CCV@25  
Acq Operator: TNB

Seq Line: 1  
Location: Vial 71  
Inj. No.: 1  
Inj. Vol.: 50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD01.D      Sample Name: 668344    CCV@25

```

=====
Injection Date: 8/14/2019 08:28:02      Seq Line: 1
Sample Name: 668344    CCV@25      Location: Vial 71
Acq Operator: TNB      Inj. No.: 1
                                         Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

Perchlorate analysis

Sample Information

```

=====
Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 25.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.940	PBA	1417055.0	23.9827	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.960	PBA	443367.1	25.2066	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.960	PBA	180205.1	5.0000	CLO4-89-ISTD

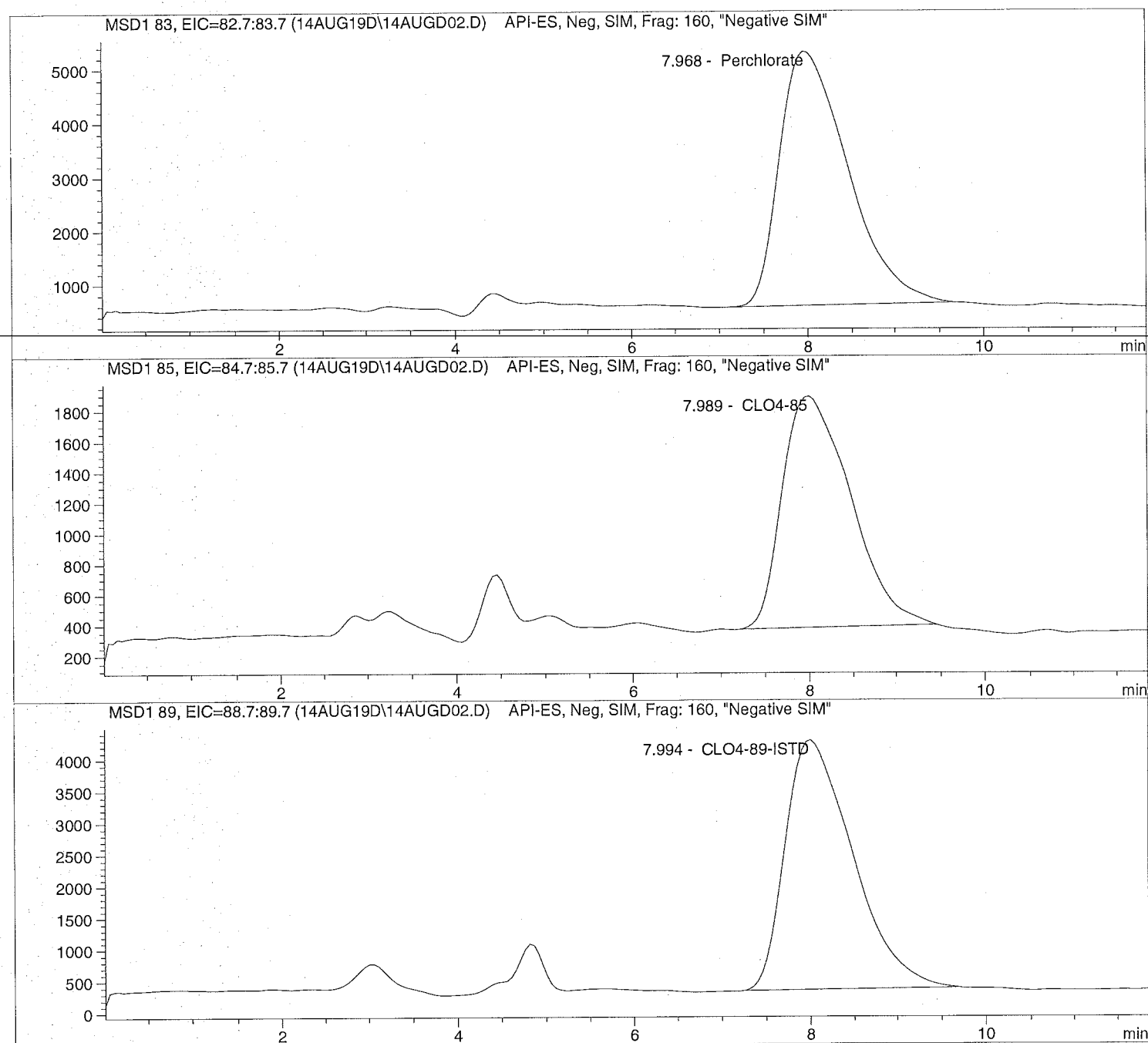
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD02.D Sample Name: 668348 QC@4.0

=====  
Injection Date: 8/14/2019 08:43:08 Seq Line: 2  
Sample Name: 668348 QC@4.0 Location: Vial 72  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD02.D Sample Name: 668348 QC@4.0

```

=====
Injection Date: 8/14/2019 08:43:08      Seq Line: 2
Sample Name: 668348 QC@4.0              Location: Vial 72
Acq Operator: TNB                        Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.968	PBA	254232.1	4.0006	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.989	PBA	81271.6	4.1562	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.994	PBA	209395.8	5.0000	CLO4-89-ISTD

```

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

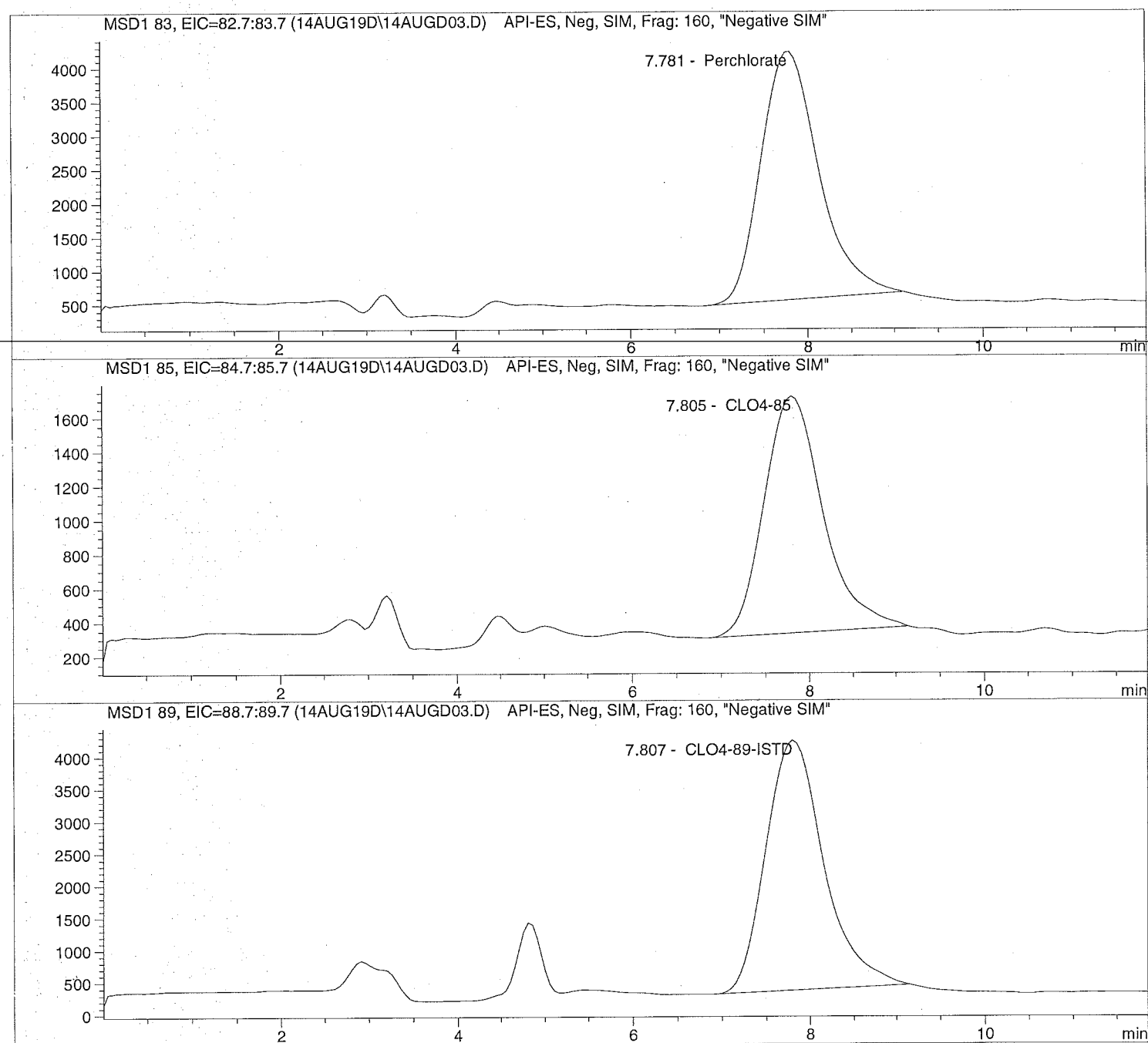
```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD03.D Sample Name: 668346 ICS@4.0

```
=====
Injection Date: 8/14/2019 08:57:20      Seq Line: 3
Sample Name: 668346 ICS@4.0             Location: Vial 73
Acq Operator: TNB                        Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13
```

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD03.D Sample Name: 668346 ICS@4.0

```

=====
Injection Date: 8/14/2019 08:57:20      Seq Line: 3
Sample Name: 668346 ICS@4.0           Location: Vial 73
Acq Operator: TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

Perchlorate analysis

Sample Information

```

=====
Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 4.000
=====

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.781	PBA	169005.6	3.1613	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.805	PBA	64727.2	3.8866	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.807	PBA	178426.7	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD04.D

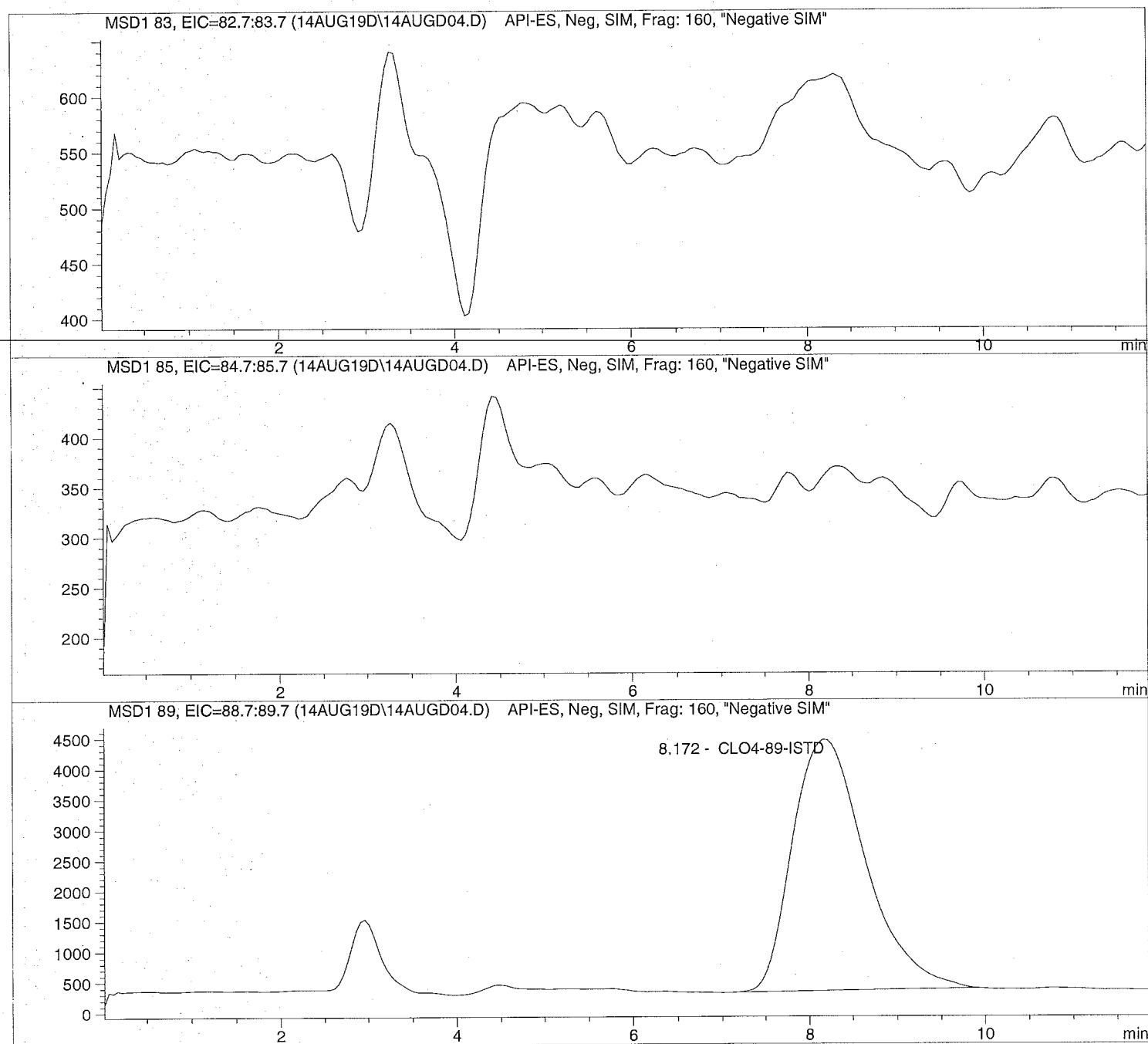
Sample Name: 668347 LMB

=====  
Injection Date: 8/14/2019 09:11:36  
Sample Name: 668347 LMB  
Acq Operator: TNB

Seq Line: 4  
Location: Vial 74  
Inj. No.: 1  
Inj. Vol.: 50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD04.D Sample Name: 668347 LMB

```

=====
Injection Date: 8/14/2019 09:11:36      Seq Line: 4
Sample Name: 668347 LMB                  Location: Vial 74
Acq Operator: TNB                        Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.172	PBA	239408.7	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD05.D

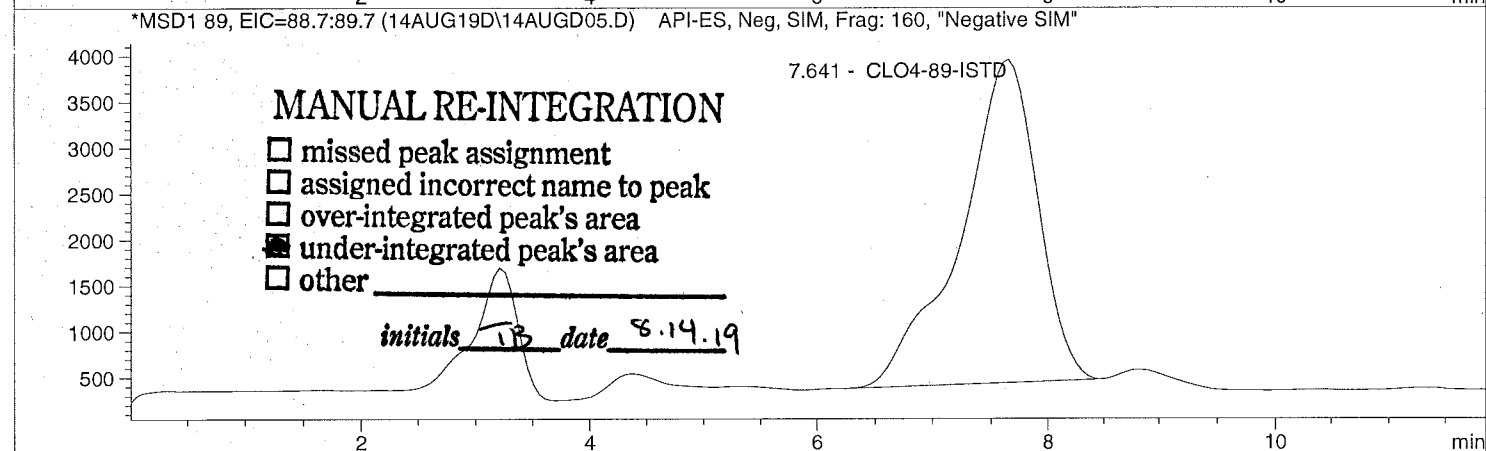
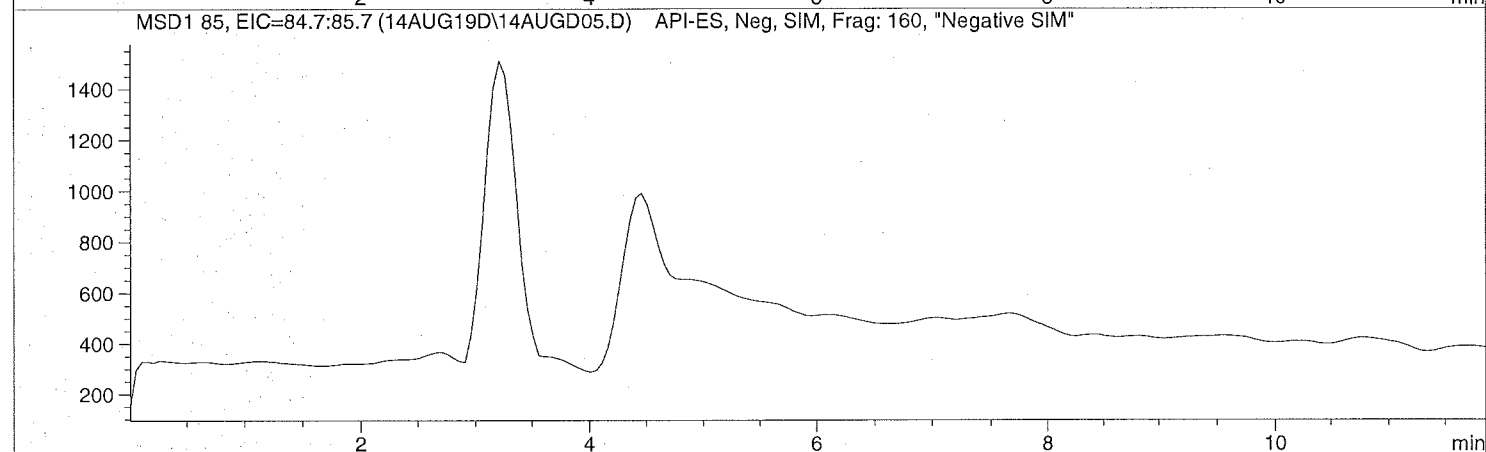
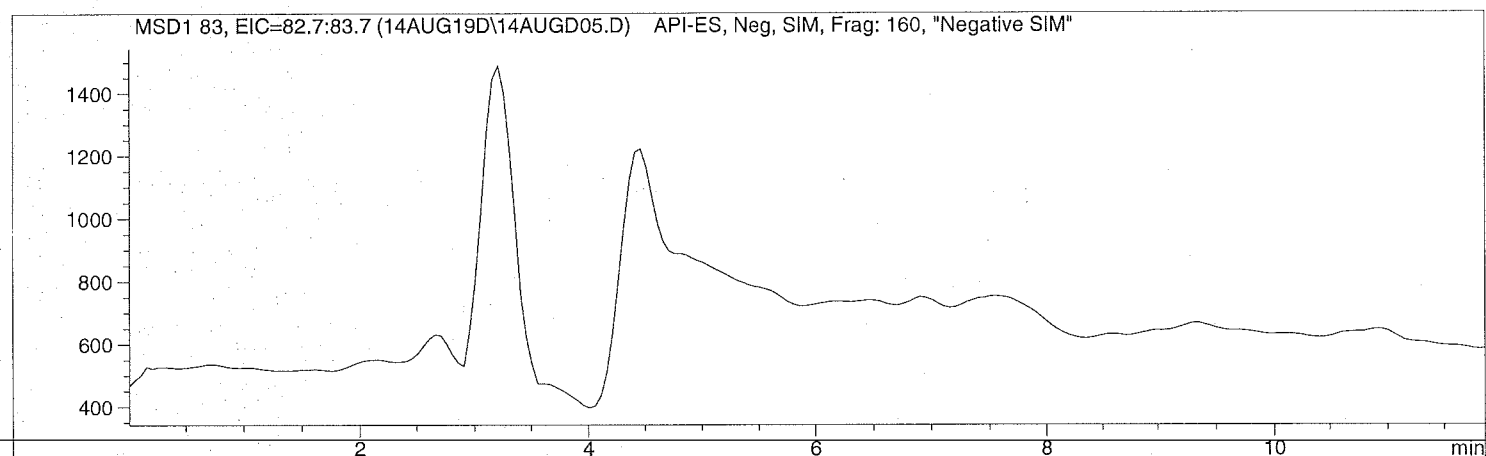
Sample Name: 1922027001

Injection Date: 8/14/2019 09:25:46  
 Sample Name: 1922027001  
 Acq Operator: TNB

Seq Line: 5  
 Location: Vial 75  
 Inj. No.: 1  
 Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD05.D Sample Name: 1922027001

```

=====
Injection Date: 8/14/2019 09:25:46      Seq Line: 5
Sample Name: 1922027001                Location: Vial 75
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.641	MM	162744.4	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD06.D

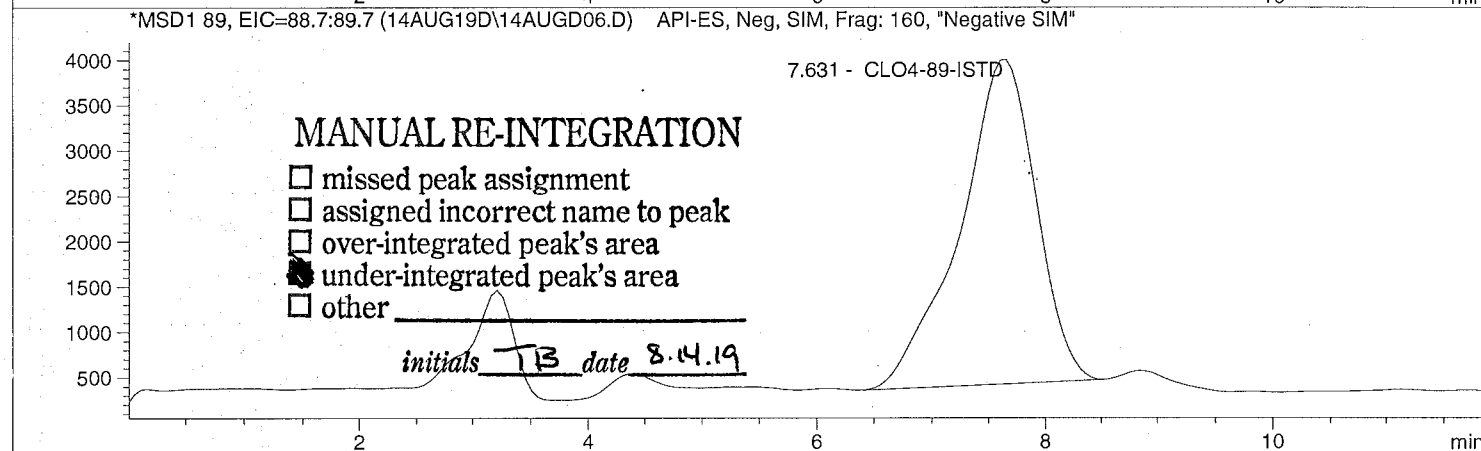
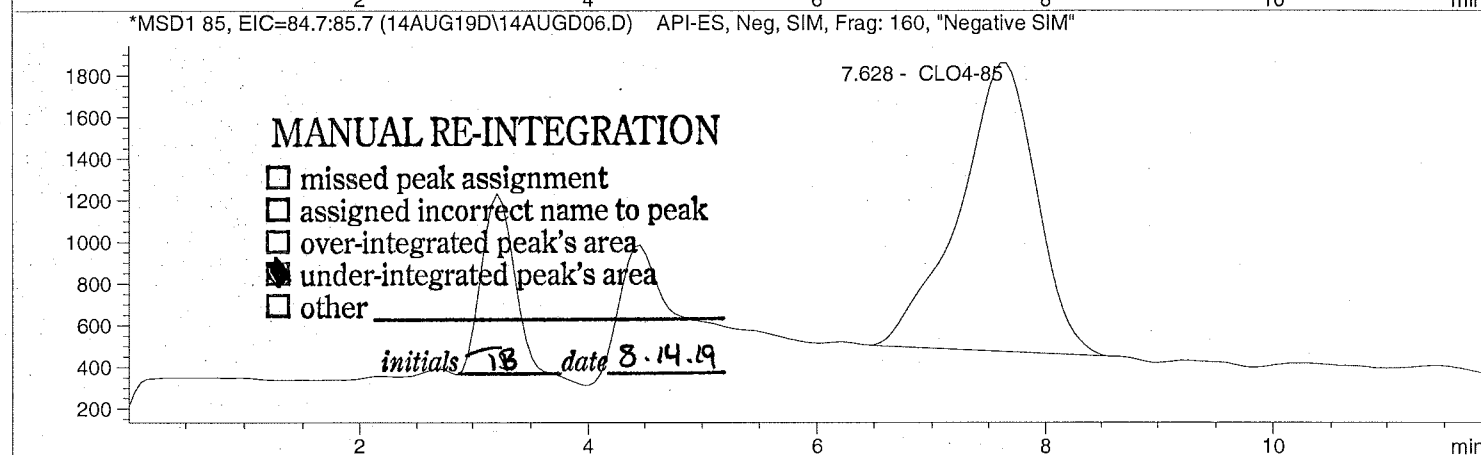
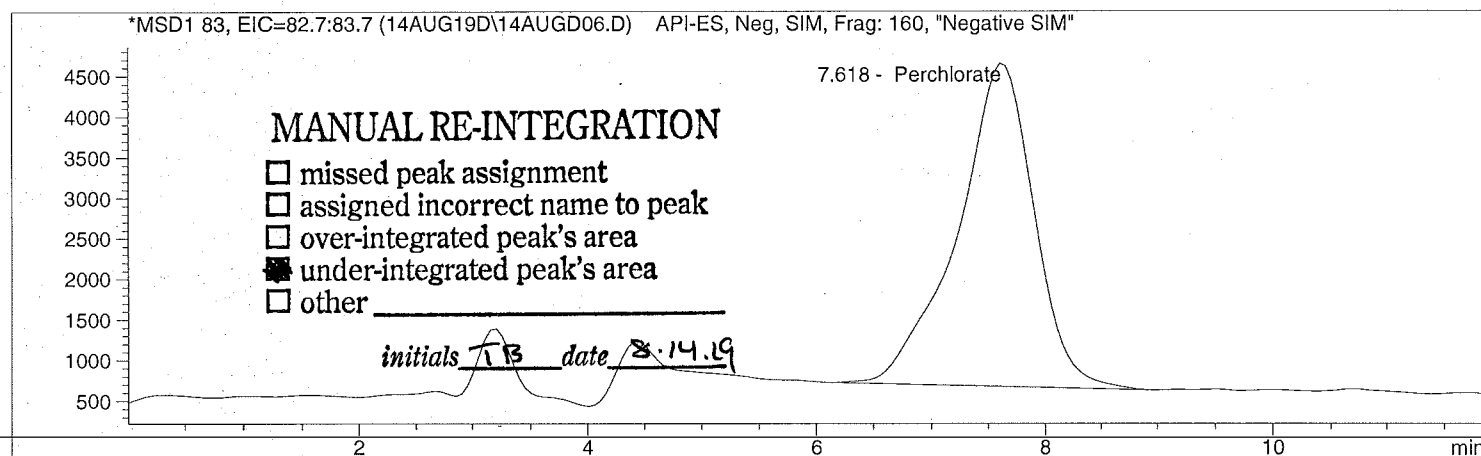
Sample Name: 668349 220271S

Injection Date: 8/14/2019 09:39:59  
Sample Name: 668349 220271S  
Acq Operator: TNB

Seq Line: 6  
Location: Vial 76  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD06.D Sample Name: 668349 220271S

=====  
 Injection Date: 8/14/2019 09:39:59 Seq Line: 6  
 Sample Name: 668349 220271S Location: Vial 76  
 Acq Operator: TNB Inj. No.: 1  
 Inj. Vol.: 50 µl  
 =====

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis

=====  
 Sample Information  
 =====

Sorted By: Signal  
 Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am  
 Multiplier: 1.000000  
 Dilution: 1.000000  
 Sample Amount: 0.000

=====  
 LCMS Results  
 =====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.618	MM	185324.7	3.6879	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.628	MM	65179.4	4.1973	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.631	MM	166279.3	5.0000	CLO4-89-ISTD

=====  
 \*\*\* End of Report \*\*\*  
 =====

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD07.D

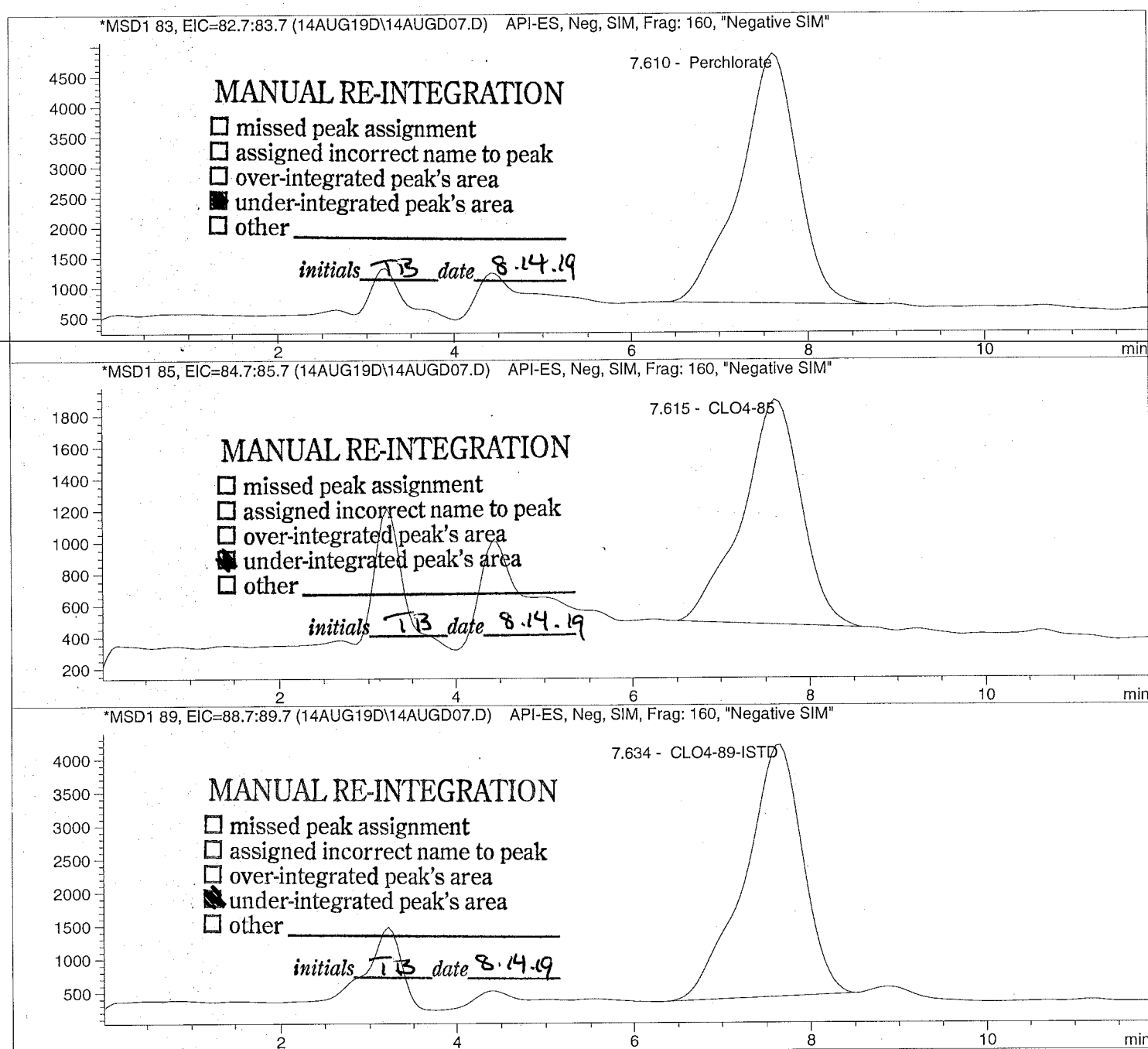
Sample Name: 668350 220271D

Injection Date: 8/14/2019 09:54:13  
 Sample Name: 668350 220271D  
 Acq Operator: TNB

Seq Line: 7  
 Location: Vial 77  
 Inj. No.: 1  
 Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD07.D Sample Name: 668350 220271D

```

=====
Injection Date: 8/14/2019 09:54:13      Seq Line: 7
Sample Name:    668350 220271D          Location:  Vial 77
Acq Operator:  TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.610	MM	187102.7	3.6290	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.615	MM	65317.5	4.0970	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.634	MM	170742.6	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD08.D

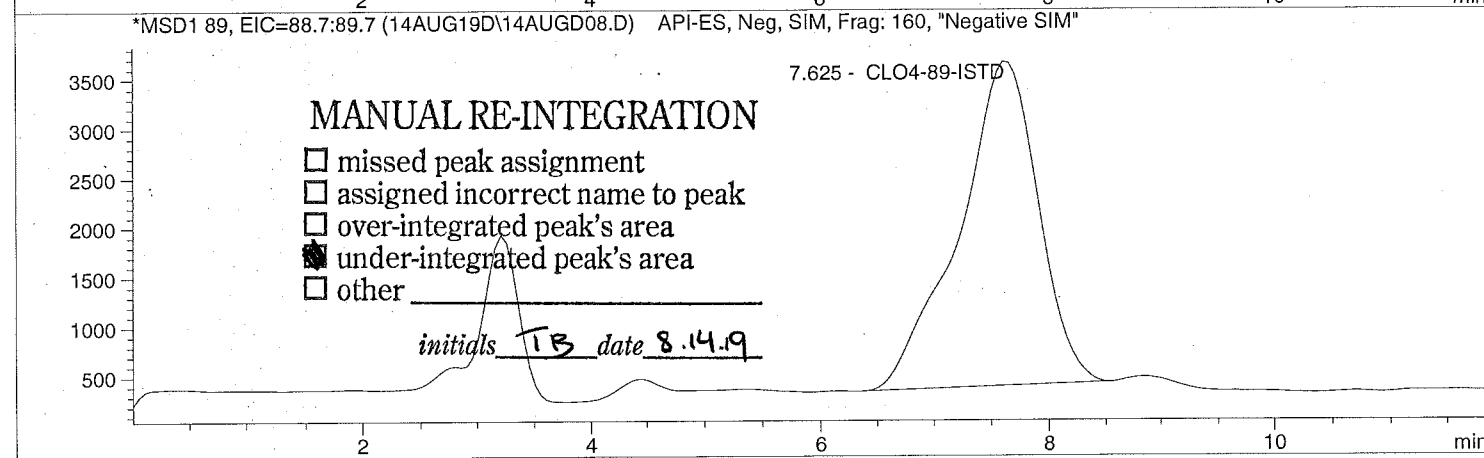
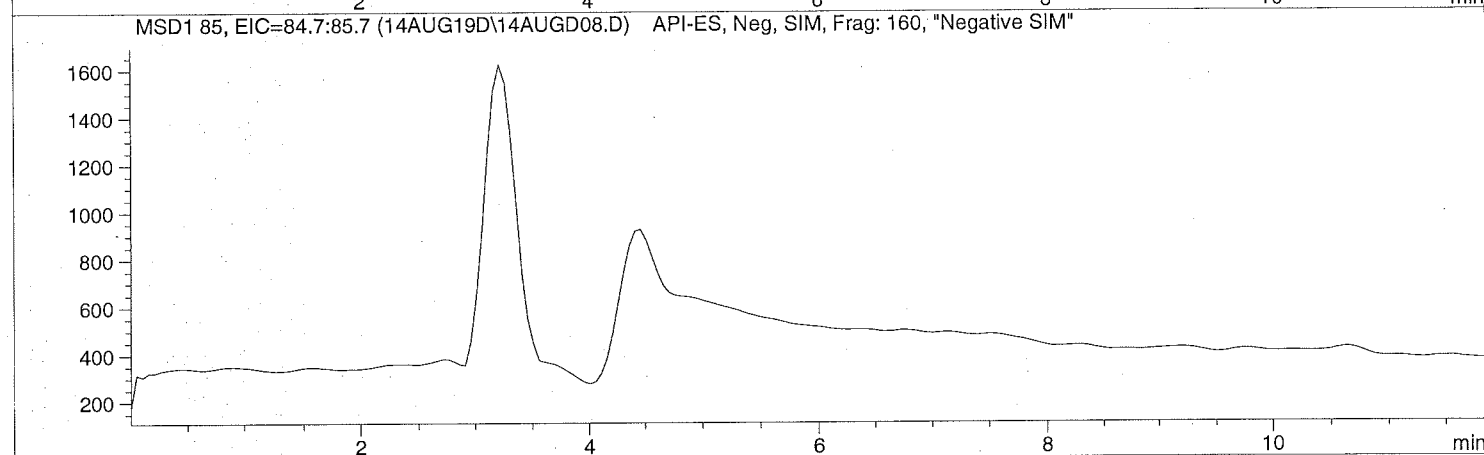
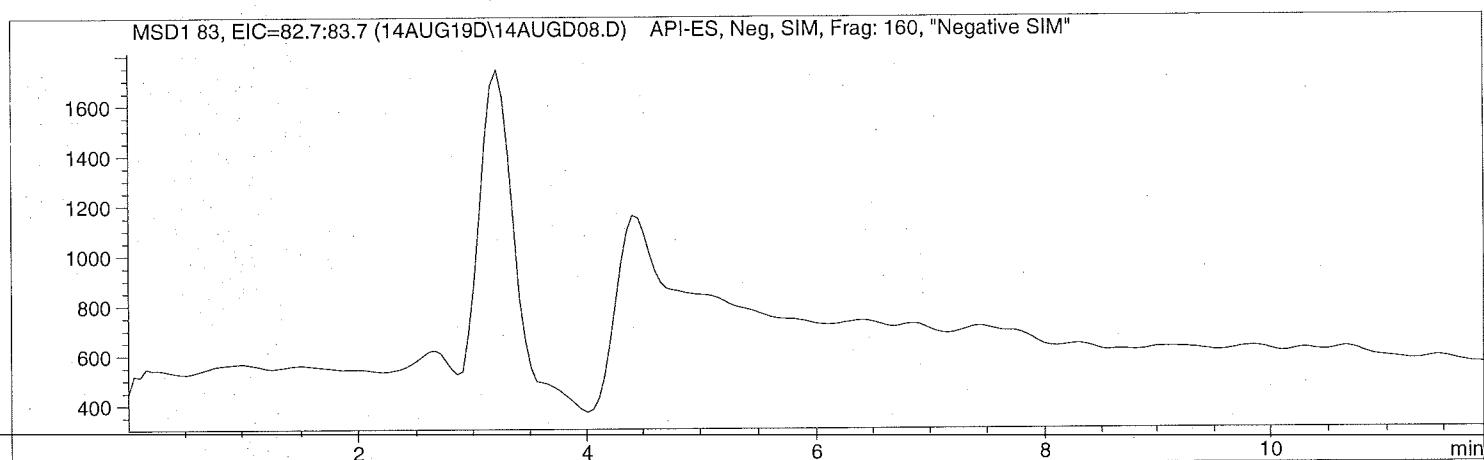
Sample Name: 1922715001

Injection Date: 8/14/2019 10:08:31  
 Sample Name: 1922715001  
 Acq Operator: TNB

Seq Line: 8  
 Location: Vial 78  
 Inj. No.: 1  
 Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD08.D Sample Name: 1922715001

```

=====
Injection Date: 8/14/2019 10:08:31      Seq Line:      8
Sample Name:   1922715001                Location:      Vial 78
Acq Operator:  TNB                       Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:    1.000000
Dilution:      1.000000
Sample Amount: 0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.625	MM	155455.2	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD09.D

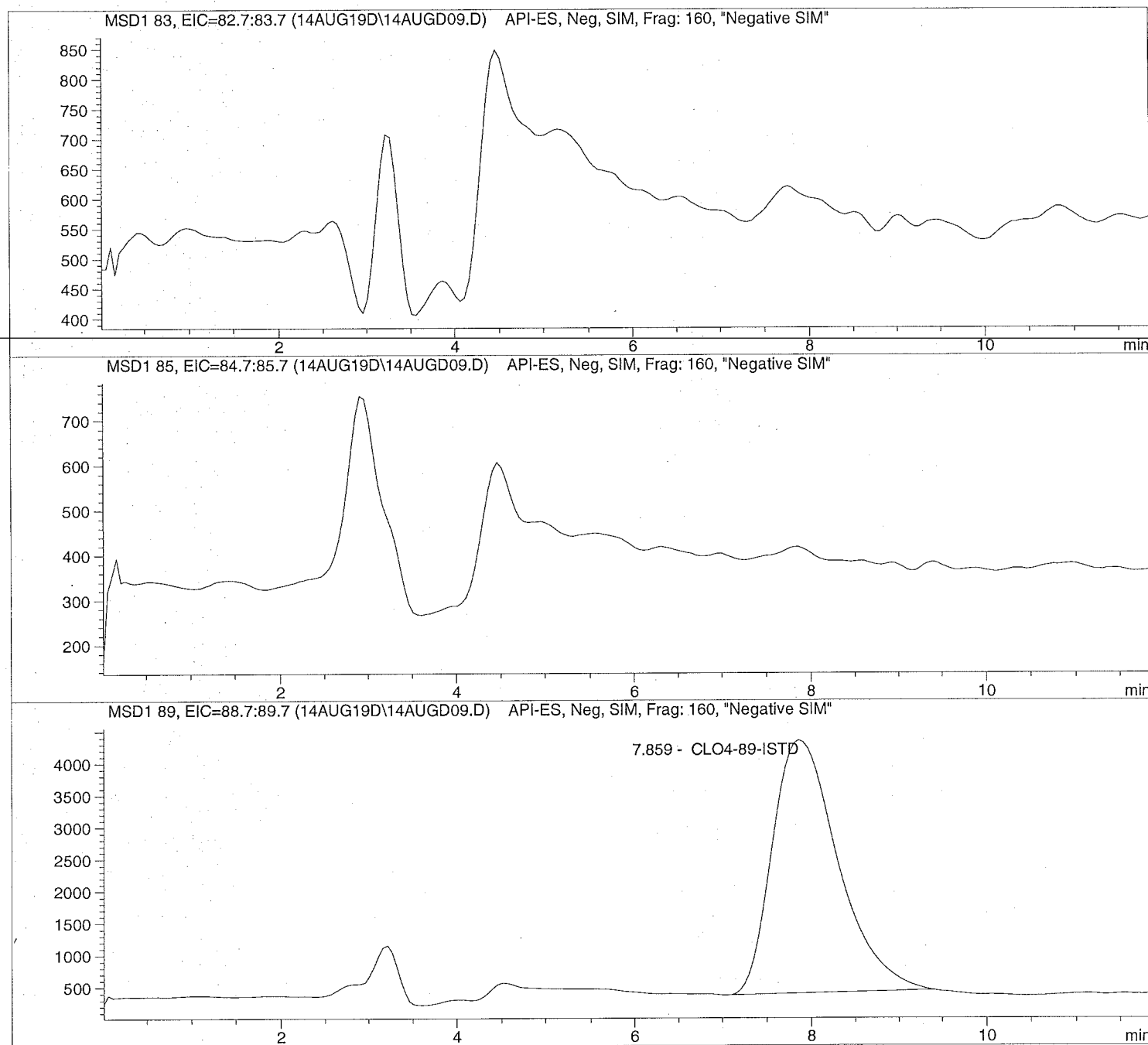
Sample Name: 1923027001

Injection Date: 8/14/2019 10:22:43  
Sample Name: 1923027001  
Acq Operator: TNB

Seq Line: 9  
Location: Vial 79  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD09.D Sample Name: 1923027001

```

=====
Injection Date: 8/14/2019 10:22:43      Seq Line:          9
Sample Name:    1923027001              Location:         Vial 79
Acq Operator:   TNB                     Inj. No.:        1
                                           Inj. Vol.:       50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.859	PBA	203712.1	5.0000	CLO4-89-ISTD

```

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

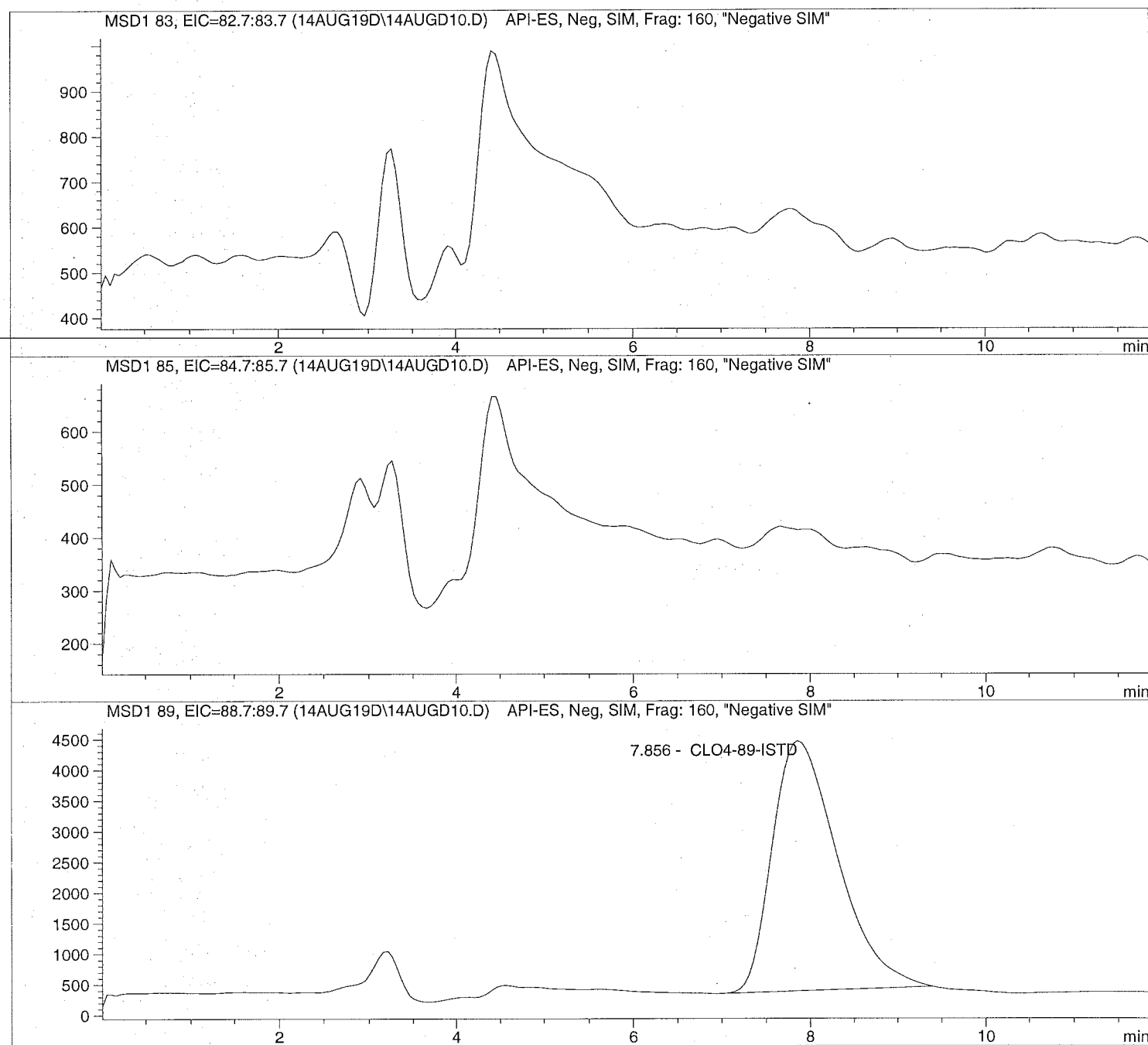
```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD10.D Sample Name: 1923027002

=====  
Injection Date: 8/14/2019 10:36:56 Seq Line: 10  
Sample Name: 1923027002 Location: Vial 80  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD10.D Sample Name: 1923027002

```

=====
Injection Date: 8/14/2019 10:36:56      Seq Line: 10
Sample Name: 1923027002                Location: Vial 80
Acq Operator: TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019, 07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.856	PBA	210021.3	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD11.D

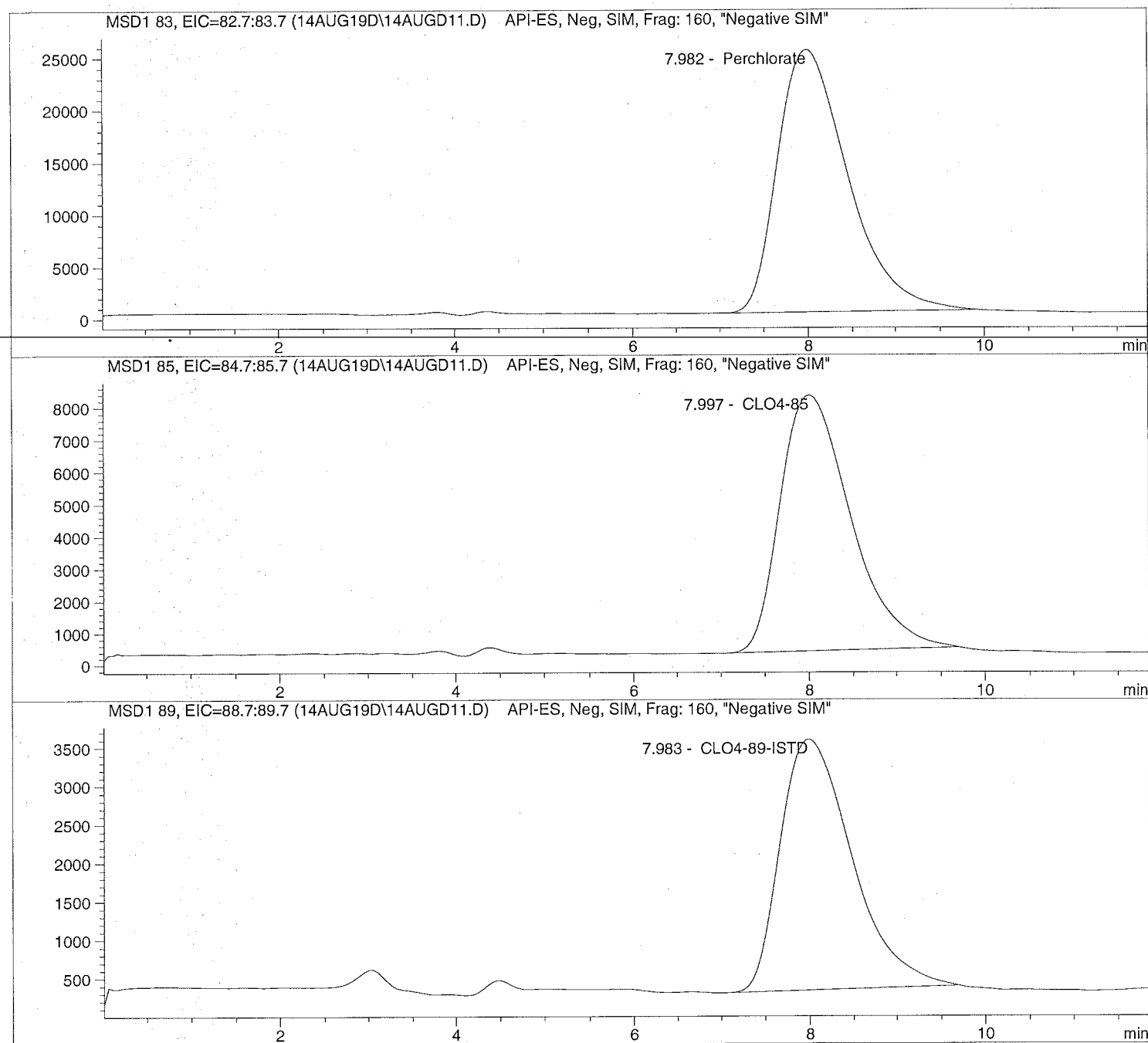
Sample Name: 668351 CCV@25

Injection Date: 8/14/2019 10:55:23  
Sample Name: 668351 CCV@25  
Acq Operator: TNB

Seq Line: 11  
Location: Vial 71  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD11.D Sample Name: 668351 CCV@25

```

=====
Injection Date: 8/14/2019 10:55:23      Seq Line: 11
Sample Name: 668351 CCV@25             Location: Vial 71
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 25.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.982	PBA	1389218.6	23.0642	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.997	PBA	440722.5	24.5580	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.983	PBA	184111.7	5.0000	CLO4-89-ISTD

```

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

```



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

---

# Raw Data

## Initial Calibration

=====  
 Calibration Table  
 =====

Perchlorate

Calib. Data Modified : 3/19/2019 2:35:19 PM

Calculate : Internal Standard  
 Based on : Peak Area

Rel. Reference Window : 20.000 %  
 Abs. Reference Window : 0.000 min  
 Rel. Non-ref. Window : 20.000 %  
 Abs. Non-ref. Window : 0.000 min

Use Multiplier & Dilution Factor with ISTDs  
 Uncalibrated Peaks : not reported  
 Partial Calibration : No recalibration if peaks missing

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

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

-----  
 Calibration Report Options :

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

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

ISTD ISTD Amount Name

#	ISTD Amount	Name
1	5.00000	CLO4-89-ISTD

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

RetTime [min]	Lvl	Amount	Area	Amt/Area	Ref	Grp	Name
8.744	1	1.00000	7.76074e4	1.28854e-5	1		Perchlorate
		2.00000	1.35273e5	1.47849e-5			
		5.00000	3.37764e5	1.48033e-5			
		10.00000	6.83454e5	1.46316e-5			
		25.00000	2.08433e6	1.19943e-5			
		50.00000	4.13334e6	1.20968e-5			
		75.00000	5.99313e6	1.25143e-5			
8.755	2	1.00000	2.36780e4	4.22333e-5	1		CLO4-85
		2.00000	4.69486e4	4.25998e-5			
		5.00000	1.06124e5	4.71147e-5			
		10.00000	2.13523e5	4.68335e-5			
		25.00000	6.14295e5	4.06971e-5			
		50.00000	1.19814e6	4.17315e-5			
		75.00000	1.78355e6	4.20509e-5			
8.766	3	5.00000	2.73208e5	1.83011e-5	+I1		CLO4-89-ISTD
		5.00000	2.24886e5	2.22335e-5			
		5.00000	2.33196e5	2.14412e-5			
		5.00000	2.34454e5	2.13262e-5			
		5.00000	2.50568e5	1.99547e-5			
		5.00000	2.30977e5	2.16472e-5			

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min  
Curve Type : Quadratic  
Origin : Ignored  
Calibration Level Weights:/  
Level 1 : 1  
Level 2 : 0.5  
Level 3 : 0.2  
Level 4 : 0.1  
Level 5 : 0.04  
Level 6 : 0.02  
Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min  
Curve Type : Quadratic  
Origin : Ignored  
Calibration Level Weights:/  
Level 1 : 1  
Level 2 : 0.5  
Level 3 : 0.2  
Level 4 : 0.1  
Level 5 : 0.04  
Level 6 : 0.02  
Level 7 : 0.013333

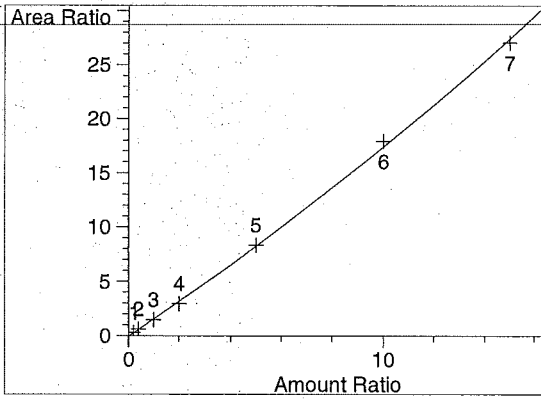
Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min  
Curve Type : Linear  
Origin : Included  
Calibration Level Weights:/  
Level 1 : 1  
Level 2 : 1  
Level 3 : 1  
Level 4 : 1  
Level 5 : 1  
Level 6 : 1  
Level 7 : 1

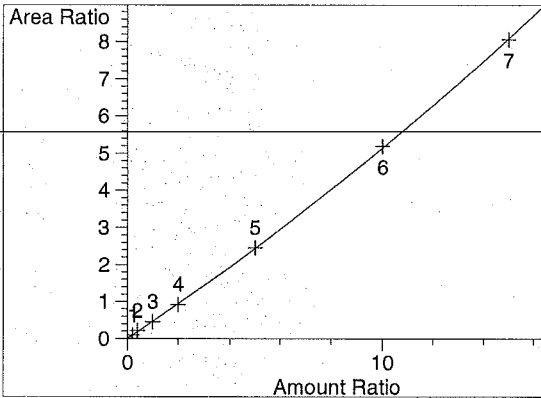
=====  
Peak Sum Table  
=====

\*\*\*No Entries in table\*\*\*  
=====

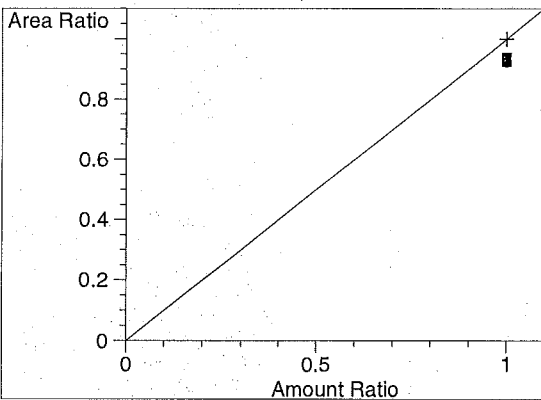
=====  
 Calibration Curves  
 =====



Perchlorate at exp. RT: 8.744  
 MSD1 83, EIC=82.7:83.7  
 Correlation: 0.99957  
 Residual Std. Dev.: 0.30744  
 Formula:  $y = ax^2 + bx + c$   
 a: 1.76988e-2  
 b: 1.56480  
 c: -4.92430e-2  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755  
 MSD1 85, EIC=84.7:85.7  
 Correlation: 0.99983  
 Residual Std. Dev.: 0.03473  
 Formula:  $y = ax^2 + bx + c$   
 a: 5.13396e-3  
 b: 4.62055e-1  
 c: 4.97209e-4  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766  
 MSD1 89, EIC=88.7:89.7  
 Correlation: 1.00000  
 Residual Std. Dev.: 0.00000  
 Formula:  $y = mx + b$   
 m: 1.00000  
 b: 0.00000  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

['#' ==&gt; Run has not been reprocessed with Batch Review Method

['\*' ==&gt; 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

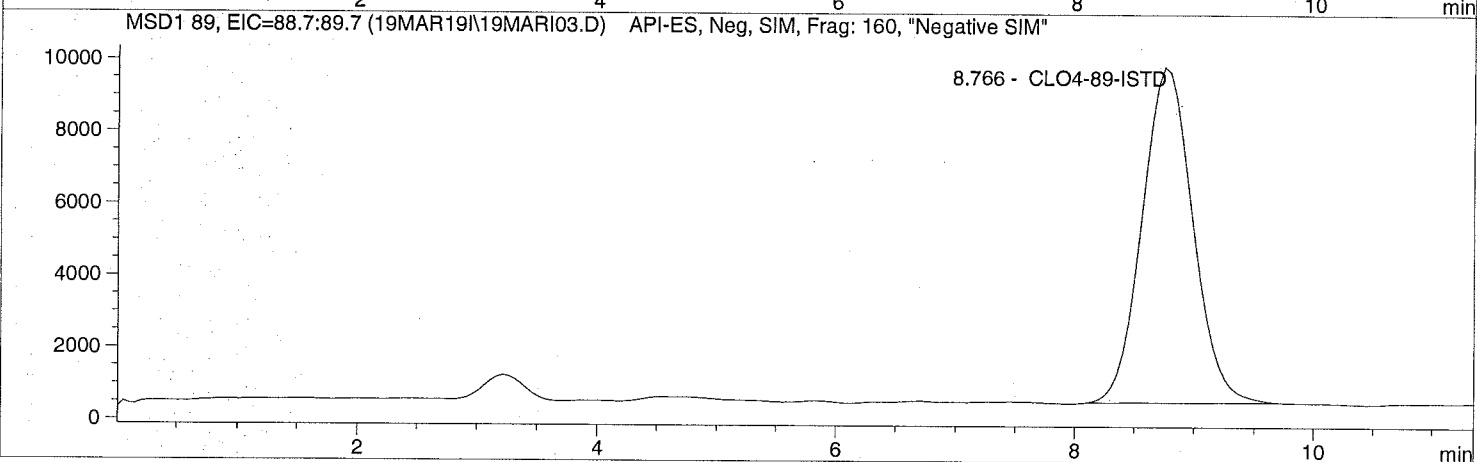
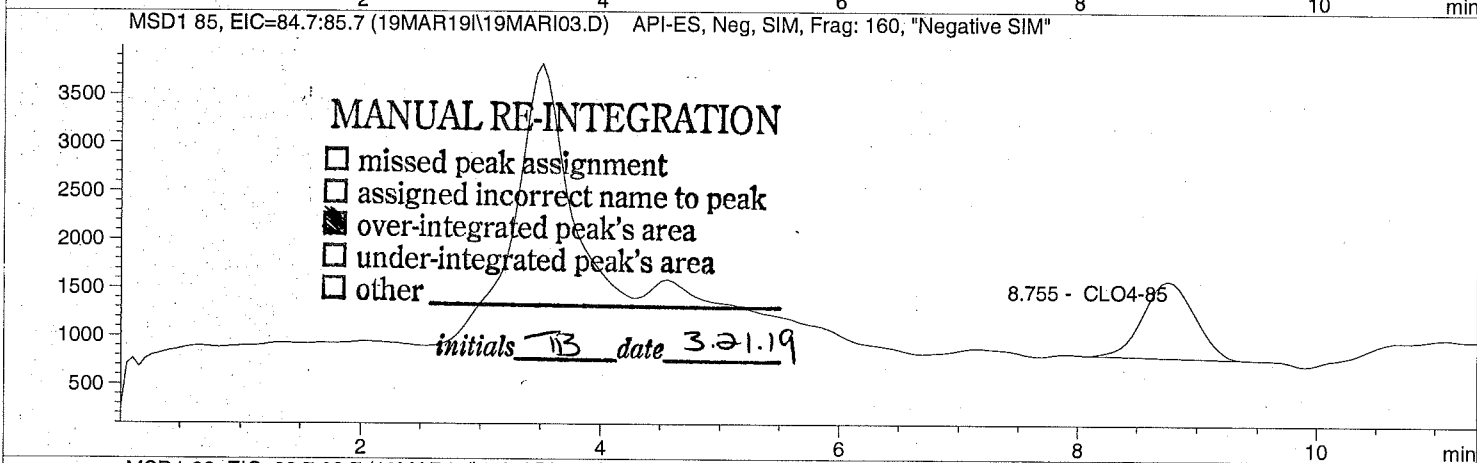
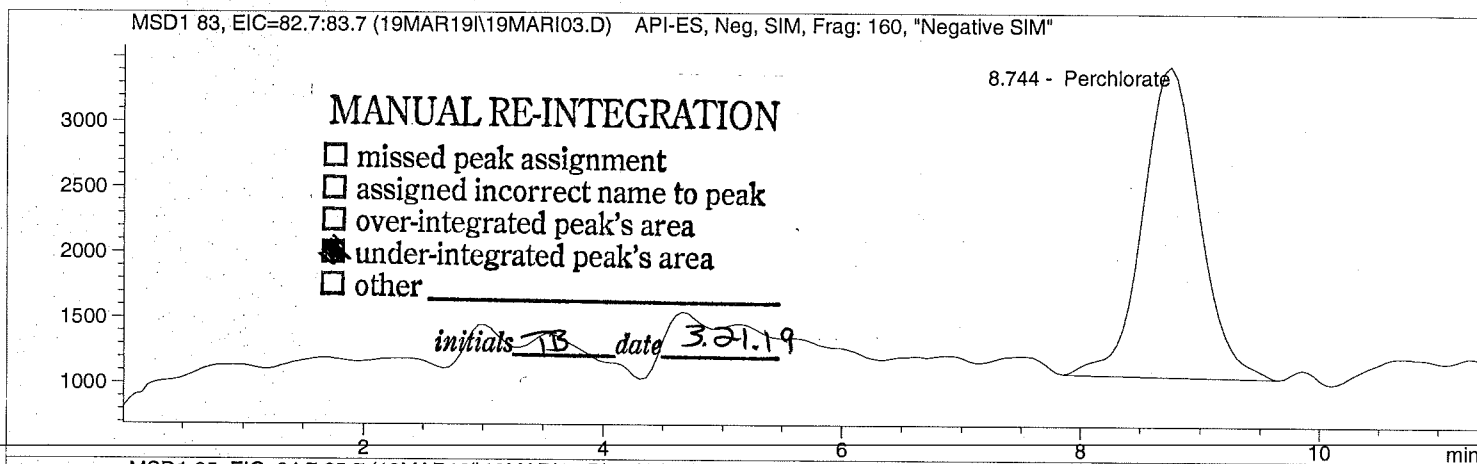
Inj. Vol.: 30 µl

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

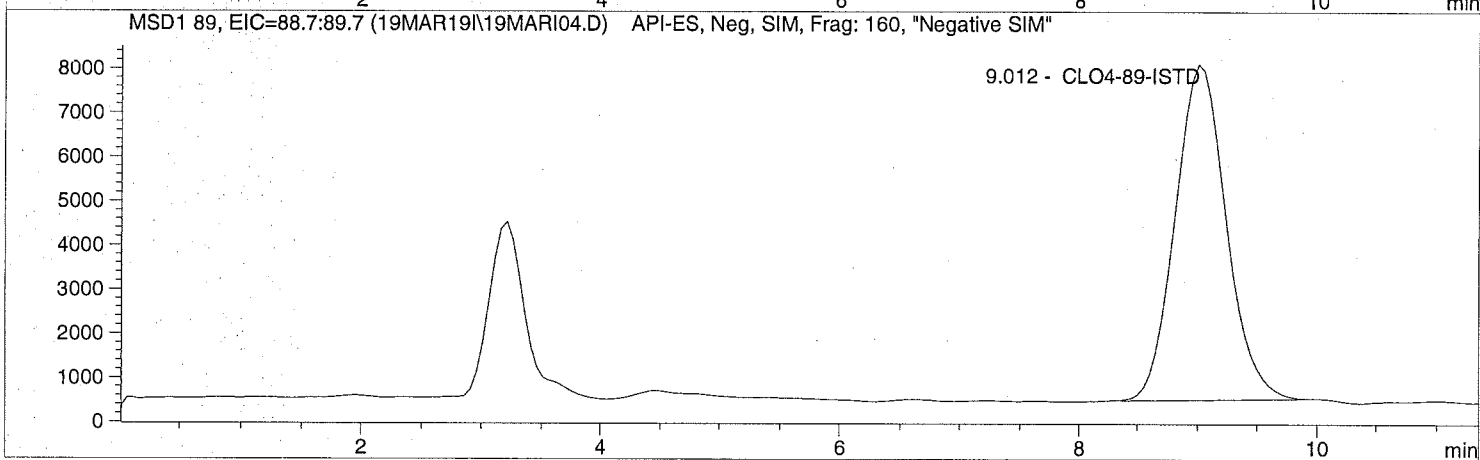
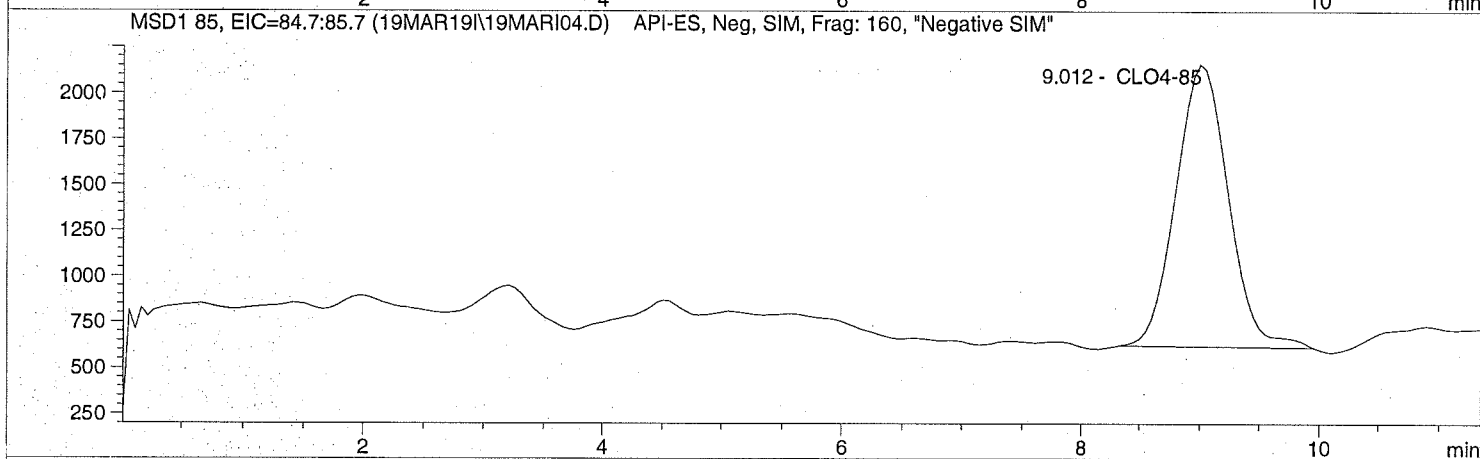
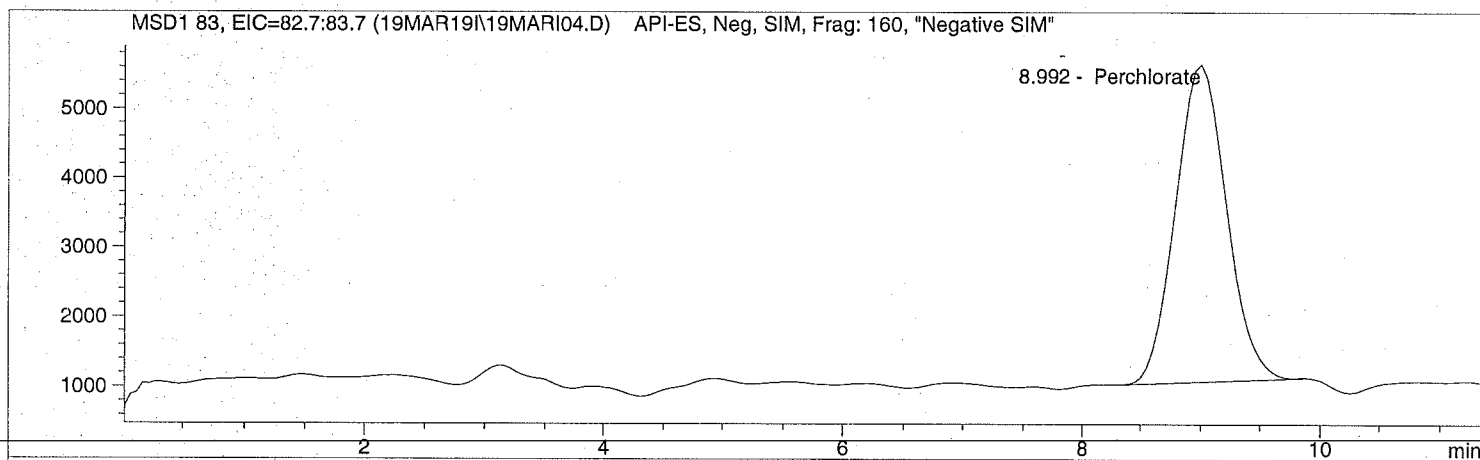
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\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 ***

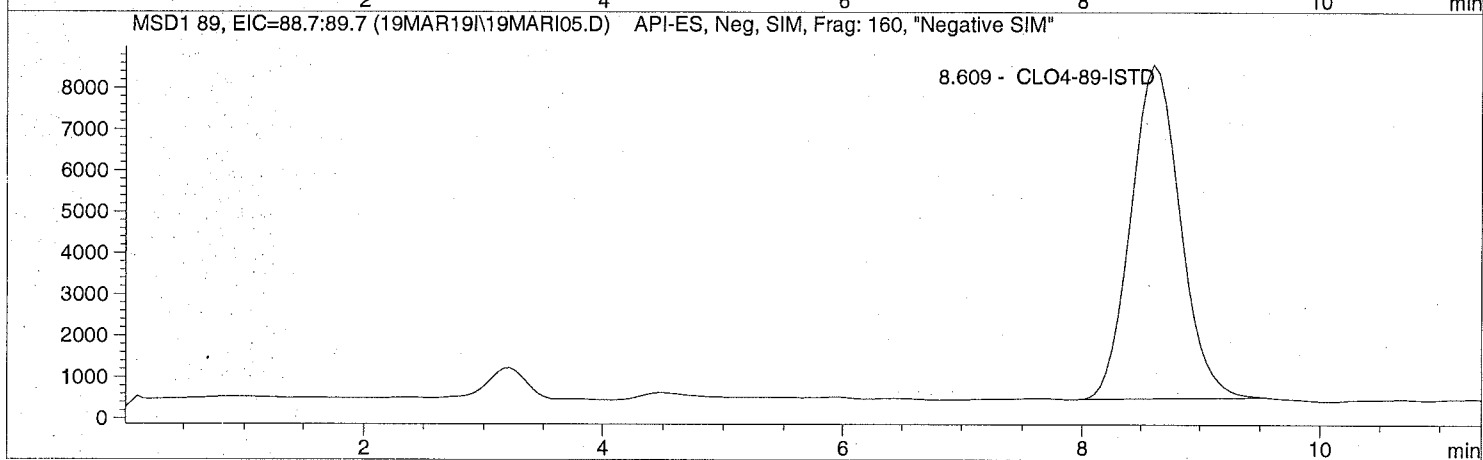
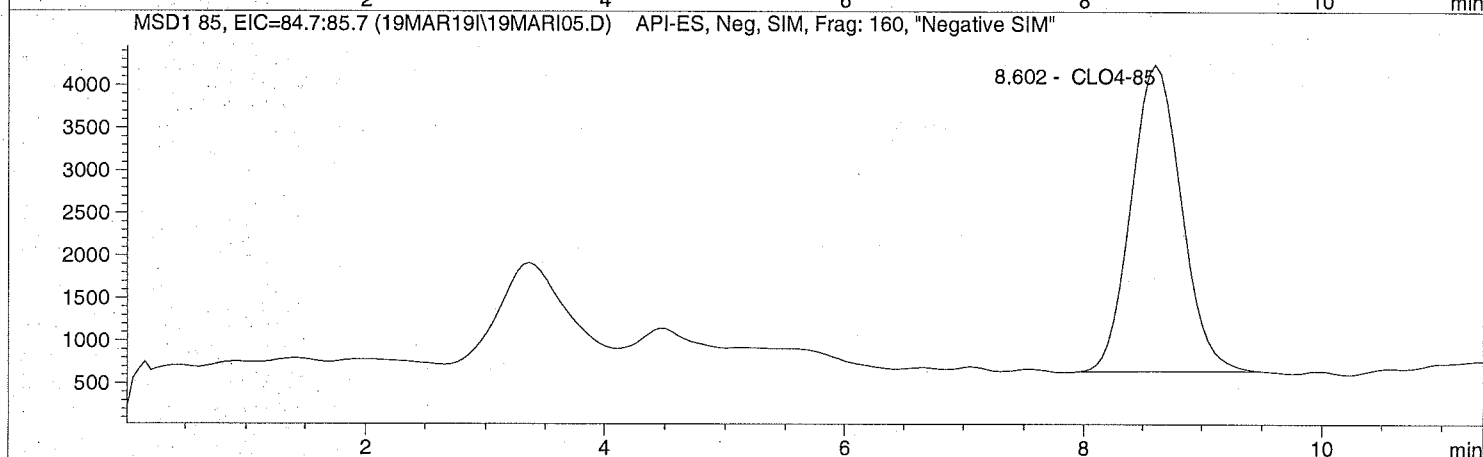
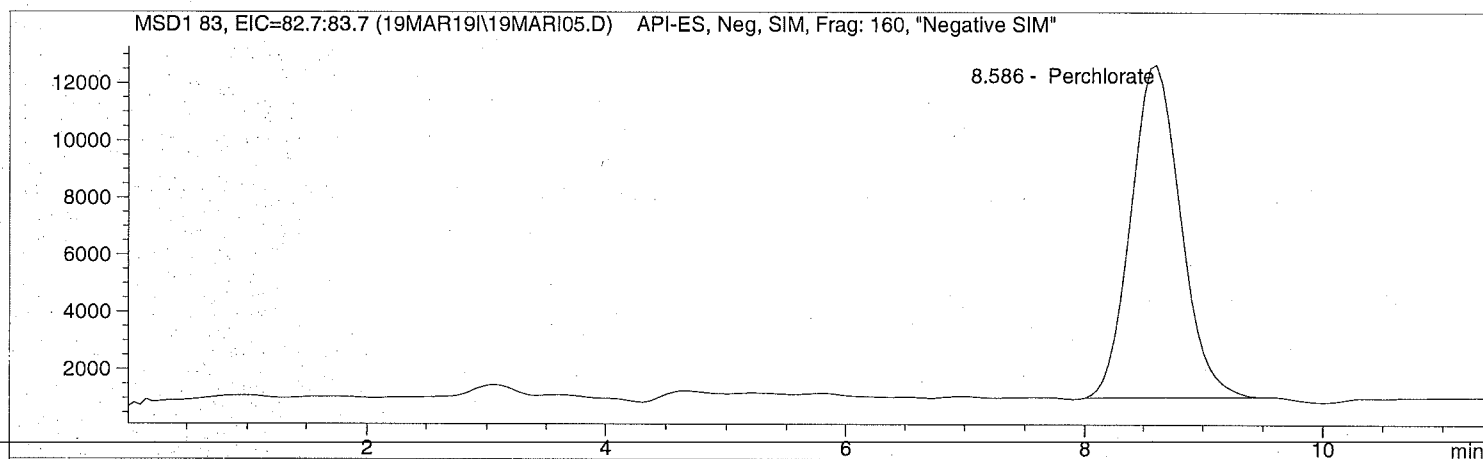
```

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 ***

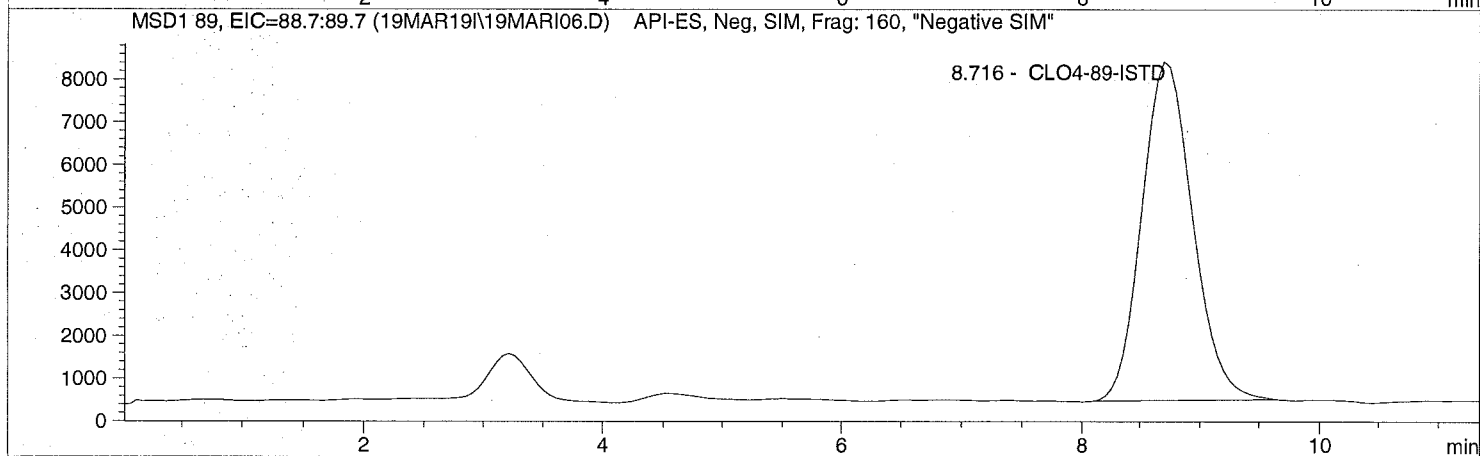
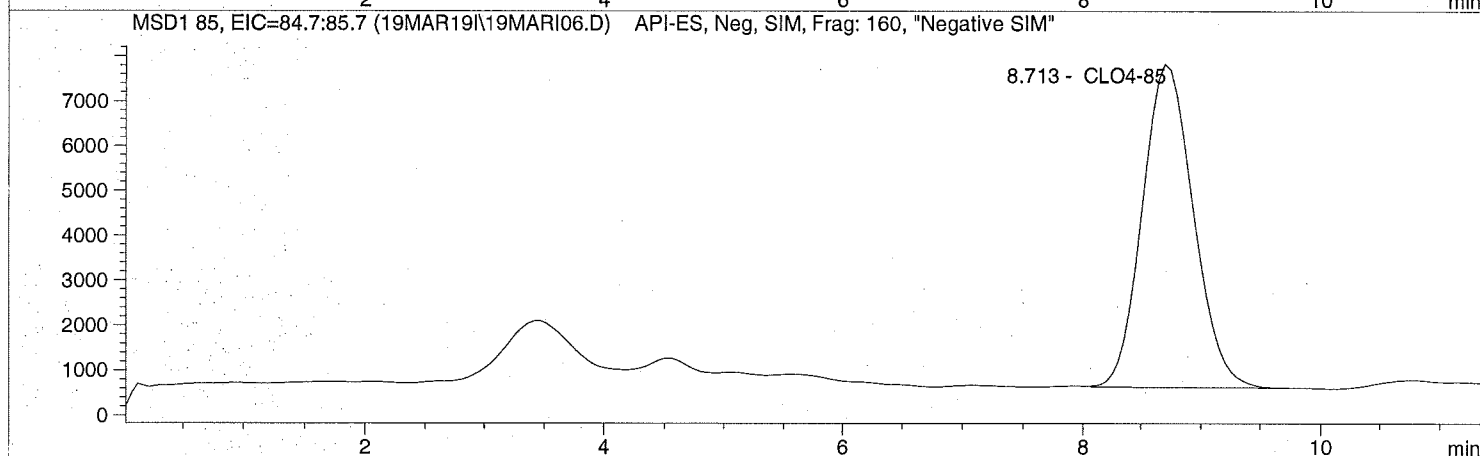
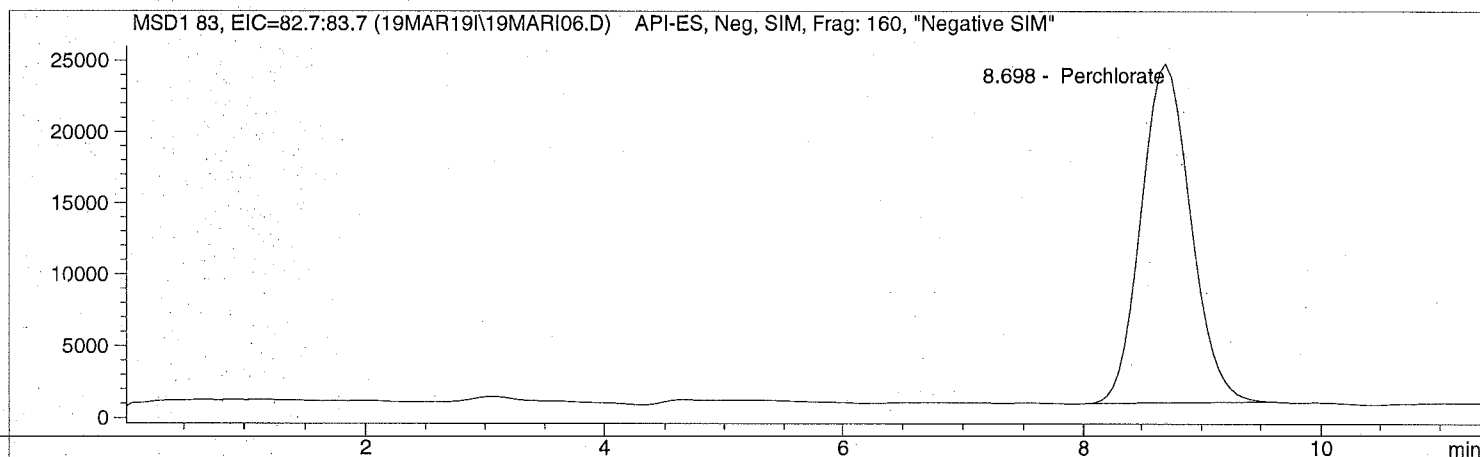
```

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

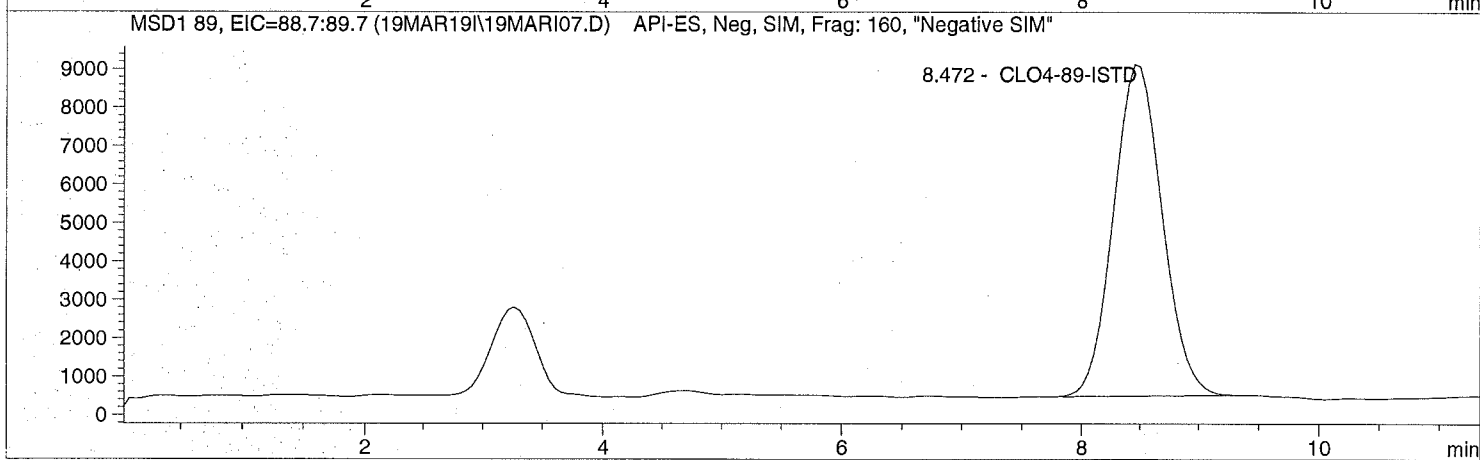
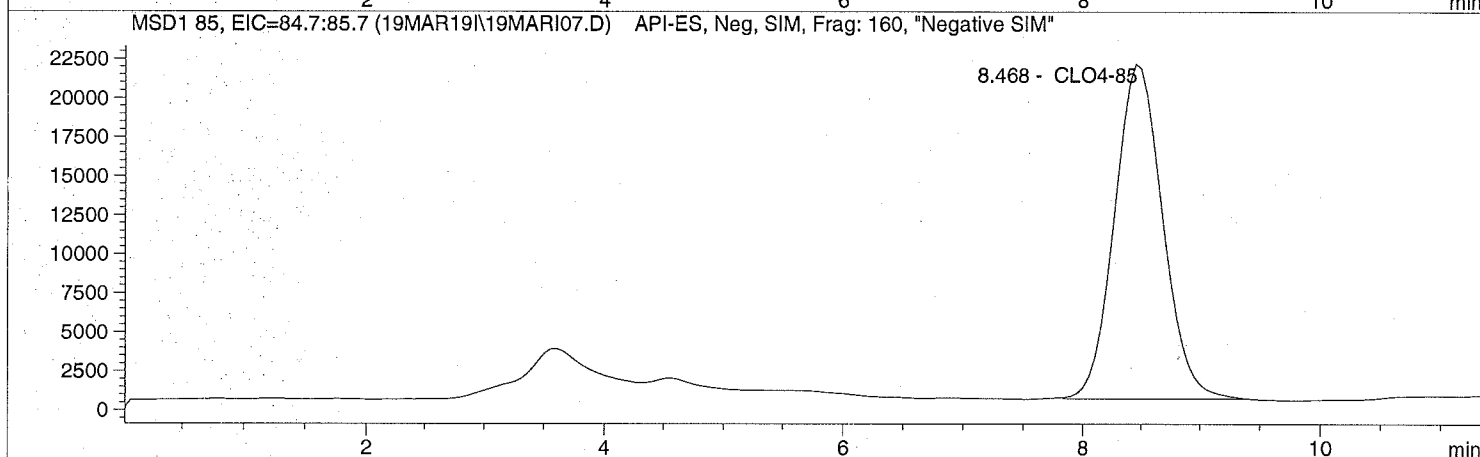
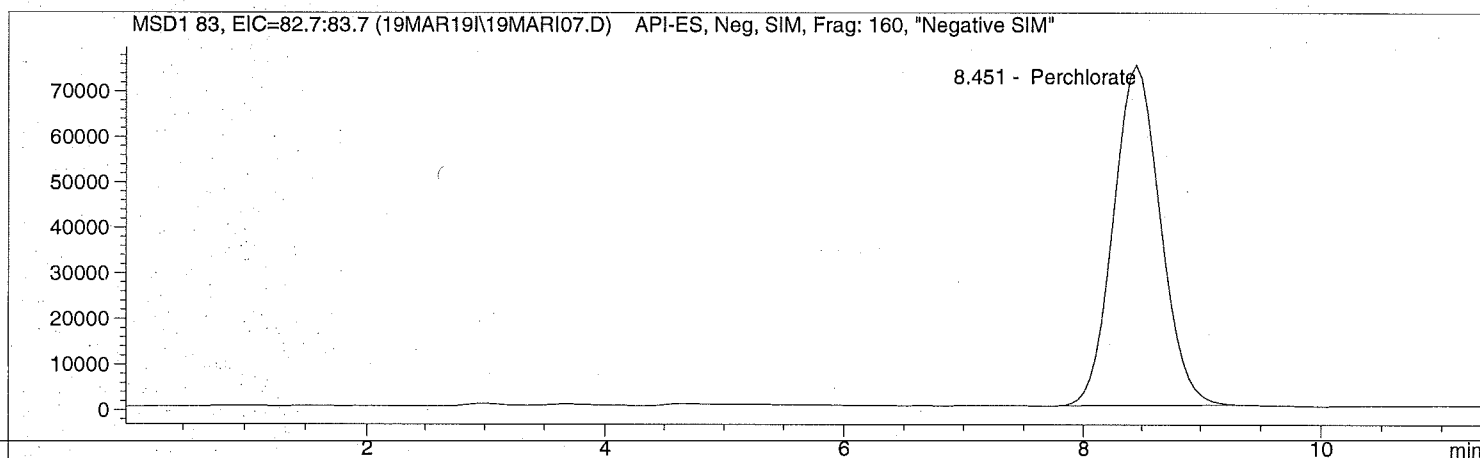
Inj. Vol.: 30 µl

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

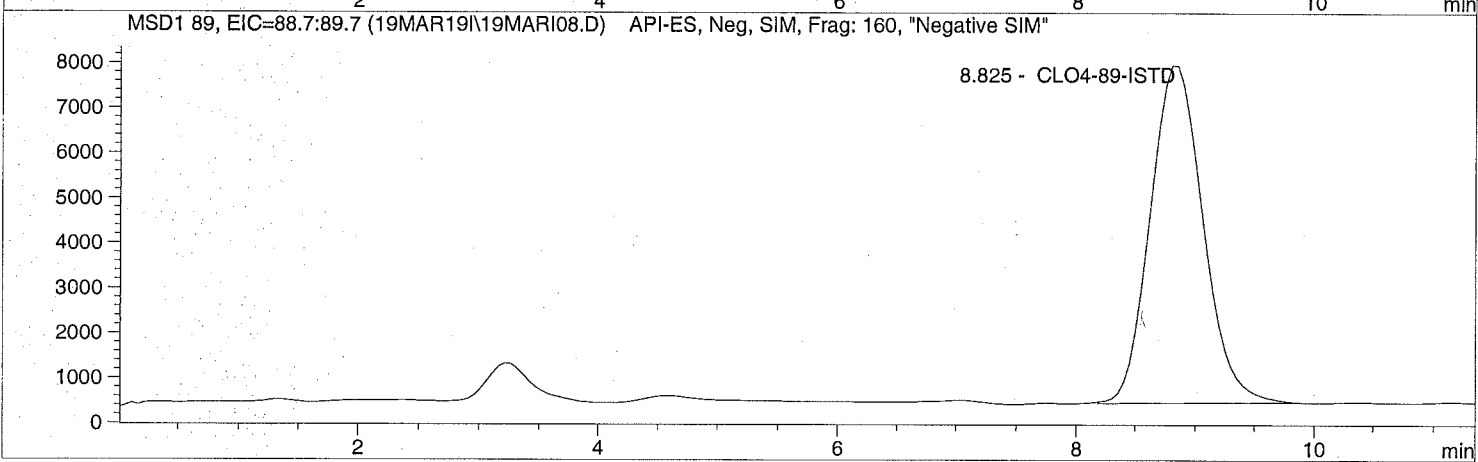
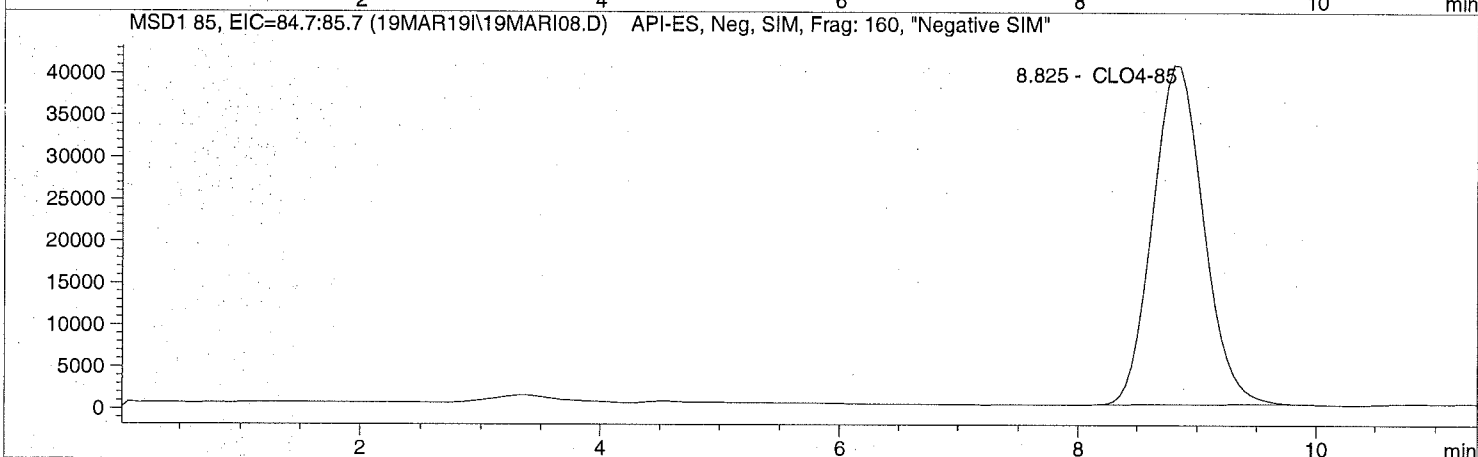
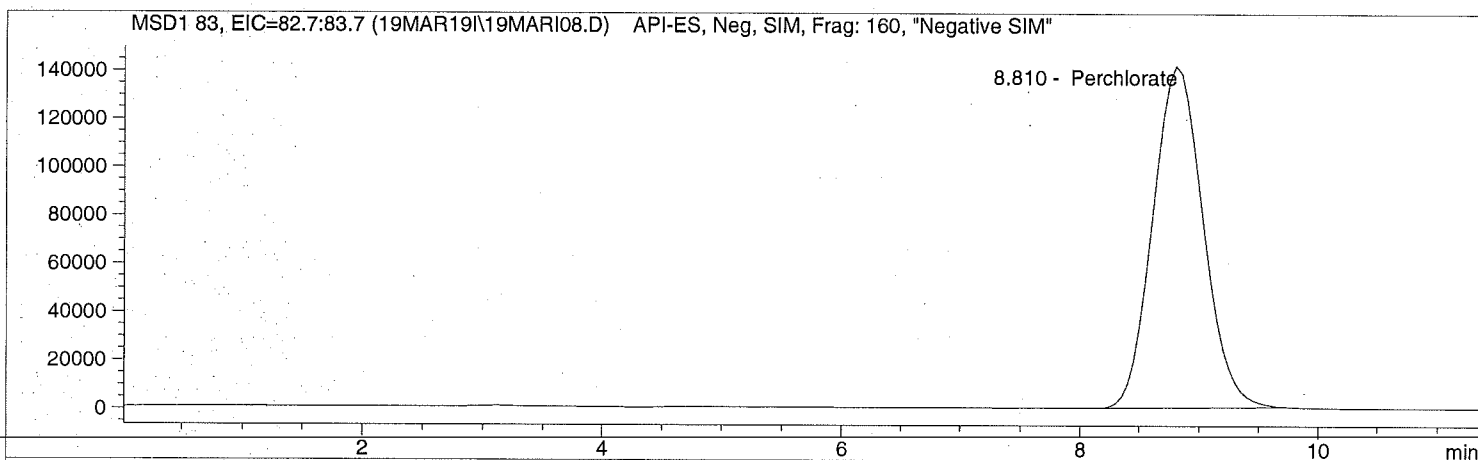
Inj. Vol.: 30 µl

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

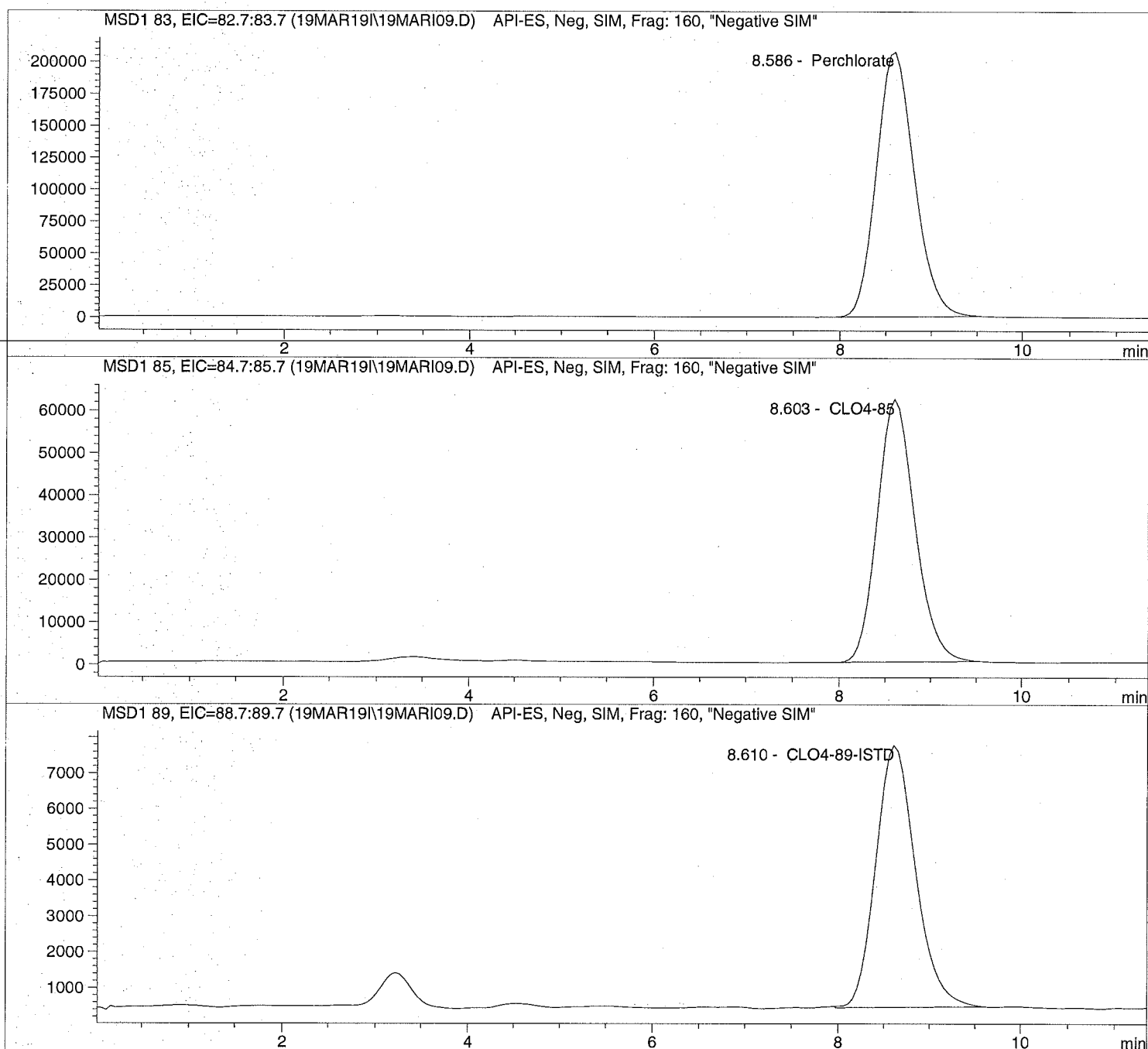
Inj. Vol.: 30 µl

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

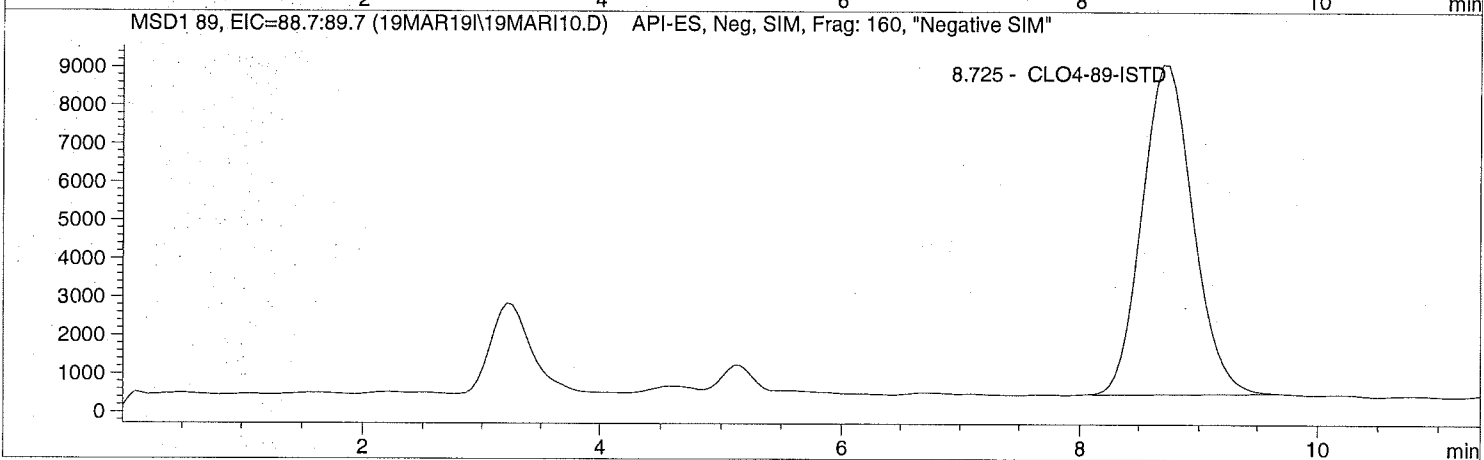
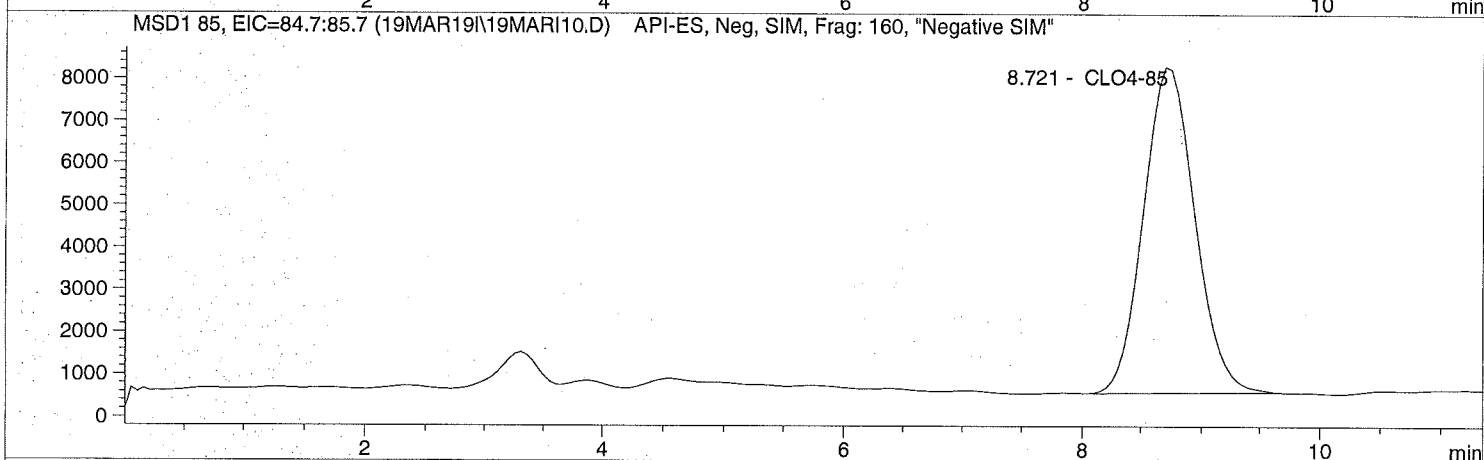
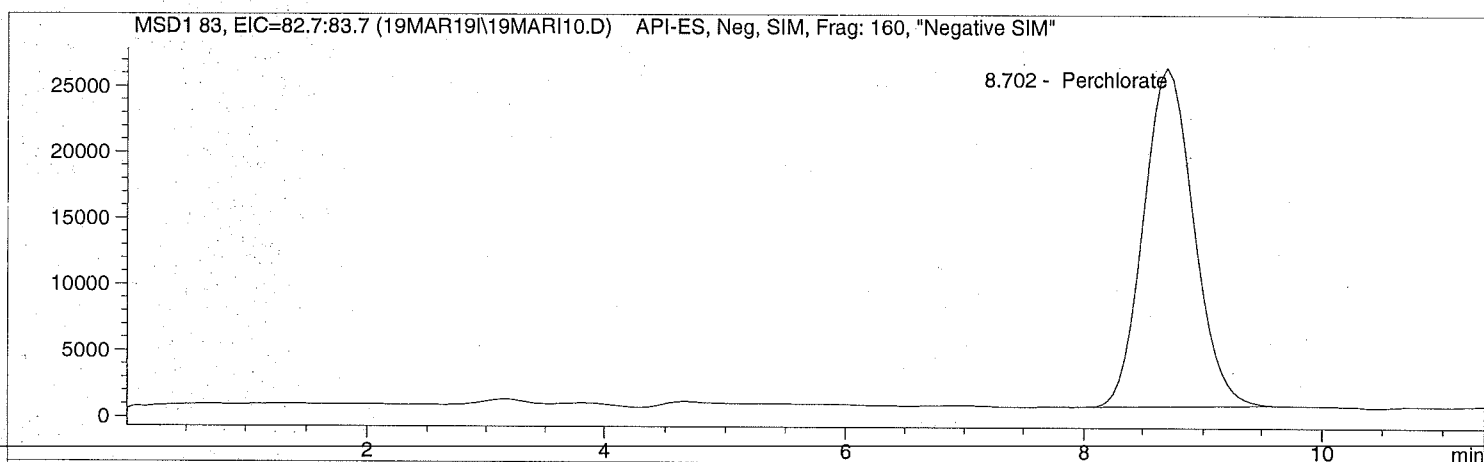
Inj. Vol.: 30 µl

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

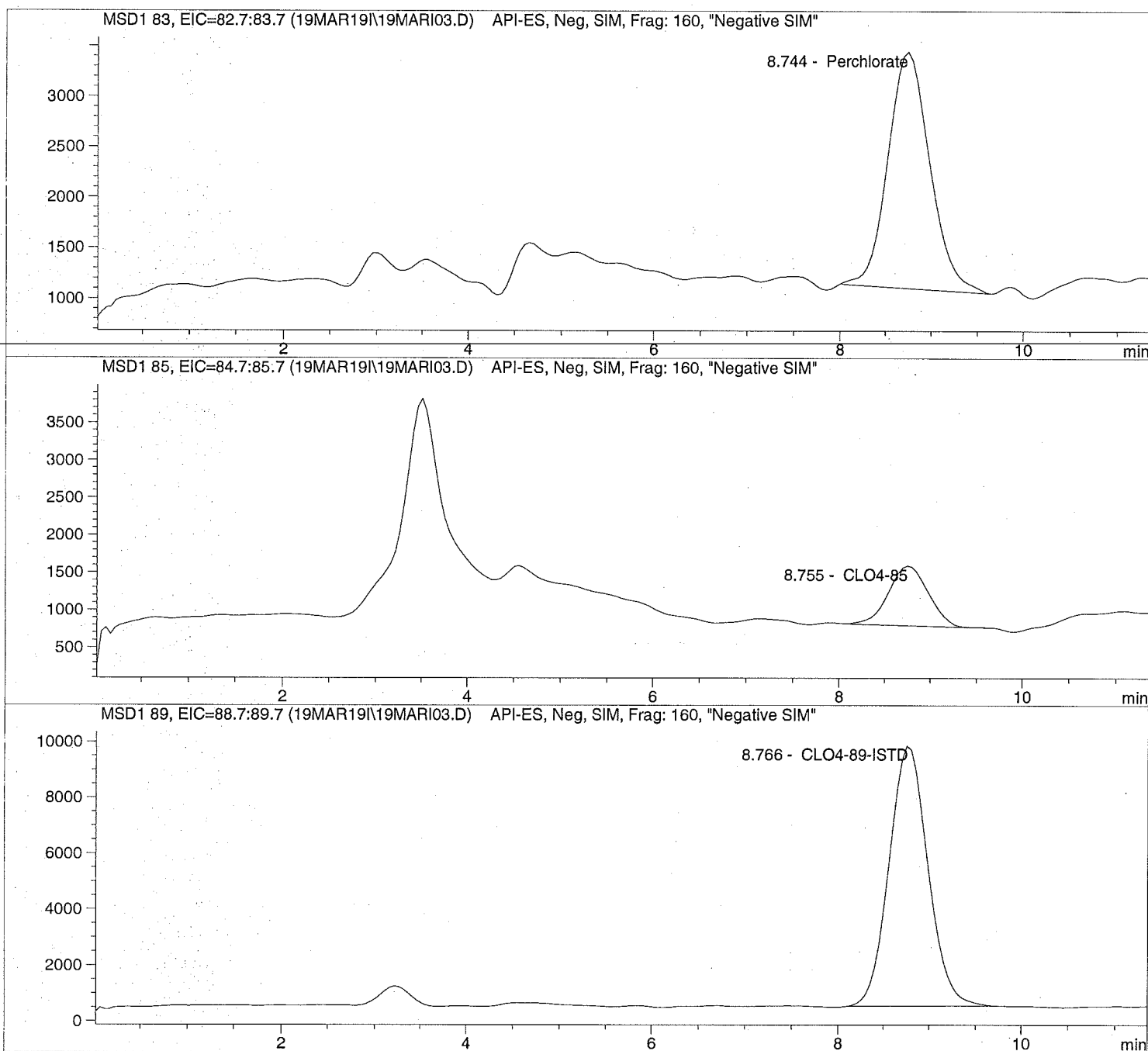
Sample Name: CLO4@ 1.0ug/L

=====  
Injection Date: 3/19/2019 09:39:40  
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



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 ***

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD05.D

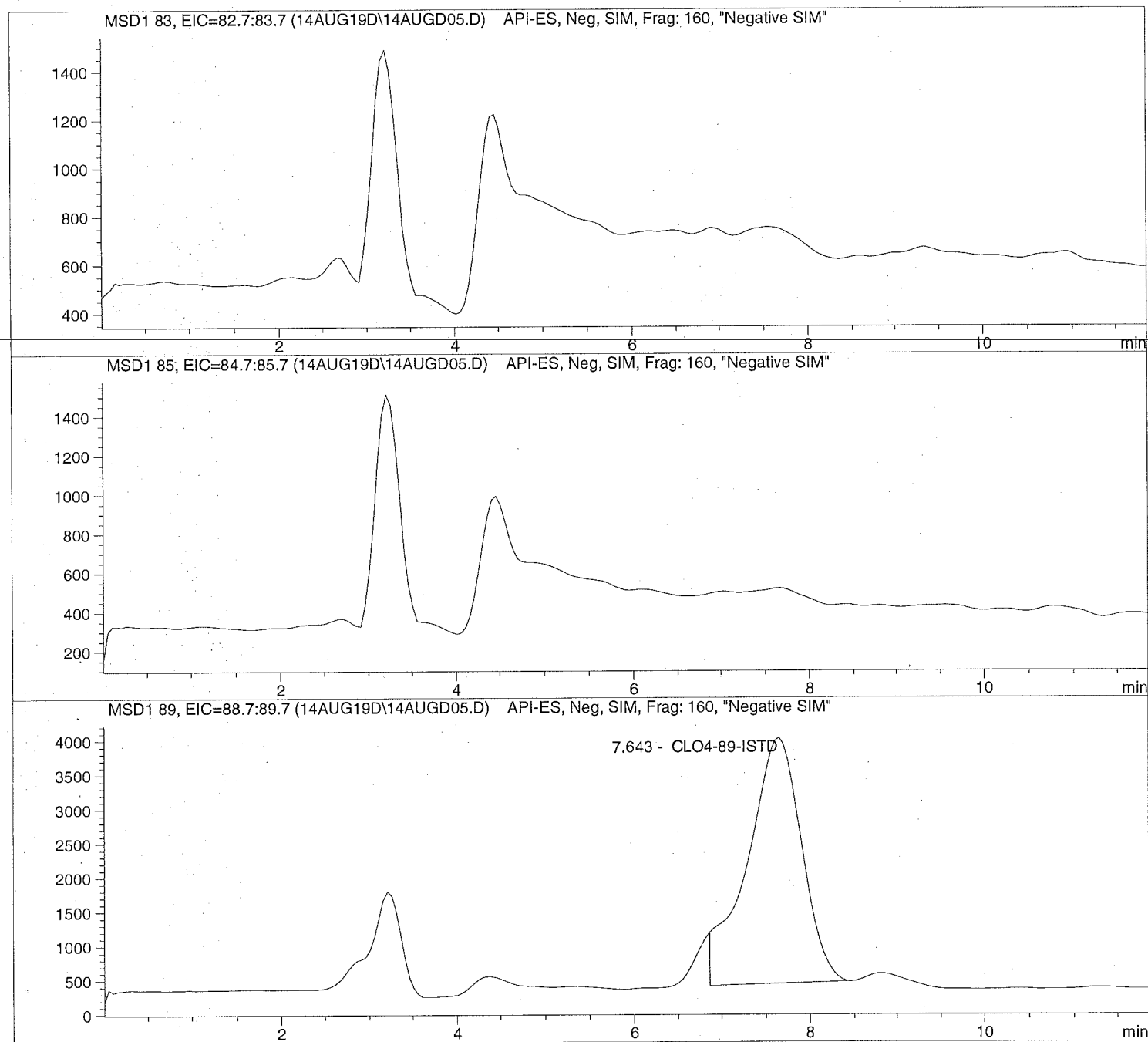
Sample Name: 1922027001

=====  
Injection Date: 8/14/2019 09:25:46  
Sample Name: 1922027001  
Acq Operator: TNB

Seq Line: 5  
Location: Vial 75  
Inj. No.: 1  
Inj. Vol.: 50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD05.D Sample Name: 1922027001

```

=====
Injection Date: 8/14/2019 09:25:46      Seq Line:          5
Sample Name:    1922027001              Location:         Vial 75
Acq Operator:  TNB                      Inj. No.:        1
                                           Inj. Vol.:       50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   4/12/2019 07:54:13

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.643	BBA	153964.0	5.0000	CLO4-89-ISTD

```

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

```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD06.D

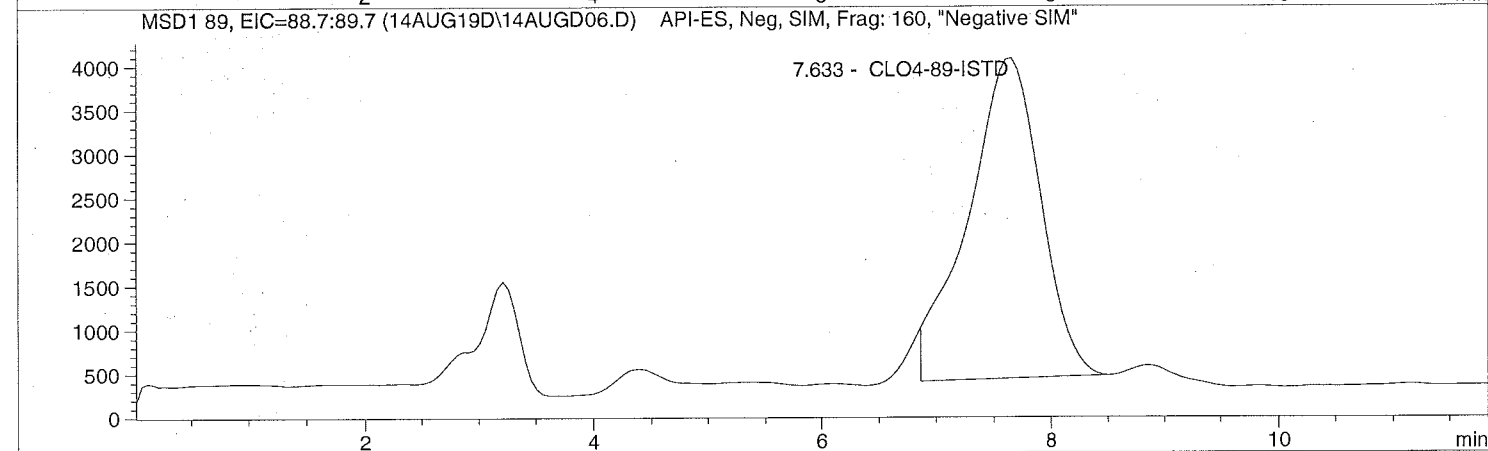
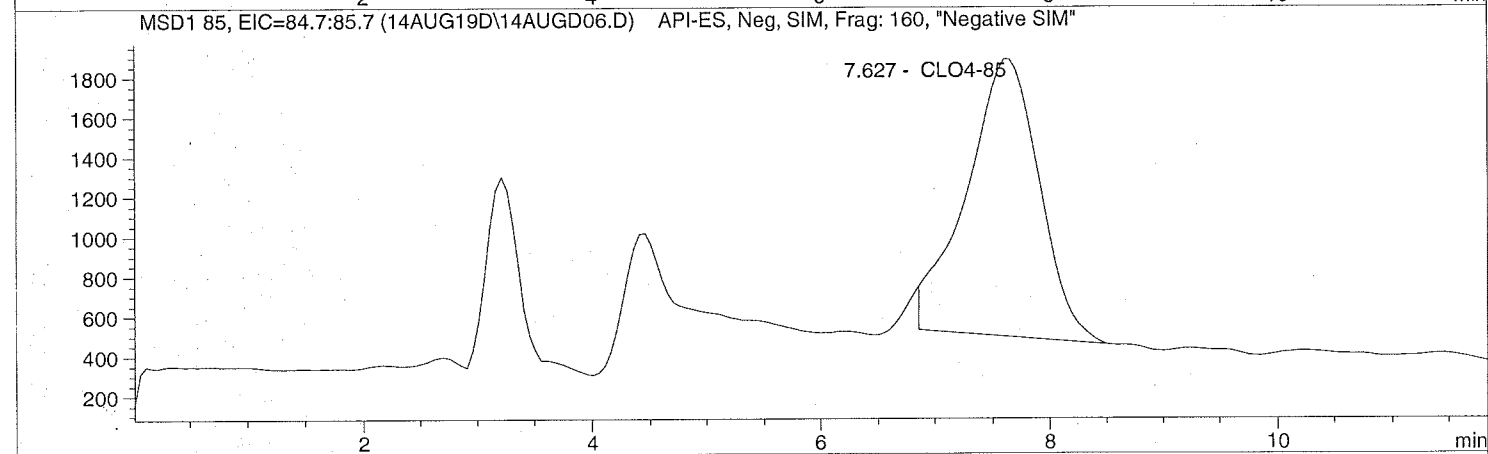
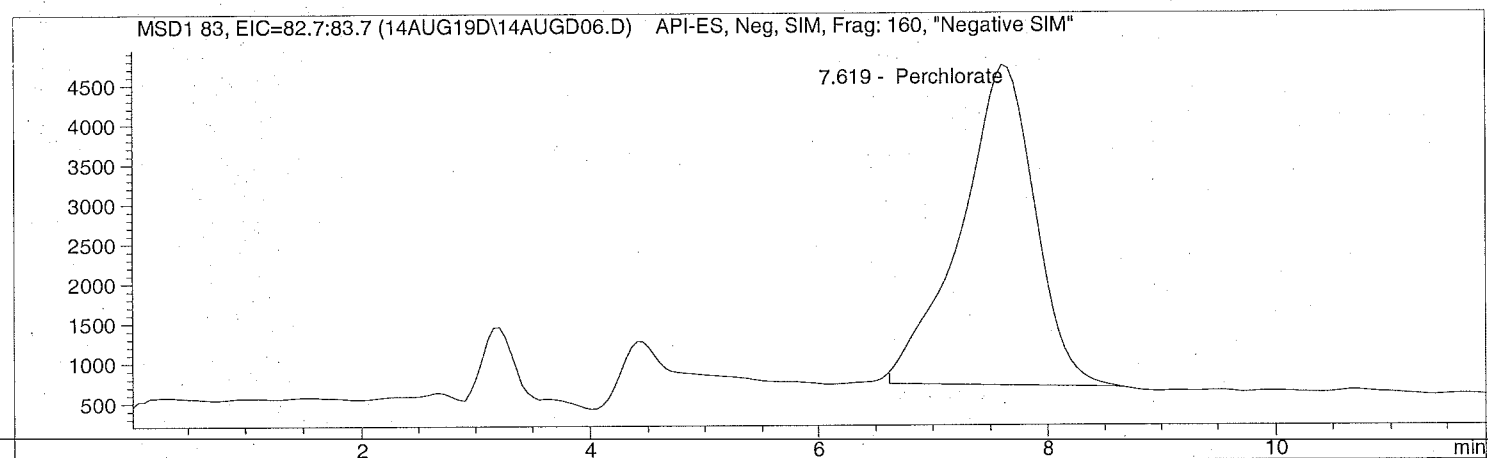
Sample Name: 668349 220271S

Injection Date: 8/14/2019 09:39:59  
Sample Name: 668349 220271S  
Acq Operator: TNB

Seq Line: 6  
Location: Vial 76  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD06.D Sample Name: 668349 220271S

```

=====
Injection Date: 8/14/2019 09:39:59      Seq Line: 6
Sample Name: 668349 220271S            Location: Vial 76
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.619	BBA	180213.1	3.7183	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.627	BBA	61346.3	4.0986	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.633	BBA	160298.6	5.0000	CLO4-89-ISTD

```

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

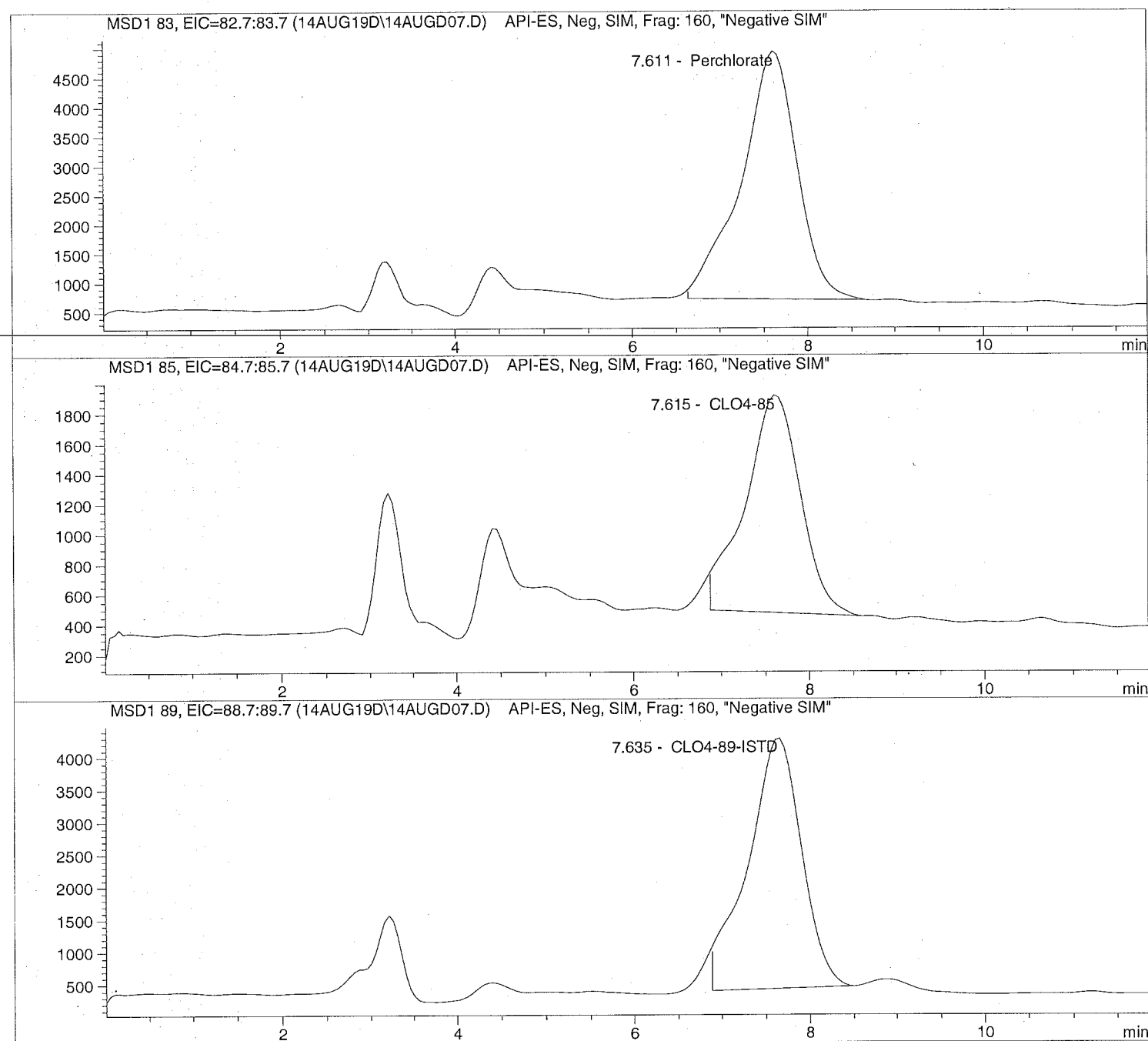
```

Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD07.D Sample Name: 668350 220271D

=====  
Injection Date: 8/14/2019 09:54:13 Seq Line: 7  
Sample Name: 668350 220271D Location: Vial 77  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD07.D Sample Name: 668350 220271D

```

=====
Injection Date: 8/14/2019 09:54:13      Seq Line: 7
Sample Name: 668350 220271D            Location: Vial 77
Acq Operator: TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 4/12/2019 07:54:13

```

Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 0.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.611	BBA	186832.0	3.7710	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.615	BBA	62944.2	4.1167	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.635	BBA	163743.1	5.0000	CLO4-89-ISTD

```

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

```



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD08.D

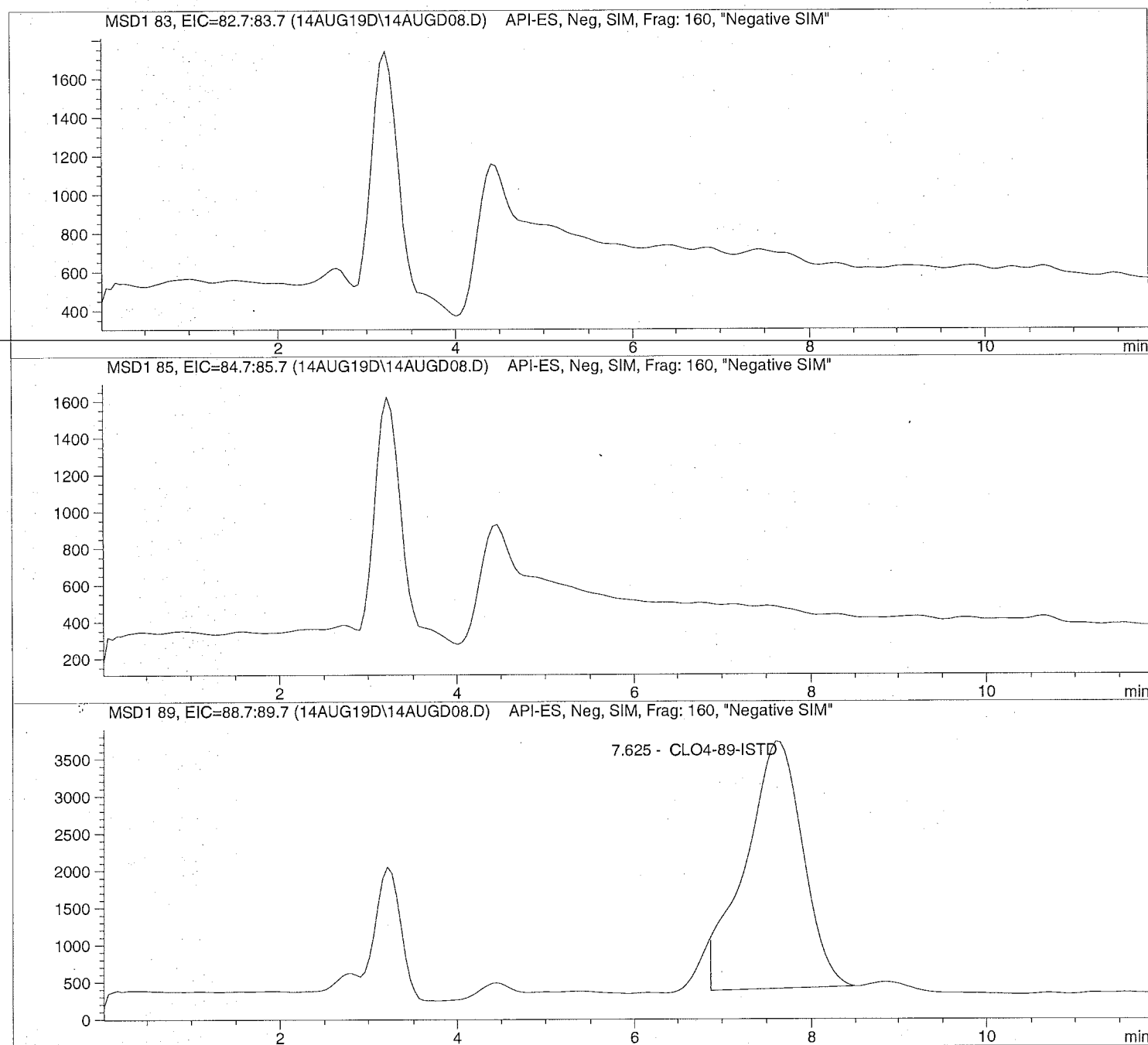
Sample Name: 1922715001

=====  
Injection Date: 8/14/2019 10:08:31  
Sample Name: 1922715001  
Acq Operator: TNB

Seq Line: 8  
Location: Vial 78  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 4/12/2019 07:54:13

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\14AUG19D\14AUGD08.D Sample Name: 1922715001

```

=====
Injection Date: 8/14/2019 10:08:31      Seq Line:      8
Sample Name:   1922715001              Location:      Vial 78
Acq Operator:  TNB                      Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  4/12/2019 07:54:13

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Fri, 12. Apr. 2019,07:52:58 am
Multiplier:    1.000000
Dilution:      1.000000
Sample Amount: 0.000

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

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

Signal2: MSD1 85, EIC=84.7:85.7

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

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.625	BBA	148522.8	5.0000	CLO4-89-ISTD

```

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

```



---

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August 14, 2019

Marcia Olive  
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445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS19080343**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia,

ALS Environmental received 2 sample(s) on Aug 07, 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,

A handwritten signature in black ink, appearing to read 'Raj Modashia', enclosed in a simple oval scribble.

Generated By: DAYNA.FISHER  
RJ Modashia  
Project Manager

ALS Houston, US

Date: 14-ago-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19080343

**SAMPLE SUMMARY**

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Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19080343-01	LH18/24-SP650_080619	Water		06-Aug-2019 14:00	07-Aug-2019 08:50	<input type="checkbox"/>
HS19080343-02	Trip Blank	Water	CG 040119 -162	06-Aug-2019 00:00	07-Aug-2019 08:50	<input type="checkbox"/>

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**ALS Houston, US**

Date: 14-Aug-19

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**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19080343

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**CASE NARRATIVE**

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**GCMS Volatiles by Method SW8260****Batch ID: R344032****Sample ID: HS19080443-02MS**

- MS and MSD are for an unrelated sample

**Sample ID: HS19080443-06MS**

- MS and MSD are for an unrelated sample
- 

**WetChemistry by Method SW9056****Batch ID: R344190****Sample ID: HS19080180-02MSD**

- MSD is for an unrelated sample (Sulfate)
-

## ALS Houston, US

Date: 14-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_080619  
 Collection Date: 06-Aug-2019 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19080343  
 Lab ID:HS19080343-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: AKP
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
<b>1,2-Dichloroethane</b>	<b>0.42</b>	<b>J</b>	<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	10-Aug-2019 03:52	
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	10-Aug-2019 03:52	
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	10-Aug-2019 03:52	
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	10-Aug-2019 03:52	
<b>Acetone</b>	<b>5.6</b>		<b>0.40</b>	<b>1.0</b>	<b>2.0</b>	<b>UG/L</b>	1	10-Aug-2019 03:52	
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	10-Aug-2019 03:52	
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	

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

## ALS Houston, US

Date: 14-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_080619  
 Collection Date: 06-Aug-2019 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19080343  
 Lab ID:HS19080343-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>						Analyst: AKP	
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
<b>cis-1,2-Dichloroethene</b>	<b>1.7</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	10-Aug-2019 03:52	
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	10-Aug-2019 03:52	
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	10-Aug-2019 03:52	
<b>Methylene chloride</b>	<b>0.95</b>	<b>J</b>	<b>0.40</b>	<b>1.0</b>	<b>2.0</b>	<b>UG/L</b>	1	10-Aug-2019 03:52	
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
<b>Trichloroethene</b>	<b>0.75</b>	<b>J</b>	<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	10-Aug-2019 03:52	
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 03:52	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>89.3</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	1	10-Aug-2019 03:52	
<i>Surr: 4-Bromofluorobenzene</i>	<i>100</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	1	10-Aug-2019 03:52	
<i>Surr: Dibromofluoromethane</i>	<i>92.5</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	1	10-Aug-2019 03:52	
<i>Surr: Toluene-d8</i>	<i>101</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	1	10-Aug-2019 03:52	
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>						Analyst: KMU	
<b>Chloride</b>	<b>338</b>		<b>2.00</b>	<b>5.00</b>	<b>5.00</b>	<b>mg/L</b>	10	13-Aug-2019 00:35	
<b>Sulfate</b>	<b>37.6</b>		<b>2.00</b>	<b>5.00</b>	<b>5.00</b>	<b>mg/L</b>	10	13-Aug-2019 00:35	

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

## ALS Houston, US

Date: 14-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: Trip Blank  
 Collection Date: 06-Aug-2019 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19080343  
 Lab ID:HS19080343-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: AKP
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	10-Aug-2019 00:16	
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	10-Aug-2019 00:16	
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	10-Aug-2019 00:16	
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	10-Aug-2019 00:16	
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	10-Aug-2019 00:16	
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16	
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16	

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



## ALS Houston, US

Date: 14-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: Trip Blank  
 Collection Date: 06-Aug-2019 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19080343  
 Lab ID:HS19080343-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						
<b>8260C</b>								Analyst: AKP
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	10-Aug-2019 00:16
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	10-Aug-2019 00:16
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	10-Aug-2019 00:16
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	10-Aug-2019 00:16
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	10-Aug-2019 00:16
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	10-Aug-2019 00:16
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	10-Aug-2019 00:16
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>88.7</i>			<i>0</i>	<i>81-118</i>	<i>%REC</i>	<i>1</i>	<i>10-Aug-2019 00:16</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>99.2</i>			<i>0</i>	<i>85-114</i>	<i>%REC</i>	<i>1</i>	<i>10-Aug-2019 00:16</i>
<i>Surr: Dibromofluoromethane</i>	<i>90.6</i>			<i>0</i>	<i>80-119</i>	<i>%REC</i>	<i>1</i>	<i>10-Aug-2019 00:16</i>
<i>Surr: Toluene-d8</i>	<i>103</i>			<i>0</i>	<i>89-112</i>	<i>%REC</i>	<i>1</i>	<i>10-Aug-2019 00:16</i>

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

ALS Houston, US

Date: 14-ago-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080343

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R344032 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS19080343-01	LH18/24-SP650_080619	06 Aug 2019 14:00			10 Aug 2019 03:52	1
HS19080343-02	Trip Blank	06 Aug 2019 00:00			10 Aug 2019 00:16	1
<b>Batch ID:</b> R344190 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> Water	
HS19080343-01	LH18/24-SP650_080619	06 Aug 2019 14:00			13 Aug 2019 00:35	10



## ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080343

## QC BATCH REPORT

Batch ID: R344032 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MBLK	Sample ID: VBLKW-190809	Units: UG/L			Analysis Date: 09-Aug-2019 23:04					
Client ID:	Run ID: VOA6_344032	SeqNo: 5204476	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	1.0	2.0								U
Carbon tetrachloride	0.50	1.0								U
Chlorobenzene	0.50	1.0								U
Chloroethane	0.50	1.0								U
Chloroform	0.50	1.0								U
Chloromethane	0.50	1.0								U
cis-1,2-Dichloroethene	0.50	1.0								U
cis-1,3-Dichloropropene	0.50	1.0								U
Dibromochloromethane	0.50	1.0								U
Dibromomethane	0.50	1.0								U
Dichlorodifluoromethane	0.50	1.0								U
Ethylbenzene	0.50	1.0								U
Hexachlorobutadiene	1.0	1.0								U
Isopropylbenzene	0.50	1.0								U
m,p-Xylene	1.0	2.0								U
Methylene chloride	1.0	2.0								U
Naphthalene	0.50	1.0								U
n-Butylbenzene	0.50	1.0								U
n-Propylbenzene	0.50	1.0								U
o-Xylene	0.50	1.0								U
sec-Butylbenzene	0.50	1.0								U
Styrene	0.50	1.0								U
tert-Butylbenzene	0.50	1.0								U
Tetrachloroethene	0.50	1.0								U
Toluene	0.50	1.0								U
trans-1,2-Dichloroethene	0.50	1.0								U
trans-1,3-Dichloropropene	0.50	1.0								U
Trichloroethene	0.50	1.0								U
Trichlorofluoromethane	0.50	1.0								U
Vinyl chloride	0.50	1.0								U
Surr: 1,2-Dichloroethane-d4	45.02	1.0	50	0	90.0	81 - 118				
Surr: 4-Bromofluorobenzene	50.47	1.0	50	0	101	85 - 114				
Surr: Dibromofluoromethane	46.39	1.0	50	0	92.8	80 - 119				
Surr: Toluene-d8	51.92	1.0	50	0	104	89 - 112				

ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080343

**QC BATCH REPORT**

Batch ID: R344032 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS	Sample ID: VLCSW-190809	Units: UG/L			Analysis Date: 09-Aug-2019 22:15					
Client ID:	Run ID: VOA6_344032	SeqNo: 5204475	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	20.52	1.0	20	0	103	78 - 124				
1,1,1-Trichloroethane	20.89	1.0	20	0	104	74 - 131				
1,1,2,2-Tetrachloroethane	21.17	1.0	20	0	106	71 - 121				
1,1,2-Trichloroethane	20.29	1.0	20	0	101	80 - 119				
1,1-Dichloroethane	20.21	1.0	20	0	101	77 - 125				
1,1-Dichloroethene	21.15	1.0	20	0	106	71 - 131				
1,1-Dichloropropene	20.73	1.0	20	0	104	78 - 125				
1,2,3-Trichlorobenzene	23.36	1.0	20	0	117	69 - 129				
1,2,3-Trichloropropane	20.51	1.0	20	0	103	73 - 122				
1,2,4-Trichlorobenzene	22.17	1.0	20	0	111	69 - 130				
1,2,4-Trimethylbenzene	21.43	1.0	20	0	107	76 - 124				
1,2-Dibromo-3-chloropropane	20.24	1.0	20	0	101	62 - 128				
1,2-Dibromoethane	20.43	1.0	20	0	102	77 - 121				
1,2-Dichlorobenzene	21.56	1.0	20	0	108	80 - 119				
1,2-Dichloroethane	19.54	1.0	20	0	97.7	73 - 128				
1,2-Dichloropropane	21.14	1.0	20	0	106	78 - 122				
1,3,5-Trimethylbenzene	21.65	1.0	20	0	108	75 - 124				
1,3-Dichlorobenzene	20.64	1.0	20	0	103	80 - 119				
1,3-Dichloropropane	20.17	1.0	20	0	101	80 - 119				
1,4-Dichlorobenzene	21.76	1.0	20	0	109	79 - 118				
2,2-Dichloropropane	19.11	1.0	20	0	95.5	60 - 139				
2-Butanone	36.47	2.0	40	0	91.2	56 - 143				
2-Chlorotoluene	20.94	1.0	20	0	105	79 - 122				
2-Hexanone	40.55	2.0	40	0	101	57 - 139				
4-Chlorotoluene	20.83	1.0	20	0	104	78 - 122				
4-Isopropyltoluene	22.19	1.0	20	0	111	77 - 127				
4-Methyl-2-pentanone	39.49	2.0	40	0	98.7	67 - 130				
Acetone	32.53	2.0	40	0	81.3	39 - 160				
Benzene	20.82	1.0	20	0	104	79 - 120				
Bromobenzene	20.4	1.0	20	0	102	80 - 120				
Bromochloromethane	19.31	1.0	20	0	96.6	78 - 123				
Bromodichloromethane	20.17	1.0	20	0	101	79 - 125				
Bromoform	19.73	1.0	20	0	98.7	66 - 130				
Bromomethane	24.36	1.0	20	0	122	53 - 141				

ALS Houston, US

Date: 14-Aug-19

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**Project:** Longhorn GW Treatment Plant  
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**QC BATCH REPORT**

Batch ID: R344032 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS	Sample ID: VLCSW-190809	Units: UG/L			Analysis Date: 09-Aug-2019 22:15					
Client ID:	Run ID: VOA6_344032	SeqNo: 5204475	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	42.97	2.0	40	0	107	64 - 133				
Carbon tetrachloride	20.35	1.0	20	0	102	72 - 136				
Chlorobenzene	20.55	1.0	20	0	103	82 - 118				
Chloroethane	22.73	1.0	20	0	114	60 - 138				
Chloroform	20.27	1.0	20	0	101	79 - 124				
Chloromethane	21.92	1.0	20	0	110	50 - 139				
cis-1,2-Dichloroethene	19.87	1.0	20	0	99.4	78 - 123				
cis-1,3-Dichloropropene	20.31	1.0	20	0	102	75 - 124				
Dibromochloromethane	20.25	1.0	20	0	101	74 - 126				
Dibromomethane	20.31	1.0	20	0	102	79 - 123				
Dichlorodifluoromethane	20.6	1.0	20	0	103	32 - 152				
Ethylbenzene	21.31	1.0	20	0	107	79 - 121				
Hexachlorobutadiene	26.02	1.0	20	0	130	66 - 134				
Isopropylbenzene	21.62	1.0	20	0	108	72 - 131				
m,p-Xylene	42.34	2.0	40	0	106	80 - 121				
Methylene chloride	21.7	2.0	20	0	108	74 - 124				
Naphthalene	21.25	1.0	20	0	106	61 - 128				
n-Butylbenzene	22.67	1.0	20	0	113	75 - 128				
n-Propylbenzene	21.66	1.0	20	0	108	76 - 126				
o-Xylene	21.02	1.0	20	0	105	78 - 122				
sec-Butylbenzene	22.34	1.0	20	0	112	77 - 126				
Styrene	21.15	1.0	20	0	106	78 - 123				
tert-Butylbenzene	21.9	1.0	20	0	110	78 - 124				
Tetrachloroethene	21.08	1.0	20	0	105	74 - 129				
Toluene	20.98	1.0	20	0	105	80 - 121				
trans-1,2-Dichloroethene	20.55	1.0	20	0	103	75 - 124				
trans-1,3-Dichloropropene	20.33	1.0	20	0	102	73 - 127				
Trichloroethene	20.83	1.0	20	0	104	79 - 123				
Trichlorofluoromethane	21.48	1.0	20	0	107	65 - 141				
Vinyl chloride	21.66	1.0	20	0	108	58 - 137				
Surr: 1,2-Dichloroethane-d4	49.49	1.0	50	0	99.0	81 - 118				
Surr: 4-Bromofluorobenzene	51.41	1.0	50	0	103	85 - 114				
Surr: Dibromofluoromethane	49.94	1.0	50	0	99.9	80 - 119				
Surr: Toluene-d8	47.97	1.0	50	0	95.9	89 - 112				

ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080343

**QC BATCH REPORT**

Batch ID: R344032 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS	Sample ID: HS19080443-06MS	Units: UG/L			Analysis Date: 10-Aug-2019 02:40					
Client ID:	Run ID: VOA6_344032	SeqNo: 5204485	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	16.7	1.0	20	0	83.5	78 - 124				
1,1,1-Trichloroethane	15.51	1.0	20	0	77.6	74 - 131				
1,1,2,2-Tetrachloroethane	17	1.0	20	0	85.0	71 - 121				
1,1,2-Trichloroethane	15.98	1.0	20	0	79.9	80 - 119				S
1,1-Dichloroethane	14.67	1.0	20	0	73.4	77 - 125				S
1,1-Dichloroethene	14.96	1.0	20	0	74.8	71 - 131				
1,1-Dichloropropene	15.97	1.0	20	0	79.8	78 - 125				
1,2,3-Trichlorobenzene	16.59	1.0	20	0	83.0	69 - 129				
1,2,3-Trichloropropane	23.75	1.0	20	0	119	73 - 122				
1,2,4-Trichlorobenzene	17.01	1.0	20	0	85.1	69 - 130				
1,2,4-Trimethylbenzene	17.66	1.0	20	0	88.3	76 - 124				
1,2-Dibromo-3-chloropropane	15.59	1.0	20	0	78.0	62 - 128				
1,2-Dibromoethane	15.79	1.0	20	0	79.0	77 - 121				
1,2-Dichlorobenzene	18.04	1.0	20	0	90.2	80 - 119				
1,2-Dichloroethane	14.85	1.0	20	0	74.3	73 - 128				
1,2-Dichloropropane	16	1.0	20	0	80.0	78 - 122				
1,3,5-Trimethylbenzene	18.1	1.0	20	0	90.5	75 - 124				
1,3-Dichlorobenzene	17.22	1.0	20	0	86.1	80 - 119				
1,3-Dichloropropane	15.92	1.0	20	0	79.6	80 - 119				S
1,4-Dichlorobenzene	18.12	1.0	20	0	90.6	79 - 118				
2,2-Dichloropropane	12.79	1.0	20	0	63.9	60 - 139				
2-Butanone	34.65	2.0	40	0	86.6	56 - 143				
2-Chlorotoluene	17.62	1.0	20	0	88.1	79 - 122				
2-Hexanone	43.8	2.0	40	0	109	57 - 139				
4-Chlorotoluene	17.45	1.0	20	0	87.2	78 - 122				
4-Isopropyltoluene	18.31	1.0	20	0	91.6	77 - 127				
4-Methyl-2-pentanone	43.51	2.0	40	0	109	67 - 130				
Acetone	27	2.0	40	0	67.5	39 - 160				
Benzene	15.86	1.0	20	0	79.3	79 - 120				
Bromobenzene	16.8	1.0	20	0	84.0	80 - 120				
Bromochloromethane	14.06	1.0	20	0	70.3	78 - 123				S
Bromodichloromethane	15.3	1.0	20	0	76.5	79 - 125				S
Bromoform	15.37	1.0	20	0	76.8	66 - 130				
Bromomethane	15.25	1.0	20	0	76.3	53 - 141				

ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
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**QC BATCH REPORT**

Batch ID: R344032 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS	Sample ID: HS19080443-06MS	Units: UG/L			Analysis Date: 10-Aug-2019 02:40					
Client ID:	Run ID: VOA6_344032	SeqNo: 5204485	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	42.19	2.0	40	0	105	64 - 133				
Carbon tetrachloride	16.03	1.0	20	0	80.2	72 - 136				
Chlorobenzene	16.6	1.0	20	0	83.0	82 - 118				
Chloroethane	14.84	1.0	20	0	74.2	60 - 138				
Chloroform	14.73	1.0	20	0	73.6	79 - 124				S
Chloromethane	11.41	1.0	20	0	57.0	50 - 139				
cis-1,2-Dichloroethene	14.47	1.0	20	0	72.4	78 - 123				S
cis-1,3-Dichloropropene	15.04	1.0	20	0	75.2	75 - 124				
Dibromochloromethane	15.95	1.0	20	0	79.7	74 - 126				
Dibromomethane	15.18	1.0	20	0	75.9	79 - 123				S
Dichlorodifluoromethane	8.24	1.0	20	0	41.2	32 - 152				
Ethylbenzene	17.56	1.0	20	0	87.8	79 - 121				
Hexachlorobutadiene	19.66	1.0	20	0	98.3	66 - 134				
Isopropylbenzene	17.76	1.0	20	0	88.8	72 - 131				
m,p-Xylene	34.46	2.0	40	0	86.1	80 - 121				
Methylene chloride	14.82	2.0	20	0	74.1	74 - 124				
Naphthalene	14.34	1.0	20	0	71.7	61 - 128				
n-Butylbenzene	18.55	1.0	20	0	92.8	75 - 128				
n-Propylbenzene	18.51	1.0	20	0	92.6	76 - 126				
o-Xylene	17.05	1.0	20	0	85.2	78 - 122				
sec-Butylbenzene	18.8	1.0	20	0	94.0	77 - 126				
Styrene	16.9	1.0	20	0	84.5	78 - 123				
tert-Butylbenzene	18.59	1.0	20	0	93.0	78 - 124				
Tetrachloroethene	17.42	1.0	20	0	87.1	74 - 129				
Toluene	17.11	1.0	20	0	85.6	80 - 121				
trans-1,2-Dichloroethene	14.48	1.0	20	0	72.4	75 - 124				S
trans-1,3-Dichloropropene	14.6	1.0	20	0	73.0	73 - 127				
Trichloroethene	16.04	1.0	20	0	80.2	79 - 123				
Trichlorofluoromethane	14.69	1.0	20	0	73.5	65 - 141				
Vinyl chloride	12.69	1.0	20	0	63.5	58 - 137				
Surr: 1,2-Dichloroethane-d4	45.22	1.0	50	0	90.4	81 - 118				
Surr: 4-Bromofluorobenzene	50.15	1.0	50	0	100	85 - 114				
Surr: Dibromofluoromethane	46.42	1.0	50	0	92.8	80 - 119				
Surr: Toluene-d8	50.8	1.0	50	0	102	89 - 112				



ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
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**QC BATCH REPORT**

Batch ID: R344032 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS	Sample ID: HS19080443-02MS	Units: UG/L			Analysis Date: 10-Aug-2019 01:52					
Client ID:	Run ID: VOA6_344032	SeqNo: 5204483	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	15.79	1.0	20	0	78.9	78 - 124				
1,1,1-Trichloroethane	14.9	1.0	20	0	74.5	74 - 131				
1,1,2,2-Tetrachloroethane	15.8	1.0	20	0	79.0	71 - 121				
1,1,2-Trichloroethane	15.43	1.0	20	0	77.1	80 - 119				S
1,1-Dichloroethane	14.09	1.0	20	0	70.4	77 - 125				S
1,1-Dichloroethene	14.54	1.0	20	0	72.7	71 - 131				
1,1-Dichloropropene	15.39	1.0	20	0	77.0	78 - 125				S
1,2,3-Trichlorobenzene	15.28	1.0	20	0	76.4	69 - 129				
1,2,3-Trichloropropane	22.77	1.0	20	0	114	73 - 122				
1,2,4-Trichlorobenzene	15.97	1.0	20	0	79.9	69 - 130				
1,2,4-Trimethylbenzene	16.62	1.0	20	0	83.1	76 - 124				
1,2-Dibromo-3-chloropropane	14.78	1.0	20	0	73.9	62 - 128				
1,2-Dibromoethane	15.23	1.0	20	0	76.1	77 - 121				S
1,2-Dichlorobenzene	16.91	1.0	20	0	84.6	80 - 119				
1,2-Dichloroethane	14.24	1.0	20	0	71.2	73 - 128				S
1,2-Dichloropropane	15.4	1.0	20	0	77.0	78 - 122				S
1,3,5-Trimethylbenzene	17.01	1.0	20	0	85.1	75 - 124				
1,3-Dichlorobenzene	16.07	1.0	20	0	80.3	80 - 119				
1,3-Dichloropropane	15.27	1.0	20	0	76.4	80 - 119				S
1,4-Dichlorobenzene	16.84	1.0	20	0	84.2	79 - 118				
2,2-Dichloropropane	12.59	1.0	20	0	63.0	60 - 139				
2-Butanone	33.38	2.0	40	0	83.4	56 - 143				
2-Chlorotoluene	16.35	1.0	20	0	81.8	79 - 122				
2-Hexanone	41.86	2.0	40	0	105	57 - 139				
4-Chlorotoluene	16.25	1.0	20	0	81.2	78 - 122				
4-Isopropyltoluene	17.21	1.0	20	0	86.0	77 - 127				
4-Methyl-2-pentanone	41.98	2.0	40	0	105	67 - 130				
Acetone	26.96	2.0	40	0	67.4	39 - 160				
Benzene	15.37	1.0	20	0	76.8	79 - 120				S
Bromobenzene	15.83	1.0	20	0	79.1	80 - 120				S
Bromochloromethane	13.59	1.0	20	0	68.0	78 - 123				S
Bromodichloromethane	14.7	1.0	20	0	73.5	79 - 125				S
Bromoform	14.56	1.0	20	0	72.8	66 - 130				
Bromomethane	16.62	1.0	20	0	83.1	53 - 141				

## ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080343

## QC BATCH REPORT

Batch ID: R344032 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS	Sample ID: HS19080443-02MS	Units: UG/L			Analysis Date: 10-Aug-2019 01:52					
Client ID:	Run ID: VOA6_344032	SeqNo: 5204483	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	41.47	2.0	40	0	104	64 - 133				
Carbon tetrachloride	15.42	1.0	20	0	77.1	72 - 136				
Chlorobenzene	15.86	1.0	20	0	79.3	82 - 118				S
Chloroethane	14.57	1.0	20	0	72.9	60 - 138				
Chloroform	14.25	1.0	20	0	71.2	79 - 124				S
Chloromethane	11.09	1.0	20	0	55.5	50 - 139				
cis-1,2-Dichloroethene	14.26	1.0	20	0	71.3	78 - 123				S
cis-1,3-Dichloropropene	14.32	1.0	20	0	71.6	75 - 124				S
Dibromochloromethane	15.06	1.0	20	0	75.3	74 - 126				
Dibromomethane	14.32	1.0	20	0	71.6	79 - 123				S
Dichlorodifluoromethane	8.367	1.0	20	0	41.8	32 - 152				
Ethylbenzene	16.48	1.0	20	0	82.4	79 - 121				
Hexachlorobutadiene	18.63	1.0	20	0	93.1	66 - 134				
Isopropylbenzene	16.89	1.0	20	0	84.5	72 - 131				
m,p-Xylene	32.74	2.0	40	0	81.9	80 - 121				
Methylene chloride	14.62	2.0	20	0	73.1	74 - 124				S
Naphthalene	13.37	1.0	20	0	66.8	61 - 128				
n-Butylbenzene	17.45	1.0	20	0	87.2	75 - 128				
n-Propylbenzene	17.2	1.0	20	0	86.0	76 - 126				
o-Xylene	16.25	1.0	20	0	81.2	78 - 122				
sec-Butylbenzene	17.55	1.0	20	0	87.8	77 - 126				
Styrene	16.07	1.0	20	0	80.4	78 - 123				
tert-Butylbenzene	17.5	1.0	20	0	87.5	78 - 124				
Tetrachloroethene	23.4	1.0	20	6.846	82.8	74 - 129				
Toluene	16.25	1.0	20	0	81.2	80 - 121				
trans-1,2-Dichloroethene	14.43	1.0	20	0	72.2	75 - 124				S
trans-1,3-Dichloropropene	13.78	1.0	20	0	68.9	73 - 127				S
Trichloroethene	16.14	1.0	20	0.5885	77.8	79 - 123				S
Trichlorofluoromethane	14.48	1.0	20	0	72.4	65 - 141				
Vinyl chloride	12.55	1.0	20	0	62.7	58 - 137				
Surr: 1,2-Dichloroethane-d4	45.39	1.0	50	0	90.8	81 - 118				
Surr: 4-Bromofluorobenzene	50.08	1.0	50	0	100	85 - 114				
Surr: Dibromofluoromethane	46.42	1.0	50	0	92.8	80 - 119				
Surr: Toluene-d8	49.93	1.0	50	0	99.9	89 - 112				

ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080343

**QC BATCH REPORT**

Batch ID: R344032 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD	Sample ID: HS19080443-06MSD	Units: UG/L			Analysis Date: 10-Aug-2019 03:04					
Client ID:	Run ID: VOA6_344032	SeqNo: 5204486	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	15.89	1.0	20	0	79.5	78 - 124	16.7	4.99	20	
1,1,1-Trichloroethane	14.48	1.0	20	0	72.4	74 - 131	15.51	6.91	20	S
1,1,2,2-Tetrachloroethane	16.53	1.0	20	0	82.7	71 - 121	17	2.75	20	
1,1,2-Trichloroethane	15.8	1.0	20	0	79.0	80 - 119	15.98	1.13	20	S
1,1-Dichloroethane	13.87	1.0	20	0	69.3	77 - 125	14.67	5.63	20	S
1,1-Dichloroethene	14	1.0	20	0	70.0	71 - 131	14.96	6.68	20	S
1,1-Dichloropropene	15.07	1.0	20	0	75.4	78 - 125	15.97	5.77	20	S
1,2,3-Trichlorobenzene	15.99	1.0	20	0	80.0	69 - 129	16.59	3.68	20	
1,2,3-Trichloropropane	23.3	1.0	20	0	116	73 - 122	23.75	1.93	20	
1,2,4-Trichlorobenzene	16.19	1.0	20	0	81.0	69 - 130	17.01	4.95	20	
1,2,4-Trimethylbenzene	16.48	1.0	20	0	82.4	76 - 124	17.66	6.92	20	
1,2-Dibromo-3-chloropropane	15.68	1.0	20	0	78.4	62 - 128	15.59	0.573	20	
1,2-Dibromoethane	15.55	1.0	20	0	77.7	77 - 121	15.79	1.57	20	
1,2-Dichlorobenzene	16.93	1.0	20	0	84.7	80 - 119	18.04	6.36	20	
1,2-Dichloroethane	14.54	1.0	20	0	72.7	73 - 128	14.85	2.14	20	S
1,2-Dichloropropane	15.5	1.0	20	0	77.5	78 - 122	16	3.19	20	S
1,3,5-Trimethylbenzene	16.69	1.0	20	0	83.5	75 - 124	18.1	8.09	20	
1,3-Dichlorobenzene	16.06	1.0	20	0	80.3	80 - 119	17.22	6.96	20	
1,3-Dichloropropane	15.56	1.0	20	0	77.8	80 - 119	15.92	2.28	20	S
1,4-Dichlorobenzene	17.01	1.0	20	0	85.1	79 - 118	18.12	6.32	20	
2,2-Dichloropropane	12.02	1.0	20	0	60.1	60 - 139	12.79	6.19	20	
2-Butanone	34.29	2.0	40	0	85.7	56 - 143	34.65	1.03	20	
2-Chlorotoluene	16.5	1.0	20	0	82.5	79 - 122	17.62	6.54	20	
2-Hexanone	43.35	2.0	40	0	108	57 - 139	43.8	1.03	20	
4-Chlorotoluene	16.14	1.0	20	0	80.7	78 - 122	17.45	7.76	20	
4-Isopropyltoluene	16.99	1.0	20	0	84.9	77 - 127	18.31	7.51	20	
4-Methyl-2-pentanone	43.26	2.0	40	0	108	67 - 130	43.51	0.578	20	
Acetone	27.03	2.0	40	0	67.6	39 - 160	27	0.0883	20	
Benzene	15.12	1.0	20	0	75.6	79 - 120	15.86	4.77	20	S
Bromobenzene	16.14	1.0	20	0	80.7	80 - 120	16.8	4.01	20	
Bromochloromethane	13.66	1.0	20	0	68.3	78 - 123	14.06	2.93	20	S
Bromodichloromethane	14.9	1.0	20	0	74.5	79 - 125	15.3	2.64	20	S
Bromoform	15.02	1.0	20	0	75.1	66 - 130	15.37	2.27	20	
Bromomethane	14.53	1.0	20	0	72.6	53 - 141	15.25	4.88	20	

## ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080343

## QC BATCH REPORT

Batch ID: R344032 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD	Sample ID: HS19080443-06MSD	Units: UG/L			Analysis Date: 10-Aug-2019 03:04					
Client ID:	Run ID: VOA6_344032	SeqNo: 5204486	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	39.53	2.0	40	0	98.8	64 - 133	42.19	6.52	20	
Carbon tetrachloride	15.19	1.0	20	0	75.9	72 - 136	16.03	5.4	20	
Chlorobenzene	15.9	1.0	20	0	79.5	82 - 118	16.6	4.31	20	S
Chloroethane	13.97	1.0	20	0	69.8	60 - 138	14.84	6.07	20	
Chloroform	14.13	1.0	20	0	70.7	79 - 124	14.73	4.12	20	S
Chloromethane	10.62	1.0	20	0	53.1	50 - 139	11.41	7.13	20	
cis-1,2-Dichloroethene	13.79	1.0	20	0	68.9	78 - 123	14.47	4.85	20	S
cis-1,3-Dichloropropene	14.58	1.0	20	0	72.9	75 - 124	15.04	3.08	20	S
Dibromochloromethane	15.36	1.0	20	0	76.8	74 - 126	15.95	3.75	20	
Dibromomethane	14.69	1.0	20	0	73.5	79 - 123	15.18	3.26	20	S
Dichlorodifluoromethane	7.925	1.0	20	0	39.6	32 - 152	8.24	3.9	20	
Ethylbenzene	16.4	1.0	20	0	82.0	79 - 121	17.56	6.86	20	
Hexachlorobutadiene	18.26	1.0	20	0	91.3	66 - 134	19.66	7.35	20	
Isopropylbenzene	16.68	1.0	20	0	83.4	72 - 131	17.76	6.3	20	
m,p-Xylene	32.16	2.0	40	0	80.4	80 - 121	34.46	6.91	20	
Methylene chloride	14.19	2.0	20	0	71.0	74 - 124	14.82	4.29	20	S
Naphthalene	13.7	1.0	20	0	68.5	61 - 128	14.34	4.58	20	
n-Butylbenzene	17.19	1.0	20	0	85.9	75 - 128	18.55	7.63	20	
n-Propylbenzene	17.04	1.0	20	0	85.2	76 - 126	18.51	8.28	20	
o-Xylene	16.34	1.0	20	0	81.7	78 - 122	17.05	4.25	20	
sec-Butylbenzene	17.26	1.0	20	0	86.3	77 - 126	18.8	8.52	20	
Styrene	15.96	1.0	20	0	79.8	78 - 123	16.9	5.73	20	
tert-Butylbenzene	17.35	1.0	20	0	86.8	78 - 124	18.59	6.89	20	
Tetrachloroethene	16.22	1.0	20	0	81.1	74 - 129	17.42	7.11	20	
Toluene	16.17	1.0	20	0	80.8	80 - 121	17.11	5.7	20	
trans-1,2-Dichloroethene	14.02	1.0	20	0	70.1	75 - 124	14.48	3.23	20	S
trans-1,3-Dichloropropene	14.41	1.0	20	0	72.1	73 - 127	14.6	1.31	20	S
Trichloroethene	15.29	1.0	20	0	76.4	79 - 123	16.04	4.78	20	S
Trichlorofluoromethane	13.85	1.0	20	0	69.2	65 - 141	14.69	5.9	20	
Vinyl chloride	11.99	1.0	20	0	60.0	58 - 137	12.69	5.67	20	
Surr: 1,2-Dichloroethane-d4	45.37	1.0	50	0	90.7	81 - 118	45.22	0.338	20	
Surr: 4-Bromofluorobenzene	50.22	1.0	50	0	100	85 - 114	50.15	0.144	20	
Surr: Dibromofluoromethane	46.3	1.0	50	0	92.6	80 - 119	46.42	0.248	20	
Surr: Toluene-d8	50.44	1.0	50	0	101	89 - 112	50.8	0.709	20	

ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080343

**QC BATCH REPORT**

Batch ID: R344032 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C							
MSD	Sample ID: HS19080443-02MSD	Units: UG/L			Analysis Date: 10-Aug-2019 02:16						
Client ID:	Run ID: VOA6_344032	SeqNo: 5204484		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	15.45	1.0	20	0	77.3	78 - 124	15.79	2.14	20	S	
1,1,1-Trichloroethane	14.42	1.0	20	0	72.1	74 - 131	14.9	3.22	20	S	
1,1,2,2-Tetrachloroethane	15.63	1.0	20	0	78.1	71 - 121	15.8	1.12	20		
1,1,2-Trichloroethane	15.11	1.0	20	0	75.5	80 - 119	15.43	2.08	20	S	
1,1-Dichloroethane	13.58	1.0	20	0	67.9	77 - 125	14.09	3.63	20	S	
1,1-Dichloroethene	13.8	1.0	20	0	69.0	71 - 131	14.54	5.2	20	S	
1,1-Dichloropropene	14.89	1.0	20	0	74.4	78 - 125	15.39	3.32	20	S	
1,2,3-Trichlorobenzene	15.44	1.0	20	0	77.2	69 - 129	15.28	1.01	20		
1,2,3-Trichloropropane	22.11	1.0	20	0	111	73 - 122	22.77	2.94	20		
1,2,4-Trichlorobenzene	15.51	1.0	20	0	77.5	69 - 130	15.97	2.97	20		
1,2,4-Trimethylbenzene	16.04	1.0	20	0	80.2	76 - 124	16.62	3.58	20		
1,2-Dibromo-3-chloropropane	14.48	1.0	20	0	72.4	62 - 128	14.78	2.02	20		
1,2-Dibromoethane	14.85	1.0	20	0	74.2	77 - 121	15.23	2.55	20	S	
1,2-Dichlorobenzene	16.5	1.0	20	0	82.5	80 - 119	16.91	2.49	20		
1,2-Dichloroethane	14.21	1.0	20	0	71.1	73 - 128	14.24	0.21	20	S	
1,2-Dichloropropane	15.05	1.0	20	0	75.2	78 - 122	15.4	2.34	20	S	
1,3,5-Trimethylbenzene	16.37	1.0	20	0	81.8	75 - 124	17.01	3.85	20		
1,3-Dichlorobenzene	15.56	1.0	20	0	77.8	80 - 119	16.07	3.22	20	S	
1,3-Dichloropropane	15.05	1.0	20	0	75.3	80 - 119	15.27	1.48	20	S	
1,4-Dichlorobenzene	16.43	1.0	20	0	82.1	79 - 118	16.84	2.49	20		
2,2-Dichloropropane	11.8	1.0	20	0	59.0	60 - 139	12.59	6.51	20	S	
2-Butanone	33.92	2.0	40	0	84.8	56 - 143	33.38	1.61	20		
2-Chlorotoluene	15.77	1.0	20	0	78.9	79 - 122	16.35	3.6	20	S	
2-Hexanone	41.84	2.0	40	0	105	57 - 139	41.86	0.0663	20		
4-Chlorotoluene	15.74	1.0	20	0	78.7	78 - 122	16.25	3.15	20		
4-Isopropyltoluene	16.72	1.0	20	0	83.6	77 - 127	17.21	2.85	20		
4-Methyl-2-pentanone	42.12	2.0	40	0	105	67 - 130	41.98	0.318	20		
Acetone	26.48	2.0	40	0	66.2	39 - 160	26.96	1.79	20		
Benzene	14.74	1.0	20	0	73.7	79 - 120	15.37	4.14	20	S	
Bromobenzene	15.42	1.0	20	0	77.1	80 - 120	15.83	2.63	20	S	
Bromochloromethane	13.09	1.0	20	0	65.5	78 - 123	13.59	3.75	20	S	
Bromodichloromethane	14.51	1.0	20	0	72.5	79 - 125	14.7	1.31	20	S	
Bromoform	14.51	1.0	20	0	72.6	66 - 130	14.56	0.324	20		
Bromomethane	14.4	1.0	20	0	72.0	53 - 141	16.62	14.3	20		

## ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080343

## QC BATCH REPORT

Batch ID: R344032 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD	Sample ID: HS19080443-02MSD	Units: UG/L			Analysis Date: 10-Aug-2019 02:16					
Client ID:	Run ID: VOA6_344032	SeqNo: 5204484	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	39.18	2.0	40	0	97.9	64 - 133	41.47	5.68	20	
Carbon tetrachloride	14.75	1.0	20	0	73.8	72 - 136	15.42	4.45	20	
Chlorobenzene	15.49	1.0	20	0	77.5	82 - 118	15.86	2.37	20	S
Chloroethane	13.57	1.0	20	0	67.9	60 - 138	14.57	7.11	20	
Chloroform	13.6	1.0	20	0	68.0	79 - 124	14.25	4.65	20	S
Chloromethane	10.45	1.0	20	0	52.3	50 - 139	11.09	5.91	20	
cis-1,2-Dichloroethene	13.71	1.0	20	0	68.5	78 - 123	14.26	3.95	20	S
cis-1,3-Dichloropropene	14.09	1.0	20	0	70.5	75 - 124	14.32	1.57	20	S
Dibromochloromethane	14.87	1.0	20	0	74.4	74 - 126	15.06	1.25	20	
Dibromomethane	14.23	1.0	20	0	71.1	79 - 123	14.32	0.675	20	S
Dichlorodifluoromethane	7.819	1.0	20	0	39.1	32 - 152	8.367	6.77	20	
Ethylbenzene	16.07	1.0	20	0	80.4	79 - 121	16.48	2.54	20	
Hexachlorobutadiene	18.25	1.0	20	0	91.3	66 - 134	18.63	2.02	20	
Isopropylbenzene	16.34	1.0	20	0	81.7	72 - 131	16.89	3.29	20	
m,p-Xylene	31.48	2.0	40	0	78.7	80 - 121	32.74	3.94	20	S
Methylene chloride	13.94	2.0	20	0	69.7	74 - 124	14.62	4.76	20	S
Naphthalene	13.21	1.0	20	0	66.0	61 - 128	13.37	1.2	20	
n-Butylbenzene	16.85	1.0	20	0	84.2	75 - 128	17.45	3.49	20	
n-Propylbenzene	16.59	1.0	20	0	82.9	76 - 126	17.2	3.63	20	
o-Xylene	15.8	1.0	20	0	79.0	78 - 122	16.25	2.78	20	
sec-Butylbenzene	16.91	1.0	20	0	84.6	77 - 126	17.55	3.71	20	
Styrene	15.76	1.0	20	0	78.8	78 - 123	16.07	1.97	20	
tert-Butylbenzene	16.79	1.0	20	0	84.0	78 - 124	17.5	4.12	20	
Tetrachloroethene	22.33	1.0	20	6.846	77.4	74 - 129	23.4	4.67	20	
Toluene	15.8	1.0	20	0	79.0	80 - 121	16.25	2.78	20	S
trans-1,2-Dichloroethene	13.59	1.0	20	0	67.9	75 - 124	14.43	6.03	20	S
trans-1,3-Dichloropropene	13.73	1.0	20	0	68.6	73 - 127	13.78	0.419	20	S
Trichloroethene	15.39	1.0	20	0.5885	74.0	79 - 123	16.14	4.74	20	S
Trichlorofluoromethane	13.65	1.0	20	0	68.3	65 - 141	14.48	5.85	20	
Vinyl chloride	11.89	1.0	20	0	59.5	58 - 137	12.55	5.36	20	
Surr: 1,2-Dichloroethane-d4	45.07	1.0	50	0	90.1	81 - 118	45.39	0.723	20	
Surr: 4-Bromofluorobenzene	50.65	1.0	50	0	101	85 - 114	50.08	1.14	20	
Surr: Dibromofluoromethane	46.26	1.0	50	0	92.5	80 - 119	46.42	0.344	20	
Surr: Toluene-d8	50.38	1.0	50	0	101	89 - 112	49.93	0.897	20	

ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080343

**QC BATCH REPORT****Batch ID:** R344032 ( 0 )**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch: HS19080343-01 HS19080343-02

ALS Houston, US

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080343

**QC BATCH REPORT**

Batch ID: R344190 ( 0 )		Instrument: ICS2100		Method: ANIONS BY SW9056A						
<b>MBLK</b>	Sample ID: <b>WBLKW1-081219</b>	Units: <b>mg/L</b>			Analysis Date: <b>12-Aug-2019 17:50</b>					
Client ID:	Run ID: <b>ICS2100_344190</b>	SeqNo: <b>5207964</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	0.500	0.500							U	
Sulfate	0.500	0.500							U	
<b>LCS</b>	Sample ID: <b>WLCSW1-081219</b>	Units: <b>mg/L</b>			Analysis Date: <b>12-Aug-2019 18:15</b>					
Client ID:	Run ID: <b>ICS2100_344190</b>	SeqNo: <b>5207965</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	20.64	0.500	20	0	103	80 - 120				
Sulfate	20.76	0.500	20	0	104	80 - 120				
<b>LCSD</b>	Sample ID: <b>WLCSDW1-081219</b>	Units: <b>mg/L</b>			Analysis Date: <b>12-Aug-2019 18:29</b>					
Client ID:	Run ID: <b>ICS2100_344190</b>	SeqNo: <b>5207966</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	19.94	0.500	20	0	99.7	80 - 120	20.64	3.46	20	
Sulfate	20.06	0.500	20	0	100	80 - 120	20.76	3.42	20	
<b>MS</b>	Sample ID: <b>HS19080180-02MS</b>	Units: <b>mg/L</b>			Analysis Date: <b>13-Aug-2019 00:06</b>					
Client ID:	Run ID: <b>ICS2100_344190</b>	SeqNo: <b>5207989</b>		PrepDate:			DF: <b>50</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	680.5	25.0	500	178.9	100	80 - 120				
Sulfate	3460	25.0	500	2914	109	80 - 120			O	
<b>MSD</b>	Sample ID: <b>HS19080180-02MSD</b>	Units: <b>mg/L</b>			Analysis Date: <b>13-Aug-2019 00:21</b>					
Client ID:	Run ID: <b>ICS2100_344190</b>	SeqNo: <b>5207990</b>		PrepDate:			DF: <b>50</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	642	25.0	500	178.9	92.6	80 - 120	680.5	5.82	20	
Sulfate	3265	25.0	500	2914	70.2	80 - 120	3460	5.78	20 SO	

The following samples were analyzed in this batch:



**ALS Houston, US**

Date: 14-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19080343

**QUALIFIERS,  
ACRONYMS, UNITS**

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

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

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

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ALS Houston, US

Date: 14-ago-19

**Client:** Bhate Environmental Associates, Inc.**Project:** Longhorn GW Treatment Plant**Work Order:** HS19080343**SAMPLE TRACKING**

---

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19080343-01	LH18/24-SP650_080619	Login	08/08/2019 7:15:26	JRM	WET259
HS19080343-01	LH18/24-SP650_080619	Login	08/08/2019 7:15:26	JRM	VOA160
HS19080343-02	Trip Blank	Login	08/08/2019 7:15:26	JRM	VOA160

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**Sample Receipt Checklist**

Client Name: Bhate Environmental  
 Work Order: HS19080343

Date/Time Received: **07-Aug-2019 08:50**  
 Received by: **JRM**

Checklist completed by: Jared R. Makan 8-Aug-2019  
 eSignature Date

Reviewed by: RJ Modashia 8-Aug-2019  
 eSignature Date

Matrices: **Water**

Carrier name: **FedEx Priority Overnight**

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

Temperature(s)/Thermometer(s): 0.7c/0.7c UC/C IR25  
 Cooler(s)/Kit(s): 44179  
 Date/Time sample(s) sent to storage: 08/08/2019 08:50

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

pH adjusted by:


Login Notes:

Client Contacted: Date Contacted: Person Contacted:  
 Contacted By: Regarding:

Comments:

Corrective Action:



 <p><b>ALS</b> 10450 Stancilff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887</p>	<b>CUSTODY S</b>	
	Date: 8/6/19	Time: 1
	Name: Scott Bess	
	Company: BHA	

<b>SEAL</b>	Seal Broken By:
1430	SM
NOGR	Date:
	8/9/19

TRK# 4809 7834 3300  
0221

RETURNS MON-SAT  
PRIORITY OVERNIGHT

**FedEx**  
TRK# 4809 7834 3300  
0221

77099  
WED - 07 AUG 10:30A  
PRIORITY OVERNIGHT

**AB SGRA**

77099  
TX-US  
IAH



1 102 107705 06AUG19 00GA 580C2/F651/BCDN



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

August 30, 2019

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

Work Order: **HS19080732**

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

Dear Marcia,

ALS Environmental received 3 sample(s) on Aug 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval.

Generated By: JUMOKE.LAWAL  
RJ Modashia  
Project Manager

ALS Houston, US

Date: 30-Aug-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**Work Order:** HS19080732

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**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19080732-01	LH18/24-SP650_081419	Water		14-Aug-2019 14:00	15-Aug-2019 08:49	<input type="checkbox"/>
HS19080732-02	LH18/24-SP650_081419_BIX	Water		14-Aug-2019 14:00	15-Aug-2019 08:49	<input type="checkbox"/>
HS19080732-03	Trip Blank	Water	C&G- 062119-168	14-Aug-2019 00:00	15-Aug-2019 08:49	<input type="checkbox"/>

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**ALS Houston, US**

Date: 30-Aug-19

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**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**Work Order:**

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**CASE NARRATIVE**

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**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: 144188****Sample ID: LCSD-144188**

- The RPD between the LCS and LCSD was outside of the control limit for surrogate Nitrobenzene-d5
- 

**GCMS Volatiles by Method SW8260****Batch ID: R344596****Sample ID: HS19080827-02MS**

- MS and MSD are for an unrelated sample
- 

**Metals by Method SW6020****Batch ID: 144236****Sample ID: HS19080444-02MS**

- MS/MSD and DUPs are for an unrelated sample
- 

**WetChemistry by Method SW7196****Batch ID: R344315**

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

## ALS Houston, US

Date: 30-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: LH18/24-SP650\_081419  
 Collection Date: 14-Aug-2019 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19080732  
 Lab ID:HS19080732-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	20-Aug-2019 18:30	
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	20-Aug-2019 18:30	
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	20-Aug-2019 18:30	
<b>Acetone</b>	<b>3.4</b>		<b>0.40</b>	<b>1.0</b>	<b>2.0</b>	<b>UG/L</b>	1	20-Aug-2019 18:30	
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	20-Aug-2019 18:30	
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	

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

## ALS Houston, US

Date: 30-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: LH18/24-SP650\_081419  
 Collection Date: 14-Aug-2019 14:00

## ANALYTICAL REPORT

WorkOrder:HS19080732  
 Lab ID:HS19080732-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>						Analyst: PC	
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
<b>cis-1,2-Dichloroethene</b>	<b>2.0</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	20-Aug-2019 18:30	
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	20-Aug-2019 18:30	
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	20-Aug-2019 18:30	
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	20-Aug-2019 18:30	
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
<b>Trichloroethene</b>	<b>0.93</b>	<b>J</b>	<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	20-Aug-2019 18:30	
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 18:30	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>90.0</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	1	20-Aug-2019 18:30	
<i>Surr: 4-Bromofluorobenzene</i>	<i>102</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	1	20-Aug-2019 18:30	
<i>Surr: Dibromofluoromethane</i>	<i>94.3</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	1	20-Aug-2019 18:30	
<i>Surr: Toluene-d8</i>	<i>102</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	1	20-Aug-2019 18:30	
<b>SEMIVOLATILES SIM</b>		<b>Method:SW8270SIM</b>				Prep:SW3510 / 15-Aug-2019		Analyst: LG	
<b>1,4-Dioxane</b>	<b>0.49</b>		<b>0.010</b>	<b>0.010</b>	<b>0.010</b>	<b>ug/L</b>	1	20-Aug-2019 14:43	
<i>Surr: 2-Fluorobiphenyl</i>	<i>83.8</i>			<b>0</b>	<i>40-140</i>	<b>%REC</b>	1	20-Aug-2019 14:43	
<i>Surr: 4-Terphenyl-d14</i>	<i>92.3</i>			<b>0</b>	<i>40-140</i>	<b>%REC</b>	1	20-Aug-2019 14:43	
<i>Surr: Nitrobenzene-d5</i>	<i>99.1</i>			<b>0</b>	<i>40-140</i>	<b>%REC</b>	1	20-Aug-2019 14:43	
<b>METALS BY ICPMS BY SW6020A</b>		<b>Method:SW6020</b>				Prep:SW3010A / 16-Aug-2019		Analyst: JHD	
<b>Barium</b>	<b>0.138</b>		<b>0.00190</b>	<b>0.00250</b>	<b>0.00500</b>	<b>mg/L</b>	1	21-Aug-2019 14:04	
Lead	0.00100	U	0.000600	0.00100	0.00500	mg/L	1	21-Aug-2019 14:04	
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	21-Aug-2019 14:04	
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	21-Aug-2019 14:04	

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

## ALS Houston, US

Date: 30-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: LH18/24-SP650\_081419  
 Collection Date: 14-Aug-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19080732  
 Lab ID:HS19080732-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>HEXAVALENT CHROMIUM BY SW7196A</b>	<b>Method:SW7196</b>							Analyst: MZD
Chromium, Hexavalent	0.0100	U	0.00600	0.0100	0.0100	mg/L	1	15-Aug-2019 12:20

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

## ALS Houston, US

Date: 30-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: LH18/24-SP650\_081419\_ BIX  
 Collection Date: 14-Aug-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19080732  
 Lab ID:HS19080732-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>		Analyst: SUB				
Subcontract Analysis	See Attached		0	0		NA	1	23-Aug-2019 18:03

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

## ALS Houston, US

Date: 30-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: Trip Blank  
 Collection Date: 14-Aug-2019 00:00

**ANALYTICAL REPORT**

WorkOrder:HS19080732  
 Lab ID:HS19080732-03  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	20-Aug-2019 17:42	
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	20-Aug-2019 17:42	
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	20-Aug-2019 17:42	
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	20-Aug-2019 17:42	
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	20-Aug-2019 17:42	
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42	
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42	

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

## ALS Houston, US

Date: 30-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Effluent Samples  
 Sample ID: Trip Blank  
 Collection Date: 14-Aug-2019 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19080732  
 Lab ID:HS19080732-03  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						
<b>8260C</b>								Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	20-Aug-2019 17:42
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	20-Aug-2019 17:42
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	20-Aug-2019 17:42
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	20-Aug-2019 17:42
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	20-Aug-2019 17:42
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	20-Aug-2019 17:42
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	20-Aug-2019 17:42
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>88.5</i>			<i>0</i>	<i>81-118</i>	<i>%REC</i>	<i>1</i>	<i>20-Aug-2019 17:42</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>103</i>			<i>0</i>	<i>85-114</i>	<i>%REC</i>	<i>1</i>	<i>20-Aug-2019 17:42</i>
<i>Surr: Dibromofluoromethane</i>	<i>92.9</i>			<i>0</i>	<i>80-119</i>	<i>%REC</i>	<i>1</i>	<i>20-Aug-2019 17:42</i>
<i>Surr: Toluene-d8</i>	<i>103</i>			<i>0</i>	<i>89-112</i>	<i>%REC</i>	<i>1</i>	<i>20-Aug-2019 17:42</i>

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

## WEIGHT LOG

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

**Batch ID:** 144188      **Method:** SEMIVOLATILES SIM      **Prep:** 3510\_B\_SIM

SamplID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19080732-01	1	1000	1 (mL)	0.001

**Batch ID:** 144236      **Method:** METALS BY ICPMS BY SW6020A      **Prep:** 3010A

SamplID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19080732-01	1	10	10 (mL)	1



ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> 144188 ( 0 )		<b>Test Name :</b> SEMIVOLATILES SIM			<b>Matrix:</b> Water	
HS19080732-01	LH18/24-SP650_081419	14 Aug 2019 14:00		15 Aug 2019 13:05	20 Aug 2019 14:43	1
<b>Batch ID:</b> 144236 ( 0 )		<b>Test Name :</b> METALS BY ICPMS BY SW6020A			<b>Matrix:</b> Water	
HS19080732-01	LH18/24-SP650_081419	14 Aug 2019 14:00		16 Aug 2019 11:00	21 Aug 2019 14:04	1
<b>Batch ID:</b> R344315 ( 0 )		<b>Test Name :</b> HEXAVALENT CHROMIUM BY SW7196A			<b>Matrix:</b> Water	
HS19080732-01	LH18/24-SP650_081419	14 Aug 2019 14:00			15 Aug 2019 12:20	1
<b>Batch ID:</b> R344596 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS19080732-01	LH18/24-SP650_081419	14 Aug 2019 14:00			20 Aug 2019 18:30	1
HS19080732-03	Trip Blank	14 Aug 2019 00:00			20 Aug 2019 17:42	1
<b>Batch ID:</b> R344886 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS19080732-02	LH18/24-SP650_081419_BIX	14 Aug 2019 14:00			23 Aug 2019 18:03	1

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

**QC BATCH REPORT**

Batch ID: 144236 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A						
<b>MBLK</b>	Sample ID: <b>MBLK-144236</b>	Units: <b>mg/L</b>		Analysis Date: <b>21-Aug-2019 12:39</b>						
Client ID:	Run ID: <b>ICPMS05_344606</b>	SeqNo: <b>5219424</b>	PrepDate: <b>16-Aug-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.00250	0.00500								U
Lead	0.00100	0.00500								U
Selenium	0.00250	0.00500								U
Silver	0.000500	0.00500								U
<b>LCS</b>	Sample ID: <b>LCS-144236</b>	Units: <b>mg/L</b>		Analysis Date: <b>21-Aug-2019 12:41</b>						
Client ID:	Run ID: <b>ICPMS05_344606</b>	SeqNo: <b>5219425</b>	PrepDate: <b>16-Aug-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	0.04667	0.00500	0.05	0	93.3	86 - 114				
Lead	0.04668	0.00500	0.05	0	93.4	88 - 115				
Selenium	0.04726	0.00500	0.05	0	94.5	80 - 120				
Silver	0.04905	0.00500	0.05	0	98.1	85 - 116				
<b>MS</b>	Sample ID: <b>HS19080444-02MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>21-Aug-2019 13:14</b>						
Client ID:	Run ID: <b>ICPMS05_344606</b>	SeqNo: <b>5219411</b>	PrepDate: <b>16-Aug-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	1.005	0.00500	0.05	0.9778	54.2	86 - 114				SO
Lead	0.04697	0.00500	0.05	0.000297	93.3	88 - 115				
Selenium	0.04542	0.00500	0.05	-0.000066	91.0	80 - 120				
Silver	0.04799	0.00500	0.05	0.000091	95.8	85 - 116				
<b>MSD</b>	Sample ID: <b>HS19080444-02MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>21-Aug-2019 13:16</b>						
Client ID:	Run ID: <b>ICPMS05_344606</b>	SeqNo: <b>5219412</b>	PrepDate: <b>16-Aug-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	1.051	0.00500	0.05	0.9778	146	86 - 114	1.005	4.47	20	SO
Lead	0.04753	0.00500	0.05	0.000297	94.5	88 - 115	0.04697	1.19	20	
Selenium	0.04647	0.00500	0.05	-0.000066	93.1	80 - 120	0.04542	2.29	20	
Silver	0.04619	0.00500	0.05	0.000091	92.2	85 - 116	0.04799	3.83	20	

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

**QC BATCH REPORT**

Batch ID: 144236 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A						
<b>PDS</b>	Sample ID: <b>HS19080444-02PDS</b>	Units: <b>mg/L</b>			Analysis Date: <b>21-Aug-2019 13:18</b>					
Client ID:	Run ID: <b>ICPMS05_344606</b>	SeqNo: <b>5219413</b>		PrepDate: <b>16-Aug-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Barium	1.13	0.00500	0.1	0.9778	152	80 - 120			SO	
Lead	0.1158	0.00500	0.1	0.000297	115	80 - 120				
Selenium	0.1168	0.00500	0.1	-0.000066	117	80 - 120				
Silver	0.1004	0.00500	0.1	0.000091	100	80 - 120				
<b>SD</b>	Sample ID: <b>HS19080444-02SD</b>	Units: <b>mg/L</b>			Analysis Date: <b>21-Aug-2019 13:12</b>					
Client ID:	Run ID: <b>ICPMS05_344606</b>	SeqNo: <b>5219410</b>		PrepDate: <b>16-Aug-2019</b>		DF: <b>5</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	Limit Qual	
Barium	0.965	0.0250					0.9778	1.31	10	
Lead	0.00500	0.0250					0.000297	0	10 U	
Selenium	0.0125	0.0250					-0.000066	0	10 U	
Silver	0.00250	0.0250					0.000091	0	10 U	
The following samples were analyzed in this batch: <span style="border: 1px solid black; padding: 2px;">HS19080732-01</span>										

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

**QC BATCH REPORT**

Batch ID: 144188 ( 0 )		Instrument: SV-6		Method: SEMIVOLATILES SIM						
<b>MBLK</b>	Sample ID: <b>MBLK-144188</b>	Units: <b>ug/L</b>			Analysis Date: <b>20-Aug-2019 13:24</b>					
Client ID:	Run ID: <b>SV-6_344637</b>	SeqNo: <b>5217309</b>		PrepDate: <b>15-Aug-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
1,4-Dioxane	0.010	0.010							U	
Surr: 2-Fluorobiphenyl	0.06413	0	0.08	0	80.2	40 - 140				
Surr: 4-Terphenyl-d14	0.06533	0	0.08	0	81.7	40 - 140				
Surr: Nitrobenzene-d5	0.06706	0	0.08	0	83.8	40 - 140				
<b>LCS</b>	Sample ID: <b>LCS-144188</b>	Units: <b>ug/L</b>			Analysis Date: <b>20-Aug-2019 13:43</b>					
Client ID:	Run ID: <b>SV-6_344637</b>	SeqNo: <b>5217310</b>		PrepDate: <b>15-Aug-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
1,4-Dioxane	0.08189	0.010	0.08	0	102	40 - 140				
Surr: 2-Fluorobiphenyl	0.06937	0	0.08	0	86.7	40 - 140				
Surr: 4-Terphenyl-d14	0.08466	0	0.08	0	106	40 - 140				
Surr: Nitrobenzene-d5	0.06584	0	0.08	0	82.3	40 - 140				
<b>LCSD</b>	Sample ID: <b>LCSD-144188</b>	Units: <b>ug/L</b>			Analysis Date: <b>20-Aug-2019 14:02</b>					
Client ID:	Run ID: <b>SV-6_344637</b>	SeqNo: <b>5217311</b>		PrepDate: <b>15-Aug-2019</b>		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
1,4-Dioxane	0.08085	0.010	0.08	0	101	40 - 140	0.08189	1.28	20	
Surr: 2-Fluorobiphenyl	0.07486	0	0.08	0	93.6	40 - 140	0.06937	7.61	20	
Surr: 4-Terphenyl-d14	0.07438	0	0.08	0	93.0	40 - 140	0.08466	12.9	20	
Surr: Nitrobenzene-d5	0.08144	0	0.08	0	102	40 - 140	0.06584	21.2	20 R	

The following samples were analyzed in this batch:

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

**QC BATCH REPORT**

Batch ID: R344596 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MBLK	Sample ID: VBLKW-190820	Units: UG/L			Analysis Date: 20-Aug-2019 13:41					
Client ID:	Run ID: VOA6_344596	SeqNo: 5216650	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	0.50	1.0								U
1,1,1-Trichloroethane	0.50	1.0								U
1,1,2,2-Tetrachloroethane	0.50	1.0								U
1,1,2-Trichloroethane	0.50	1.0								U
1,1-Dichloroethane	0.50	1.0								U
1,1-Dichloroethene	0.50	1.0								U
1,1-Dichloropropene	0.50	1.0								U
1,2,3-Trichlorobenzene	0.50	1.0								U
1,2,3-Trichloropropane	0.50	1.0								U
1,2,4-Trichlorobenzene	0.50	1.0								U
1,2,4-Trimethylbenzene	0.50	1.0								U
1,2-Dibromo-3-chloropropane	0.50	1.0								U
1,2-Dibromoethane	0.50	1.0								U
1,2-Dichlorobenzene	0.50	1.0								U
1,2-Dichloroethane	0.50	1.0								U
1,2-Dichloropropane	0.50	1.0								U
1,3,5-Trimethylbenzene	0.50	1.0								U
1,3-Dichlorobenzene	0.50	1.0								U
1,3-Dichloropropane	0.50	1.0								U
1,4-Dichlorobenzene	0.50	1.0								U
2,2-Dichloropropane	0.50	1.0								U
2-Butanone	1.0	2.0								U
2-Chlorotoluene	0.50	1.0								U
2-Hexanone	1.0	2.0								U
4-Chlorotoluene	0.50	1.0								U
4-Isopropyltoluene	0.50	1.0								U
4-Methyl-2-pentanone	1.0	2.0								U
Acetone	1.0	2.0								U
Benzene	0.50	1.0								U
Bromobenzene	0.50	1.0								U
Bromochloromethane	0.50	1.0								U
Bromodichloromethane	0.50	1.0								U
Bromoform	0.50	1.0								U
Bromomethane	0.50	1.0								U

## ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

## QC BATCH REPORT

Batch ID: R344596 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MBLK	Sample ID: VBLKW-190820	Units: UG/L			Analysis Date: 20-Aug-2019 13:41					
Client ID:	Run ID: VOA6_344596	SeqNo: 5216650	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	1.0	2.0								U
Carbon tetrachloride	0.50	1.0								U
Chlorobenzene	0.50	1.0								U
Chloroethane	0.50	1.0								U
Chloroform	0.50	1.0								U
Chloromethane	0.50	1.0								U
cis-1,2-Dichloroethene	0.50	1.0								U
cis-1,3-Dichloropropene	0.50	1.0								U
Dibromochloromethane	0.50	1.0								U
Dibromomethane	0.50	1.0								U
Dichlorodifluoromethane	0.50	1.0								U
Ethylbenzene	0.50	1.0								U
Hexachlorobutadiene	1.0	1.0								U
Isopropylbenzene	0.50	1.0								U
m,p-Xylene	1.0	2.0								U
Methylene chloride	1.0	2.0								U
Naphthalene	0.50	1.0								U
n-Butylbenzene	0.50	1.0								U
n-Propylbenzene	0.50	1.0								U
o-Xylene	0.50	1.0								U
sec-Butylbenzene	0.50	1.0								U
Styrene	0.50	1.0								U
tert-Butylbenzene	0.50	1.0								U
Tetrachloroethene	0.50	1.0								U
Toluene	0.50	1.0								U
trans-1,2-Dichloroethene	0.50	1.0								U
trans-1,3-Dichloropropene	0.50	1.0								U
Trichloroethene	0.50	1.0								U
Trichlorofluoromethane	0.50	1.0								U
Vinyl chloride	0.50	1.0								U
Surr: 1,2-Dichloroethane-d4	43.51	1.0	50	0	87.0	81 - 118				
Surr: 4-Bromofluorobenzene	51.16	1.0	50	0	102	85 - 114				
Surr: Dibromofluoromethane	46.18	1.0	50	0	92.4	80 - 119				
Surr: Toluene-d8	51.6	1.0	50	0	103	89 - 112				

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

**QC BATCH REPORT**

Batch ID: R344596 ( 0 )		Instrument: VOA6			Method: VOLATILES ORGANICS BY METHOD 8260C					
LCS	Sample ID: VLCSW-190820	Units: UG/L			Analysis Date: 20-Aug-2019 12:53					
Client ID:	Run ID: VOA6_344596	SeqNo: 5216649		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	19.51	1.0	20	0	97.6	78 - 124				
1,1,1-Trichloroethane	19.78	1.0	20	0	98.9	74 - 131				
1,1,2,2-Tetrachloroethane	20.56	1.0	20	0	103	71 - 121				
1,1,2-Trichloroethane	20.02	1.0	20	0	100	80 - 119				
1,1-Dichloroethane	20.57	1.0	20	0	103	77 - 125				
1,1-Dichloroethene	20.28	1.0	20	0	101	71 - 131				
1,1-Dichloropropene	19.03	1.0	20	0	95.2	78 - 125				
1,2,3-Trichlorobenzene	22.1	1.0	20	0	110	69 - 129				
1,2,3-Trichloropropane	20.63	1.0	20	0	103	73 - 122				
1,2,4-Trichlorobenzene	21.03	1.0	20	0	105	69 - 130				
1,2,4-Trimethylbenzene	19.28	1.0	20	0	96.4	76 - 124				
1,2-Dibromo-3-chloropropane	19.41	1.0	20	0	97.1	62 - 128				
1,2-Dibromoethane	19.53	1.0	20	0	97.7	77 - 121				
1,2-Dichlorobenzene	20.11	1.0	20	0	101	80 - 119				
1,2-Dichloroethane	19.23	1.0	20	0	96.1	73 - 128				
1,2-Dichloropropane	21.19	1.0	20	0	106	78 - 122				
1,3,5-Trimethylbenzene	19.22	1.0	20	0	96.1	75 - 124				
1,3-Dichlorobenzene	19.2	1.0	20	0	96.0	80 - 119				
1,3-Dichloropropane	19.96	1.0	20	0	99.8	80 - 119				
1,4-Dichlorobenzene	20.08	1.0	20	0	100	79 - 118				
2,2-Dichloropropane	21.06	1.0	20	0	105	60 - 139				
2-Butanone	41.11	2.0	40	0	103	56 - 143				
2-Chlorotoluene	19.1	1.0	20	0	95.5	79 - 122				
2-Hexanone	41.2	2.0	40	0	103	57 - 139				
4-Chlorotoluene	19.11	1.0	20	0	95.6	78 - 122				
4-Isopropyltoluene	19.13	1.0	20	0	95.7	77 - 127				
4-Methyl-2-pentanone	38.96	2.0	40	0	97.4	67 - 130				
Acetone	40.69	2.0	40	0	102	39 - 160				
Benzene	20.38	1.0	20	0	102	79 - 120				
Bromobenzene	18.72	1.0	20	0	93.6	80 - 120				
Bromochloromethane	20.23	1.0	20	0	101	78 - 123				
Bromodichloromethane	20.11	1.0	20	0	101	79 - 125				
Bromoform	19.43	1.0	20	0	97.2	66 - 130				
Bromomethane	22.94	1.0	20	0	115	53 - 141				

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

**QC BATCH REPORT**

Batch ID: R344596 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS	Sample ID: VLCSW-190820	Units: UG/L			Analysis Date: 20-Aug-2019 12:53					
Client ID:	Run ID: VOA6_344596	SeqNo: 5216649	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	41.66	2.0	40	0	104	64 - 133				
Carbon tetrachloride	18.11	1.0	20	0	90.6	72 - 136				
Chlorobenzene	19.51	1.0	20	0	97.5	82 - 118				
Chloroethane	22.7	1.0	20	0	113	60 - 138				
Chloroform	20.16	1.0	20	0	101	79 - 124				
Chloromethane	20.03	1.0	20	0	100	50 - 139				
cis-1,2-Dichloroethene	20.62	1.0	20	0	103	78 - 123				
cis-1,3-Dichloropropene	21.38	1.0	20	0	107	75 - 124				
Dibromochloromethane	19.58	1.0	20	0	97.9	74 - 126				
Dibromomethane	20.09	1.0	20	0	100	79 - 123				
Dichlorodifluoromethane	15.34	1.0	20	0	76.7	32 - 152				
Ethylbenzene	19.47	1.0	20	0	97.3	79 - 121				
Hexachlorobutadiene	22.86	1.0	20	0	114	66 - 134				
Isopropylbenzene	19.27	1.0	20	0	96.3	72 - 131				
m,p-Xylene	38.98	2.0	40	0	97.4	80 - 121				
Methylene chloride	21.78	2.0	20	0	109	74 - 124				
Naphthalene	20.2	1.0	20	0	101	61 - 128				
n-Butylbenzene	19.59	1.0	20	0	98.0	75 - 128				
n-Propylbenzene	19.05	1.0	20	0	95.3	76 - 126				
o-Xylene	19.55	1.0	20	0	97.8	78 - 122				
sec-Butylbenzene	18.88	1.0	20	0	94.4	77 - 126				
Styrene	20.23	1.0	20	0	101	78 - 123				
tert-Butylbenzene	18.69	1.0	20	0	93.5	78 - 124				
Tetrachloroethene	18.39	1.0	20	0	92.0	74 - 129				
Toluene	20	1.0	20	0	100	80 - 121				
trans-1,2-Dichloroethene	20.14	1.0	20	0	101	75 - 124				
trans-1,3-Dichloropropene	20.9	1.0	20	0	105	73 - 127				
Trichloroethene	19.86	1.0	20	0	99.3	79 - 123				
Trichlorofluoromethane	19.18	1.0	20	0	95.9	65 - 141				
Vinyl chloride	20.53	1.0	20	0	103	58 - 137				
Surr: 1,2-Dichloroethane-d4	50.89	1.0	50	0	102	81 - 118				
Surr: 4-Bromofluorobenzene	51.76	1.0	50	0	104	85 - 114				
Surr: Dibromofluoromethane	52.03	1.0	50	0	104	80 - 119				
Surr: Toluene-d8	48.2	1.0	50	0	96.4	89 - 112				



ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

**QC BATCH REPORT**

Batch ID: R344596 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS	Sample ID: HS19080827-02MS	Units: UG/L			Analysis Date: 20-Aug-2019 15:18					
Client ID:	Run ID: VOA6_344596	SeqNo: 5217642	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	19.44	1.0	20	0	97.2	78 - 124				
1,1,1-Trichloroethane	18.48	1.0	20	0	92.4	74 - 131				
1,1,2,2-Tetrachloroethane	20.01	1.0	20	0	100	71 - 121				
1,1,2-Trichloroethane	19.05	1.0	20	0	95.3	80 - 119				
1,1-Dichloroethane	17.91	1.0	20	0	89.5	77 - 125				
1,1-Dichloroethene	18.41	1.0	20	0.5958	89.1	71 - 131				
1,1-Dichloropropene	19.09	1.0	20	0	95.4	78 - 125				
1,2,3-Trichlorobenzene	19.65	1.0	20	0	98.3	69 - 129				
1,2,3-Trichloropropane	19.48	1.0	20	0	97.4	73 - 122				
1,2,4-Trichlorobenzene	20.38	1.0	20	0	102	69 - 130				
1,2,4-Trimethylbenzene	21.18	1.0	20	0	106	76 - 124				
1,2-Dibromo-3-chloropropane	18.13	1.0	20	0	90.7	62 - 128				
1,2-Dibromoethane	18.51	1.0	20	0	92.5	77 - 121				
1,2-Dichlorobenzene	20.77	1.0	20	0	104	80 - 119				
1,2-Dichloroethane	16.89	1.0	20	0	84.4	73 - 128				
1,2-Dichloropropane	18.99	1.0	20	0	94.9	78 - 122				
1,3,5-Trimethylbenzene	21.53	1.0	20	0	108	75 - 124				
1,3-Dichlorobenzene	20.16	1.0	20	0	101	80 - 119				
1,3-Dichloropropane	19.15	1.0	20	0	95.7	80 - 119				
1,4-Dichlorobenzene	20.97	1.0	20	0	105	79 - 118				
2,2-Dichloropropane	18.71	1.0	20	0	93.6	60 - 139				
2-Butanone	42.14	2.0	40	0	105	56 - 143				
2-Chlorotoluene	20.78	1.0	20	0	104	79 - 122				
2-Hexanone	52.41	2.0	40	0	131	57 - 139				
4-Chlorotoluene	20.61	1.0	20	0	103	78 - 122				
4-Isopropyltoluene	21.85	1.0	20	0	109	77 - 127				
4-Methyl-2-pentanone	52.13	2.0	40	0	130	67 - 130				S
Acetone	33.7	2.0	40	0	84.2	39 - 160				
Benzene	18.71	1.0	20	0	93.6	79 - 120				
Bromobenzene	19.49	1.0	20	0	97.5	80 - 120				
Bromochloromethane	16.79	1.0	20	0	83.9	78 - 123				
Bromodichloromethane	18.07	1.0	20	0	90.4	79 - 125				
Bromoform	18.05	1.0	20	0	90.2	66 - 130				
Bromomethane	17.5	1.0	20	0	87.5	53 - 141				

## ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

## QC BATCH REPORT

Batch ID: R344596 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS	Sample ID: HS19080827-02MS	Units: UG/L			Analysis Date: 20-Aug-2019 15:18					
Client ID:	Run ID: VOA6_344596	SeqNo: 5217642	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	50.6	2.0	40	0	126	64 - 133				
Carbon tetrachloride	18.79	1.0	20	0	93.9	72 - 136				
Chlorobenzene	19.69	1.0	20	0	98.4	82 - 118				
Chloroethane	17.69	1.0	20	0	88.4	60 - 138				
Chloroform	17.51	1.0	20	0	87.6	79 - 124				
Chloromethane	9.929	1.0	20	0	49.6	50 - 139				S
cis-1,2-Dichloroethene	17.71	1.0	20	0	88.6	78 - 123				
cis-1,3-Dichloropropene	18.55	1.0	20	0	92.8	75 - 124				
Dibromochloromethane	18.86	1.0	20	0	94.3	74 - 126				
Dibromomethane	17.44	1.0	20	0	87.2	79 - 123				
Dichlorodifluoromethane	5.742	1.0	20	0	28.7	32 - 152				S
Ethylbenzene	20.68	1.0	20	0	103	79 - 121				
Hexachlorobutadiene	23.64	1.0	20	0	118	66 - 134				
Isopropylbenzene	21.19	1.0	20	0	106	72 - 131				
m,p-Xylene	41.11	2.0	40	0	103	80 - 121				
Methylene chloride	17.7	2.0	20	0	88.5	74 - 124				
Naphthalene	17.81	1.0	20	0	89.0	61 - 128				
n-Butylbenzene	22.5	1.0	20	0	113	75 - 128				
n-Propylbenzene	21.89	1.0	20	0	109	76 - 126				
o-Xylene	20.37	1.0	20	0	102	78 - 122				
sec-Butylbenzene	22.34	1.0	20	0	112	77 - 126				
Styrene	20.34	1.0	20	0	102	78 - 123				
tert-Butylbenzene	21.7	1.0	20	0	109	78 - 124				
Tetrachloroethene	20.82	1.0	20	0	104	74 - 129				
Toluene	20.39	1.0	20	0	102	80 - 121				
trans-1,2-Dichloroethene	17.83	1.0	20	0	89.2	75 - 124				
trans-1,3-Dichloropropene	18.11	1.0	20	0	90.6	73 - 127				
Trichloroethene	44.31	1.0	20	24.53	98.9	79 - 123				
Trichlorofluoromethane	16.9	1.0	20	0	84.5	65 - 141				
Vinyl chloride	13.41	1.0	20	0	67.1	58 - 137				
Surr: 1,2-Dichloroethane-d4	46.52	1.0	50	0	93.0	81 - 118				
Surr: 4-Bromofluorobenzene	50.6	1.0	50	0	101	85 - 114				
Surr: Dibromofluoromethane	47.65	1.0	50	0	95.3	80 - 119				
Surr: Toluene-d8	51.23	1.0	50	0	102	89 - 112				

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

**QC BATCH REPORT**

Batch ID: R344596 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD	Sample ID: HS19080827-02MSD	Units: UG/L			Analysis Date: 20-Aug-2019 15:42					
Client ID:	Run ID: VOA6_344596	SeqNo: 5217643	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	18.47	1.0	20	0	92.4	78 - 124	19.44	5.12	20	
1,1,1-Trichloroethane	17.56	1.0	20	0	87.8	74 - 131	18.48	5.09	20	
1,1,2,2-Tetrachloroethane	19.16	1.0	20	0	95.8	71 - 121	20.01	4.32	20	
1,1,2-Trichloroethane	18.37	1.0	20	0	91.8	80 - 119	19.05	3.64	20	
1,1-Dichloroethane	16.81	1.0	20	0	84.0	77 - 125	17.91	6.34	20	
1,1-Dichloroethene	17.41	1.0	20	0.5958	84.1	71 - 131	18.41	5.56	20	
1,1-Dichloropropene	18.04	1.0	20	0	90.2	78 - 125	19.09	5.68	20	
1,2,3-Trichlorobenzene	18.91	1.0	20	0	94.5	69 - 129	19.65	3.86	20	
1,2,3-Trichloropropane	18.64	1.0	20	0	93.2	73 - 122	19.48	4.41	20	
1,2,4-Trichlorobenzene	19.4	1.0	20	0	97.0	69 - 130	20.38	4.92	20	
1,2,4-Trimethylbenzene	20	1.0	20	0	100	76 - 124	21.18	5.72	20	
1,2-Dibromo-3-chloropropane	17.85	1.0	20	0	89.2	62 - 128	18.13	1.58	20	
1,2-Dibromoethane	18.05	1.0	20	0	90.2	77 - 121	18.51	2.52	20	
1,2-Dichlorobenzene	19.79	1.0	20	0	98.9	80 - 119	20.77	4.85	20	
1,2-Dichloroethane	16.55	1.0	20	0	82.8	73 - 128	16.89	2	20	
1,2-Dichloropropane	18.39	1.0	20	0	91.9	78 - 122	18.99	3.23	20	
1,3,5-Trimethylbenzene	20.33	1.0	20	0	102	75 - 124	21.53	5.73	20	
1,3-Dichlorobenzene	18.96	1.0	20	0	94.8	80 - 119	20.16	6.13	20	
1,3-Dichloropropane	18.53	1.0	20	0	92.6	80 - 119	19.15	3.31	20	
1,4-Dichlorobenzene	19.44	1.0	20	0	97.2	79 - 118	20.97	7.56	20	
2,2-Dichloropropane	17.33	1.0	20	0	86.7	60 - 139	18.71	7.66	20	
2-Butanone	42.62	2.0	40	0	107	56 - 143	42.14	1.14	20	
2-Chlorotoluene	19.52	1.0	20	0	97.6	79 - 122	20.78	6.24	20	
2-Hexanone	52.42	2.0	40	0	131	57 - 139	52.41	0.00735	20	
4-Chlorotoluene	19.49	1.0	20	0	97.4	78 - 122	20.61	5.57	20	
4-Isopropyltoluene	20.58	1.0	20	0	103	77 - 127	21.85	5.97	20	
4-Methyl-2-pentanone	52.58	2.0	40	0	131	67 - 130	52.13	0.863	20	S
Acetone	33.29	2.0	40	0	83.2	39 - 160	33.7	1.21	20	
Benzene	17.98	1.0	20	0	89.9	79 - 120	18.71	3.99	20	
Bromobenzene	18.44	1.0	20	0	92.2	80 - 120	19.49	5.56	20	
Bromochloromethane	16.17	1.0	20	0	80.9	78 - 123	16.79	3.75	20	
Bromodichloromethane	17.52	1.0	20	0	87.6	79 - 125	18.07	3.1	20	
Bromoform	17.56	1.0	20	0	87.8	66 - 130	18.05	2.73	20	
Bromomethane	15.67	1.0	20	0	78.3	53 - 141	17.5	11.1	20	

## ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

## QC BATCH REPORT

Batch ID: R344596 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD	Sample ID: HS19080827-02MSD	Units: UG/L			Analysis Date: 20-Aug-2019 15:42					
Client ID:	Run ID: VOA6_344596	SeqNo: 5217643	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	47.55	2.0	40	0	119	64 - 133	50.6	6.2	20	
Carbon tetrachloride	17.69	1.0	20	0	88.4	72 - 136	18.79	6.05	20	
Chlorobenzene	18.8	1.0	20	0	94.0	82 - 118	19.69	4.63	20	
Chloroethane	16.84	1.0	20	0	84.2	60 - 138	17.69	4.92	20	
Chloroform	16.61	1.0	20	0	83.1	79 - 124	17.51	5.29	20	
Chloromethane	9.465	1.0	20	0	47.3	50 - 139	9.929	4.78	20	S
cis-1,2-Dichloroethene	16.83	1.0	20	0	84.1	78 - 123	17.71	5.13	20	
cis-1,3-Dichloropropene	18.05	1.0	20	0	90.3	75 - 124	18.55	2.75	20	
Dibromochloromethane	18.33	1.0	20	0	91.7	74 - 126	18.86	2.86	20	
Dibromomethane	16.91	1.0	20	0	84.6	79 - 123	17.44	3.09	20	
Dichlorodifluoromethane	5.372	1.0	20	0	26.9	32 - 152	5.742	6.65	20	S
Ethylbenzene	19.5	1.0	20	0	97.5	79 - 121	20.68	5.86	20	
Hexachlorobutadiene	22.61	1.0	20	0	113	66 - 134	23.64	4.45	20	
Isopropylbenzene	20.08	1.0	20	0	100	72 - 131	21.19	5.38	20	
m,p-Xylene	39.12	2.0	40	0	97.8	80 - 121	41.11	4.97	20	
Methylene chloride	17.04	2.0	20	0	85.2	74 - 124	17.7	3.81	20	
Naphthalene	16.99	1.0	20	0	84.9	61 - 128	17.81	4.72	20	
n-Butylbenzene	21.08	1.0	20	0	105	75 - 128	22.5	6.51	20	
n-Propylbenzene	20.52	1.0	20	0	103	76 - 126	21.89	6.46	20	
o-Xylene	19.2	1.0	20	0	96.0	78 - 122	20.37	5.89	20	
sec-Butylbenzene	20.64	1.0	20	0	103	77 - 126	22.34	7.93	20	
Styrene	19.38	1.0	20	0	96.9	78 - 123	20.34	4.83	20	
tert-Butylbenzene	20.35	1.0	20	0	102	78 - 124	21.7	6.4	20	
Tetrachloroethene	19.63	1.0	20	0	98.1	74 - 129	20.82	5.9	20	
Toluene	19.3	1.0	20	0	96.5	80 - 121	20.39	5.49	20	
trans-1,2-Dichloroethene	16.73	1.0	20	0	83.6	75 - 124	17.83	6.4	20	
trans-1,3-Dichloropropene	17.47	1.0	20	0	87.3	73 - 127	18.11	3.62	20	
Trichloroethene	41.97	1.0	20	24.53	87.2	79 - 123	44.31	5.45	20	
Trichlorofluoromethane	15.83	1.0	20	0	79.1	65 - 141	16.9	6.56	20	
Vinyl chloride	12.45	1.0	20	0	62.2	58 - 137	13.41	7.45	20	
Surr: 1,2-Dichloroethane-d4	44.58	1.0	50	0	89.2	81 - 118	46.52	4.26	20	
Surr: 4-Bromofluorobenzene	50.88	1.0	50	0	102	85 - 114	50.6	0.55	20	
Surr: Dibromofluoromethane	47.14	1.0	50	0	94.3	80 - 119	47.65	1.07	20	
Surr: Toluene-d8	50.63	1.0	50	0	101	89 - 112	51.23	1.18	20	

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

**QC BATCH REPORT**

<b>Batch ID:</b> R344596 ( 0 )	<b>Instrument:</b> VOA6	<b>Method:</b> VOLATILES ORGANICS BY METHOD 8260C
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The following samples were analyzed in this batch: 

HS19080732-01	HS19080732-03
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ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Effluent Samples  
**WorkOrder:** HS19080732

**QC BATCH REPORT**

Batch ID: R344315 ( 0 )		Instrument: UV-2450		Method: HEXAVALENT CHROMIUM BY SW7196A						
<b>MBLK</b>	Sample ID: <b>MBLK-344315</b>	Units: <b>mg/L</b>		Analysis Date: <b>15-Aug-2019 12:20</b>						
Client ID:	Run ID: <b>UV-2450_344315</b>	SeqNo: <b>5210951</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chromium, Hexavalent	0.0100	0.0100							U	
<b>LCS</b>	Sample ID: <b>LCS-344315</b>	Units: <b>mg/L</b>		Analysis Date: <b>15-Aug-2019 12:20</b>						
Client ID:	Run ID: <b>UV-2450_344315</b>	SeqNo: <b>5210952</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chromium, Hexavalent	0.254	0.0100	0.25	0	102	90 - 111				
<b>MS</b>	Sample ID: <b>HS19080735-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>15-Aug-2019 12:20</b>						
Client ID:	Run ID: <b>UV-2450_344315</b>	SeqNo: <b>5210954</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chromium, Hexavalent	0.258	0.0100	0.25	-0.003	104	90 - 111				
<b>MSD</b>	Sample ID: <b>HS19080735-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>15-Aug-2019 12:20</b>						
Client ID:	Run ID: <b>UV-2450_344315</b>	SeqNo: <b>5210955</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chromium, Hexavalent	0.258	0.0100	0.25	-0.003	104	90 - 111	0.258	0	20	

The following samples were analyzed in this batch: HS19080732-01

**ALS Houston, US**

Date: 30-Aug-19

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<b>Client:</b>	Bhate Environmental Associates, Inc.	<b>QUALIFIERS, ACRONYMS, UNITS</b>
<b>Project:</b>	Longhorn GW Treatment Plant Monthly Effluent Samples	
<b>WorkOrder:</b>	<b>HS19080732</b>	

---

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

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

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**CERTIFICATIONS, ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
North Dakota	R-193 2019	30-Apr-2020
Oklahoma	2019-141	31-Aug-2020
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020



**Sample Receipt Checklist**

Client Name: Bhate Environmental  
 Work Order: HS19080732

Date/Time Received: **15-Aug-2019 08:49**  
 Received by: **PMG**

Checklist completed by: Paresh M. Giga 15-Aug-2019  
 eSignature Date

Reviewed by: RJ Modashia 15-Aug-2019  
 eSignature 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): 0.9c U/C IR25  
 Cooler(s)/Kit(s): 44594  
 Date/Time sample(s) sent to storage: 8/15/19 10:45

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

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:  
 Contacted By: Regarding:


Comments:

Corrective Action:

**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

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001		<b>Analyses</b>										<b>HS19080732</b> Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant Monthly Effluent Sample											
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT                  MONTHLY EFFLUENT SAMPLES</b>					MS / MSD	No. OF CONTAINERS	VOLATILES	SILVER, SELENIUM, LEAD, BARIUM	HEXAVALENT CHROMIUM	1, 4 - DIOXANE	PERCHLORATE											Remarks (Preservatives, etc.)	Lab I.D.#			
<b>Prepared By:</b> Scott Beesinger			<b>P.O. Number</b>																							
<b>Field Sample I.D.</b>			<b>Sample Matrix</b>		<b>Date / Time</b>																					
LH18/24-SP650_081419			Water		08/14/19 / 14:00		3		X												HCL					
LH18/24-SP650_081419			Water		08/14/19 / 14:00		2				X		X												NONE	
LH18/24-SP650_081419_BIX			Water		08/14/19 / 14:00		1						X												NONE	
LH18/24-SP650_081419			Water		08/14/19 / 14:00		1		X												HNO3					
Trip Blank			Water		08/14/19		2		X												HCL					
<b>Additional Remarks: STANDARD TURN AROUND TIME</b>																										
<b>Relinquished By:</b>		<b>Date</b>	<b>Time</b>	<b>Received By:</b>		<b>Date</b>	<b>Time</b>	<b>Relinquished By:</b>		<b>Date</b>	<b>Time</b>	<b>Received By:</b>		<b>Date</b>	<b>Time</b>											
<i>Scott Beesinger</i>		08/14/19	14:30	<i>[Signature]</i>		08/14/19	08:49																			
<b>For Lab Use Only</b>																										
<b>Received At Lab By:</b>			<b>Date</b>	<b>Time</b>	<b>Alrbill No.</b>	<b>Opened By:</b>			<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>													
Remarks:  <div style="text-align: center;">                     OK                      44594                      0.90                      #25                      Cl-000                 </div>																										

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

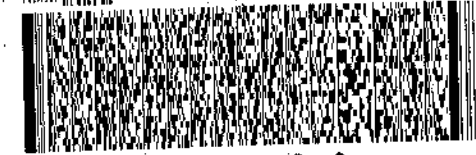
**CUSTODY SEAL**

Date: 8/14/19 Time: 1430  
 Name: Scott E. Bessinger  
 Company: Bitter

Seal Broken  
 Date

TO CLIENT SERVICES  
 ALS LABORATORY GROUP  
 10450 STANCLIFF ROAD  
 SUITE 210  
 HOUSTON TX 77099

(281) 530-5656  
 REF: LHAAP/18/24 & SURFACE WATER - RJ  
 RMA: 11111111



RETURNS MON - SAT  
 PRIORITY OVERNIGHT  
 THU 15 AUG 10:30A  
 PRIORITY OVERNIGHT

FedEx  
 TRK# 4809 7834 3310

**AB SGRA**

77099  
 TX-US  
 IAH



118 162785 1A0619 G6CA 660C2/F551/BCBA



## Case Narrative

**Method:** 6850  
**Analysis:** Perchlorate  
**Analysis SOP:** LC-MS-CLO4  
**ALS WO ID(s):** 1923487; 1923490; 1923491;  
1923492; 1923494

**Client:** ALS Laboratories (Houston, TX)  
**Matrix:** Water  
**ELMS Batch (HBN):** 2284 (246025)

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

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

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

**Holding Times:** Holding times were met for all analyses.

**Dilutions:** Field sample 1923492001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

**Method QC data:** The method blank (LMB 669454) was less than 1/2 the CRDL. The recovery for the LCS (669455) was within acceptable parameters.



**MS/MSD Analysis:** MS/MSD was performed on samples 1923490002/03 (Client ID: 16WW57-190815). 4.0 $\mu$ l of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4.0 $\mu$ g/L. The MS/MSD failed QC acceptance criteria for percent recoveries due to an unknown co-eluting contamination. The MS/MSD is reported for the clients' information only. The sample matrix may be inappropriate for the method selected. The 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  $\mu$ g/L. Results were calculated in  $\mu$ g/L by the equation (A)x(B),

where: A = Analyte concentration from the standard curve ( $\mu$ g/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 – 669452) is reported from the analysis of the Laboratory Control Sample (LCS – 669455) at a level of 4.0 $\mu$ g/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) along with datafiles 20AUGD06-08/11/13.

Thomas Bosch      August 21, 2019  
Analyst                      Date



# ANALYTICAL REPORT

Report Date: August 22, 2019

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

Phone: 281 530-5656

E-mail: RJ.Modashia@ALSGlobal.com

Workorder: **34-1923494**

Project ID: HS19080732

Purchase Order: HS19080732

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_081419_BIX	1923494001	08/14/19	08/16/19	



## ANALYTICAL REPORT

Workorder: 34-1923494

Client: ALS Environmental  
(Houston)

Project Manager: Kevin W. Griffiths

## Analytical Results

Sample ID: <b>LH18/24-SP650_081419_BIX</b>	Sampling Site: NA	Collected: 08/14/2019				
Lab ID: 1923494001	Media: 125 mL Nalgene	Received: 08/16/2019				
Matrix: Water	Sampling Parameter: NA					
<b>Analysis Method - EPA 6850, DoD QSM</b>						
Preparation: Not Applicable	Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2284 (HBN: 246025) Analyzed: 08/20/2019 11:23	Instrument ID: LCMS04 %Solids: NA Report Basis: Wet				
<b>Analyte</b>	<b>Result (ug/L)</b>	<b>DL (ug/L)</b>	<b>LOD (ug/L)</b>	<b>LOQ (ug/L)</b>	<b>Dilution</b>	<b>Qual</b>
Perchlorate	12	1.0	2.0	4.0	1	

## Comments

**Quality Control: EPA 6850, DoD QSM - (HBN: 246025)**

Field sample 1923492001 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 08/20/2019 13:38	/S/ Stephen Brose 08/22/2019 14:34

## Laboratory Contact Information

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

Phone: (801) 266-7700  
Email: als@alst.com  
Web: www.alst.com



## ANALYTICAL REPORT

Workorder: 34-1923494

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	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>
	PJLA (ISO 17025)	L17-507-R1	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>
	Utah (TNI)	UT00953	<a href="http://lams.nelac-institute.org/search">http://lams.nelac-institute.org/search</a>
	Iowa (TNI)	IA# 376	<a href="http://www.shl.uiowa.edu/labcert/idnr/">http://www.shl.uiowa.edu/labcert/idnr/</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/envlab/disclaimer.html">http://www.kdheks.gov/envlab/disclaimer.html</a>
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	DOECAP-AP	L18-606	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>
	Washington	C596	<a href="https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation">https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation</a>
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>

**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

00951169

## Analysis Information

**Workorder:** 1923494

**Limits:** Client SOW/Contract Specified  
**Basis:** DoD QSM

**Preparation:** NA  
**Batch:** NA  
**Prepared By:** NA

**Analysis:** EPA 6850, DoD QSM  
**Batch:** ELMS/2284 (HBN: 246025)  
**Analyzed By:** Thomas Bosch

## Blank

<b>LMB:</b> 669454 <b>Analyzed:</b> 08/20/2019 09:15 <b>Units:</b> ug/L			
Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

## Laboratory Control Sample

<b>LCS:</b> 669455 <b>Analyzed:</b> 08/20/2019 08:46 <b>Dilution:</b> 1 <b>Units:</b> ug/L					
Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.16	4.00	104	78.8	123.8

## Matrix Spike - Matrix Spike Duplicate

<b>Sample:</b> 1923490001 <b>Analyzed:</b> 08/20/2019 09:44 <b>Dilution:</b> 1 <b>Units:</b> ug/L			<b>MS:</b> 1923490002 <b>Analyzed:</b> 08/20/2019 09:58 <b>Dilution:</b> 1 <b>Units:</b> ug/L				<b>MSD:</b> 1923490003 <b>Analyzed:</b> 08/20/2019 10:12 <b>Dilution:</b> 1 <b>Units:</b> ug/L			
Analyte	Result	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits	
Perchlorate	ND	5.2	4	# 130	78.8   123.8	5.3	# 133	1.95	0.0   20.0	

## Comments

Field sample 1923492001 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 08/20/2019 13:45	/S/ Stephen Brose 08/22/2019 14:34

## 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



1923494

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

18698/#2

### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11986

**SUBCONTRACT TO:**

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

**Phone:** +1 801 266 7700

1923494

**CUSTOMER INFORMATION:**

**Company:** ALS Houston  
**Contact:** RJ Modashia  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RJ.Modashia@alsglobal.com  
**Alternate Contact:**  
**Email:**

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS19080732  
**TSR:** Danielle Winnings

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	HS19080732-02	LH18/24-SP650_081419_ BIX	Water	14 Aug 2019 14:00
	SUB_Perch-6850			29 Aug 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]*  
\_\_\_\_\_  
*[Signature]*  
\_\_\_\_\_  
982

Date/Time:

8/15/19 1800  
\_\_\_\_\_  
8/16/19 1848  
\_\_\_\_\_  
3'

Received By:

Date/Time:

Cooler ID(s):

Temperature(s):



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

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

1923494

Client Name: ALS Houston Project/Task/Site: \_\_\_\_\_

Date/Time of Receipt: 8/14/19 / 848 Number of Coolers Received: \_\_\_\_\_

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

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

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 9832	3 °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C		C19	°C	9	C19	°C

Taken By: Meredith Decker Signature Meredith Decker Printed Name 8/14/19 Date

CLIENT-RELATED INFORMATION

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

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES  NO

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: \_\_\_\_\_ Returned to Sample Receipt by: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name Signature

Must Deliver Next Business Day  
Time and Tempature Sensitive!



Form # 130453-004 RTR EDP 02/00-\*

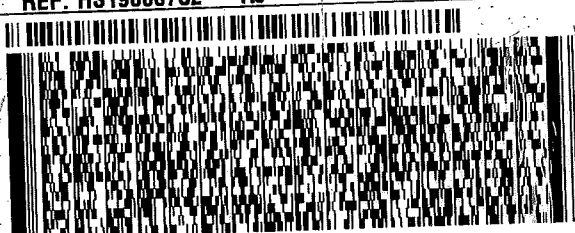
ORIGIN ID:SGRA (281) 530-5656  
CLIENT SERVICES  
ALS LABORATORY GROUP  
10450 STANCLIFF ROAD  
SUITE 210  
HOUSTON, TX 77099  
UNITED STATES US

SHIP DATE: 15AUG19  
ACTWGT: 13.90 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: HS19080732 - RJ



**FedEx**  
Express



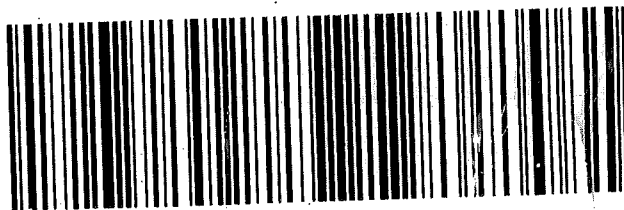
JT81116060501 IN

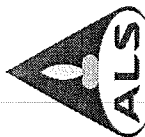
**FRI - 16 AUG 3:00P**  
**STANDARD OVERNIGHT**

TRK# 4809 7836 7888  
0201

**AX BTFA**

**84123**  
**UT-US SLC**





# Batch Worklist

HBN: 246025

Instrument: WP  
Status: WP

Created: 8/20/2019 07:47  
Analyst: T. Bosch

Batch: ELMS/2284  
Rule: EPA 6850, DoD QSM Water



- Workorder: 1923487 [ENV\_LVL4]
- Workorder: 1923490 [ENV\_LVL4]
- Workorder: 1923491 [ENV\_LVL4]
- Workorder: 1923492 [ENV\_LVL4]
- Workorder: 1923494 [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	669451	CCV for HBN 246025 [ELMS/2284]				CCV	3		E685041C3Q	5311		8/23/2019	
2	669452	RLYS for HBN 246025 [ELMS/2284]				RLYS	3		E685041C3Q	5311		8/23/2019	
3	669453	ICS for HBN 246025 [ELMS/2284]				ICS	3		E6850.D3Q	5311		8/23/2019	
4	669454	LMB for HBN 246025 [ELMS/2284]				LMB	3		E6850Q413Q	5311		8/23/2019	
5	669455	LCS for HBN 246025 [ELMS/2284]				LCS	3		E6850Q413Q	5311		8/23/2019	
6	1923487001	50WW29-190815				SAMPLE	3	1923487001-A	E6850Q41.3	5480	9/12/2019	8/23/2019	
7	1923490001	16WW57-190815				SAMPLE	3	1923490001-A	E6850Q41.3	5480	9/12/2019	8/23/2019	
8	1923490002	16WW57-190815MS				MS	3	1923490002-A	E6850Q413Q	5480		8/23/2019	
9	1923490003	16WW57-190815MSD				MSD	3	1923490003-A	E6850Q413Q	5480		8/23/2019	
10	1923490004	16WW58-190815				SAMPLE	3	1923490004-A	E6850Q41.3	5480	9/12/2019	8/23/2019	
11	1923490005	16WW58-190815-FD				FLDDUP	3	1923490005-A	E6850Q41.3	5480	9/12/2019	8/23/2019	
12	1923491001	LH18/24-SP650_081419_BIX				SAMPLE	3	1923491001-A	E6850Q41.3	5480	9/11/2019	8/29/2019	
13	1923492001	LH18/24-SP140_081419				SAMPLE	3	1923492001-A	E6850Q41.3	5480	9/11/2019	8/29/2019	
14	1923494001	LH18/24-SP650_081419_BIX				SAMPLE	3	1923494001-A	E6850Q41.3	5480	9/11/2019	8/29/2019	
15	669456	CCV for HBN 246025 [ELMS/2284]				CCV	3		E685041C3Q	5311		8/23/2019	



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**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Analytical Documentation**

Analyst Write-up

ALS Work Order #'s & Sample #(')s: 1923487 (001); 192349 (001-05) 1923491 (001);1923492 (001);1923494 (001)  
 ELMS Batch/HBN ID: 2284 (246025)  
 Prep Date: 08/19/2019 Analysis Date: 08/20/2019 Analyst: T. Bosch  
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**  
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\AUG\20AUG19D.s  
 Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

SAMPLE PREPARATION/ANALYSIS:

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

**REAGENTS:** Eluent A1: 95% ASTM Type II water (ALS)/ 5% ACN (B&J Lot AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).  
 Eluent B1: 95% ACN (B&J Lot AH015-4) / 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

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

**CALIBRATION CURVE:** Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.M

**INSTRUMENT CONDITIONS:** Samples were analyzed with an Agilent 1100 LC/MSD system, in negative SIM mode, monitoring m/z 83, 85, and 89.

**Instrument ID:** LCMS04 Online Acquisition Method: CLO4-AQN.M Fragmentor: 160 Output Gain: 10 Injection Volume: 50µL  
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

FLOW GRADIENT:

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

**QC DATA:** 4.0µL of QC Solution Horizon ID 47516 was used for LCS 669455; Target = 4.0µg/L. ASTM type II water was used for LMB 669454.

**MS/MSD:** The Matrix Spike and duplicate (MS/MSD) were performed on samples 1923490002/03 (Client ID: 16WW57-190815). 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 1923492001 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 Matrix Spike and duplicate (MS/MSD) failed QC acceptance criteria for percent recoveries due to an unknown co-eluting contamination. 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\AUG\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\246025-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 669452) is reported from the analysis of the Laboratory Control Sample (LCS – 669455) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03) along with datafiles 20AUGD06-08/11/13.



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

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

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDG: ELMS: 2284 HBN#: 246025		
Sample Set IDs if Applicable: 1923492/1923494 1923487/1923490/1923491		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSS, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SP
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR#</u>	—	—
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB



## STANDARD REPORT

## Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850.WKG Std 100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	0.1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	
MFG Lot: 218065075		Amount: 100 mL	
Part ID: IC-PER-10X-1		Expires: 07/25/2020	
		Usable: No	
		Lab Lot: CLO4 STOCK	
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 INT

CLO4 INT			Description - 6850 Intermdt AccStd 10.ug/mL		
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



## STANDARD REPORT

## Working Standard - CLO4 QC WRK

CLO4 QC WRK			Description - 6850 QC WKG STD 100ug/L		
Standard: 47516		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC WRK 100.ug/L	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

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



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL	
Standard: 36748		Created By: Thomas Bosch	Amount: 100 mL
MFG: Ultra Scientific		Create Date: 05/11/2017 01:05PM	Expires: 03/31/2020
MFG Lot: CP-0860			Usable: Yes
Part ID: ICC-013			Lab Lot: CLO4 QC STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL





## STANDARD REPORT

## Constituent

## Working Standard - CLO4 QC INT

CLO4 QC INT		Description - 6850 QC Intrmdt Std-QC 10ug/mL			
Standard: 47515		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC INT 10.ug/mL	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020



## STANDARD REPORT

## Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		Verified By: Thomas Bosch		Usable: Yes	
Pipette ID: Not Provided		Verify Date:		Lab Lot: CLO4ISTDWRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L		
2	14797-73-0-89	Perchlorate 89	1000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026

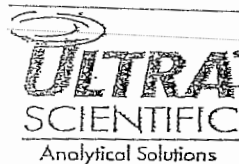


## STANDARD REPORT

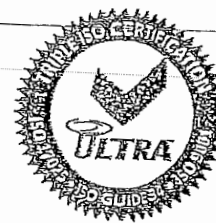
## Constituent

## Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK		Description - Perchlorate ISTD Stock	
Standard: 43729	Created By: Thomas Bosch	Amount: 1 mL	
MFG: Cambridge Isotope	Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026	
MFG Lot: SDFP-012A	Verified By: Thomas Bosch	Usable: Yes	
Part ID: OLM-7310-S	Verify Date:	Lab Lot: CLO4ISTDSTK	
Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL



# Certificate of Analysis



## ISO Guide 34 Reference Material

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

Lot Issue Date: 29-Feb 2016  
Expiration Date: 31-Mar 2020

Product Name: Perchlorate IC Standard

### Description:

This Reference Material (RM) was gravimetrically prepared in accordance with ISO Guide 34 and under ULTRA Scientific's ISO 9001 registered quality system. The neat materials used for this product have been verified by ULTRA's ISO 17025 laboratory and under ULTRA's ISO Guide 34 accreditation. The analyte concentrations were verified by ULTRA's ISO 17025 accredited laboratory. For each analyte, the true value, with its uncertainty value calculated at the 95% confidence level, is reported below.

Analyte	Starting Material	Lot Number	Purity (%)	Calculated Value	True Value	Traceability & Method
perchlorate	potassium perchlorate	RM07987	100	1001 ± 5 µg/mL	976 ± 6 µg/mL	NIST SRM 3141A; ICP-OES

Solvent: water (low TOC, < 50 ppb)

Storage: Store at Room Temperature (15° to 30°C).

### Traceability:

Traceability has been established through an unbroken chain of comparisons, each having stated uncertainties. Comparisons are based on appropriate physical or chemical measurements, including gravimetric or volumetric dilution, where the mass or volume of a solution before and after dilution is measured. The balances used for these measurements are calibrated with weights traceable to NIST in compliance with ANSI/NCSL Z-540-1, ISO 9001, ISO 17025, and ISO Guide 34. Calibrated Class A glassware is used for volumetric measurements. Thermometers are calibrated against a NIST traceable thermometer in accordance with NIST Special Publication 819.

### Estimation of Uncertainties:

The true value is reported, with its uncertainty value calculated at the 95% confidence level.

### Homogeneity:

This RM was formulated and unitized according to an in-house procedure and is guaranteed to be homogeneous. There is no minimum sub-sample size required.

### Intended Use:

This RM is intended for the preparation of working reference samples for use in routine laboratory analyses, calibration of instruments, validation of analytical methods, assessments of measurement methods and continuing calibration verification.

### Instructions for Use:

Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the bottle after removing any material and store according to the instructions noted above.

### Hazards:

Refer to the Safety Data Sheet for information regarding this RM.

### Expiration of Certification:

The certification of this RM is valid, within the measurement uncertainty specified, until the expiration date specified above, provided the RM is handled and stored in accordance with the instructions given in this certificate. This certification is nullified if the RM is damaged, contaminated, or otherwise modified.





# Certificate of Analysis



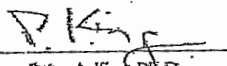
## ISO Guide 34 Reference Material

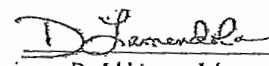
Product Number: ICC-013  
Lot Number: CP-0860

Lot Issue Date: 29-Feb 2016  
Expiration Date: 31-Mar 2020

### Maintenance of Certification:

The real-time, long term stability of the RM may be monitored over the lifetime of the certification. If substantive changes occur that affect the certification before the expiration of this certificate, ULTRA Scientific will notify the purchaser.

  
Peter A. King, Ph.D.  
VP, Technical Operations

  
Daniel J. Lamendola  
Director of QA/QA



125 Market Street  
New Haven, CT 06513  
USA



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<sub>4</sub>)  
SRM: Ind. Std.  
Lot: 218065075  
Matrix: Water  
Hazards: Refer to SDS for complete safety information

Date Certified: Jun 25, 2018  
Expiration: Jul 25, 2020  
Sample Size: 100 mL  
Components: 1  
Storage Condition: Ambient (>5 °C)  
Included on ISO/IEC 17025 Scope of Accreditation: Yes  
Included on ISO 17034 Scope of Accreditation: Yes



Signal Word: None

Component	SRM #	Prepared Concentration (µg/mL)
ClO <sub>4</sub> Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is ±0.24%.

The final solution was checked against an independent standard to verify its concentration.

We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.

All solutions are filtered through a 0.2 µm filter prior to being bottled.

All glassware used in preparation is Class A and calibrated regularly.

All weights are traceable through NIST, Test No. 822-275872-11

All bottles are triple rinsed with deionized water prior to use.

Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.

We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By:

*Meigan O'Leary*

Meigan O'Leary, Inorganic QC Manager

Cambridge Isotope Laboratories, Inc.

## Certificate of Analysis

Quality Standards:  
 ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

Product Name: PERCHLORIC ACID, SODIUM SALT  
 (Isotopic Label & Enrichment Specification) (18O<sub>4</sub>, 90%+) 100 UG/ML IN WATER

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

## Product Information

Chemical Purity Specification:  $\geq 98\%$

Labeled CAS Number: NA

Unlabeled CAS Number: 7601-89-0

MW\*: 130.4

Chemical Formula: NaCl\*O<sub>4</sub>

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)



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**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	
*	669451	CCV@25	Vial 71	1	Control	1	1.83142e6	7.920	24.74457
*	669455	QC@40.	Vial 72	1	Control	2	3.16440e5	7.864	4.15613
*	669453	ICS@4.0	Vial 73	1	Control	3	2.24930e5	7.622	3.70421
*	669454	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1923487001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1923490001		Vial 76	1	Sample	6	1.36285e5	6.452	<del>2.91596</del>
*	1923490002	MS	Vial 77	1	Sample	7	3.54477e5	6.456	5.19924
*	1923490003	MSD	Vial 78	1	Sample	8	3.58346e5	6.443	5.30157
*	1923490004		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1923490005		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1923491001		Vial 81	1	Sample	11	5.58062e5	7.463	10.20944
*	1923492001	1K	Vial 82	1	Sample	12	6.21377e5	8.056	8846.41646
*	1923494001		Vial 83	1	Sample	13	5.89441e5	7.465	12.30933
*	669456	CCV@25	Vial 71	1	Control	14	1.49865e6	7.934	23.18463

N.R. - NOT REPORTED / FAILS 83/85 ION RATIO

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	669451	CCV@25	Vial 71	1	Control	1	5.59319e5	7.925	25.42099
*	669455	QC@40.	Vial 72	1	Control	2	1.05210e5	7.919	4.49624
*	669453	ICS@4.0	Vial 73	1	Control	3	8.51245e4	7.639	4.53455
*	669454	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1923487001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1923490001		Vial 76	1	Sample	6	5435.15332	6.455	3.69491e-1
*	1923490002	MS	Vial 77	1	Sample	7	6.92296e4	6.460	3.34493
*	1923490003	MSD	Vial 78	1	Sample	8	6.93358e4	6.454	3.38171
*	1923490004		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1923490005		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1923491001		Vial 81	1	Sample	11	1.97832e5	7.485	12.02438
*	1923492001	1K	Vial 82	1	Sample	12	1.97618e5	8.075	9349.59092
*	1923494001		Vial 83	1	Sample	13	2.00512e5	7.480	13.95607
*	669456	CCV@25	Vial 71	1	Control	14	4.73078e5	7.940	24.57014

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	669451	CCV@25	Vial 71	1	Control	1	2.25315e5	7.934	5.00000
*	669455	QC@40.	Vial 72	1	Control	2	2.50411e5	7.899	5.00000
*	669453	ICS@4.0	Vial 73	1	Control	3	2.00878e5	7.639	5.00000
*	669454	LMB	Vial 74	1	Control	4	2.37984e5	7.976	5.00000
*	1923487001		Vial 75	1	Sample	5	2.26263e5	7.226	5.00000
*	1923490001		Vial 76	1	Sample	6	1.56767e5	6.449	5.00000
*	1923490002	MS	Vial 77	1	Sample	7	2.21958e5	6.471	5.00000
*	1923490003	MSD	Vial 78	1	Sample	8	2.19867e5	6.460	5.00000
*	1923490004		Vial 79	1	Sample	9	1.85427e5	7.007	5.00000
*	1923490005		Vial 80	1	Sample	10	1.90140e5	7.042	5.00000
*	1923491001		Vial 81	1	Sample	11	1.73328e5	7.485	5.00000
*	1923492001	1K	Vial 82	1	Sample	12	2.23942e5	8.077	5000.00000
*	1923494001		Vial 83	1	Sample	13	1.50739e5	7.485	5.00000
*	669456	CCV@25	Vial 71	1	Control	14	1.97525e5	7.935	5.00000

\*\*\* End of Report \*\*\*

## Sequence Table:

## Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	669451	CCV@25	CLO4-AQN	1	Ctrl Samp	
2	Vial 72	669455	QC@40.	CLO4-AQN	1	Ctrl Samp	
3	Vial 73	669453	ICS@4.0	CLO4-AQN	1	Ctrl Samp	
4	Vial 74	669454	LMB	CLO4-AQN	1	Ctrl Samp	
5	Vial 75	1923487001		CLO4-AQN	1	Sample	
6	Vial 76	1923490001		CLO4-AQN	1	Sample	
7	Vial 77	1923490002	MS	CLO4-AQN	1	Sample	
8	Vial 78	1923490003	MSD	CLO4-AQN	1	Sample	
9	Vial 79	1923490004		CLO4-AQN	1	Sample	
10	Vial 80	1923490005		CLO4-AQN	1	Sample	
11	Vial 81	1923491001		CLO4-AQN	1	Sample	
12	Vial 82	1923492001	1K	CLO4-AQN	1	Sample	
13	Vial 83	1923494001		CLO4-AQN	1	Sample	
14	Vial 71	669456	CCV@25	CLO4-AQN	1	Ctrl Samp	

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD01.D

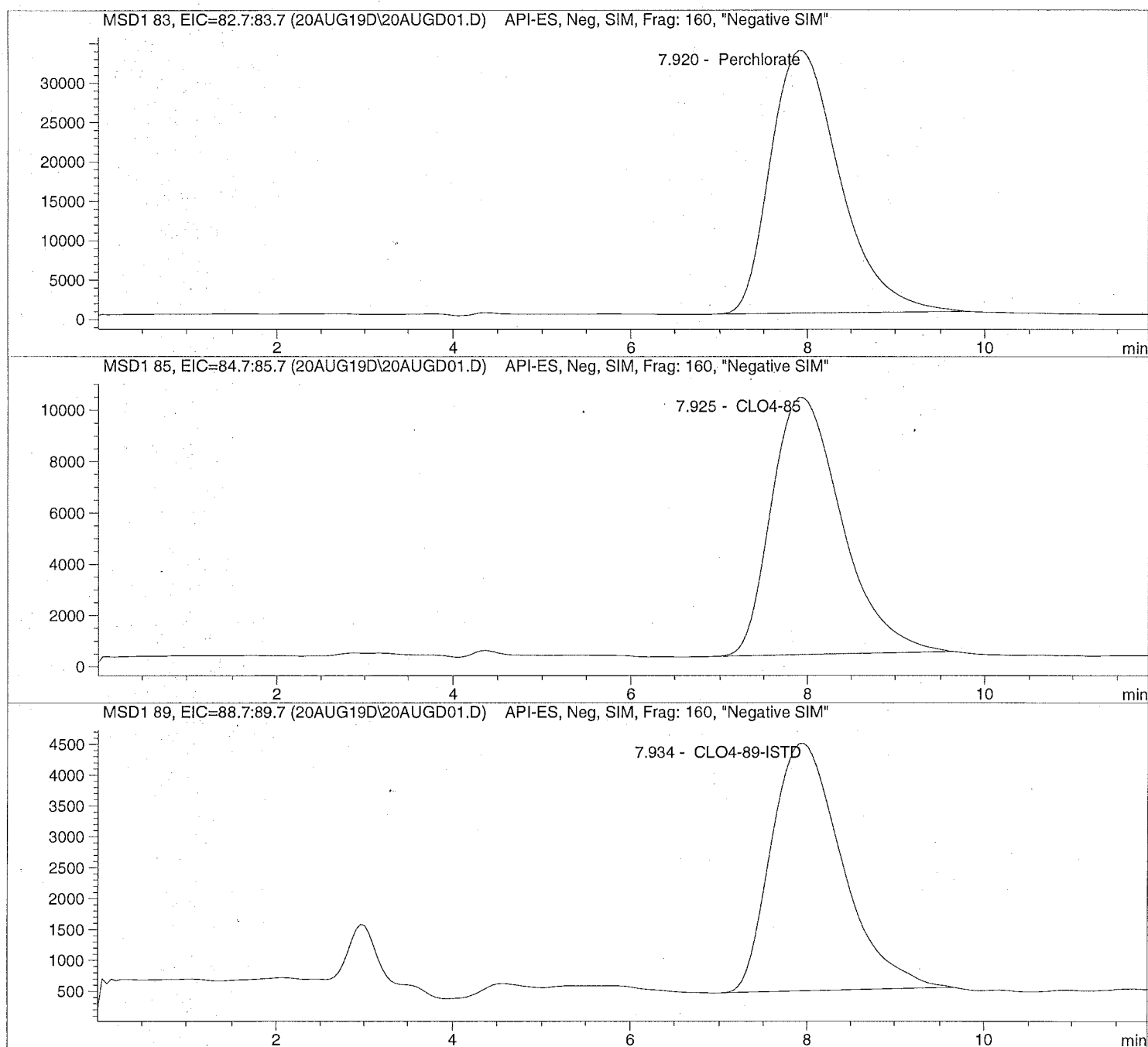
Sample Name: 669451 CCV@25

Injection Date: 8/20/2019 08:32:23  
Sample Name: 669451 CCV@25  
Acq Operator: TNB

Seq Line: 1  
Location: Vial 71  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD02.D

Sample Name: 669455 QC@40.

Injection Date: 8/20/2019 08:46:36

Seq Line: 2

Sample Name: 669455 QC@40

Location: Vial 72

Acq Operator: TNB

Inj. No.: 1

TB 8 20 19

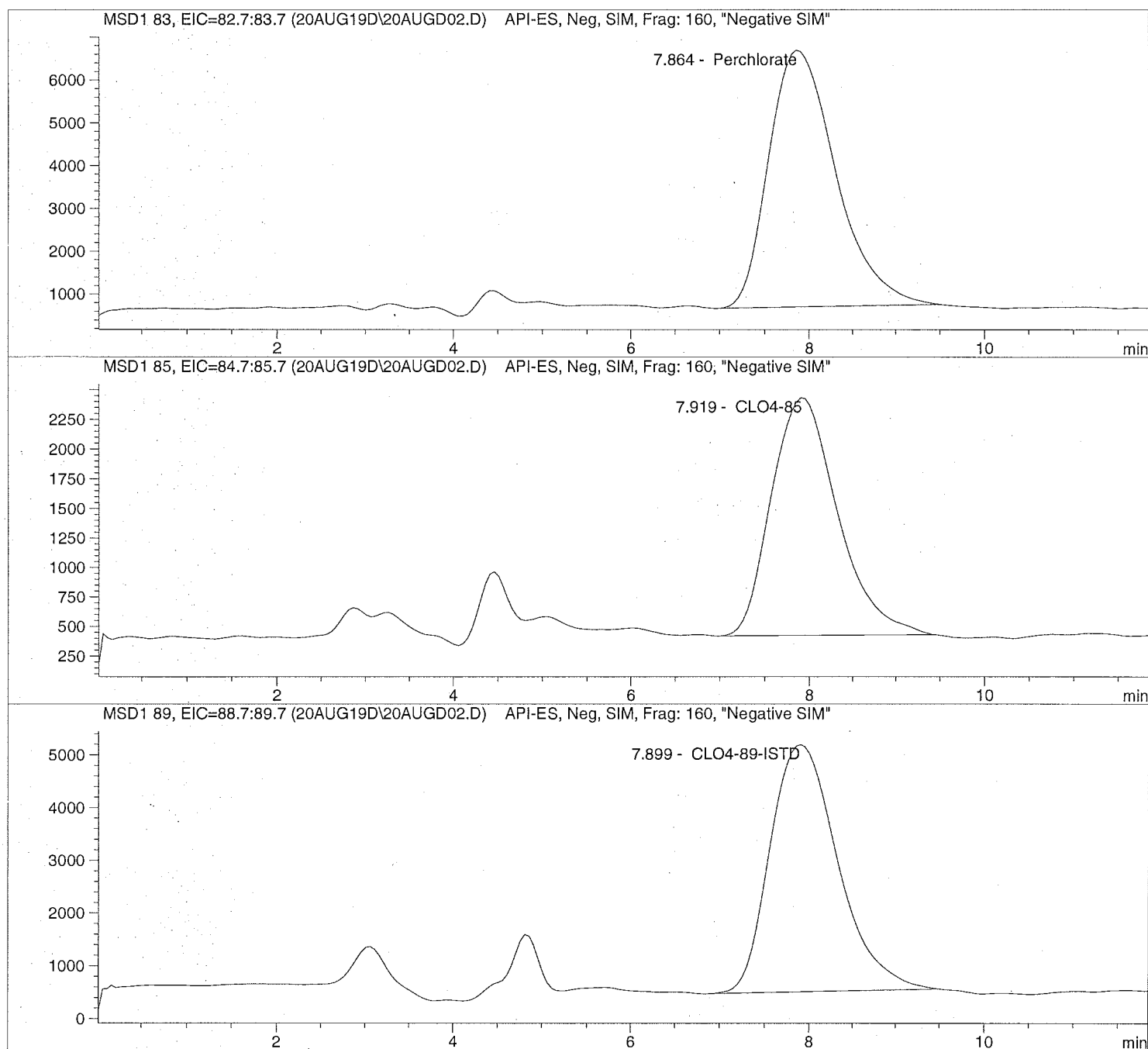
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



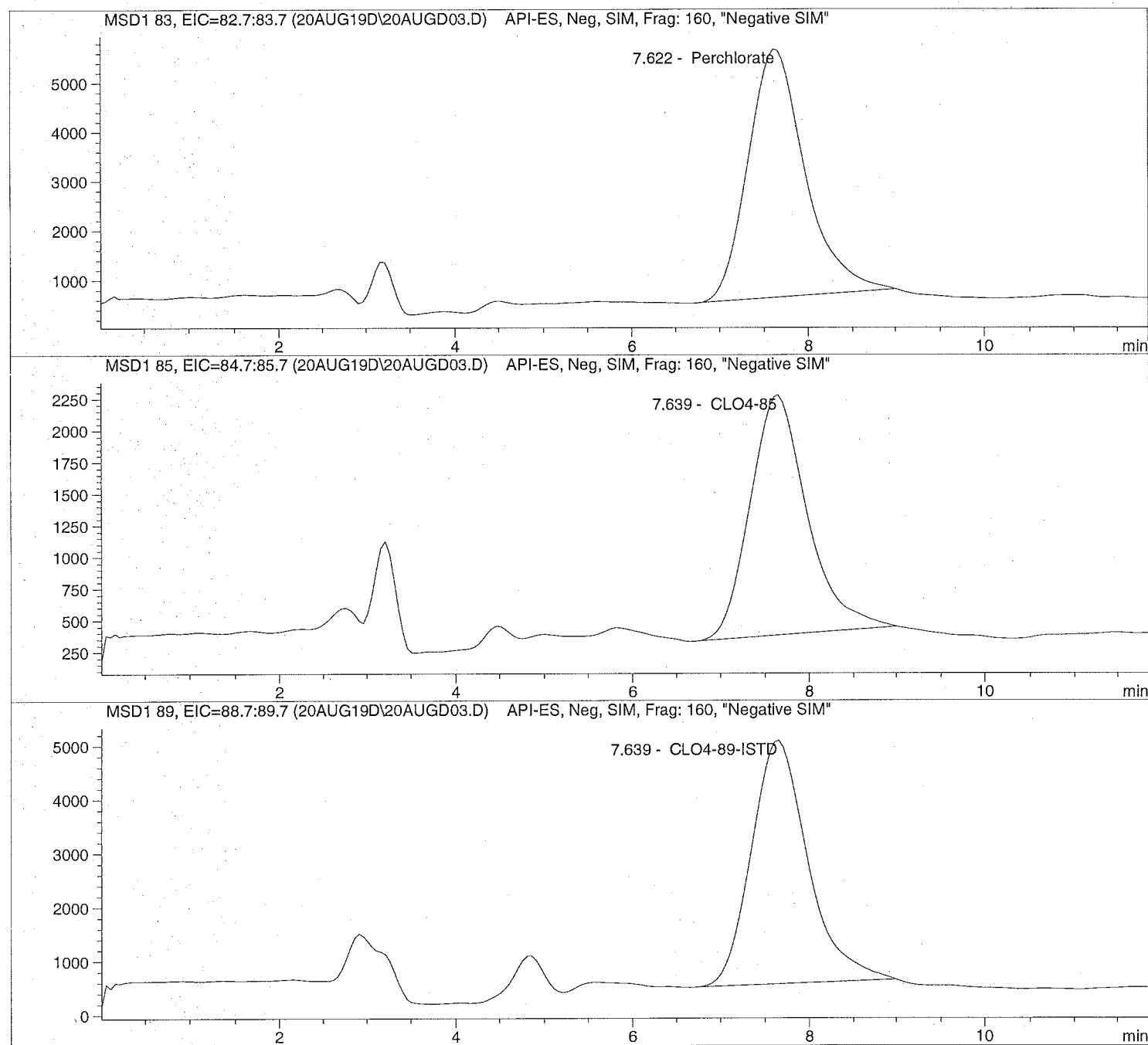


Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD03.D Sample Name: 669453 ICS@4.0

```
=====
Injection Date: 8/20/2019 09:01:36 Seq Line: 3
Sample Name: 669453 ICS@4.0 Location: Vial 73
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 50 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08
```

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD03.D Sample Name: 669453 ICS@4.0

```

=====
Injection Date: 8/20/2019 09:01:36      Seq Line: 3
Sample Name: 669453 ICS@4.0           Location: Vial 73
Acq Operator: TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.622	PBA	224930.3	3.7042	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.639	PBA	85124.5	4.5346	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.639	PBA	200877.9	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

```



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD04.D

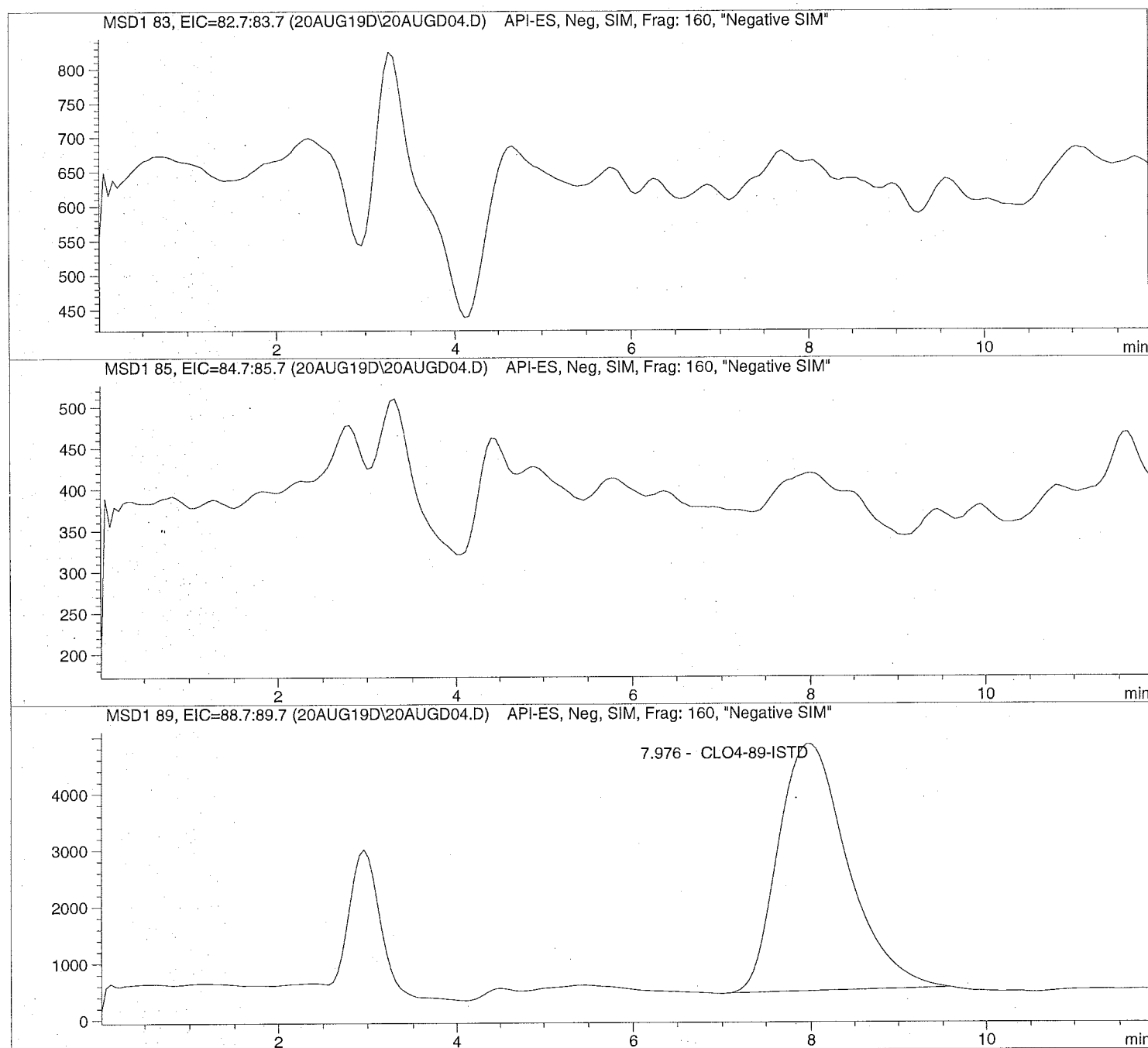
Sample Name: 669454 LMB

=====  
Injection Date: 8/20/2019 09:15:53  
Sample Name: 669454 LMB  
Acq Operator: TNB

Seq Line: 4  
Location: Vial 74  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD04.D Sample Name: 669454 LMB

```

=====
Injection Date: 8/20/2019 09:15:53      Seq Line: 4
Sample Name: 669454 LMB                 Location: Vial 74
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019, 10:15:00 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
7.976	PBA	237984.2	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD05.D

Sample Name: 1923487001

Injection Date: 8/20/2019 09:30:05

Seq Line: 5

Sample Name: 1923487001

Location: Vial 75

Acq Operator: TNB

Inj. No.: 1

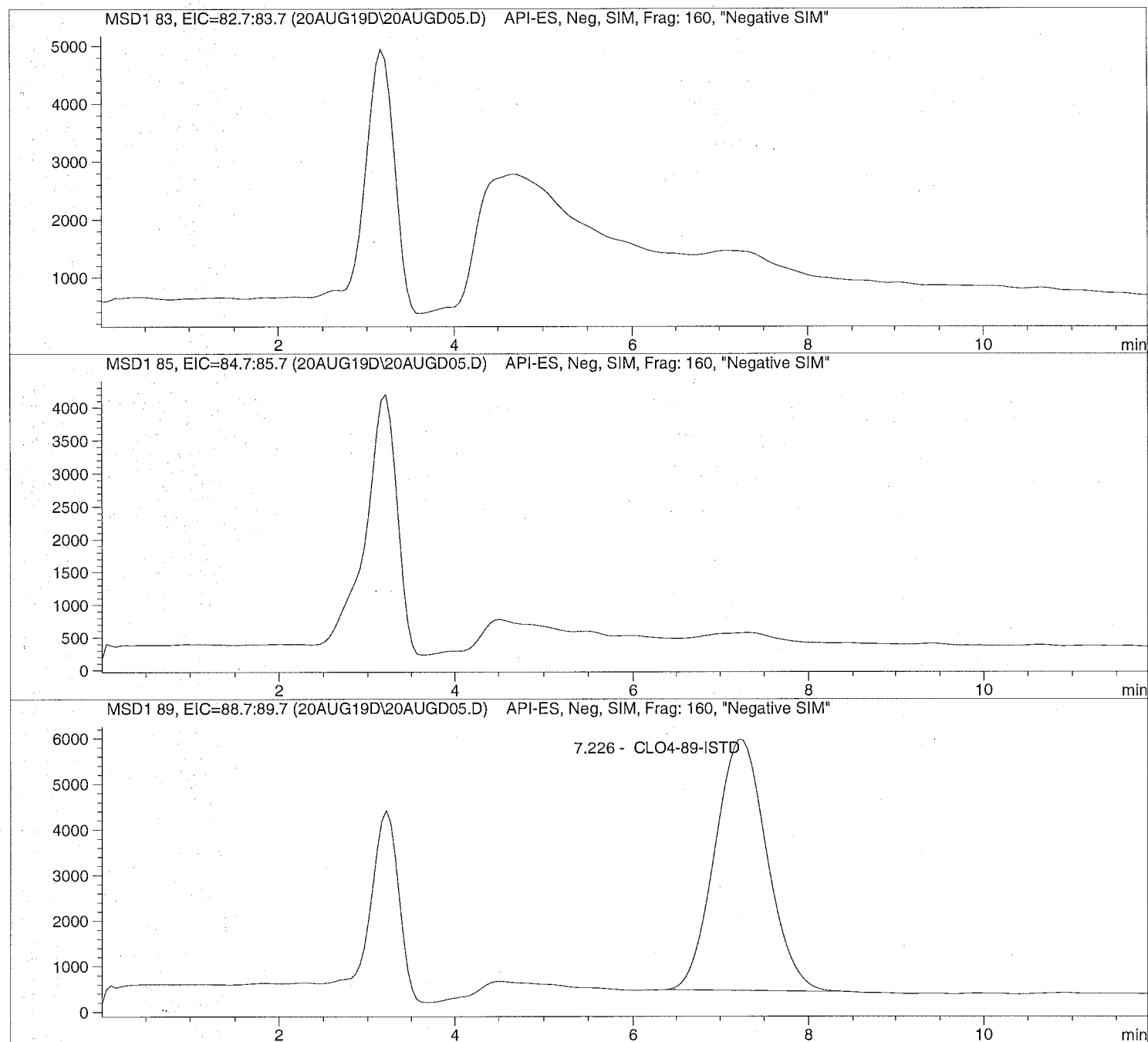
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD05.D

Sample Name: 1923487001

```

=====
Injection Date: 8/20/2019 09:30:05      Seq Line:      5
Sample Name:    1923487001              Location:      Vial 75
Acq Operator:   TNB                      Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.226	PBA	226262.5	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD06.D

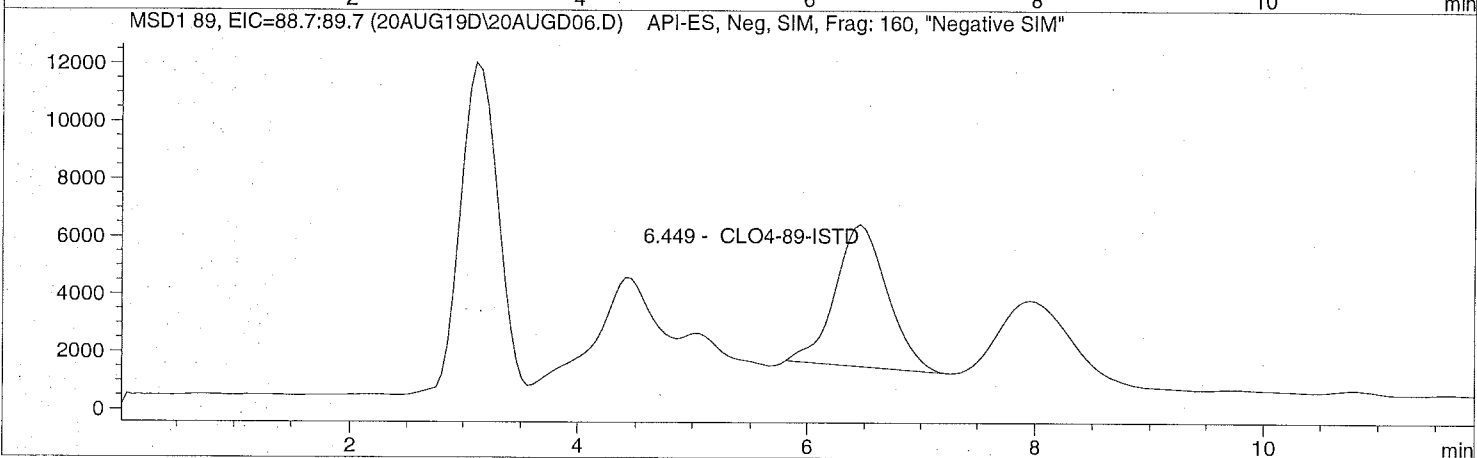
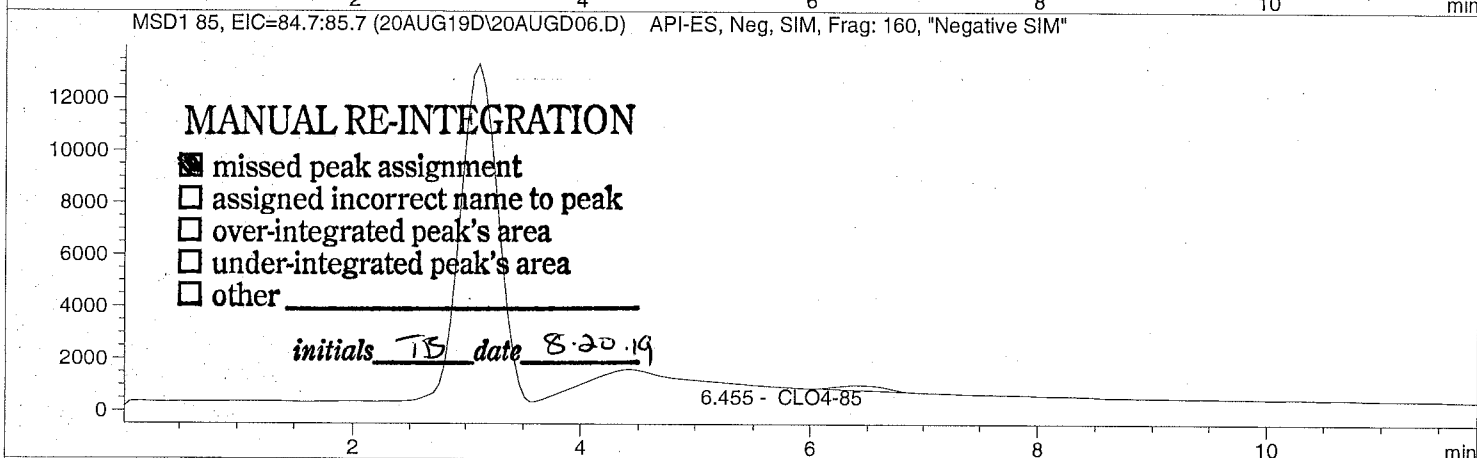
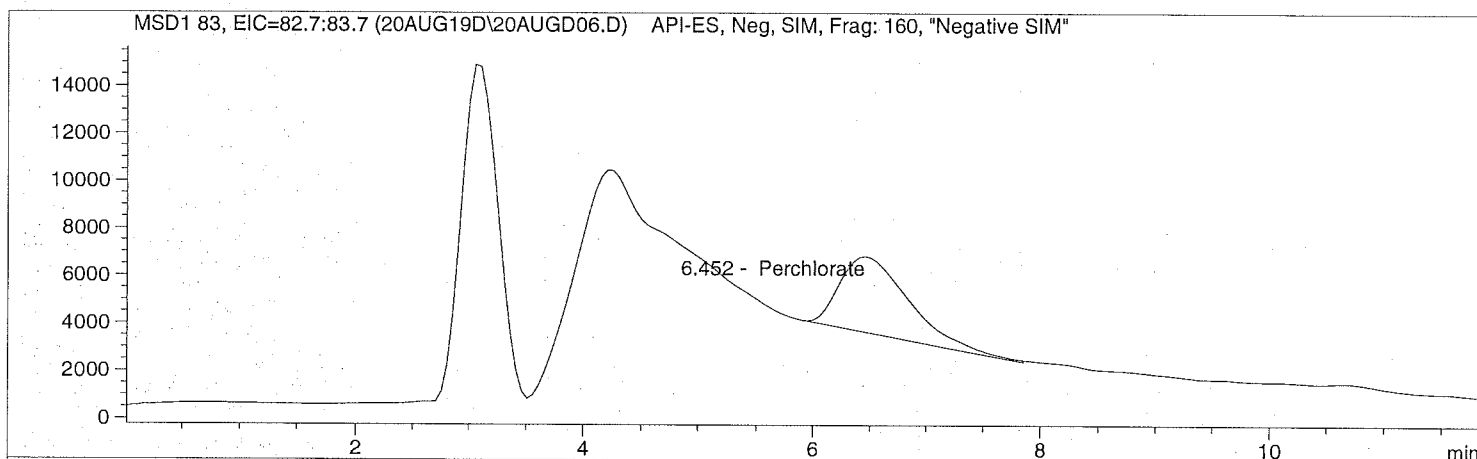
Sample Name: 1923490001

=====  
 Injection Date: 8/20/2019 09:44:16  
 Sample Name: 1923490001  
 Acq Operator: TNB

Seq Line: 6  
 Location: Vial 76  
 Inj. No.: 1  
 Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD06.D

Sample Name: 1923490001

```

=====
Injection Date: 8/20/2019 09:44:16      Seq Line: 6
Sample Name:    1923490001              Location:  Vial 76
Acq Operator:   TNB                     Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.452	BBA	136285.4	2.9160	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.455	MM	5435.2	0.3695	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.449	PB	156766.8	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD07.D

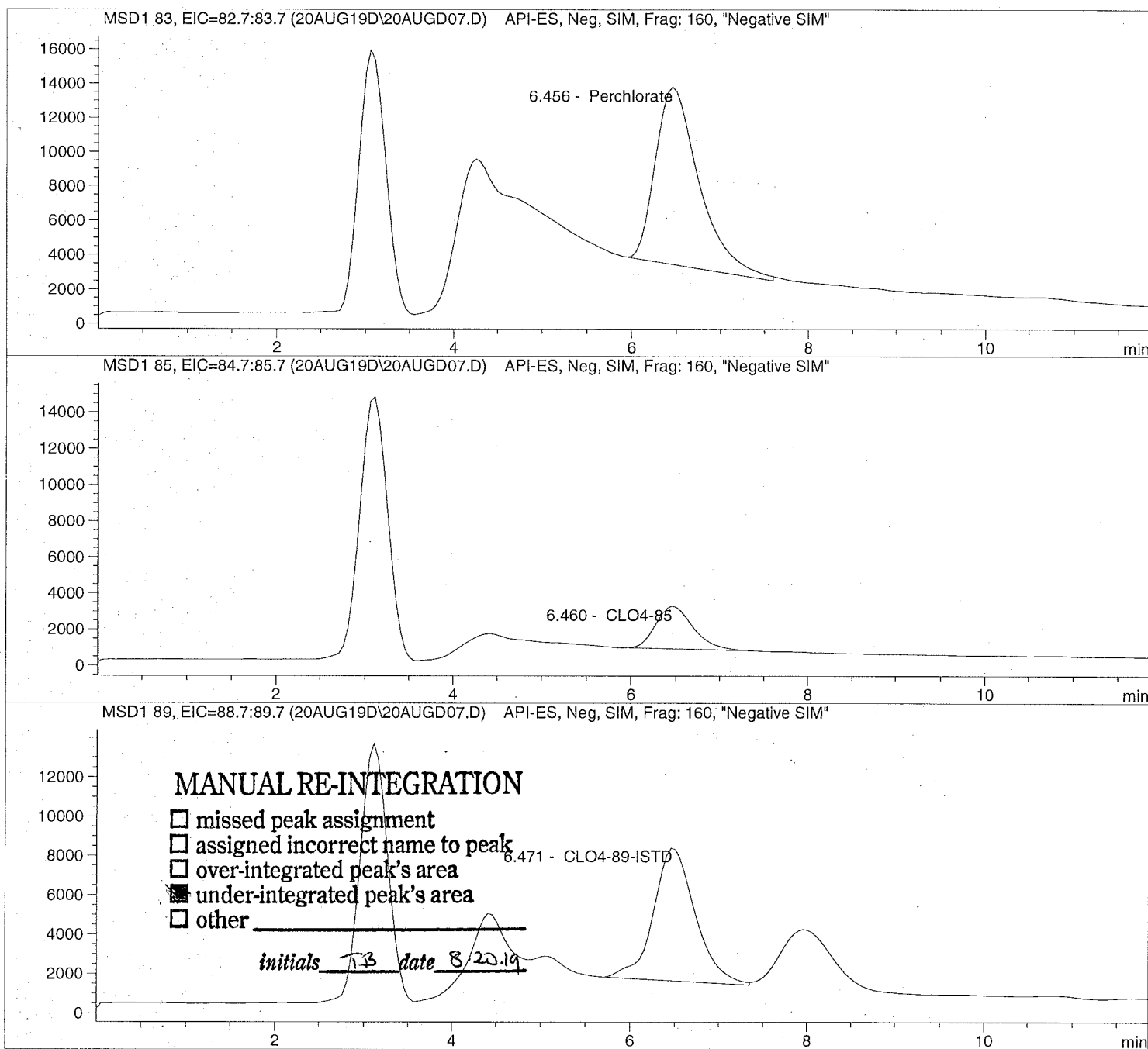
Sample Name: 1923490002 MS

=====  
 Injection Date: 8/20/2019 09:58:28  
 Sample Name: 1923490002 MS  
 Acq Operator: TNB

Seq Line: 7  
 Location: Vial 77  
 Inj. No.: 1  
 Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 8/20/2019 12:11:08

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD07.D Sample Name: 1923490002 MS

```

=====
Injection Date: 8/20/2019 09:58:28      Seq Line:          7
Sample Name:    1923490002 MS           Location:          Vial 77
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.456	BBA	354476.8	5.1992	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.460	PBA	69229.6	3.3449	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.471	MF	221958.3	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

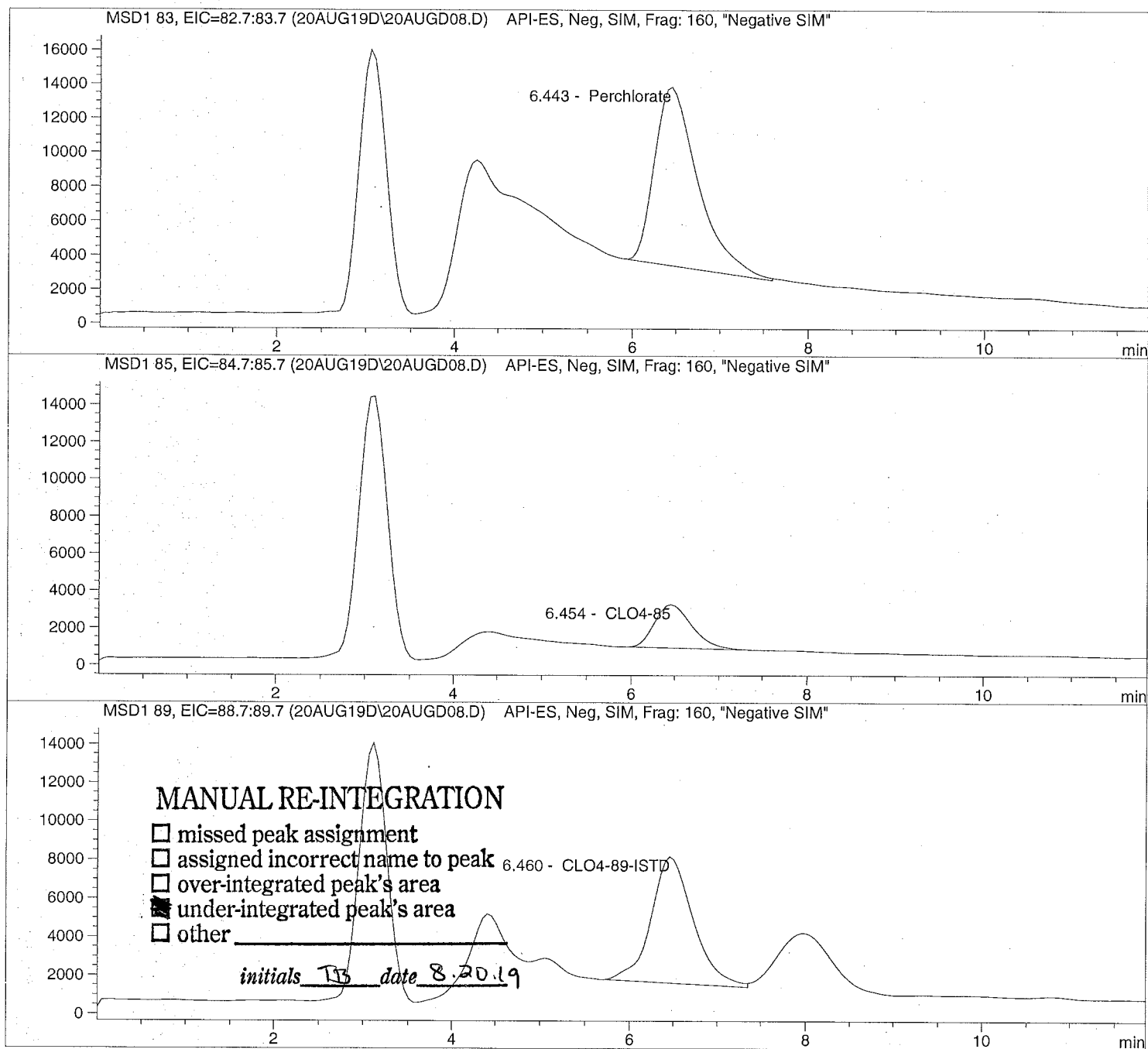


Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD08.D Sample Name: 1923490003 MSD

=====  
 Injection Date: 8/20/2019 10:12:40 Seq Line: 8  
 Sample Name: 1923490003 MSD Location: Vial 78  
 Acq Operator: TNB Inj. No.: 1  
 Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD08.D Sample Name: 1923490003 MSD

```

=====
Injection Date: 8/20/2019 10:12:40      Seq Line:      8
Sample Name:   1923490003  MSD          Location:      Vial 78
Acq Operator:  TNB                Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.443	BBA	358346.0	5.3016	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.454	PBA	69335.8	3.3817	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.460	MF	219867.2	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD09.D

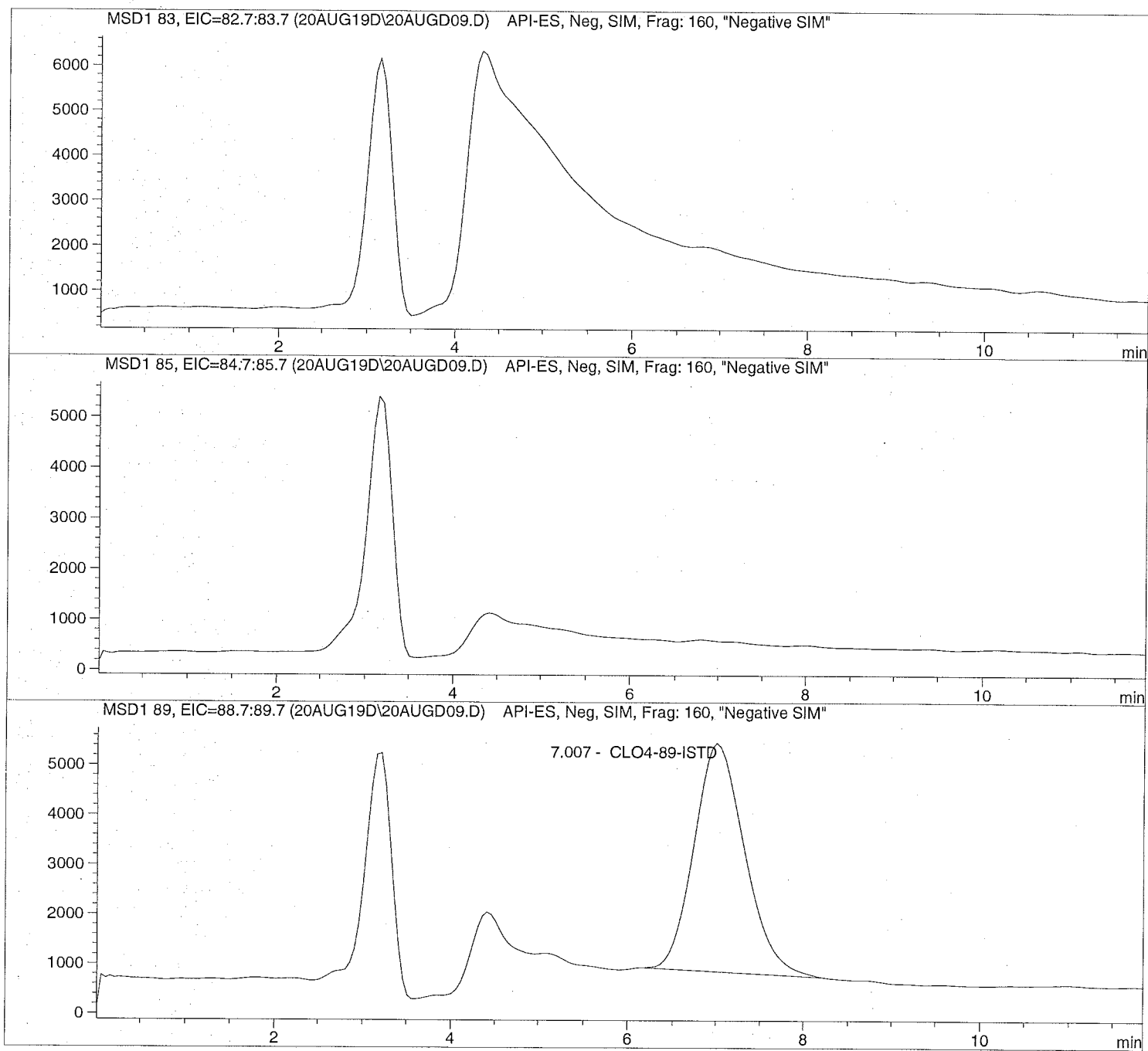
Sample Name: 1923490004

=====  
Injection Date: 8/20/2019 10:26:54  
Sample Name: 1923490004  
Acq Operator: TNB

Seq Line: 9  
Location: Vial 79  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

=====  
Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD09.D Sample Name: 1923490004

```

=====
Injection Date: 8/20/2019 10:26:54      Seq Line:          9
Sample Name:    1923490004              Location:         Vial 79
Acq Operator:   TNB                     Inj. No.:        1
                                           Inj. Vol.:       50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.007	PBA	185427.0	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

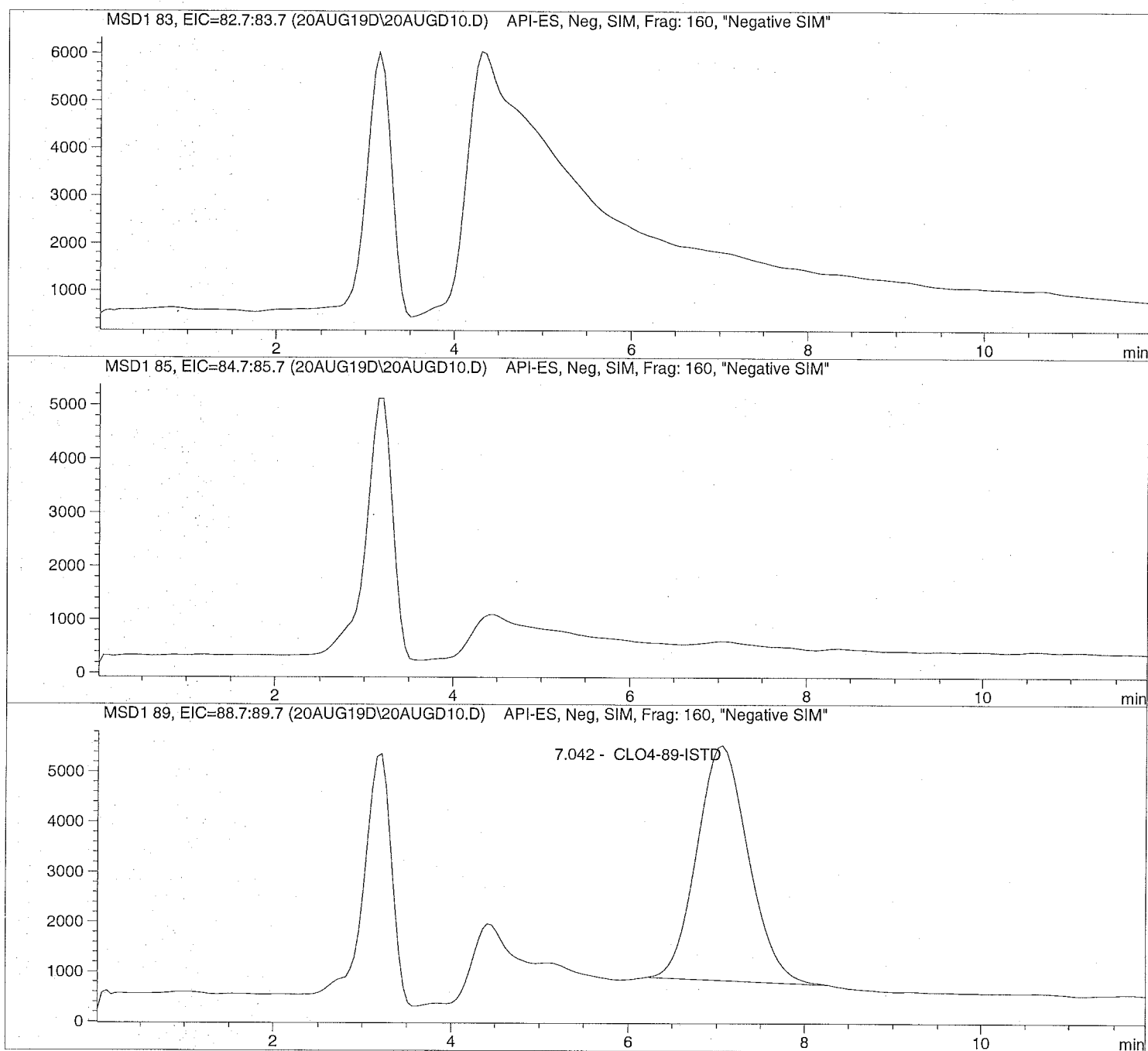
Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD10.D

Sample Name: 1923490005

```
=====
Injection Date: 8/20/2019 10:41:08      Seq Line:      10
Sample Name:    1923490005              Location:      Vial 80
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
```

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD10.D

Sample Name: 1923490005

```

=====
Injection Date: 8/20/2019 10:41:08      Seq Line:          10
Sample Name:   1923490005                Location:          Vial 80
Acq Operator:  TNB                        Inj. No.:         1
                                           Inj. Vol.:        50 µl
=====

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:          Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.042	PBA	190139.9	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD11.D

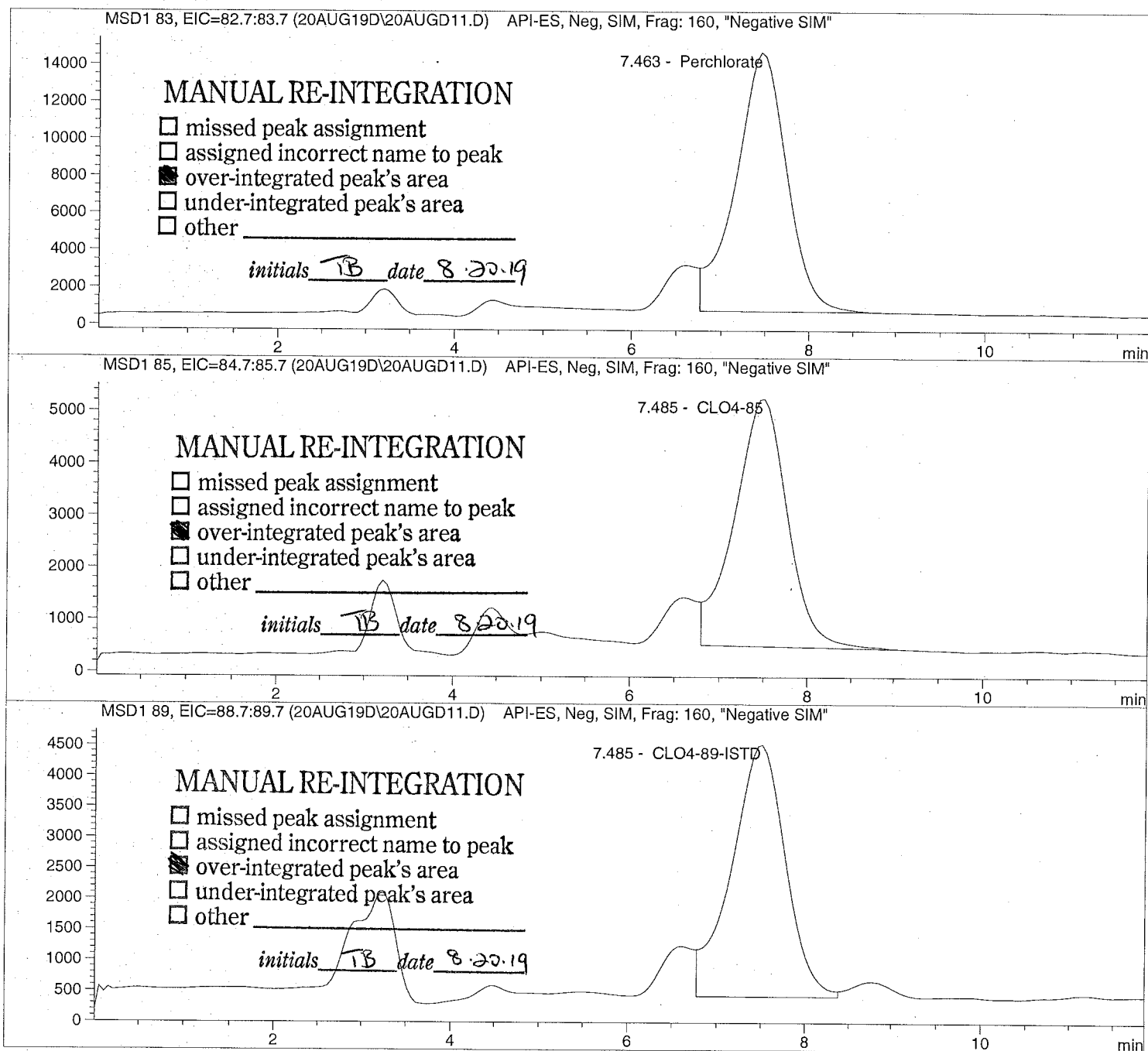
Sample Name: 1923491001

Injection Date: 8/20/2019 10:55:21  
Sample Name: 1923491001  
Acq Operator: TNB

Seq Line: 11  
Location: Vial 81  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD11.D Sample Name: 1923491001

```

=====
Injection Date: 8/20/2019 10:55:21      Seq Line:      11
Sample Name:    1923491001              Location:      Vial 81
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.463	FM	558061.6	10.2094	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	FM	197832.2	12.0244	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	MF	173328.0	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

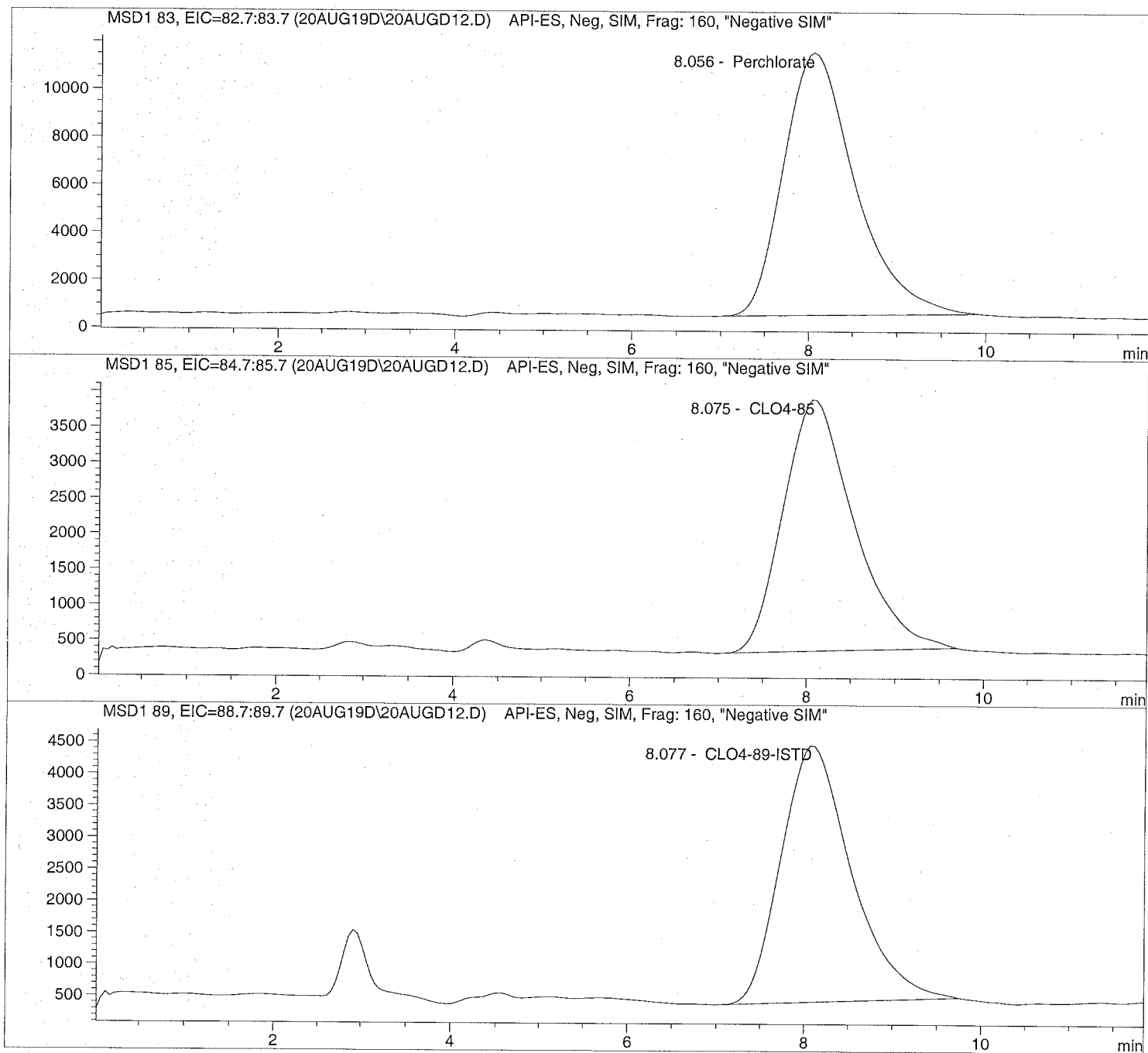


Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD12.D Sample Name: 1923492001 1K

```
=====
Injection Date: 8/20/2019 11:09:30      Seq Line:      12
Sample Name:    1923492001 1K           Location:      Vial 82
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
```

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD12.D Sample Name: 1923492001 1K

```

=====
Injection Date: 8/20/2019 11:09:30      Seq Line:      12
Sample Name:    1923492001 1K           Location:      Vial 82
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 am
Multiplier:     1.000000
Dilution:       1000.000000
Sample Amount:  0.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.056	PBA	621376.9	8846.4165	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.075	PBA	197618.2	9349.5909	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.077	PBA	223941.7	5000.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD13.D

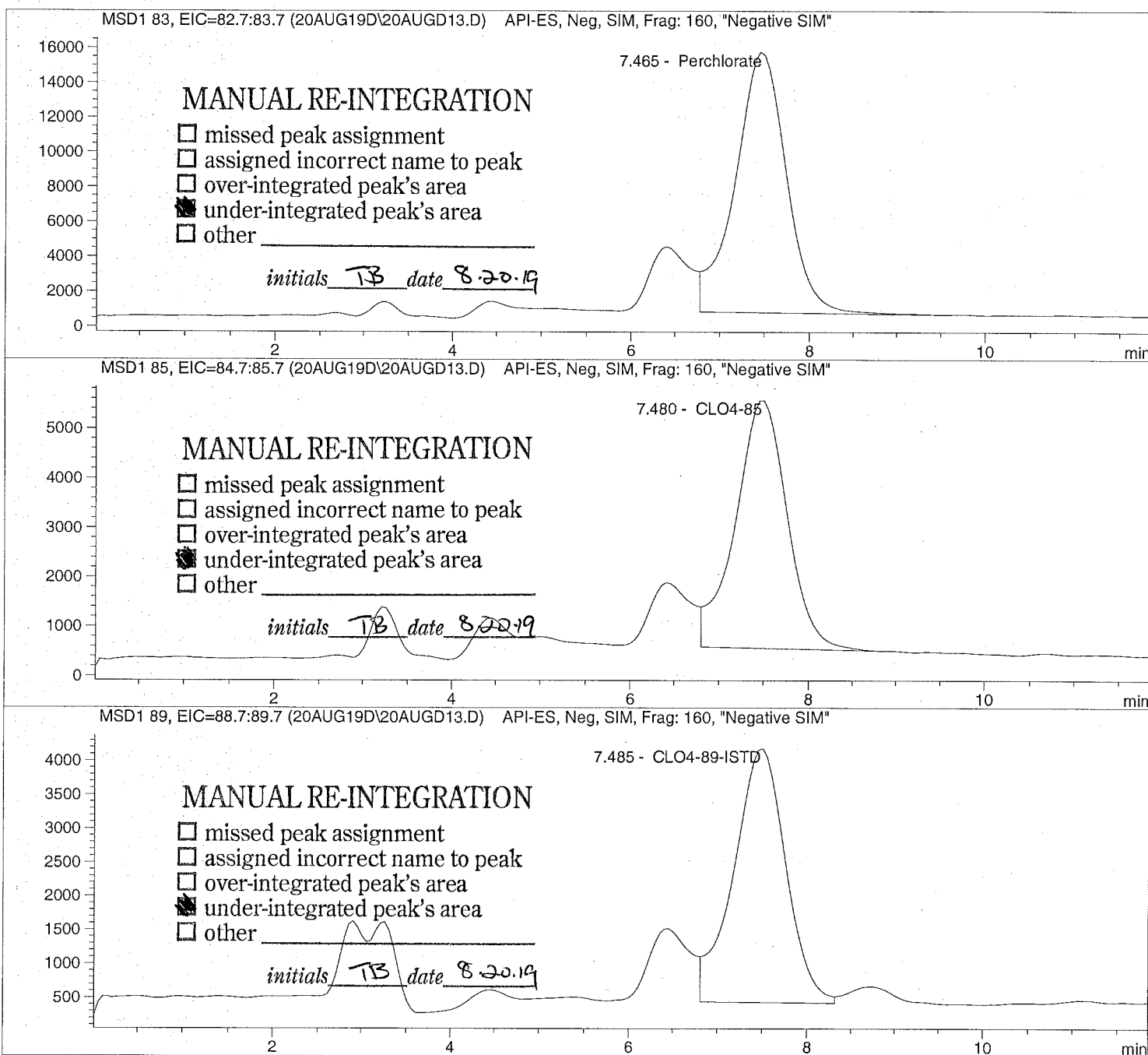
Sample Name: 1923494001

Injection Date: 8/20/2019 11:23:40  
Sample Name: 1923494001  
Acq Operator: TNB

Seq Line: 13  
Location: Vial 83  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD13.D Sample Name: 1923494001

```
=====
Injection Date: 8/20/2019 11:23:40      Seq Line:          13
Sample Name:    1923494001              Location:          Vial 83
Acq Operator:   TNB                      Inj. No.:         1
                                           Inj. Vol.:        50 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
```

Perchlorate analysis

Sample Information

```
Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.465	FM	589441.2	12.3093	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.480	FM	200511.5	13.9561	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	MF	150739.0	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD14.D

Sample Name: 669456 CCV@25

Injection Date: 8/20/2019 11:37:53

Seq Line: 14

Sample Name: 669456 CCV@25

Location: Vial 71

Acq Operator: TNB

Inj. No.: 1

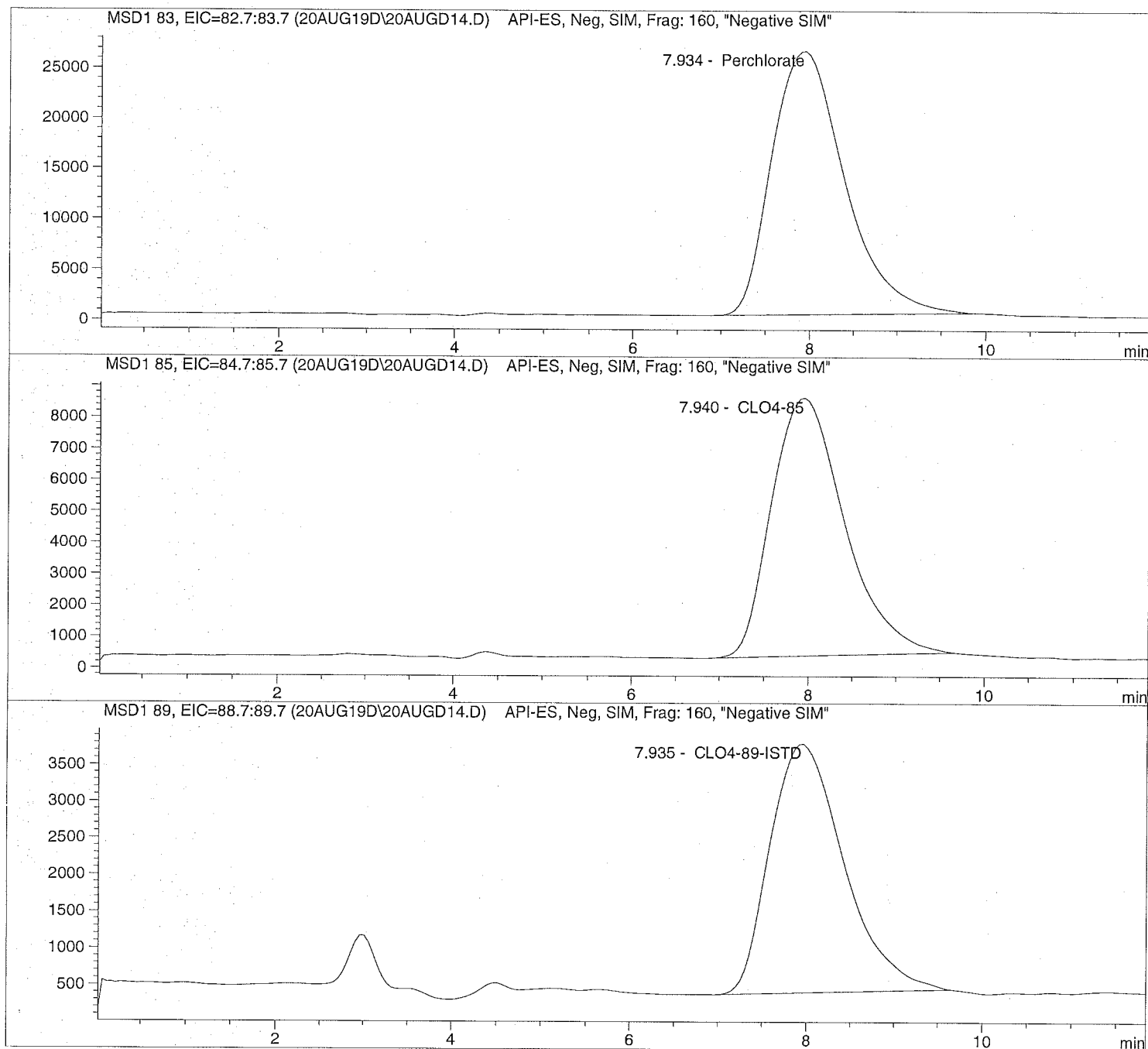
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD14.D Sample Name: 669456 CCV@25

```

=====
Injection Date: 8/20/2019 11:37:53      Seq Line:      14
Sample Name:   669456   CCV@25          Location:      Vial 71
Acq Operator:  TNB                Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.934	PBA	1498652.4	23.1846	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.940	PBA	473077.5	24.5701	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.935	PBA	197525.4	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```



---

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

## **Initial Calibration**

=====  
 Calibration Table  
 =====

Perchlorate

Calib. Data Modified : 3/19/2019 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	Amount	Area	Amt/Area	Ref	Grp	Name
8.744	1	1.00000	7.76074e4	1.28854e-5	1		Perchlorate
	2	2.00000	1.35273e5	1.47849e-5			
	3	5.00000	3.37764e5	1.48033e-5			
	4	10.00000	6.83454e5	1.46316e-5			
	5	25.00000	2.08433e6	1.19943e-5			
	6	50.00000	4.13334e6	1.20968e-5			
	7	75.00000	5.99313e6	1.25143e-5			
8.755	2	1.00000	2.36780e4	4.22333e-5	1		CLO4-85
	2	2.00000	4.69486e4	4.25998e-5			
	3	5.00000	1.06124e5	4.71147e-5			
	4	10.00000	2.13523e5	4.68335e-5			
	5	25.00000	6.14295e5	4.06971e-5			
	6	50.00000	1.19814e6	4.17315e-5			
	7	75.00000	1.78355e6	4.20509e-5			
8.766	3	5.00000	2.73208e5	1.83011e-5	+I1		CLO4-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5			
	3	5.00000	2.33196e5	2.14412e-5			
	4	5.00000	2.34454e5	2.13262e-5			
	5	5.00000	2.50568e5	1.99547e-5			
	6	5.00000	2.30977e5	2.16472e-5			



RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
	7	5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min  
Curve Type : Quadratic  
Origin : Ignored  
Calibration Level Weights:/  
Level 1 : 1  
Level 2 : 0.5  
Level 3 : 0.2  
Level 4 : 0.1  
Level 5 : 0.04  
Level 6 : 0.02  
Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min  
Curve Type : Quadratic  
Origin : Ignored  
Calibration Level Weights:/  
Level 1 : 1  
Level 2 : 0.5  
Level 3 : 0.2  
Level 4 : 0.1  
Level 5 : 0.04  
Level 6 : 0.02  
Level 7 : 0.013333

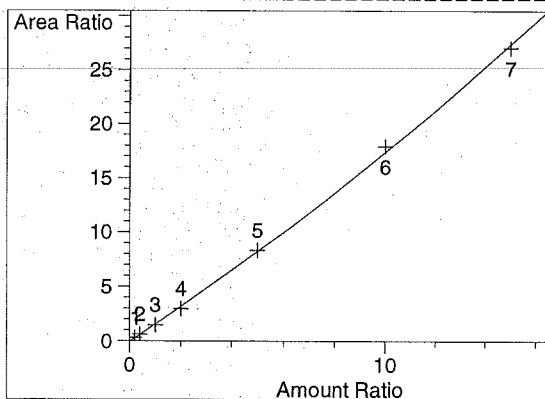
Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min  
Curve Type : Linear  
Origin : Included  
Calibration Level Weights:/  
Level 1 : 1  
Level 2 : 1  
Level 3 : 1  
Level 4 : 1  
Level 5 : 1  
Level 6 : 1  
Level 7 : 1

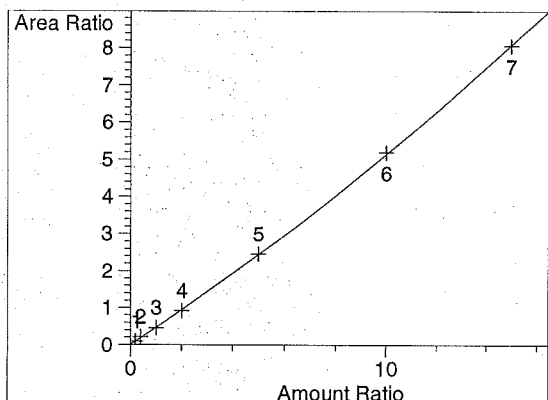
=====  
Peak Sum Table  
=====

\*\*\*No Entries in table\*\*\*  
=====

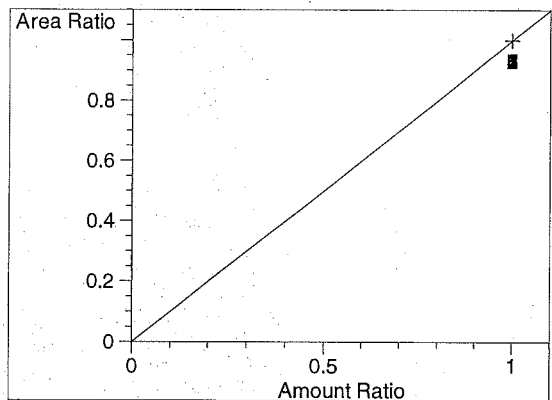
=====  
 Calibration Curves  
 =====



Perchlorate at exp. RT: 8.744  
 MSD1 83, EIC=82.7:83.7  
 Correlation: 0.99957  
 Residual Std. Dev.: 0.30744  
 Formula:  $y = ax^2 + bx + c$   
 a: 1.76988e-2  
 b: 1.56480  
 c: -4.92430e-2  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755  
 MSD1 85, EIC=84.7:85.7  
 Correlation: 0.99983  
 Residual Std. Dev.: 0.03473  
 Formula:  $y = ax^2 + bx + c$   
 a: 5.13396e-3  
 b: 4.62055e-1  
 c: 4.97209e-4  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766  
 MSD1 89, EIC=88.7:89.7  
 Correlation: 1.00000  
 Residual Std. Dev.: 0.00000  
 Formula:  $y = mx + b$   
 m: 1.00000  
 b: 0.00000  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

## Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

['#' ==&gt; Run has not been reprocessed with Batch Review Method

['\*' ==&gt; 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

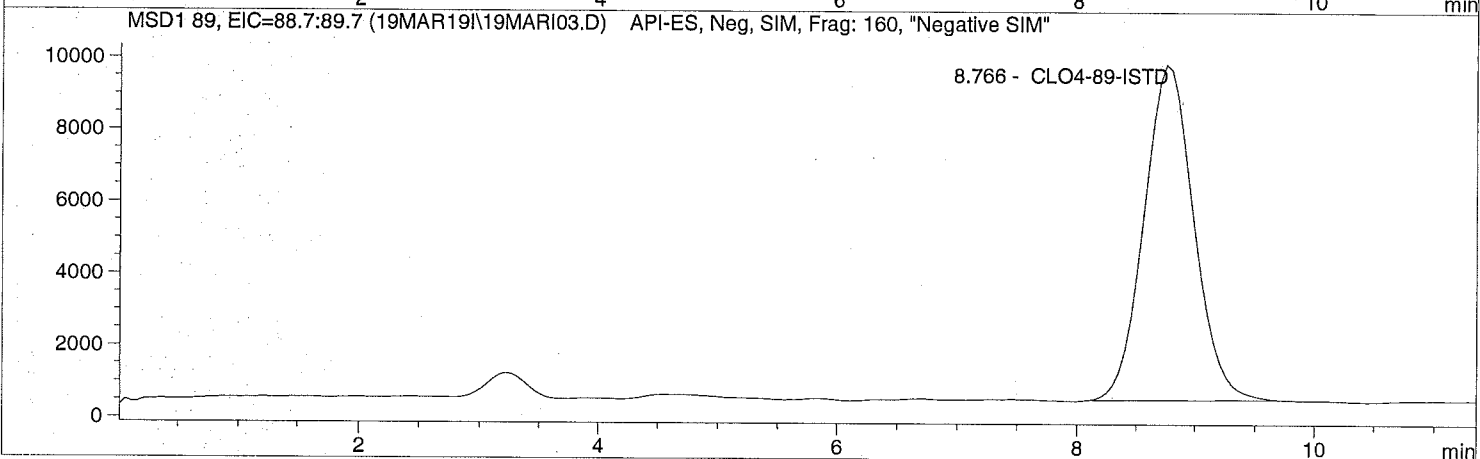
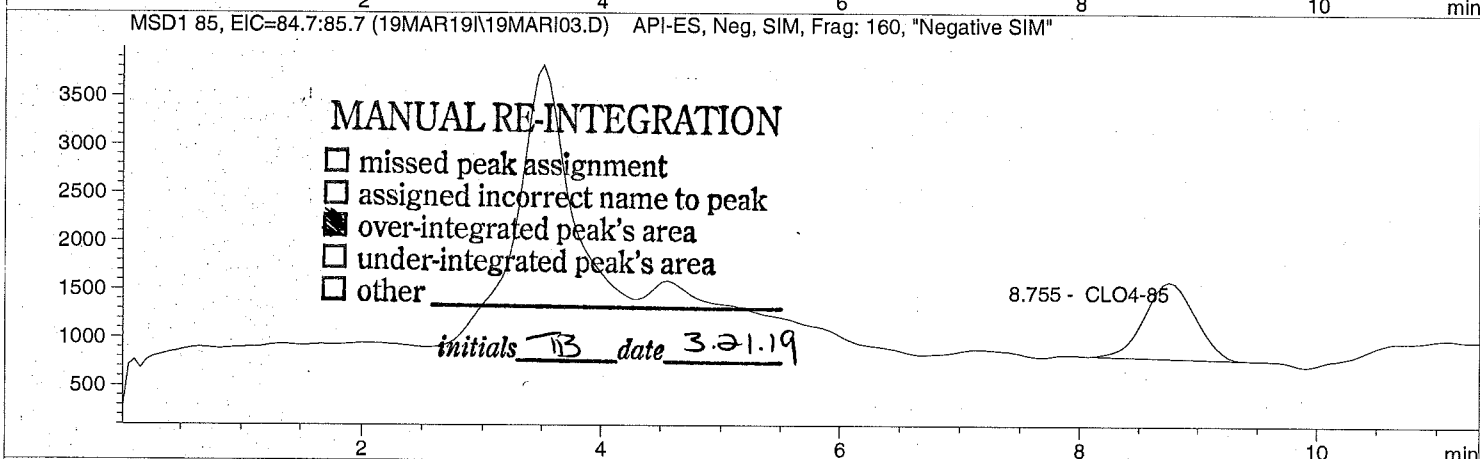
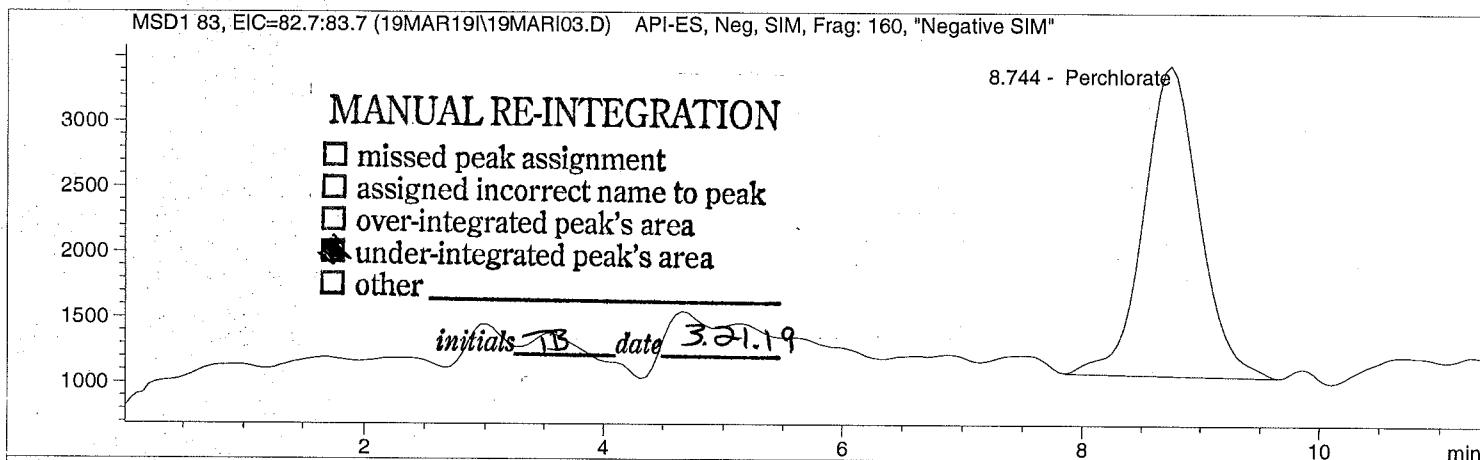
Inj. Vol.: 30 µl

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

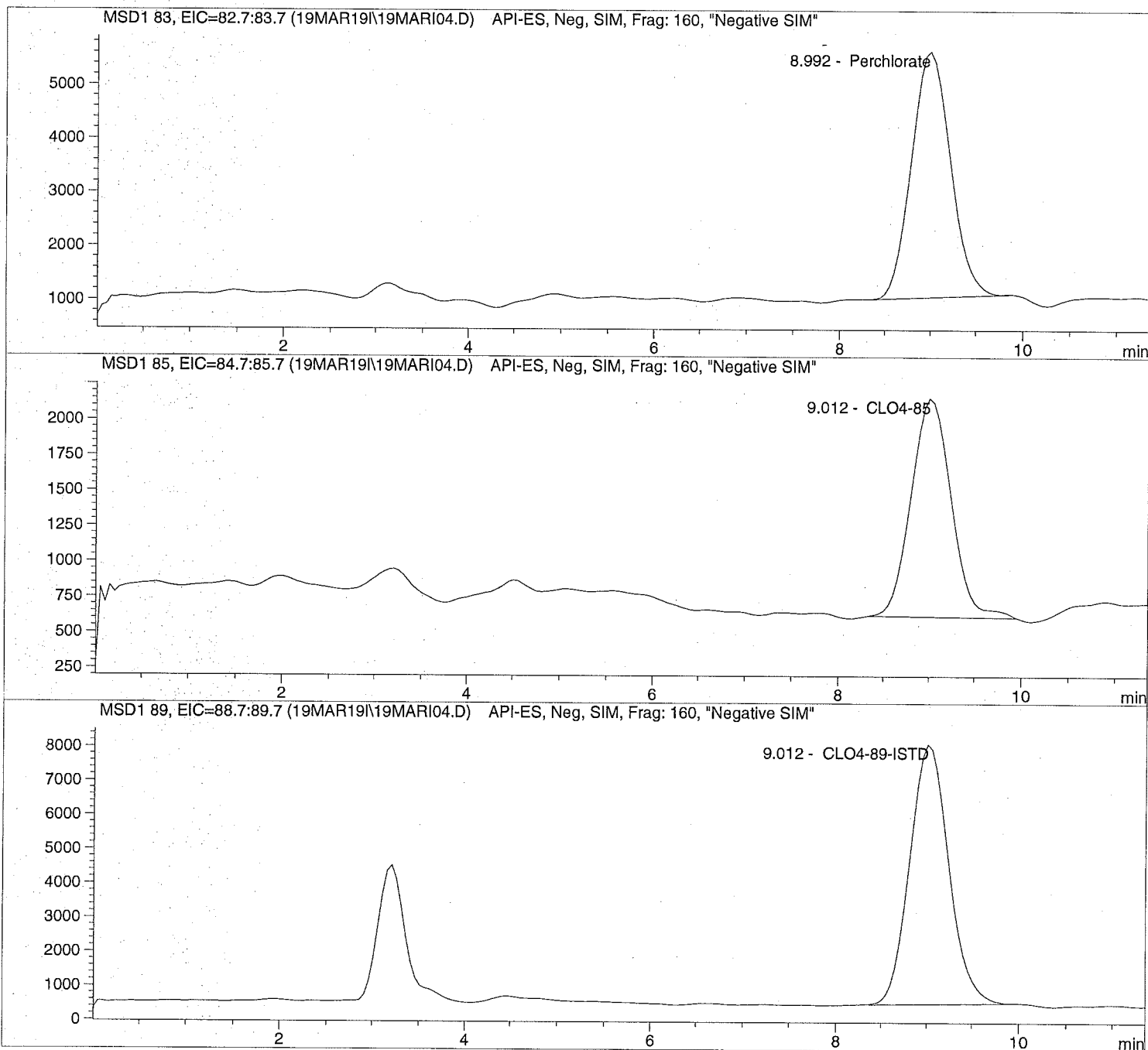
Inj. Vol.: 30 µl

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

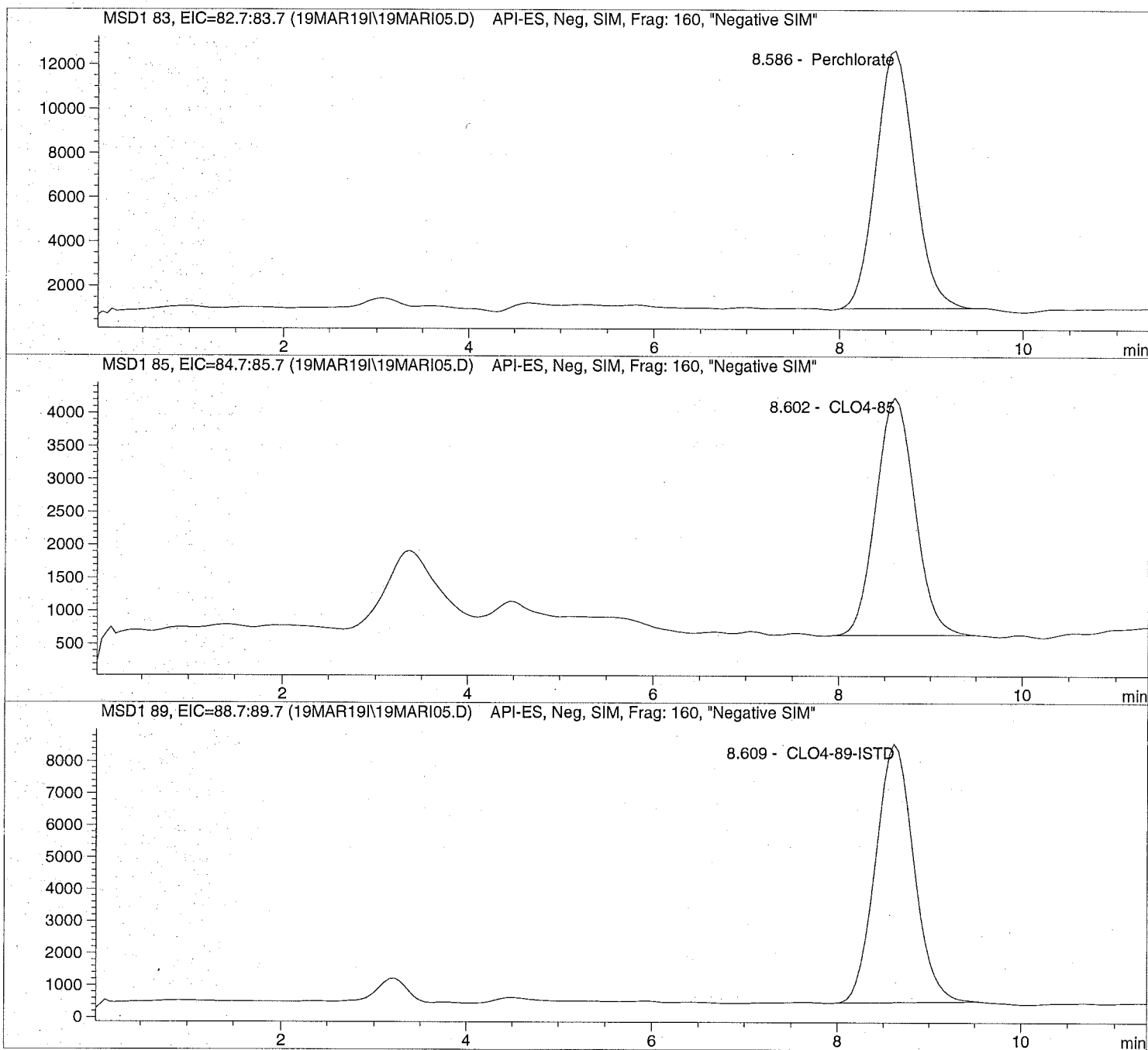
Inj. Vol.: 30 µl

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

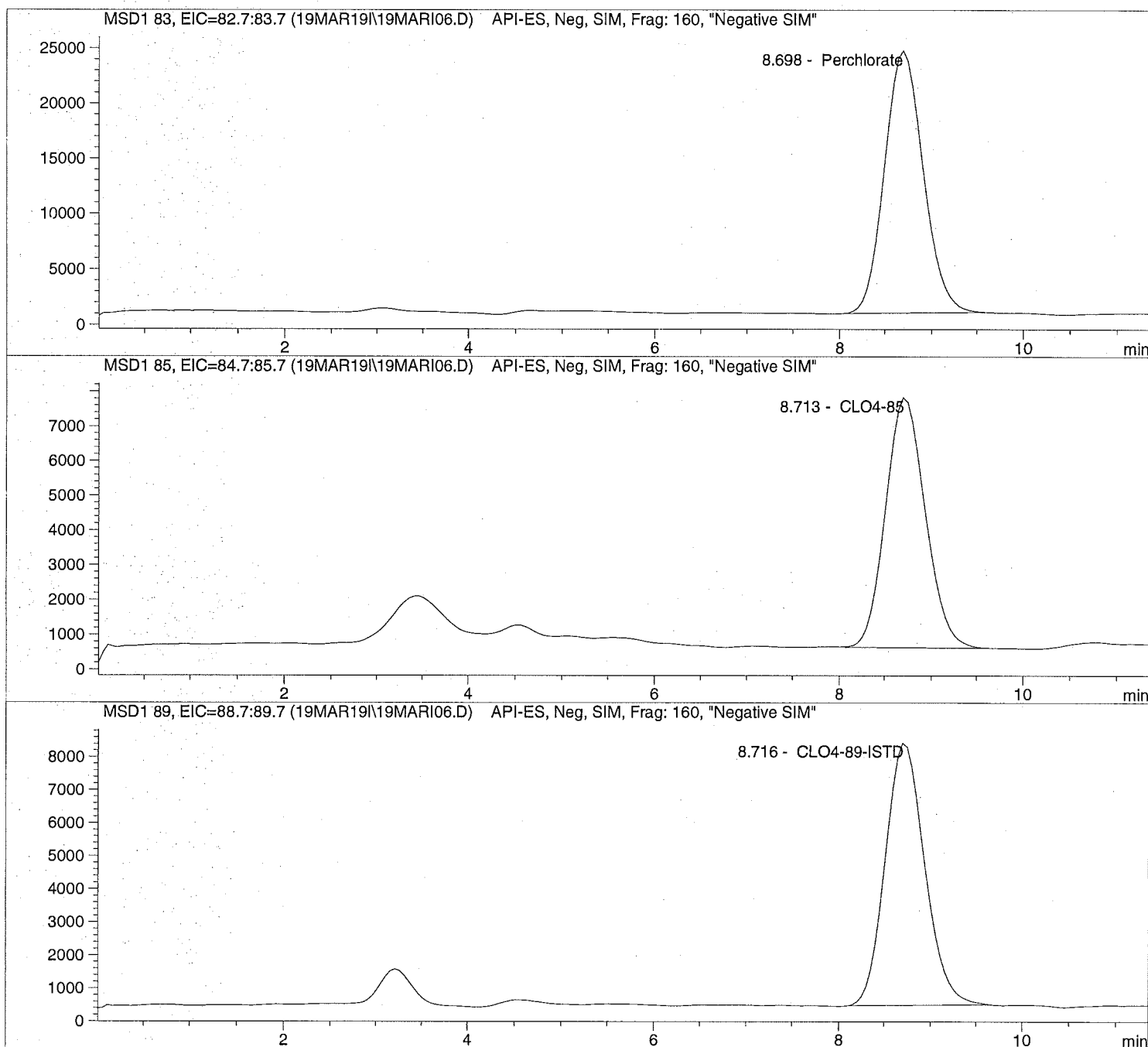
Inj. Vol.: 30 µl

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

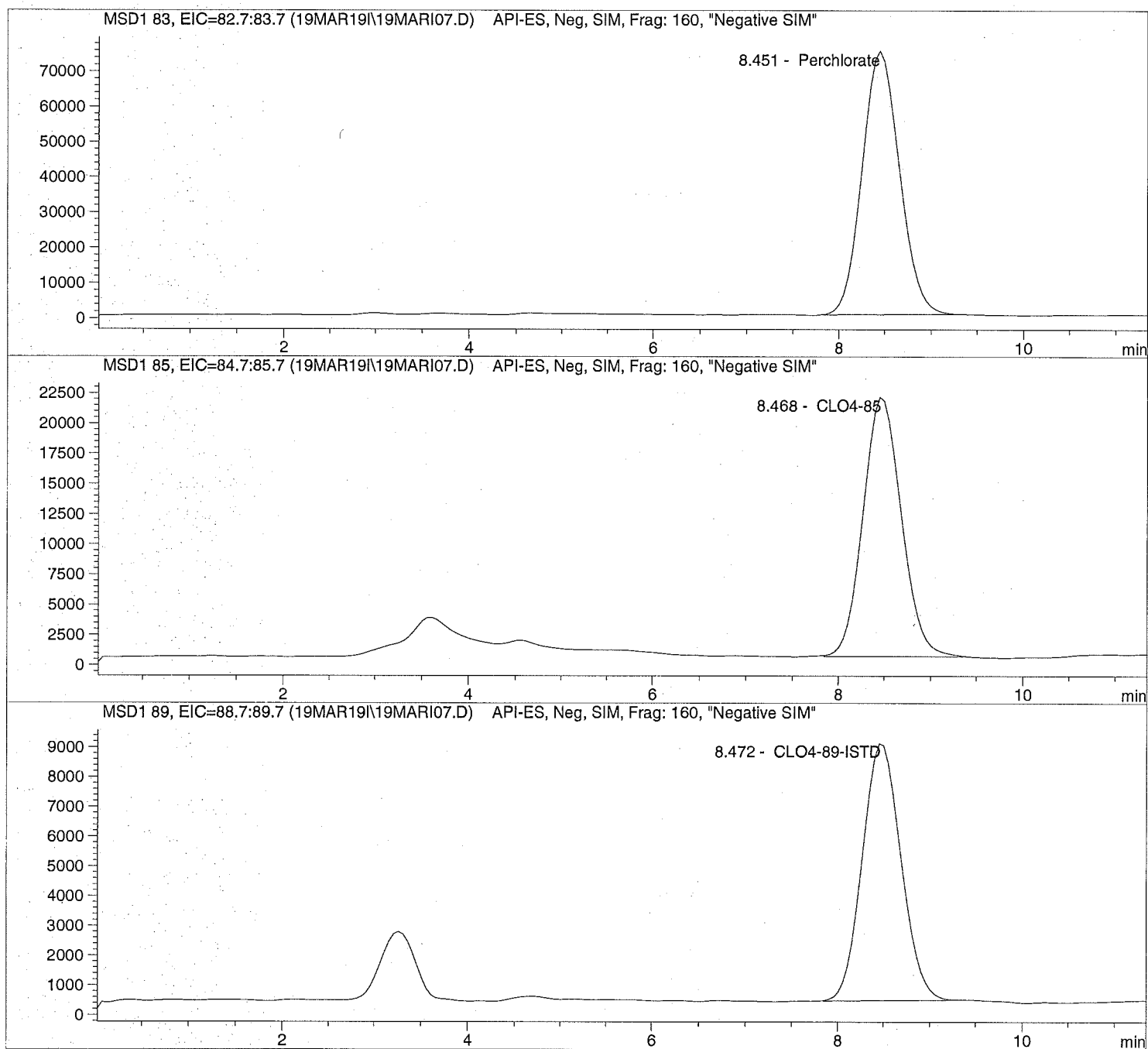
Inj. Vol.: 30 µl

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

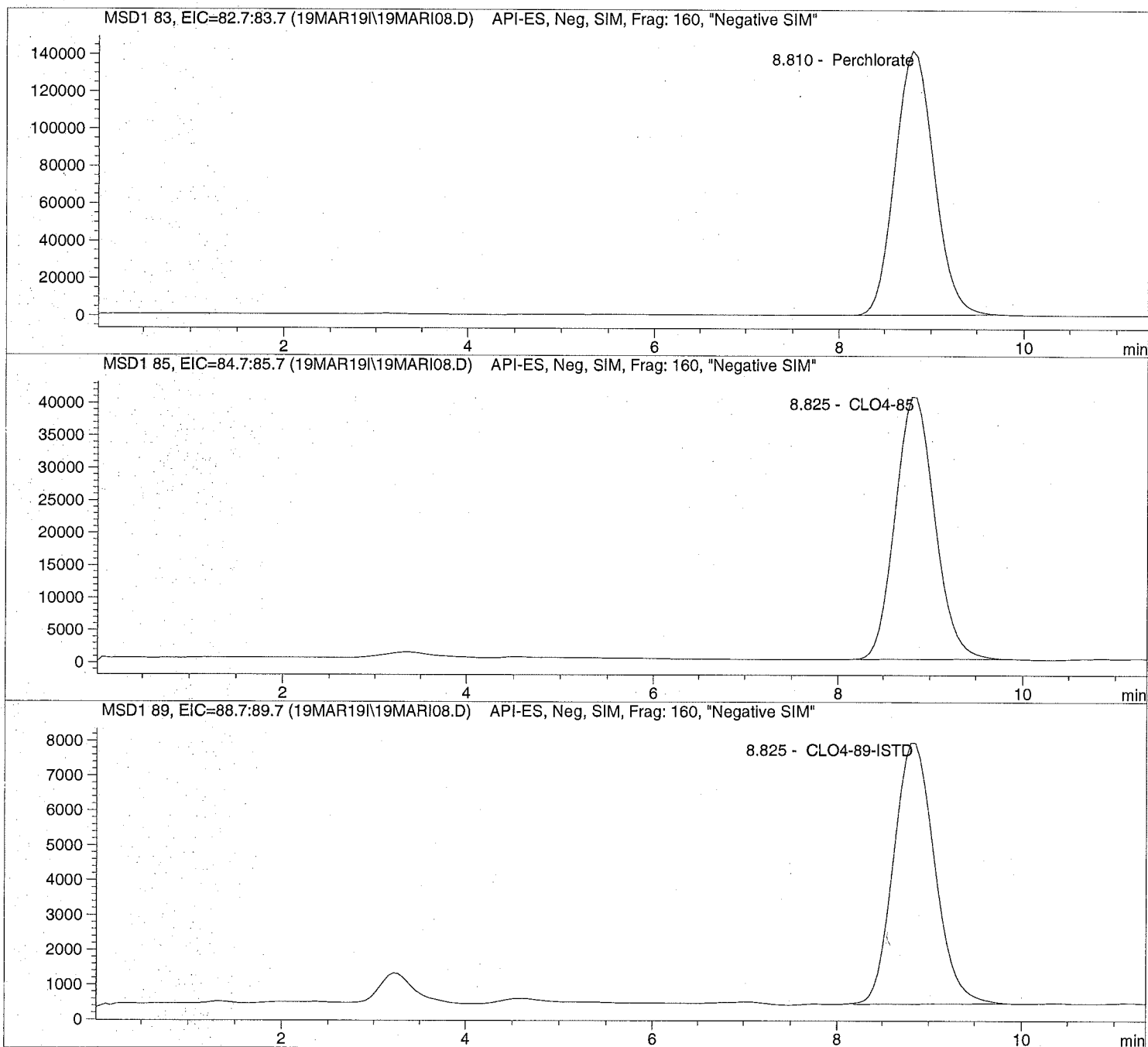
Inj. Vol.: 30 µl

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

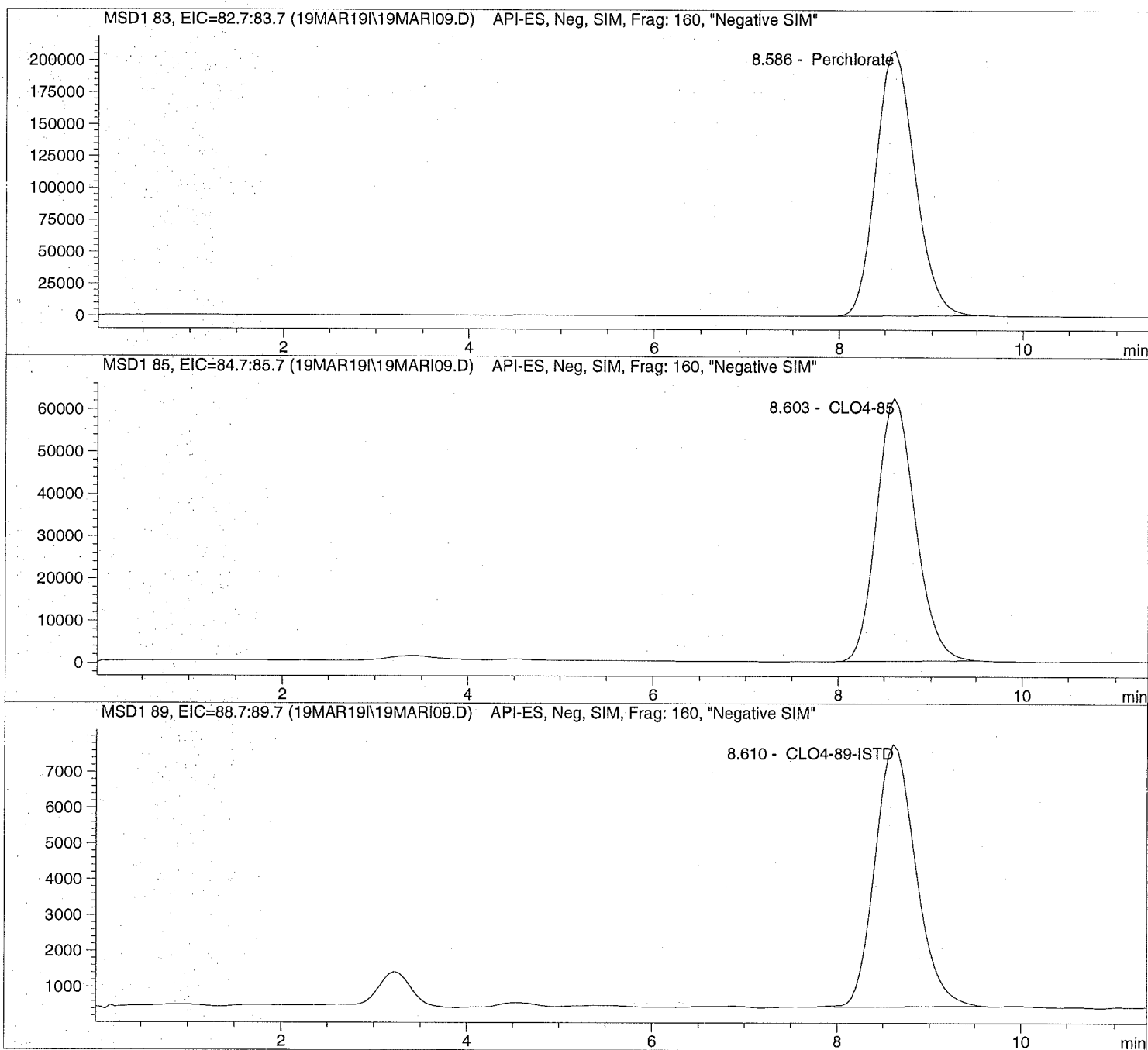
Inj. Vol.: 30 µl

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

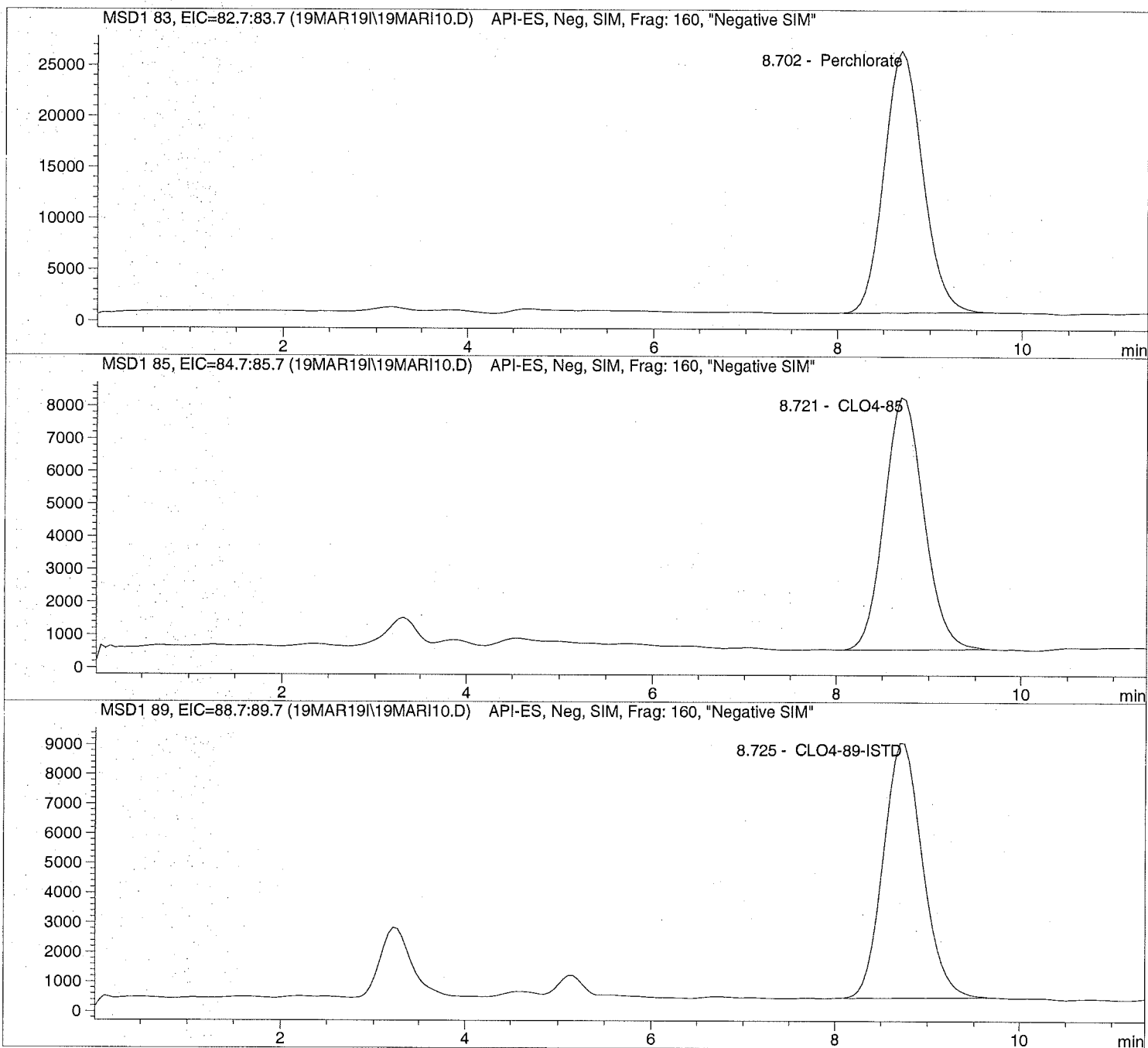
Inj. Vol.: 30 µl

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

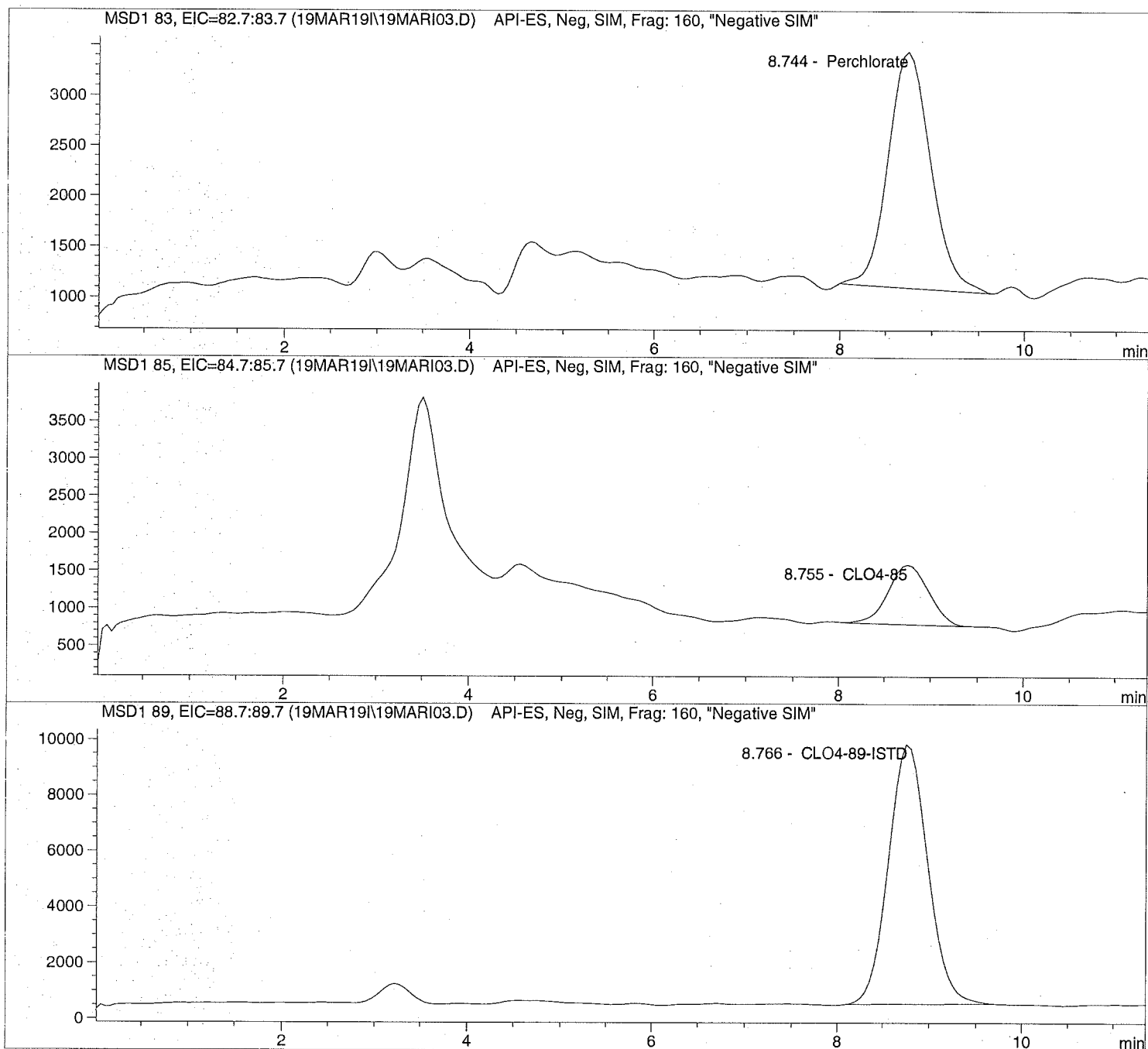
Sample Name: CLO4@ 1.0ug/L

=====  
Injection Date: 3/19/2019 09:39:40  
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



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 ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD06.D

Sample Name: 1923490001

Injection Date: 8/20/2019 09:44:16

Seq Line: 6

Sample Name: 1923490001

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

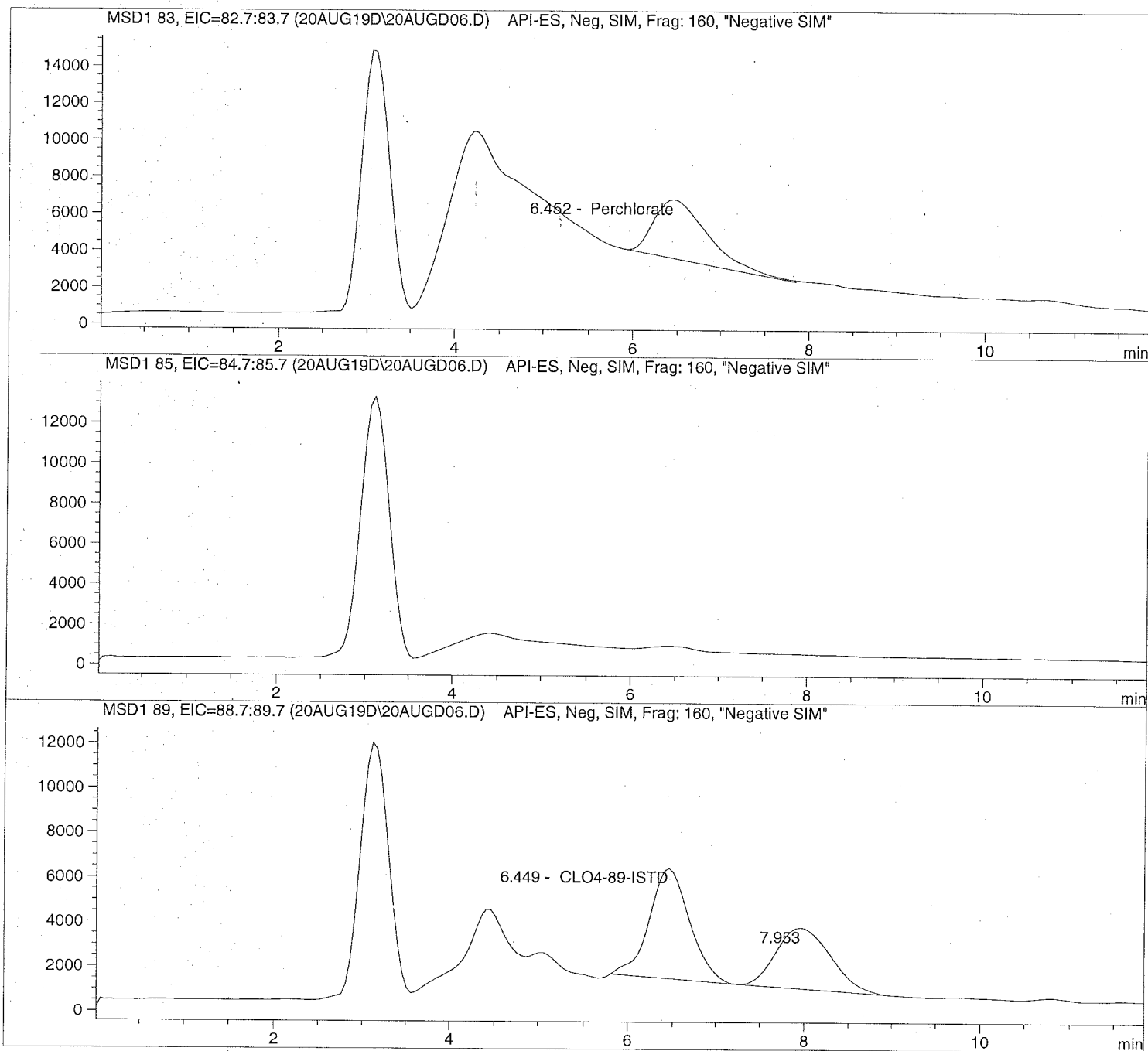
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD06.D Sample Name: 1923490001

```

=====
Injection Date: 8/20/2019 09:44:16      Seq Line: 6
Sample Name: 1923490001                Location: Vial 76
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.452	BBA	136285.4	2.9160	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.449	PB	156766.8	5.0000	CLO4-89-ISTD
7.953	VBA	116815.5	0.0000	

```

=====
*** End of Report ***
=====

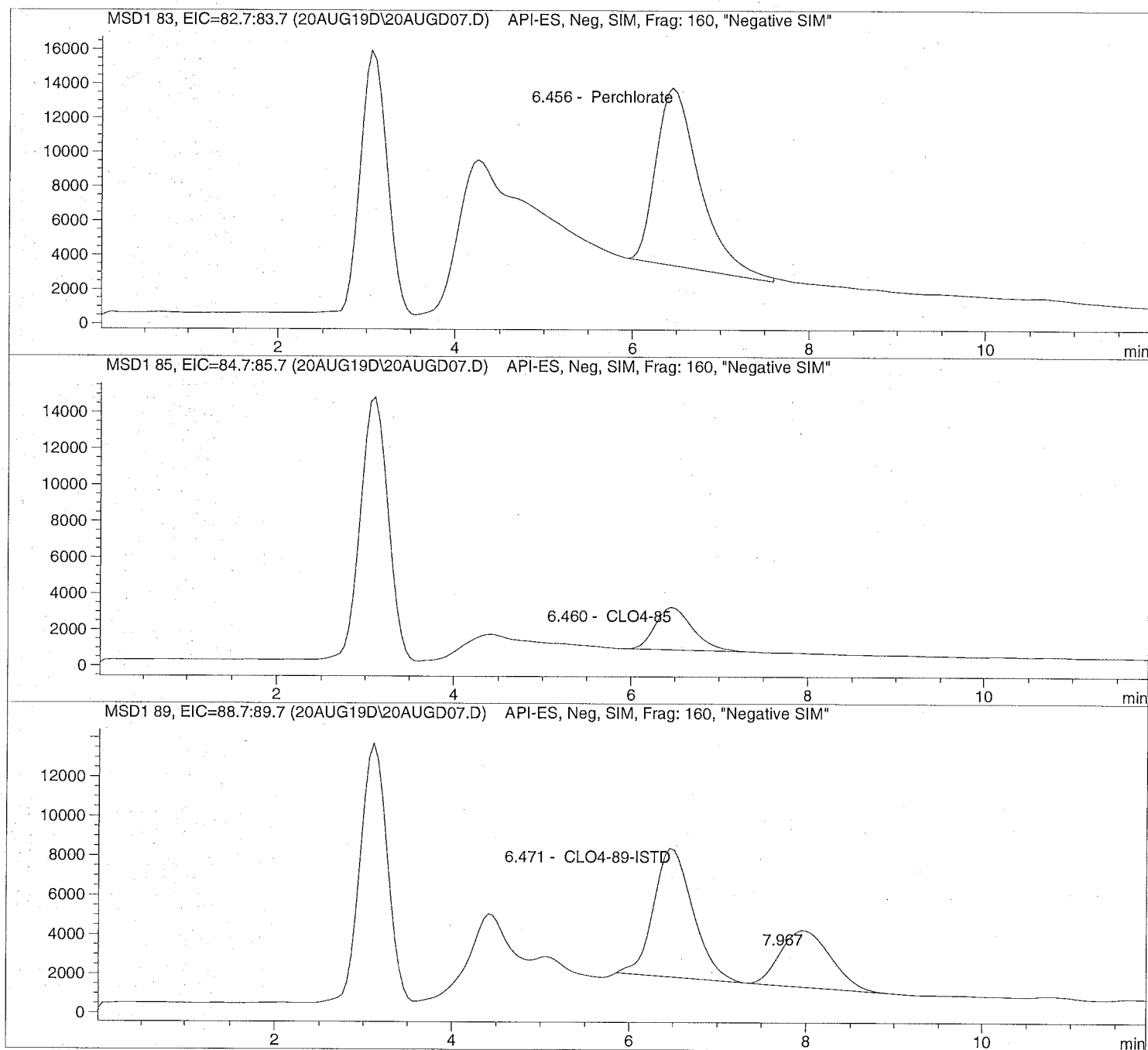
```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD07.D Sample Name: 1923490002 MS

=====  
Injection Date: 8/20/2019 09:58:28 Seq Line: 7  
Sample Name: 1923490002 MS Location: Vial 77  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl

=====  
Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD07.D Sample Name: 1923490002 MS

```

=====
Injection Date: 8/20/2019 09:58:28      Seq Line: 7
Sample Name: 1923490002 MS              Location: Vial 77
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.456	BBA	354476.8	5.6977	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.460	PBA	69229.6	3.6775	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.471	PB	201765.7	5.0000	CLO4-89-ISTD
7.967	VBA	113315.4	0.0000	

```

=====
*** End of Report ***
=====

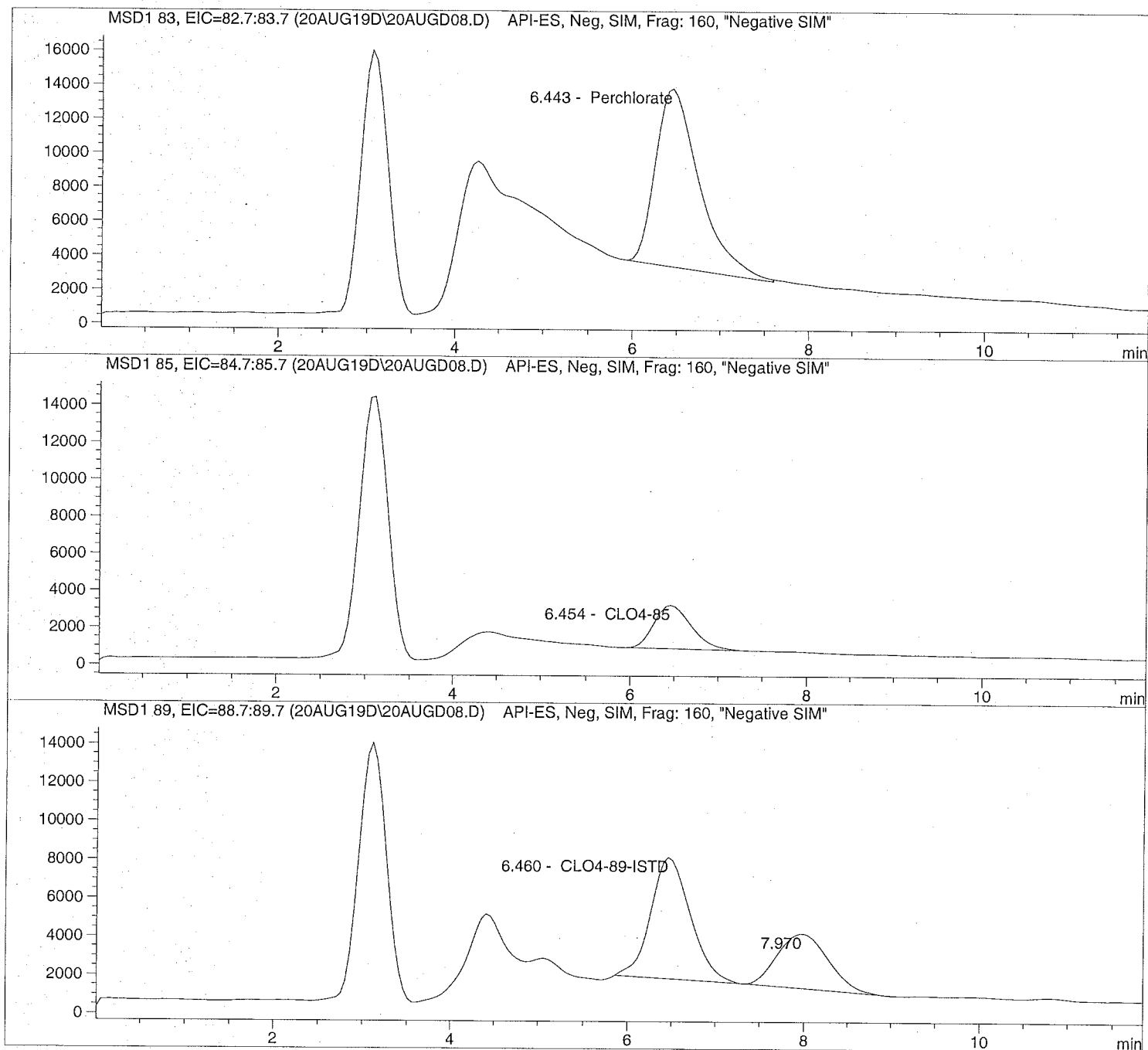
```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD08.D Sample Name: 1923490003 MSD

```
=====
Injection Date: 8/20/2019 10:12:40 Seq Line: 8
Sample Name: 1923490003 MSD Location: Vial 78
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 50 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08
```

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD08.D Sample Name: 1923490003 MSD

```

=====
Injection Date: 8/20/2019 10:12:40      Seq Line:      8
Sample Name:    1923490003  MSD          Location:      Vial 78
Acq Operator:   TNB                Inj. No.:     1
                                           Inj. Vol.:   50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.443	BBA	358346.0	5.9025	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.454	PBA	69335.8	3.7791	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.460	PB	196607.1	5.0000	CLO4-89-ISTD
7.970	VBA	113071.0	0.0000	

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD11.D

Sample Name: 1923491001

Injection Date: 8/20/2019 10:55:21

Seq Line: 11

Sample Name: 1923491001

Location: Vial 81

Acq Operator: TNB

Inj. No.: 1

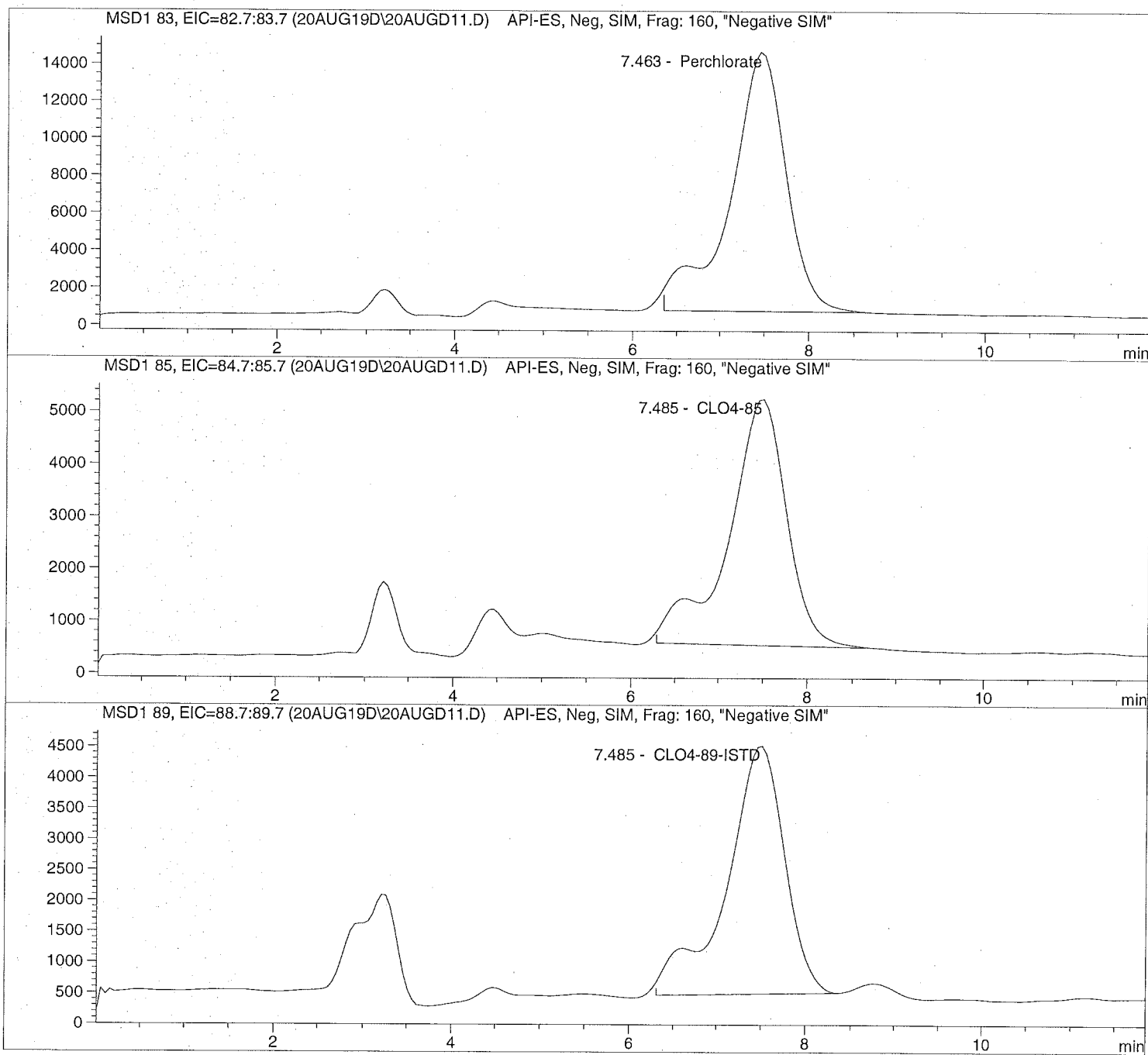
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD11.D Sample Name: 1923491001

```
=====
Injection Date: 8/20/2019 10:55:21      Seq Line:          11
Sample Name:    1923491001              Location:          Vial 81
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        50 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
```

Perchlorate analysis

Sample Information

```
Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.463	BBA	609174.5	10.4556	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	BBA	215767.9	12.3076	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	BBA	184580.3	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD13.D

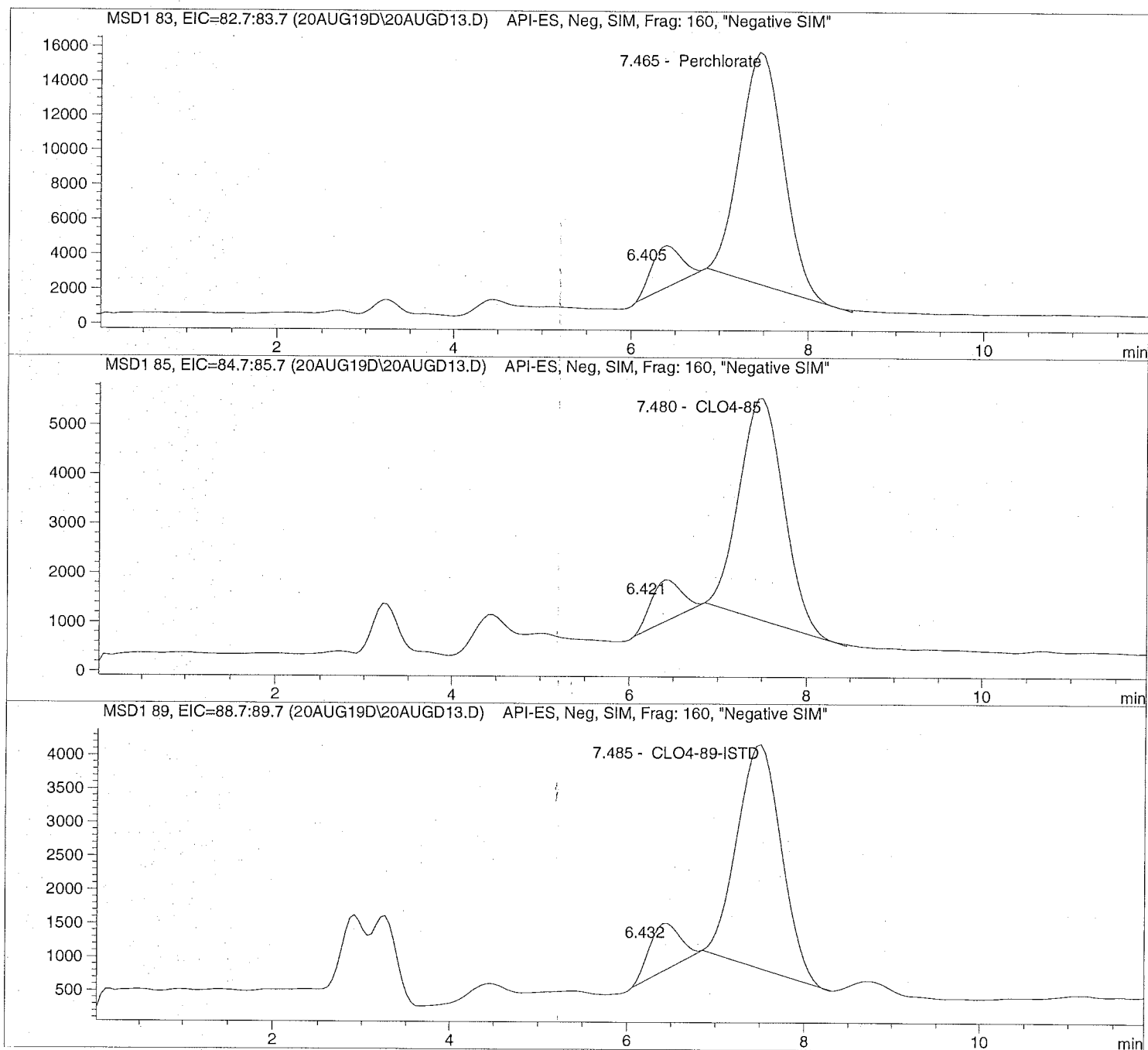
Sample Name: 1923494001

Injection Date: 8/20/2019 11:23:40  
Sample Name: 1923494001  
Acq Operator: TNB

Seq Line: 13  
Location: Vial 83  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD13.D Sample Name: 1923494001

```

=====
Injection Date: 8/20/2019 11:23:40      Seq Line:      13
Sample Name:    1923494001              Location:      Vial 83
Acq Operator:   TNB                      Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.405	PB	55558.6	0.0000	
7.465	VBA	456021.6	12.4256	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.421	PB	19909.2	0.0000	
7.480	VBA	156790.2	14.2359	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.432	PB	16677.9	0.0000	
7.485	VBA	115485.0	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

August 30, 2019

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS19080735**

Laboratory Results for: **Longhorn GW Treatment Plant Monthly Influent Samples**

Dear Marcia,

ALS Environmental received 1 sample(s) on Aug 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval scribble.

Generated By: DAYNA.FISHER  
RJ Modashia  
Project Manager

ALS Houston, US

Date: 30-Aug-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**Work Order:** HS19080735

---

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19080735-01	LH18/24-SP140_081419	Water		14-Aug-2019 14:00	15-Aug-2019 08:49	<input type="checkbox"/>

---

**ALS Houston, US**

Date: 30-Aug-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**Work Order:**

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**CASE NARRATIVE**

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Salt Lake City, UT. Final report attached.
- 

**Metals by Method SW6020****Batch ID: 144236**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method SW7196****Batch ID: R344315**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 30-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Influent Samples  
 Sample ID: LH18/24-SP140\_081419  
 Collection Date: 14-Aug-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19080735  
 Lab ID:HS19080735-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>METALS BY ICPMS BY SW6020A</b>	<b>Method:SW6020</b>				Prep:SW3010A / 16-Aug-2019		Analyst: JHD	
Selenium	0.00250	U	0.00110	0.00250	0.00500	mg/L	1	21-Aug-2019 14:06
Silver	0.000500	U	0.000200	0.000500	0.00500	mg/L	1	21-Aug-2019 14:06
<b>HEXAVALENT CHROMIUM BY SW7196A</b>	<b>Method:SW7196</b>						Analyst: MZD	
Chromium, Hexavalent	0.0100	U	0.00600	0.0100	0.0100	mg/L	1	15-Aug-2019 12:20
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>	<b>Method:NA</b>						Analyst: SUB	
Subcontract Analysis	0		0	0	0	NA	1	23-Aug-2019 18:03

**WEIGHT LOG**

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS19080735

**Batch ID:** 144236      **Method:** METALS BY ICPMS BY SW6020A      **Prep:** 3010A

<b>SampleID</b>	<b>Container</b>	<b>Sample Wt/Vol</b>	<b>Final Volume</b>	<b>Prep Factor</b>
HS19080735-01	1	10	10 (mL)	1

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS19080735

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> 144236 ( 0 )		<b>Test Name :</b> METALS BY ICPMS BY SW6020A			<b>Matrix:</b> Water	
HS19080735-01	LH18/24-SP140_081419	14 Aug 2019 14:00		16 Aug 2019 11:00	21 Aug 2019 14:06	1
<b>Batch ID:</b> R344315 ( 0 )		<b>Test Name :</b> HEXAVALENT CHROMIUM BY SW7196A			<b>Matrix:</b> Water	
HS19080735-01	LH18/24-SP140_081419	14 Aug 2019 14:00			15 Aug 2019 12:20	1
<b>Batch ID:</b> R344886 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS19080735-01	LH18/24-SP140_081419	14 Aug 2019 14:00			23 Aug 2019 18:03	1

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS19080735

**QC BATCH REPORT**

Batch ID: 144236 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A						
<b>MBLK</b>	Sample ID: <b>MBLK-144236</b>	Units: <b>mg/L</b>		Analysis Date: <b>21-Aug-2019 12:39</b>						
Client ID:	Run ID: <b>ICPMS05_344606</b>	SeqNo: <b>5219424</b>	PrepDate: <b>16-Aug-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Selenium	0.00250	0.00500							U	
Silver	0.000500	0.00500							U	
<b>LCS</b>	Sample ID: <b>LCS-144236</b>	Units: <b>mg/L</b>		Analysis Date: <b>21-Aug-2019 12:41</b>						
Client ID:	Run ID: <b>ICPMS05_344606</b>	SeqNo: <b>5219425</b>	PrepDate: <b>16-Aug-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Selenium	0.04726	0.00500	0.05	0	94.5	80 - 120				
Silver	0.04905	0.00500	0.05	0	98.1	85 - 116				
<b>MS</b>	Sample ID: <b>HS19080444-02MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>21-Aug-2019 13:14</b>						
Client ID:	Run ID: <b>ICPMS05_344606</b>	SeqNo: <b>5219411</b>	PrepDate: <b>16-Aug-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Selenium	0.04542	0.00500	0.05	-0.000066	91.0	80 - 120				
Silver	0.04799	0.00500	0.05	0.000091	95.8	85 - 116				
<b>MSD</b>	Sample ID: <b>HS19080444-02MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>21-Aug-2019 13:16</b>						
Client ID:	Run ID: <b>ICPMS05_344606</b>	SeqNo: <b>5219412</b>	PrepDate: <b>16-Aug-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Selenium	0.04647	0.00500	0.05	-0.000066	93.1	80 - 120	0.04542	2.29	20	
Silver	0.04619	0.00500	0.05	0.000091	92.2	85 - 116	0.04799	3.83	20	
<b>PDS</b>	Sample ID: <b>HS19080444-02PDS</b>	Units: <b>mg/L</b>		Analysis Date: <b>21-Aug-2019 13:18</b>						
Client ID:	Run ID: <b>ICPMS05_344606</b>	SeqNo: <b>5219413</b>	PrepDate: <b>16-Aug-2019</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Selenium	0.1168	0.00500	0.1	-0.000066	117	80 - 120				
Silver	0.1004	0.00500	0.1	0.000091	100	80 - 120				



ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS19080735

**QC BATCH REPORT**

Batch ID: 144236 ( 0 )		Instrument: ICPMS05		Method: METALS BY ICPMS BY SW6020A						
SD	Sample ID: HS19080444-02SD	Units: mg/L			Analysis Date: 21-Aug-2019 13:12					
Client ID:	Run ID: ICPMS05_344606	SeqNo: 5219410	PrepDate: 16-Aug-2019	DF: 5						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	Limit	Qual
Selenium	0.0125	0.0250					-0.000066	0	10	U
Silver	0.00250	0.0250					0.000091	0	10	U

The following samples were analyzed in this batch:

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS19080735

**QC BATCH REPORT**

Batch ID: R344315 ( 0 )		Instrument: UV-2450		Method: HEXAVALENT CHROMIUM BY SW7196A						
<b>MBLK</b>	Sample ID: <b>MBLK-344315</b>	Units: <b>mg/L</b>		Analysis Date: <b>15-Aug-2019 12:20</b>						
Client ID:	Run ID: <b>UV-2450_344315</b>	SeqNo: <b>5210951</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chromium, Hexavalent	0.0100	0.0100							U	
<b>LCS</b>	Sample ID: <b>LCS-344315</b>	Units: <b>mg/L</b>		Analysis Date: <b>15-Aug-2019 12:20</b>						
Client ID:	Run ID: <b>UV-2450_344315</b>	SeqNo: <b>5210952</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chromium, Hexavalent	0.254	0.0100	0.25	0	102	90 - 111				
<b>MS</b>	Sample ID: <b>HS19080735-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>15-Aug-2019 12:20</b>						
Client ID: <b>LH18/24-SP140_081419</b>	Run ID: <b>UV-2450_344315</b>	SeqNo: <b>5210954</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chromium, Hexavalent	0.258	0.0100	0.25	-0.003	104	90 - 111				
<b>MSD</b>	Sample ID: <b>HS19080735-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>15-Aug-2019 12:20</b>						
Client ID: <b>LH18/24-SP140_081419</b>	Run ID: <b>UV-2450_344315</b>	SeqNo: <b>5210955</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chromium, Hexavalent	0.258	0.0100	0.25	-0.003	104	90 - 111	0.258	0	20	

The following samples were analyzed in this batch: HS19080735-01

**ALS Houston, US**

Date: 30-Aug-19

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<b>Client:</b>	Bhate Environmental Associates, Inc.	<b>QUALIFIERS, ACRONYMS, UNITS</b>
<b>Project:</b>	Longhorn GW Treatment Plant Monthly Influent Samples	
<b>WorkOrder:</b>	<b>HS19080735</b>	

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<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
North Dakota	R-193 2019	30-Apr-2020
Oklahoma	2019-141	31-Aug-2020
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

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ALS Houston, US

Date: 30-Aug-19

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**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**Work Order:** HS19080735

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**SAMPLE TRACKING**

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Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19080735-01	LH18/24-SP140_081419	Login	8/15/2019 10:42:47 AM	PMG	EXT092
HS19080735-01	LH18/24-SP140_081419	Login	8/15/2019 10:42:47 AM	PMG	WET336
HS19080735-01	LH18/24-SP140_081419	Login	8/15/2019 10:42:47 AM	PMG	MET090
HS19080735-01	LH18/24-SP140_081419	Login	8/15/2019 10:42:47 AM	PMG	VOA235

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**Sample Receipt Checklist**

Client Name: Bhate Environmental  
 Work Order: HS19080735

Date/Time Received: **15-Aug-2019 08:49**  
 Received by: **PMG**

Checklist completed by: Paresh M. Giga 15-Aug-2019  
 eSignature Date

Reviewed by: RJ Modashia 15-Aug-2019  
 eSignature 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): 0.9c U/C IR25  
 Cooler(s)/Kit(s): 44594  
 Date/Time sample(s) sent to storage: 8/15/19 10:55

- Water - VOA vials have zero headspace? Yes  No  No VOA vials submitted
- Water - pH acceptable upon receipt? Yes  No  N/A
- pH adjusted? Yes  No  N/A

pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:  
 Contacted By: Regarding:

Comments:

Corrective Action:



**ALS**  
 10450 Stancliff Rd., Suite 210  
 Houston, Texas 77099  
 Tel. +1 281 530 5656  
 Fax. +1 281 530 5887

**CUSTODY SEAL**

Date: 8/14/19 Time: 1430  
 Name: Scott Benschneider  
 Company: BTHK

Seal: Ken B  
 Date:

TO CLIENT SERVICES  
 ALS LABORATORY GROUP  
 10450 STANCLIFF ROAD  
 SUITE 210  
 HOUSTON TX 77099

(281) 530-5656  
 REF: LHAAP/18/24 & SURFACE WATER - RJ



**FedEx**  
 Express  
 E

RETURNS MON-SAT  
 PRIORITY OVERNIGHT  
 THU 15 AUG 10:30A  
 PRIORITY OVERNIGHT

**FedEx**  
 TRACKING  
 4809 7834 3310

**AB SGRA**

77099  
 TX-US  
 IAH



10 162785 14ANG19 G6GA 580C2/1551/BCBA





## Case Narrative

**Method:** 6850

**Analysis:** Perchlorate

**Analysis SOP:** LC-MS-CLO4

**ALS WO ID(s):** 1923487; 1923490; 1923491;  
1923492; 1923494

**Client:** ALS Laboratories (Houston, TX)

**Matrix:** Water

**ELMS Batch (HBN):** 2284 (246025)

**General Set Information:** There were nine field samples in these Work Orders. The samples were analyzed for perchlorate.

**Method Summary:** Each sample was prepared as noted below and analyzed using an Agilent 1100 LC/MSD system in select ion monitoring (SIM) mode at  $m/z$  83 and 85, which corresponds to the loss of one oxygen atom from the perchlorate molecule. ChemStation software was used for instrument control and data analysis. The ion ratio of  $m/z$  83 to 85 was used to positively identify the response peak as perchlorate. Quantitation was performed using the  $m/z$  83 peak area. An internal standard (ISTD) of  $^{18}\text{O}$  labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in quantitation.

**Sample Preparation:** A 10.0mL aliquot of each sample was transferred into a 15-mL centrifuge tube. 50 $\mu\text{L}$  of an  $^{18}\text{O}$  labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45 $\mu\text{m}$  Syringe filters.

**Holding Times:** Holding times were met for all analyses.

**Dilutions:** Field sample 1923492001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

**Method QC data:** The method blank (LMB 669454) was less than 1/2 the CRDL. The recovery for the LCS (669455) was within acceptable parameters.



**MS/MSD Analysis:** MS/MSD was performed on samples 1923490002/03 (Client ID: 16WW57-190815). 4.0 $\mu$ l of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4. $\mu$ g/L. The MS/MSD failed QC acceptance criteria for percent recoveries due to an unknown co-eluting contamination. The MS/MSD is reported for the clients' information only. The sample matrix may be inappropriate for the method selected. The 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  $\mu$ g/L. Results were calculated in  $\mu$ g/L by the equation (A)x(B),

where: A = Analyte concentration from the standard curve ( $\mu$ g/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 – 669452) is reported from the analysis of the Laboratory Control Sample (LCS – 669455) at a level of 4.0 $\mu$ g/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) along with datafiles 20AUGD06-08/11/13.

Thomas Bosch      August 21, 2019  
Analyst                      Date



# ANALYTICAL REPORT

Report Date: August 22, 2019

RJ Modashia  
ALS Environmental (Houston)  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099

Phone: 281 530-5656

E-mail: RJ.Modashia@ALSGlobal.com

Workorder: **34-1923492**

Project ID: HS19080735

Purchase Order: HS19080735

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP140_081419	1923492001	08/14/19	08/16/19	



## ANALYTICAL REPORT

Workorder: 34-1923492

Client: ALS Environmental  
(Houston)

Project Manager: Kevin W. Griffiths

## Analytical Results

Sample ID: <b>LH18/24-SP140_081419</b>	Sampling Site: NA	Collected: 08/14/2019				
Lab ID: 1923492001	Media: 125 mL Nalgene	Received: 08/16/2019				
Matrix: Water	Sampling Parameter: NA					
<b>Analysis Method - EPA 6850, DoD QSM</b>						
Preparation: Not Applicable	Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2284 (HBN: 246025) Analyzed: 08/20/2019 11:09	Instrument ID: LCMS04 %Solids: NA Report Basis: Wet				
<b>Analyte</b>	<b>Result (ug/L)</b>	<b>DL (ug/L)</b>	<b>LOD (ug/L)</b>	<b>LOQ (ug/L)</b>	<b>Dilution</b>	<b>Qual</b>
Perchlorate	8800	1000	2000	4000	1000	

## Comments

**Quality Control: EPA 6850, DoD QSM - (HBN: 246025)**

Field sample 1923492001 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 08/20/2019 13:38	/S/ Stephen Brose 08/22/2019 14:34

## Laboratory Contact Information

ALS Environmental  
960 W Levoy Drive  
Salt Lake City, Utah 84123

Phone: (801) 266-7700  
Email: als@alst.com  
Web: www.alst.com



## ANALYTICAL REPORT

Workorder: 34-1923492

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	<a href="http://www.pjlab.com">http://www.pjlab.com</a>
	PJLA (ISO 17025)	L17-507-R1	<a href="http://www.pjlab.com">http://www.pjlab.com</a>
	Utah (TNI)	UT00953	<a href="http://lams.nelac-institute.org/search">http://lams.nelac-institute.org/search</a>
	Iowa (TNI)	IA# 376	<a href="http://www.shl.uiowa.edu/labcert/idnr/">http://www.shl.uiowa.edu/labcert/idnr/</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/envlab/disclaimer.html">http://www.kdheks.gov/envlab/disclaimer.html</a>
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	DOECAP-AP	L18-606	<a href="http://www.pjlab.com">http://www.pjlab.com</a>
	Washington	C596	<a href="https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation">https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation</a>
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	<a href="http://www.pjlab.com">http://www.pjlab.com</a>

**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

00951278

## Analysis Information

**Workorder:** 1923492

**Limits:** Client SOW/Contract Specified  
**Basis:** DoD QSM

**Preparation:** NA  
**Batch:** NA  
**Prepared By:** NA

**Analysis:** EPA 6850, DoD QSM  
**Batch:** ELMS/2284 (HBN: 246025)  
**Analyzed By:** Thomas Bosch

## Blank

<b>LMB:</b> 669454 <b>Analyzed:</b> 08/20/2019 09:15 <b>Units:</b> ug/L			
Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

## Laboratory Control Sample

<b>LCS:</b> 669455 <b>Analyzed:</b> 08/20/2019 08:46 <b>Dilution:</b> 1 <b>Units:</b> ug/L				
Analyte	Result	Target	% Rec	QC Limits
Perchlorate	4.16	4.00	104	78.8   123.8

## Matrix Spike - Matrix Spike Duplicate

<b>Sample:</b> 1923490001 <b>Analyzed:</b> 08/20/2019 09:44 <b>Dilution:</b> 1 <b>Units:</b> ug/L		<b>MS:</b> 1923490002 <b>Analyzed:</b> 08/20/2019 09:58 <b>Dilution:</b> 1 <b>Units:</b> ug/L			<b>MSD:</b> 1923490003 <b>Analyzed:</b> 08/20/2019 10:12 <b>Dilution:</b> 1 <b>Units:</b> ug/L				
Analyte	Result	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Perchlorate	ND	5.2	4	# 130	78.8   123.8	5.3	# 133	1.95	0.0   20.0

## Comments

Field sample 1923492001 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 08/20/2019 13:45	/S/ Stephen Brose 08/22/2019 14:34

## Symbols and Definitions

- \* - Analyte above reporting limit or outside of control limits
- ▲ - Sample result is greater than 4 times the spike added
- - Sample and Matrix Duplicate less than 5 times the reporting limit
- - Result is above the calibration range
- # - The Matrix Spike, Matrix Spike duplicate or Matrix Duplicate is reported for your information only. The sample matrix may be inappropriate for the method selected.

- RPD - Relative % Difference (Spike / Spike Duplicate)
- ND - Not Detected (U - Qualifier also flags analyte as not detected)
- NA - Not Applicable
- QC results are not adjusted for moisture correction, where applicable



10450 Stancliff Rd, Ste 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

### Subcontract Chain of Custody

18698/#2

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11987

**SUBCONTRACT TO:**

ALS Laboratory Group  
960 LeVoy Dr  
Salt Lake City, UT 84123

**Phone:** +1 801 266 7700

1923492

**CUSTOMER INFORMATION:**

**Company:** ALS Houston  
**Contact:** RJ Modashia  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RJ.Modashia@alsglobal.com  
**Alternate Contact:**  
**Email:**


**INVOICE INFORMATION:**

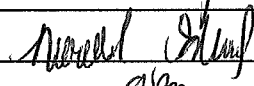
**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS19080735  
**TSR:** Danielle Winnings

	LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
	ANALYSIS REQUESTED			DUE DATE
1.	HS19080735-01	LH18/24-SP140_081419	Water	14 Aug 2019 14:00
	SUB_Perch-6850			29 Aug 2019

**Comments:** Please analyze for the analysis listed above.  
Send report to the emails shown above.

**QC Level:** DOD IV (DoD Data Package)

Relinquished By: 

Received By: 

Cooler ID(s): 982

Date/Time: 08/15/19 1800

Date/Time: 8/16/19 9/8

Temperature(s): 3°





ALS-SALT LAKE CITY-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill in or Circle)

1923492

Client Name: ALS Houston Project/Task/Site: \_\_\_\_\_

Date/Time of Receipt: 8/10/19 / 848 Number of Coolers Received: 1

Condition of Coolers:	Acceptable/Unacceptable	Temperature Control:	Present/Not Included
Cooler Custody Seals:	Present/Absent/NA	Location Temp Taken:	Control/Between Samples
Container Custody Seals:	Present/Absent/NA	Are all temperatures within project specific guidelines?	Yes/No/NA
Ice Present:	Yes/No/NA	VOA Headspace Present?	Yes/No/NA
	Frozen/Melted/NA		

pH Check Performed:	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH - 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 9872	3 °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C		C19	°C	9	C19	°C

Taken By: Meredith Smith Signature Meredith Smith Printed Name 8/10/19 Date

CLIENT-RELATED INFORMATION

<input type="checkbox"/> Missing Cooler	<input type="checkbox"/> Missing Samples/Bottles	<input type="checkbox"/> Incorrect Preservation	<input type="checkbox"/> Insufficient Sample Volume
<input type="checkbox"/> Cooler Conditions	<input type="checkbox"/> Broken/Leaking Samples	<input type="checkbox"/> pH Criteria Not Met	<input type="checkbox"/> Chain of Custody Problems
<input type="checkbox"/> Missing Paperwork	<input type="checkbox"/> Incorrect Bottle Type	<input type="checkbox"/> Residual Chlorine Present	<input type="checkbox"/> Other:
<input type="checkbox"/> Missing/Incorrect Bottle Labels	<input type="checkbox"/> Cooler Temperatures Out of Range	<input type="checkbox"/> Head Space in Bottles	

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES  NO

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: \_\_\_\_\_ Returned to Sample Receipt by: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name Signature

Must Deliver Next Business Day  
Time and Tempature Sensitive!



Form # 103458-1034 RITE TEMP 02/2004

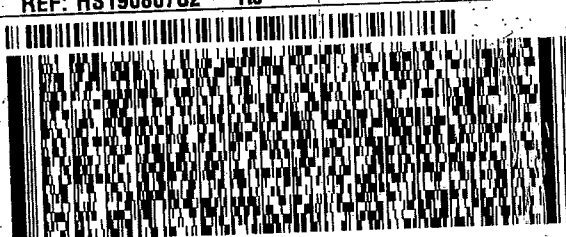
ORIGIN ID:SGRA (281) 530-5656  
CLIENT SERVICES  
ALS LABORATORY GROUP  
10450 STANCLIFF ROAD  
SUITE 210  
HOUSTON, TX 77099  
UNITED STATES US

SHIP DATE: 15AUG19  
ACTWGT: 13.30 LB  
CAD: 300130/CAFE9211  
DIMS: 14x11x10 IN  
BILL THIRD PARTY

TO **SAMPLE RECEIVING**  
**ALS ENVIRONMENTAL**  
**960 W. LEVOY DRIVE**

**SALT LAKE CITY UT 84123**

(801) 266-7700  
REF: HS19080732 - RJ



**FedEx**  
Express



551C2/F51/1014

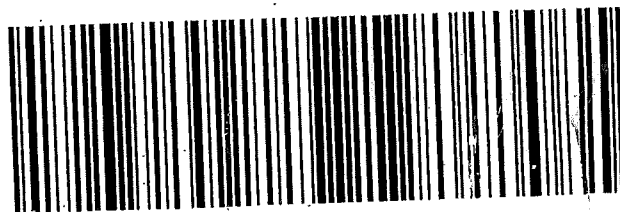
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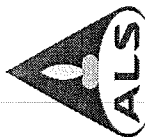
**FRI - 16 AUG 3:00P**  
**STANDARD OVERNIGHT**

TRK# 4809 7836 7888  
0201

**AX BTFA**

**84123**  
UT-US **SLC**





# Batch Worklist

HBN: 246025

Instrument: WP  
Status: WP

Created: 8/20/2019 07:47  
Analyst: T. Bosch

Batch: ELMS/2284  
Rule: EPA 6850, DoD QSM Water

- Workorder: 1923487 [ENV\_LVL4]
- Workorder: 1923490 [ENV\_LVL4]
- Workorder: 1923491 [ENV\_LVL4]
- Workorder: 1923492 [ENV\_LVL4]
- Workorder: 1923494 [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	669451	CCV for HBN 246025 [ELMS/2284]				CCV	3		E685041C3Q	5311		8/23/2019	
2	669452	RLYS for HBN 246025 [ELMS/2284]				RLYS	3		E685041C3Q	5311		8/23/2019	
3	669453	ICS for HBN 246025 [ELMS/2284]				ICS	3		E6850.D3Q	5311		8/23/2019	
4	669454	LMB for HBN 246025 [ELMS/2284]				LMB	3		E6850Q413Q	5311		8/23/2019	
5	669455	LCS for HBN 246025 [ELMS/2284]				LCS	3		E6850Q413Q	5311		8/23/2019	
6	1923487001	50WW29-190815				SAMPLE	3	1923487001-A	E6850Q41.3	5480	9/12/2019	8/23/2019	
7	1923490001	16WW57-190815				SAMPLE	3	1923490001-A	E6850Q41.3	5480	9/12/2019	8/23/2019	
8	1923490002	16WW57-190815MS				MS	3	1923490002-A	E6850Q413Q	5480		8/23/2019	
9	1923490003	16WW57-190815MSD				MSD	3	1923490003-A	E6850Q413Q	5480		8/23/2019	
10	1923490004	16WW58-190815				SAMPLE	3	1923490004-A	E6850Q41.3	5480	9/12/2019	8/23/2019	
11	1923490005	16WW58-190815-FD				FLDDUP	3	1923490005-A	E6850Q41.3	5480	9/12/2019	8/23/2019	
12	1923491001	LH18/24-SP650_081419_BIX				SAMPLE	3	1923491001-A	E6850Q41.3	5480	9/11/2019	8/29/2019	
13	1923492001	LH18/24-SP140_081419				SAMPLE	3	1923492001-A	E6850Q41.3	5480	9/11/2019	8/29/2019	
14	1923494001	LH18/24-SP650_081419_BIX				SAMPLE	3	1923494001-A	E6850Q41.3	5480	9/11/2019	8/29/2019	
15	669456	CCV for HBN 246025 [ELMS/2284]				CCV	3		E685041C3Q	5311		8/23/2019	



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**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Analytical Documentation**

Analyst Write-up

ALS Work Order #'s & Sample #( )'s: 1923487 (001); 192349 (001-05) 1923491 (001);1923492 (001);1923494 (001)  
 ELMS Batch/HBN ID: 2284 (246025)  
 Prep Date: 08/19/2019 Analysis Date: 08/20/2019 Analyst: T. Bosch  
 Analyte: **Perchlorate** Matrix: **Water** Method: **6850**  
 Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\AUG\20AUG19D.s  
 Reported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**

SAMPLE PREPARATION/ANALYSIS:

**Water:** Samples were prepared by Thomas Bosch. 10.0mL of each sample was pipetted into a 15-mL centrifuge tube, and 50µL of an oxygen-18 labeled perchlorate solution was added as an internal standard. The samples were capped, vortexed, and filtered with Phenex PES membrane 0.45µm Syringe filters prior to analysis.

**REAGENTS:** Eluent A1: 95% ASTM Type II water (ALS)/ 5% ACN (B&J Lot AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).  
 Eluent B1: 95% ACN (B&J Lot AH015-4) 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

**STANDARDS:** Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

**CALIBRATION CURVE:** Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.M

**INSTRUMENT CONDITIONS:** Samples were analyzed with an Agilent 1100 LC/MSD system, in negative SIM mode, monitoring m/z 83, 85, and 89.

**Instrument ID:** LCMS04 Online Acquisition Method: CLO4-AQN.M Fragmentor: 160 Output Gain: 10 Injection Volume: 50µL  
 Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

FLOW GRADIENT:

Time (min.)	Flow (mL/min)
0	0.65
5.8	0.65
5.9	0.25
10.3	0.25
10.5	0.65
12.0	0.65

**QC DATA:** 4.0µL of QC Solution Horizon ID 47516 was used for LCS 669455; Target = 4.0µg/L. ASTM type II water was used for LMB 669454.

**MS/MSD:** The Matrix Spike and duplicate (MS/MSD) were performed on samples 1923490002/03 (Client ID: 16WW57-190815). 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 1923492001 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 Matrix Spike and duplicate (MS/MSD) failed QC acceptance criteria for percent recoveries due to an unknown co-eluting contamination. 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\AUG\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\246025-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 669452) is reported from the analysis of the Laboratory Control Sample (LCS – 669455) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03) along with datafiles 20AUGD06-08/11/13.

### 5.5 Chromatography (GC, HPLC and LC/MS) Technical Review

Note: It is the peer reviewer's responsibility to ensure that appropriate criteria are used as defined in the HORIZON PROFILE. The evaluation criteria are prioritized as per Section 2.2 of this SOP. These items must be checked for all projects. The following checklist will be completed by both the analyst and the peer reviewer and scanned into the HBN folder with the raw data.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDG: ELMS: 2284 HBN#: 246025		
Sample Set IDs if Applicable: 1923492/1923494 1923487/1923490/1923491		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSS, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SP
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR#</u>	—	—
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB



## STANDARD REPORT

## Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850.WKG Std 100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	0.1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	
MFG Lot: 218065075		Amount: 100 mL	
Part ID: IC-PER-10X-1		Expires: 07/25/2020	
		Usable: No	
		Lab Lot: CLO4 STOCK	
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL





## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

ASTM H2O		Description - ASTM Type II Water	
Standard: 109	Created By: ALS Support (Lims)	Amount: 1000 L	
MFG: DCL In House	Create Date: 10/06/2005 09:10AM	Expires: 11/07/2025	
MFG Lot: Not Provided		Usable: Yes	
Part ID: Not Provided		Lab Lot: LAB 109	
Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 INT

CLO4 INT			Description - 6850 Intermdt AccStd 10.ug/mL		
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



## STANDARD REPORT

## Working Standard - CLO4 QC WRK

CLO4 QC WRK			Description - 6850 QC WKG STD 100ug/L		
Standard: 47516		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC WRK 100.ug/L	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

ASTM H2O		Description - ASTM Type II Water	
Standard: 109	Created By: ALS Support (Lims)	Amount: 1000 L	
MFG: DCL In House	Create Date: 10/06/2005 09:10AM	Expires: 11/07/2025	
MFG Lot: Not Provided		Usable: Yes	
Part ID: Not Provided		Lab Lot: LAB 109	
Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL	
Standard: 36748	Created By: Thomas Bosch	Amount: 100 mL	
MFG: Ultra Scientific	Create Date: 05/11/2017 01:05PM	Expires: 03/31/2020	
MFG Lot: CP-0860		Usable: Yes	
Part ID: ICC-013		Lab Lot: CLO4 QC STOCK	
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

Working Standard - CLO4 QC INT

CLO4 QC INT		Description - 6850 QC Intrmdt Std-QC 10ug/mL			
Standard: 47515		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC INT 10.ug/mL	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020



## STANDARD REPORT

## Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		Verified By: Thomas Bosch		Usable: Yes	
Pipette ID: Not Provided		Verify Date:		Lab Lot: CLO4ISTDWRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L		
2	14797-73-0-89	Perchlorate 89	1000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



## STANDARD REPORT

## Constituent

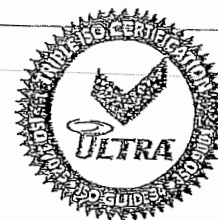
## Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK		Description - Perchlorate ISTD Stock	
Standard: 43729	Created By: Thomas Bosch	Amount: 1 mL	
MFG: Cambridge Isotope	Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026	
MFG Lot: SDFF-012A	Verified By: Thomas Bosch	Usable: Yes	
Part ID: OLM-7310-S	Verify Date:	Lab Lot: CLO4ISTDSTK	
Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL





## Certificate of Analysis



### ISO Guide 34 Reference Material

Product Number: ICC-013  
Lot Number: CP-0860

Lot Issue Date: 29-Feb 2016  
Expiration Date: 31-Mar 2020

Product Name: Perchlorate IC Standard

#### Description:

This Reference Material (RM) was gravimetrically prepared in accordance with ISO Guide 34 and under ULTRA Scientific's ISO 9001 registered quality system. The neat materials used for this product have been verified by ULTRA's ISO 17025 laboratory and under ULTRA's ISO Guide 34 accreditation. The analyte concentrations were verified by ULTRA's ISO 17025 accredited laboratory. For each analyte, the true value, with its uncertainty value calculated at the 95% confidence level, is reported below.

Analyte	Starting Material	Lot Number	Purity (%)	Calculated Value	True Value	Traceability & Method
perchlorate	potassium perchlorate	RM07987	100	1001 ± 5 µg/mL	976 ± 6 µg/mL	NIST SRM 3141A; ICP-OES

Solvent: water (low TOC, < 50 ppb)

Storage: Store at Room Temperature (15° to 30°C).

#### Traceability:

Traceability has been established through an unbroken chain of comparisons, each having stated uncertainties. Comparisons are based on appropriate physical or chemical measurements, including gravimetric or volumetric dilution, where the mass or volume of a solution before and after dilution is measured. The balances used for these measurements are calibrated with weights traceable to NIST in compliance with ANSI/NCCL Z-540-1, ISO 9001, ISO 17025, and ISO Guide 34. Calibrated Class A glassware is used for volumetric measurements. Thermometers are calibrated against a NIST traceable thermometer in accordance with NIST Special Publication 819.

#### Estimation of Uncertainties:

The true value is reported, with its uncertainty value calculated at the 95% confidence level.

#### Homogeneity:

This RM was formulated and unitized according to an in-house procedure and is guaranteed to be homogeneous. There is no minimum sub-sample size required.

#### Intended Use:

This RM is intended for the preparation of working reference samples for use in routine laboratory analyses, calibration of instruments, validation of analytical methods, assessments of measurement methods and continuing calibration verification.

#### Instructions for Use:

Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the bottle after removing any material and store according to the instructions noted above.

#### Hazards:

Refer to the Safety Data Sheet for information regarding this RM.

#### Expiration of Certification:

The certification of this RM is valid, within the measurement uncertainty specified, until the expiration date specified above, provided the RM is handled and stored in accordance with the instructions given in this certificate. This certification is nullified if the RM is damaged, contaminated, or otherwise modified.





# Certificate of Analysis



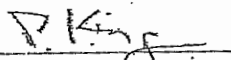
## ISO Guide 34 Reference Material

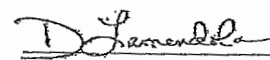
Product Number: JCC-013  
Lot Number: CP-0860

Lot Issue Date: 29-Feb 2016  
Expiration Date: 31-Mar 2020

### Maintenance of Certification:

The real-time, long term stability of the RM may be monitored over the lifetime of the certification. If substantive changes occur that affect the certification before the expiration of this certificate, ULTRA Scientific will notify the purchaser.

  
Peter A. King, Ph.D.  
VP, Technical Operations

  
Daniel J. Lamendola  
Director of QA/RA



125 Market Street  
New Haven, CT 06513  
USA



AccuStandard®

Tel (203)786-5290  
Fax (203)786-5287  
www.AccuStandard.com

# CERTIFICATE OF ANALYSIS



S 43659

AccuTrace™ Reference Standard

Catalog No: IC-PER-10X-1  
Description: Perchlorate Standard  
Element: Perchlorate (ClO<sub>4</sub>)  
SRM: Ind. Std.  
Lot: 218065075  
Matrix: Water  
Hazards: Refer to SDS for complete safety information

Date Certified: Jun 25, 2018  
Expiration: Jul 25, 2020  
Sample Size: 100 mL  
Components: 1  
Storage Condition: Ambient (>5 °C)  
Included on ISO/IEC 17025 Scope of Accreditation: Yes  
Included on ISO 17034 Scope of Accreditation: Yes



Signal Word: None

Component	SRM #	Prepared Concentration (µg/mL)
ClO <sub>4</sub> Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is ±0.24%.

The final solution was checked against an independent standard to verify its concentration.

We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.

All solutions are filtered through a 0.2 µm filter prior to being bottled.

All glassware used in preparation is Class A and calibrated regularly.

All weights are traceable through NIST, Test No. 822-275872-11

All bottles are triple rinsed with deionized water prior to use.

Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.

We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By:

*Meigan O'Leary*

Meigan O'Leary, Inorganic QC Manager

Cambridge Isotope Laboratories, Inc.

## Certificate of Analysis

Quality Standards:  
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

Product Name: PERCHLORIC ACID, SODIUM SALT  
(Isotopic Label & Enrichment Specification) (18O<sub>4</sub>, 90%+) 100 UG/ML IN WATER

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

## Product Information

Chemical Purity Specification:  $\geq 98\%$

Labeled CAS Number: NA

Unlabeled CAS Number: 7601-89-0

MW\*: 130.4

Chemical Formula: NaCl\*O<sub>4</sub>

Storage: Store at room temperature away from light and moisture.

Stability: See storage and expiration date.

## Certification

Cambridge Isotope Laboratories, Inc. guarantees that this material meets or exceeds the specifications stated. Absolute identity as well as chemical and isotopic purities are assured by the use of unambiguous synthetic routes and multiple chemical analyses whenever possible. Results are representative of QC testing at time of release from Quality Control unless otherwise stated.

Volumetric measurements were made with Class A glassware. Gravimetry is traceable to the NIST through calibrated balances and certified, calibrated, standard weights. The calibrations are traceable to the NIST under Test No. 822/270236-04. The calibrations also meet specifications outlined in ISO 9001, ISO/IEC 17025, ANSI/NCSL Z540-1-1994, NCR Document 10CFR50 Appendix B, and applicable subdocuments.

This COA references the bulk catalog number before packaging. The COA also applies to the CIL finished good catalog number. Some possible packaging sizes and their corresponding suffix are -1.2, -1, -0.5, -10, or -0.1.

\* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

## Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 µg/mL
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	109.4 ± 2.8 µg/mL (k=2)



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**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	
*	669451	CCV@25	Vial 71	1	Control	1	1.83142e6	7.920	24.74457
*	669455	QC@40.	Vial 72	1	Control	2	3.16440e5	7.864	4.15613
*	669453	ICS@4.0	Vial 73	1	Control	3	2.24930e5	7.622	3.70421
*	669454	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1923487001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1923490001		Vial 76	1	Sample	6	1.36285e5	6.452	<del>2.91596</del>
*	1923490002	MS	Vial 77	1	Sample	7	3.54477e5	6.456	5.19924
*	1923490003	MSD	Vial 78	1	Sample	8	3.58346e5	6.443	5.30157
*	1923490004		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1923490005		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1923491001		Vial 81	1	Sample	11	5.58062e5	7.463	10.20944
*	1923492001	1K	Vial 82	1	Sample	12	6.21377e5	8.056	8846.41646
*	1923494001		Vial 83	1	Sample	13	5.89441e5	7.465	12.30933
*	669456	CCV@25	Vial 71	1	Control	14	1.49865e6	7.934	23.18463

N.R. - NOT REPORTED / FAILS 83/85 ION RATIO

N.R.  
TB  
8/20/19

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	669451	CCV@25	Vial 71	1	Control	1	5.59319e5	7.925	25.42099
*	669455	QC@40.	Vial 72	1	Control	2	1.05210e5	7.919	4.49624
*	669453	ICS@4.0	Vial 73	1	Control	3	8.51245e4	7.639	4.53455
*	669454	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1923487001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1923490001		Vial 76	1	Sample	6	5435.15332	6.455	3.69491e-1
*	1923490002	MS	Vial 77	1	Sample	7	6.92296e4	6.460	3.34493
*	1923490003	MSD	Vial 78	1	Sample	8	6.93358e4	6.454	3.38171
*	1923490004		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1923490005		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1923491001		Vial 81	1	Sample	11	1.97832e5	7.485	12.02438
*	1923492001	1K	Vial 82	1	Sample	12	1.97618e5	8.075	9349.59092
*	1923494001		Vial 83	1	Sample	13	2.00512e5	7.480	13.95607
*	669456	CCV@25	Vial 71	1	Control	14	4.73078e5	7.940	24.57014

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	669451	CCV@25	Vial 71	1	Control	1	2.25315e5	7.934	5.00000
*	669455	QC@40.	Vial 72	1	Control	2	2.50411e5	7.899	5.00000
*	669453	ICS@4.0	Vial 73	1	Control	3	2.00878e5	7.639	5.00000
*	669454	LMB	Vial 74	1	Control	4	2.37984e5	7.976	5.00000
*	1923487001		Vial 75	1	Sample	5	2.26263e5	7.226	5.00000
*	1923490001		Vial 76	1	Sample	6	1.56767e5	6.449	5.00000
*	1923490002	MS	Vial 77	1	Sample	7	2.21958e5	6.471	5.00000
*	1923490003	MSD	Vial 78	1	Sample	8	2.19867e5	6.460	5.00000
*	1923490004		Vial 79	1	Sample	9	1.85427e5	7.007	5.00000
*	1923490005		Vial 80	1	Sample	10	1.90140e5	7.042	5.00000
*	1923491001		Vial 81	1	Sample	11	1.73328e5	7.485	5.00000
*	1923492001	1K	Vial 82	1	Sample	12	2.23942e5	8.077	5000.00000
*	1923494001		Vial 83	1	Sample	13	1.50739e5	7.485	5.00000
*	669456	CCV@25	Vial 71	1	Control	14	1.97525e5	7.935	5.00000

\*\*\* End of Report \*\*\*

## Sequence Table:

## Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	669451	CCV@25	CLO4-AQN	1	Ctrl Samp	
2	Vial 72	669455	QC@40.	CLO4-AQN	1	Ctrl Samp	
3	Vial 73	669453	ICS@4.0	CLO4-AQN	1	Ctrl Samp	
4	Vial 74	669454	LMB	CLO4-AQN	1	Ctrl Samp	
5	Vial 75	1923487001		CLO4-AQN	1	Sample	
6	Vial 76	1923490001		CLO4-AQN	1	Sample	
7	Vial 77	1923490002	MS	CLO4-AQN	1	Sample	
8	Vial 78	1923490003	MSD	CLO4-AQN	1	Sample	
9	Vial 79	1923490004		CLO4-AQN	1	Sample	
10	Vial 80	1923490005		CLO4-AQN	1	Sample	
11	Vial 81	1923491001		CLO4-AQN	1	Sample	
12	Vial 82	1923492001	1K	CLO4-AQN	1	Sample	
13	Vial 83	1923494001		CLO4-AQN	1	Sample	
14	Vial 71	669456	CCV@25	CLO4-AQN	1	Ctrl Samp	

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD01.D

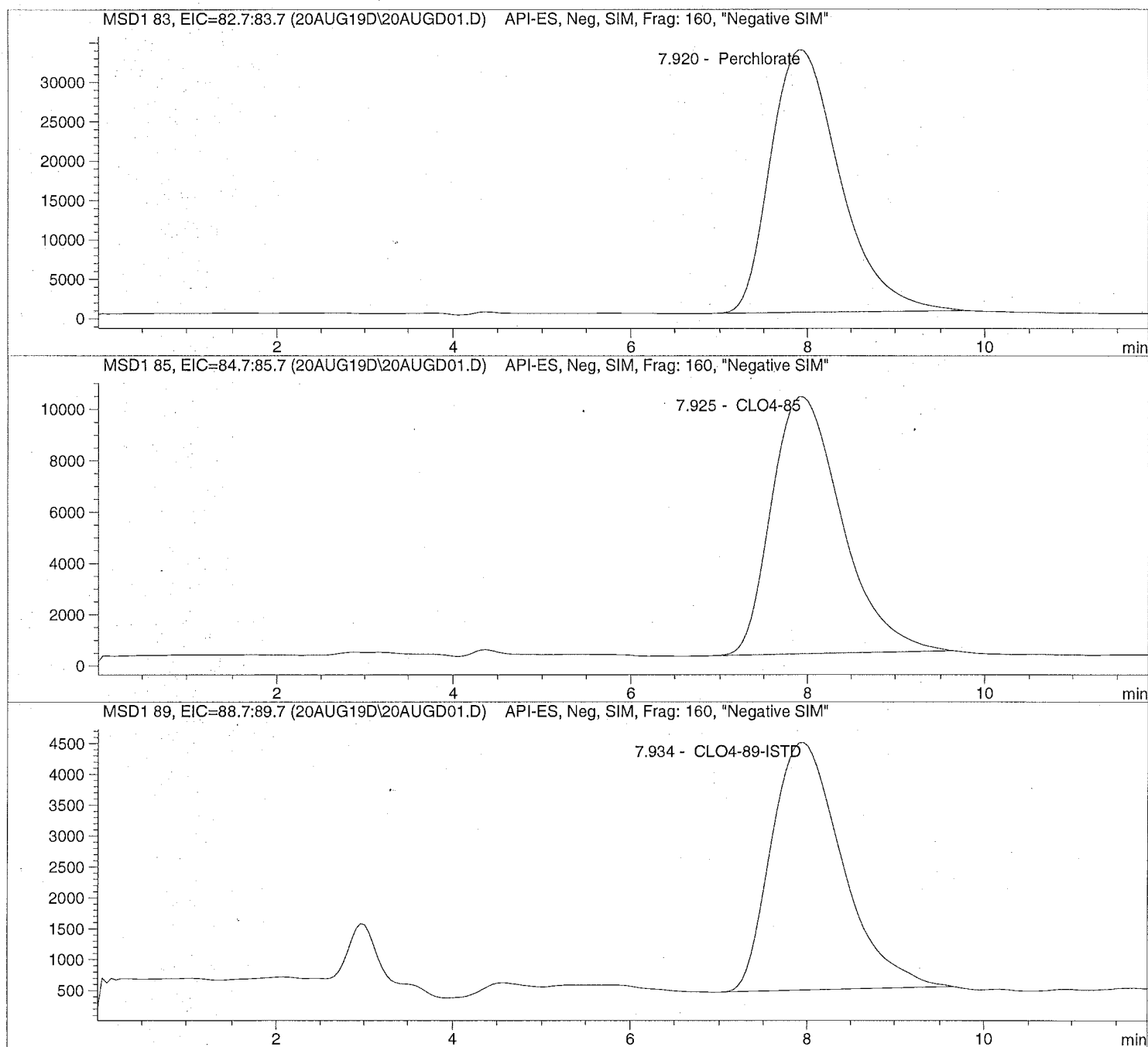
Sample Name: 669451 CCV@25

Injection Date: 8/20/2019 08:32:23  
Sample Name: 669451 CCV@25  
Acq Operator: TNB

Seq Line: 1  
Location: Vial 71  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

## Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD01.D

Sample Name: 669451 CCV@25

```

=====
Injection Date: 8/20/2019 08:32:23      Seq Line: 1
Sample Name: 669451 CCV@25             Location: Vial 71
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.920	PBA	1831422.8	24.7446	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.925	PBA	559319.2	25.4210	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.934	PBA	225315.3	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD02.D

Sample Name: 669455 QC@40.

Injection Date: 8/20/2019 08:46:36

Seq Line: 2

Sample Name: 669455 QC@40

Location: Vial 72

Acq Operator: TNB

Inj. No.: 1

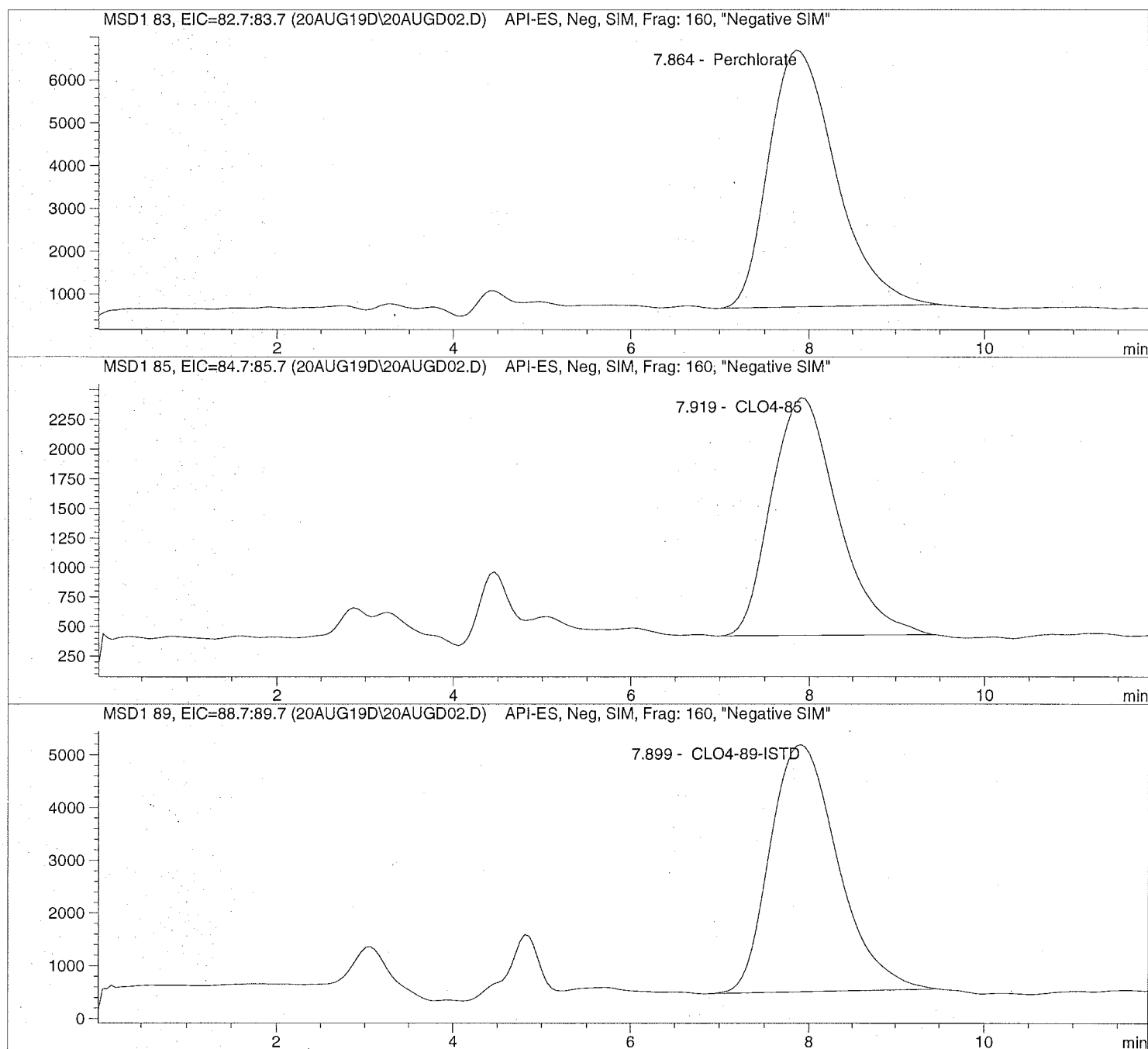
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD03.D

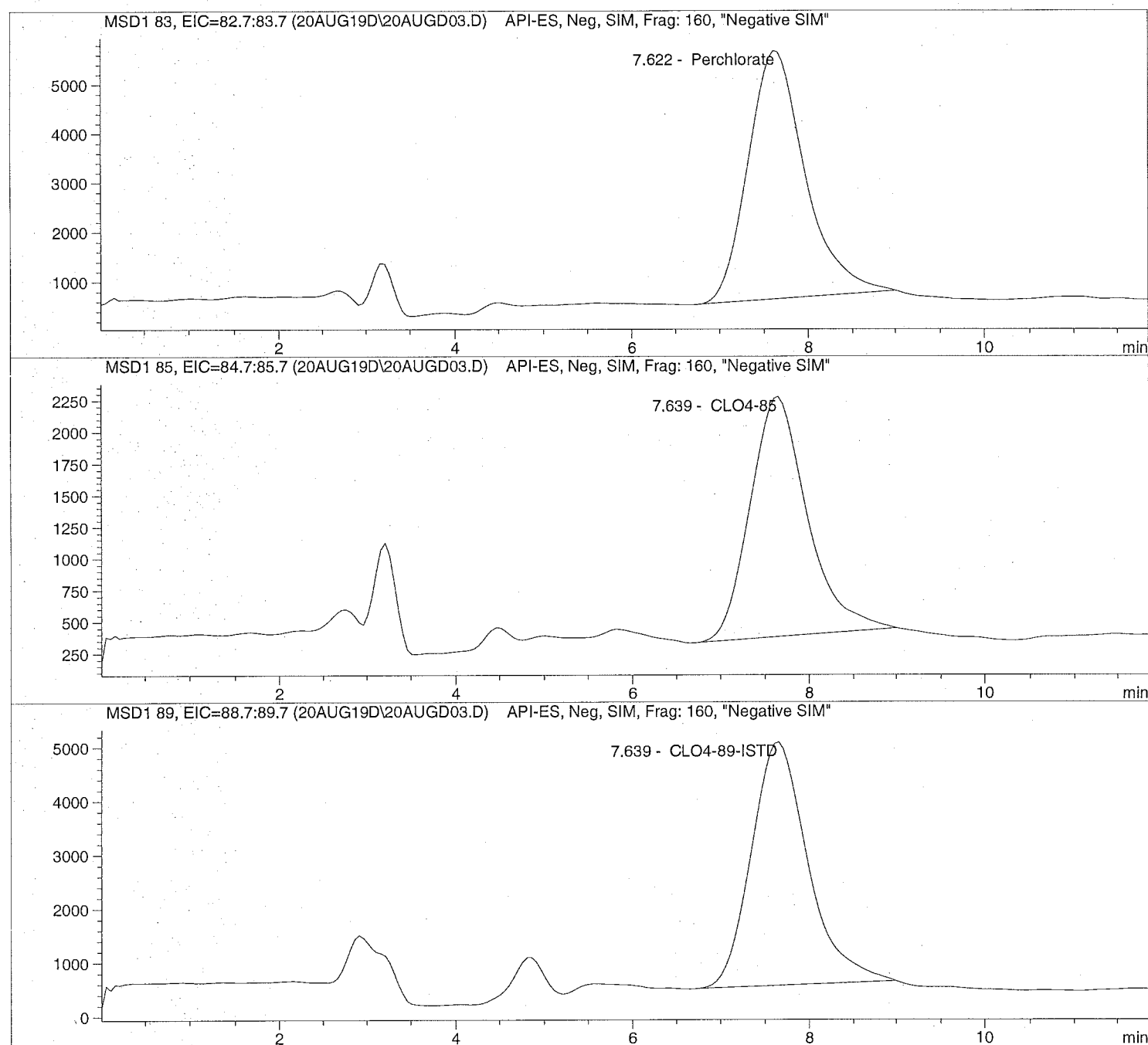
Sample Name: 669453 ICS@4.0

Injection Date: 8/20/2019 09:01:36  
Sample Name: 669453 ICS@4.0  
Acq Operator: TNB

Seq Line: 3  
Location: Vial 73  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD03.D Sample Name: 669453 ICS@4.0

```

=====
Injection Date: 8/20/2019 09:01:36 Seq Line: 3
Sample Name: 669453 ICS@4.0 Location: Vial 73
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.622	PBA	224930.3	3.7042	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.639	PBA	85124.5	4.5346	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.639	PBA	200877.9	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD04.D

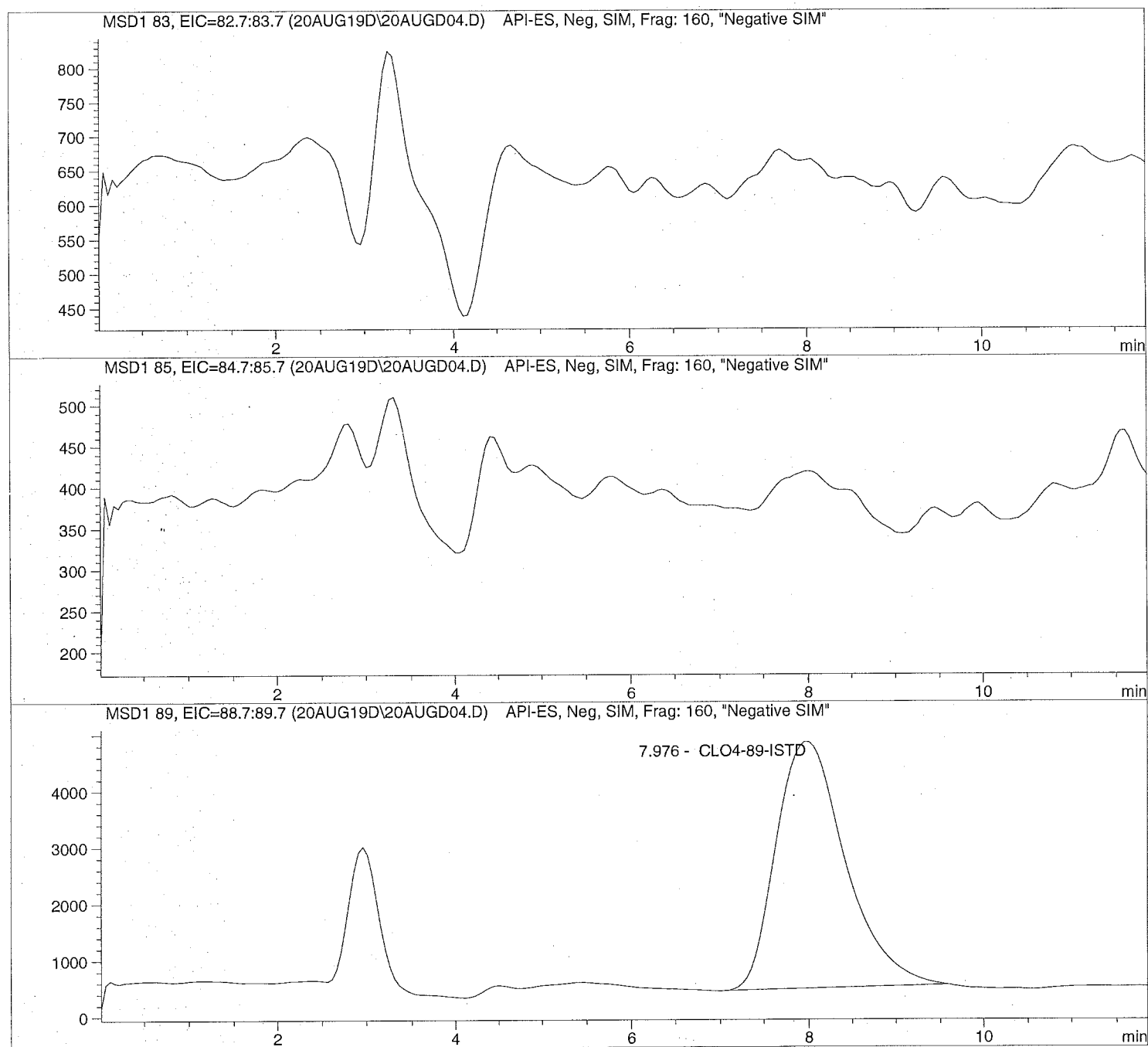
Sample Name: 669454 LMB

Injection Date: 8/20/2019 09:15:53  
Sample Name: 669454 LMB  
Acq Operator: TNB

Seq Line: 4  
Location: Vial 74  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD04.D Sample Name: 669454 LMB

```

=====
Injection Date: 8/20/2019 09:15:53 Seq Line: 4
Sample Name: 669454 LMB Location: Vial 74
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08

```

Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.976	PBA	237984.2	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD05.D

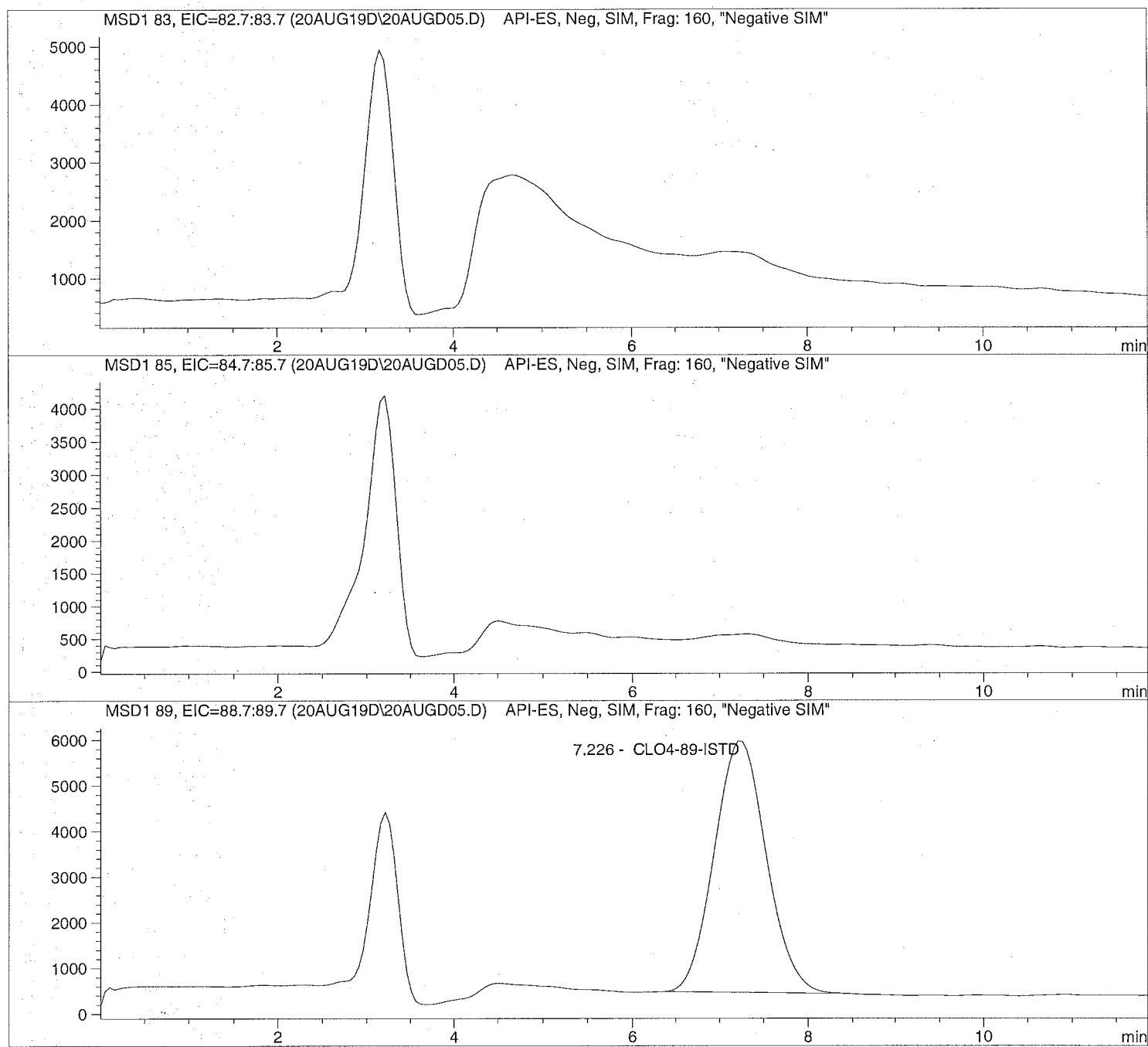
Sample Name: 1923487001

Injection Date: 8/20/2019 09:30:05  
Sample Name: 1923487001  
Acq Operator: TNB

Seq Line: 5  
Location: Vial 75  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD05.D Sample Name: 1923487001

```

=====
Injection Date: 8/20/2019 09:30:05      Seq Line:          5
Sample Name:    1923487001              Location:          Vial 75
Acq Operator:  TNB                      Inj. No.:         1
                                           Inj. Vol.:        50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.226	PBA	226262.5	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD06.D

Sample Name: 1923490001

Injection Date: 8/20/2019 09:44:16

Seq Line: 6

Sample Name: 1923490001

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

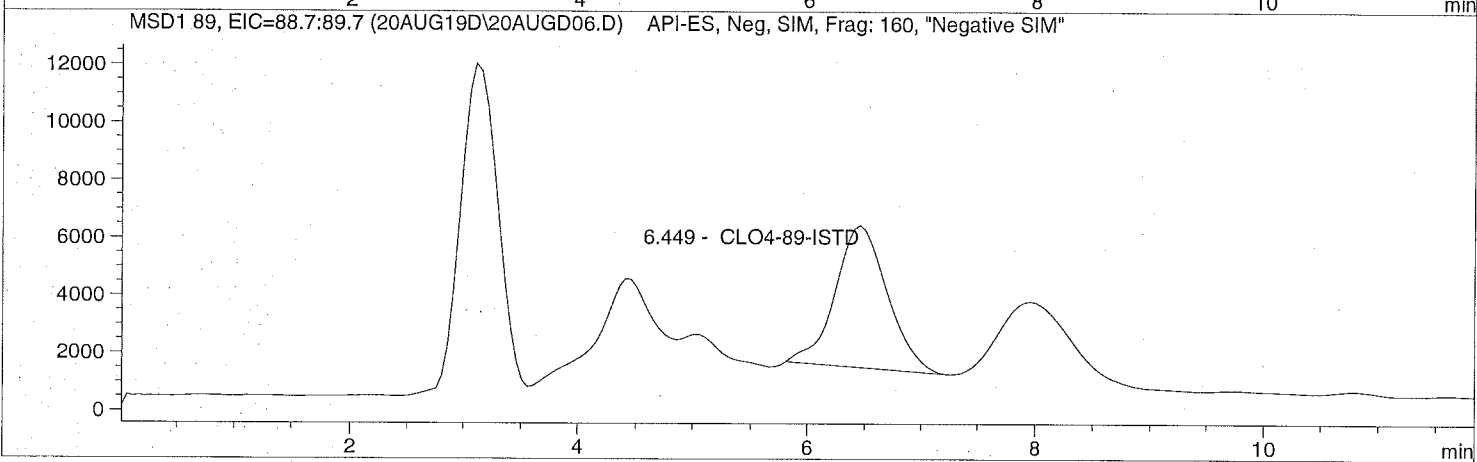
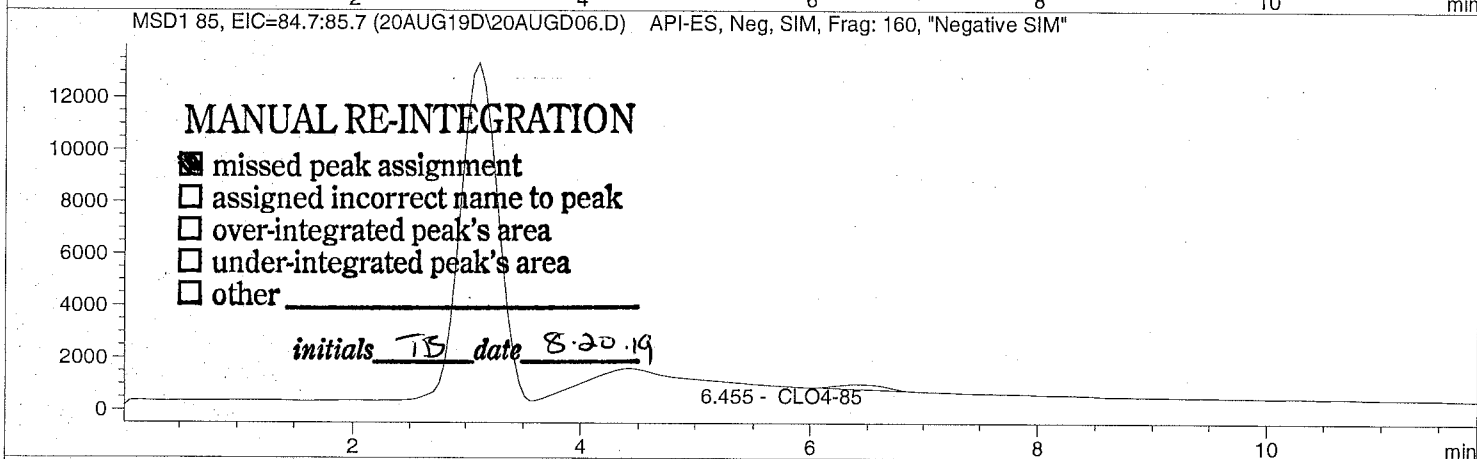
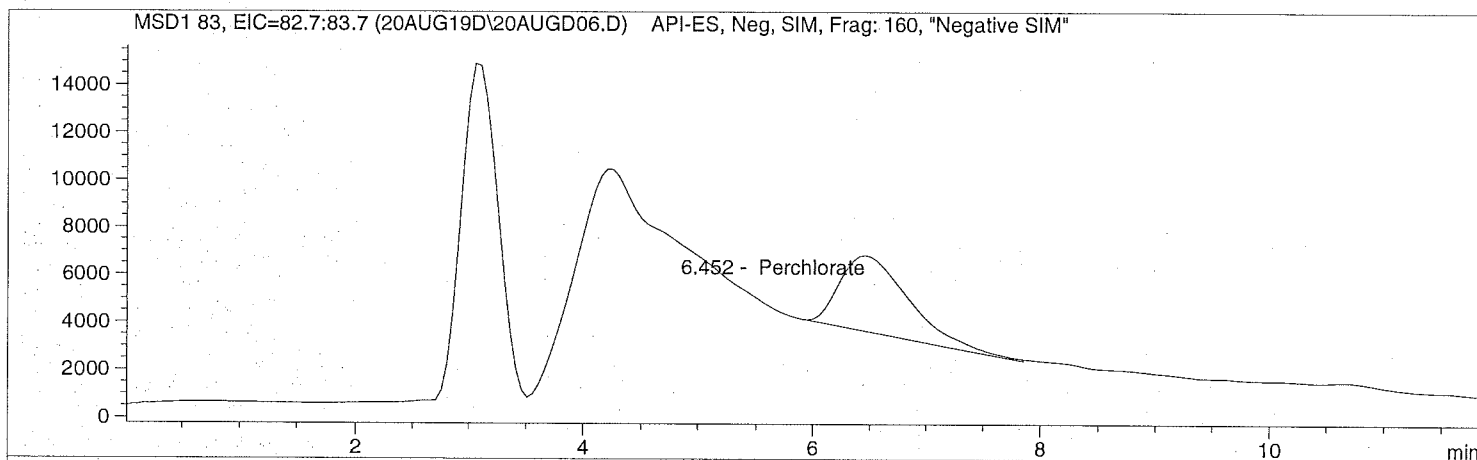
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD06.D Sample Name: 1923490001

```

=====
Injection Date: 8/20/2019 09:44:16      Seq Line: 6
Sample Name:    1923490001              Location:  Vial 76
Acq Operator:  TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.452	BBA	136285.4	2.9160	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.455	MM	5435.2	0.3695	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.449	PB	156766.8	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD07.D

Sample Name: 1923490002 MS

Injection Date: 8/20/2019 09:58:28

Seq Line: 7

Sample Name: 1923490002 MS

Location: Vial 77

Acq Operator: TNB

Inj. No.: 1

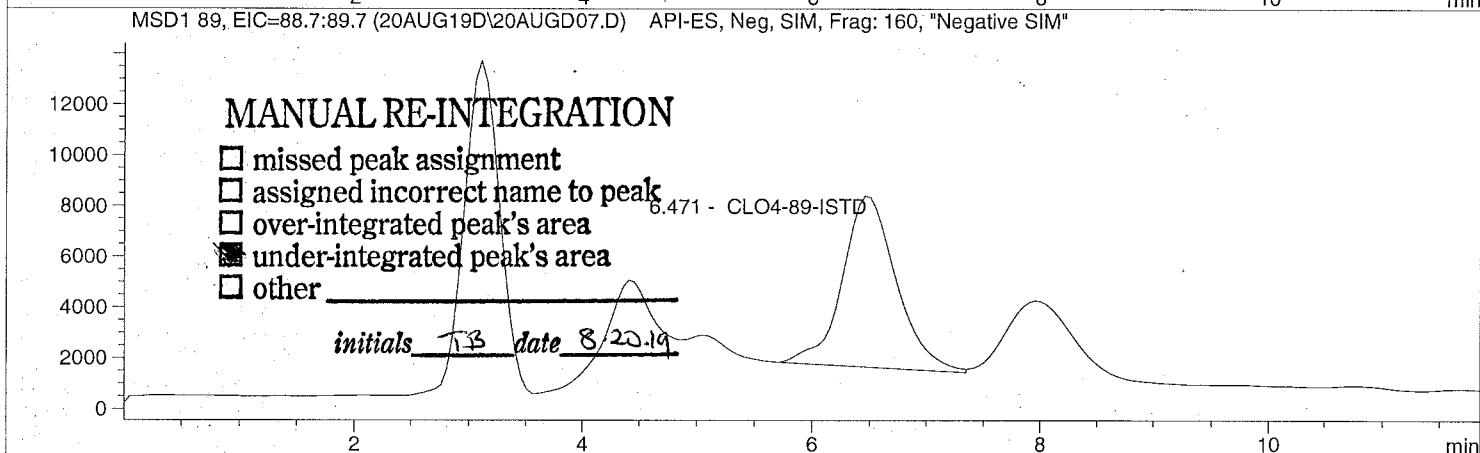
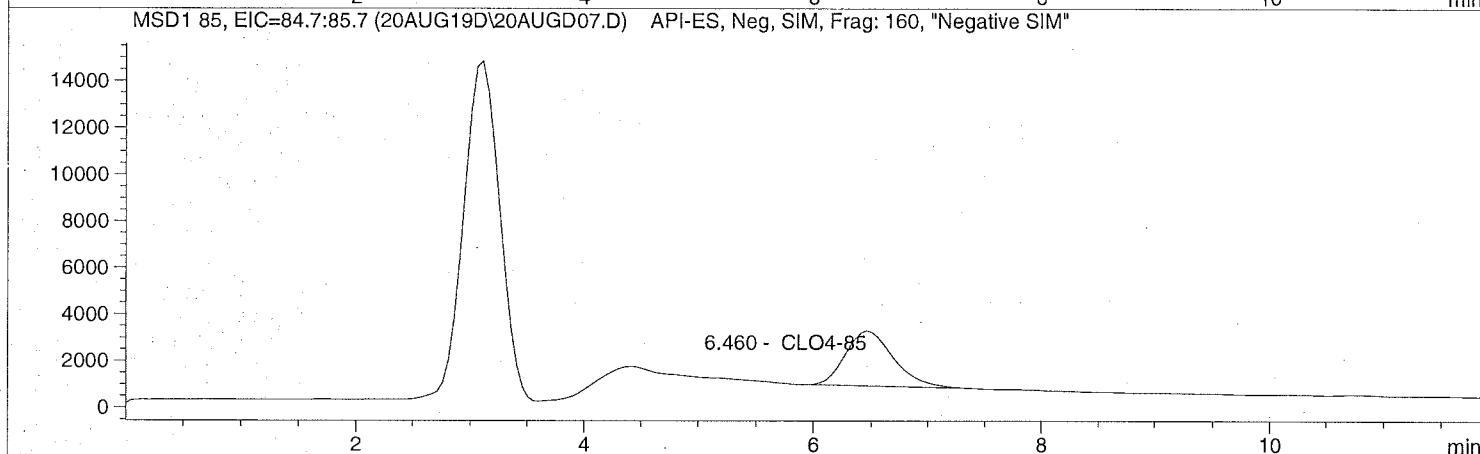
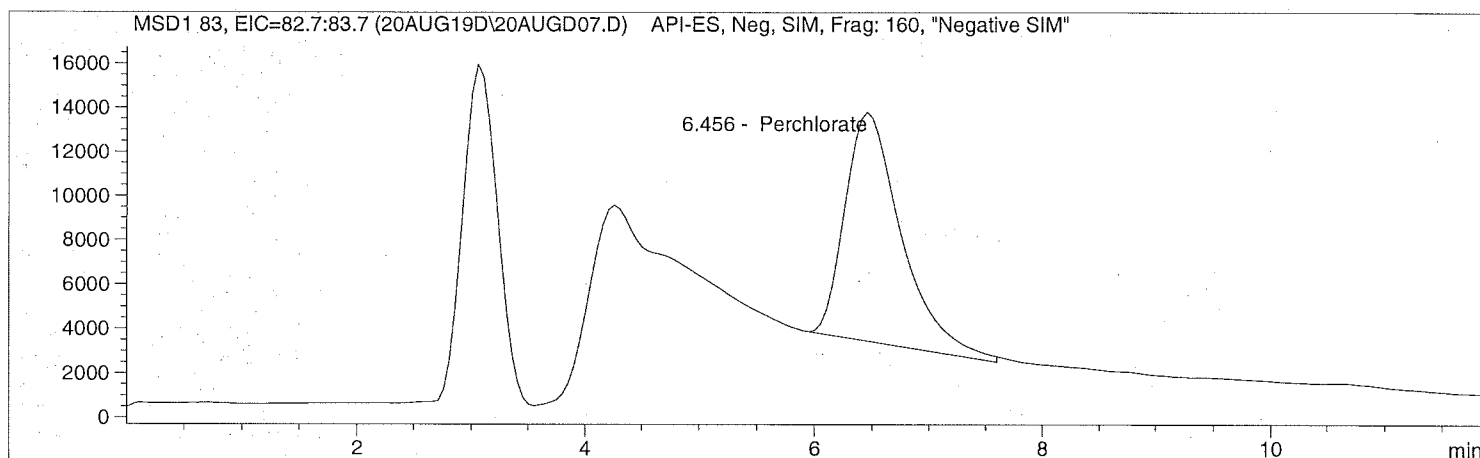
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD07.D Sample Name: 1923490002 MS

```

=====
Injection Date: 8/20/2019 09:58:28      Seq Line: 7
Sample Name:    1923490002 MS           Location:  Vial 77
Acq Operator:  TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.456	BBA	354476.8	5.1992	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.460	PBA	69229.6	3.3449	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.471	MF	221958.3	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD08.D

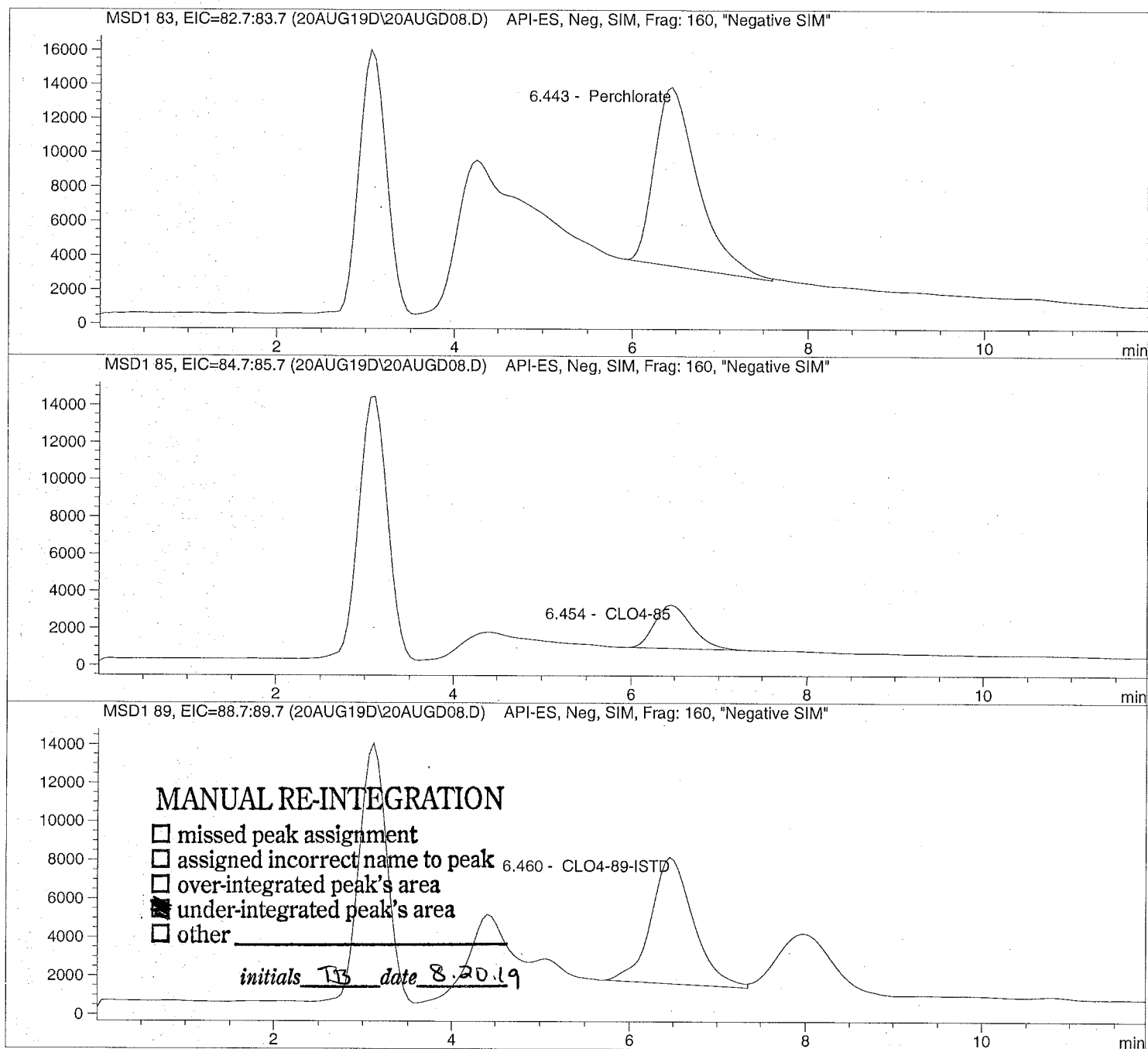
Sample Name: 1923490003 MSD

Injection Date: 8/20/2019 10:12:40  
 Sample Name: 1923490003 MSD  
 Acq Operator: TNB

Seq Line: 8  
 Location: Vial 78  
 Inj. No.: 1  
 Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD08.D Sample Name: 1923490003 MSD

```

=====
Injection Date: 8/20/2019 10:12:40      Seq Line:      8
Sample Name:   1923490003  MSD          Location:     Vial 78
Acq Operator:  TNB                Inj. No.:    1
                                           Inj. Vol.:  50 µl
=====

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.443	BBA	358346.0	5.3016	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.454	PBA	69335.8	3.3817	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.460	MF	219867.2	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD09.D

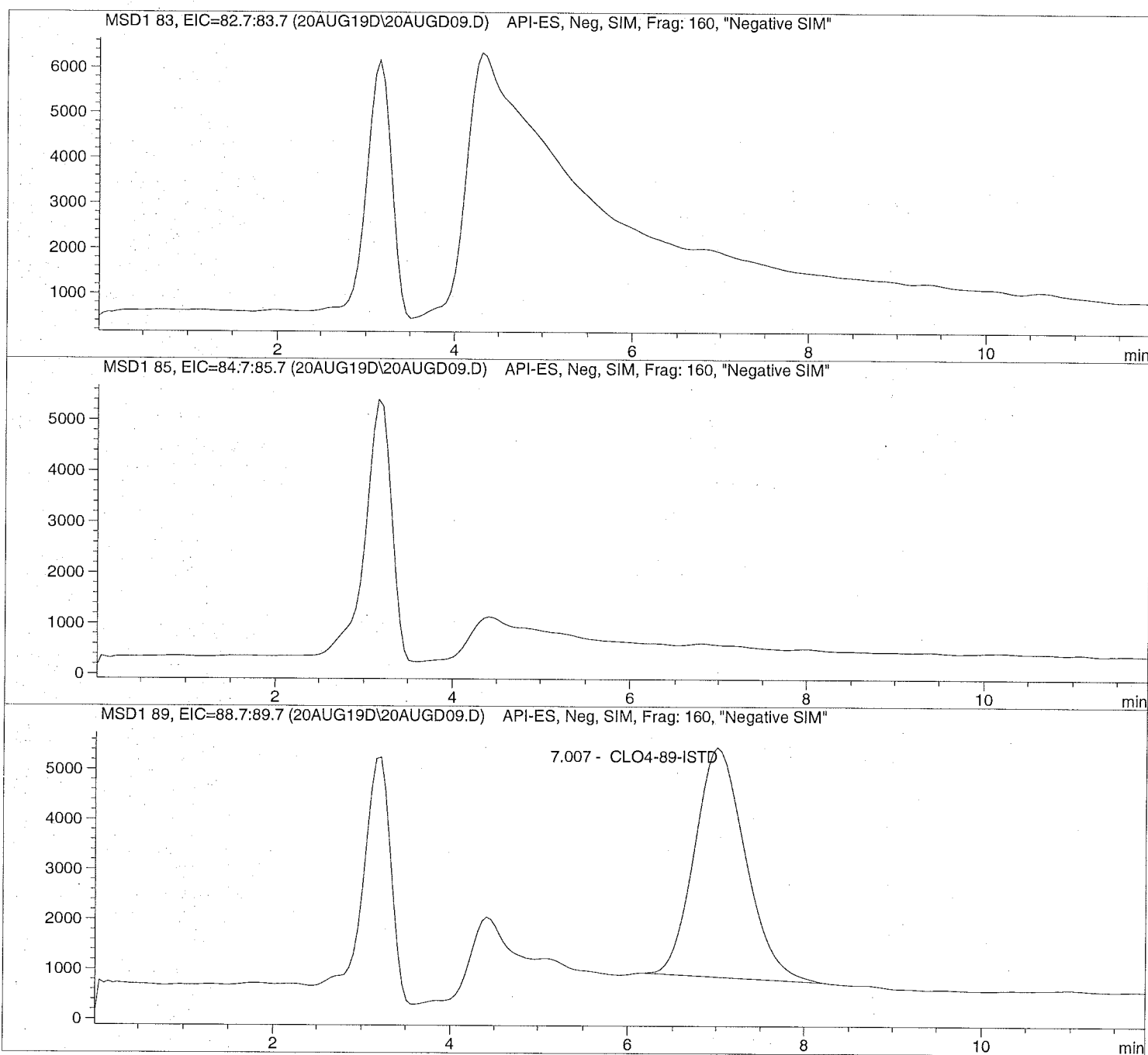
Sample Name: 1923490004

=====  
Injection Date: 8/20/2019 10:26:54  
Sample Name: 1923490004  
Acq Operator: TNB

Seq Line: 9  
Location: Vial 79  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

=====  
Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD09.D

Sample Name: 1923490004

```

=====
Injection Date:  8/20/2019  10:26:54      Seq Line:          9
Sample Name:    1923490004                Location:          Vial 79
Acq Operator:   TNB                       Inj. No.:         1
                                           Inj. Vol.:        50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019  12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified:  Tue, 20. Aug. 2019,10:15:00 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
7.007	PBA	185427.0	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD10.D

Sample Name: 1923490005

Injection Date: 8/20/2019 10:41:08

Seq Line: 10

Sample Name: 1923490005

Location: Vial 80

Acq Operator: TNB

Inj. No.: 1

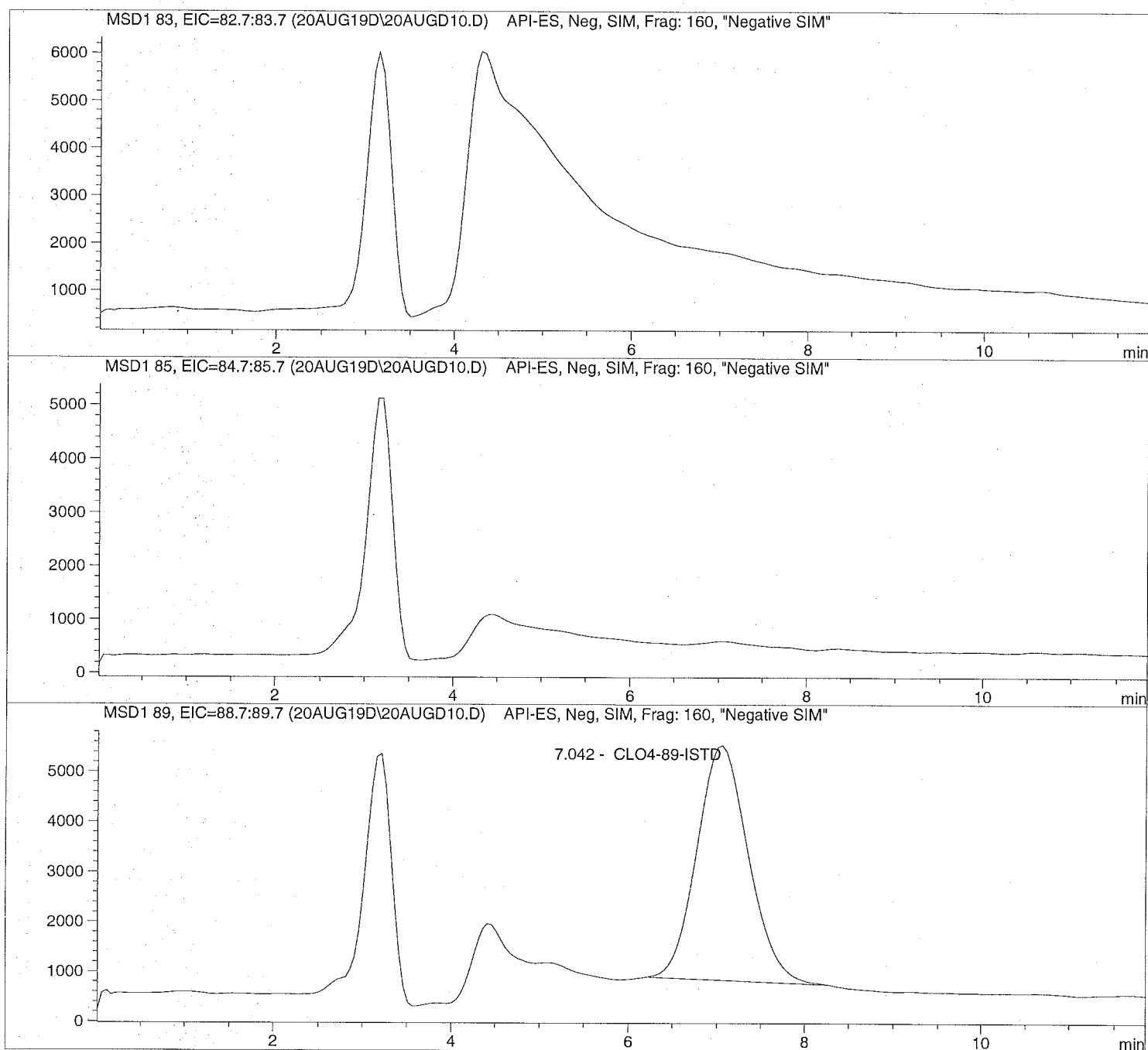
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



```
=====  
Injection Date: 8/20/2019 10:41:08      Seq Line:      10  
Sample Name:    1923490005              Location:      Vial 80  
Acq Operator:   TNB                    Inj. No.:     1  
                                           Inj. Vol.:    50 µl  
=====
```

```
Acq. Method:    CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed:   8/20/2019 12:11:08  
=====
```

## Perchlorate analysis

=====  
Sample Information  
=====

```
Sorted By:      Signal  
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.042	PBA	190139.9	5.0000	CLO4-89-ISTD

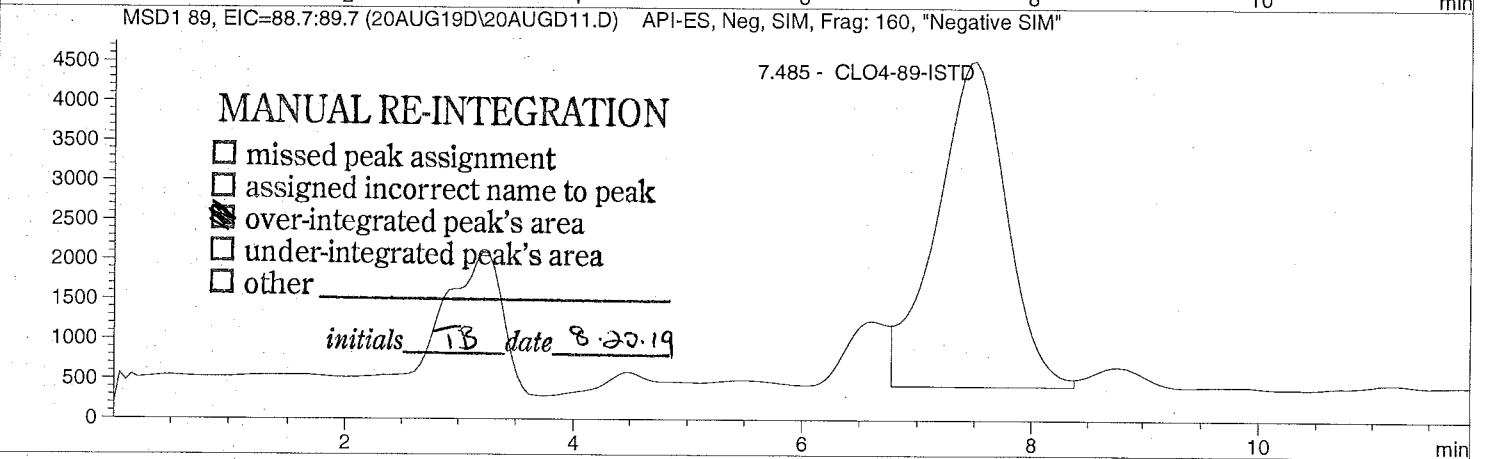
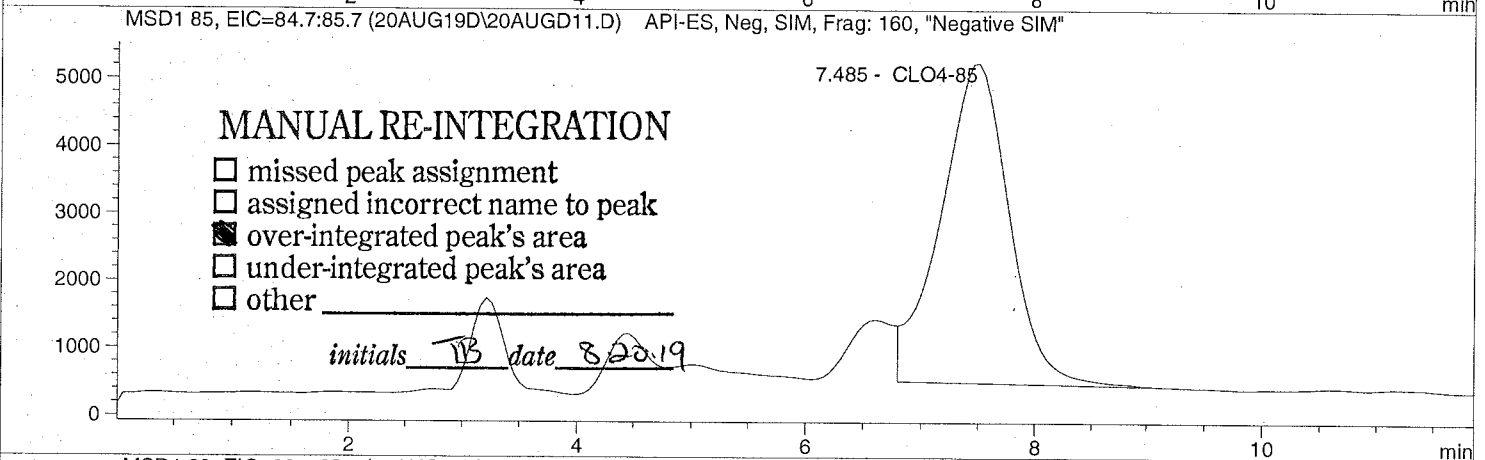
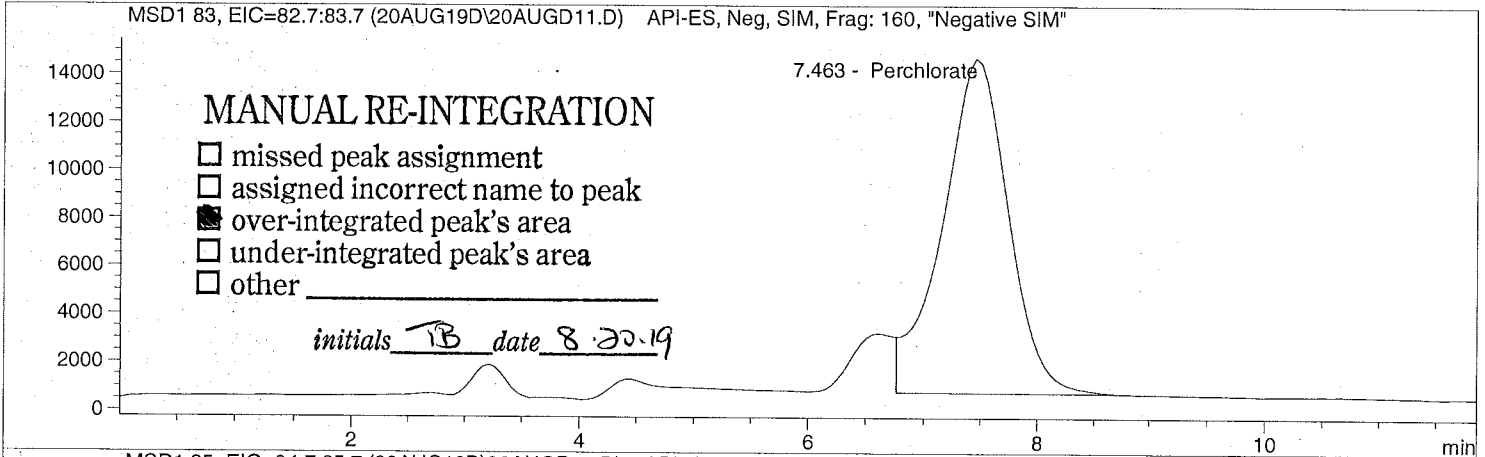
=====  
\*\*\* End of Report \*\*\*  
=====

Injection Date: 8/20/2019 10:55:21  
Sample Name: 1923491001  
Acq Operator: TNB

Seq Line: 11  
Location: Vial 81  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



```
=====  
Injection Date: 8/20/2019 10:55:21      Seq Line: 11  
Sample Name: 1923491001                Location: Vial 81  
Acq Operator: TNB                       Inj. No.: 1  
                                           Inj. Vol.: 50 µl  
=====
```

```
Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08
```

## Perchlorate analysis

=====  
Sample Information  
=====

```
Sorted By: Signal  
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.463	FM	558061.6	10.2094	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	FM	197832.2	12.0244	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	MF	173328.0	5.0000	CLO4-89-ISTD

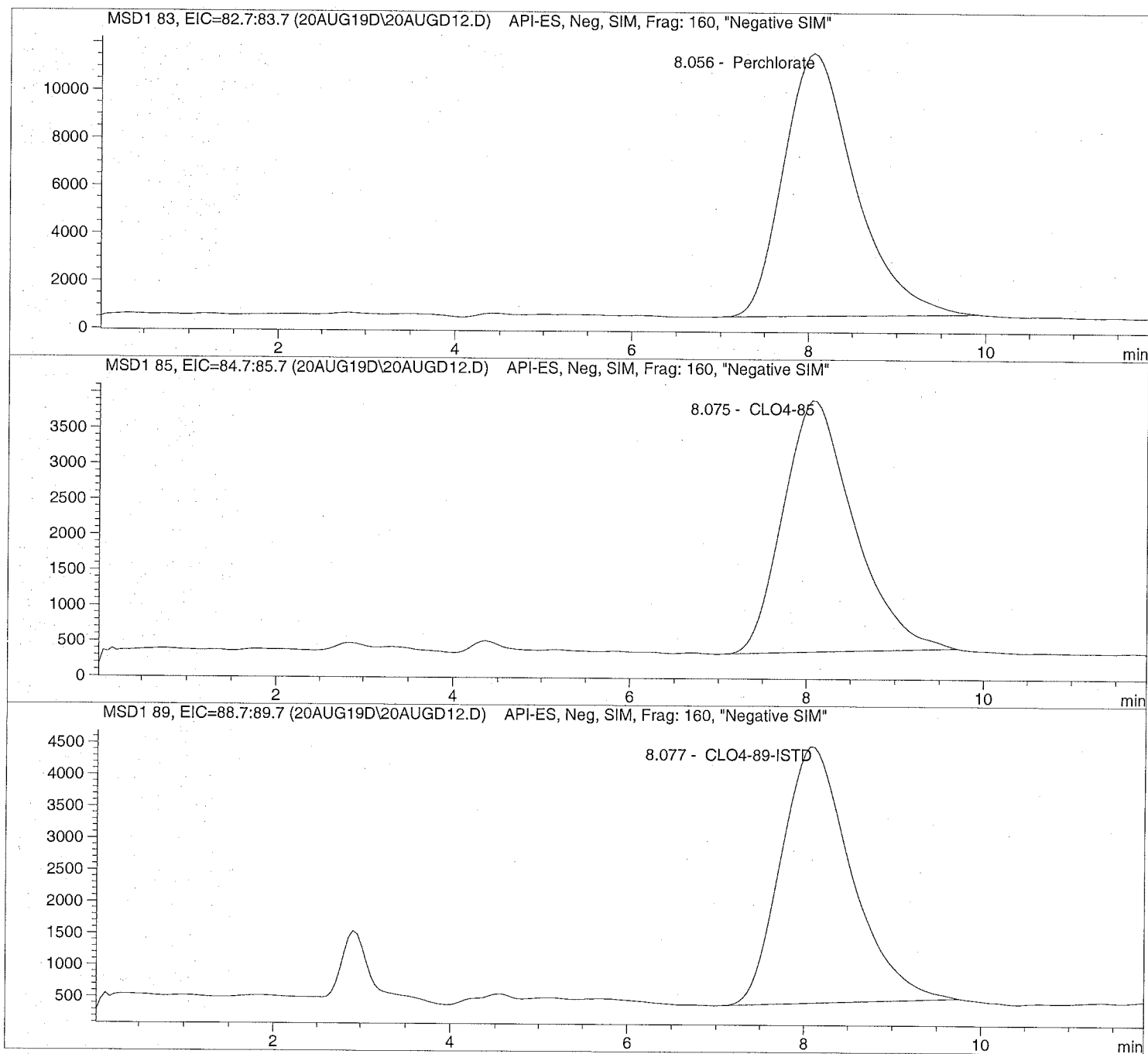
=====  
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD12.D Sample Name: 1923492001 1K

```
=====
Injection Date: 8/20/2019 11:09:30      Seq Line:      12
Sample Name:    1923492001 1K           Location:      Vial 82
Acq Operator:   TNB                    Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====
```

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD12.D Sample Name: 1923492001 1K

```

=====
Injection Date: 8/20/2019 11:09:30      Seq Line:      12
Sample Name:   1923492001 1K           Location:      Vial 82
Acq Operator:  TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 am
Multiplier:    1.000000
Dilution:      1000.000000
Sample Amount: 0.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.056	PBA	621376.9	8846.4165	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.075	PBA	197618.2	9349.5909	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.077	PBA	223941.7	5000.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

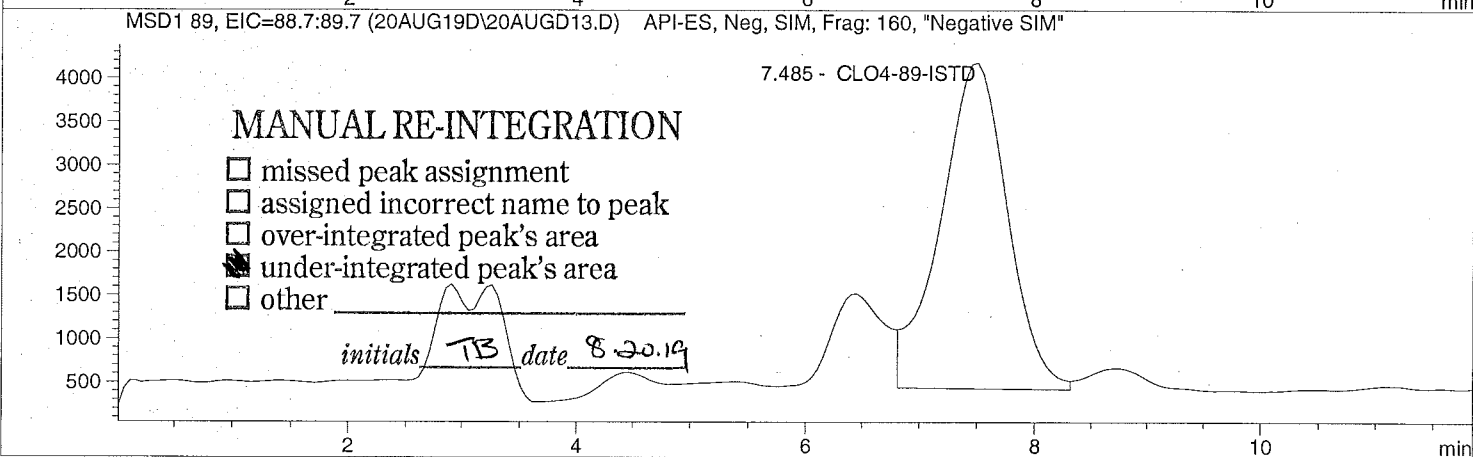
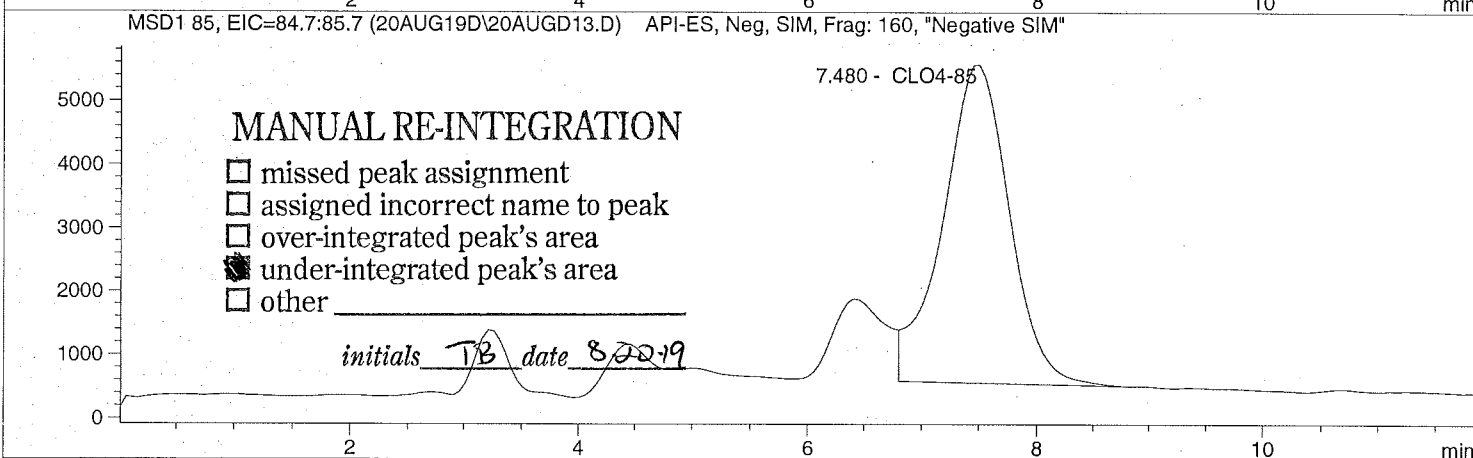
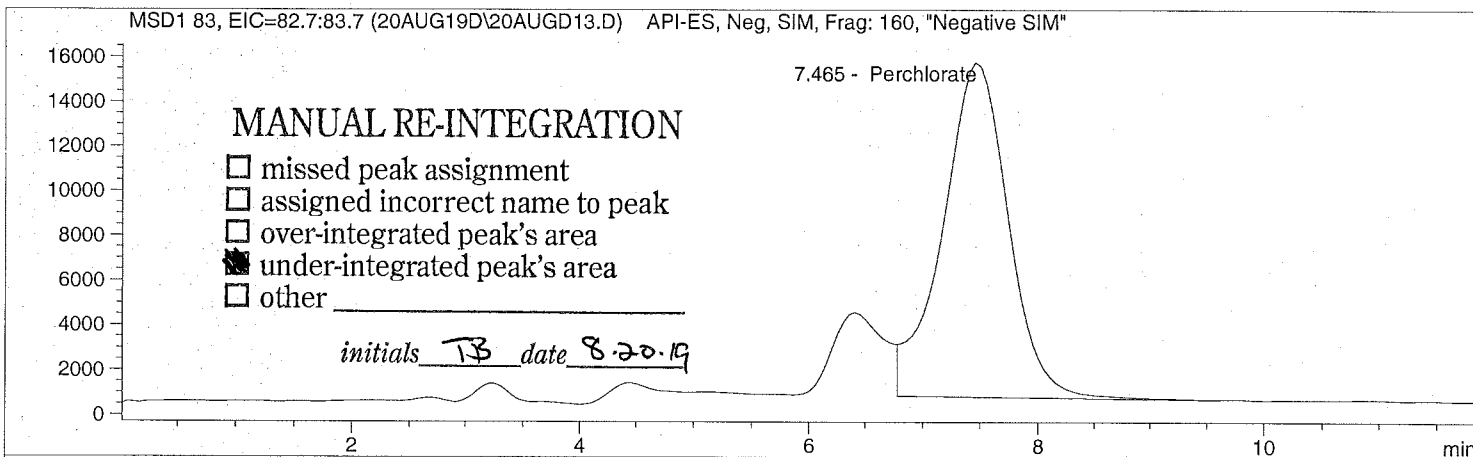
```

Injection Date: 8/20/2019 11:23:40  
Sample Name: 1923494001  
Acq Operator: TNB

Seq Line: 13  
Location: Vial 83  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis





```
=====
Injection Date: 8/20/2019 11:23:40      Seq Line: 13
Sample Name: 1923494001                 Location: Vial 83
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.465	FM	589441.2	12.3093	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.480	FM	200511.5	13.9561	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	MF	150739.0	5.0000	CLO4-89-ISTD

=====
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD14.D

Sample Name: 669456 CCV@25

Injection Date: 8/20/2019 11:37:53

Seq Line: 14

Sample Name: 669456 CCV@25

Location: Vial 71

Acq Operator: TNB

Inj. No.: 1

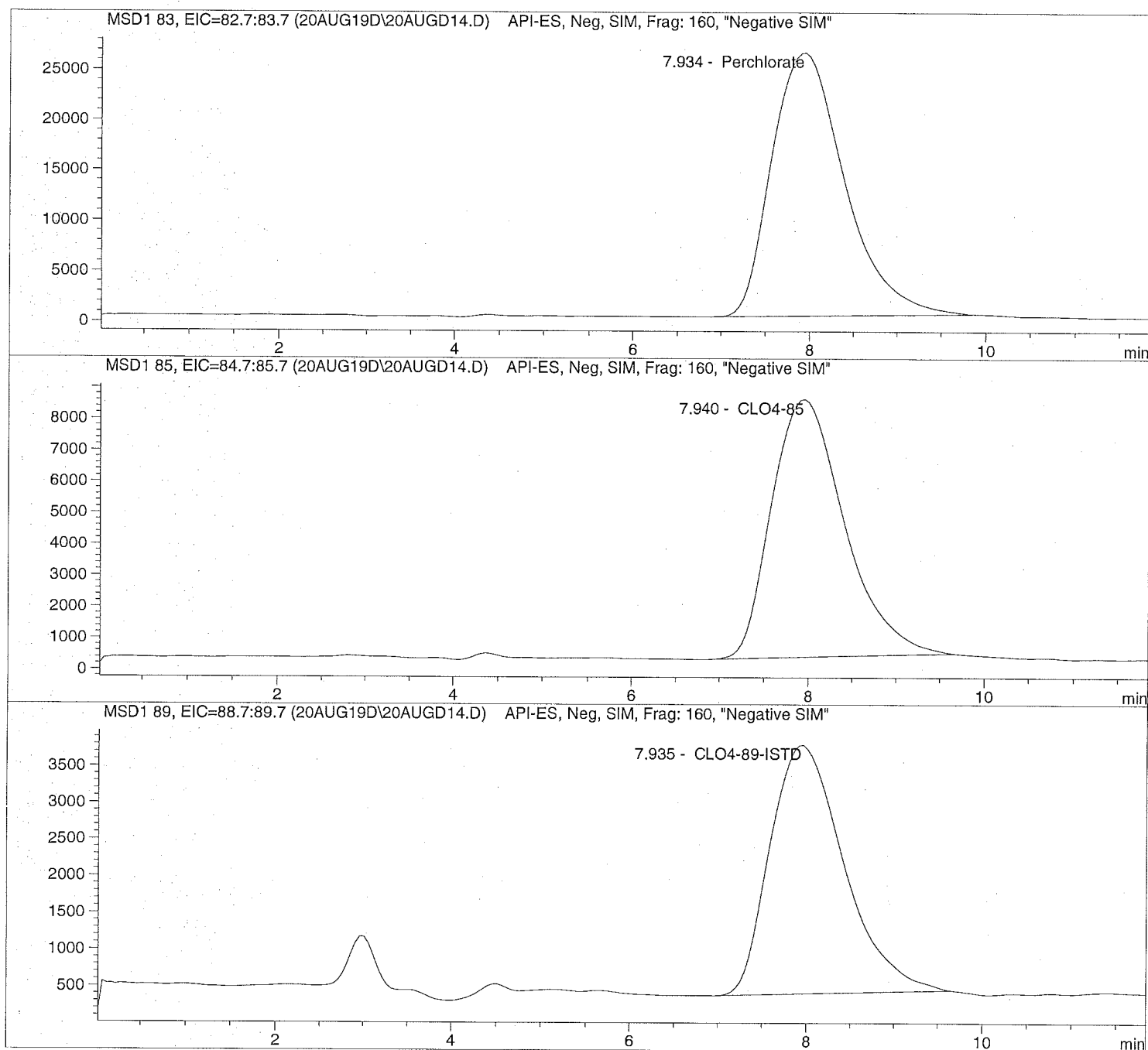
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD14.D Sample Name: 669456 CCV@25

```

=====
Injection Date: 8/20/2019 11:37:53      Seq Line:          14
Sample Name:    669456   CCV@25          Location:          Vial 71
Acq Operator:   TNB                Inj. No.:         1
                                           Inj. Vol.:        50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.934	PBA	1498652.4	23.1846	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.940	PBA	473077.5	24.5701	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.935	PBA	197525.4	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```



---

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

**Initial  
Calibration**

=====  
 Calibration Table  
 =====

Perchlorate

Calib. Data Modified : 3/19/2019 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	Amount	Area	Amt/Area	Ref	Grp	Name
8.744	1	1.00000	7.76074e4	1.28854e-5	1		Perchlorate
	2	2.00000	1.35273e5	1.47849e-5			
	3	5.00000	3.37764e5	1.48033e-5			
	4	10.00000	6.83454e5	1.46316e-5			
	5	25.00000	2.08433e6	1.19943e-5			
	6	50.00000	4.13334e6	1.20968e-5			
	7	75.00000	5.99313e6	1.25143e-5			
8.755	2	1.00000	2.36780e4	4.22333e-5	1		CLO4-85
	2	2.00000	4.69486e4	4.25998e-5			
	3	5.00000	1.06124e5	4.71147e-5			
	4	10.00000	2.13523e5	4.68335e-5			
	5	25.00000	6.14295e5	4.06971e-5			
	6	50.00000	1.19814e6	4.17315e-5			
	7	75.00000	1.78355e6	4.20509e-5			
8.766	3	5.00000	2.73208e5	1.83011e-5	+I1		CLO4-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5			
	3	5.00000	2.33196e5	2.14412e-5			
	4	5.00000	2.34454e5	2.13262e-5			
	5	5.00000	2.50568e5	1.99547e-5			
	6	5.00000	2.30977e5	2.16472e-5			

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

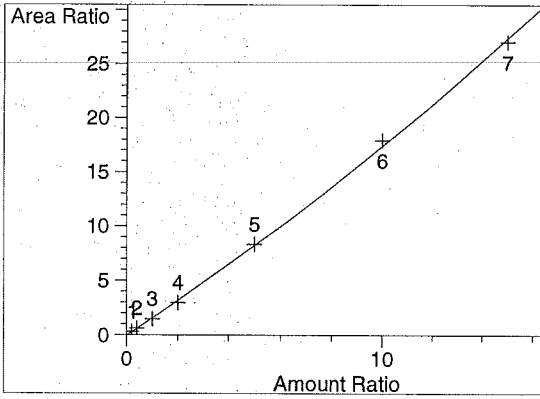
Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min  
 Curve Type : Linear  
 Origin : Included  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

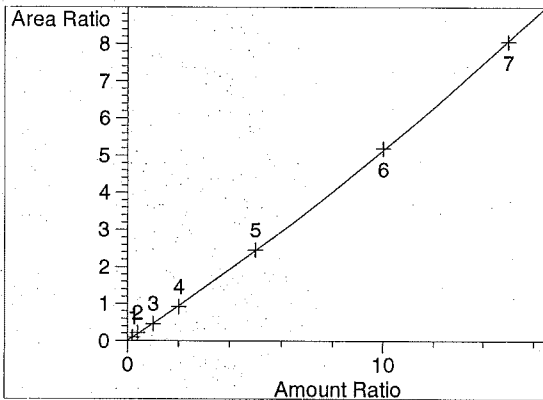
=====  
 Peak Sum Table  
 =====

\*\*\*No Entries in table\*\*\*  
 =====

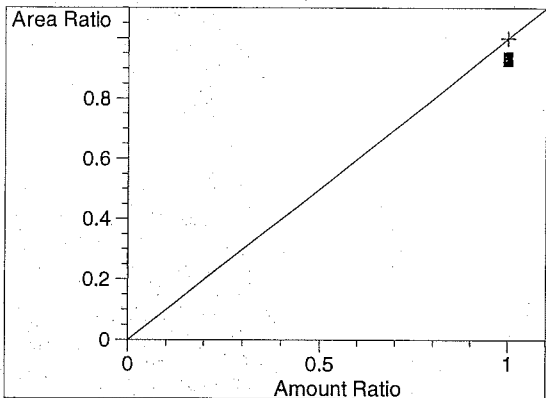
=====  
 Calibration Curves  
 =====



Perchlorate at exp. RT: 8.744  
 MSD1 83, EIC=82.7:83.7  
 Correlation: 0.99957  
 Residual Std. Dev.: 0.30744  
 Formula:  $y = ax^2 + bx + c$   
 a: 1.76988e-2  
 b: 1.56480  
 c: -4.92430e-2  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755  
 MSD1 85, EIC=84.7:85.7  
 Correlation: 0.99983  
 Residual Std. Dev.: 0.03473  
 Formula:  $y = ax^2 + bx + c$   
 a: 5.13396e-3  
 b: 4.62055e-1  
 c: 4.97209e-4  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766  
 MSD1 89, EIC=88.7:89.7  
 Correlation: 1.00000  
 Residual Std. Dev.: 0.00000  
 Formula:  $y = mx + b$   
 m: 1.00000  
 b: 0.00000  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

## Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

['#' ==&gt; Run has not been reprocessed with Batch Review Method

['\*' ==&gt; 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

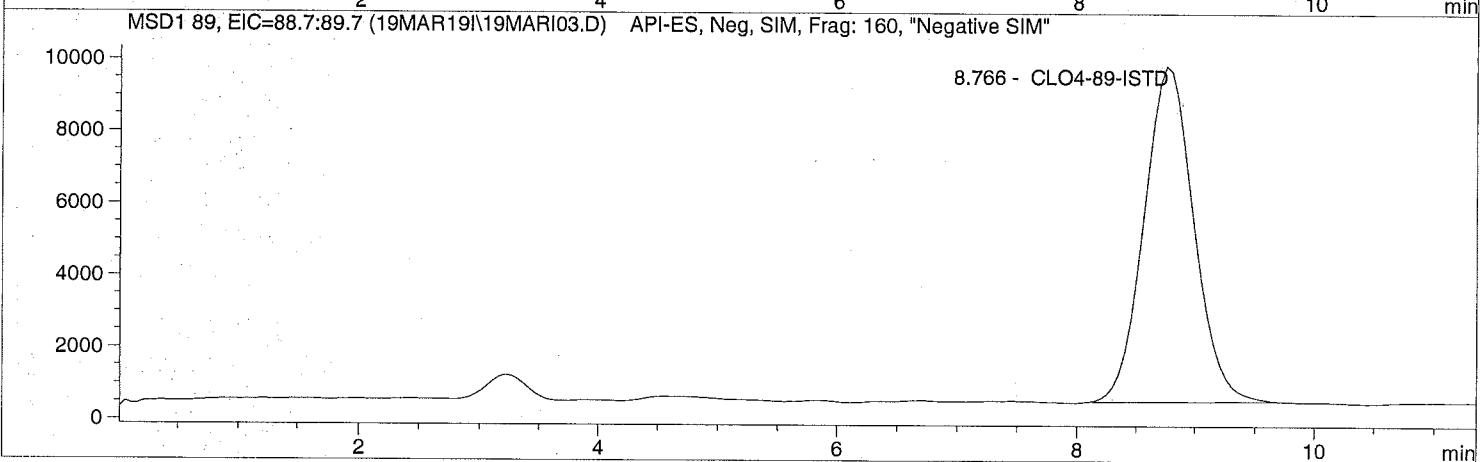
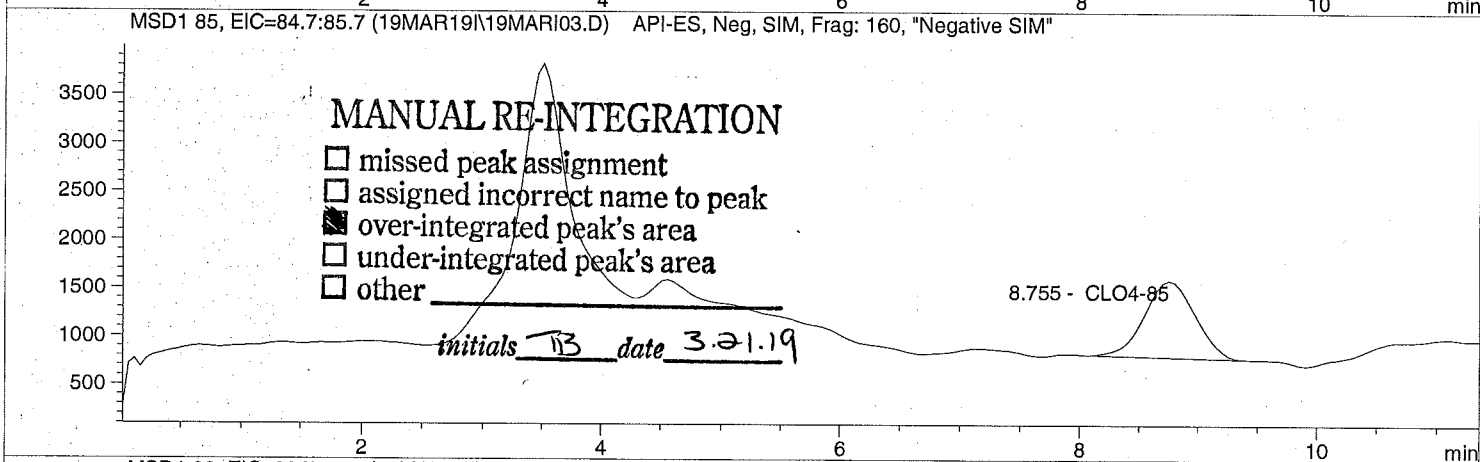
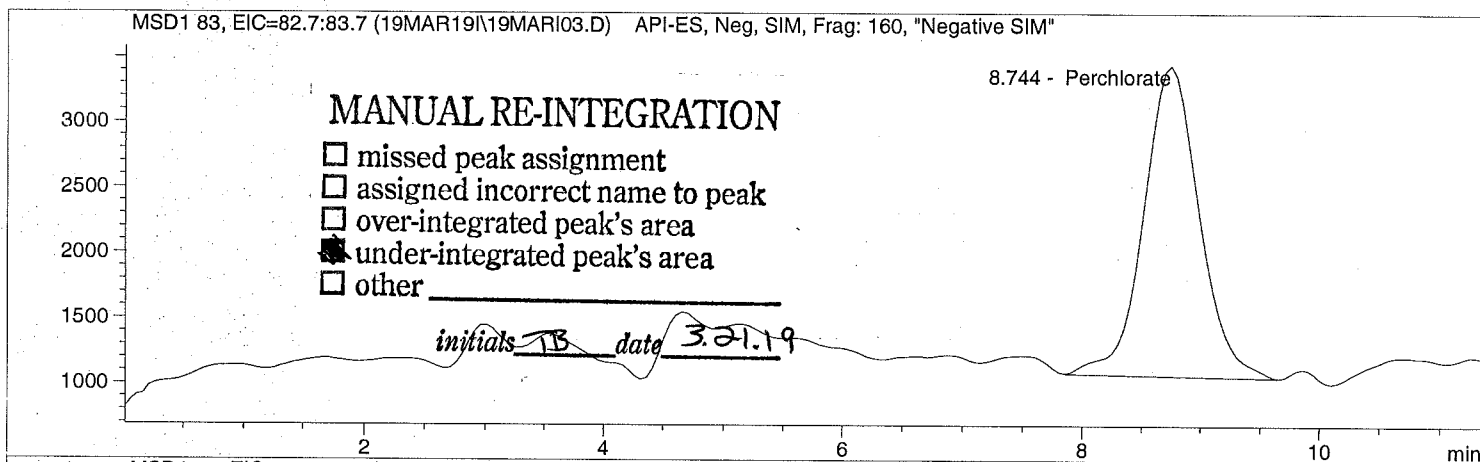
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date: 3/19/2019 09:39:40      Seq Line: 3
Sample Name: CLO4@ 1.0ug/L              Location: Vial 73
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 30 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 3/19/2019 14:35:22
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By: Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 1.000
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.744	MM	77607.4	1.0625	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.755	MM	23678.0	0.9305	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

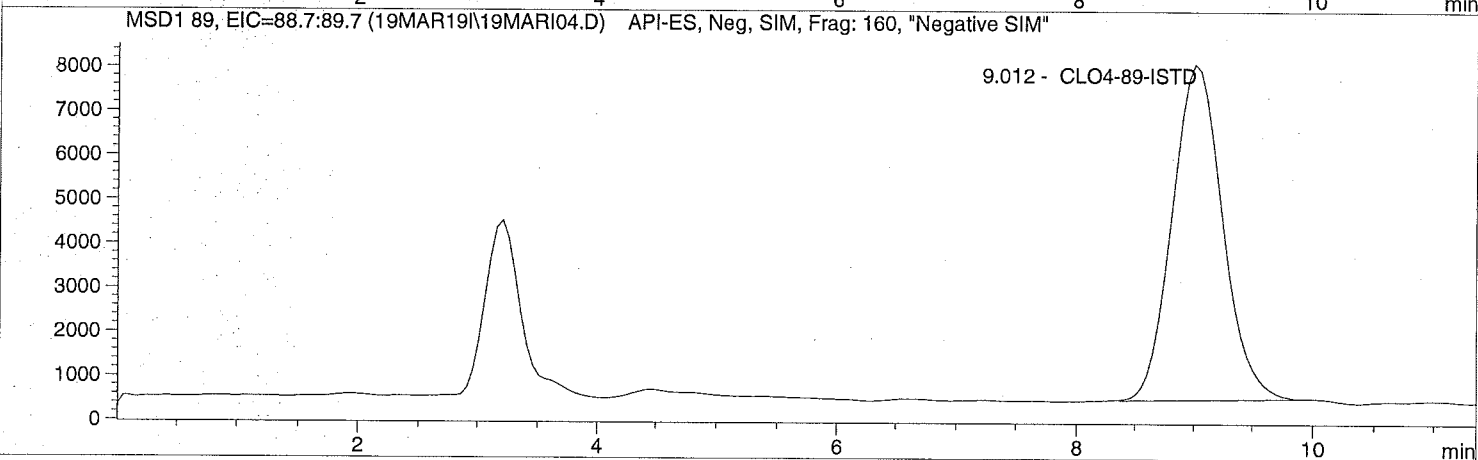
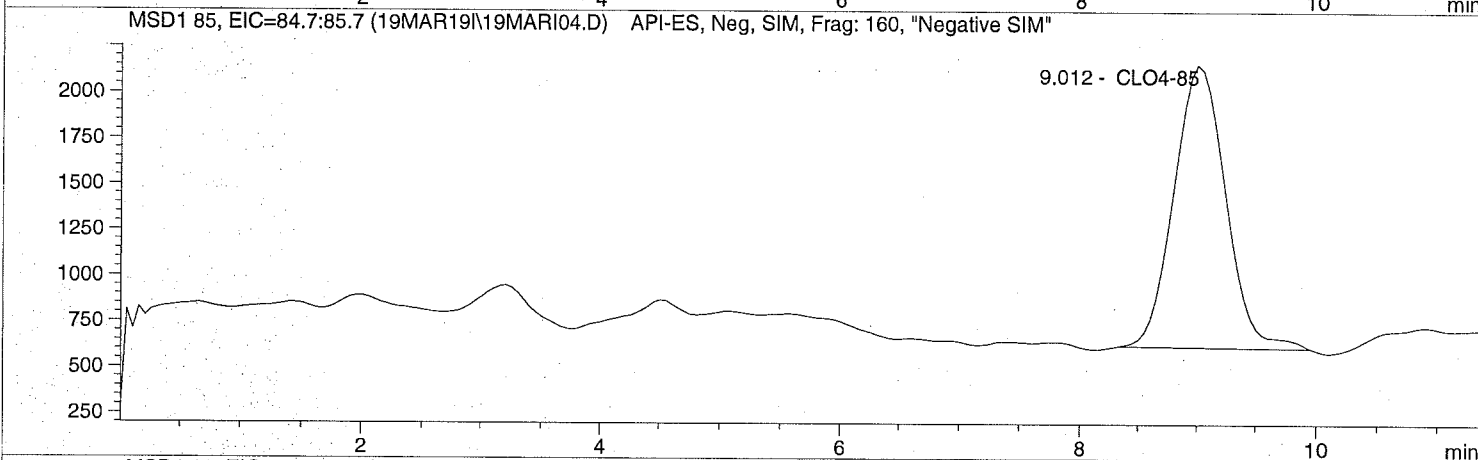
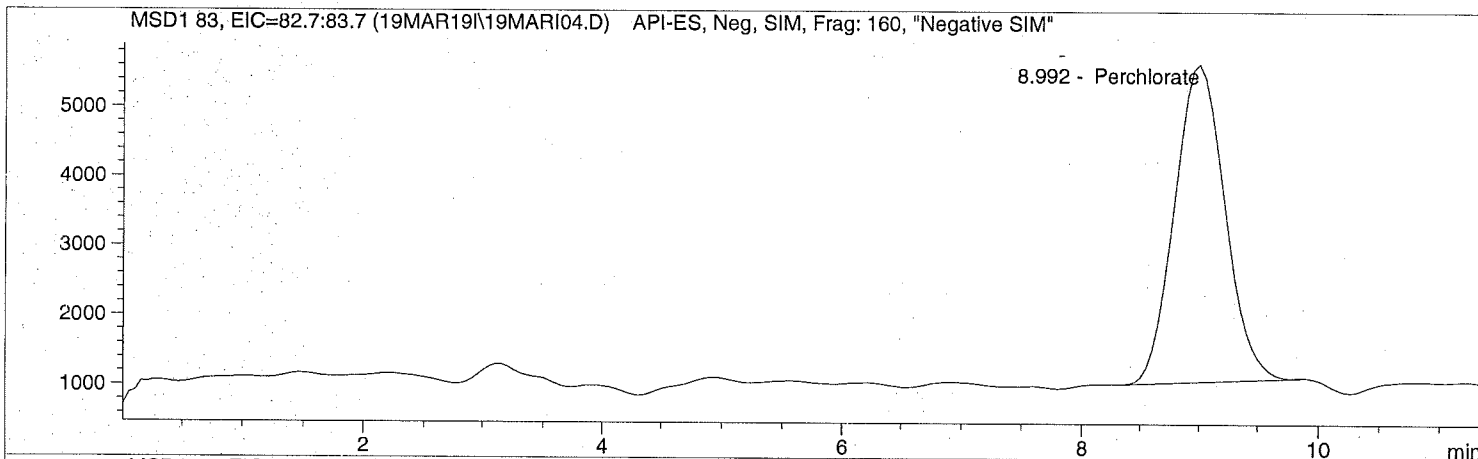
=====
\*\*\* End of Report \*\*\*

Injection Date: 3/19/2019 09:53:00  
Sample Name: CLO4@ 2.0ug/L  
Acq Operator: TNB

Seq Line: 4  
Location: Vial 74  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date: 3/19/2019 09:53:00      Seq Line:      4
Sample Name:    CLO4@ 2.0ug/L           Location:      Vial 74
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    30 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  2.000
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.992	BBA	135272.8	2.0697	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	46948.6	2.2425	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
9.012	BBA	224885.9	5.0000	CLO4-89-ISTD

=====
\*\*\* End of Report \*\*\*

Injection Date: 3/19/2019 10:06:16

Seq Line: 5

Sample Name: CLO4@ 5.0ug/L

Location: Vial 75

Acq Operator: TNB

Inj. No.: 1

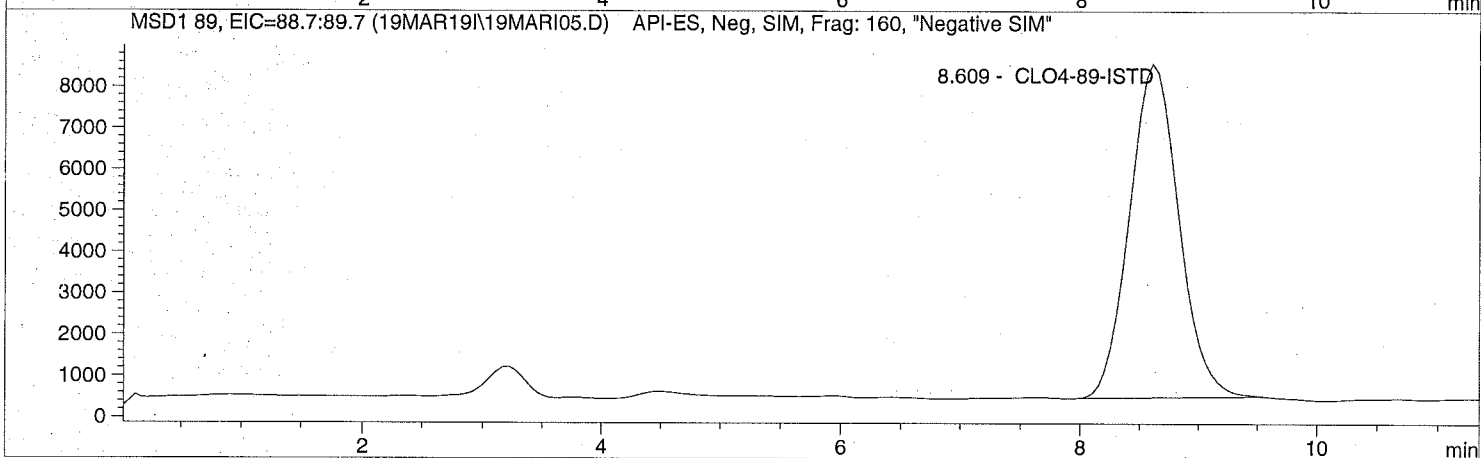
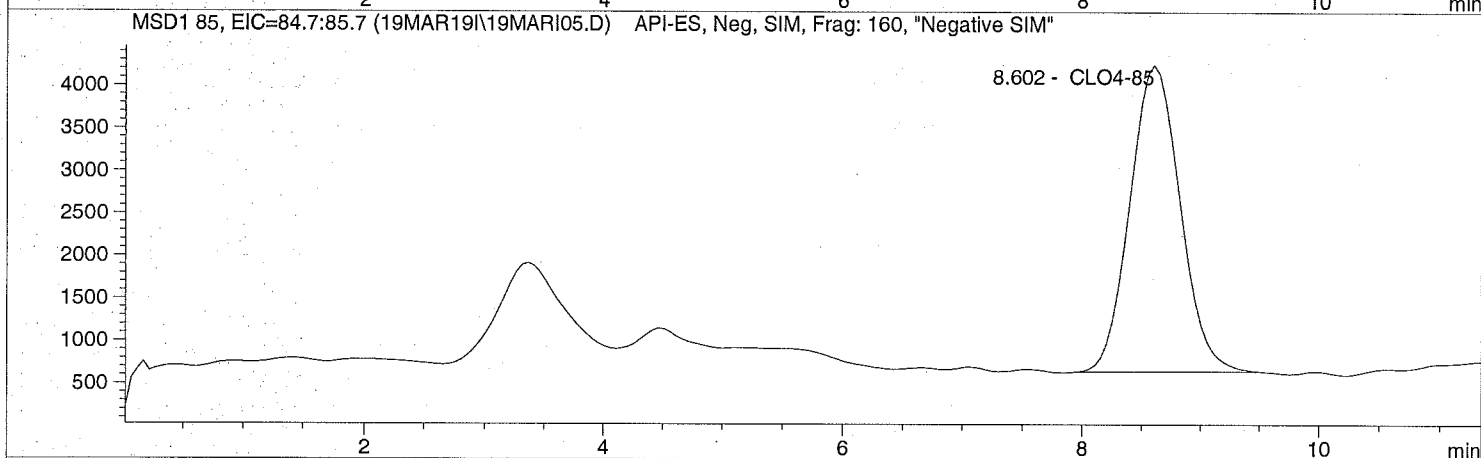
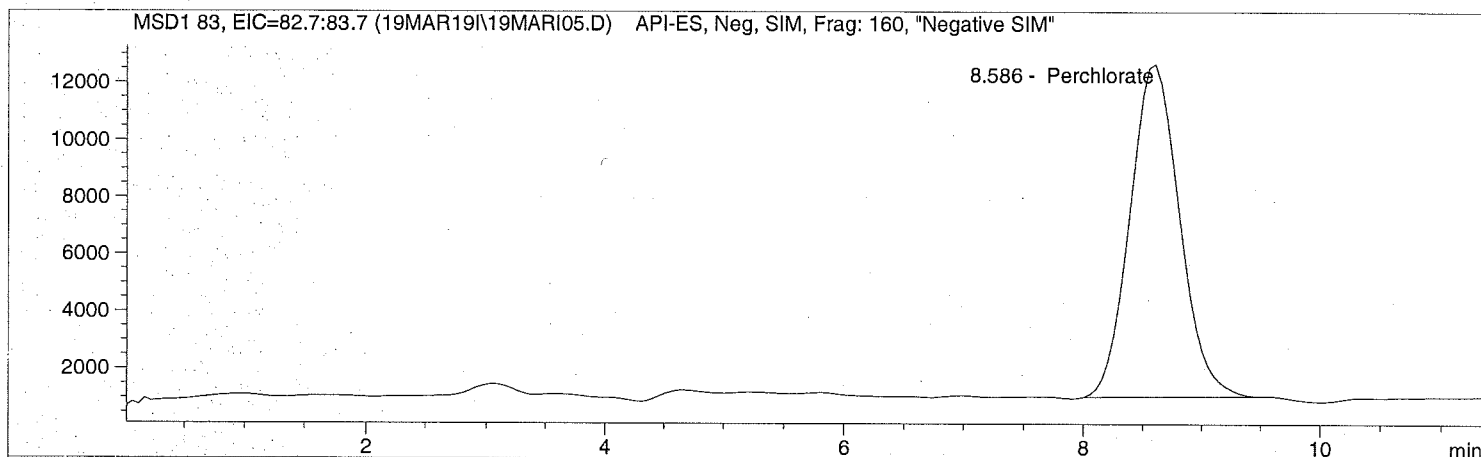
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date: 3/19/2019 10:06:16      Seq Line:          5
Sample Name:    CLO4@ 5.0ug/L           Location:          Vial 75
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        30 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  5.000
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.586	PBA	337763.6	4.7347	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.602	PBA	106124.0	4.8666	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.609	PBA	233196.3	5.0000	CLO4-89-ISTD

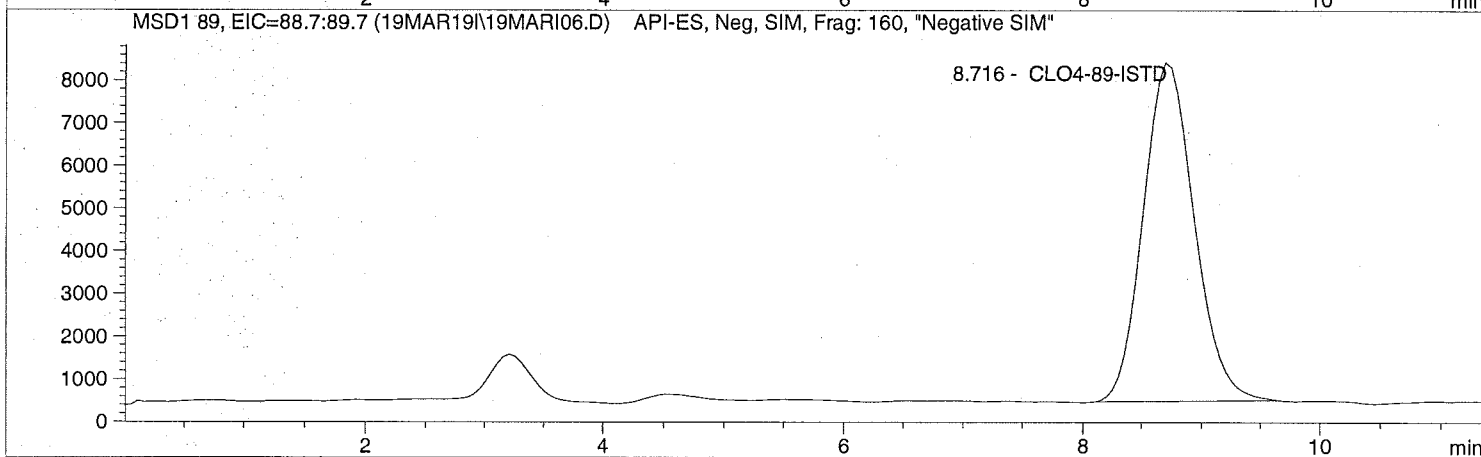
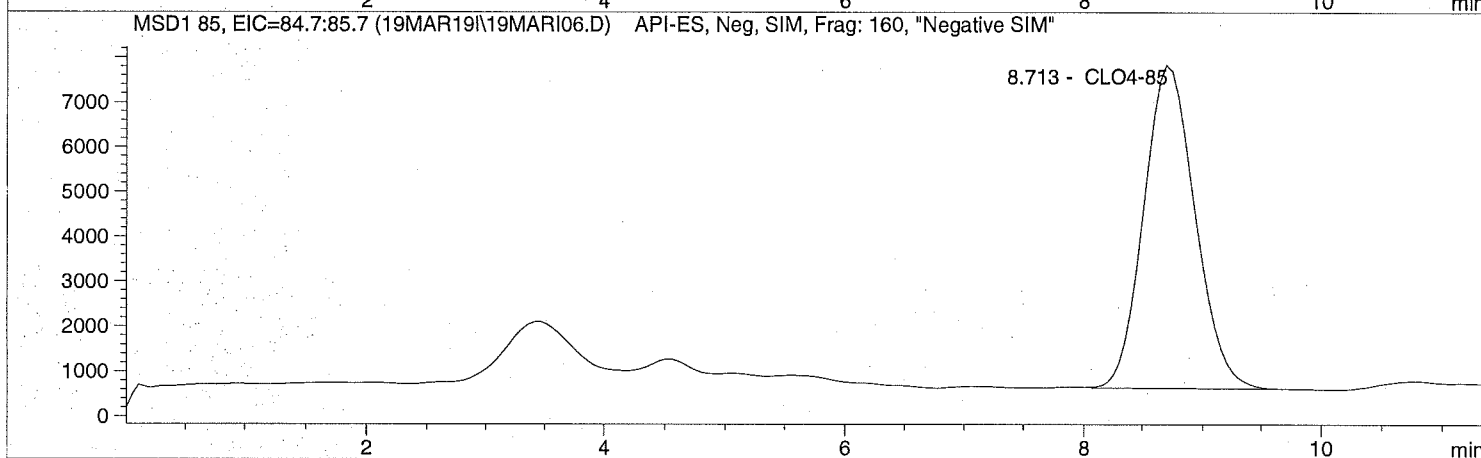
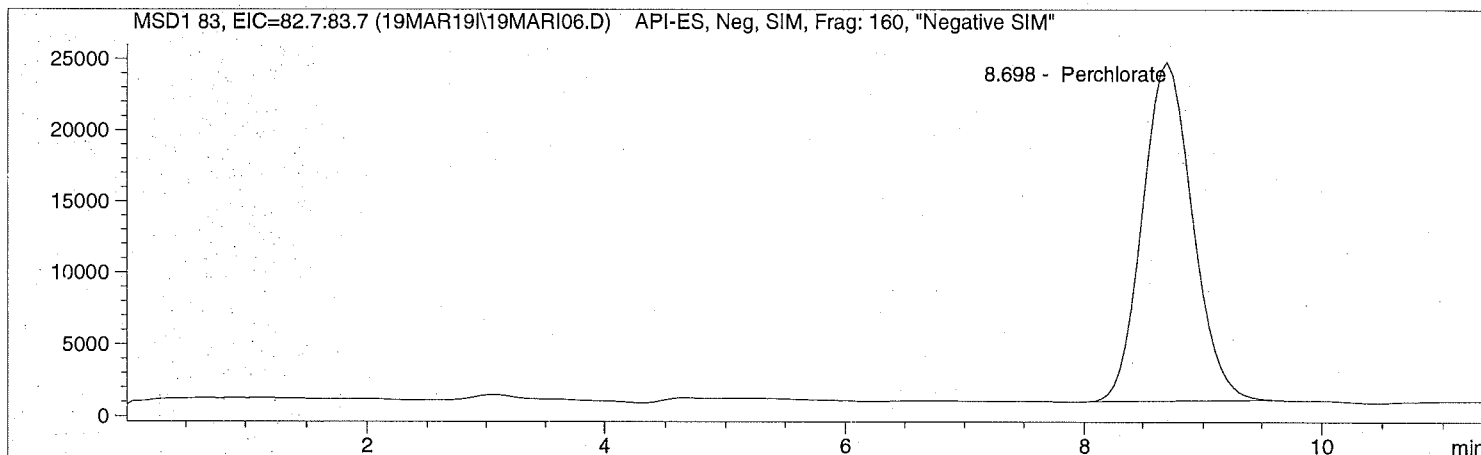
=====
\*\*\* End of Report \*\*\*

Injection Date: 3/19/2019 10:19:32  
Sample Name: CLO4@ 10.ug/L  
Acq Operator: TNB

Seq Line: 6  
Location: Vial 76  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis





```
=====
Injection Date: 3/19/2019 10:19:32      Seq Line: 6
Sample Name:    CLO4@ 10.ug/L           Location:  Vial 76
Acq Operator:   TNB                     Inj. No.: 1
                                           Inj. Vol.: 30 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:      1.000000
Sample Amount:  10.000
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.698	PBA	683454.4	9.2773	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.713	BBA	213522.6	9.6431	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.716	PBA	234453.6	5.0000	CLO4-89-ISTD

=====
\*\*\* End of Report \*\*\*

Injection Date: 3/19/2019 10:32:49

Seq Line: 7

Sample Name: CLO4@ 25.ug/L

Location: Vial 77

Acq Operator: TNB

Inj. No.: 1

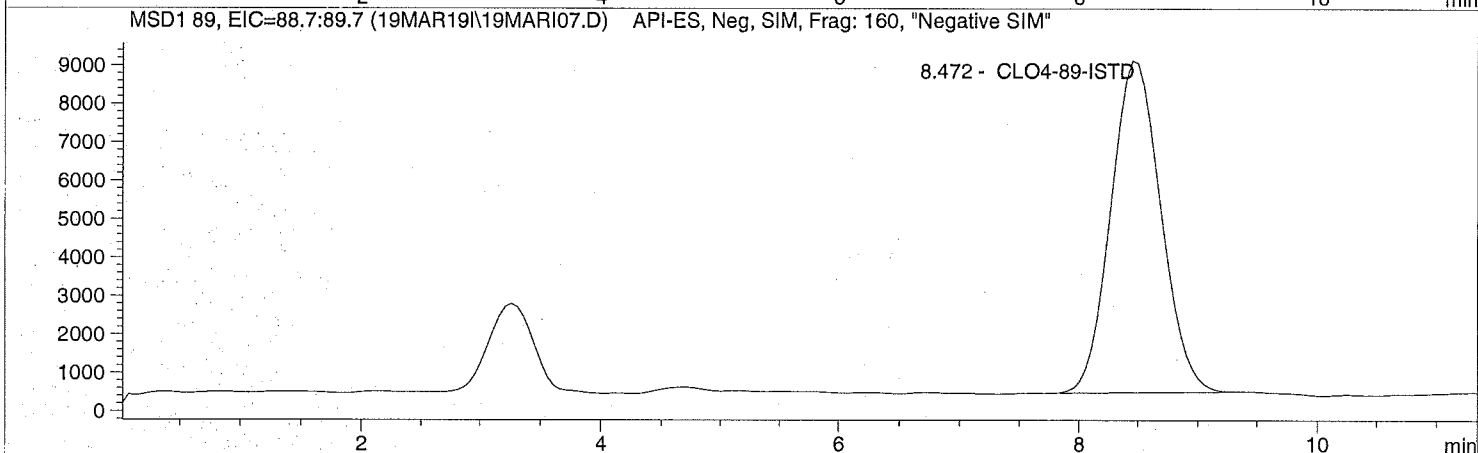
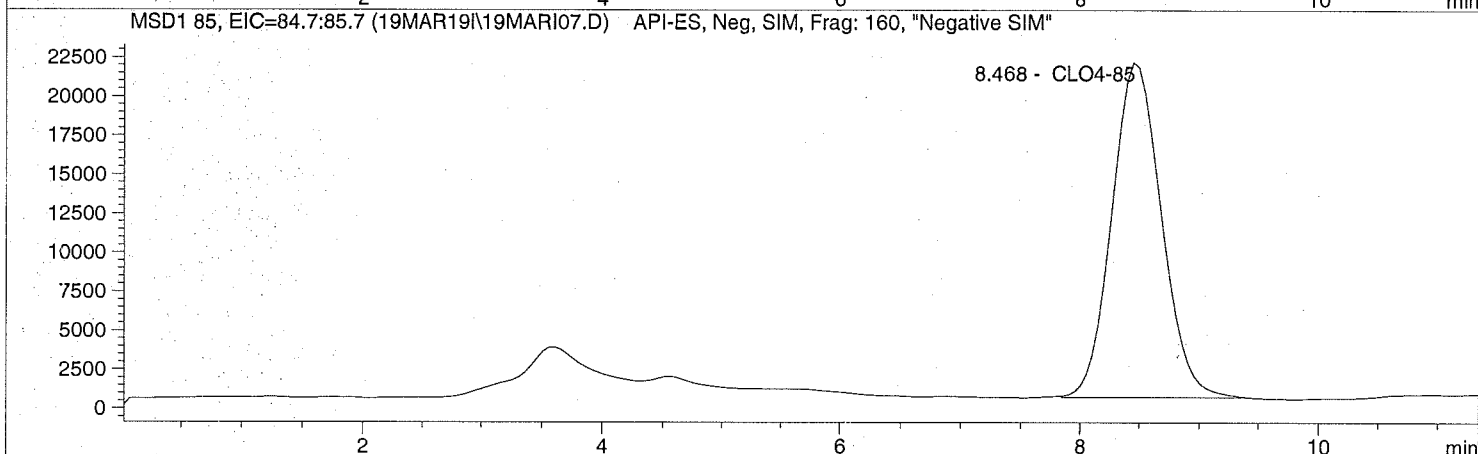
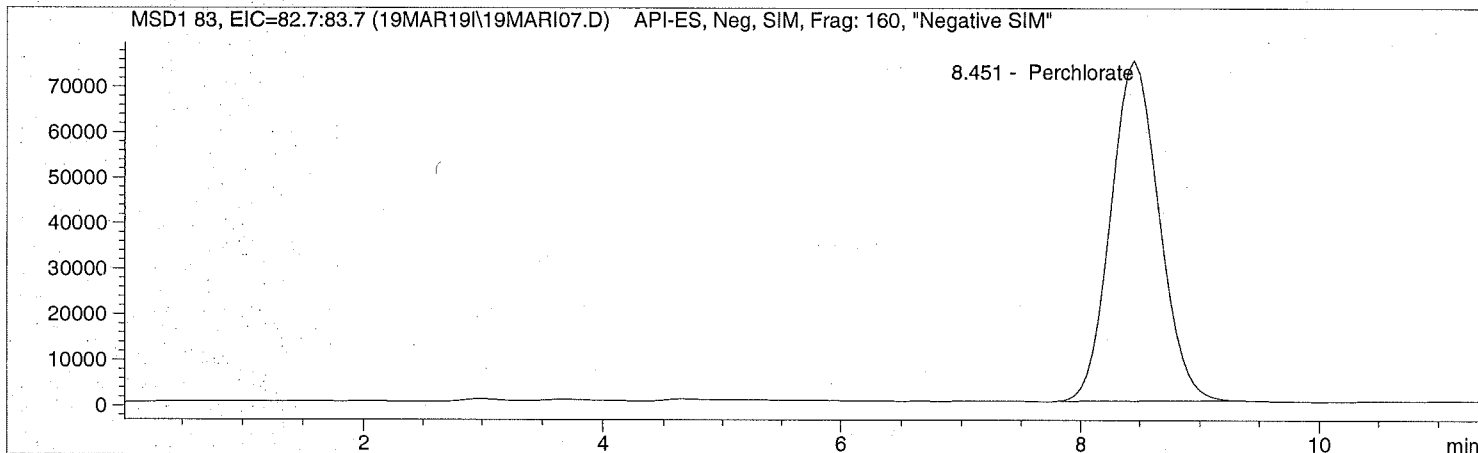
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date: 3/19/2019 10:32:49      Seq Line:          7
Sample Name:    CLO4@ 25.ug/L           Location:         Vial 77
Acq Operator:   TNB                     Inj. No.:        1
                                           Inj. Vol.:       30 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  25.000
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.451	PBA	2084327.4	25.2904	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.468	BBA	614294.8	25.1216	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.472	BBA	250568.0	5.0000	CLO4-89-ISTD

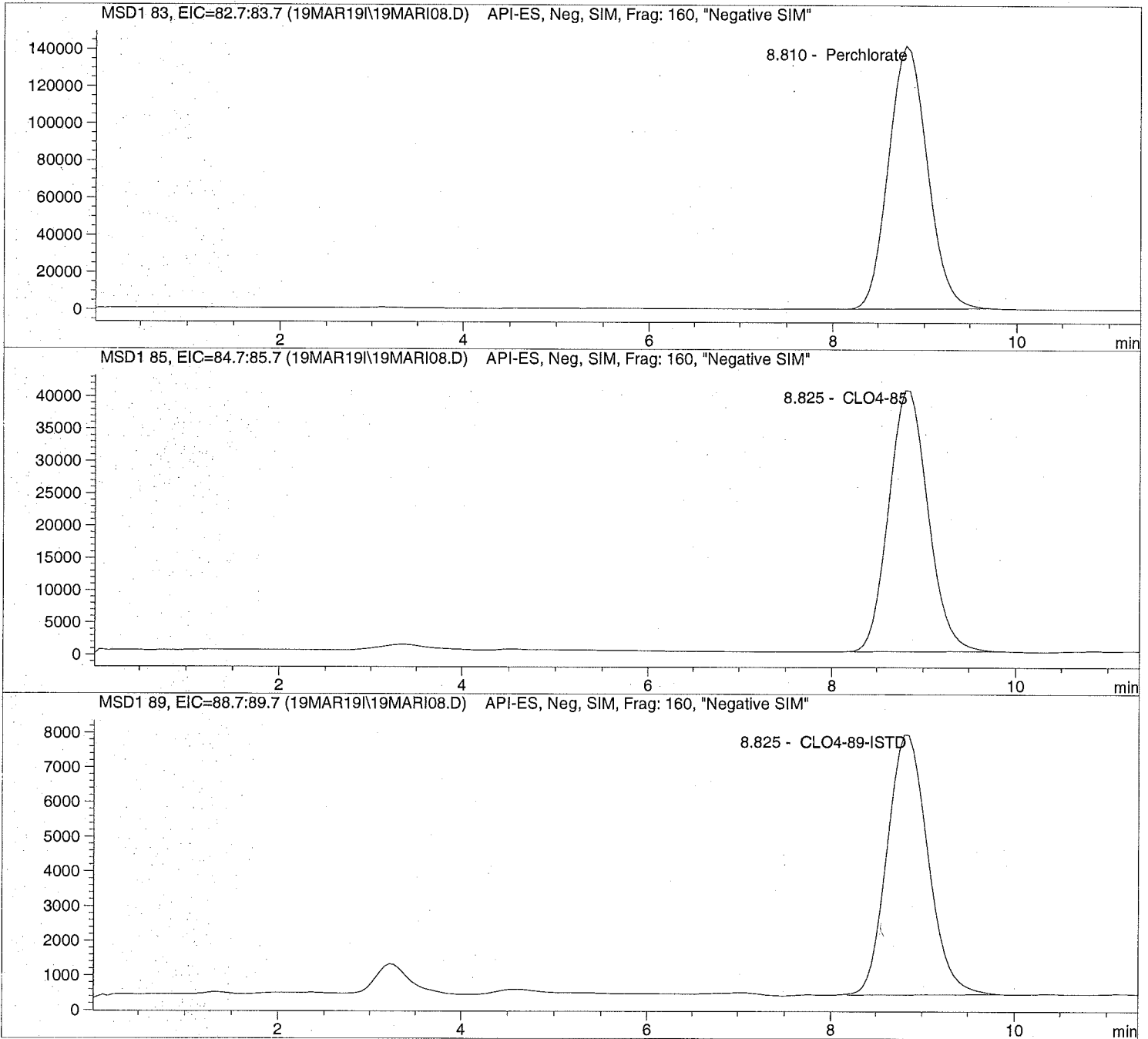
=====
\*\*\* End of Report \*\*\*

Injection Date: 3/19/2019 10:46:05  
Sample Name: CLO4@ 50.ug/L  
Acq Operator: TNB

Seq Line: 8  
Location: Vial 78  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



```
=====
Injection Date: 3/19/2019 10:46:05      Seq Line:      8
Sample Name:    CLO4@ 50.ug/L           Location:      Vial 78
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    30 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  50.000
```

## ===== LCMS Results =====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.810	PBA	4133340.5	51.3684	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	1198135.6	50.4672	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.825	BBA	230976.7	5.0000	CLO4-89-ISTD

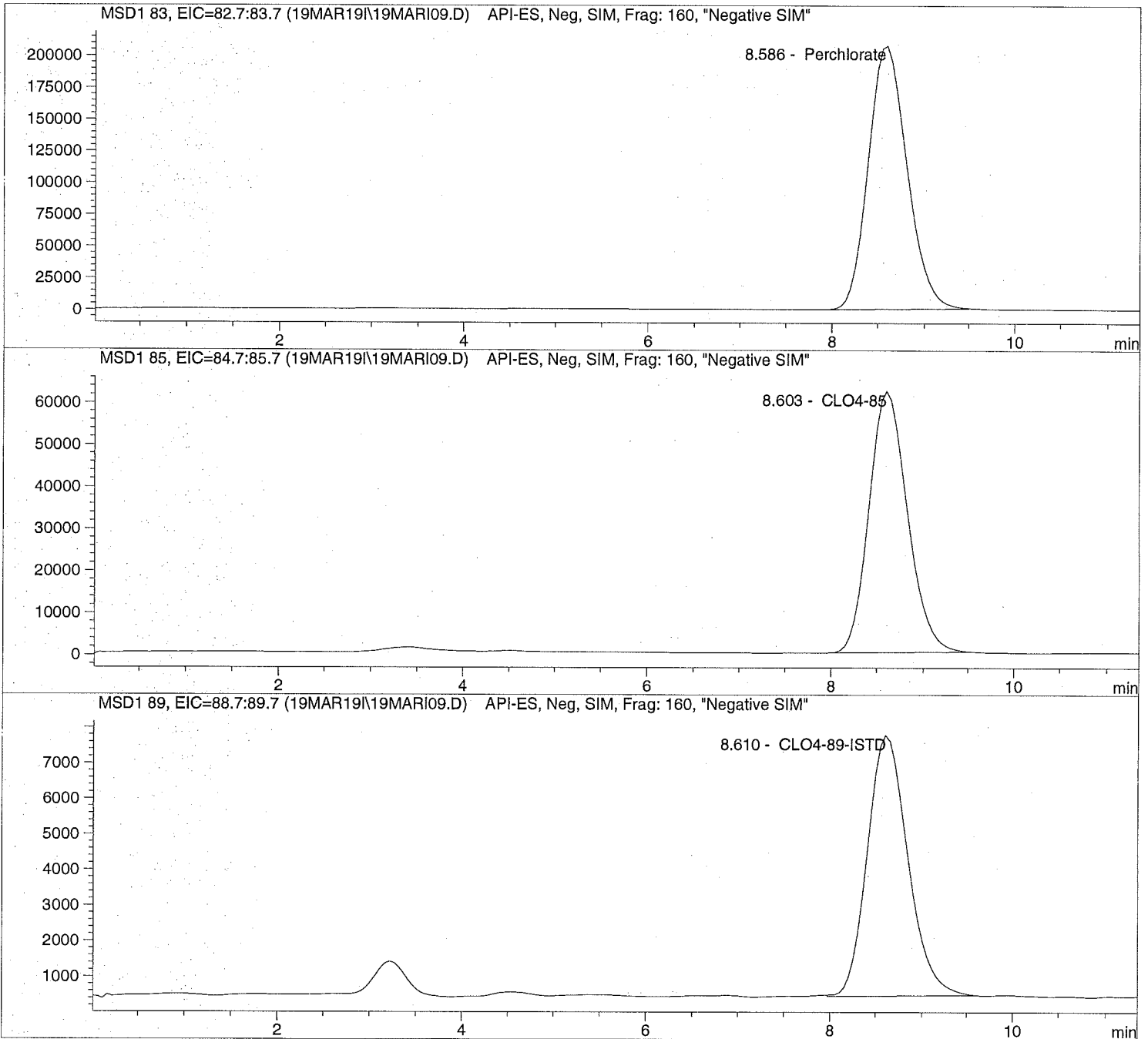
=====
\*\*\* End of Report \*\*\*

Injection Date: 3/19/2019 10:59:22  
Sample Name: CLO4@ 75.ug/L  
Acq Operator: TNB

Seq Line: 9  
Location: Vial 79  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



=====  
Injection Date: 3/19/2019 10:59:22                   Seq Line:                   9  
Sample Name:    CLO4@ 75.ug/L                    Location:                Vial 79  
Acq Operator:   TNB                               Inj. No.:               1  
  Inj. Vol.:               30 µl  
=====

Acq. Method:    CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed:   3/19/2019 14:35:22

## Perchlorate analysis

=====  
Sample Information  
=====

Sorted By:                   Signal  
Calib. Data Modified:       Tue, 19. Mar. 2019,02:35:19 pm  
Multiplier:                 1.000000  
Dilution:                   1.000000  
Sample Amount:              75.000

=====  
LCMS Results  
=====

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

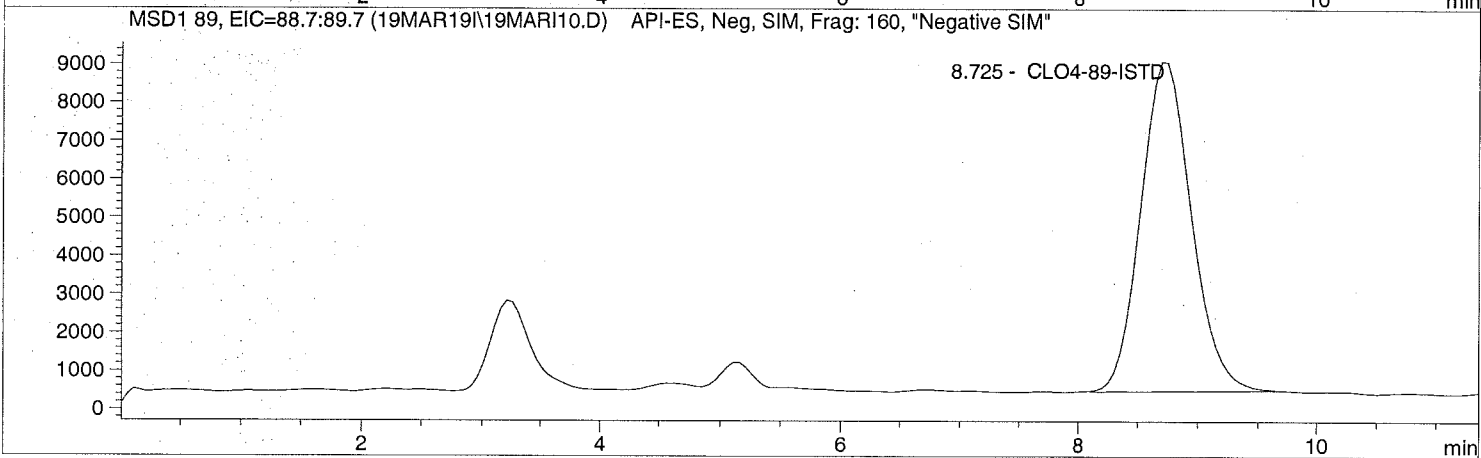
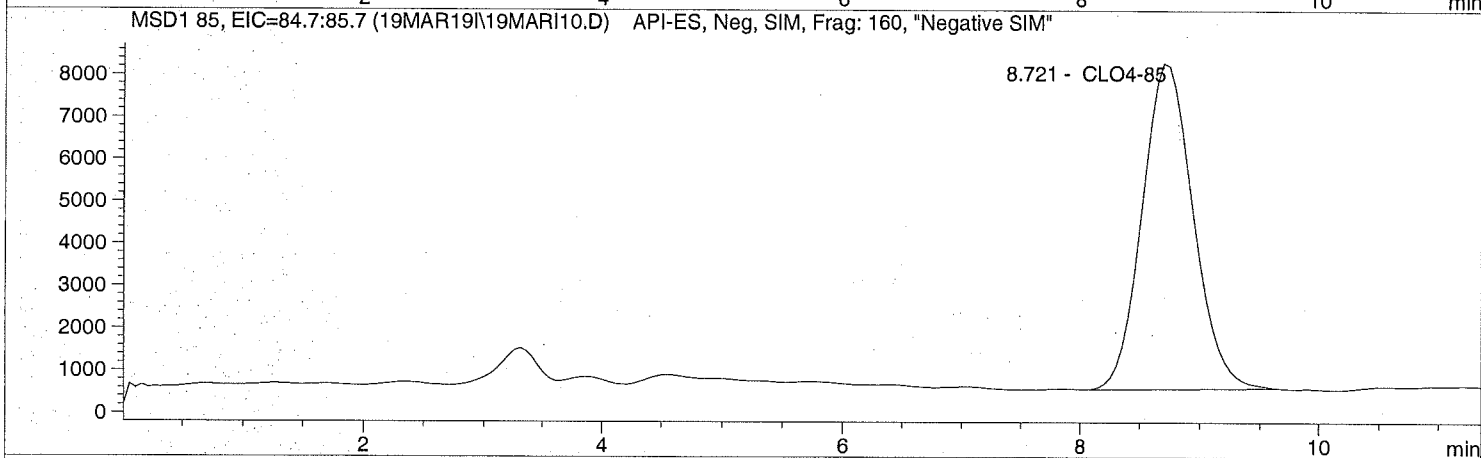
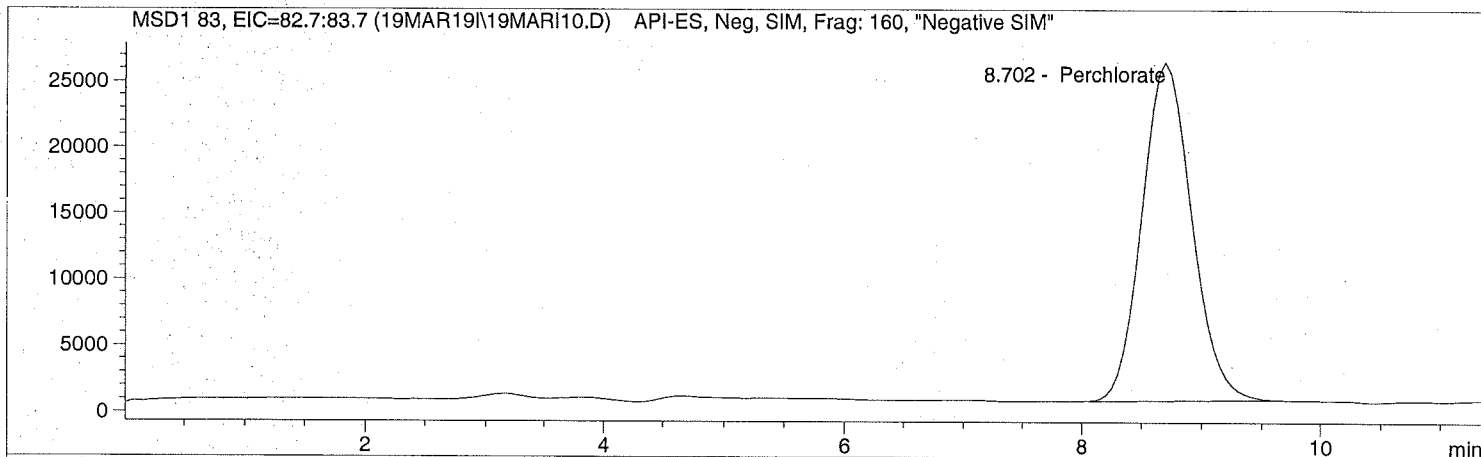
=====  
\*\*\* End of Report \*\*\*  
=====

Injection Date: 3/19/2019 11:12:42  
Sample Name: ICAL Verf@10ug/L  
Acq Operator: TNB

Seq Line: 10  
Location: Vial 80  
Inj. No.: 1  
Inj. Vol.: 30 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 3/19/2019 14:35:22

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D      Sample Name: ICAL Verf@10ug/L

```

=====
Injection Date: 3/19/2019 11:12:42      Seq Line:            10
Sample Name:    ICAL Verf@10ug/L        Location:            Vial 80
Acq Operator:   TNB                     Inj. No.:            1
                                         Inj. Vol.:            30 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22

```

Perchlorate analysis

Sample Information

```

Sorted By:            Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:          1.000000
Dilution:            1.000000
Sample Amount:        10.000

```

LCMS Results

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*



---

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

**Unmodified**

Data file: C:\HPCHEM\1\DATA\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

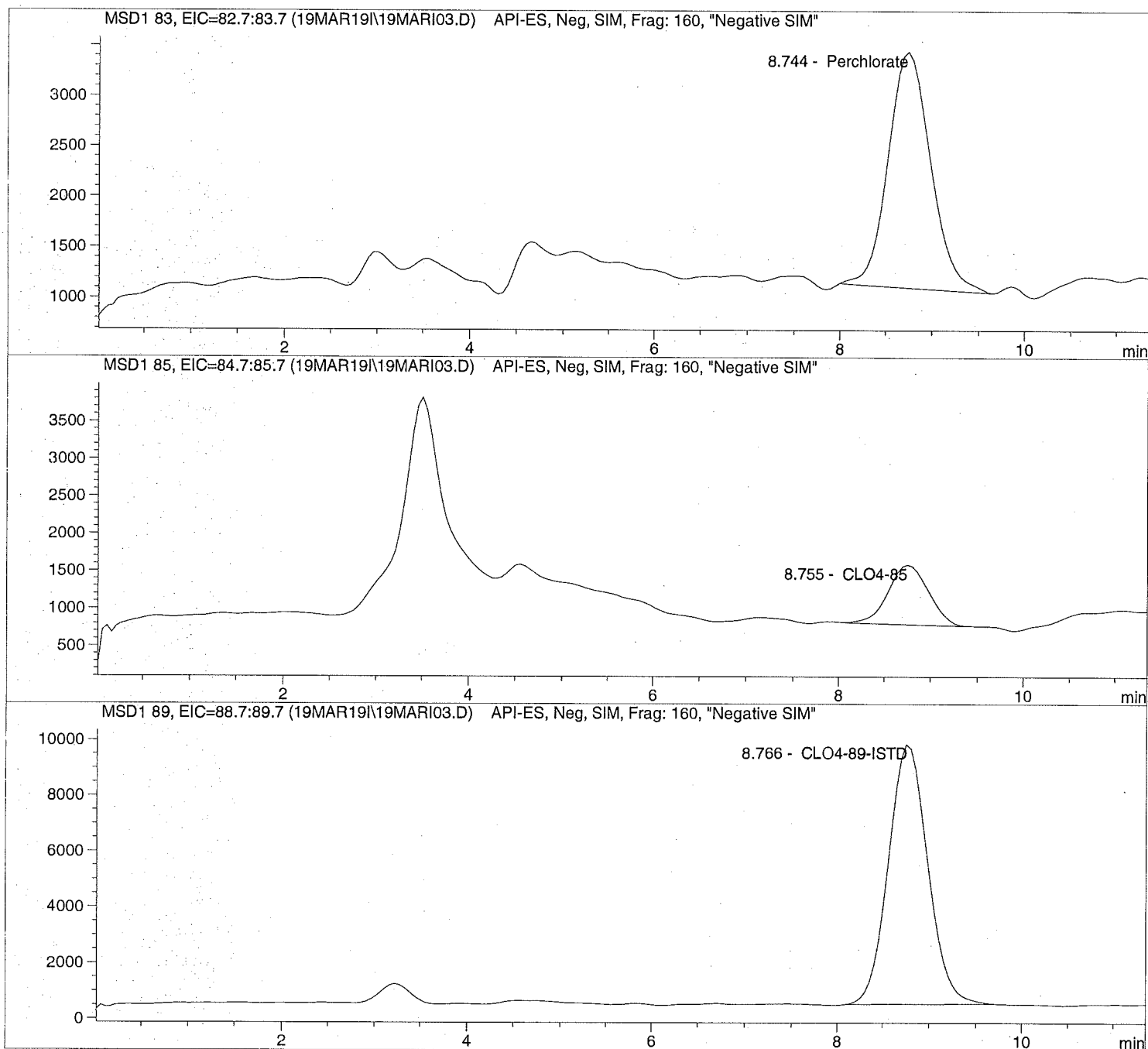
Inj. Vol.: 30 µl

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

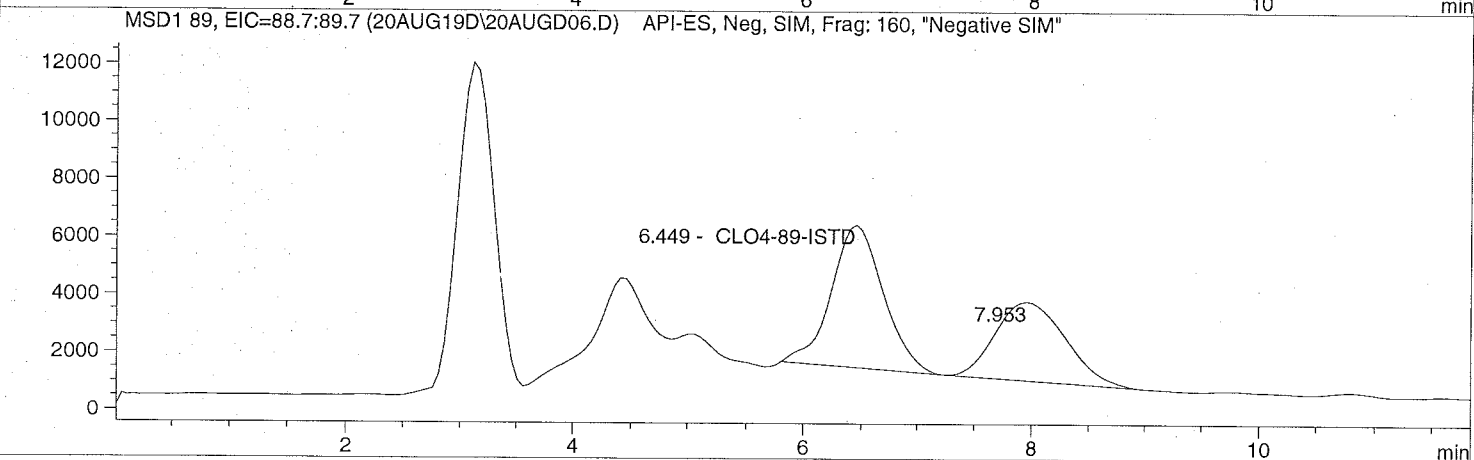
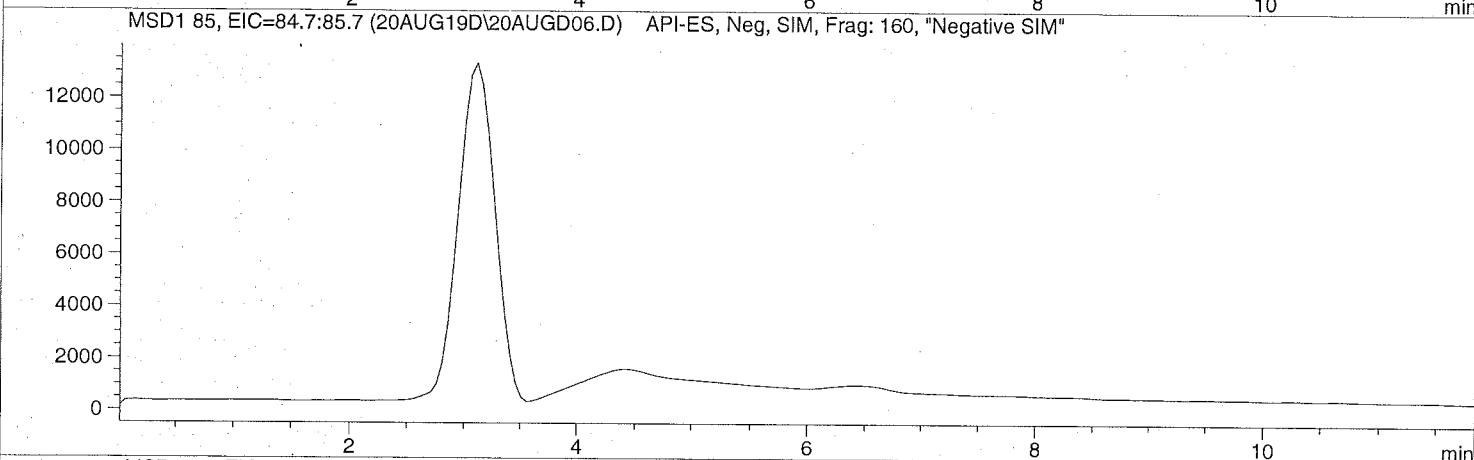
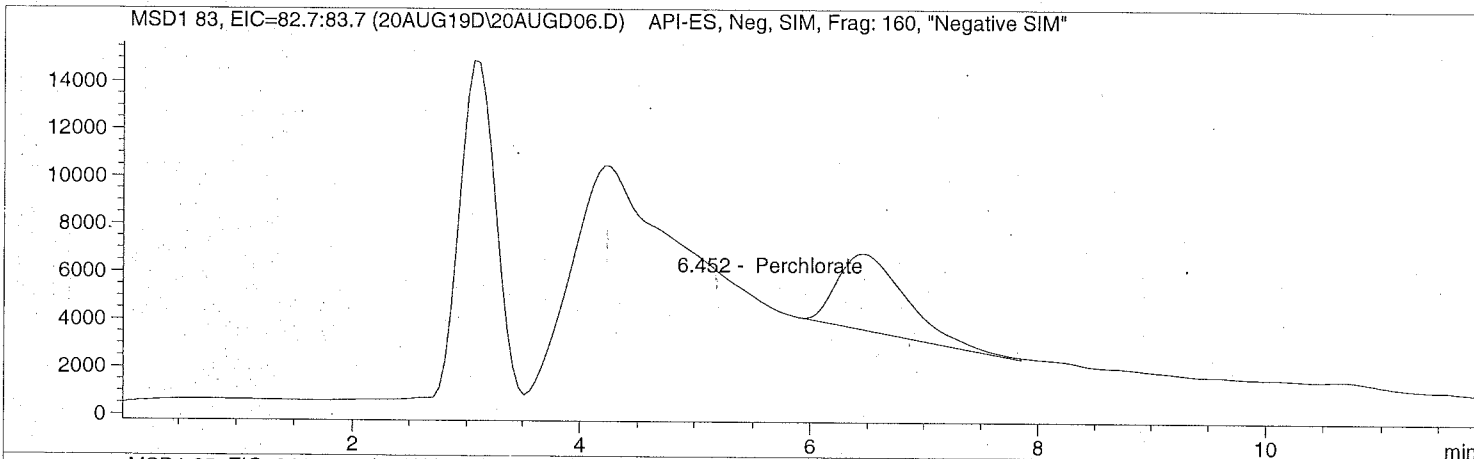
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.766	BBA	273207.6	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

=====  
Injection Date: 8/20/2019 09:44:16                      Seq Line: 6  
Sample Name: 1923490001                                    Location: Vial 76  
Acq Operator: TNB    Inj. No.: 1  
    Inj. Vol.: 50 µl

=====  
Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Injection Date: 8/20/2019 09:44:16 Seq Line: 6  
Sample Name: 1923490001 Location: Vial 76  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

## Perchlorate analysis

## Sample Information

Sorted By: Signal  
Calib. Data Modified: Tue, 20. Aug. 2019, 10:15:00 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
6.452	BBA	136285.4	2.9160	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.449	PB	156766.8	5.0000	CLO4-89-ISTD
7.953	VBA	116815.5	0.0000	

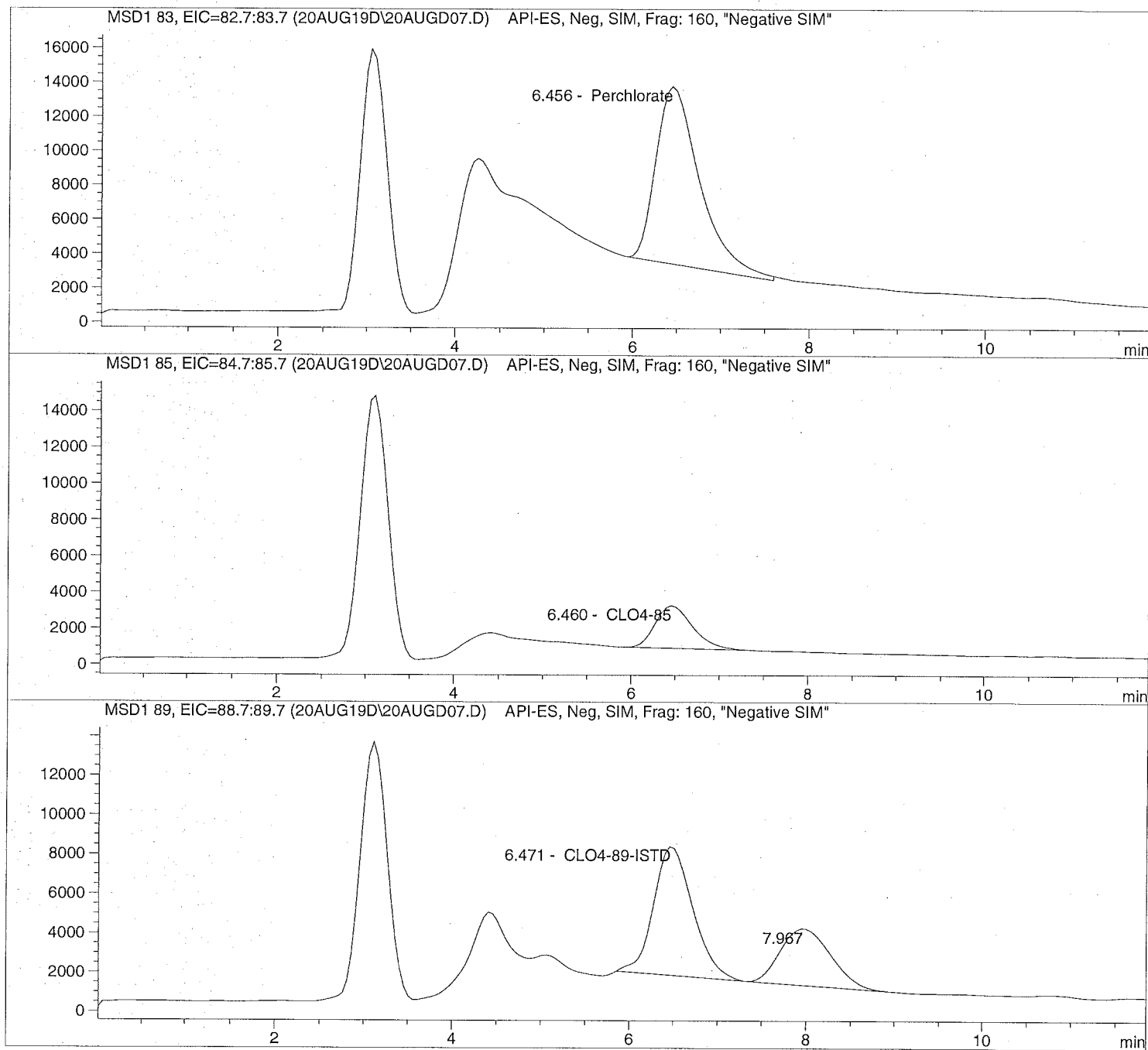
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD07.D Sample Name: 1923490002 MS

```
=====
Injection Date: 8/20/2019 09:58:28      Seq Line: 7
Sample Name: 1923490002 MS              Location: Vial 77
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08
```

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD07.D Sample Name: 1923490002 MS

```
=====
Injection Date: 8/20/2019 09:58:28      Seq Line:          7
Sample Name:    1923490002 MS           Location:         Vial 77
Acq Operator:   TNB                     Inj. No.:        1
                                           Inj. Vol.:       50 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
```

Perchlorate analysis

Sample Information

```
Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.456	BBA	354476.8	5.6977	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.460	PBA	69229.6	3.6775	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.471	PB	201765.7	5.0000	CLO4-89-ISTD
7.967	VBA	113315.4	0.0000	

\*\*\* End of Report \*\*\*



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD08.D

Sample Name: 1923490003 MSD

Injection Date: 8/20/2019 10:12:40

Seq Line: 8

Sample Name: 1923490003 MSD

Location: Vial 78

Acq Operator: TNB

Inj. No.: 1

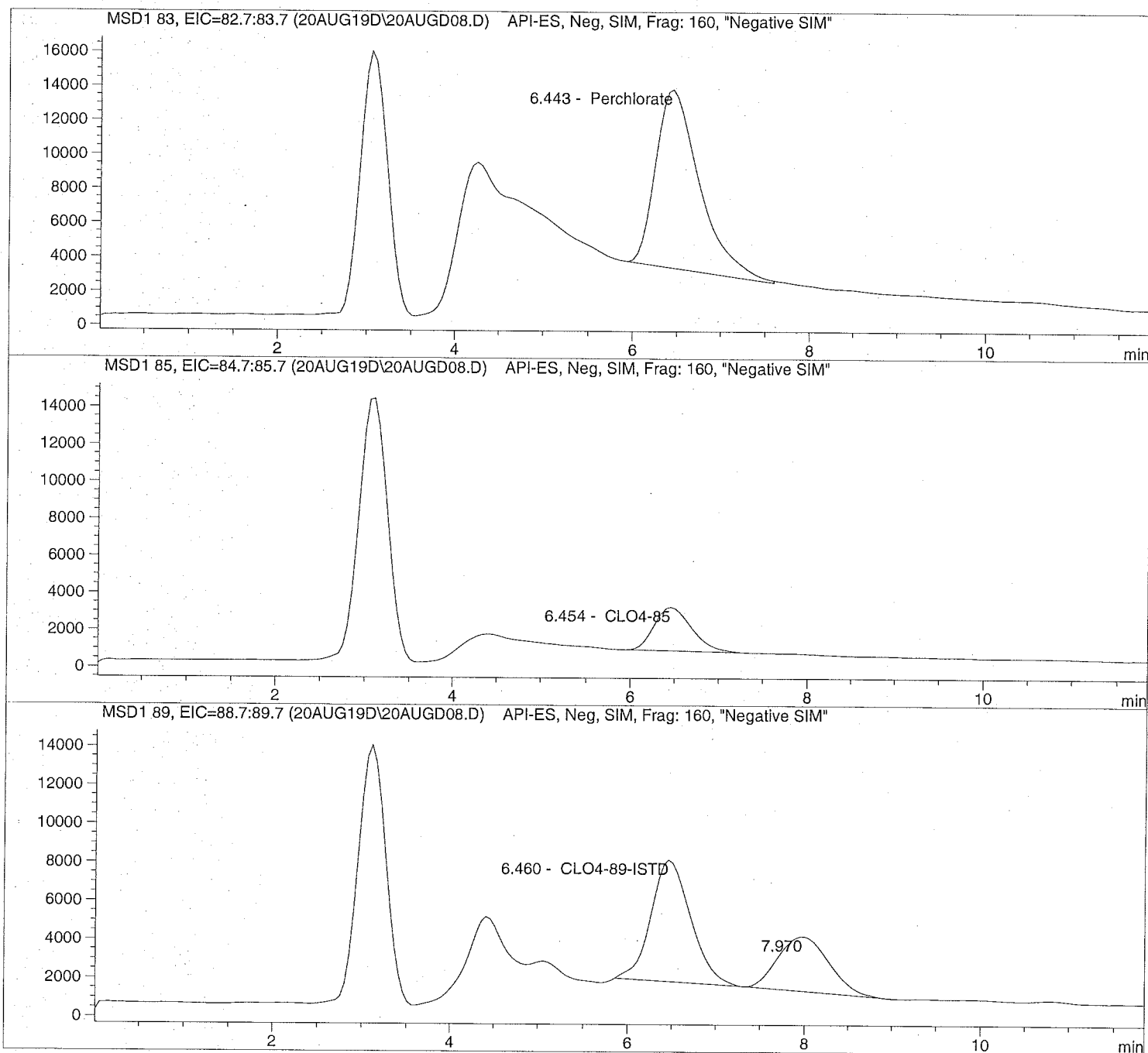
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD08.D Sample Name: 1923490003 MSD

```
=====
Injection Date: 8/20/2019 10:12:40      Seq Line:      8
Sample Name:    1923490003  MSD          Location:      Vial 78
Acq Operator:   TNB                Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====
```

Perchlorate analysis

Sample Information

```
Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.443	BBA	358346.0	5.9025	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.454	PBA	69335.8	3.7791	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

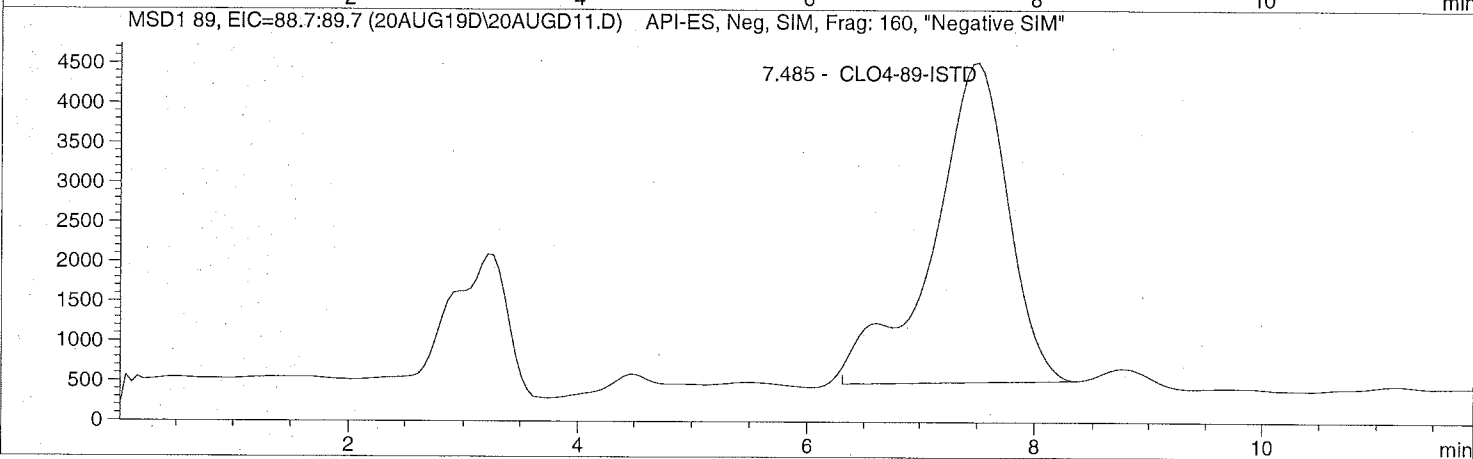
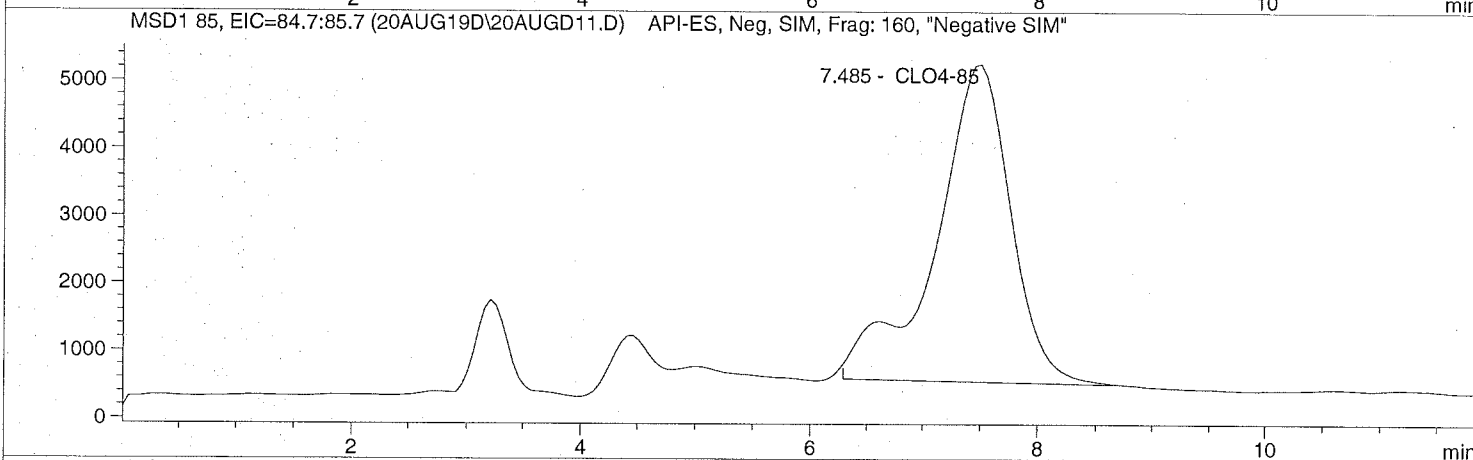
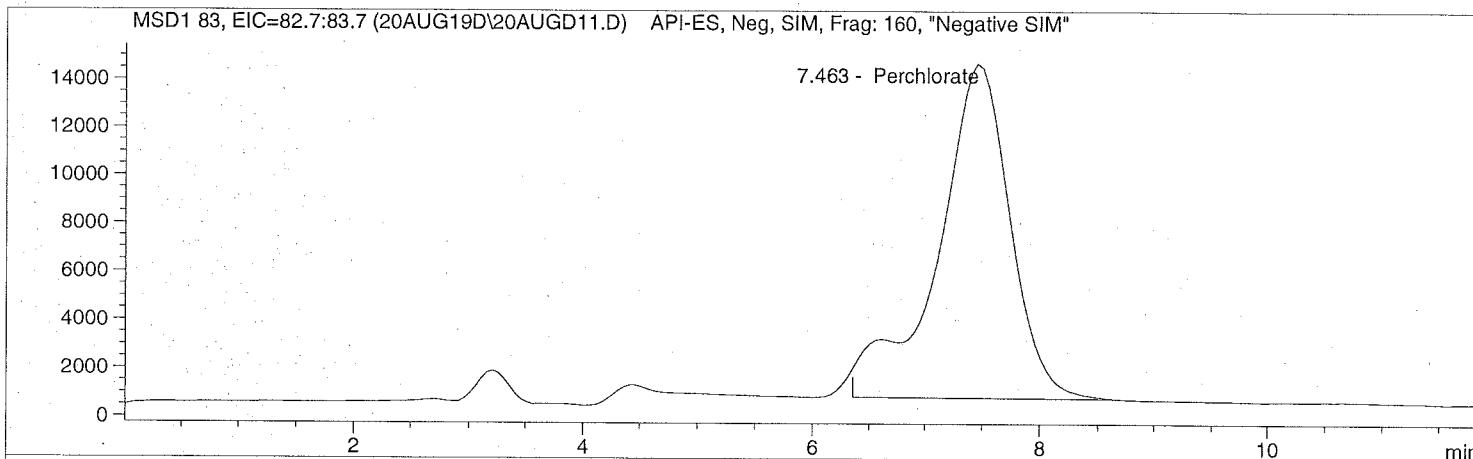
RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.460	PB	196607.1	5.0000	CLO4-89-ISTD
7.970	VBA	113071.0	0.0000	

\*\*\* End of Report \*\*\*

=====  
Injection Date: 8/20/2019 10:55:21                   Seq Line:                   11  
Sample Name: 1923491001                                Location:                   Vial 81  
Acq Operator: TNB                                       Inj. No.:                   1  
  Inj. Vol.:                   50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis  
=====



=====  
Injection Date: 8/20/2019 10:55:21                   Seq Line:                   11  
Sample Name: 1923491001                                Location:                   Vial 81  
Acq Operator: TNB                                        Inj. No.:                   1  
  Inj. Vol.:                   50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

## Perchlorate analysis

=====  
Sample Information  
=====

Sorted By: Signal  
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.463	BBA	609174.5	10.4556	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	BBA	215767.9	12.3076	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	BBA	184580.3	5.0000	CLO4-89-ISTD

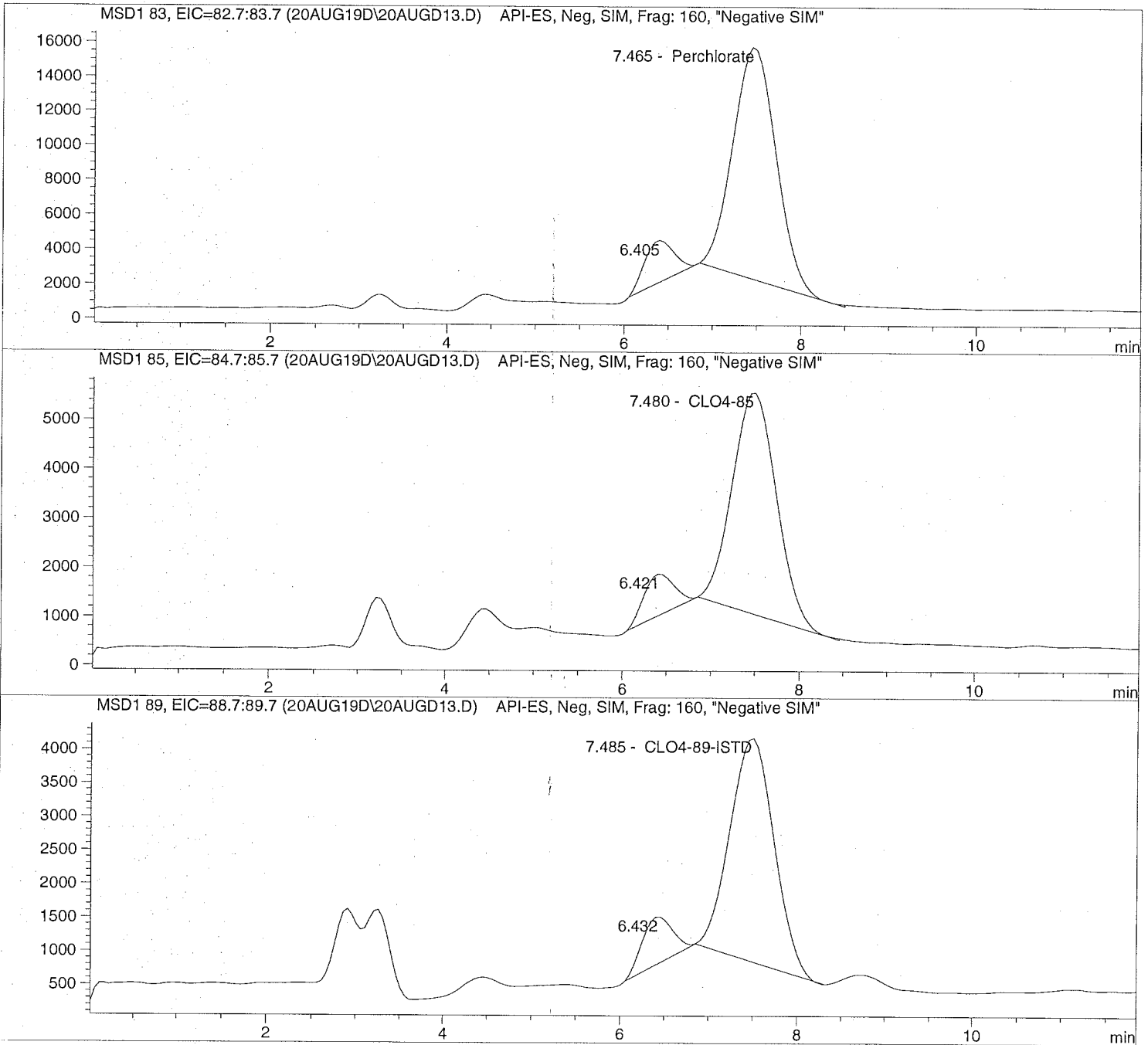
=====  
\*\*\* End of Report \*\*\*  
=====

Injection Date: 8/20/2019 11:23:40  
Sample Name: 1923494001  
Acq Operator: TNB

Seq Line: 13  
Location: Vial 83  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



```
=====
Injection Date: 8/20/2019 11:23:40      Seq Line:          13
Sample Name:    1923494001              Location:         Vial 83
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        50 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====
```

## Perchlorate analysis

## ===== Sample Information =====

```
Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.405	PB	55558.6	0.0000	
7.465	VBA	456021.6	12.4256	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.421	PB	19909.2	0.0000	
7.480	VBA	156790.2	14.2359	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.432	PB	16677.9	0.0000	
7.485	VBA	115485.0	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

August 30, 2019

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS19080736**

Laboratory Results for: **Longhorn GW Treatment Plant Monthly Influent Samples**

Dear Marcia,

ALS Environmental received 2 sample(s) on Aug 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval scribble.

Generated By: DAYNA.FISHER

RJ Modashia  
Project Manager

ALS Houston, US

Date: 30-Aug-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**Work Order:** HS19080736

---

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19080736-01	LH18/24-SP650_081419	Water		14-Aug-2019 14:00	15-Aug-2019 08:49	<input type="checkbox"/>
HS19080736-02	LH18/24-SP650_081419_BIX	Water		14-Aug-2019 14:00	15-Aug-2019 08:49	<input type="checkbox"/>

---



**ALS Houston, US**

Date: 30-Aug-19

---

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn 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.
- 

**Work Order Comments**

- The analysis for TOC Analysis was subcontracted to ALS Environmental in Kelso, WA. Final report attached.
- 

**WetChemistry by Method E350.3****Batch ID: R344588**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E365.3****Batch ID: R344427**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 30-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Influent Samples  
 Sample ID: LH18/24-SP650\_081419  
 Collection Date: 14-Aug-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19080736  
 Lab ID:HS19080736-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>								Analyst: MZD
	Method:E350.3							
Nitrogen, Ammonia (As N)	11		0.20	0.20	0.20	mg/L	1	20-Aug-2019 13:40
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3</b>								Analyst: MZD
	Method:E365.3							
Phosphorus, Total Orthophosphate (As P)	2.25		0.100	0.250	0.250	mg/L	10	15-Aug-2019 12:52
<b>SUBCONTRACT ANALYSIS - TOC ANALYSIS</b>								Analyst: SUBK
	Method:NA							
Subcontract Analysis	See Attached		0	0		NA	1	30-Aug-2019 14:51

## ALS Houston, US

Date: 30-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant Monthly Influent Samples  
 Sample ID: LH18/24-SP650\_081419\_BIX  
 Collection Date: 14-Aug-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19080736  
 Lab ID:HS19080736-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>						Analyst: SUB	
Subcontract Analysis	0		0	0	0	NA	1	23-Aug-2019 18:03	

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS19080736

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R344427 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3			<b>Matrix:</b> Water	
HS19080736-01	LH18/24-SP650_081419	14 Aug 2019 14:00			15 Aug 2019 12:52	10
<b>Batch ID:</b> R344588 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS19080736-01	LH18/24-SP650_081419	14 Aug 2019 14:00			20 Aug 2019 13:40	1
<b>Batch ID:</b> R344886 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS19080736-02	LH18/24-SP650_081419_BIX	14 Aug 2019 14:00			23 Aug 2019 18:03	1
<b>Batch ID:</b> R345307 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - TOC ANALYSIS			<b>Matrix:</b> Water	
HS19080736-01	LH18/24-SP650_081419	14 Aug 2019 14:00			30 Aug 2019 14:51	1

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS19080736

**QC BATCH REPORT**

Batch ID:	R344427 ( 0 )	Instrument:	UV-2450	Method:	ORTHO PHOSPHATE (PO4) AS P BY E365.3					
<b>MBLK</b>	Sample ID: <b>MBLK-344427</b>	Units: <b>mg/L</b>		Analysis Date: <b>15-Aug-2019 12:52</b>						
Client ID:		Run ID: <b>UV-2450_344427</b>		SeqNo: <b>5213115</b>	PrepDate:		DF: <b>1</b>			
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	
<b>LCS</b>	Sample ID: <b>LCS-344427</b>	Units: <b>mg/L</b>		Analysis Date: <b>15-Aug-2019 12:52</b>						
Client ID:		Run ID: <b>UV-2450_344427</b>		SeqNo: <b>5213116</b>	PrepDate:		DF: <b>1</b>			
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				
<b>MS</b>	Sample ID: <b>HS19080736-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>15-Aug-2019 12:52</b>						
Client ID: <b>LH18/24-SP650_081419</b>		Run ID: <b>UV-2450_344427</b>		SeqNo: <b>5213118</b>	PrepDate:		DF: <b>10</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	4.68	0.250	2.5	2.25	97.2	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19080736-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>15-Aug-2019 12:52</b>						
Client ID: <b>LH18/24-SP650_081419</b>		Run ID: <b>UV-2450_344427</b>		SeqNo: <b>5213119</b>	PrepDate:		DF: <b>10</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	4.82	0.250	2.5	2.25	103	80 - 120	4.68	2.95	20	

The following samples were analyzed in this batch:

ALS Houston, US

Date: 30-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**WorkOrder:** HS19080736

**QC BATCH REPORT**

Batch ID:	R344588 ( 0 )	Instrument:	WetChem_HS	Method:	AMMONIA AS N BY E350.3(ISE)					
<b>MBLK</b>	Sample ID: <b>MBLK-344588</b>	Units:	mg/L	Analysis Date:	<b>20-Aug-2019 13:40</b>					
Client ID:	Run ID: <b>WetChem_HS_344588</b>	SeqNo:	<b>5216506</b>	PrepDate:	DF: <b>1</b>					
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
<b>LCS</b>	Sample ID: <b>LCS-344588</b>	Units:	mg/L	Analysis Date:	<b>20-Aug-2019 13:40</b>					
Client ID:	Run ID: <b>WetChem_HS_344588</b>	SeqNo:	<b>5216507</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.07	0.20	10	0	101	80 - 120				
<b>MS</b>	Sample ID: <b>HS19080469-01MS</b>	Units:	mg/L	Analysis Date:	<b>20-Aug-2019 13:40</b>					
Client ID:	Run ID: <b>WetChem_HS_344588</b>	SeqNo:	<b>5216509</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	11.46	0.20	10	0.371	111	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19080469-01MSD</b>	Units:	mg/L	Analysis Date:	<b>20-Aug-2019 13:40</b>					
Client ID:	Run ID: <b>WetChem_HS_344588</b>	SeqNo:	<b>5216510</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	11.22	0.20	10	0.371	108	80 - 120	11.46	2.12	20	

The following samples were analyzed in this batch: HS19080736-01

**ALS Houston, US**

Date: 30-Aug-19

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<b>Client:</b>	Bhate Environmental Associates, Inc.	<b>QUALIFIERS, ACRONYMS, UNITS</b>
<b>Project:</b>	Longhorn GW Treatment Plant Monthly Influent Samples	
<b>WorkOrder:</b>	<b>HS19080736</b>	

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<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
North Dakota	R-193 2019	30-Apr-2020
Oklahoma	2019-141	31-Aug-2020
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

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ALS Houston, US

Date: 30-Aug-19

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**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant Monthly Influent Samples  
**Work Order:** HS19080736

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**SAMPLE TRACKING**

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Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS19080736-01	LH18/24-SP650_081419	Login	8/15/2019 10:51:12 AM	PMG	Sub
HS19080736-01	LH18/24-SP650_081419	Login	8/15/2019 10:51:12 AM	PMG	WET336
HS19080736-01	LH18/24-SP650_081419	Login	8/15/2019 10:51:12 AM	PMG	MET090

---

**Sample Receipt Checklist**

Client Name: Bhate Environmental  
 Work Order: HS19080736

Date/Time Received: **15-Aug-2019 08:49**  
 Received by: **PMG**

Checklist completed by: Paresh M. Giga 15-Aug-2019  
 eSignature Date

Reviewed by: RJ Modashia 15-Aug-2019  
 eSignature 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): 0.9c U/C IR25  
 Cooler(s)/Kit(s): 44594  
 Date/Time sample(s) sent to storage: 8/15/19 11:00

- Water - VOA vials have zero headspace? Yes  No  No VOA vials submitted
- Water - pH acceptable upon receipt? Yes  No  N/A
- pH adjusted? Yes  No  N/A

pH adjusted by:


Login Notes:

Client Contacted: Date Contacted: Person Contacted:  
 Contacted By: Regarding:

Comments:

Corrective Action:



 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTODY SEAL</b>		Sealed by: <i>[Signature]</i>
	Date: <i>8/14/19</i>	Time: <i>1430</i>	Date: <i>8/14/19</i>
Name: <i>Scott P. [unclear]</i>		Company: <i>[unclear]</i>	

TO CLIENT SERVICES  
 ALS LABORATORY GROUP  
 10450 STANCLIFF-ROAD  
 SUITE 210  
 HOUSTON TX 77099  
 (281) 530-5656  
 REF: LHAAP/16/24 & SURFACE WATER - RJ  
 RMA: 11111111



**FedEx Express**  


*44594* RETURNS MON-SAT  
 PRIORITY OVERNIGHT  
 THU 7:15 AUG 10:30A  
 PRIORITY OVERNIGHT

**FedEx**  
 4809 7834 3310

**AB SGRA** 77099  
 TX-US  
 IAH



170 162705 14AUG19 000A 5682/1551/800A



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[www.alsglobal.com](http://www.alsglobal.com)

August 30, 2019

**Analytical Report for Service Request No: K1907532**

RJ Modashia  
ALS Laboratory Group  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**RE: HS19080736**

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory August 16, 2019  
For your reference, these analyses have been assigned our service request number **K1907532**.

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](http://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](mailto:Kelley.Lovejoy@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

*Kelley Lovejoy*

Kelley Lovejoy  
Project Manager



---

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.



**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L16-58-R4
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	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](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636-1 068  
[www.alsglobal.com](http://www.alsglobal.com)



**Client:** ALS Environmental - US  
**Project:** HS19080736  
**Sample Matrix:** Water

**Service Request:** K1907532  
**Date Received:** 08/16/2019

**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 08/16/2019. 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:**

Method SM 5310 C, 08/28/2019: The Relative Percent Difference (RPD) criterion for the replicate analysis of Total Organic Carbon in the Batch QC sample was not applicable because the analyte concentration was not significantly greater than the Method Reporting Limit (MRL). Analytical values derived from measurements close to the detection limit are not subject to the same accuracy and precision criteria as results derived from measurements higher on the calibration range for the method.

Approved by           Kelley Lovejoy          

Date           08/30/2019



## 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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Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

*K1907532*

### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11990

**SUBCONTRACT TO:**

ALS Environmental Kelso  
1317 S. 13th Avenue  
Kelso, WA 98626

**Phone:** +1 360 501 3312

**CUSTOMER INFORMATION:**

**Company:** ALS Houston  
**Contact:** RJ Modashia  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RJ.Modashia@alsglobal.com  
**Alternate Contact:**  
**Email:**

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS19080736  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19080736-01	LH18/24-SP650_081419	Water	14 Aug 2019 14:00
TOC Analysis for DOD Level IV			29 Aug 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]*

Received By: *N. Pedersen ALS*

Cooler ID(s): \_\_\_\_\_

Date/Time: *8/15/19 1800*

Date/Time: *8-16-19 0940*

Temperature(s): \_\_\_\_\_

ALS GLOBAL (NYSE: ALS) | NYSE LISTED PARTNER



PC KL

**Cooler Receipt and Preservation Form**

Client ALS Houston Service Request K19 07532  
 Received: 8/16/19 Opened: 8/16/19 By: AK Unloaded: 8/16/19 By: AK

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? \_\_\_\_\_  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
0.0	0.1	1.5	1.6	0.1	370	11990	4809 7836 7855		

4. Packing material: Inserts Buggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves \_\_\_\_\_  
 5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N  
 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N  
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed  
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N  
 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N  
 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N  
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N  
 11. Were VOA vials received without headspace? Indicate in the table below. NA Y N  
 12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Out of	Head-	Broke	pH	Reagent	Volume	Reagent Lot	Initials	Time
	Bottle Type	Temp	space				added	Number		

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



## 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](http://www.alsglobal.com)

Analytical Report

**Client:** ALS Environmental - US  
**Project:** HS19080736  
**Sample Matrix:** Water  
**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Service Request:** K1907532  
**Date Collected:** 08/14/19  
**Date Received:** 08/16/19  
**Units:** mg/L  
**Basis:** NA

**Carbon, Total Organic**

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_081419	K1907532-001	19.0	0.50	0.20	0.07	1	08/28/19 10:56	
Method Blank	K1907532-MB	ND U	0.50	0.20	0.07	1	08/27/19 23:36	



ALS Group USA, Corp.  
dba ALS Environmental

## QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19080736  
**Sample Matrix:** Water  
**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Service Request:** K1907532  
**Date Collected:** 08/14/19  
**Date Received:** 08/16/19

**Units:** mg/L  
**Basis:** NA

Replicate Sample Summary  
Carbon, Total Organic

Sample Name:	Lab Code:	LOQ	LOD	MDL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
Batch QC	K1907279-001DUP	0.50	0.20	0.07	8.96	9.02	8.99	<1	10	08/28/19
Batch QC	K1907279-002DUP	0.50	0.20	0.07	15.7	15.8	15.7	<1	10	08/28/19
Batch QC	K1907279-003DUP	0.50	0.20	0.07	27.9	27.5	27.7	2	10	08/28/19
Batch QC	K1907279-004DUP	0.50	0.20	0.07	22.4	22.4	22.4	<1	10	08/28/19
Batch QC	K1907279-005DUP	1.0	0.4	0.2	54.3	55.0	54.6	1	10	08/28/19
Batch QC	K1907469-001DUP	0.50	0.20	0.07	7.63	7.41	7.52	3	10	08/28/19
Batch QC	K1907469-002DUP	0.50	0.20	0.07	1.50	1.49	1.49	<1	10	08/28/19
Batch QC	K1907469-003DUP	0.50	0.20	0.07	1.37	1.41	1.39	3	10	08/28/19
Batch QC	K1907469-004DUP	0.50	0.20	0.07	3.84	3.77	3.80	2	10	08/28/19
Batch QC	K1907474-001DUP	0.50	0.20	0.07	1.20	1.10	1.15	9	10	08/28/19
Batch QC	K1907476-001DUP	50	20	7	799	799	799	<1	10	08/28/19
Batch QC	K1907476-002DUP	50	20	7	502	493	498	2	10	08/28/19
Batch QC	K1907476-003DUP	50	20	7	343	326	334	5	10	08/28/19
LH18/24-SP650_081419	K1907532-001DUP	0.50	0.20	0.07	19.0	18.5	18.8	2	10	08/28/19
Batch QC	K1907535-001DUP	0.50	0.20	0.07	4.96	4.94	4.95	<1	10	08/28/19
Batch QC	K1907548-001DUP	0.50	0.20	0.07	9.19	9.23	9.21	<1	10	08/28/19
Batch QC	K1907548-002DUP	0.50	0.20	0.07	0.80	0.70	0.754	13 *	10	08/28/19
Batch QC	K1907548-003DUP	0.50	0.20	0.07	ND U	ND U	NC	NC	10	08/28/19
Batch QC	K1907548-004DUP	0.50	0.20	0.07	24.5	25.2	24.8	3	10	08/28/19
Batch QC	K1907548-005DUP	0.50	0.20	0.07	25.7	26.1	25.9	1	10	08/28/19

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** HS19080736  
**Sample Matrix:** Water

**Service Request:** K1907532  
**Date Collected:** N/A  
**Date Received:** N/A  
**Date Analyzed:** 08/28/19  
**Date Extracted:** NA

**Matrix Spike Summary**  
**Carbon, Total Organic**

**Sample Name:** Batch QC  
**Lab Code:** K1907469-002  
**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA

**Matrix Spike**  
K1907469-002MS

<u>Analyte Name</u>	<u>Sample Result</u>	<u>Result</u>	<u>Spike Amount</u>	<u>% Rec</u>	<u>% Rec Limits</u>
Carbon, Total Organic	1.50	26.9	25.0	102	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  
**Project:** HS19080736  
**Sample Matrix:** Water

**Service Request:** K1907532  
**Date Analyzed:** 08/27/19  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Carbon, Total Organic**

**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 648996

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1907532-LCS	25.2	25.0	101	83-117

**Client:** ALS Environmental - US  
**Project:** HS19080736

**Service Request:** K1907532

### Continuing Calibration Verification (CCV) Summary

#### Carbon, Total Organic

**Analysis Method:** SM 5310 C

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>True Value</b>	<b>Measured Value</b>	<b>Percent Recovery</b>	<b>Acceptance Limits</b>
CCV1	648996	KQ1912156-05	08/27/19 23:07	25.0	25.0	100	90-110
CCV2	648996	KQ1912156-06	08/28/19 03:50	25.0	24.6	98	90-110
CCV3	648996	KQ1912156-07	08/28/19 08:33	25.0	24.5	98	90-110
CCV4	648996	KQ1912156-08	08/28/19 13:44	25.0	25.6	102	90-110
CCV5	648996	KQ1912156-09	08/28/19 18:28	25.0	25.0	100	90-110

**Client:** ALS Environmental - US  
**Project:** HS19080736

**Service Request:** K1907532

**Continuing Calibration Blank (CCB) Summary**  
**Carbon, Total Organic**

**Analysis Method:** SM 5310 C

**Units:** mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>LOQ</b>	<b>LOD</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	648996	KQ1912156-10	08/27/19 23:21	0.50	0.20	0.07	ND	U
CCB2	648996	KQ1912156-11	08/28/19 04:04	0.50	0.20	0.07	ND	U
CCB3	648996	KQ1912156-12	08/28/19 08:48	0.50	0.20	0.07	ND	U
CCB4	648996	KQ1912156-13	08/28/19 13:59	0.50	0.20	0.07	0.37	J
CCB5	648996	KQ1912156-14	08/28/19 18:43	0.50	0.20	0.07	ND	U



## Raw Data

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
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## General Chemistry

**ALS Environmental—Kelso Laboratory**  
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Work Request # <sup>Original</sup> (K190) 7294, 7303, 7495, 7279, 7469, 7474, 7476, 7532, 7535, 7548, 7526  
 Tier: I II II I IV II II IV II II IV  
 Date Analyzed: 8/27/19 TOC: 648995, 7311,  
 Analyst: HLM/BCP 648996, II  
 Analysis: TOC/DOC Run # DOC: 648997, 7413,  
 II  
 7440,  
 II  
 7456,  
 I

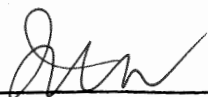
DATA QUALITY REPORT  
 INORGANICS

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  $\geq 0.995$ ?  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:

K1907548-2,20 & K1907311-3,30 present high percent RPD. However, they are less than 5x the MRL.

Final Approved by:  Date: 8/29/19  
 DQREPORT



## Analytical Results Summary

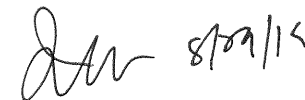
Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 648995 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
K1907294-001	Carbon, Total Organic	N/A		Drinking Water	1.38 mg/L	10 ml	1.38 mg/L	1	0.07	0.50			8/27/19 15:07	N	I
K1907294-002	Carbon, Total Organic	N/A		Drinking Water	0.72 mg/L	10 ml	0.72 mg/L	1	0.07	0.50			8/27/19 16:05	N	I
K1907303-001	Carbon, Total Organic	N/A		Water	2.69 mg/L	10 ml	2.69 mg/L	1	0.07	0.50			8/27/19 16:33	N	II
K1907303-002	Carbon, Total Organic	N/A		Water	2.65 mg/L	10 ml	2.65 mg/L	1	0.07	0.50			8/27/19 17:01	N	II
K1907303-003	Carbon, Total Organic	N/A		Water	3.48 mg/L	10 ml	3.48 mg/L	1	0.07	0.50			8/27/19 17:29	N	II
K1907303-004	Carbon, Total Organic	N/A		Water	1.78 mg/L	10 ml	36 mg/L	20	2	10			8/27/19 18:26	N	II
K1907495-001	Carbon, Total Organic	N/A		Water	0.45 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/27/19 18:54	N	II
K1907495-002	Carbon, Total Organic	N/A		Water	9.14 mg/L	10 ml	9.14 mg/L	1	0.07	0.50			8/27/19 19:22	N	II
K1907495-008	Carbon, Total Organic	N/A		Water	0.58 mg/L	10 ml	0.58 mg/L	1	0.07	0.50			8/27/19 19:50	N	II
K1907495-009	Carbon, Total Organic	N/A		Water	0.58 mg/L	10 ml	0.58 mg/L	1	0.07	0.50			8/27/19 20:19	N	II
K1907495-010	Carbon, Total Organic	N/A		Water	8.97 mg/L	10 ml	8.97 mg/L	1	0.07	0.50			8/27/19 20:47	N	II
K1907495-011	Carbon, Total Organic	N/A		Water	10.02 mg/L	10 ml	10.0 mg/L	1	0.07	0.50			8/27/19 21:15	N	II
K1907495-012	Carbon, Total Organic	N/A		Water	3.52 mg/L	10 ml	3.52 mg/L	1	0.07	0.50			8/27/19 21:43	N	II
K1907495-013	Carbon, Total Organic	N/A		Water	5.18 mg/L	10 ml	5.18 mg/L	1	0.07	0.50			8/27/19 22:11	N	II
K1907495-014	Carbon, Total Organic	N/A		Water	0.56 mg/L	10 ml	0.56 mg/L	1	0.07	0.50			8/27/19 22:39	N	II
K1907495-022	Carbon, Total Organic	N/A		Water	0.24 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/28/19 00:05	N	II
K1907495-023	Carbon, Total Organic	N/A		Water	1.00 mg/L	10 ml	1.00 mg/L	1	0.07	0.50			8/28/19 00:33	N	II
K1907495-024	Carbon, Total Organic	N/A		Water	1.17 mg/L	10 ml	1.17 mg/L	1	0.07	0.50			8/28/19 01:01	N	II
K1907495-027	Carbon, Total Organic	N/A		Water	0.03 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/28/19 01:30	N	II
K1907495-028	Carbon, Total Organic	N/A		Water	3.84 mg/L	10 ml	3.84 mg/L	1	0.07	0.50			8/28/19 01:58	N	II
KQ1912155-01	Carbon, Total Organic	MS	K1907294-001	Drinking Water	26.82 mg/L	10 ml	26.8 mg/L	1	0.07	0.50	102		8/27/19 15:35	N	I
KQ1912155-02	Carbon, Total Organic	CCV		Drinking Water	25.31 mg/L	10 ml	25.3 mg/L	1					8/27/19 13:53	N	I
KQ1912155-03	Carbon, Total Organic	CCV		Drinking Water	24.78 mg/L	10 ml	24.8 mg/L	1					8/27/19 17:57	N	I
KQ1912155-04	Carbon, Total Organic	CCV		Drinking Water	24.97 mg/L	10 ml	25.0 mg/L	1					8/27/19 23:07	N	I
KQ1912155-05	Carbon, Total Organic	CCV		Drinking Water	24.55 mg/L	10 ml	24.6 mg/L	1					8/28/19 03:50	N	I
KQ1912155-06	Carbon, Total Organic	CCB		Drinking Water	-0.03 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/27/19 14:08	N	I
KQ1912155-07	Carbon, Total Organic	CCB		Drinking Water	-0.03 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/27/19 18:11	N	I
KQ1912155-08	Carbon, Total Organic	CCB		Drinking Water	-0.03 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/27/19 23:21	N	I
KQ1912155-09	Carbon, Total Organic	CCB		Drinking Water	-0.03 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/28/19 04:04	N	I
KQ1912155-10	Carbon, Total Organic	MB		Drinking Water	-0.03 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/27/19 14:23	N	I
KQ1912155-11	Carbon, Total Organic	LCS		Drinking Water	25.16 mg/L	10 ml	25.2 mg/L	1	0.07	0.50	101		8/27/19 14:38	N	I

# indicates Final Result is not yet adjusted for Solids because it has not yet been determined.



HLM 8/29/19

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 648995 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
KQ1912155-12	Carbon, Total Organic	DUP	K1907294-001	Drinking Water	1.34 mg/L	10 ml	1.34 mg/L	1	0.07	0.50		3	8/27/19 15:07	N	I
KQ1912155-13	Carbon, Total Organic	DUP	K1907294-002	Drinking Water	0.71 mg/L	10 ml	0.71 mg/L	1	0.07	0.50		<1	8/27/19 16:05	N	I
KQ1912155-14	Carbon, Total Organic	DUP	K1907303-001	Water	2.67 mg/L	10 ml	2.67 mg/L	1	0.07	0.50		<1	8/27/19 16:33	N	II
KQ1912155-15	Carbon, Total Organic	DUP	K1907303-002	Water	2.68 mg/L	10 ml	2.68 mg/L	1	0.07	0.50		1	8/27/19 17:01	N	II
KQ1912155-16	Carbon, Total Organic	DUP	K1907303-003	Water	3.49 mg/L	10 ml	3.49 mg/L	1	0.07	0.50		<1	8/27/19 17:29	N	II
KQ1912155-17	Carbon, Total Organic	DUP	K1907303-004	Water	1.87 mg/L	10 ml	37 mg/L	20	2	10		5	8/27/19 18:26	N	II
KQ1912155-18	Carbon, Total Organic	DUP	K1907495-001	Water	0.42 mg/L	10 ml	0.42 mg/L	J 1	0.07	0.50		NC	8/27/19 18:54	N	II
KQ1912155-19	Carbon, Total Organic	DUP	K1907495-002	Water	9.45 mg/L	10 ml	9.45 mg/L	1	0.07	0.50		3	8/27/19 19:22	N	II
KQ1912155-20	Carbon, Total Organic	DUP	K1907495-008	Water	0.50 mg/L	10 ml	0.50 mg/L	1	0.07	0.50		14	8/27/19 19:50	N	II
KQ1912155-21	Carbon, Total Organic	DUP	K1907495-009	Water	0.55 mg/L	10 ml	0.55 mg/L	1	0.07	0.50		5	8/27/19 20:19	N	II
KQ1912155-22	Carbon, Total Organic	DUP	K1907495-010	Water	8.57 mg/L	10 ml	8.57 mg/L	1	0.07	0.50		5	8/27/19 20:47	N	II
KQ1912155-23	Carbon, Total Organic	DUP	K1907495-011	Water	10.20 mg/L	10 ml	10.2 mg/L	1	0.07	0.50		2	8/27/19 21:15	N	II
KQ1912155-24	Carbon, Total Organic	DUP	K1907495-012	Water	3.53 mg/L	10 ml	3.53 mg/L	1	0.07	0.50		<1	8/27/19 21:43	N	II
KQ1912155-25	Carbon, Total Organic	DUP	K1907495-013	Water	5.20 mg/L	10 ml	5.20 mg/L	1	0.07	0.50		<1	8/27/19 22:11	N	II
KQ1912155-26	Carbon, Total Organic	DUP	K1907495-014	Water	0.47 mg/L	10 ml	0.47 mg/L	J 1	0.07	0.50		17	8/27/19 22:39	N	II
KQ1912155-27	Carbon, Total Organic	DUP	K1907495-022	Water	0.15 mg/L	10 ml	0.15 mg/L	J 1	0.07	0.50		NC	8/28/19 00:05	N	II
KQ1912155-28	Carbon, Total Organic	DUP	K1907495-023	Water	1.02 mg/L	10 ml	1.02 mg/L	1	0.07	0.50		1	8/28/19 00:33	N	II
KQ1912155-29	Carbon, Total Organic	DUP	K1907495-024	Water	1.16 mg/L	10 ml	1.16 mg/L	1	0.07	0.50		<1	8/28/19 01:01	N	II
KQ1912155-30	Carbon, Total Organic	DUP	K1907495-027	Water	0.00 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50		NC	8/28/19 01:30	N	II
KQ1912155-31	Carbon, Total Organic	DUP	K1907495-028	Water	3.65 mg/L	10 ml	3.65 mg/L	1	0.07	0.50		5	8/28/19 01:58	N	II

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# indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

HLM 8/29/19

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 648996 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
K1907279-001	Carbon, Total Organic	N/A		Ground Water	8.96 mg/L	10 ml	8.96 mg/L	1	0.07	0.50			8/28/19 02:54	N	I
K1907279-002	Carbon, Total Organic	N/A		Ground Water	15.68 mg/L	10 ml	15.7 mg/L	1	0.07	0.50			8/28/19 03:22	N	I
K1907279-003	Carbon, Total Organic	N/A		Ground Water	27.94 mg/L	10 ml	27.9 mg/L	1	0.07	0.50			8/28/19 04:19	N	I
K1907279-004	Carbon, Total Organic	N/A		Ground Water	22.36 mg/L	10 ml	22.4 mg/L	1	0.07	0.50			8/28/19 04:47	N	I
K1907279-005	Carbon, Total Organic	N/A		Ground Water	27.15 mg/L	10 ml	54.3 mg/L	2	0.2	1.0			8/28/19 05:16	N	I
K1907469-001	Carbon, Total Organic	N/A		Ground Water	7.63 mg/L	10 ml	7.63 mg/L	1	0.07	0.50			8/28/19 05:44	N	IV
K1907469-002	Carbon, Total Organic	N/A		Ground Water	1.50 mg/L	10 ml	1.50 mg/L	1	0.07	0.50			8/28/19 06:12	N	IV
K1907469-003	Carbon, Total Organic	N/A		Ground Water	1.37 mg/L	10 ml	1.37 mg/L	1	0.07	0.50			8/28/19 07:09	N	IV
K1907469-004	Carbon, Total Organic	N/A		Ground Water	3.84 mg/L	10 ml	3.84 mg/L	1	0.07	0.50			8/28/19 07:37	N	IV
K1907474-001	Carbon, Total Organic	N/A		Water	1.20 mg/L	10 ml	1.20 mg/L	1	0.07	0.50			8/28/19 09:32	N	II
K1907476-001	Carbon, Total Organic	N/A		Water	7.99 mg/L	10 ml	799 mg/L	100	7	50			8/28/19 14:14	N	II
K1907476-002	Carbon, Total Organic	N/A		Water	5.02 mg/L	10 ml	502 mg/L	100	7	50			8/28/19 14:42	N	II
K1907476-003	Carbon, Total Organic	N/A		Water	3.43 mg/L	10 ml	343 mg/L	100	7	50			8/28/19 15:10	N	II
K1907495-032	Carbon, Total Organic	N/A		Water	3.80 mg/L	10 ml	3.80 mg/L	1	0.07	0.50			8/28/19 02:26	N	II
K1907532-001	Carbon, Total Organic	N/A		Water	18.99 mg/L	10 ml	19.0 mg/L	1	0.07	0.50			8/28/19 10:56	N	IV
K1907535-001	Carbon, Total Organic	N/A		Water	4.96 mg/L	10 ml	4.96 mg/L	1	0.07	0.50			8/28/19 08:05	N	II
K1907548-001	Carbon, Total Organic	N/A		Water	9.19 mg/L	10 ml	9.19 mg/L	1	0.07	0.50			8/28/19 11:24	N	II
K1907548-002	Carbon, Total Organic	N/A		Water	0.80 mg/L	10 ml	0.80 mg/L	1	0.07	0.50			8/28/19 11:52	N	II
K1907548-003	Carbon, Total Organic	N/A		Water	-0.03 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/28/19 12:20	N	II
K1907548-004	Carbon, Total Organic	N/A		Water	24.51 mg/L	10 ml	24.5 mg/L	1	0.07	0.50			8/28/19 12:48	N	II
K1907548-005	Carbon, Total Organic	N/A		Water	25.75 mg/L	10 ml	25.7 mg/L	1	0.07	0.50			8/28/19 13:16	N	II
KQ1912156-01	Carbon, Total Organic	MS	K1907469-002	Ground Water	26.88 mg/L	10 ml	26.9 mg/L	1	0.07	0.50	102		8/28/19 06:40	N	IV
KQ1912156-02	Carbon, Total Organic	N/A		Water	1.50 mg/L	10 mL	1.50 mg/L	1	0.07	0.50			8/28/19 06:12:00	N	II
KQ1912156-03	Carbon, Total Organic	MS	KQ1912156-02	Water	26.88 mg/L	10 mL	26.9 mg/L	1	0.07	0.50	102		8/28/19 06:40:00	N	II
KQ1912156-04	Carbon, Total Organic	DUP	KQ1912156-02	Water	1.49 mg/L	10 mL	1.49 mg/L	1	0.07	0.50	<1		8/28/19 06:12:00	N	II
KQ1912156-05	Carbon, Total Organic	CCV		Water	24.97 mg/L	10 ml	25.0 mg/L	1					8/27/19 23:07	N	II
KQ1912156-05	Carbon, Total Organic	CCV		Water	24.97 mg/L	10 ml	25.0 mg/L	1					8/27/19 23:07	N	II
KQ1912156-06	Carbon, Total Organic	CCV		Water	24.55 mg/L	10 ml	24.6 mg/L	1					8/28/19 03:50	N	II
KQ1912156-06	Carbon, Total Organic	CCV		Water	24.55 mg/L	10 ml	24.6 mg/L	1					8/28/19 03:50	N	II
KQ1912156-07	Carbon, Total Organic	CCV		Water	24.50 mg/L	10 ml	24.5 mg/L	1					8/28/19 08:33	N	II
KQ1912156-07	Carbon, Total Organic	CCV		Water	24.50 mg/L	10 ml	24.5 mg/L	1					8/28/19 08:33	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: 648996 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
KQ1912156-08	Carbon, Total Organic	CCV		Water	25.61 mg/L	10 ml	25.6 mg/L	1					8/28/19 13:44	N	II
KQ1912156-08	Carbon, Total Organic	CCV		Water	25.61 mg/L	10 ml	25.6 mg/L	1					8/28/19 13:44	N	II
KQ1912156-09	Carbon, Total Organic	CCV		Water	24.96 mg/L	10 ml	25.0 mg/L	1					8/28/19 18:28	N	II
KQ1912156-09	Carbon, Total Organic	CCV		Water	24.96 mg/L	10 ml	25.0 mg/L	1					8/28/19 18:28	N	II
KQ1912156-10	Carbon, Total Organic	CCB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/27/19 23:21	N	II
KQ1912156-10	Carbon, Total Organic	CCB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/27/19 23:21	N	II
KQ1912156-11	Carbon, Total Organic	CCB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/28/19 04:04	N	II
KQ1912156-11	Carbon, Total Organic	CCB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/28/19 04:04	N	II
KQ1912156-12	Carbon, Total Organic	CCB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/28/19 08:48	N	II
KQ1912156-12	Carbon, Total Organic	CCB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/28/19 08:48	N	II
KQ1912156-13	Carbon, Total Organic	CCB		Water	0.37 mg/L	10 ml	0.37 mg/L J	1	0.07	0.50			8/28/19 13:59	N	II
KQ1912156-13	Carbon, Total Organic	CCB		Water	0.37 mg/L	10 ml	0.37 mg/L J	1	0.07	0.50			8/28/19 13:59	N	II
KQ1912156-14	Carbon, Total Organic	CCB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/28/19 18:43	N	II
KQ1912156-14	Carbon, Total Organic	CCB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/28/19 18:43	N	II
KQ1912156-15	Carbon, Total Organic	MB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/27/19 23:36	N	II
KQ1912156-15	Carbon, Total Organic	MB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/27/19 23:36	N	II
KQ1912156-16	Carbon, Total Organic	LCS		Water	25.18 mg/L	10 ml	25.2 mg/L	1	0.07	0.50	101		8/27/19 23:50	N	II
KQ1912156-16	Carbon, Total Organic	LCS		Water	25.18 mg/L	10 ml	25.2 mg/L	1	0.07	0.50	101		8/27/19 23:50	N	II
KQ1912156-17	Carbon, Total Organic	DUP	K1907495-032	Water	3.81 mg/L	10 ml	3.81 mg/L	1	0.07	0.50		<1	8/28/19 02:26	N	II
KQ1912156-18	Carbon, Total Organic	DUP	K1907279-001	Ground Water	9.02 mg/L	10 ml	9.02 mg/L	1	0.07	0.50		<1	8/28/19 02:54	N	I
KQ1912156-19	Carbon, Total Organic	DUP	K1907279-002	Ground Water	15.77 mg/L	10 ml	15.8 mg/L	1	0.07	0.50		<1	8/28/19 03:22	N	I
KQ1912156-20	Carbon, Total Organic	DUP	K1907279-003	Ground Water	27.51 mg/L	10 ml	27.5 mg/L	1	0.07	0.50		2	8/28/19 04:19	N	I
KQ1912156-21	Carbon, Total Organic	DUP	K1907279-004	Ground Water	22.40 mg/L	10 ml	22.4 mg/L	1	0.07	0.50		<1	8/28/19 04:47	N	I
KQ1912156-22	Carbon, Total Organic	DUP	K1907279-005	Ground Water	27.48 mg/L	10 ml	55.0 mg/L	2	0.2	1.0		1	8/28/19 05:16	N	I
KQ1912156-23	Carbon, Total Organic	DUP	K1907469-001	Ground Water	7.41 mg/L	10 ml	7.41 mg/L	1	0.07	0.50		3	8/28/19 05:44	N	IV
KQ1912156-24	Carbon, Total Organic	DUP	K1907469-002	Ground Water	1.49 mg/L	10 ml	1.49 mg/L	1	0.07	0.50		<1	8/28/19 06:12	N	IV
KQ1912156-25	Carbon, Total Organic	DUP	K1907469-003	Ground Water	1.41 mg/L	10 ml	1.41 mg/L	1	0.07	0.50		3	8/28/19 07:09	N	IV
KQ1912156-26	Carbon, Total Organic	DUP	K1907469-004	Ground Water	3.77 mg/L	10 ml	3.77 mg/L	1	0.07	0.50		2	8/28/19 07:37	N	IV
KQ1912156-27	Carbon, Total Organic	DUP	K1907535-001	Water	4.94 mg/L	10 ml	4.94 mg/L	1	0.07	0.50		<1	8/28/19 08:05	N	II
KQ1912156-28	Carbon, Total Organic	DUP	K1907532-001	Water	18.54 mg/L	10 ml	18.5 mg/L	1	0.07	0.50		2	8/28/19 10:56	N	IV
KQ1912156-29	Carbon, Total Organic	DUP	K1907548-001	Water	9.23 mg/L	10 ml	9.23 mg/L	1	0.07	0.50		<1	8/28/19 11:24	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: 648996 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
KQ1912156-30	Carbon, Total Organic	DUP	K1907548-002	Water	0.70 mg/L	10 ml	0.70 mg/L	1	0.07	0.50		13*	8/28/19 11:52	N	II
KQ1912156-31	Carbon, Total Organic	DUP	K1907548-003	Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50		NC	8/28/19 12:20	N	II
KQ1912156-32	Carbon, Total Organic	DUP	K1907548-004	Water	25.17 mg/L	10 ml	25.2 mg/L	1	0.07	0.50		3	8/28/19 12:48	N	II
KQ1912156-33	Carbon, Total Organic	DUP	K1907548-005	Water	26.07 mg/L	10 ml	26.1 mg/L	1	0.07	0.50		1	8/28/19 13:16	N	II
KQ1912156-34	Carbon, Total Organic	DUP	K1907476-001	Water	7.99 mg/L	10 ml	799 mg/L	100	7	50		<1	8/28/19 14:14	N	II
KQ1912156-35	Carbon, Total Organic	DUP	K1907476-002	Water	4.93 mg/L	10 ml	493 mg/L	100	7	50		2	8/28/19 14:42	N	II
KQ1912156-36	Carbon, Total Organic	DUP	K1907476-003	Water	3.26 mg/L	10 ml	326 mg/L	100	7	50		5	8/28/19 15:10	N	II
KQ1912156-37	Carbon, Total Organic	DUP	K1907474-001	Water	1.10 mg/L	10 ml	1.10 mg/L	1	0.07	0.50		9	8/28/19 09:32	N	II

*JAH* 8/29/19

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## Analytical Results Summary

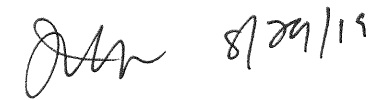
Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 648997 Method/Testcode: SM 5310 C/TOC T

Lab Code	Target Analytes	QC	Parent Sample	Matrix	Raw Result	Sample Amt.	Final Result	Dil	MDL	POL	% Rec	% RSD	Date Analyzed	QC?	Tier
K1907526-001	Carbon, Total Organic	N/A		Ground Water	11.56 mg/L	10 ml	11.6 mg/L	1	0.07	0.50			8/28/19 15:38	N	IV
K1907526-002	Carbon, Total Organic	N/A		Ground Water	2.73 mg/L	10 ml	2.73 mg/L	1	0.07	0.50			8/28/19 16:06	Y	IV
K1907526-003	Carbon, Total Organic	N/A		Ground Water	1.95 mg/L	10 ml	1.95 mg/L	1	0.07	0.50			8/28/19 17:03	N	IV
KQ1912157-01	Carbon, Total Organic	CCV		Ground Water	25.61 mg/L	10 ml	25.6 mg/L	1					8/28/19 13:44	N	IV
KQ1912157-02	Carbon, Total Organic	CCV		Ground Water	24.96 mg/L	10 ml	25.0 mg/L	1					8/28/19 18:28	N	IV
KQ1912157-03	Carbon, Total Organic	CCB		Ground Water	0.37 mg/L	10 ml	0.37 mg/L	J 1	0.07	0.50			8/28/19 13:59	N	IV
KQ1912157-04	Carbon, Total Organic	CCB		Ground Water	-0.03 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/28/19 18:43	N	IV
KQ1912157-05	Carbon, Total Organic	MB		Ground Water	-0.03 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50			8/28/19 09:03	N	IV
KQ1912157-06	Carbon, Total Organic	LCS		Ground Water	24.98 mg/L	10 ml	25.0 mg/L	1	0.07	0.50	100		8/28/19 09:17	N	IV
KQ1912157-07	Carbon, Total Organic	MS	K1907526-002	Ground Water	28.35 mg/L	10 ml	28.4 mg/L	1	0.07	0.50	102		8/28/19 16:34	N	IV
KQ1912157-08	Carbon, Total Organic	DUP	K1907526-001	Ground Water	11.42 mg/L	10 ml	11.4 mg/L	1	0.07	0.50		1	8/28/19 15:38	N	IV
KQ1912157-09	Carbon, Total Organic	DUP	K1907526-002	Ground Water	2.63 mg/L	10 ml	2.63 mg/L	1	0.07	0.50		4	8/28/19 16:06	N	IV
KQ1912157-10	Carbon, Total Organic	DUP	K1907526-003	Ground Water	1.93 mg/L	10 ml	1.93 mg/L	1	0.07	0.50		1	8/28/19 17:03	N	IV

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# indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

## Analytical Results Summary

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 648998 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
KQ1912158-10	Carbon, Dissolved Organic (DOC)	LCS		Water	25.17 mg/L	10 ml	25.2 mg/L	1	0.07	0.50	101		8/28/19 19:12	N	II
KQ1912158-11	Carbon, Dissolved Organic (DOC)	MS	K1907440-001	Water	25.65 mg/L	10 ml	25.7 mg/L	1	0.07	0.50	103		8/28/19 22:16	N	II
KQ1912158-12	Carbon, Dissolved Organic (DOC)	DUP	K1907311-001	Water	5.02 mg/L	10 ml	5.02 mg/L	1	0.07	0.50		6	8/28/19 17:32	N	II
KQ1912158-13	Carbon, Dissolved Organic (DOC)	DUP	K1907311-002	Water	4.96 mg/L	10 ml	4.96 mg/L	1	0.07	0.50		<1	8/28/19 18:00	N	II
KQ1912158-14	Carbon, Dissolved Organic (DOC)	DUP	K1907311-003	Water	0.75 mg/L	10 ml	0.75 mg/L	1	0.07	0.50		13*	8/28/19 19:27	N	II
KQ1912158-15	Carbon, Dissolved Organic (DOC)	DUP	K1907413-001	Water	3.38 mg/L	10 ml	3.38 mg/L	1	0.07	0.50		<1	8/28/19 19:55	N	II
KQ1912158-16	Carbon, Dissolved Organic (DOC)	DUP	K1907413-002	Water	6.14 mg/L	10 ml	6.14 mg/L	1	0.07	0.50		<1	8/28/19 20:23	N	II
KQ1912158-17	Carbon, Dissolved Organic (DOC)	DUP	K1907456-001	Water	9.84 mg/L	10 ml	19.7 mg/L	2	0.2	1.0		<1	8/28/19 21:20	N	I
KQ1912158-18	Carbon, Dissolved Organic (DOC)	DUP	K1907456-002	Water	6.93 mg/L	10 ml	6.93 mg/L	1	0.07	0.50		2	8/28/19 21:48	N	I
KQ1912158-19	Carbon, Dissolved Organic (DOC)	DUP	K1907440-001	Water	0.09 mg/L	10 ml	0.09 mg/L	J 1	0.07	0.50		NC	8/28/19 23:00	N	II
KQ1912158-20	Carbon, Dissolved Organic (DOC)	DUP	K1907440-002	Water	0.23 mg/L	10 ml	0.23 mg/L	J 1	0.07	0.50		NC	8/28/19 23:28	N	II
KQ1912158-21	Carbon, Dissolved Organic (DOC)	DUP	K1907440-003	Water	0.43 mg/L	10 ml	0.43 mg/L	J 1	0.07	0.50		NC	8/28/19 23:57	N	II
KQ1912158-22	Carbon, Dissolved Organic (DOC)	DUP	K1907440-004	Water	0.34 mg/L	10 ml	0.34 mg/L	J 1	0.07	0.50		NC	8/29/19 00:25	N	II
KQ1912158-23	Carbon, Dissolved Organic (DOC)	DUP	K1907440-005	Water	0.26 mg/L	10 ml	0.26 mg/L	J 1	0.07	0.50		NC	8/29/19 00:53	N	II
KQ1912158-24	Carbon, Dissolved Organic (DOC)	DUP	K1907440-006	Water	0.43 mg/L	10 ml	0.43 mg/L	J 1	0.07	0.50		NC	8/29/19 01:21	N	II
KQ1912158-25	Carbon, Dissolved Organic (DOC)	DUP	K1907440-007	Water	-0.03 mg/L	10 ml	0.50 mg/L	U 1	0.07	0.50		NC	8/29/19 01:49	N	II

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HLM  
8/29/19

## Analytical Results Summary

Instrument Name: K-TOC-03

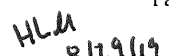
Analyst: BDITZLER

Analysis Lot: 648998 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
K1907311-001	Carbon, Dissolved Organic (DOC)	N/A		Water	5.31 mg/L	10 ml	5.31 mg/L	1	0.07	0.50			8/28/19 17:32	N	II
K1907311-002	Carbon, Dissolved Organic (DOC)	N/A		Water	4.91 mg/L	10 ml	4.91 mg/L	1	0.07	0.50			8/28/19 18:00	N	II
K1907311-003	Carbon, Dissolved Organic (DOC)	N/A		Water	0.85 mg/L	10 ml	0.85 mg/L	1	0.07	0.50			8/28/19 19:27	N	II
K1907413-001	Carbon, Dissolved Organic (DOC)	N/A		Water	3.36 mg/L	10 ml	3.36 mg/L	1	0.07	0.50			8/28/19 19:55	N	II
K1907413-002	Carbon, Dissolved Organic (DOC)	N/A		Water	6.13 mg/L	10 ml	6.13 mg/L	1	0.07	0.50			8/28/19 20:23	N	II
K1907440-001	Carbon, Dissolved Organic (DOC)	N/A		Water	0.08 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/28/19 23:00	N	II
K1907440-002	Carbon, Dissolved Organic (DOC)	N/A		Water	0.18 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/28/19 23:28	N	II
K1907440-003	Carbon, Dissolved Organic (DOC)	N/A		Water	0.42 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/28/19 23:57	N	II
K1907440-004	Carbon, Dissolved Organic (DOC)	N/A		Water	0.36 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/29/19 00:25	N	II
K1907440-005	Carbon, Dissolved Organic (DOC)	N/A		Water	0.25 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/29/19 00:53	N	II
K1907440-006	Carbon, Dissolved Organic (DOC)	N/A		Water	0.41 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/29/19 01:21	N	II
K1907440-007	Carbon, Dissolved Organic (DOC)	N/A		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/29/19 01:49	N	II
K1907456-001	Carbon, Dissolved Organic (DOC)	N/A		Water	9.88 mg/L	10 ml	19.8 mg/L	2	0.2	1.0			8/28/19 21:20	N	I
K1907456-002	Carbon, Dissolved Organic (DOC)	N/A		Water	7.09 mg/L	10 ml	7.09 mg/L	1	0.07	0.50			8/28/19 21:48	N	I
KQ1912158-01	Carbon, Dissolved Organic (DOC)	CCV		Water	25.61 mg/L	10 ml	25.6 mg/L	1					8/28/19 13:44	N	II
KQ1912158-02	Carbon, Dissolved Organic (DOC)	CCV		Water	24.96 mg/L	10 ml	25.0 mg/L	1					8/28/19 18:28	N	II
KQ1912158-03	Carbon, Dissolved Organic (DOC)	CCV		Water	24.58 mg/L	10 ml	24.6 mg/L	1					8/28/19 22:31	N	II
KQ1912158-04	Carbon, Dissolved Organic (DOC)	CCV		Water	24.13 mg/L	10 ml	24.1 mg/L	1					8/29/19 02:45	N	II
KQ1912158-05	Carbon, Dissolved Organic (DOC)	CCB		Water	0.37 mg/L	10 ml	0.37 mg/L J	1	0.07	0.50			8/28/19 13:59	N	II
KQ1912158-06	Carbon, Dissolved Organic (DOC)	CCB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/28/19 18:43	N	II
KQ1912158-07	Carbon, Dissolved Organic (DOC)	CCB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/28/19 22:46	N	II
KQ1912158-08	Carbon, Dissolved Organic (DOC)	CCB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/29/19 03:00	N	II
KQ1912158-09	Carbon, Dissolved Organic (DOC)	MB		Water	-0.03 mg/L	10 ml	0.50 mg/L U	1	0.07	0.50			8/28/19 18:57	N	II

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# indicates Final Result is not yet adjusted for Solids because it has not yet been determined.



ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER)

Method: Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
CBA	RB	1			0.0000	0	<0.5	
2	ccv	1	25.338	0.0305	25.3073	25.30731	25.3	8/27/2019
3	ccb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/27/2019
4	mb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/27/2019
5	lcs	1	25.193	0.0305	25.1628	25.16281	25.2	8/27/2019
6	K1907294-001	1	1.410	0.0305	1.3796	1.37961	1.38	8/27/2019
7	K1907294-001	1	1.374	0.0305	1.3437	1.34371	1.3	8/27/2019
8	KQ1912155-01	1	26.851	0.0305	26.8200	26.82001	27	8/27/2019
9	K1907294-002	1	0.748	0.0305	0.7173	0.71731	0.72	8/27/2019
10	K1907294-002	1	0.745	0.0305	0.7145	0.71451	0.71	8/27/2019
11	K1907303-001	1	2.717	0.0305	2.6869	2.68691	2.7	8/27/2019
12	K1907303-001	1	2.702	0.0305	2.6713	2.67131	2.67	8/27/2019
13	K1907303-002	1	2.680	0.0305	2.6494	2.64941	2.65	8/27/2019
14	K1907303-002	1	2.714	0.0305	2.6834	2.68341	2.68	8/27/2019
15	K1907303-003	1	3.508	0.0305	3.4776	3.47761	3.5	8/27/2019
16	K1907303-003	1	3.520	0.0305	3.4894	3.48941	3.5	8/27/2019
17	ccv	1	24.813	0.0305	24.7827	24.78271	24.78	8/27/2019
18	ccb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/27/2019
19	K1907303-004	20	1.806	0.0305	1.7752	35.5042	35.5	8/27/2019
20	K1907303-004	20	1.899	0.0305	1.8681	37.3622	37.36	8/27/2019
21	K1907495-001	1	0.484	0.0305	0.4537	0.45371	<0.5	8/27/2019
22	K1907495-001	1	0.454	0.0305	0.4237	0.42371	<0.5	8/27/2019
23	K1907495-002	1	9.167	0.0305	9.1366	9.13661	9.1	8/27/2019
24	K1907495-002	1	9.476	0.0305	9.4457	9.44571	9.45	8/27/2019
25	K1907495-008	1	0.611	0.0305	0.5801	0.58011	0.58	8/27/2019

ICAL Date 10/20/16 ICAL ID#:11-GEN-05-51A

LCS =24.0 ppm APG 4013 Lot #010615 (REF# 11-GEN-05-50N)

CCV = 25.0 ppm (Ref.#11-GEN-05-52E)

Spike: 0.05 ml of 5000 ppm stock ----> 10.0 ml =25.0 ppm x Dilution Factor (Ref.# 11-GEN-05-51M)

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Analyzed By: <i>BCD</i>	Date Analyzed: <i>8/27/19</i>
Reviewed By: <i>JAN</i>	Date Reviewed: <i>8/29/19</i>

Matrix: WATER

Analysis: Total Organic Carbon (WATER)

Method: Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
26	K1907495-008	1	0.533	0.0305	0.5029	0.50291	0.50	8/27/2019
27	K1907495-009	1	0.615	0.0305	0.5845	0.58451	0.58	8/27/2019
28	K1907495-009	1	0.584	0.0305	0.5539	0.55391	0.6	8/27/2019
29	K1907495-010	1	9.004	0.0305	8.9738	8.97381	9.0	8/27/2019
30	K1907495-010	1	8.605	0.0305	8.5740	8.57401	8.6	8/27/2019
31	K1907495-011	1	10.055	0.0305	10.0242	10.02421	10.0	8/27/2019
32	K1907495-011	1	10.234	0.0305	10.2034	10.20341	10.2	8/27/2019
33	K1907495-012	1	3.546	0.0305	3.5158	3.51581	3.5	8/27/2019
34	K1907495-012	1	3.559	0.0305	3.5280	3.52801	3.5	8/27/2019
35	K1907495-013	1	5.215	0.0305	5.1845	5.18451	5.2	8/27/2019
36	K1907495-013	1	5.226	0.0305	5.1952	5.19521	5.2	8/27/2019
37	K1907495-014	1	0.595	0.0305	0.5642	0.56421	0.6	8/27/2019
38	K1907495-014	1	0.505	0.0305	0.4745	0.47451	<0.5	8/27/2019
39	ccv	1	24.997	0.0305	24.9664	24.96641	25.0	8/27/2019
40	ccb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/27/2019
41	K1907495-022	1	0.269	0.0305	0.2383	0.23831	<0.5	8/28/2019
42	K1907495-022	1	0.176	0.0305	0.1457	0.14571	<0.5	8/28/2019
43	K1907495-023	1	1.033	0.0305	1.0029	1.00291	1.0	8/28/2019
44	K1907495-023	1	1.048	0.0305	1.0171	1.01711	1.0	8/28/2019
45	K1907495-024	1	1.203	0.0305	1.1723	1.17231	1.2	8/28/2019
46	K1907495-024	1	1.192	0.0305	1.1611	1.16111	1.2	8/28/2019
47	K1907495-027	1	0.058	0.0305	0.0274	0.02741	<0.5	8/28/2019
48	K1907495-027	1	0.028	0.0305	-0.0022	-0.00219	<0.5	8/28/2019
49	K1907495-028	1	3.874	0.0305	3.8430	3.84301	3.8	8/28/2019
50	K1907495-028	1	3.683	0.0305	3.6523	3.65231	3.7	8/28/2019

Analyzed By: <i>WP</i>	Date Analyzed: <i>8/27/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>8/28/19</i>

Matrix: WATER

Analysis: Total Organic Carbon (WATER)

Method: Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
51	ccv	1	24.582	0.0305	24.5510	24.55101	24.55	8/28/2019
52	ccb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/28/2019
53		1		0.0000	0.0000	0	<0.5	
54		1		0.0000	0.0000	0	<0.5	
55		1		0.0000	0.0000	0	<0.5	
56		1		0.0000	0.0000	0	<0.5	
57		1		0.0000	0.0000	0	<0.5	
58		1		0.0000	0.0000	0	<0.5	
59		1		0.0000	0.0000	0	<0.5	
60		1		0.0000	0.0000	0	<0.5	
61		1		0.0000	0.0000	0	<0.5	
62		1		0.0000	0.0000	0	<0.5	
63		1		0.0000	0.0000	0	<0.5	
64		1		0.0000	0.0000	0	<0.5	
65		1		0.0000	0.0000	0	<0.5	
66		1		0.0000	0.0000	0	<0.5	
67		1		0.0000	0.0000	0	<0.5	
68		1		0.0000	0.0000	0	<0.5	
69		1		0.0000	0.0000	0	<0.5	
70		1		0.0000	0.0000	0	<0.5	
71		1		0.0000	0.0000	0	<0.5	
72		1		0.0000	0.0000	0	<0.5	
73		1		0.0000	0.0000	0	<0.5	
74		1		0.0000	0.0000	0	<0.5	
75		1		0.0000	0.0000	0	<0.5	

Analyzed By: <i>BCP</i>	Date Analyzed: <i>8/27/19</i>
Reviewed By: <i>JAN</i>	Date Reviewed: <i>8/28/19</i>

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER)

Method: Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
CBA	RB	1			0.0000	0	<0.5	
2	ccv	1	24.997	0.0305	24.9664	24.96641	25.0	8/27/2019
3	ccb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/27/2019
4	mb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/27/2019
5	lcs	1	25.212	0.0305	25.1816	25.18161	25.2	8/27/2019
6	K1907495-032	1	3.832	0.0305	3.8016	3.80161	3.80	8/28/2019
7	K1907495-032	1	3.841	0.0305	3.8107	3.81071	3.8	8/28/2019
8	K1907279-001	1	8.989	0.0305	8.9584	8.95841	9	8/28/2019
9	K1907279-001	1	9.054	0.0305	9.0232	9.02321	9.02	8/28/2019
10	K1907279-002	1	15.714	0.0305	15.6834	15.68341	15.68	8/28/2019
11	K1907279-002	1	15.798	0.0305	15.7678	15.76781	15.8	8/28/2019
12	ccv	1	24.582	0.0305	24.5510	24.55101	24.55	8/28/2019
13	ccb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/28/2019
14	K1907279-003	1	27.966	0.0305	27.9355	27.93551	27.94	8/28/2019
15	K1907279-003	1	27.543	0.0305	27.5126	27.51261	27.5	8/28/2019
16	K1907279-004	1	22.388	0.0305	22.3574	22.35741	22.4	8/28/2019
17	K1907279-004	1	22.432	0.0305	22.4012	22.40121	22.40	8/28/2019
18	K1907279-005	2	27.184	0.0305	27.1531	54.30622	54.3	8/28/2019
19	K1907279-005	2	27.515	0.0305	27.4843	54.96862	55.0	8/28/2019
20	K1907469-001	1	7.657	0.0305	7.6264	7.62641	7.63	8/28/2019
21	K1907469-001	1	7.445	0.0305	7.4140	7.41401	7.41	8/28/2019
22	K1907469-002	1	1.526	0.0305	1.4956	1.49561	1.5	8/28/2019
23	K1907469-002	1	1.520	0.0305	1.4891	1.48911	1.5	8/28/2019
24	KQ1912156-01	1	26.907	0.0305	26.8763	26.87631	26.88	8/28/2019
25	K1907469-003	1	1.401	0.0305	1.3703	1.37031	1.37	8/28/2019

ICAL Date 10/20/16 ICAL ID#:11-GEN-05-51A

LCS =24.0 ppm APG 4013 Lot #010615 (REF# 11-GEN-05-50N)

CCV = 25.0 ppm (Ref.#11-GEN-05-52E)

Spike: 0.05 ml of 5000 ppm stock ----> 10.0 ml =25.0 ppm x Dilution Factor (Ref.# 11-GEN-05-51M)

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Analyzed By: <i>BCP</i>	Date Analyzed: <i>8/27/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>8/29/19</i>

Matrix: WATER

Analysis: Total Organic Carbon (WATER)

Method: Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
26	K1907469-003	1	1.445	0.0305	1.4145	1.41451	1.41	8/28/2019
27	K1907469-004	1	3.869	0.0305	3.8381	3.83811	3.84	8/28/2019
28	K1907469-004	1	3.799	0.0305	3.7683	3.76831	3.8	8/28/2019
29	K1907535-001	1	4.990	0.0305	4.9596	4.95961	5.0	8/28/2019
30	K1907535-001	1	4.973	0.0305	4.9426	4.94261	4.9	8/28/2019
31	ccv	1	24.526	0.0305	24.4954	24.49541	24.5	8/28/2019
32	ccb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/28/2019
33	K1907474-001	1	1.233	0.0305	1.2028	1.20281	1.2	8/28/2019
34	K1907474-001	1	1.126	0.0305	1.0953	1.09531	1.1	8/28/2019
35	K1907532-001	1	19.024	0.0305	18.9934	18.99341	19.0	8/28/2019
36	K1907532-001	1	18.569	0.0305	18.5380	18.53801	18.5	8/28/2019
37	K1907548-001	1	9.223	0.0305	9.1929	9.19291	9.2	8/28/2019
38	K1907548-001	1	9.263	0.0305	9.2321	9.23211	9.2	8/28/2019
39	K1907548-002	1	0.835	0.0305	0.8049	0.80491	0.8	8/28/2019
40	K1907548-002	1	0.735	0.0305	0.7040	0.70401	0.7	8/28/2019
41	K1907548-003	1	0.004	0.0305	-0.0264	-0.02639	<0.5	8/28/2019
42	K1907548-003	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/28/2019
43	K1907548-004	1	24.545	0.0305	24.5148	24.51481	24.5	8/28/2019
44	K1907548-004	1	25.196	0.0305	25.1656	25.16561	25.2	8/28/2019
45	K1907548-005	1	25.776	0.0305	25.7453	25.74531	25.7	8/28/2019
46	K1907548-005	1	26.098	0.0305	26.0678	26.06781	26.1	8/28/2019
47	ccv	1	25.643	0.0305	25.6127	25.61271	25.6	8/28/2019
48	ccb	1	0.396	0.0305	0.3659	0.36591	<0.5	8/28/2019
49	K1907476-001	100	8.022	0.0305	7.9913	799.131	799.1	8/28/2019
50	K1907476-001	100	8.016	0.0305	7.9857	798.571	798.6	8/28/2019

Analyzed By: <i>BCD</i>	Date Analyzed: <i>8/27/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>8/29/19</i>

Matrix: WATER

Analysis: Total Organic Carbon (WATER)

Method: Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
51	K1907476-002	100	5.054	0.0305	5.0237	502.371	502.37	8/28/2019
52	K1907476-002	100	4.962	0.0305	4.9317	493.171	493.2	8/28/2019
53	K1907476-003	100	3.458	0.0305	3.4272	342.721	342.7	8/28/2019
54	K1907476-003	100	3.293	0.0305	3.2627	326.271	326.3	8/28/2019
55	ccv	1	24.986	0.0305	24.9559	24.95591	25.0	8/28/2019
56	ccb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/28/2019
57		1		0.0000	0.0000	0	<0.5	
58		1		0.0000	0.0000	0	<0.5	
59		1		0.0000	0.0000	0	<0.5	
60		1		0.0000	0.0000	0	<0.5	
61		1		0.0000	0.0000	0	<0.5	
62		1		0.0000	0.0000	0	<0.5	
63		1		0.0000	0.0000	0	<0.5	
64		1		0.0000	0.0000	0	<0.5	
65		1		0.0000	0.0000	0	<0.5	
66		1		0.0000	0.0000	0	<0.5	
67		1		0.0000	0.0000	0	<0.5	
68		1		0.0000	0.0000	0	<0.5	
69		1		0.0000	0.0000	0	<0.5	
70		1		0.0000	0.0000	0	<0.5	
71		1		0.0000	0.0000	0	<0.5	
72		1		0.0000	0.0000	0	<0.5	
73		1		0.0000	0.0000	0	<0.5	
74		1		0.0000	0.0000	0	<0.5	
75		1		0.0000	0.0000	0	<0.5	

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Analyzed By: <i>BCP</i>	Date Analyzed: <i>8/27/19</i>
Reviewed By: <i>JAN</i>	Date Reviewed: <i>8/29/19</i>

ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER)

Method: Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
CBA	RB	1			0.0000	0	<0.5	
2	mb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/28/2019
3	lcs	1	25.013	0.0305	24.9829	24.98291	25.0	8/28/2019
4	ccv	1	25.643	0.0305	25.6127	25.61271	25.6	8/28/2019
5	ccb	1	0.396	0.0305	0.3659	0.36591	<0.5	8/28/2019
6	K1907526-001	1	11.595	0.0305	11.5646	11.56461	11.56	8/28/2019
7	K1907526-001	1	11.450	0.0305	11.4199	11.41991	11.4	8/28/2019
8	K1907526-002	1	2.758	0.0305	2.7275	2.72751	3	8/28/2019
9	K1907526-002	1	2.660	0.0305	2.6299	2.62991	2.63	8/28/2019
10	KQ1912157-07	1	28.381	0.0305	28.3507	28.35071	28.35	8/28/2019
11	K1907526-003	1	1.985	0.0305	1.9545	1.95451	2.0	8/28/2019
12	K1907526-003	1	1.958	0.0305	1.9278	1.92781	1.93	8/28/2019
13	ccv	1	24.986	0.0305	24.9559	24.95591	24.96	8/28/2019
14	ccb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/28/2019
15		1		0.0000	0.0000	0	<0.5	
16		1		0.0000	0.0000	0	<0.5	
17		1		0.0000	0.0000	0	<0.5	
18		1		0.0000	0.0000	0	<0.5	
19		1		0.0000	0.0000	0	<0.5	
20		1		0.0000	0.0000	0	<0.5	
21		1		0.0000	0.0000	0	<0.5	
22		1		0.0000	0.0000	0	<0.5	
23		1		0.0000	0.0000	0	<0.5	
24		1		0.0000	0.0000	0	<0.5	
25		1		0.0000	0.0000	0	<0.5	

ICAL Date 10/20/16 ICAL ID#:11-GEN-05-51A

LCS =24.0 ppm APG 4013 Lot #010615 (REF# 11-GEN-05-50N)

CCV = 25.0 ppm (Ref.#11-GEN-05-52E)

Spike: 0.05 ml of 5000 ppm stock ----> 10.0 ml =25.0 ppm x Dilution Factor (Ref.# 11-GEN-05-51M)

Analyzed By: <i>BCP</i>	Date Analyzed: <i>8/27/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>8/29/19</i>

Revision 1, 2010 R:\WET\ANALYSES\TOC\TEMPLATE\TOCwaterLIMS

## ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER)Method: Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
CBA	RB	1			0.0000	0	<0.5	
2	ccv	1	25.643	0.0305	25.6127	25.61271	25.6	8/28/2019
3	ccb	1	0.396	0.0305	0.3659	0.36591	<0.5	8/28/2019
4	K1907311-001	1	5.341	0.0305	5.3104	5.31041	5.3	8/28/2019
5	K1907311-001	1	5.055	0.0305	5.0249	5.02491	5.0	8/28/2019
6	K1907311-002	1	4.944	0.0305	4.9134	4.91341	4.91	8/28/2019
7	K1907311-002	1	4.989	0.0305	4.9580	4.95801	5.0	8/28/2019
8	ccv	1	24.986	0.0305	24.9559	24.95591	25	8/28/2019
9	ccb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/28/2019
10	mb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/28/2019
11	lcs	1	25.197	0.0305	25.1666	25.16661	25.2	8/28/2019
12	K1907311-003	1	0.879	0.0305	0.8482	0.84821	0.85	8/28/2019
13	K1907311-003	1	0.778	0.0305	0.7475	0.74751	0.75	8/28/2019
14	K1907413-001	1	3.392	0.0305	3.3611	3.36111	3.36	8/28/2019
15	K1907413-001	1	3.406	0.0305	3.3755	3.37551	3.4	8/28/2019
16	K1907413-002	1	6.163	0.0305	6.1322	6.13221	6.1	8/28/2019
17	K1907413-002	1	6.166	0.0305	6.1357	6.13571	6.14	8/28/2019
18	K1907456-001	2	9.913	0.0305	9.8826	19.76522	19.8	8/28/2019
19	K1907456-001	2	9.871	0.0305	9.8401	19.68022	19.7	8/28/2019
20	K1907456-002	1	7.116	0.0305	7.0850	7.08501	7.09	8/28/2019
21	K1907456-002	1	6.958	0.0305	6.9278	6.92781	6.93	8/28/2019
22	KQ1912158-11	1	25.683	0.0305	25.6522	25.65221	25.7	8/28/2019
23	ccv	1	24.608	0.0305	24.5778	24.57781	24.6	8/28/2019
24	ccb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/28/2019
25	K1907440-001	1	0.106	0.0305	0.0754	0.07541	<0.5	8/28/2019

ICAL Date 10/20/16 ICAL ID#:11-GEN-05-51A

LCS =24.0 ppm APG 4013 Lot #010615 (REF# 11-GEN-05-50N)

CCV = 25.0 ppm (Ref.#11-GEN-05-52E)

Spike: 0.05 ml of 5000 ppm stock ----&gt; 10.0 ml =25.0 ppm x Dilution Factor (Ref.# 11-GEN-05-51M)

Analyzed By:	Date Analyzed	date	time
BGP	8/27/19		
Reviewed By: JAW	Date Reviewed	8/29/19	

Revision 1, 2010 R:\WET\ANALYSES\TOC\TEMPLATE\TOCwaterLIMS



ALS ENVIRONMENTAL

Matrix: WATER

Analysis: Total Organic Carbon (WATER) Method: Oxidation EPA 415.1/9060/5310C

Printout	Sample #	Dil. Factor	Solution Conc.,mg/L	Blank Correction, mg/L	Net mg/L	TOC mg/L	Reported TOC mg/L	
26	K1907440-001	1	0.116	0.0305	0.0859	0.08591	<0.5	8/28/2019
27	K1907440-002	1	0.212	0.0305	0.1816	0.18161	<0.5	8/28/2019
28	K1907440-002	1	0.258	0.0305	0.2271	0.22711	<0.5	8/28/2019
29	K1907440-003	1	0.447	0.0305	0.4166	0.41661	<0.5	8/28/2019
30	K1907440-003	1	0.458	0.0305	0.4276	0.42761	<0.5	8/28/2019
31	K1907440-004	1	0.391	0.0305	0.3609	0.36091	<0.5	8/29/2019
32	K1907440-004	1	0.373	0.0305	0.3422	0.34221	<0.5	8/29/2019
33	K1907440-005	1	0.280	0.0305	0.2497	0.24971	<0.5	8/29/2019
34	K1907440-005	1	0.287	0.0305	0.2560	0.25601	<0.5	8/29/2019
35	K1907440-006	1	0.444	0.0305	0.4133	0.41331	<0.5	8/29/2019
36	K1907440-006	1	0.459	0.0305	0.4284	0.42841	<0.5	8/29/2019
37	K1907440-007	1	0.002	0.0305	-0.0289	-0.02889	<0.5	8/29/2019
38	K1907440-007	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/29/2019
39	ccv	1	24.156	0.0305	24.1256	24.12561	24.1	8/29/2019
40	ccb	1	0.000	0.0305	-0.0305	-0.03049	<0.5	8/29/2019
41		1		0.0000	0.0000	0	<0.5	
42		1		0.0000	0.0000	0	<0.5	
43		1		0.0000	0.0000	0	<0.5	
44		1		0.0000	0.0000	0	<0.5	
45		1		0.0000	0.0000	0	<0.5	
46		1		0.0000	0.0000	0	<0.5	
47		1		0.0000	0.0000	0	<0.5	
48		1		0.0000	0.0000	0	<0.5	
49		1		0.0000	0.0000	0	<0.5	
50		1		0.0000	0.0000	0	<0.5	

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Analyzed By: <i>BCP</i>	Date Analyzed: <i>8/27/19</i>
Reviewed By: <i>[Signature]</i>	Date Reviewed: <i>8/29/19</i>

0.396	OBSERVATIONS	13	ABOVE
0.000	STD Deviator	0.10994	0
0.000	AVERAGE	0.03049	0
0.000	UCL	0.14043	0
0.000	LCL	-0.07945	0
0.000			0
0.000			0
0.000	OBSERVATIONS	0	0
0.000	STD Deviator	0.00000	0
0.000	AVERAGE	#DIV/0!	0
0.000	UCL	#DIV/0!	0
0.000	LCL	#DIV/0!	0
0.000			0
0.000			0
	OBSERVATIONS	0	0
	STD Deviator	0.00000	0
	AVERAGE	#DIV/0!	0
	UCL	#DIV/0!	0
	LCL	#DIV/0!	0
			0
			0
	OBSERVATIONS	0	0
	STD Deviator	#DIV/0!	0
	AVERAGE	#DIV/0!	0
			0
			0
			0
			0
			0
			0
			0

**Schedule: 08272019**

Version: 6

Instrument: Fusion1

Last Saved by: Fusion1 (Fusion1)

Last Saved on: 2019/08/27 13:17 - Tuesday

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps	Use	State
(Clean)	Clean	Clean		1	True	Ready
(Clean)	Clean	Clean		1	True	Ready
(Clean)	Clean	Clean		1	True	Ready
(Blank)	Blank	Reagent/Acid Blank		1	True	Ready
D	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
1	Sample	MB1	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [24.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
2	Sample	ICS	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
3	Sample	K1907294-001.02	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
4	Sample	K1907294-001.02 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
5	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
6	Sample	K1907294-002.02	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
7	Sample	K1907303-001.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
8	Sample	K1907303-002.05	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
9	Sample	K1907303-003.05	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	K1907303-004.05 20x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
11	Sample	K1907495-001.16	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
12	Sample	K1907495-002.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
13	Sample	K1907495-008.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
14	Sample	K1907495-009.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
15	Sample	K1907495-010.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
16	Sample	K1907495-011.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
17	Sample	K1907495-012.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
18	Sample	K1907495-013.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
19	Sample	K1907495-014.15	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	K1907495-022.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
22	Sample	K1907495-023.16	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
23	Sample	K1907495-024.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
24	Sample	K1907495-027.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
25	Sample	K1907495-028.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
26	Sample	K1907495-032.15	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
27	Sample	K1907279-001.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
28	Sample	K1907279-002.03	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	K1907279-003.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
30	Sample	K1907279-004.03	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
31	Sample	K1907279-005.03 2x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
32	Sample	K1907469-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
33	Sample	K1907469-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
34	Sample	K1907469-002.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
35	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
36	Sample	K1907469-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
37	Sample	K1907469-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
38	Sample	K1907535-001.01	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

Printed on: August 29, 2019 08:26:04

Page 1

## Schedule: 08272019

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps	Use	State
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
39	Sample	MB3	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [25.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
40	Sample	K1907474-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
41	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	4	True	Ready
42	Sample	K1907532-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
43	Sample	K1907548-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
44	Sample	K1907548-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
45	Sample	K1907548-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
46	Sample	K1907548-004.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
47	Sample	K1907548-005.01	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
48	Sample	K1907476-001.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
49	Sample	K1907476-002.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
50	Sample	K1907476-003.01 100x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
51	Sample	K1907526-001.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
52	Sample	K1907526-002.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
53	Sample	K1907526-002.01 ms	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
54	Sample	RB	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
55	Sample	K1907526-003.01	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
56	Sample	K1907311-001.02 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
57	Sample	K1907311-002.02 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
B	Check Standard	[TOC] CCV 25 ppm [25 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
D	Check Standard	[TOC] CCB [0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
58	Sample	MB4	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
C	Check Standard	[TOC] LCS [25.0 ppm]	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
59	Sample	K1907311-003.02 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
60	Sample	K1907413-001.02 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
61	Sample	K1907413-002.02 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
62	Sample	FB 8/20/19	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
63	Sample	FB 8/21/19	CAS_salt_010711 (CAS_salt_010711)	1	True	Ready
64	Sample	K1907456-001.05 doc 2x	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
65	Sample	K1907456-002.05 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
66	Sample	K1907440-001.01 ms doc	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
67	Sample	K1907440-001.01 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
68	Sample	K1907440-002.01 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
69	Sample	K1907440-003.01 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
70	Sample	K1907440-004.01 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
71	Sample	K1907440-005.01 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
72	Sample	K1907440-006.01 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
73	Sample	K1907440-007.01 doc	CAS_salt_010711 (CAS_salt_010711)	2	True	Ready
74	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 - 08272019

### Tuesday, August 27, 2019 11:36 AM

(View - Repts, Unused Repts, Meta-Data, Signature, History)  
 Printed on 2019/08/29 08:26 -  
 Thursday

### Report Summary Information

Company Location: Gen Chem Lab  
 Schedule Name: 08272019  
 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)

Engine Version: 1.1.5.1  
 Firmware Version: 1.2.0696  
 Connection: RS232 COM1

Comment:

### Report Results

Sample Type: Clean							From Schedule Version 2
Pos	Analysis Type	Sample ID			Start Time		
◆ (clean)		Clean			2019/08/27 11:36		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	13.50	16.84	3.34	49.67	05:23	
2	TC Clean	17.98	21.18	3.19	50.18	04:04	
3	TC Clean	3.37	6.59	3.21	50.15	03:48	
4	TC Clean	2.31	5.62	3.32	50.12	03:48	

Sample Type: Clean							From Schedule Version 3
Pos	Analysis Type	Sample ID			Start Time		
◆ (clean)		Clean			2019/08/27 12:01		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	11.56	14.85	3.28	49.64	05:11	
2	TC Clean	5.73	8.97	3.24	50.12	04:02	
3	TC Clean	2.82	6.05	3.24	50.13	03:46	

4	TC Clean	1.97	5.36	3.39	50.08	03:44
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**Sample Type:** Clean

From Schedule Version 4

Pos	Analysis Type	Sample ID	Start Time
♦ (clean)		Clean	2019/08/27 12:23

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	11.24	14.58	3.34	49.68	05:13
2	TC Clean	5.34	8.58	3.23	50.09	04:00
3	TC Clean	3.52	6.67	3.14	50.12	03:54
4	TC Clean	2.30	5.63	3.33	50.13	03:55

**Sample Type:** Blank (Creating v1288)

From Schedule Version 5

Pos	Analysis Type	Sample ID	Start Time
♦ (blank)		Reagent/Acid Blank	2019/08/27 13:05

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	11.45	14.84	3.39	49.56	05:20
2	TC Clean	8.98	12.24	3.26	50.07	04:03
3	TC Clean	3.79	7.03	3.24	50.15	03:47
4	TC Clean	2.19	5.50	3.31	50.05	03:44
5	Reagent Blank	5.35	8.65	3.30	50.07	05:02
6	Acid Blank	1.50	4.71	3.21	49.58	05:25

**Sample Type:** Sample

From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ D	TOC	RB	0.5233 ppm	0.0000 ppm	0.0000%	2019/08/27 13:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5233	5.2326	12.42	15.70	3.28	50.22	10:30

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.8732 (IC) (v1288)	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	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	25.3378 ppm (PASS)	0.0000 ppm	0%	2019/08/27 13:53

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.3378	253.3780	181.45	184.62	3.16	50.27	10:34

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos B</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	0.0000	1:1	[TOC] CCB [0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/27 14:08

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	8.26	11.52	3.25	50.29	10:29

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos D</b>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
◊	1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/27 14:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.08	10.64	3.57	50.32	10:31

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.8732 (IC) (v1288)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

**Sample Type:** Check Standard --> LCS From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊	C	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	25.1933 ppm (PASS)	0.0000 ppm	0%	2019/08/27 14:38

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	25.1933	251.9328	180.47	183.99	3.52	50.34	10:30

**Completion State** Success - Criteria met.  
**Success Action** Do Nothing  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)  
**STD Conc - Pos C** 25 ppmC

Sample Type: Sample

From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
2	TOC	ICS	0.2834 ppm	0.0000 ppm	0.0000%	2019/08/27 14:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2834	2.8342	10.80	14.22	3.42	50.34	10:31

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
3	TOC	K1907294-001.02	1.3921 ppm	0.0254 ppm	1.8300%	2019/08/27 15:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4101	14.1012	18.44	21.67	3.23	50.35	10:32
2	TOC	1.3742	13.7418	18.20	21.55	3.35	50.33	10:27

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
4	TOC	K1907294-001.02 ms	26.8505 ppm	0.0000 ppm	0.0000%	2019/08/27 15:35

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.8505	268.5053	191.13	194.58	3.45	50.37	10:30

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
5	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/27 15:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.71	11.16	3.45	50.38	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC)  
**Method** CAS\_salt\_010711  
**Calibration** CAS\_salt\_010711



(v1288)

(v4)

(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
6	TOC	K1907294-002.02	0.7464 ppm	0.0020 ppm	0.2700%	2019/08/27 16:05

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.7478	7.4777	13.95	17.30	3.35	50.37	10:23
2	TOC	0.7450	7.4497	13.93	17.31	3.38	50.37	10:24

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
7	TOC	K1907303-001.05	2.7096 ppm	0.0110 ppm	0.4100%	2019/08/27 16:33

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.7174	27.1744	27.32	30.55	3.23	50.37	10:26
2	TOC	2.7018	27.0182	27.21	30.66	3.45	50.40	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
8	TOC	K1907303-002.05	2.6969 ppm	0.0241 ppm	0.8900%	2019/08/27 17:01

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.6799	26.7987	27.06	30.42	3.36	50.43	10:28
2	TOC	2.7139	27.1391	27.30	30.55	3.26	50.40	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
9	TOC	K1907303-003.05	3.5140 ppm	0.0083 ppm	0.2400%	2019/08/27 17:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.5081	35.0811	32.69	36.07	3.38	50.49	10:25
2	TOC	3.5199	35.1989	32.77	36.19	3.43	50.52	10:29

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** 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
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◆	B	TOC	25.0000	1:2	[TOC] CCV 25 ppm [25 ppm]	0 / infinity (NA / NA)	24.8132 ppm (PASS)	0.0000 ppm	0%	2019/08/27 17:57
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Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.8132	248.1320	177.89	181.34	3.45	50.53	10:30

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos B</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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/27 18:11

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.18	10.55	3.38	50.50	10:29

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos D</b>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
◆	10	TOC	K1907303-004.05 20x	1.8522 ppm	0.0657 ppm	3.5500%	2019/08/27 18:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.8057	18.0568	21.13	24.47	3.34	50.39	10:26
2	TOC	1.8986	18.9864	21.76	24.92	3.16	50.35	10:25

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.8732 (IC) (v1288)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
◆	11	TOC	K1907495-001.16	0.4692 ppm	0.0213 ppm	4.5300%	2019/08/27 18:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4842	4.8422	12.16	15.37	3.21	50.28	10:28
2	TOC	0.4542	4.5416	11.96	15.22	3.27	50.28	10:26

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.8732 (IC) (v1288)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
12	TOC	K1907495-002.15	9.3217 ppm	0.2186 ppm	2.3400%	2019/08/27 19:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.1671	91.6711	71.10	74.39	3.29	50.27	10:29
2	TOC	9.4762	94.7619	73.20	76.67	3.47	50.21	10:30

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
13	TOC	K1907495-008.15	0.5720 ppm	0.0546 ppm	9.5400%	2019/08/27 19:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6106	6.1062	13.02	16.23	3.21	50.25	10:27
2	TOC	0.5334	5.3342	12.49	15.70	3.21	50.22	10:27

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
14	TOC	K1907495-009.15	0.5997 ppm	0.0217 ppm	3.6100%	2019/08/27 20:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.6150	6.1504	13.05	16.19	3.14	50.20	10:25
2	TOC	0.5844	5.8439	12.84	16.27	3.43	50.15	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
15	TOC	K1907495-010.15	8.8044 ppm	0.2827 ppm	3.2100%	2019/08/27 20:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.0043	90.0433	69.99	73.32	3.32	50.12	10:26
2	TOC	8.6045	86.0450	67.28	70.56	3.28	50.10	10:27

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
16	TOC	K1907495-011.15	10.1443 ppm	0.1267 ppm	1.2500%	2019/08/27 21:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	10.0547	100.5472	77.12	80.29	3.17	50.09	10:28

2	TOC	10.2339	102.3386	78.34	81.81	3.47	50.05	10:26
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**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	K1907495-012.15	3.5524 ppm	0.0086 ppm	0.2400%	2019/08/27 21:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.5463	35.4626	32.94	36.31	3.37	50.06	10:26
2	TOC	3.5585	35.5849	33.03	36.27	3.24	50.06	10:24

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	K1907495-013.15	5.2203 ppm	0.0076 ppm	0.1500%	2019/08/27 22:11

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.2150	52.1496	44.27	47.63	3.36	50.07	10:28
2	TOC	5.2257	52.2571	44.34	47.52	3.17	50.08	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
19	TOC	K1907495-014.15	0.5498 ppm	0.0634 ppm	11.5400%	2019/08/27 22:39

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5947	5.9471	12.91	16.18	3.27	50.09	10:27
2	TOC	0.5050	5.0499	12.30	15.64	3.34	50.09	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** 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 )	24.9969 ppm (PASS)	0.0000 ppm	0%	2019/08/27 23:07

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.9969	249.9691	179.14	182.23	3.09	50.12	10:30

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos B</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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/27 23:21

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.67	9.98	3.31	50.11	10:30

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos D</b>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/27 23:36

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.26	9.63	3.37	50.13	10:30

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.8732 (IC) (v1288)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

**Sample Type:** Check Standard --> LCS From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊ C	TOC	25.0000	1:1	[TOC] LCS [24.0 ppm]	0 / infinity (NA / NA)	25.2121 ppm (PASS)	0.0000 ppm	0%	2019/08/27 23:50

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	25.2121	252.1214	180.60	184.07	3.47	50.15	10:33

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos C</b>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	25 ppmC

**Sample Type:** Sample From Schedule Version 6

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Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
21	TOC	K1907495-022.15	0.2225 ppm	0.0655 ppm	29.4500%	2019/08/28 00:05

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2688	2.6883	10.70	14.15	3.46	50.14	10:28
2	TOC	0.1762	1.7617	10.07	13.25	3.18	50.17	10:25

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
22	TOC	K1907495-023.16	1.0405 ppm	0.0100 ppm	0.9600%	2019/08/28 00:33

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0334	10.3342	15.89	19.39	3.50	50.19	10:31
2	TOC	1.0476	10.4757	15.98	19.38	3.40	50.20	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
23	TOC	K1907495-024.15	1.1972 ppm	0.0079 ppm	0.6600%	2019/08/28 01:01

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.2028	12.0284	17.04	20.38	3.34	50.22	10:30
2	TOC	1.1916	11.9165	16.96	20.15	3.19	50.25	10:24

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
24	TOC	K1907495-027.15	0.0431 ppm	0.0209 ppm	48.6200%	2019/08/28 01:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0579	0.5787	9.27	12.61	3.34	50.28	10:28
2	TOC	0.0283	0.2826	9.06	12.50	3.43	50.28	10:27

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
25	TOC	K1907495-028.15	3.7781 ppm	0.1348 ppm	3.5700%	2019/08/28 01:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.8735	38.7346	35.17	38.47	3.30	50.30	10:29

2	TOC	3.6828	36.8283	33.87	37.23	3.36	50.31	10:26
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**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
26	TOC	K1907495-032.15	3.8366 ppm	0.0065 ppm	0.1700%	2019/08/28 02:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.8321	38.3206	34.88	38.36	3.47	50.34	10:26
2	TOC	3.8412	38.4120	34.95	38.29	3.35	50.33	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
27	TOC	K1907279-001.03	9.0213 ppm	0.0458 ppm	0.5100%	2019/08/28 02:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.9889	89.8886	69.89	73.15	3.26	50.37	10:25
2	TOC	9.0537	90.5368	70.33	73.49	3.16	50.38	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
28	TOC	K1907279-002.03	15.7561 ppm	0.0597 ppm	0.3800%	2019/08/28 03:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	15.7139	157.1387	115.54	118.67	3.14	50.41	10:26
2	TOC	15.7983	157.9829	116.11	119.41	3.30	50.40	10:25

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** 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 )	24.5815 ppm (PASS)	0.0000 ppm	0%	2019/08/28 03:50

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.5815	245.8146	176.32	179.74	3.42	50.42	10:33

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos B</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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/28 04:04

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.67	10.05	3.39	50.45	10:31

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos D</b>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 29	TOC	K1907279-003.03	27.7546 ppm	0.2991 ppm	1.0800%	2019/08/28 04:19

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	27.9660	279.6604	198.70	202.13	3.43	50.44	10:26
2	TOC	27.5431	275.4308	195.83	199.16	3.32	50.46	10:27

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.8732 (IC) (v1288)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 30	TOC	K1907279-004.03	22.4098 ppm	0.0309 ppm	0.1400%	2019/08/28 04:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	22.3879	223.8791	160.84	164.30	3.46	50.49	10:26
2	TOC	22.4317	224.3167	161.14	164.46	3.32	50.48	10:27

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.8732 (IC) (v1288)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 31	TOC	K1907279-005.03 2x	27.3492 ppm	0.2342 ppm	0.8600%	2019/08/28 05:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	27.1836	271.8362	193.39	196.68	3.28	50.51	10:28



2	TOC	27.5148	275.1480	195.64	199.06	3.42	50.51	10:27
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**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
32	TOC	K1907469-001.01	7.5507 ppm	0.1502 ppm	1.9900%	2019/08/28 05:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.6569	76.5694	60.85	63.98	3.14	50.52	10:29
2	TOC	7.4445	74.4450	59.41	62.69	3.28	50.53	10:27

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
33	TOC	K1907469-002.01	1.5228 ppm	0.0046 ppm	0.3000%	2019/08/28 06:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5261	15.2606	19.23	22.53	3.30	50.56	10:30
2	TOC	1.5196	15.1958	19.19	22.36	3.17	50.57	10:30

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
34	TOC	K1907469-002.01 ms	26.9068 ppm	0.0000 ppm	0.0000%	2019/08/28 06:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.9068	269.0681	191.52	194.76	3.24	50.59	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
35	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/28 06:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.80	10.18	3.39	50.61	10:29

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
36	TOC	K1907469-003.01	1.4229 ppm	0.0313 ppm	2.2000%	2019/08/28 07:09

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.4008	14.0084	18.38	21.71	3.33	50.66	10:27
2	TOC	1.4450	14.4504	18.68	22.02	3.33	50.63	10:30

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
37	TOC	K1907469-004.01	3.8337 ppm	0.0494 ppm	1.2900%	2019/08/28 07:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.8686	38.6860	35.13	38.34	3.20	50.64	10:27
2	TOC	3.7988	37.9877	34.66	38.05	3.39	50.64	10:27

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
38	TOC	K1907535-001.01	4.9816 ppm	0.0121 ppm	0.2400%	2019/08/28 08:05

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.9901	49.9015	42.75	46.02	3.27	50.65	10:27
2	TOC	4.9731	49.7306	42.63	45.92	3.29	50.63	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** 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)	24.5259 ppm (PASS)	0.0000 ppm	0%	2019/08/28 08:33

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.5259	245.2592	175.94	179.31	3.36	50.63	10:33

**Completion State** Success - Criteria met.  
**Success Action** Do Nothing  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)  
**STD Conc - Pos B** 50 ppmC

**Sample Type:** Check Standard --> CCB From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/28 08:48
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.32	9.77	3.45	50.58	10:31
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos D</b>		
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)		CAS_salt_010711 (v30)		0 ppmC		

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◆ 39	TOC	MB3	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/28 09:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.77	9.14	3.36	50.57	10:31

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 8.8732 (IC) (v1288)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

**Sample Type:** Check Standard --> LCS From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◆ C	TOC	25.0000	1:1	[TOC] LCS [25.0 ppm]	0 / infinity (NA / NA)	25.0134 ppm (PASS)	0.0000 ppm	0%	2019/08/28 09:17

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	25.0134	250.1341	179.25	182.57	3.31	50.52	10:29

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos C</b>
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	K1907474-001.01	1.1796 ppm	0.0760 ppm	6.4500%	2019/08/28 09:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.2333	12.3334	17.24	20.61	3.36	50.45	10:30
2	TOC	1.1258	11.2579	16.52	19.77	3.25	50.39	10:30

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
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1:10 (TC) 8.8732 (IC) CAS\_salt\_010711 CAS\_salt\_010711  
(v1288) (v4) (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
41	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/28 10:00

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.96	9.28	3.31	50.35	10:25
2	TOC	0.0000	0.0000	6.50	9.62	3.12	50.31	10:29
3	TOC	0.0000	0.0000	6.19	9.44	3.25	50.27	10:26
4	TOC	0.0000	0.0000	6.40	9.51	3.11	50.31	10:31

Dilution 1:10 Blank Contribution (TC) 8.8732 (IC) (v1288) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
42	TOC	K1907532-001.01	18.7962 ppm	0.3220 ppm	1.7100%	2019/08/28 10:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	19.0239	190.2386	138.01	141.21	3.20	50.24	10:27
2	TOC	18.5685	185.6849	134.92	138.03	3.11	50.28	10:30

Dilution 1:10 Blank Contribution (TC) 8.8732 (IC) (v1288) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
43	TOC	K1907548-001.01	9.2430 ppm	0.0277 ppm	0.3000%	2019/08/28 11:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.2234	92.2339	71.48	74.65	3.16	50.30	10:30
2	TOC	9.2626	92.6258	71.75	74.97	3.23	50.24	10:27

Dilution 1:10 Blank Contribution (TC) 8.8732 (IC) (v1288) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
44	TOC	K1907548-002.01	0.7850 ppm	0.0714 ppm	9.0900%	2019/08/28 11:52

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8354	8.3543	14.54	17.89	3.35	50.27	10:25
2	TOC	0.7345	7.3451	13.86	17.07	3.21	50.32	10:27

Dilution 1:10 Blank Contribution (TC) 8.8732 (IC) (v1288) Method CAS\_salt\_010711 (v4) Calibration CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

◆	45	TOC	K1907548-003.01	0.0020 ppm	0.0029 ppm	141.4200%	2019/08/28 12:20			
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time		
1	TOC	0.0041	0.0410	8.90	12.14	3.24	50.28	10:29		
2	TOC	0.0000	0.0000	8.74	12.06	3.31	50.32	10:28		
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>					
1:10		(TC) 8.8732 (IC) (v1288)		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)					
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time				
◆	46	TOC	K1907548-004.01	24.8707 ppm	0.4602 ppm	1.8500%	2019/08/28 12:48			
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time		
1	TOC	24.5453	245.4527	175.48	178.69	3.21	50.34	10:26		
2	TOC	25.1961	251.9613	179.90	183.24	3.34	50.32	10:27		
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>					
1:10		(TC) 8.8732 (IC) (v1288)		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)					
Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time				
◆	47	TOC	K1907548-005.01	25.9371 ppm	0.2280 ppm	0.8800%	2019/08/28 13:16			
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time		
1	TOC	25.7758	257.7583	183.84	187.39	3.55	50.35	10:28		
2	TOC	26.0983	260.9832	186.03	189.59	3.57	50.35	10:26		
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>					
1:10		(TC) 8.8732 (IC) (v1288)		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)	25.6432 ppm (PASS)	0.0000 ppm	0%	2019/08/28 13:44
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	25.6432	256.4320	183.53	186.81	3.29	50.29	10:30
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>	<u>Calibration</u>		<u>STD Conc - Pos B</u>			
Success - Criteria met.		Do Nothing		CAS_salt_010711 (v4)	CAS_salt_010711 (v30)		50 ppmC			

**Sample Type:** Check Standard --> CCB From Schedule Version 6

Concentration	Min / Max
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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)	0.3964 ppm (PASS)	0.0000 ppm	0%	2019/08/28 13:59

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.3964	3.9637	12.15	15.51	3.36	50.39	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 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
◊	48	TOC	K1907476-001.01 100x	8.0190 ppm	0.0040 ppm	0.0500%	2019/08/28 14:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.0218	80.2185	63.32	66.69	3.37	50.36	10:28
2	TOC	8.0162	80.1625	63.29	66.63	3.34	50.31	10:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.8732 (IC) (v1288)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
◊	49	TOC	K1907476-002.01 100x	5.0082 ppm	0.0651 ppm	1.3000%	2019/08/28 14:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.0542	50.5423	43.18	46.51	3.33	50.29	10:27
2	TOC	4.9622	49.6216	42.56	45.87	3.32	50.39	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.8732 (IC) (v1288)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
◊	50	TOC	K1907476-003.01 100x	3.3754 ppm	0.1164 ppm	3.4500%	2019/08/28 15:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.4577	34.5772	32.34	35.75	3.40	50.34	10:29
2	TOC	3.2932	32.9317	31.23	34.68	3.45	50.37	10:26

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.8732 (IC) (v1288)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time	
◊	51	TOC	K1907526-001.01	11.5228 ppm	0.1023 ppm	0.8900%	2019/08/28 15:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	11.5951	115.9510	87.58	90.92	3.34	50.45	10:27
2	TOC	11.4504	114.5043	86.60	89.87	3.27	50.45	10:31

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
52	TOC	K1907526-002.01	2.7092 ppm	0.0690 ppm	2.5500%	2019/08/28 16:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.7580	27.5795	27.59	30.96	3.37	50.40	10:29
2	TOC	2.6604	26.6043	26.93	30.23	3.30	50.53	10:27

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
53	TOC	K1907526-002.01 ms	28.3812 ppm	0.0000 ppm	0.0000%	2019/08/28 16:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	28.3812	283.8119	201.52	204.94	3.41	50.50	10:30

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
54	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/28 16:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.24	11.67	3.44	50.45	10:34

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
55	TOC	K1907526-003.01	1.9716 ppm	0.0189 ppm	0.9600%	2019/08/28 17:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.9850	19.8497	22.35	25.79	3.44	50.60	10:29
2	TOC	1.9583	19.5830	22.17	25.54	3.38	50.57	10:26

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Analysis	Std. Dev.

Pos	Type	Sample ID	Result (ppmC)	(ppmC)	RSD	Start Time
56	TOC	K1907311-001.02 doc	5.1982 ppm	0.2019 ppm	3.8800%	2019/08/28 17:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	5.3409	53.4092	45.13	48.48	3.35	50.57	10:29
2	TOC	5.0554	50.5541	43.19	46.50	3.31	50.55	10:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.8732 (IC) (v1288)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
57	TOC	K1907311-002.02 doc	4.9662 ppm	0.0316 ppm	0.6400%	2019/08/28 18:00

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.9439	49.4389	42.43	45.75	3.32	50.67	10:31
2	TOC	4.9885	49.8853	42.74	46.09	3.36	50.64	10:28

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 8.8732 (IC) (v1288)	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)	24.9864 ppm (PASS)	0.0000 ppm	0%	2019/08/28 18:28

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.9864	249.8645	179.07	182.27	3.20	50.58	10:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

**Sample Type:** Check Standard --> CCB From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/28 18:43

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.59	10.97	3.39	50.46	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)

**Sample Type:** Sample

From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
58	TOC	MB4	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/28 18:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.95	10.36	3.41	50.39	10:29

Dilution

1:10

Blank Contribution(TC) 8.8732 (IC)  
(v1288)MethodCAS\_salt\_010711  
(v4)CalibrationCAS\_salt\_010711  
(v30)**Sample Type:** Check Standard --> LCS

From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
C	TOC	25.0000	1:1	[TOC] LCS [25.0 ppm]	0 / infinity (NA / NA)	25.1971 ppm (PASS)	0.0000 ppm	0%	2019/08/28 19:12

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	25.1971	251.9711	180.50	183.78	3.28	50.31	10:32

Completion State

Success - Criteria met.

Success Action

Do Nothing

MethodCAS\_salt\_010711  
(v4)CalibrationCAS\_salt\_010711  
(v30)STD Conc - Pos C

25 ppmC

**Sample Type:** Sample

From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
59	TOC	K1907311-003.02 doc	0.8284 ppm	0.0713 ppm	8.6000%	2019/08/28 19:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.8787	8.7874	14.84	18.12	3.28	50.22	10:25
2	TOC	0.7780	7.7797	14.15	17.51	3.36	50.18	10:25

Dilution

1:10

Blank Contribution(TC) 8.8732 (IC)  
(v1288)MethodCAS\_salt\_010711  
(v4)CalibrationCAS\_salt\_010711  
(v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
60	TOC	K1907413-001.02 doc	3.3988 ppm	0.0102 ppm	0.3000%	2019/08/28 19:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.3916	33.9158	31.90	35.11	3.21	50.14	10:27

2	TOC	3.4060	34.0601	31.99	35.20	3.21	50.11	10:28
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**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
61	TOC	K1907413-002.02 doc	6.1644 ppm	0.0025 ppm	0.0400%	2019/08/28 20:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.1627	61.6267	50.70	53.94	3.24	50.10	10:26
2	TOC	6.1662	61.6620	50.73	54.00	3.27	50.14	10:27

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
62	TOC	FB 8/20/19	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/28 20:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.66	10.80	3.14	50.14	10:33

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
63	TOC	FB 8/21/19	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/28 21:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.71	10.04	3.33	50.15	10:30

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
64	TOC	K1907456-001.05 doc 2x	9.8919 ppm	0.0301 ppm	0.3000%	2019/08/28 21:20

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.9131	99.1314	76.16	79.59	3.42	50.20	10:25
2	TOC	9.8706	98.7057	75.87	79.36	3.48	50.27	10:28

**Dilution** 1:10  
**Blank Contribution** (TC) 8.8732 (IC) (v1288)  
**Method** CAS\_salt\_010711 (v4)  
**Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
65	TOC	K1907456-002.05 doc	7.0369 ppm	0.1112 ppm	1.5800%	2019/08/28 21:48

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.1155	71.1553	57.17	60.57	3.40	50.35	10:29
2	TOC	6.9583	69.5834	56.11	59.38	3.27	50.51	10:27

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.8732 (IC) (v1288)	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
66	TOC	K1907440-001.01 ms doc	25.6827 ppm	0.0000 ppm	0.0000%	2019/08/28 22:16

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	25.6827	256.8273	183.21	186.45	3.25	50.62	10:32

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 8.8732 (IC) (v1288)	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)	24.6083 ppm (PASS)	0.0000 ppm	0%	2019/08/28 22:31

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.6083	246.0827	176.50	179.76	3.26	50.62	10:30

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos B</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

**Sample Type:** Check Standard --> CCB From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/28 22:46

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	7.17	10.32	3.15	50.54	10:32

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos D</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

Sample Type: Sample

From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
67	TOC	K1907440-001.01 doc	0.1111 ppm	0.0074 ppm	6.6600%	2019/08/28 23:00

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1059	1.0590	9.59	12.83	3.24	50.52	10:26
2	TOC	0.1164	1.1636	9.66	12.83	3.16	50.51	10:26

**Dilution** 1:10      **Blank Contribution** (TC) 8.8732 (IC) (v1288)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
68	TOC	K1907440-002.01 doc	0.2349 ppm	0.0322 ppm	13.7000%	2019/08/28 23:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2121	2.1212	10.31	13.64	3.33	50.48	10:29
2	TOC	0.2576	2.5764	10.62	13.84	3.22	50.48	10:26

**Dilution** 1:10      **Blank Contribution** (TC) 8.8732 (IC) (v1288)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
69	TOC	K1907440-003.01 doc	0.4526 ppm	0.0078 ppm	1.7300%	2019/08/28 23:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4471	4.4709	11.91	15.15	3.24	50.45	10:26
2	TOC	0.4581	4.5814	11.98	15.24	3.25	50.45	10:26

**Dilution** 1:10      **Blank Contribution** (TC) 8.8732 (IC) (v1288)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
70	TOC	K1907440-004.01 doc	0.3820 ppm	0.0132 ppm	3.4600%	2019/08/29 00:25

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3914	3.9140	11.53	14.83	3.30	50.45	10:27
2	TOC	0.3727	3.7269	11.40	14.66	3.26	50.44	10:28

**Dilution** 1:10      **Blank Contribution** (TC) 8.8732 (IC) (v1288)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
71	TOC	K1907440-005.01 doc	0.2833 ppm	0.0045 ppm	1.5800%	2019/08/29 00:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
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1	TOC	0.2802	2.8018	10.78	14.10	3.33	50.44	10:25
2	TOC	0.2865	2.8651	10.82	14.13	3.31	50.45	10:26

**Dilution** 1:10      **Blank Contribution** (TC) 8.8732 (IC) (v1288)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
72	TOC	K1907440-006.01 doc	0.4514 ppm	0.0106 ppm	2.3500%	2019/08/29 01:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.4438	4.4385	11.89	15.19	3.31	50.44	10:31
2	TOC	0.4589	4.5888	11.99	15.21	3.22	50.44	10:22

**Dilution** 1:10      **Blank Contribution** (TC) 8.8732 (IC) (v1288)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
73	TOC	K1907440-007.01 doc	0.0008 ppm	0.0011 ppm	141.4200%	2019/08/29 01:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0016	0.0159	8.88	12.29	3.40	50.46	10:25
2	TOC	0.0000	0.0000	8.81	12.06	3.25	50.46	10:30

**Dilution** 1:10      **Blank Contribution** (TC) 8.8732 (IC) (v1288)      **Method** CAS\_salt\_010711 (v4)      **Calibration** CAS\_salt\_010711 (v30)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
74	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/29 02:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.09	9.34	3.25	50.46	10:30
2	TOC	0.0000	0.0000	6.27	9.57	3.30	50.46	10:29

**Dilution** 1:10      **Blank Contribution** (TC) 8.8732 (IC) (v1288)      **Method** CAS\_salt\_010711 (v4)      **Calibration** 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)	24.1561 ppm (PASS)	0.0000 ppm	0%	2019/08/29 02:45

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.1561	241.5615	173.43	176.77	3.34	50.46	10:28

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos B</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	50 ppmC

**Sample Type:** Check Standard --> CCB

From Schedule Version 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)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/29 03:00

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0 ppm	1	0.0000	0.0000	6.38	9.72	3.34	50.48	10:29

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos D</u>
Success - Criteria met.	Do Nothing	CAS_salt_010711 (v4)	CAS_salt_010711 (v30)	0 ppmC

### Meta Data Used in this Report

#### Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1287	2.0470	1.9200	0.0000	0.0000	0.0000	2019/08/22 18:03	Fusion1 (Fusion1)
v1288	1.7847	1.4960	0.0000	0.0000	0.0000	2019/08/27 13:39	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<sup>2</sup> value: TOC:  $r^2 = 0.99963$   
 Comment:  
 Operator: Fusion1 (Fusion1)  
 Basic Analysis Type: TOC

**Basic Analysis Type:** TOC

Sample ID	Y Raw Value	X Expected	Message	End Time
DI Water	7.8970	0.0000		2019/03/05 16:15
0.500 ppm	11.5280	0.5000		2019/03/05 16:29
1.0 ppm	14.9760	1.0000		2019/03/05 16:44

5.0 ppm	43.6500	5.0000	2019/03/05 16:58
10 ppm	79.6020	10.0000	2019/03/05 17:12
25 ppm	183.3580	25.0000	2019/03/05 17:26
50 ppm	346.3230	50.0000	2019/03/05 17:40

**Methods**

Name: CAS\_salt\_010711 (TOC)

Version: v4

Operator: Fusion1 (Fusion1)

Ver Creation: 2019/02/21 17:57

Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	ICSpurgeRinseVolume	12.0 ml
UVReactorPrerinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPrerinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPrerinses	1	SyringeSpeedWaste	10
ICSpurgeTime	1.00 mins	SyringeSpeedAcid	7
DetectorSweepFlow	500 ml/min	SyringeSpeedReagent	7
PreSpurgeTime	2.00 mins	SyringeSpeedDIWater	7
SystemFlow	500 ml/min	NDIRPressurization	60 psig
		SyringeSpeedSampleDispense	5
		SyringeSpeedSampleAspirate	4
		SyringeSpeedUVDispense	5
		SyringeSpeedUVAspirate	5
		SyringeSpeedICDispense	5
		SyringeSpeedICAspirate	5
		NDIRPressureStabilize	1.75 min
		SampleMixing	Off
		SampleMixingCycles	1
		SampleMixingVolume	10.0
		LowLevelFilterNDIR	Off

**Acceptance / Approval**

**Electronic Signatures**

Report Version	User Name	Acceptance	Reason	Date
----------------	-----------	------------	--------	------

## Report History

### Report History

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/08/29 03:17



StarLIMS Run: 648995, 648996, 648997, 648998  
 Analysis: DOC/TOC  
 Method: SM 5310 C, 9060A, 415.1, 9060

CCV: 11-GEN-05-79K 50 ppm      LCS: 11-GEN-05-79J 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-78M

ICS TV: 25.0 ppm                      ICS % R < 1

Spike ID: 11-GEN-05-77J              0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-80D

21 % H3PO4: 11-GEN-05-80C

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: 100559

Analyzed By: <i>SCD</i>	Date Analyzed: 8/29/19
Reviewed By: <i>JAN</i>	Date Reviewed: 8/29/19



## Case Narrative

**Method:** 6850

**Analysis:** Perchlorate

**Analysis SOP:** LC-MS-CLO4

**ALS WO ID(s):** 1923487; 1923490; 1923491;  
1923492; 1923494

**Client:** ALS Laboratories (Houston, TX)

**Matrix:** Water

**ELMS Batch (HBN):** 2284 (246025)

**General Set Information:** There were nine field samples in these Work Orders. The samples were analyzed for perchlorate.

**Method Summary:** Each sample was prepared as noted below and analyzed using an Agilent 1100 LC/MSD system in select ion monitoring (SIM) mode at m/z 83 and 85, which corresponds to the loss of one oxygen atom from the perchlorate molecule. ChemStation software was used for instrument control and data analysis. The ion ratio of m/z 83 to 85 was used to positively identify the response peak as perchlorate. Quantitation was performed using the m/z 83 peak area. An internal standard (ISTD) of  $^{18}\text{O}$  labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in quantitation.

**Sample Preparation:** A 10.0mL aliquot of each sample was transferred into a 15-mL centrifuge tube. 50 $\mu\text{L}$  of an  $^{18}\text{O}$  labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45 $\mu\text{m}$  Syringe filters.

**Holding Times:** Holding times were met for all analyses.

**Dilutions:** Field sample 1923492001 was analyzed and reported from a 1:1,000 dilution. The reporting limit has been adjusted accordingly.

**Method QC data:** The method blank (LMB 669454) was less than 1/2 the CRDL. The recovery for the LCS (669455) was within acceptable parameters.



**MS/MSD Analysis:** MS/MSD was performed on samples 1923490002/03 (Client ID: 16WW57-190815). 4.0 $\mu$ l of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4.0 $\mu$ g/L. The MS/MSD failed QC acceptance criteria for percent recoveries due to an unknown co-eluting contamination. The MS/MSD is reported for the clients' information only. The sample matrix may be inappropriate for the method selected. The 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  $\mu$ g/L. Results were calculated in  $\mu$ g/L by the equation (A)x(B),

where: A = Analyte concentration from the standard curve ( $\mu$ g/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 – 669452) is reported from the analysis of the Laboratory Control Sample (LCS – 669455) at a level of 4.0 $\mu$ g/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) along with datafiles 20AUGD06-08/11/13.

Thomas Bosch      August 21, 2019  
Analyst                      Date



# ANALYTICAL REPORT

Report Date: August 22, 2019

RJ Modashia  
ALS Environmental (Houston)  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099

Phone: 281 530-5656

E-mail: RJ.Modashia@ALSGlobal.com

Workorder: **34-1923491**

Project ID: HS19080736

Purchase Order: HS19080736

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_081419_BIX	1923491001	08/14/19	08/16/19	



## ANALYTICAL REPORT

Workorder: 34-1923491

Client: ALS Environmental  
(Houston)

Project Manager: Kevin W. Griffiths

## Analytical Results

Sample ID: <b>LH18/24-SP650_081419_BIX</b>	Sampling Site: NA	Collected: 08/14/2019				
Lab ID: 1923491001	Media: 125 mL Nalgene	Received: 08/16/2019				
Matrix: Water	Sampling Parameter: NA					
<b>Analysis Method - EPA 6850, DoD QSM</b>						
Preparation: Not Applicable	Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2284 (HBN: 246025) Analyzed: 08/20/2019 10:55	Instrument ID: LCMS04 %Solids: NA Report Basis: Wet				
<b>Analyte</b>	<b>Result (ug/L)</b>	<b>DL (ug/L)</b>	<b>LOD (ug/L)</b>	<b>LOQ (ug/L)</b>	<b>Dilution</b>	<b>Qual</b>
Perchlorate	10	1.0	2.0	4.0	1	

## Comments

**Quality Control: EPA 6850, DoD QSM - (HBN: 246025)**

Field sample 1923492001 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 08/20/2019 13:38	/S/ Stephen Brose 08/22/2019 14:34

## Laboratory Contact Information

ALS Environmental  
960 W Levoy Drive  
Salt Lake City, Utah 84123

Phone: (801) 266-7700  
Email: als@alst.com  
Web: www.alst.com



## ANALYTICAL REPORT

Workorder: 34-1923491

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	<a href="http://www.pjlab.com">http://www.pjlab.com</a>
	PJLA (ISO 17025)	L17-507-R1	<a href="http://www.pjlab.com">http://www.pjlab.com</a>
	Utah (TNI)	UT00953	<a href="http://lams.nelac-institute.org/search">http://lams.nelac-institute.org/search</a>
	Iowa (TNI)	IA# 376	<a href="http://www.shl.uiowa.edu/labcert/idnr/">http://www.shl.uiowa.edu/labcert/idnr/</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/envlab/disclaimer.html">http://www.kdheks.gov/envlab/disclaimer.html</a>
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	DOECAP-AP	L18-606	<a href="http://www.pjlab.com">http://www.pjlab.com</a>
	Washington	C596	<a href="https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation">https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation</a>
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	<a href="http://www.pjlab.com">http://www.pjlab.com</a>

**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

00951455

## Analysis Information

**Workorder:** 1923491

**Limits:** Client SOW/Contract Specified  
**Basis:** DoD QSM

**Preparation:** NA  
**Batch:** NA  
**Prepared By:** NA

**Analysis:** EPA 6850, DoD QSM  
**Batch:** ELMS/2284 (HBN: 246025)  
**Analyzed By:** Thomas Bosch

## Blank

<b>LMB:</b> 669454 <b>Analyzed:</b> 08/20/2019 09:15 <b>Units:</b> ug/L			
Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

## Laboratory Control Sample

<b>LCS:</b> 669455 <b>Analyzed:</b> 08/20/2019 08:46 <b>Dilution:</b> 1 <b>Units:</b> ug/L				
Analyte	Result	Target	% Rec	QC Limits
Perchlorate	4.16	4.00	104	78.8   123.8

## Matrix Spike - Matrix Spike Duplicate

<b>Sample:</b> 1923490001 <b>Analyzed:</b> 08/20/2019 09:44 <b>Dilution:</b> 1 <b>Units:</b> ug/L		<b>MS:</b> 1923490002 <b>Analyzed:</b> 08/20/2019 09:58 <b>Dilution:</b> 1 <b>Units:</b> ug/L				<b>MSD:</b> 1923490003 <b>Analyzed:</b> 08/20/2019 10:12 <b>Dilution:</b> 1 <b>Units:</b> ug/L			
Analyte	Result	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Perchlorate	ND	5.2	4	# 130	78.8   123.8	5.3	# 133	1.95	0.0   20.0

## Comments

Field sample 1923492001 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 08/20/2019 13:45	/S/ Stephen Brose 08/22/2019 14:34

## 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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www.alsglobal.com

18698/#2

### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 11988

**SUBCONTRACT TO:**

ALS Laboratory Group  
960 LeVoy Dr  
Salt Lake City, UT 84123

**Phone:** +1 801 266 7700

1923491

**CUSTOMER INFORMATION:**

**Company:** ALS Houston  
**Contact:** RJ Modashia  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RJ.Modashia@alsglobal.com  
**Alternate Contact:**  
**Email:**

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS19080736  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19080736-02	LH18/24-SP650_081419_BIX	Water	14 Aug 2019 14:00
SUB_Perch-6850			29 Aug 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]  
Received By: [Signature]  
Cooler ID(s): 982

Date/Time: 08/15/19 1800  
Date/Time: 8/16/19  
Temperature(s): 848





ALS-SALT LAKE CITY-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill in or Circle)

1923491

Client Name: ALS Houston Project/Task/Site: \_\_\_\_\_

Date/Time of Receipt: 8/11/19 / 848 Number of Coolers Received: 1

Condition of Coolers: <u>Acceptable/Unacceptable</u>	Temperature Control: <u>Present/Not Included</u>
Cooler Custody Seals: <u>Present/Absent/NA</u>	Location Temp Taken: <u>Control/Between Samples</u>
Container Custody Seals: <u>Present/Absent/NA</u>	Are all temperatures within project specific guidelines? <u>Yes/No/NA</u>
Ice Present: <u>Yes/No/NA</u>	VOA Headspace Present? <u>Yes/No/NA</u>
Ice Present: <u>Frozen/Melted/NA</u>	

pH Check	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
Performed:	Cyanide	Yes/No/NA	TPH - 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19 <u>9872</u>	<u>3</u> °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C

Taken By: Meredith Smith Signature Meredith Smith Printed Name 8/11/19 Date

CLIENT-RELATED INFORMATION

- |  |   |  |   |
|--|---|--|---|
| <input type="checkbox"/> Missing Cooler                  | <input type="checkbox"/> Missing Samples/Bottles          | <input type="checkbox"/> Incorrect Preservation    | <input type="checkbox"/> Insufficient Sample Volume |
| <input type="checkbox"/> Cooler Conditions               | <input type="checkbox"/> Broken/Leaking Samples           | <input type="checkbox"/> pH Criteria Not Met       | <input type="checkbox"/> Chain of Custody Problems  |
| <input type="checkbox"/> Missing Paperwork               | <input type="checkbox"/> Incorrect Bottle Type            | <input type="checkbox"/> Residual Chlorine Present | <input type="checkbox"/> Other:                     |
| <input type="checkbox"/> Missing/Incorrect Bottle Labels | <input type="checkbox"/> Cooler Temperatures Out of Range | <input type="checkbox"/> Head Space in Bottles     |   |

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? Yes  No

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: \_\_\_\_\_ Returned to Sample Receipt by: \_\_\_\_\_ Date: \_\_\_\_\_

Must Deliver Next Business Day  
Time and Tempature Sensitive!



Print # 150483-034 P112 EXP 02/20

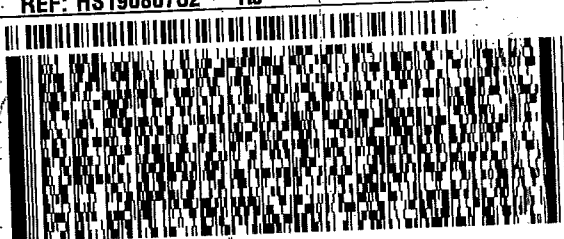
ORIGIN ID:SGRA (281) 530-5656  
CLIENT SERVICES  
ALS LABORATORY GROUP  
10450 STANCLIFF ROAD  
SUITE 210  
HOUSTON, TX 77099  
UNITED STATES US

SHIP DATE: 15AUG19  
ACTWGT: 13.30 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: HS19080732 - RJ



**FedEx**  
Express



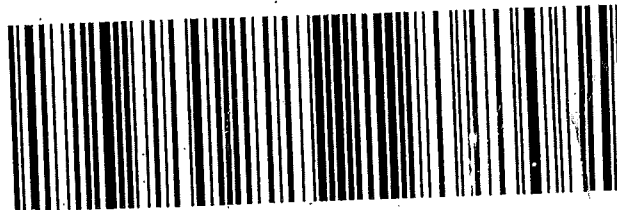
J1811180650T1U

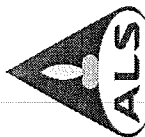
**FRI - 16 AUG 3:00P**  
**STANDARD OVERNIGHT**

TRK# 4809 7836 7888  
0201

**AX BTFA**

**84123**  
**UT-US SLC**





# Batch Worklist

**Batch:** ELMS/ 2284  
**Rule:** EPA 6850, DoD QSM Water  
**Created:** 8/20/2019 07:47  
**Analyst:** T. Bosch  
**Instrument:**  
**Status:** WP

HBN: 246025



- Workorder: 1923487 [ENV\_LVL4]
- Workorder: 1923490 [ENV\_LVL4]
- Workorder: 1923491 [ENV\_LVL4]
- Workorder: 1923492 [ENV\_LVL4]
- Workorder: 1923494 [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	669451	CCV for HBN 246025 [ELMS/2284]				CCV	3		E685041C3Q	5311		8/23/2019	
2	669452	RLYS for HBN 246025 [ELMS/2284]				RLYS	3		E685041C3Q	5311		8/23/2019	
3	669453	ICS for HBN 246025 [ELMS/2284]				ICS	3		E6850.D3Q	5311		8/23/2019	
4	669454	LMB for HBN 246025 [ELMS/2284]				LMB	3		E6850Q413Q	5311		8/23/2019	
5	669455	LCS for HBN 246025 [ELMS/2284]				LCS	3		E6850Q413Q	5311		8/23/2019	
6	1923487001	50WW29-190815				SAMPLE	3	1923487001-A	E6850Q41.3	5480	9/12/2019	8/23/2019	
7	1923490001	16WW57-190815				SAMPLE	3	1923490001-A	E6850Q41.3	5480	9/12/2019	8/23/2019	
8	1923490002	16WW57-190815MS				MS	3	1923490002-A	E6850Q413Q	5480		8/23/2019	
9	1923490003	16WW57-190815MSD				MSD	3	1923490003-A	E6850Q413Q	5480		8/23/2019	
10	1923490004	16WW58-190815				SAMPLE	3	1923490004-A	E6850Q41.3	5480	9/12/2019	8/23/2019	
11	1923490005	16WW58-190815-FD				FLDDUP	3	1923490005-A	E6850Q41.3	5480	9/12/2019	8/23/2019	
12	1923491001	LH18/24-SP650_081419_BIX				SAMPLE	3	1923491001-A	E6850Q41.3	5480	9/11/2019	8/29/2019	
13	1923492001	LH18/24-SP140_081419				SAMPLE	3	1923492001-A	E6850Q41.3	5480	9/11/2019	8/29/2019	
14	1923494001	LH18/24-SP650_081419_BIX				SAMPLE	3	1923494001-A	E6850Q41.3	5480	9/11/2019	8/29/2019	
15	669456	CCV for HBN 246025 [ELMS/2284]				CCV	3		E685041C3Q	5311		8/23/2019	



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**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Analytical Documentation**

Analyst Write-upALS Work Order #'s & Sample #( )'s: 1923487 (001); 192349 (001-05) 1923491 (001);1923492 (001);1923494 (001)ELMS Batch/HBN ID: 2284 (246025)Prep Date: 08/19/2019 Analysis Date: 08/20/2019 Analyst: T. BoschAnalyte: **Perchlorate** Matrix: **Water** Method: **6850**Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\AUG\20AUG19D.sReported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**SAMPLE PREPARATION/ANALYSIS:

**Water:** Samples were prepared by Thomas Bosch. 10.0mL of each sample was pipetted into a 15-mL centrifuge tube, and 50µL of an oxygen-18 labeled perchlorate solution was added as an internal standard. The samples were capped, vortexed, and filtered with Phenex PES membrane 0.45µm Syringe filters prior to analysis.

**REAGENTS:** Eluent A1: 95% ASTM Type II water (ALS)/ 5% ACN (B&J Lot AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).  
Eluent B1: 95% ACN (B&J Lot AH015-4) 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

**STANDARDS:** Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

**CALIBRATION CURVE:** Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.M

**INSTRUMENT CONDITIONS:** Samples were analyzed with an Agilent 1100 LC/MSD system, in negative SIM mode, monitoring m/z 83, 85, and 89.

**Instrument ID:** LCMS04 Online Acquisition Method: CLO4-AQN.M Fragmentor: 160 Output Gain: 10 Injection Volume: 50µL  
Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

FLOW GRADIENT:

Time (min.)	Flow (mL/min)
0	0.65
5.8	0.65
5.9	0.25
10.3	0.25
10.5	0.65
12.0	0.65

**QC DATA:** 4.0µL of QC Solution Horizon ID 47516 was used for LCS 669455; Target = 4.0µg/L. ASTM type II water was used for LMB 669454.

**MS/MSD:** The Matrix Spike and duplicate (MS/MSD) were performed on samples 1923490002/03 (Client ID: 16WW57-190815). 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 1923492001 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 Matrix Spike and duplicate (MS/MSD) failed QC acceptance criteria for percent recoveries due to an unknown co-eluting contamination. 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\AUG\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\246025-DoD-ALS-Hstn LCMS4 or through \\ALSLTWS013\DATAREVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 669452) is reported from the analysis of the Laboratory Control Sample (LCS – 669455) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03) along with datafiles 20AUGD06-08/11/13.

### 5.5 Chromatography (GC, HPLC and LC/MS) Technical Review

Note: It is the peer reviewer's responsibility to ensure that appropriate criteria are used as defined in the HORIZON PROFILE. The evaluation criteria are prioritized as per Section 2.2 of this SOP. These items must be checked for all projects. The following checklist will be completed by both the analyst and the peer reviewer and scanned into the HBN folder with the raw data.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
Batch(es)/SDG: ELMS: 2284 HBN: 246 025		
Sample Set IDs if Applicable: 1923492 / 1923494 1923487 / 1923490 / 1923491		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSS, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SP
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR#</u>	—	—
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB



## STANDARD REPORT

## Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850.WKG Std 100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	0.1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019





## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 STOCK

CLO4 STOCK		Description - 6850 Stock AccStd 1,000ug/mL	
Standard: 43659		Created By: Thomas Bosch	
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	
MFG Lot: 218065075		Amount: 100 mL	
Part ID: IC-PER-10X-1		Expires: 07/25/2020	
		Usable: No	
		Lab Lot: CLO4 STOCK	
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

ASTM H2O		Description - ASTM Type II Water	
Standard: 109	Created By: ALS Support (Lims)	Amount: 1000 L	
MFG: DCL In House	Create Date: 10/06/2005 09:10AM	Expires: 11/07/2025	
MFG Lot: Not Provided		Usable: Yes	
Part ID: Not Provided		Lab Lot: LAB 109	
Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 INT

CLO4 INT			Description - 6850 Intermdt AccStd 10.ug/mL		
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



## STANDARD REPORT

## Working Standard - CLO4 QC WRK

CLO4 QC WRK			Description - 6850 QC WKG STD 100ug/L		
Standard: 47516		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC WRK 100.ug/L	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

ASTM H2O		Description - ASTM Type II Water	
Standard: 109	Created By: ALS Support (Lims)	Amount: 1000 L	
MFG: DCL In House	Create Date: 10/06/2005 09:10AM	Expires: 11/07/2025	
MFG Lot: Not Provided		Usable: Yes	
Part ID: Not Provided		Lab Lot: LAB 109	
Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL	
Standard: 36748	Created By: Thomas Bosch	Amount: 100 mL	
MFG: Ultra Scientific	Create Date: 05/11/2017 01:05PM	Expires: 03/31/2020	
MFG Lot: CP-0860		Usable: Yes	
Part ID: ICC-013		Lab Lot: CLO4 QC STOCK	
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

Working Standard - CLO4 QC INT

CLO4 QC INT		Description - 6850 QC Intrmdt Std-QC 10ug/mL			
Standard: 47515		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC INT 10.ug/mL	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020



## STANDARD REPORT

## Working Standard - CLO4ISTDWRK

CLO4ISTDWRK		Description - Perchlorate ISTD Wrk 1,000ug/L			
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		Verified By: Thomas Bosch		Usable: Yes	
Pipette ID: Not Provided		Verify Date:		Lab Lot: CLO4ISTDWRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L		
2	14797-73-0-89	Perchlorate 89	1000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026





## STANDARD REPORT

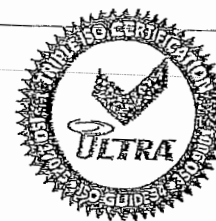
## Constituent

## Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK		Description - Perchlorate ISTD Stock	
Standard: 43729	Created By: Thomas Bosch	Amount: 1 mL	
MFG: Cambridge Isotope	Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026	
MFG Lot: SDFP-012A	Verified By: Thomas Bosch	Usable: Yes	
Part ID: OLM-7310-S	Verify Date:	Lab Lot: CLO4ISTDSTK	
Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL



# Certificate of Analysis



## ISO Guide 34 Reference Material

Product Number: ICC-013  
Lot Number: CP-0860

Lot Issue Date: 29-Feb 2016  
Expiration Date: 31-Mar 2020

Product Name: Perchlorate IC Standard

### Description:

This Reference Material (RM) was gravimetrically prepared in accordance with ISO Guide 34 and under ULTRA Scientific's ISO 9001 registered quality system. The neat materials used for this product have been verified by ULTRA's ISO 17025 laboratory and under ULTRA's ISO Guide 34 accreditation. The analyte concentrations were verified by ULTRA's ISO 17025 accredited laboratory. For each analyte, the true value, with its uncertainty value calculated at the 95% confidence level, is reported below.

Analyte	Starting Material	Lot Number	Purity (%)	Calculated Value	True Value	Traceability & Method
perchlorate	potassium perchlorate	RM07987	100	1001 ± 5 µg/mL	976 ± 6 µg/mL	NIST SRM 3141A; ICP-OES

Solvent: water (low TOC, < 50 ppb)

Storage: Store at Room Temperature (15° to 30°C).

### Traceability:

Traceability has been established through an unbroken chain of comparisons, each having stated uncertainties. Comparisons are based on appropriate physical or chemical measurements, including gravimetric or volumetric dilution, where the mass or volume of a solution before and after dilution is measured. The balances used for these measurements are calibrated with weights traceable to NIST in compliance with ANSI/NCCL Z-540-1, ISO 9001, ISO 17025, and ISO Guide 34. Calibrated Class A glassware is used for volumetric measurements. Thermometers are calibrated against a NIST traceable thermometer in accordance with NIST Special Publication 819.

### Estimation of Uncertainties:

The true value is reported, with its uncertainty value calculated at the 95% confidence level.

### Homogeneity:

This RM was formulated and unitized according to an in-house procedure and is guaranteed to be homogeneous. There is no minimum sub-sample size required.

### Intended Use:

This RM is intended for the preparation of working reference samples for use in routine laboratory analyses, calibration of instruments, validation of analytical methods, assessments of measurement methods and continuing calibration verification.

### Instructions for Use:

Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the bottle after removing any material and store according to the instructions noted above.

### Hazards:

Refer to the Safety Data Sheet for information regarding this RM.

### Expiration of Certification:

The certification of this RM is valid, within the measurement uncertainty specified, until the expiration date specified above, provided the RM is handled and stored in accordance with the instructions given in this certificate. This certification is nullified if the RM is damaged, contaminated, or otherwise modified.





# Certificate of Analysis



## ISO Guide 34 Reference Material

Product Number: ICC-013  
Lot Number: CP-0860

Lot Issue Date: 29-Feb 2016  
Expiration Date: 31-Mar 2020

### Maintenance of Certification:

The real-time, long term stability of the RM may be monitored over the lifetime of the certification. If substantive changes occur that affect the certification before the expiration of this certificate, ULTRA Scientific will notify the purchaser.

Peter A. King, Ph.D.  
VP, Technical Operations

Daniel J. Lamendola  
Director of QA/RA

125 Market Street  
New Haven, CT 06513  
USA



AccuStandard®

Tel (203)786-5290  
Fax (203)786-5287  
www.AccuStandard.com

# CERTIFICATE OF ANALYSIS



S 43659

AccuTrace™ Reference Standard

Catalog No: IC-PER-10X-1  
Description: Perchlorate Standard  
Element: Perchlorate (ClO<sub>4</sub>)  
SRM: Ind. Std.  
Lot: 218065075  
Matrix: Water  
Hazards: Refer to SDS for complete safety information

Date Certified: Jun 25, 2018  
Expiration: Jul 25, 2020  
Sample Size: 100 mL  
Components: 1  
Storage Condition: Ambient (>5 °C)  
Included on ISO/IEC 17025 Scope of Accreditation: Yes  
Included on ISO 17034 Scope of Accreditation: Yes



Signal Word: None

Component	SRM #	Prepared Concentration (µg/mL)
ClO <sub>4</sub> Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is ±0.24%.

The final solution was checked against an independent standard to verify its concentration.

We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.

All solutions are filtered through a 0.2 µm filter prior to being bottled.

All glassware used in preparation is Class A and calibrated regularly.

All weights are traceable through NIST, Test No. 822-275872-11

All bottles are triple rinsed with deionized water prior to use.

Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.

We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By:

*Meigan O'Leary*

Meigan O'Leary, Inorganic QC Manager



Cambridge Isotope Laboratories, Inc.

## Certificate of Analysis

Quality Standards:  
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

Product Name: PERCHLORIC ACID, SODIUM SALT  
(Isotopic Label & Enrichment Specification) (18O<sub>4</sub>, 90%+) 100 UG/ML IN WATER

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

## Product Information

Chemical Purity Specification:  $\geq 98\%$

Labeled CAS Number: NA

Unlabeled CAS Number: 7601-89-0

MW\*: 130.4

Chemical Formula: NaCl\*O<sub>4</sub>

Storage: Store at room temperature away from light and moisture.

Stability: See storage and expiration date.

## Certification

Cambridge Isotope Laboratories, Inc. guarantees that this material meets or exceeds the specifications stated. Absolute identity as well as chemical and isotopic purities are assured by the use of unambiguous synthetic routes and multiple chemical analyses whenever possible. Results are representative of QC testing at time of release from Quality Control unless otherwise stated.

Volumetric measurements were made with Class A glassware. Gravimetry is traceable to the NIST through calibrated balances and certified, calibrated, standard weights. The calibrations are traceable to the NIST under Test No. 822/270236-04. The calibrations also meet specifications outlined in ISO 9001, ISO/IEC 17025, ANSI/NSCL Z540-1-1994, NCR Document 10CFR50 Appendix B, and applicable subdocuments.

This COA references the bulk catalog number before packaging. The COA also applies to the CIL finished good catalog number. Some possible packaging sizes and their corresponding suffix are -1.2, -1, -0.5, -10, or -0.1.

\* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

## Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 $\mu\text{g/mL}$
Chemical Purity of Neat Material(s)	98%
LC/MS for Concentration	109.4 $\pm$ 2.8 $\mu\text{g/mL}$ (k=2)



---

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# Raw Data

Batch 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	
*	669451	CCV@25	Vial 71	1	Control	1	1.83142e6	7.920	24.74457
*	669455	QC@40.	Vial 72	1	Control	2	3.16440e5	7.864	4.15613
*	669453	ICS@4.0	Vial 73	1	Control	3	2.24930e5	7.622	3.70421
*	669454	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1923487001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1923490001		Vial 76	1	Sample	6	1.36285e5	6.452	<del>2.91596</del>
*	1923490002	MS	Vial 77	1	Sample	7	3.54477e5	6.456	5.19924
*	1923490003	MSD	Vial 78	1	Sample	8	3.58346e5	6.443	5.30157
*	1923490004		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1923490005		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1923491001		Vial 81	1	Sample	11	5.58062e5	7.463	10.20944
*	1923492001	1K	Vial 82	1	Sample	12	6.21377e5	8.056	8846.41646
*	1923494001		Vial 83	1	Sample	13	5.89441e5	7.465	12.30933
*	669456	CCV@25	Vial 71	1	Control	14	1.49865e6	7.934	23.18463

N.R. - NOT REPORTED / FAILS 83/85 ION RATIO

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	669451	CCV@25	Vial 71	1	Control	1	5.59319e5	7.925	25.42099
*	669455	QC@40.	Vial 72	1	Control	2	1.05210e5	7.919	4.49624
*	669453	ICS@4.0	Vial 73	1	Control	3	8.51245e4	7.639	4.53455
*	669454	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1923487001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	1923490001		Vial 76	1	Sample	6	5435.15332	6.455	3.69491e-1
*	1923490002	MS	Vial 77	1	Sample	7	6.92296e4	6.460	3.34493
*	1923490003	MSD	Vial 78	1	Sample	8	6.93358e4	6.454	3.38171
*	1923490004		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	1923490005		Vial 80	1	Sample	10	0.00000	0.000	0.00000
*	1923491001		Vial 81	1	Sample	11	1.97832e5	7.485	12.02438
*	1923492001	1K	Vial 82	1	Sample	12	1.97618e5	8.075	9349.59092
*	1923494001		Vial 83	1	Sample	13	2.00512e5	7.480	13.95607
*	669456	CCV@25	Vial 71	1	Control	14	4.73078e5	7.940	24.57014

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	669451	CCV@25	Vial 71	1	Control	1	2.25315e5	7.934	5.00000
*	669455	QC@40.	Vial 72	1	Control	2	2.50411e5	7.899	5.00000
*	669453	ICS@4.0	Vial 73	1	Control	3	2.00878e5	7.639	5.00000
*	669454	LMB	Vial 74	1	Control	4	2.37984e5	7.976	5.00000
*	1923487001		Vial 75	1	Sample	5	2.26263e5	7.226	5.00000
*	1923490001		Vial 76	1	Sample	6	1.56767e5	6.449	5.00000
*	1923490002	MS	Vial 77	1	Sample	7	2.21958e5	6.471	5.00000
*	1923490003	MSD	Vial 78	1	Sample	8	2.19867e5	6.460	5.00000
*	1923490004		Vial 79	1	Sample	9	1.85427e5	7.007	5.00000
*	1923490005		Vial 80	1	Sample	10	1.90140e5	7.042	5.00000
*	1923491001		Vial 81	1	Sample	11	1.73328e5	7.485	5.00000
*	1923492001	1K	Vial 82	1	Sample	12	2.23942e5	8.077	5000.00000
*	1923494001		Vial 83	1	Sample	13	1.50739e5	7.485	5.00000
*	669456	CCV@25	Vial 71	1	Control	14	1.97525e5	7.935	5.00000

\*\*\* End of Report \*\*\*

## Sequence Table:

## Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	669451	CCV@25	CLO4-AQN	1	Ctrl Samp	
2	Vial 72	669455	QC@40.	CLO4-AQN	1	Ctrl Samp	
3	Vial 73	669453	ICS@4.0	CLO4-AQN	1	Ctrl Samp	
4	Vial 74	669454	LMB	CLO4-AQN	1	Ctrl Samp	
5	Vial 75	1923487001		CLO4-AQN	1	Sample	
6	Vial 76	1923490001		CLO4-AQN	1	Sample	
7	Vial 77	1923490002	MS	CLO4-AQN	1	Sample	
8	Vial 78	1923490003	MSD	CLO4-AQN	1	Sample	
9	Vial 79	1923490004		CLO4-AQN	1	Sample	
10	Vial 80	1923490005		CLO4-AQN	1	Sample	
11	Vial 81	1923491001		CLO4-AQN	1	Sample	
12	Vial 82	1923492001	1K	CLO4-AQN	1	Sample	
13	Vial 83	1923494001		CLO4-AQN	1	Sample	
14	Vial 71	669456	CCV@25	CLO4-AQN	1	Ctrl Samp	

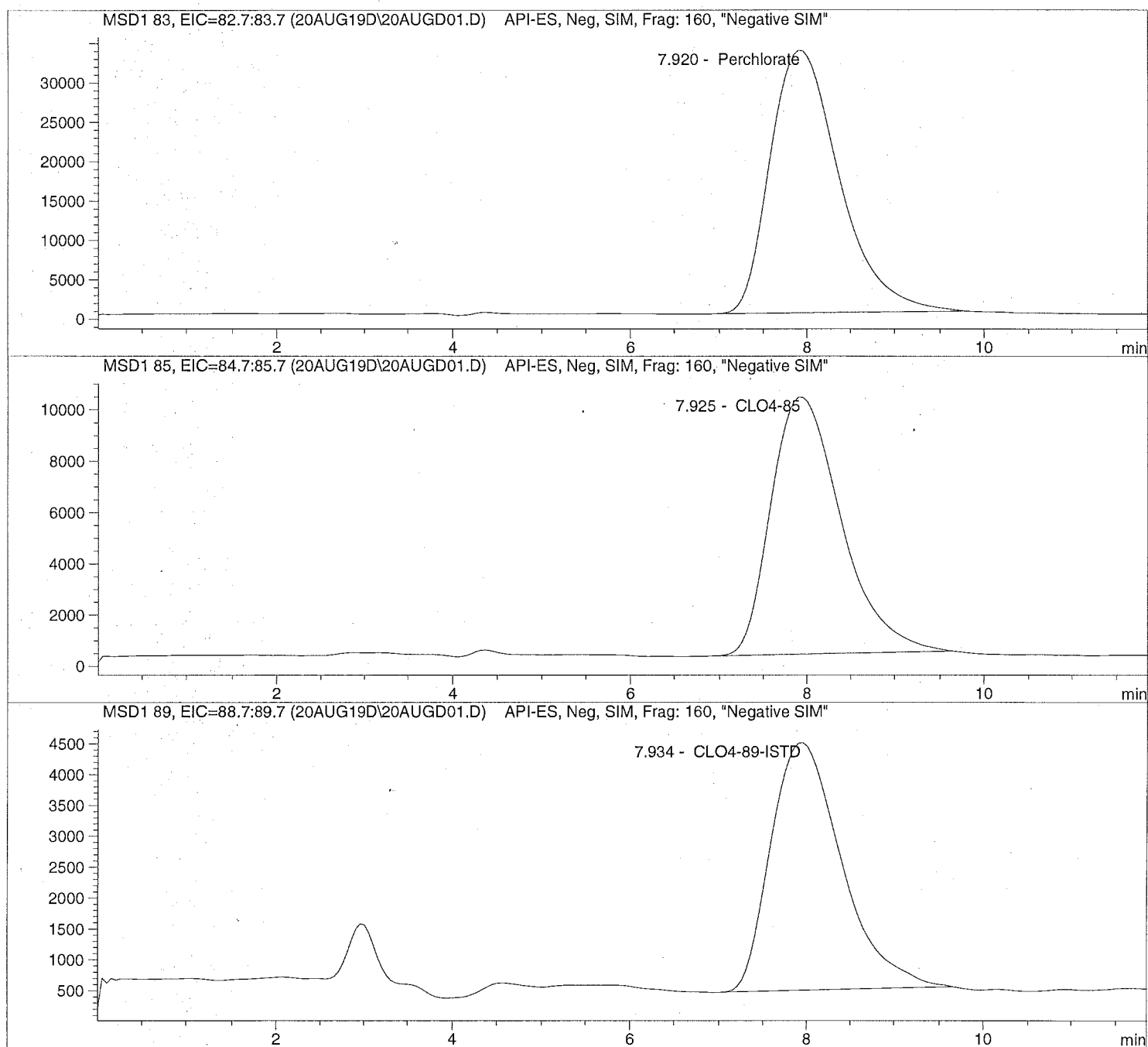


Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD01.D Sample Name: 669451 CCV@25

```
=====
Injection Date: 8/20/2019 08:32:23      Seq Line: 1
Sample Name: 669451 CCV@25             Location: Vial 71
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08
```

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD01.D Sample Name: 669451 CCV@25

```

=====
Injection Date: 8/20/2019 08:32:23      Seq Line: 1
Sample Name:    669451  CCV@25          Location:  Vial 71
Acq Operator:   TNB                    Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.920	PBA	1831422.8	24.7446	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.925	PBA	559319.2	25.4210	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.934	PBA	225315.3	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

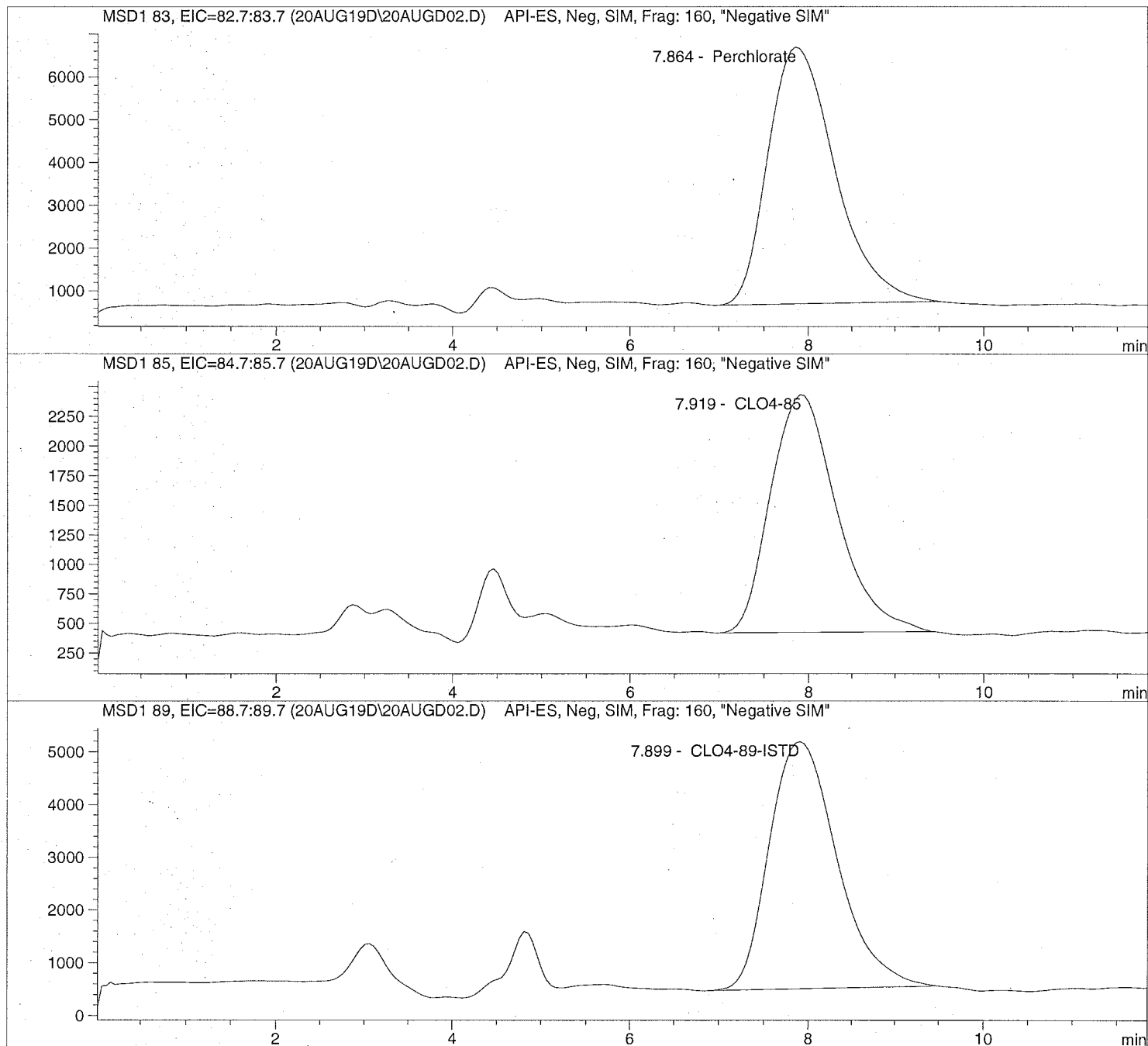
```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD02.D Sample Name: 669455 QC@40.

Injection Date: 8/20/2019 08:46:36 Seq Line: 2  
Sample Name: 669455 QC@40 Location: Vial 72  
Acq Operator: TNB 4.0 Inj. No.: 1  
Inj. Vol.: 50 µl  
TB 8-20-19

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD02.D Sample Name: 669455 QC@40.

```

=====
Injection Date: 8/20/2019 08:46:36      Seq Line: 2
Sample Name: 669455 QC@40.              Location: Vial 72
Acq Operator: TNB                        Inj. No.: 1
                                           Inj. Vol.: 50 µl
                                           4.0
                                           1382019
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 am
Multiplier: 1.000000
Dilution: 1.000000
Sample Amount: 40.000
=====

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.864	PBA	316439.8	4.1561	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.919	PBA	105210.3	4.4962	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.899	PBA	250410.7	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

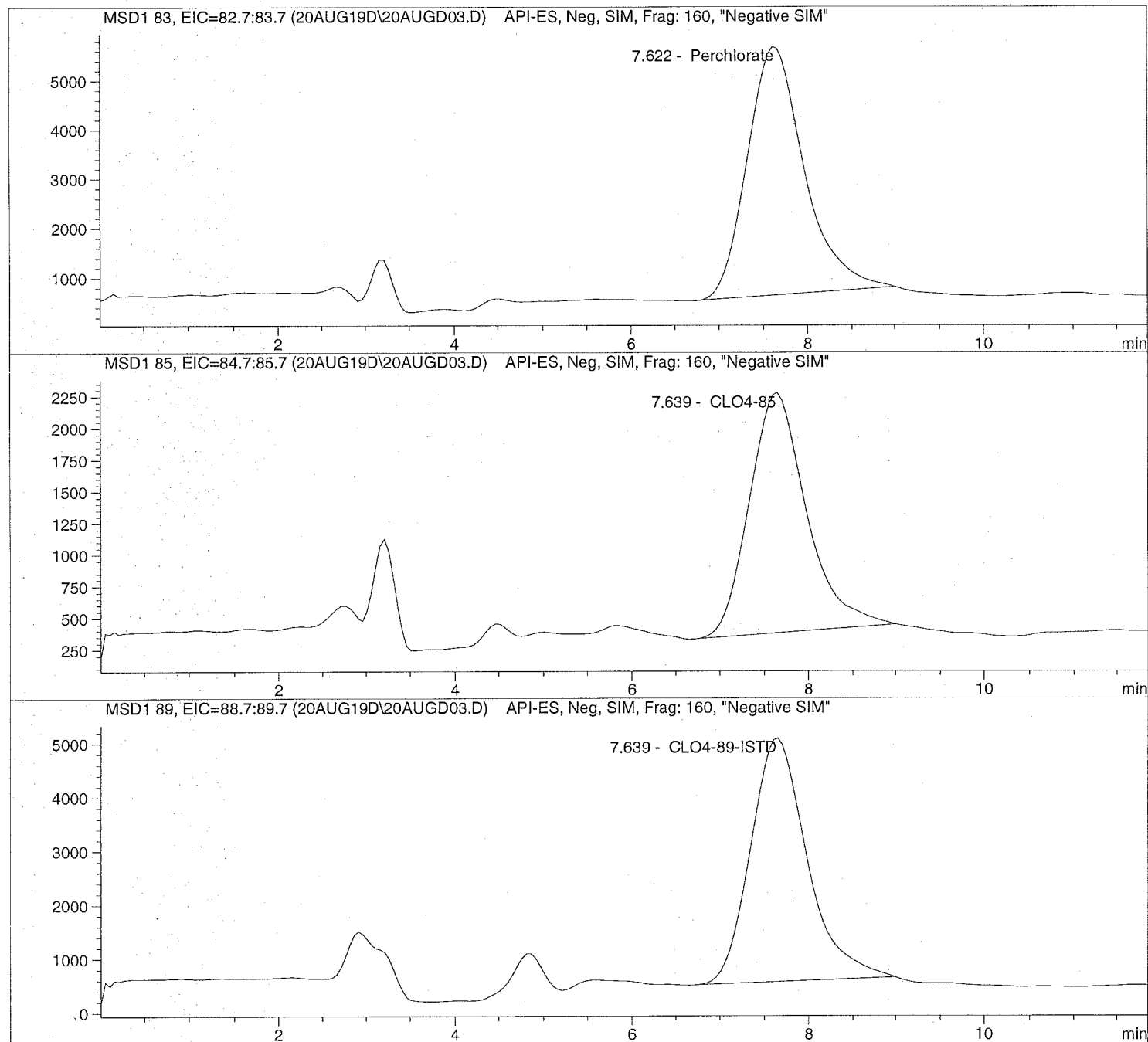
```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD03.D Sample Name: 669453 ICS@4.0

=====  
Injection Date: 8/20/2019 09:01:36 Seq Line: 3  
Sample Name: 669453 ICS@4.0 Location: Vial 73  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl  
=====

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD04.D

Sample Name: 669454 LMB

Injection Date: 8/20/2019 09:15:53

Seq Line: 4

Sample Name: 669454 LMB

Vial 74

Acq Operator: TNB

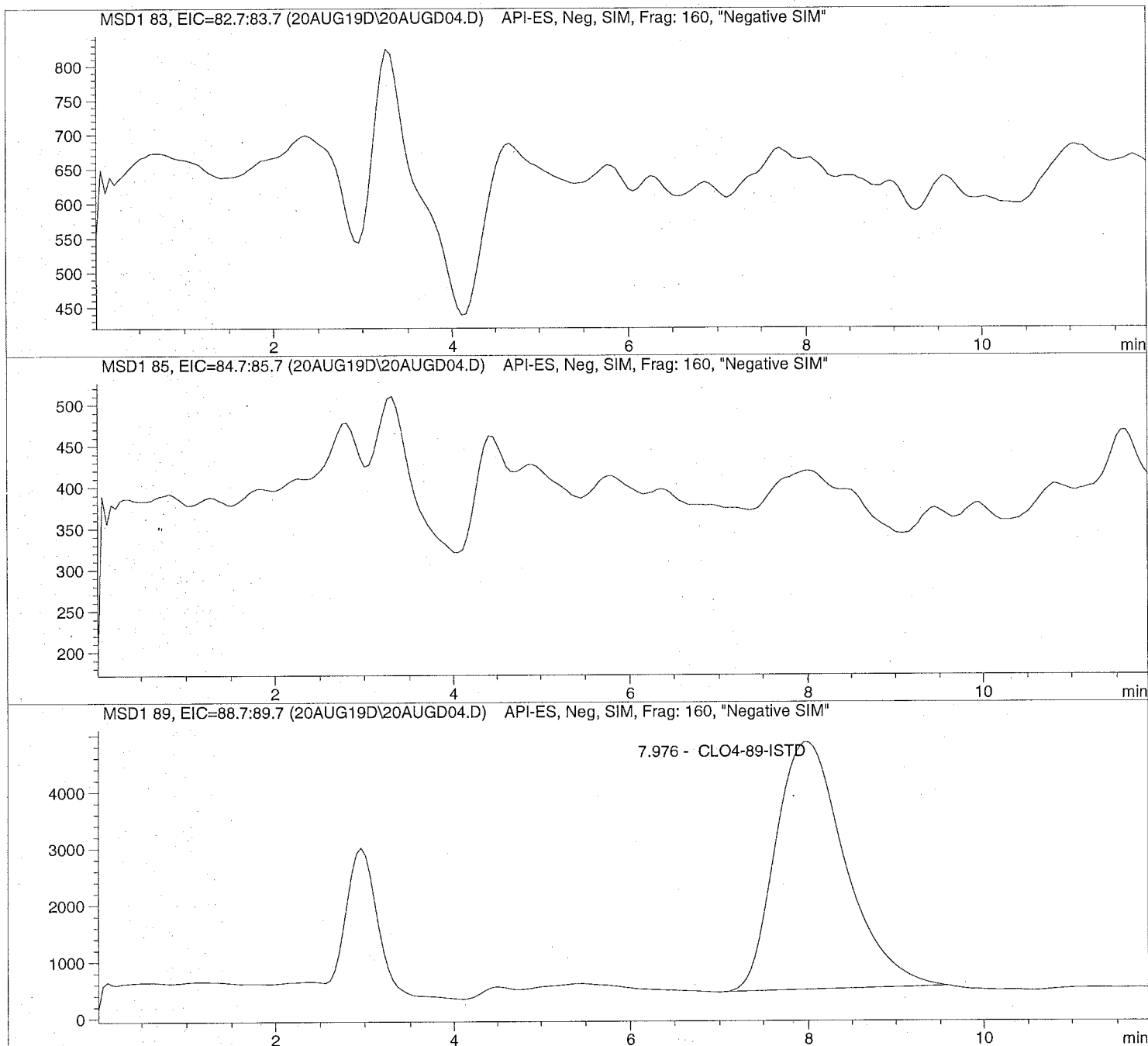
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD04.D Sample Name: 669454 LMB

```

=====
Injection Date: 8/20/2019 09:15:53      Seq Line: 4
Sample Name: 669454 LMB                  Location: Vial 74
Acq Operator: TNB                        Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.976	PBA	237984.2	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

```



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD05.D

Sample Name: 1923487001

Injection Date: 8/20/2019 09:30:05

Seq Line: 5

Sample Name: 1923487001

Location: Vial 75

Acq Operator: TNB

Inj. No.: 1

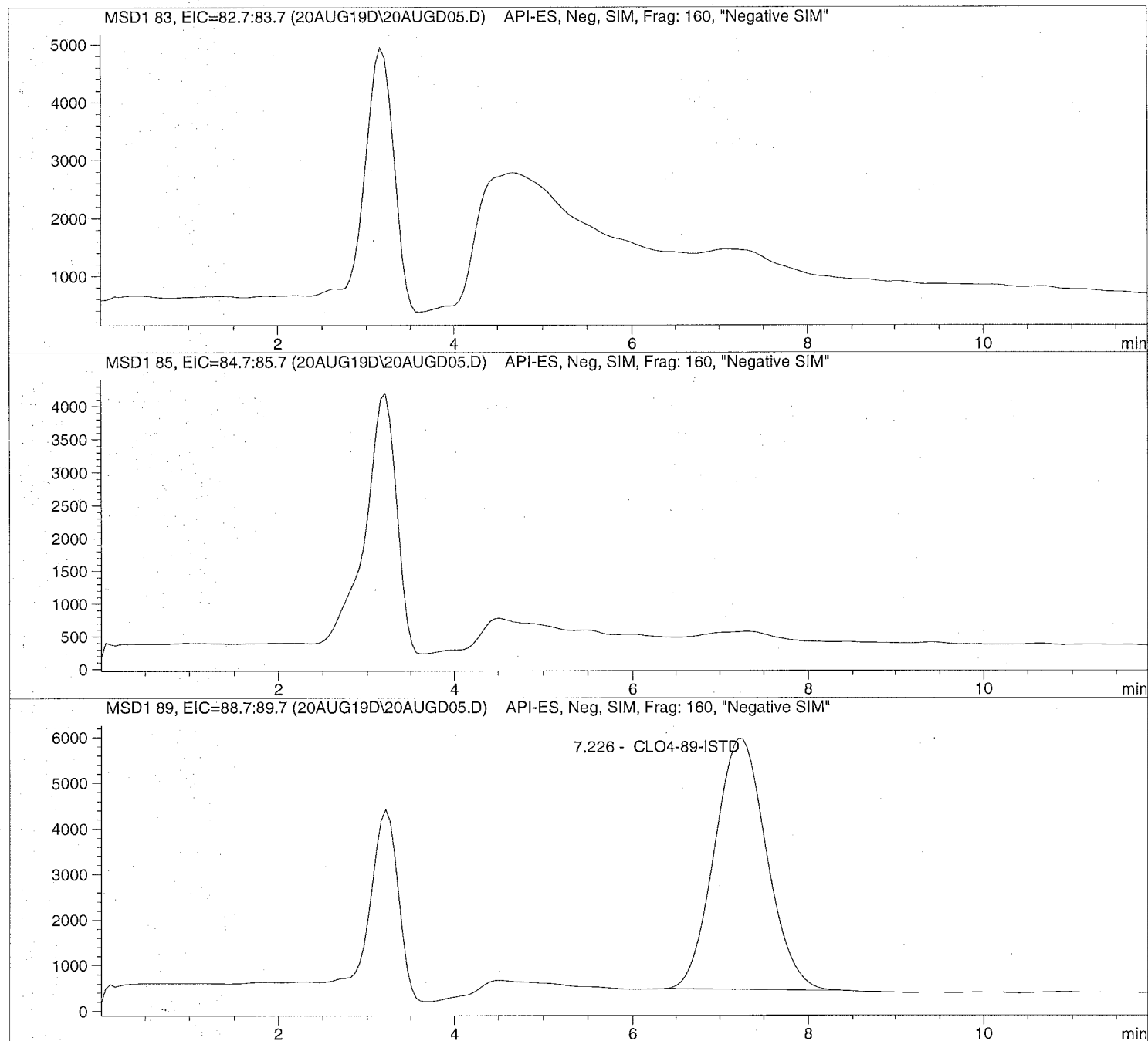
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD05.D

Sample Name: 1923487001

```

=====
Injection Date: 8/20/2019 09:30:05      Seq Line:      5
Sample Name:    1923487001              Location:      Vial 75
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.226	PBA	226262.5	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD06.D

Sample Name: 1923490001

Injection Date: 8/20/2019 09:44:16

Seq Line: 6

Sample Name: 1923490001

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

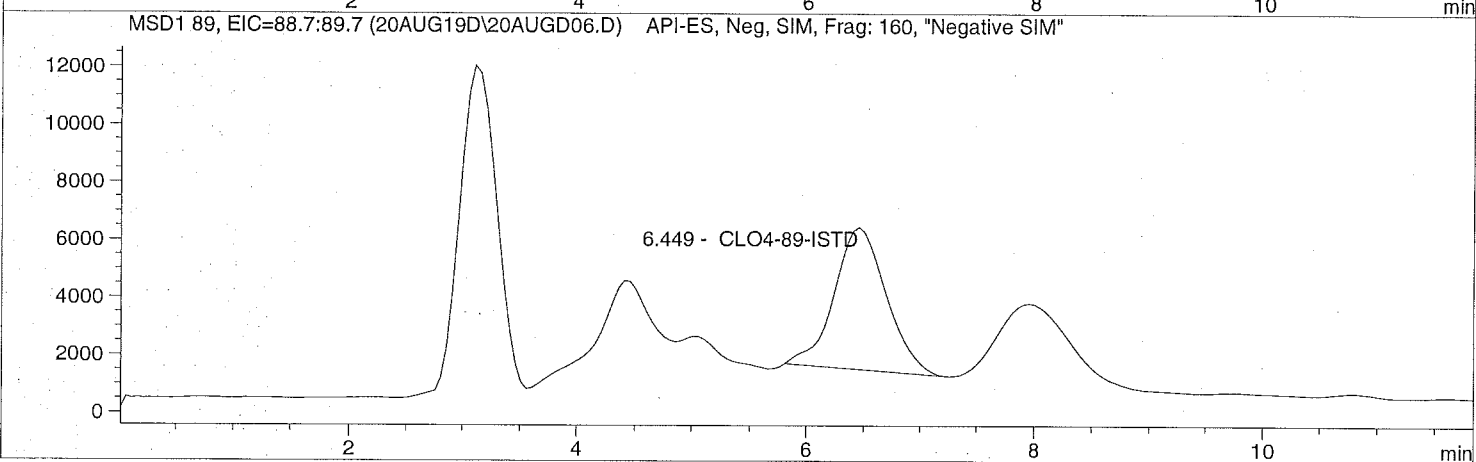
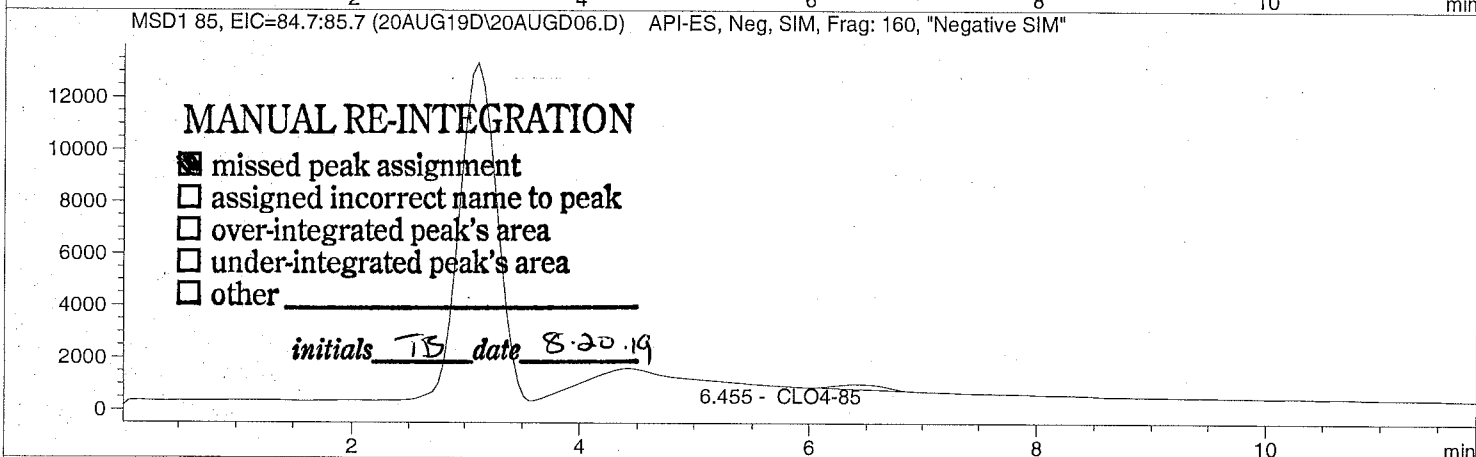
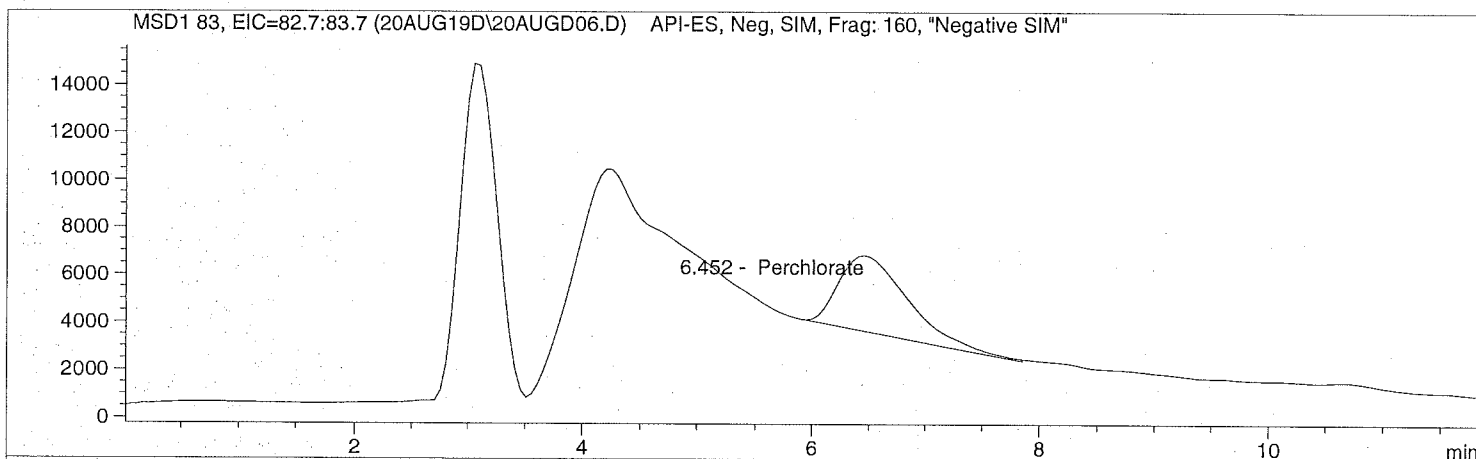
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD06.D

Sample Name: 1923490001

```

=====
Injection Date: 8/20/2019 09:44:16      Seq Line: 6
Sample Name: 1923490001                Location: Vial 76
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019, 10:15:00 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
6.452	BBA	136285.4	2.9160	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.455	MM	5435.2	0.3695	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.449	PB	156766.8	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

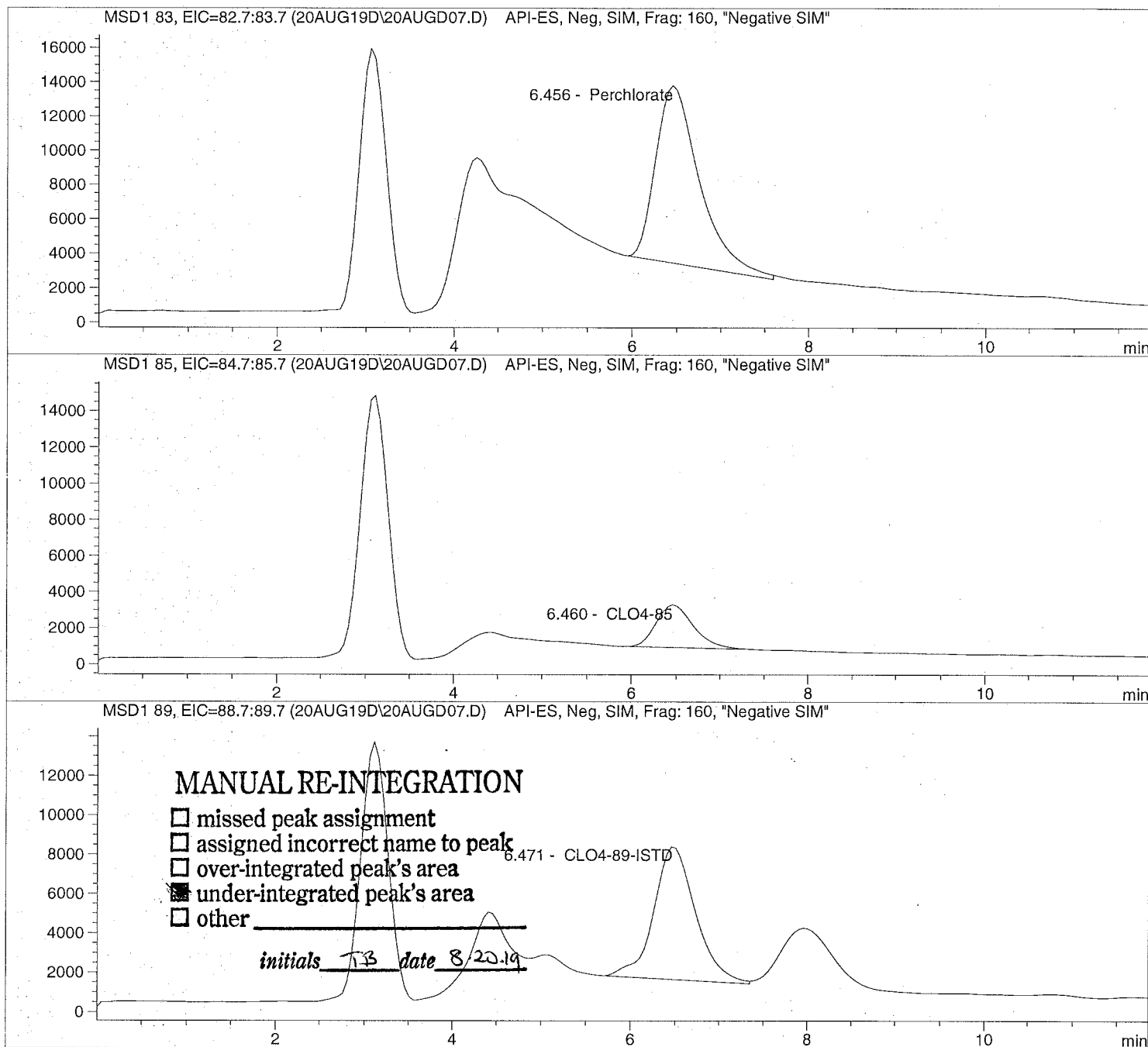
```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD07.D Sample Name: 1923490002 MS

Injection Date: 8/20/2019 09:58:28 Seq Line: 7  
Sample Name: 1923490002 MS Location: Vial 77  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD07.D Sample Name: 1923490002 MS

=====  
 Injection Date: 8/20/2019 09:58:28 Seq Line: 7  
 Sample Name: 1923490002 MS Location: Vial 77  
 Acq Operator: TNB Inj. No.: 1  
 Inj. Vol.: 50 µl

=====  
 Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 8/20/2019 12:11:08

Perchlorate analysis

=====  
 Sample Information  
 =====

Sorted By: Signal  
 Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.456	BBA	354476.8	5.1992	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.460	PBA	69229.6	3.3449	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.471	MF	221958.3	5.0000	CLO4-89-ISTD

=====  
 \*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD08.D

Sample Name: 1923490003 MSD

Injection Date: 8/20/2019 10:12:40

Seq Line: 8

Sample Name: 1923490003 MSD

Location: Vial 78

Acq Operator: TNB

Inj. No.: 1

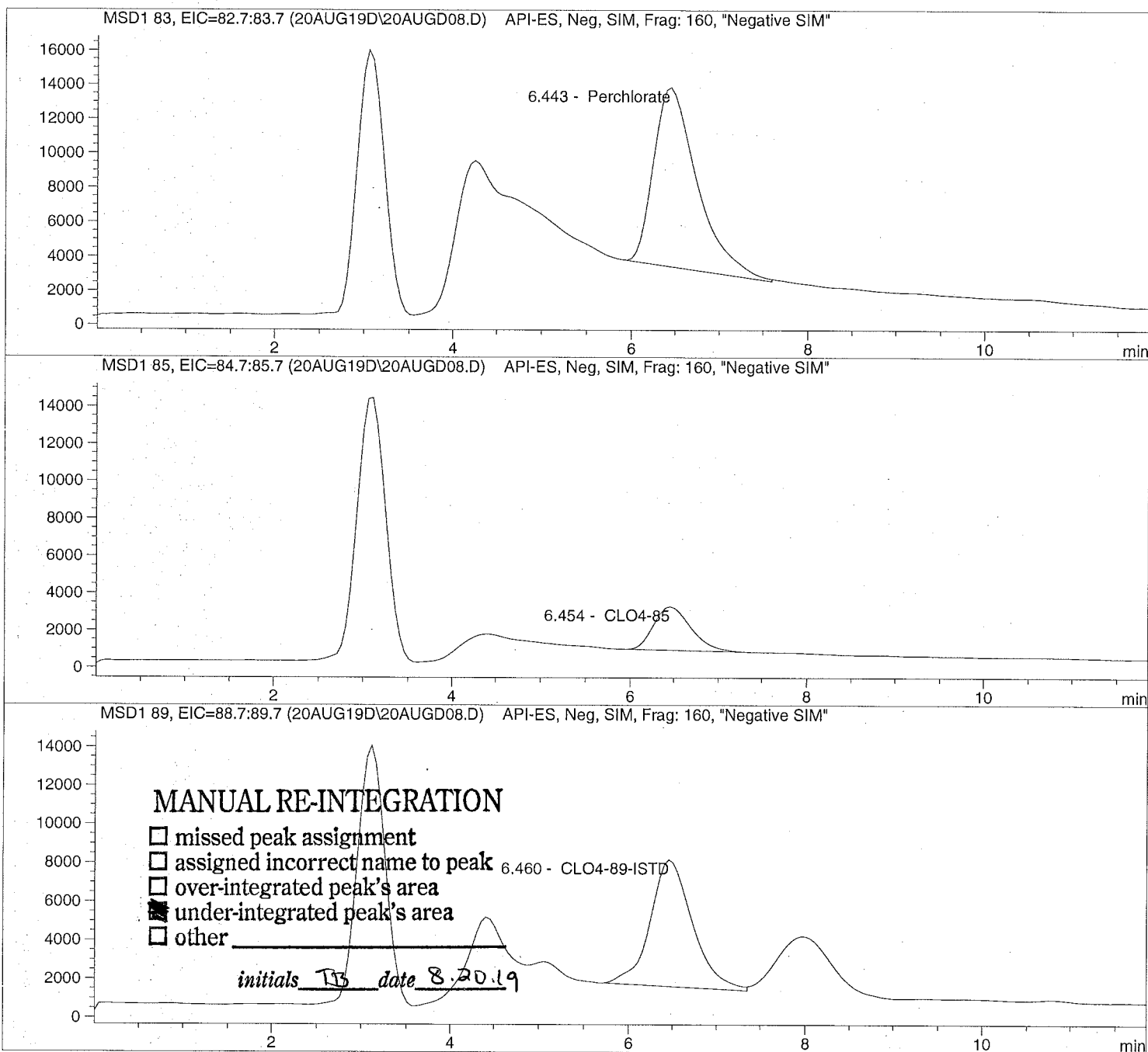
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD08.D Sample Name: 1923490003 MSD

```

=====
Injection Date: 8/20/2019 10:12:40      Seq Line:      8
Sample Name:    1923490003  MSD          Location:      Vial 78
Acq Operator:   TNB                Inj. No.:     1
                                           Inj. Vol.:   50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.443	BBA	358346.0	5.3016	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.454	PBA	69335.8	3.3817	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.460	MF	219867.2	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD09.D

Sample Name: 1923490004

Injection Date: 8/20/2019 10:26:54

Seq Line: 9

Sample Name: 1923490004

Location: Vial 79

Acq Operator: TNB

Inj. No.: 1

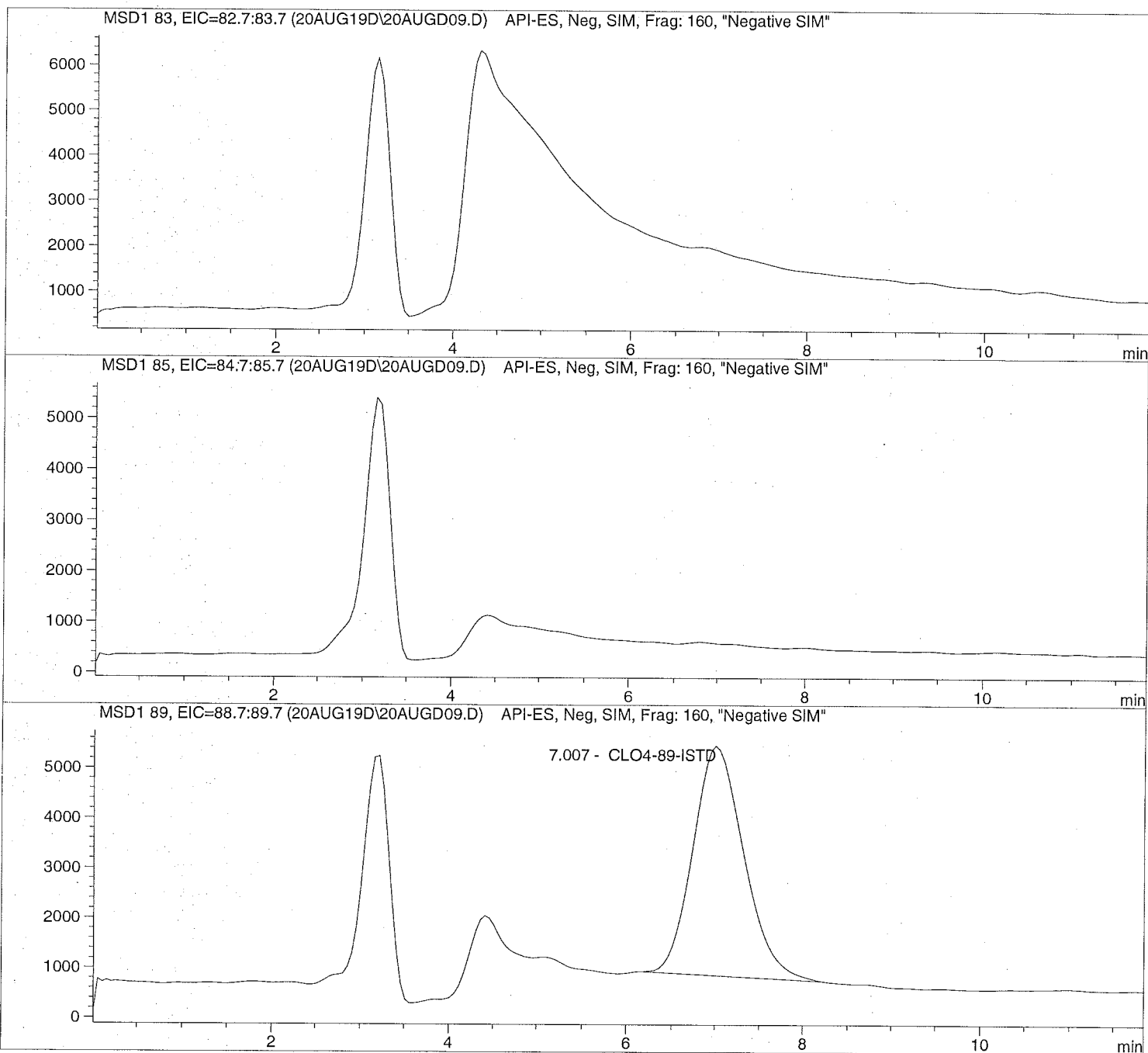
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD09.D

Sample Name: 1923490004

```

=====
Injection Date: 8/20/2019 10:26:54      Seq Line:          9
Sample Name:    1923490004              Location:         Vial 79
Acq Operator:   TNB                    Inj. No.:        1
                                           Inj. Vol.:       50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.007	PBA	185427.0	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD10.D

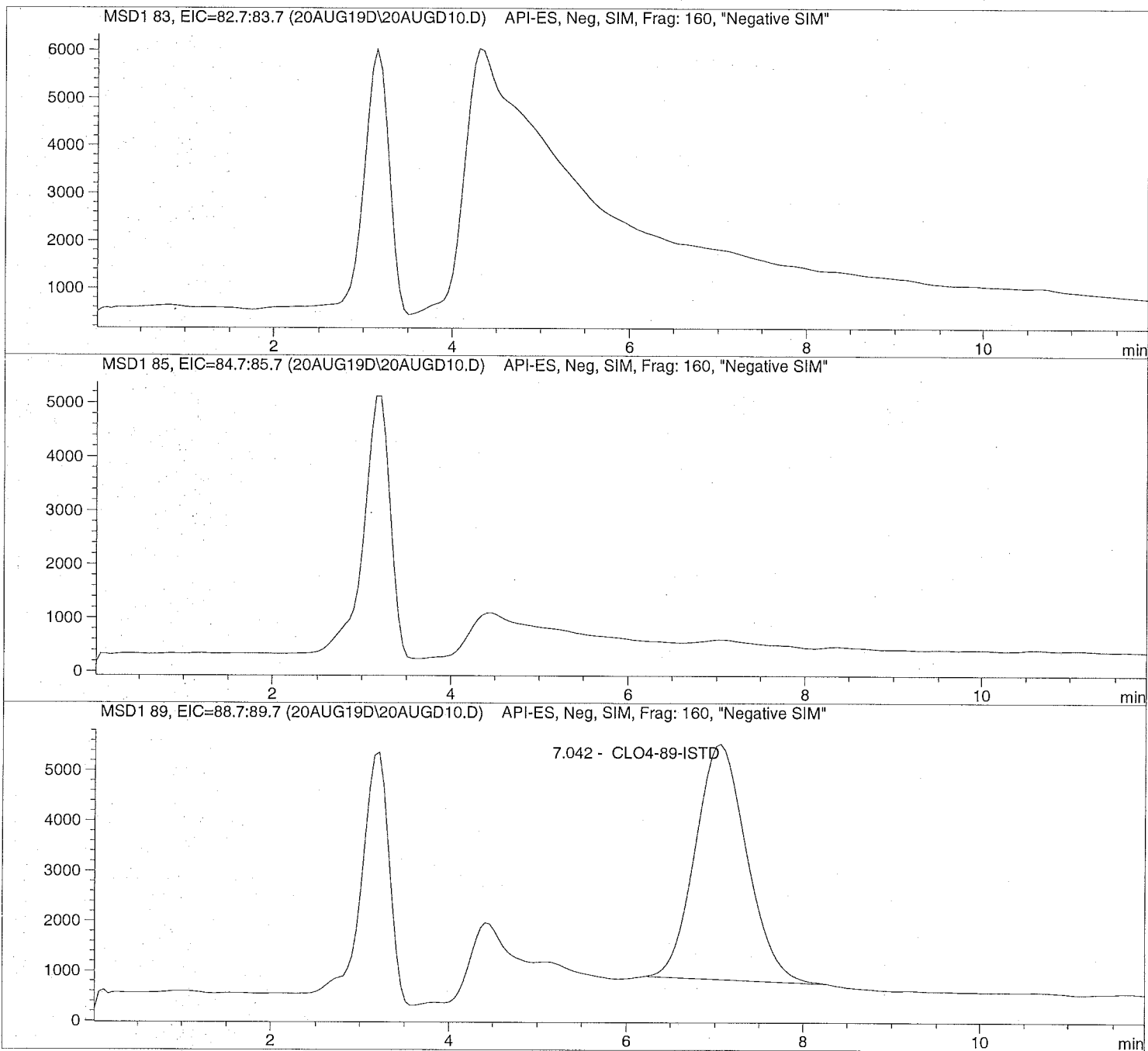
Sample Name: 1923490005

Injection Date: 8/20/2019 10:41:08  
Sample Name: 1923490005  
Acq Operator: TNB

Seq Line: 10  
Location: Vial 80  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD10.D

Sample Name: 1923490005

```

=====
Injection Date: 8/20/2019 10:41:08      Seq Line:      10
Sample Name:    1923490005              Location:      Vial 80
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.042	PBA	190139.9	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD11.D

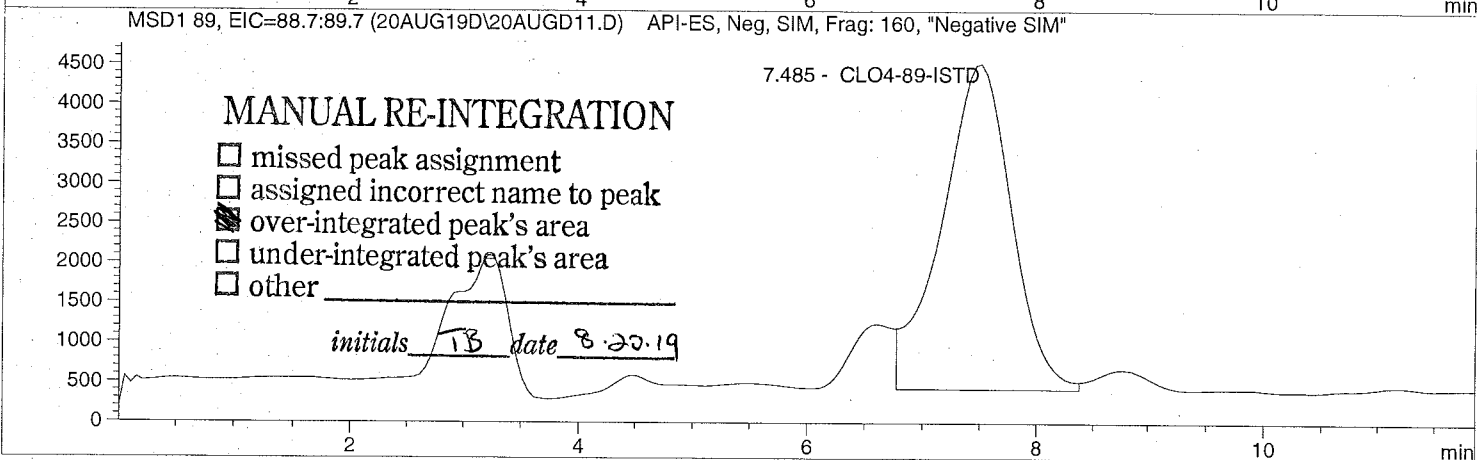
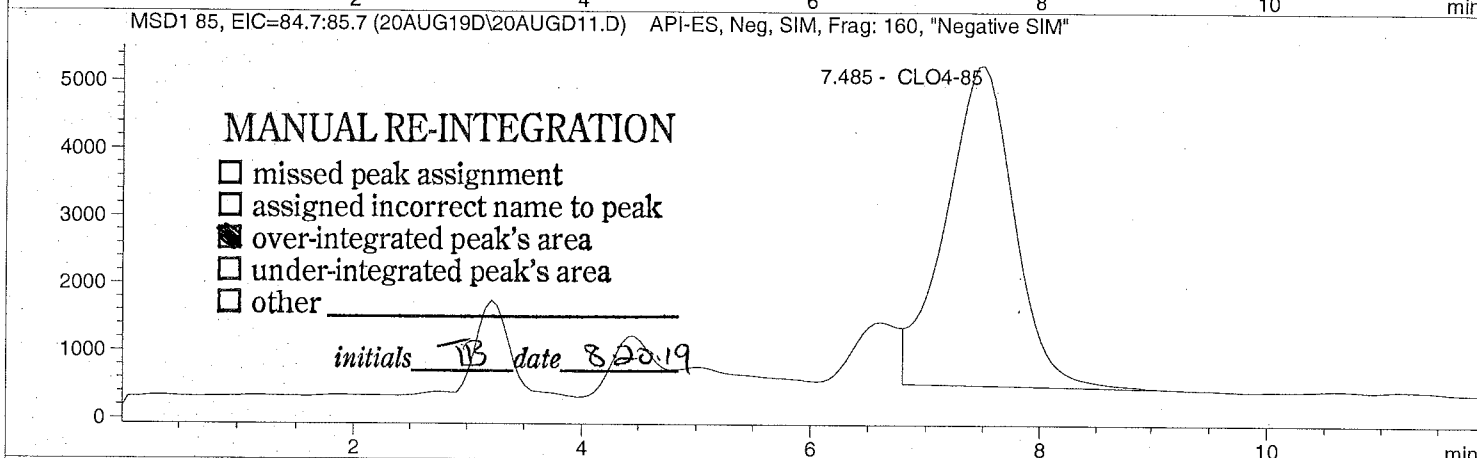
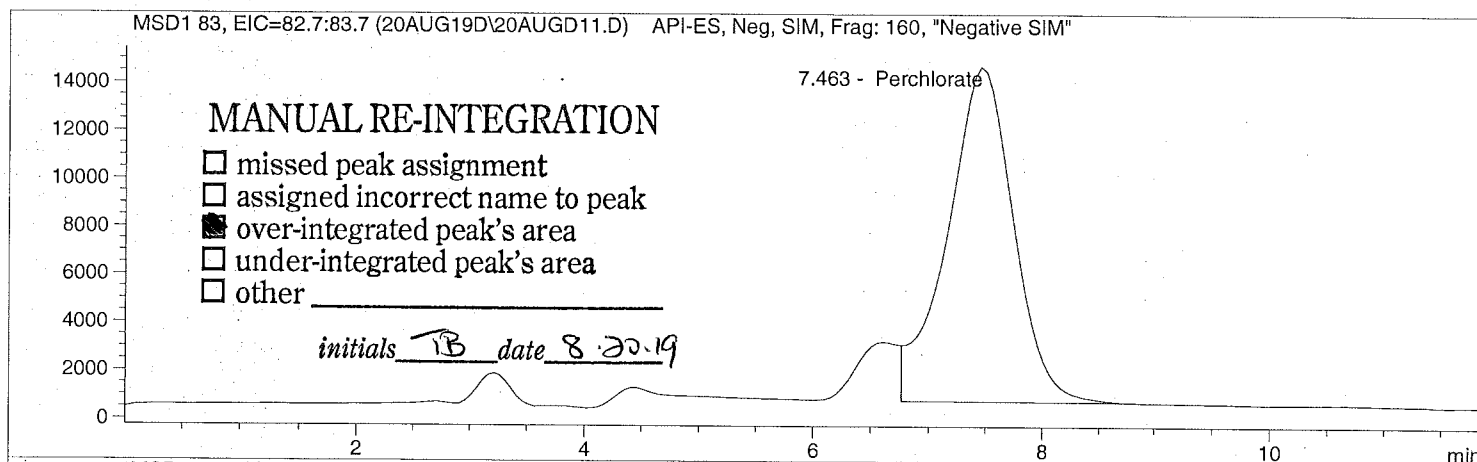
Sample Name: 1923491001

=====  
Injection Date: 8/20/2019 10:55:21  
Sample Name: 1923491001  
Acq Operator: TNB

Seq Line: 11  
Location: Vial 81  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD11.D Sample Name: 1923491001

```

=====
Injection Date: 8/20/2019 10:55:21      Seq Line:          11
Sample Name:    1923491001              Location:         Vial 81
Acq Operator:   TNB                     Inj. No.:        1
                                           Inj. Vol.:       50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.463	FM	558061.6	10.2094	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	FM	197832.2	12.0244	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	MF	173328.0	5.0000	CLO4-89-ISTD

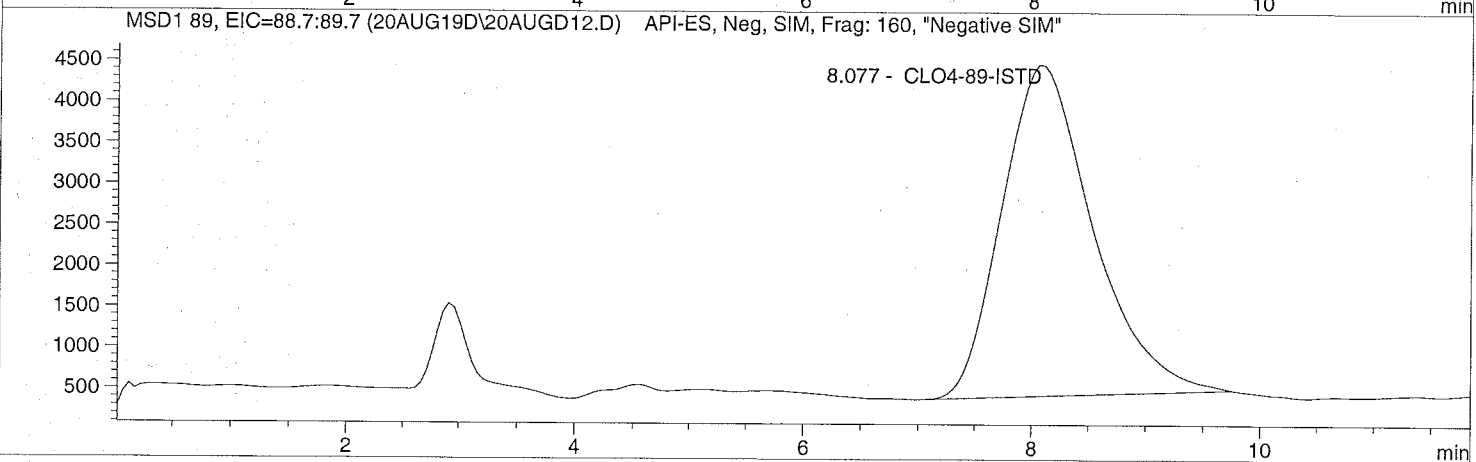
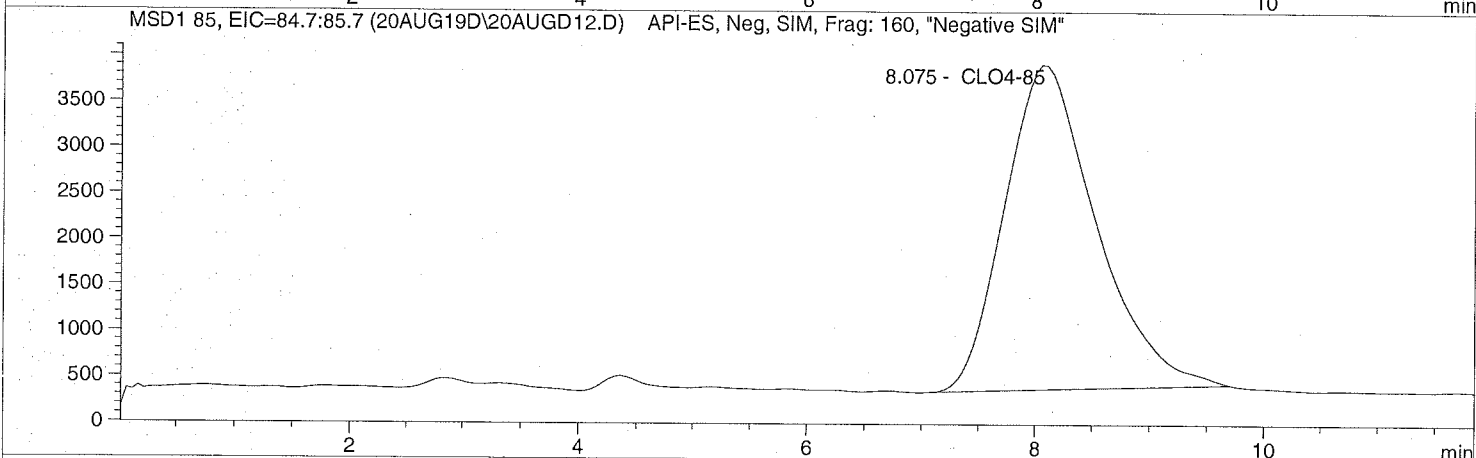
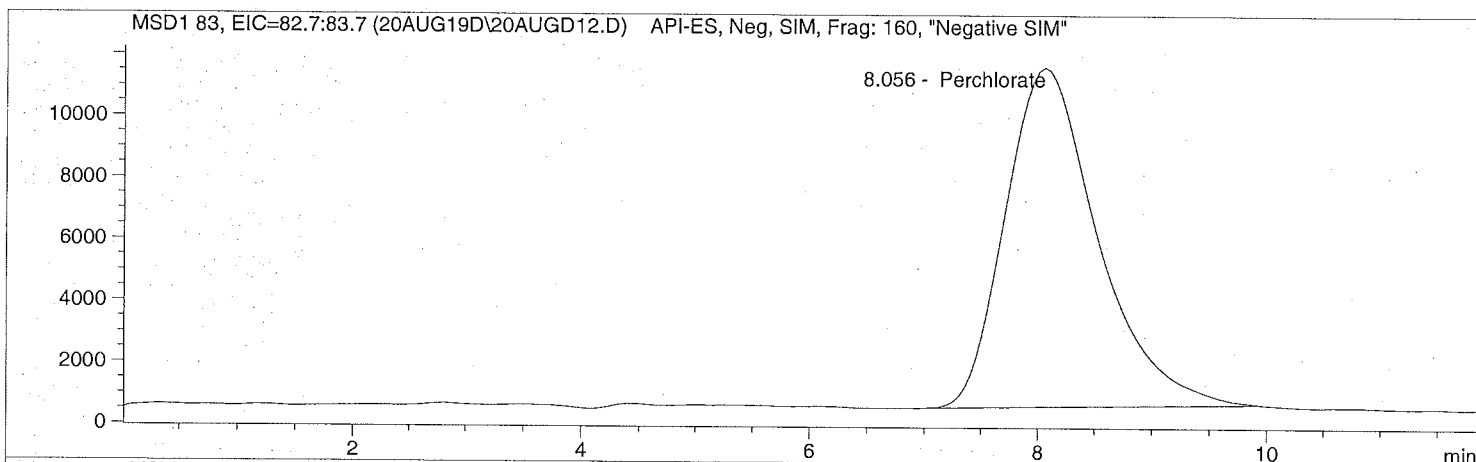
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD12.D Sample Name: 1923492001 1K

```
=====
Injection Date: 8/20/2019 11:09:30      Seq Line: 12
Sample Name:    1923492001 1K           Location:  Vial 82
Acq Operator:   TNB                     Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====
```

```
Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
```

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD12.D Sample Name: 1923492001 1K

```

=====
Injection Date: 8/20/2019 11:09:30      Seq Line:          12
Sample Name:    1923492001 1K           Location:          Vial 82
Acq Operator:   TNB                     Inj. No.:         1
                                           Inj. Vol.:        50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 am
Multiplier:     1.000000
Dilution:       1000.000000
Sample Amount:  0.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.056	PBA	621376.9	8846.4165	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.075	PBA	197618.2	9349.5909	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.077	PBA	223941.7	5000.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD13.D

Sample Name: 1923494001

Injection Date: 8/20/2019 11:23:40

Seq Line: 13

Sample Name: 1923494001

Location: Vial 83

Acq Operator: TNB

Inj. No.: 1

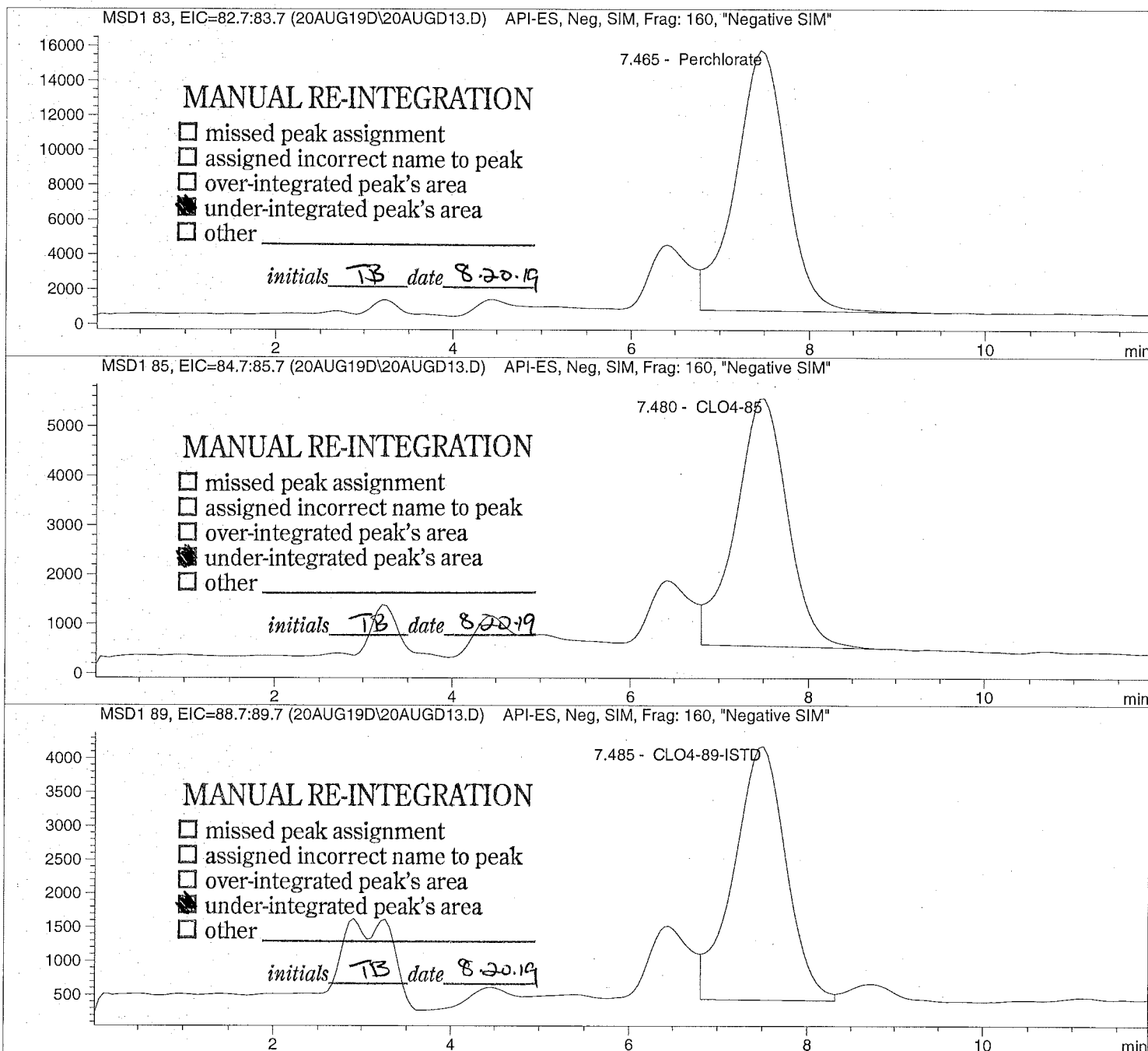
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD13.D Sample Name: 1923494001

```

=====
Injection Date: 8/20/2019 11:23:40      Seq Line:      13
Sample Name:    1923494001              Location:      Vial 83
Acq Operator:   TNB                      Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.465	FM	589441.2	12.3093	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.480	FM	200511.5	13.9561	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	MF	150739.0	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD14.D

Sample Name: 669456 CCV@25

Injection Date: 8/20/2019 11:37:53

Seq Line: 14

Sample Name: 669456 CCV@25

Location: Vial 71

Acq Operator: TNB

Inj. No.: 1

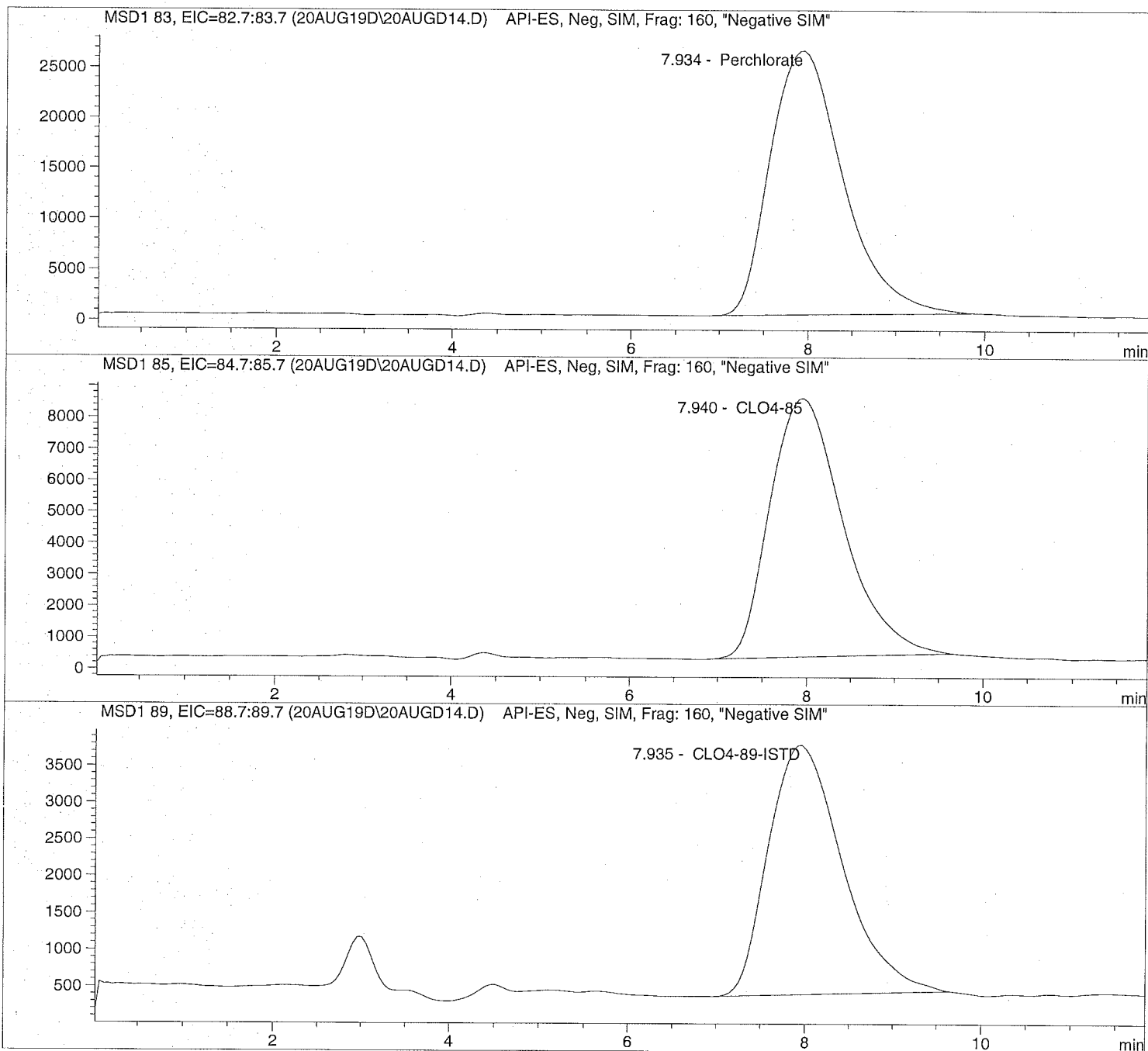
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD14.D Sample Name: 669456 CCV@25

```

=====
Injection Date: 8/20/2019 11:37:53      Seq Line:          14
Sample Name:    669456   CCV@25          Location:          Vial 71
Acq Operator:   TNB                Inj. No.:         1
                                           Inj. Vol.:       50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.934	PBA	1498652.4	23.1846	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.940	PBA	473077.5	24.5701	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.935	PBA	197525.4	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```



---

**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

**Initial  
Calibration**

=====  
 Calibration Table  
 =====

Perchlorate

Calib. Data Modified : 3/19/2019 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	Amount	Area	Amt/Area	Ref	Grp	Name
8.744	1	1.00000	7.76074e4	1.28854e-5	1		Perchlorate
	2	2.00000	1.35273e5	1.47849e-5			
	3	5.00000	3.37764e5	1.48033e-5			
	4	10.00000	6.83454e5	1.46316e-5			
	5	25.00000	2.08433e6	1.19943e-5			
	6	50.00000	4.13334e6	1.20968e-5			
	7	75.00000	5.99313e6	1.25143e-5			
8.755	2	1.00000	2.36780e4	4.22333e-5	1		CLO4-85
	2	2.00000	4.69486e4	4.25998e-5			
	3	5.00000	1.06124e5	4.71147e-5			
	4	10.00000	2.13523e5	4.68335e-5			
	5	25.00000	6.14295e5	4.06971e-5			
	6	50.00000	1.19814e6	4.17315e-5			
	7	75.00000	1.78355e6	4.20509e-5			
8.766	3	5.00000	2.73208e5	1.83011e-5	+I1		CLO4-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5			
	3	5.00000	2.33196e5	2.14412e-5			
	4	5.00000	2.34454e5	2.13262e-5			
	5	5.00000	2.50568e5	1.99547e-5			
	6	5.00000	2.30977e5	2.16472e-5			

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
	7	5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

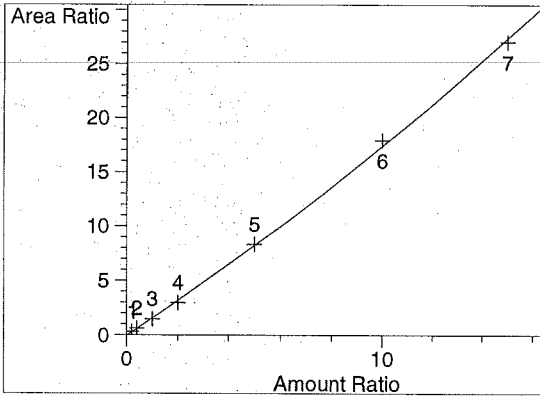
Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min  
 Curve Type : Linear  
 Origin : Included  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

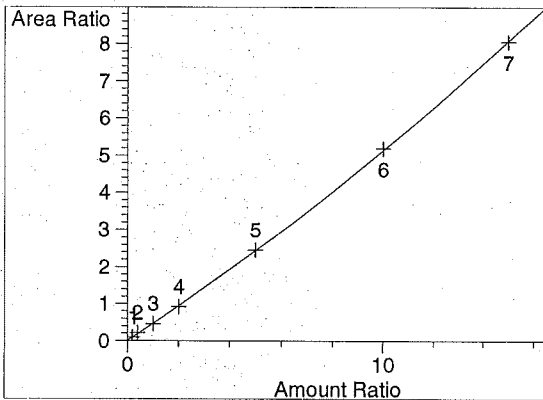
=====  
 Peak Sum Table  
 =====

\*\*\*No Entries in table\*\*\*  
 =====

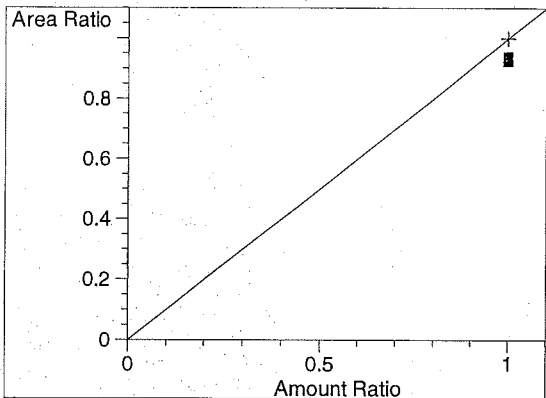
=====  
 Calibration Curves  
 =====



Perchlorate at exp. RT: 8.744  
 MSD1 83, EIC=82.7:83.7  
 Correlation: 0.99957  
 Residual Std. Dev.: 0.30744  
 Formula:  $y = ax^2 + bx + c$   
 a: 1.76988e-2  
 b: 1.56480  
 c: -4.92430e-2  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755  
 MSD1 85, EIC=84.7:85.7  
 Correlation: 0.99983  
 Residual Std. Dev.: 0.03473  
 Formula:  $y = ax^2 + bx + c$   
 a: 5.13396e-3  
 b: 4.62055e-1  
 c: 4.97209e-4  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766  
 MSD1 89, EIC=88.7:89.7  
 Correlation: 1.00000  
 Residual Std. Dev.: 0.00000  
 Formula:  $y = mx + b$   
 m: 1.00000  
 b: 0.00000  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1



## Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

['#' ==&gt; Run has not been reprocessed with Batch Review Method

['\*' ==&gt; 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

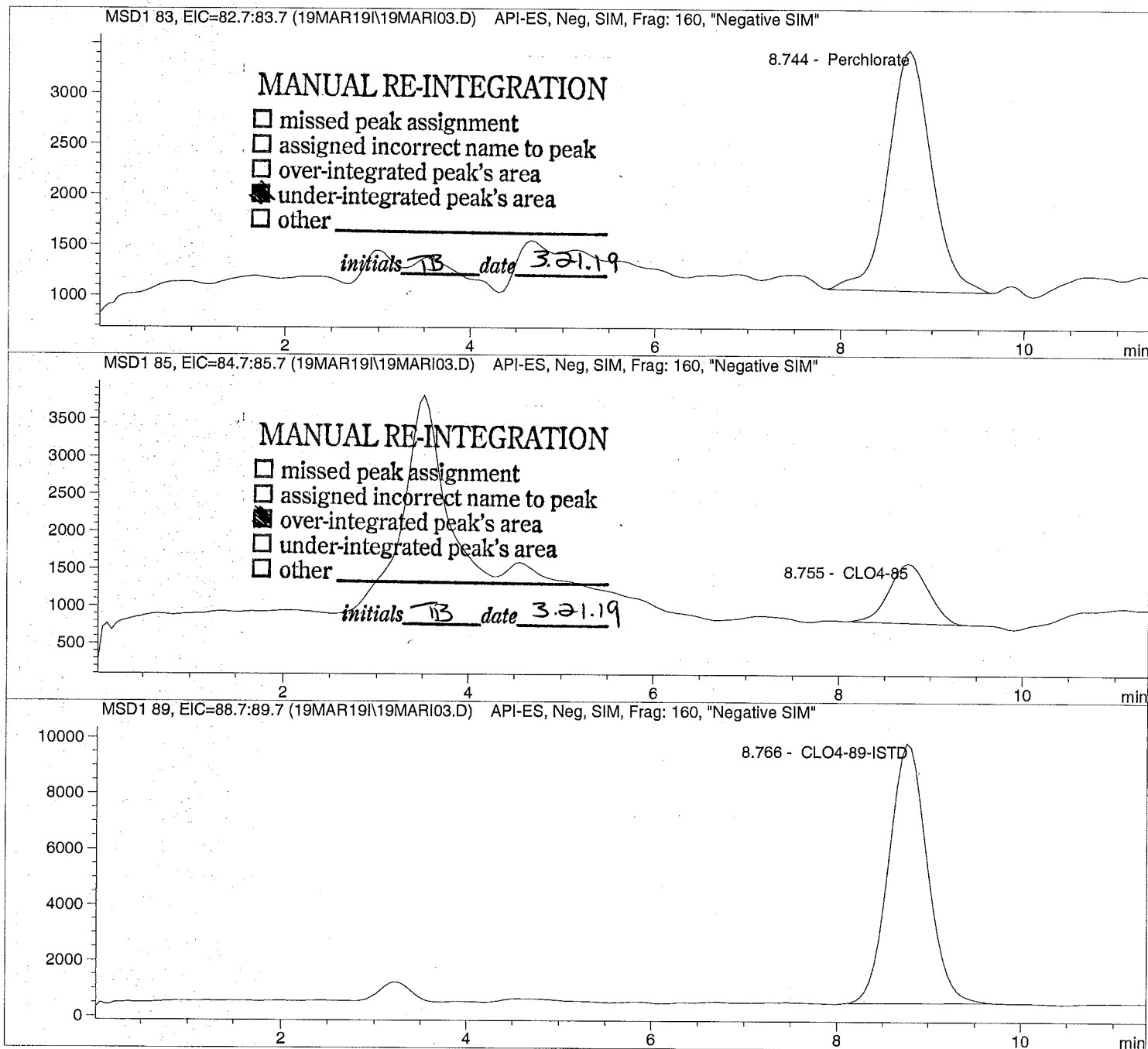
Inj. Vol.: 30 µl

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

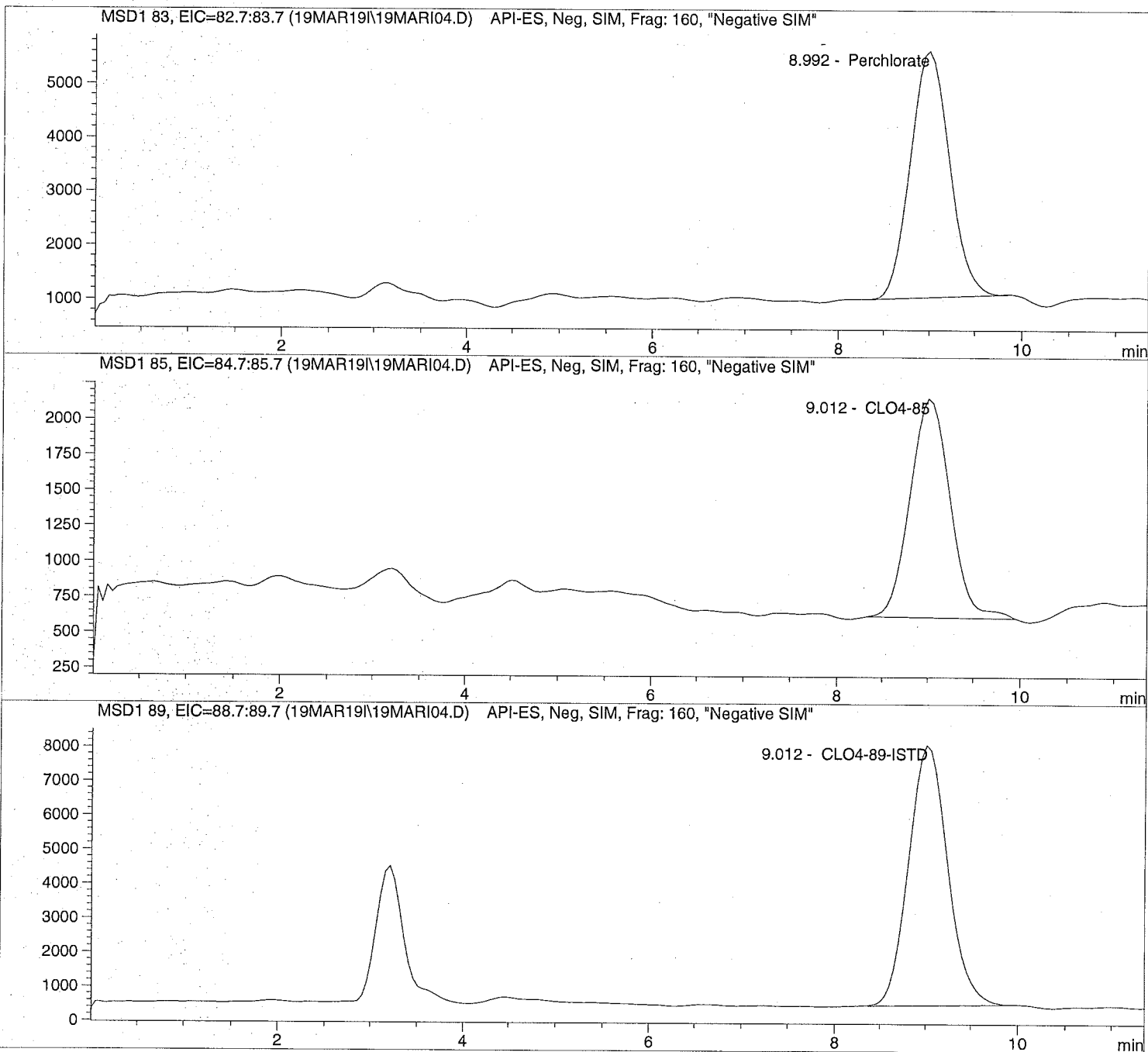
Inj. Vol.: 30 µl

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\19MAR19\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

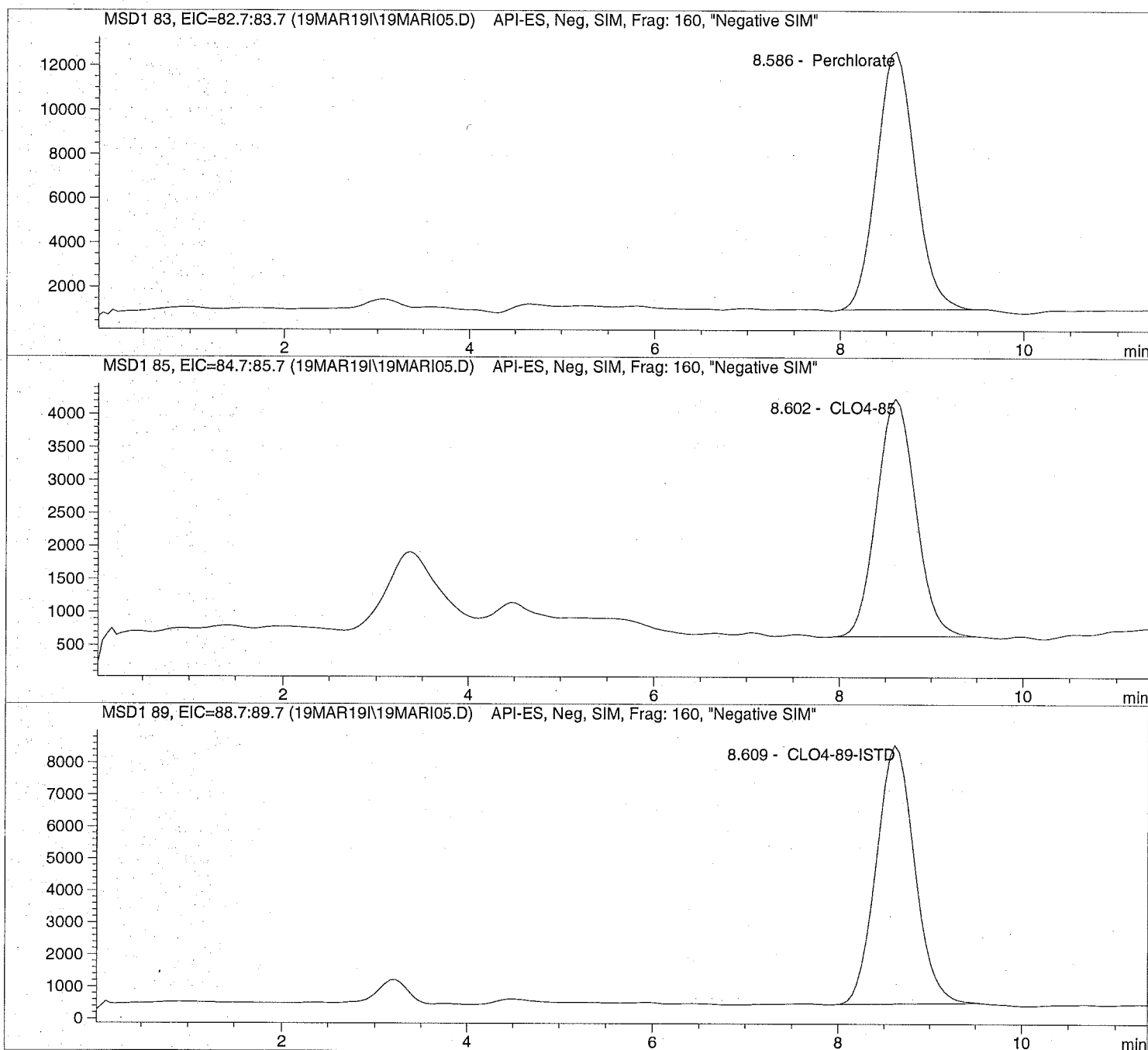
Inj. Vol.: 30 µl

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\19MAR19\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

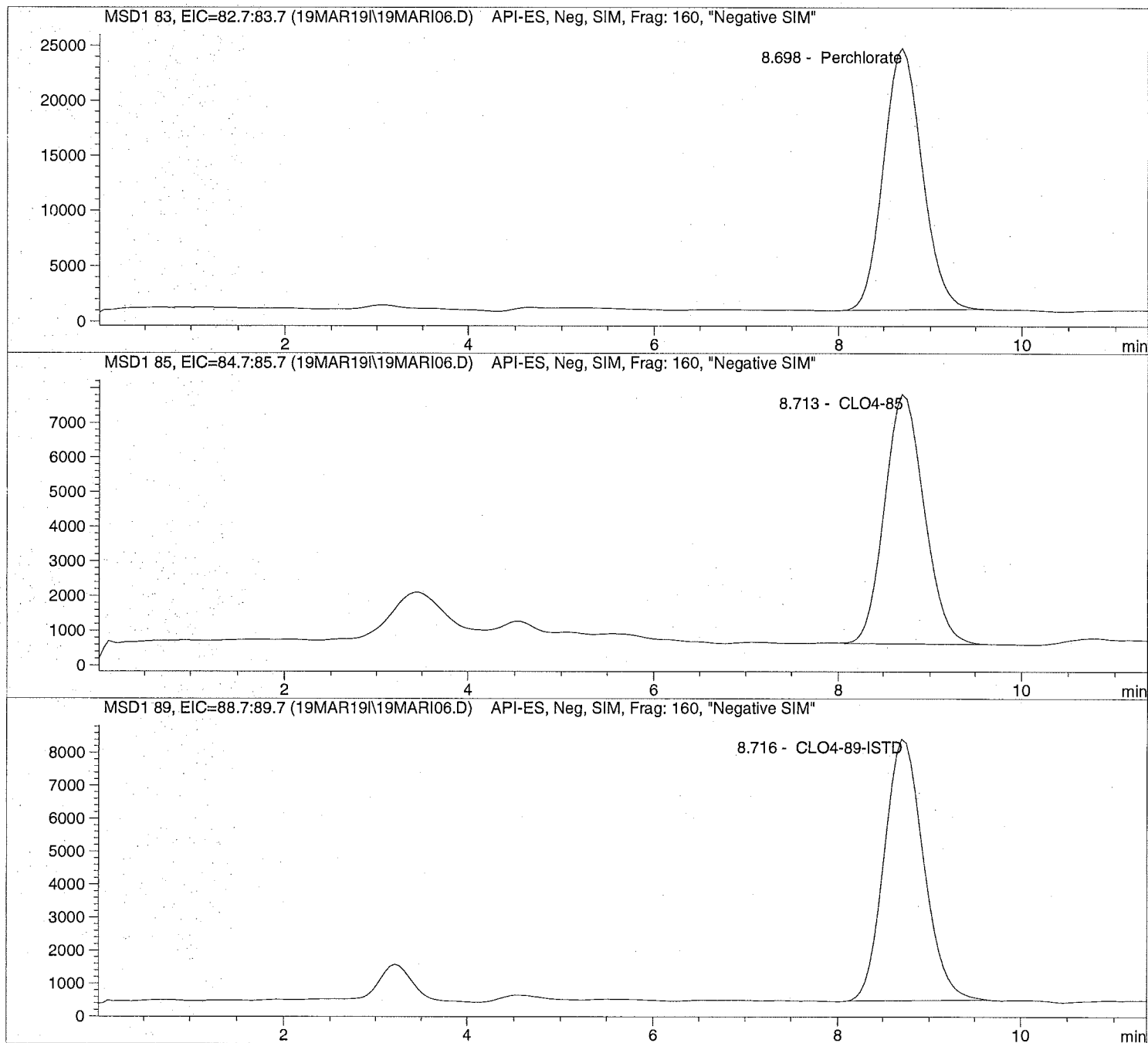
Inj. Vol.: 30 µl

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

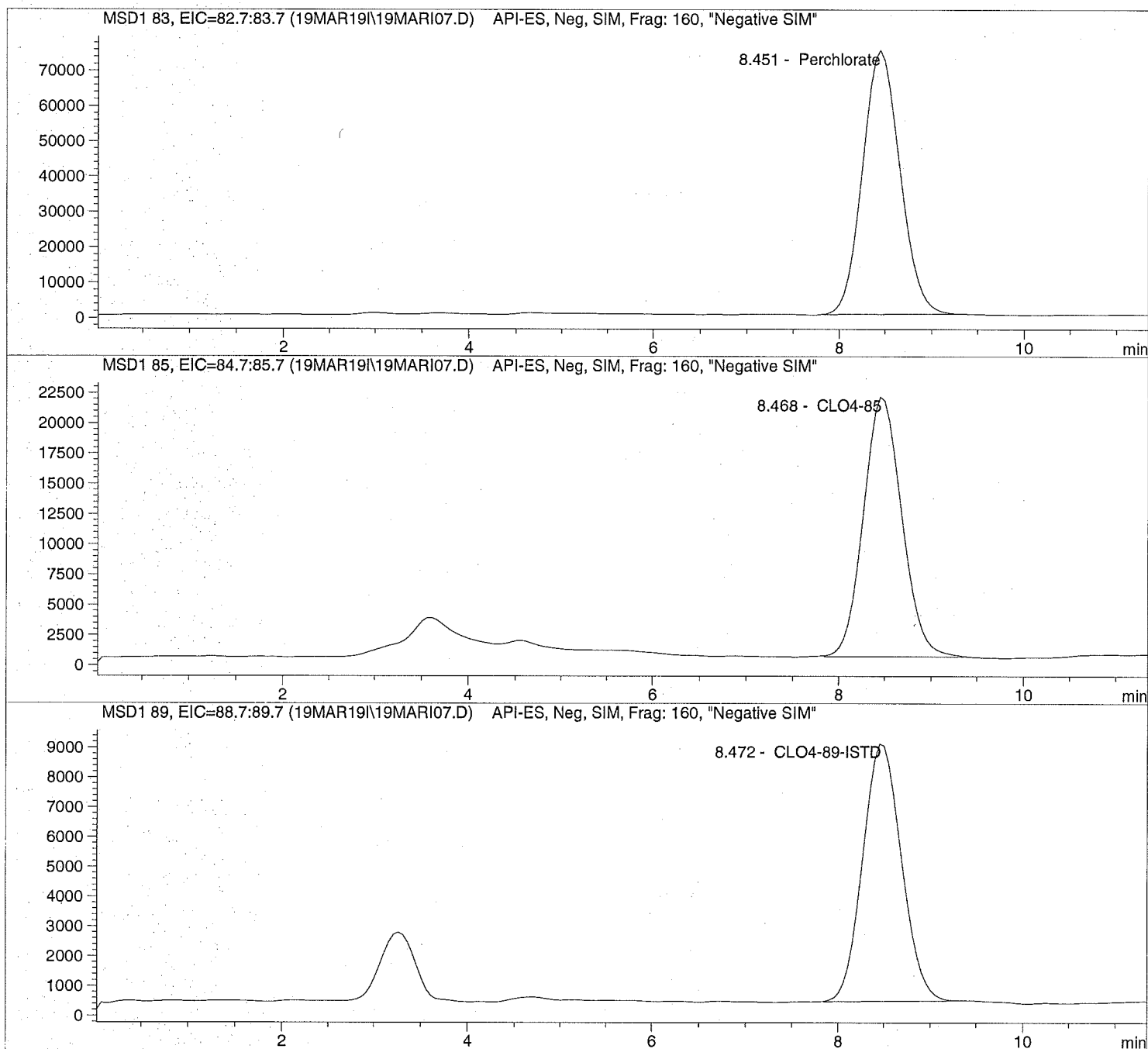
Inj. Vol.: 30 µl

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

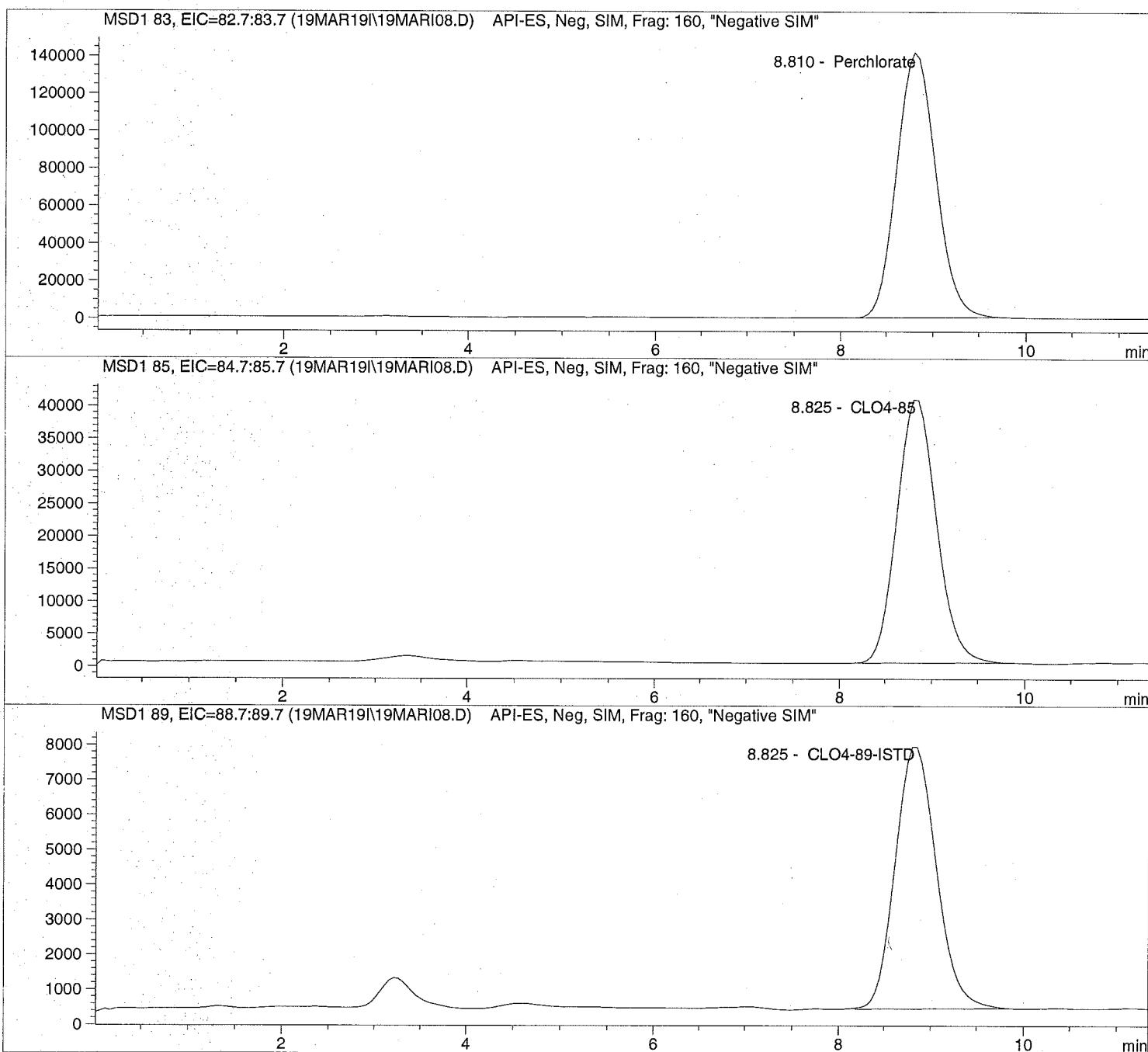
Inj. Vol.: 30 µl

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\19MAR19\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

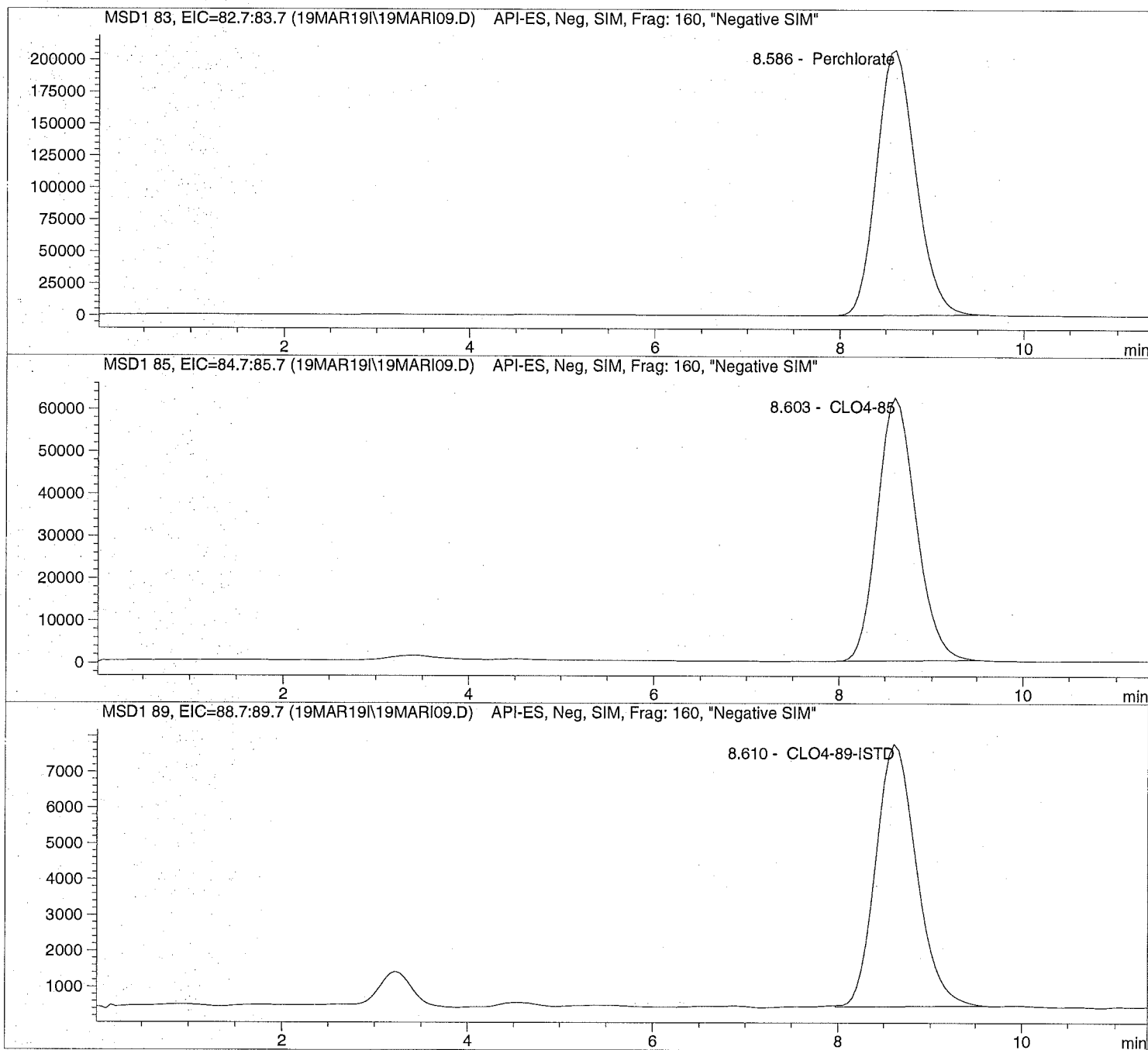
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI09.D Sample Name: CLO4@ 75.ug/L

```

=====
Injection Date: 3/19/2019 10:59:22      Seq Line:          9
Sample Name:    CLO4@ 75.ug/L          Location:          Vial 79
Acq Operator:   TNB                    Inj. No.:         1
                                           Inj. Vol.:        30 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:    1.000000
Dilution:      1.000000
Sample Amount: 75.000
=====

```

```

=====
                          LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.586	PBA	5993128.0	74.1675	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.603	PBA	1783554.4	74.7202	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.610	BBA	221504.5	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```



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

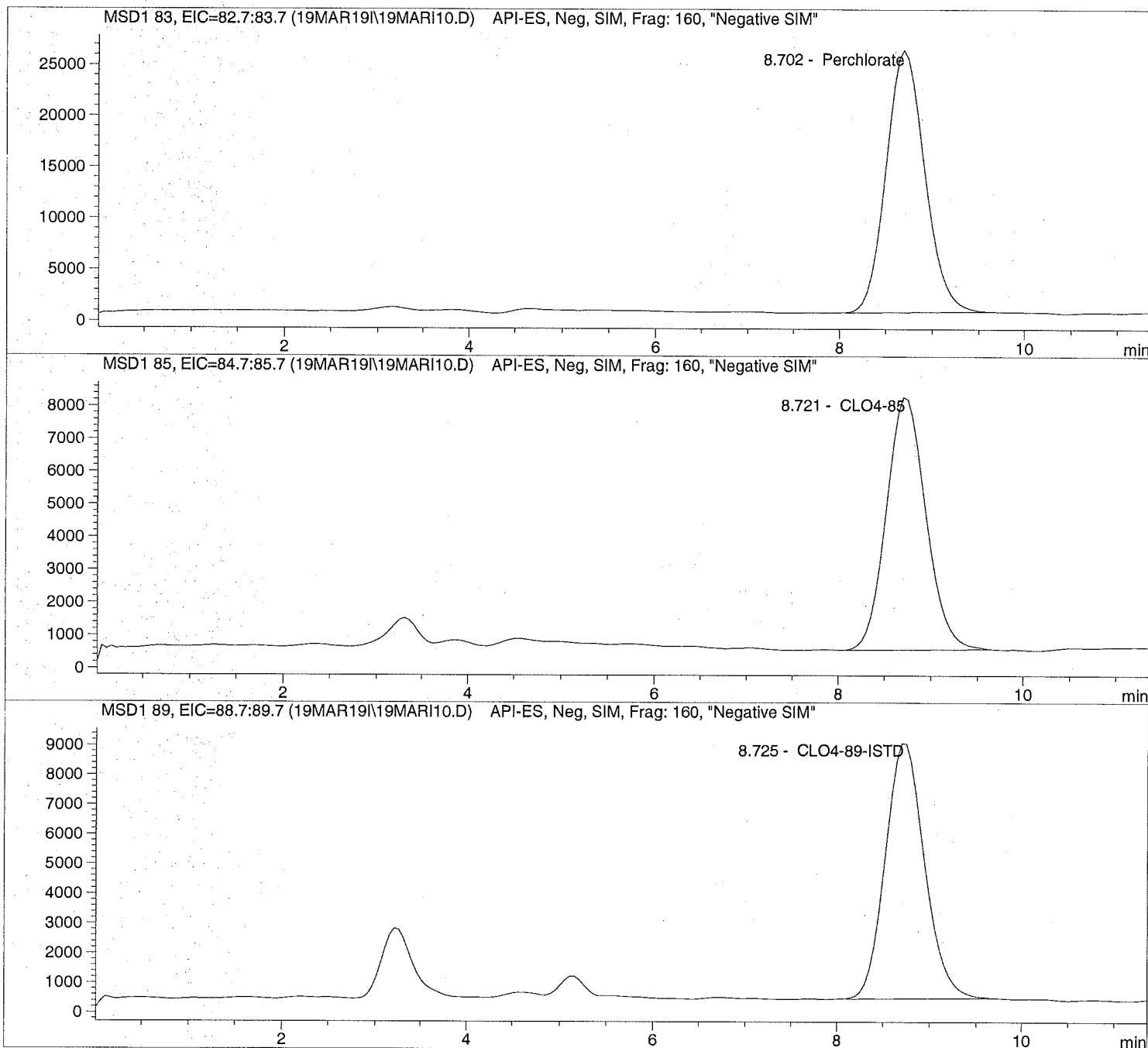
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\19MARI10.D Sample Name: ICAL Verf@10ug/L

```

=====
Injection Date: 3/19/2019 11:12:42      Seq Line:      10
Sample Name:    ICAL Verf@10ug/L        Location:      Vial 80
Acq Operator:   TNB                      Inj. No.:     1
                                           Inj. Vol.:    30 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   3/19/2019 14:35:22

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 19. Mar. 2019,02:35:19 pm
Multiplier:     1.000000
Dilution:       1.000000
Sample Amount:  10.000

```

```

=====
LCMS Results
=====

```

Signal1: MSD1 83, EIC=82.7:83.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.702	PBA	734718.7	9.2594	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.721	PBA	227494.7	9.5402	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
8.725	BBA	252544.4	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

```



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**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

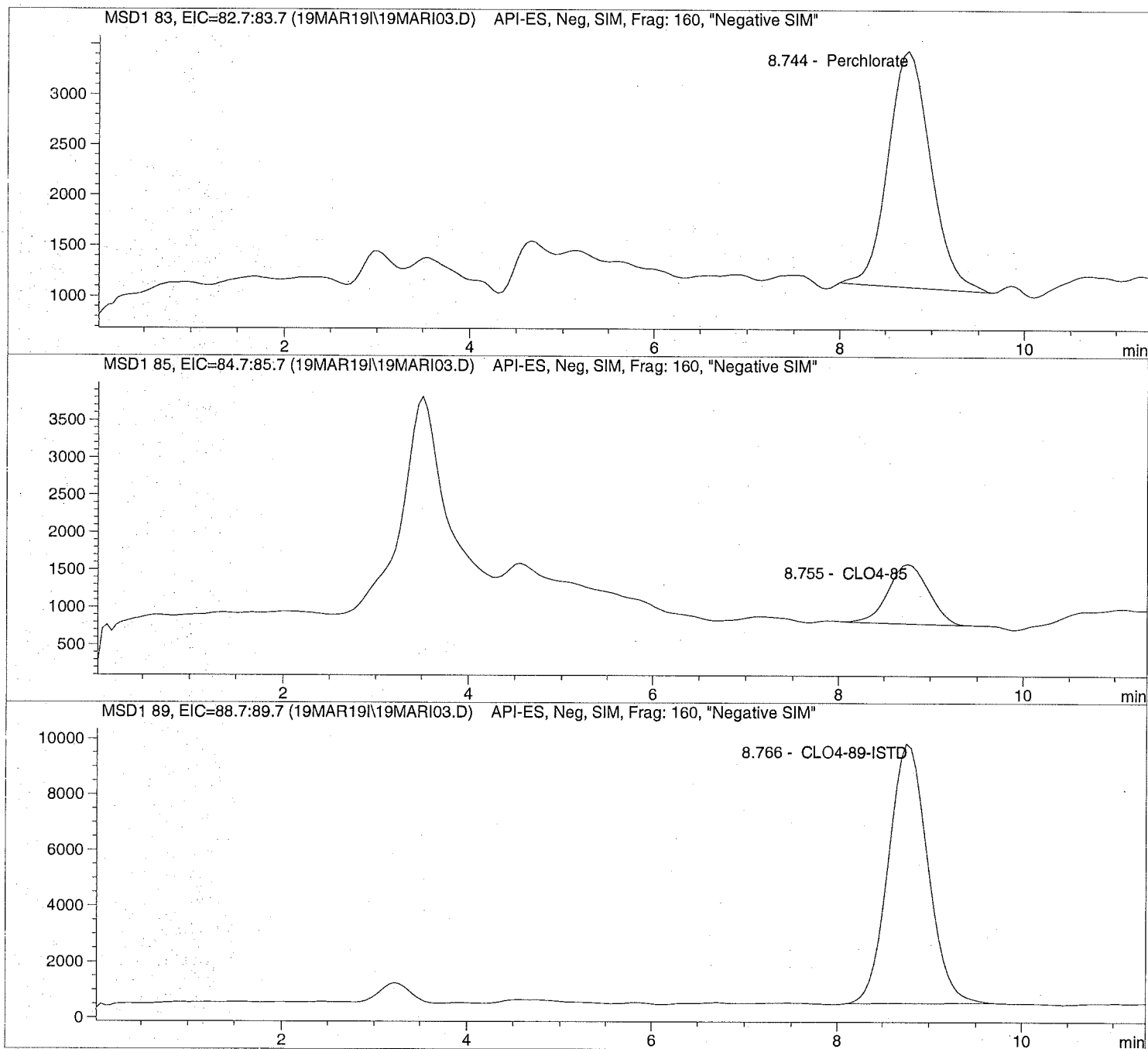
Inj. Vol.: 30  $\mu$ l

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 \*\*\*

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD06.D

Sample Name: 1923490001

Injection Date: 8/20/2019 09:44:16

Seq Line: 6

Sample Name: 1923490001

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

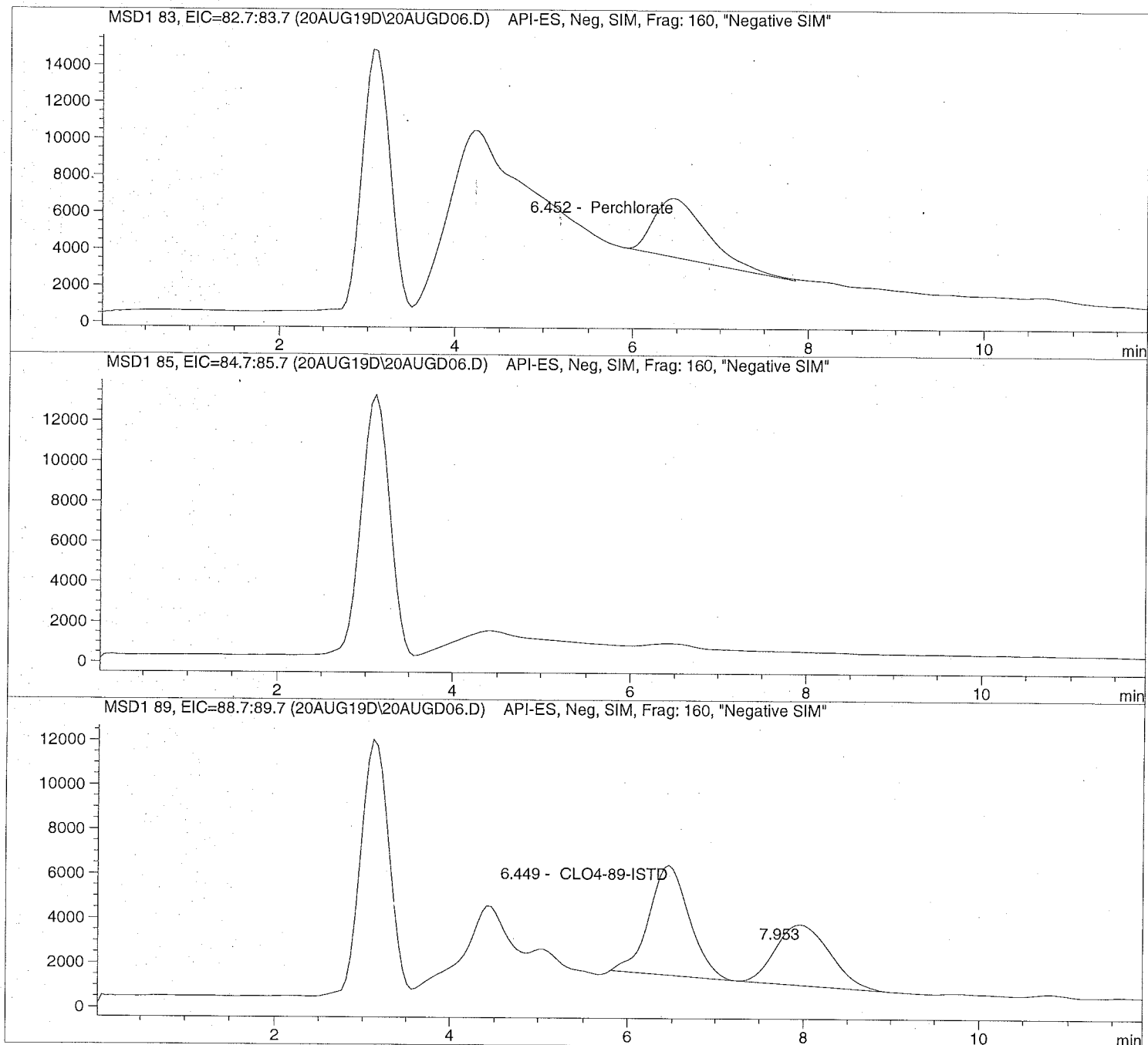
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD06.D

Sample Name: 1923490001

```

=====
Injection Date: 8/20/2019 09:44:16      Seq Line: 6
Sample Name: 1923490001                  Location: Vial 76
Acq Operator: TNB                        Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08

```

Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.452	BBA	136285.4	2.9160	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
0.000		0.0	0.0000	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.449	PB	156766.8	5.0000	CLO4-89-ISTD
7.953	VBA	116815.5	0.0000	

```

=====
*** End of Report ***

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD07.D

Sample Name: 1923490002 MS

Injection Date: 8/20/2019 09:58:28

Seq Line: 7

Sample Name: 1923490002 MS

Location: Vial 77

Acq Operator: TNB

Inj. No.: 1

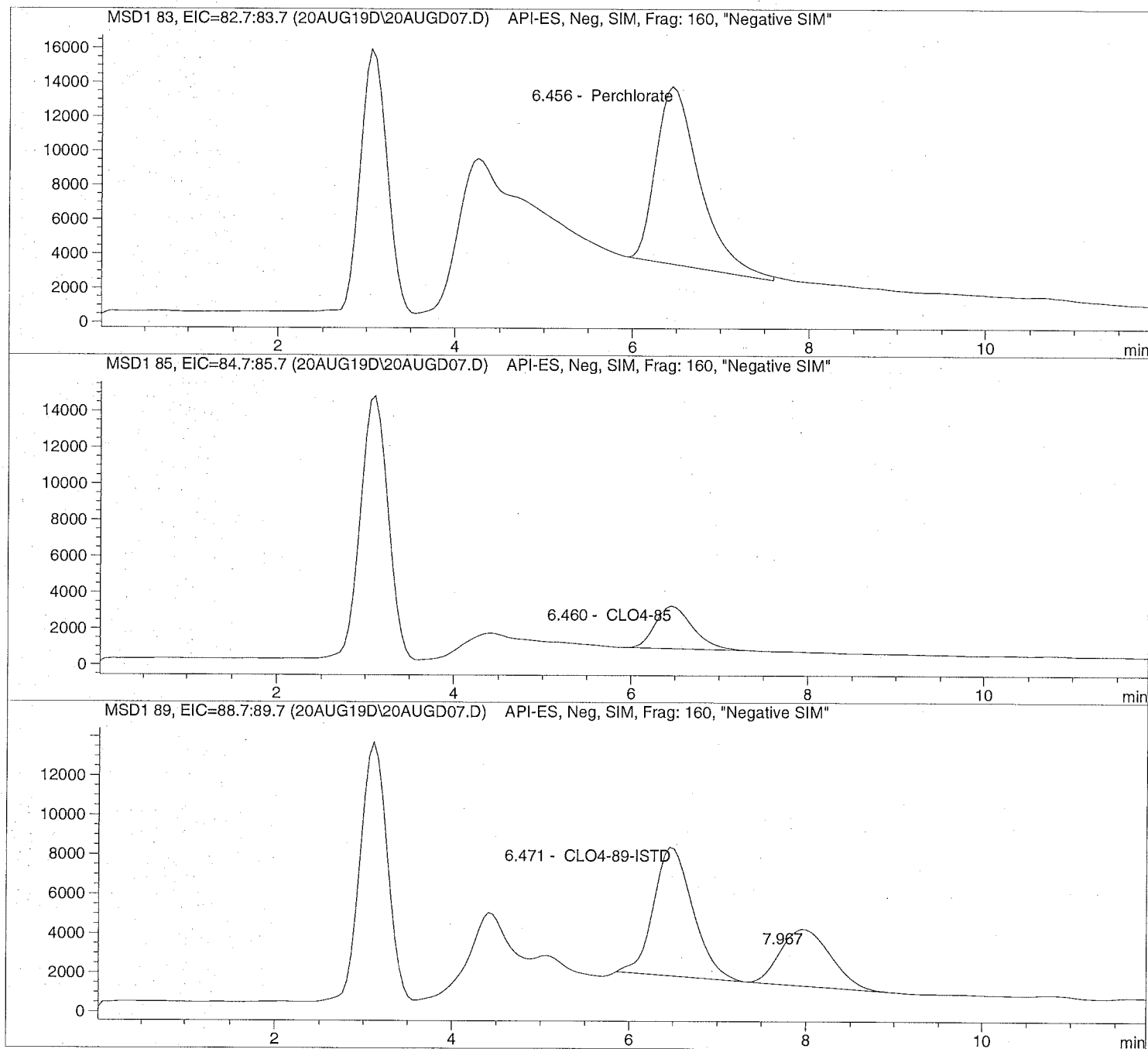
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 8/20/2019 12:11:08

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD07.D Sample Name: 1923490002 MS

```

=====
Injection Date: 8/20/2019 09:58:28      Seq Line:      7
Sample Name:    1923490002 MS           Location:      Vial 77
Acq Operator:   TNB                    Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.456	BBA	354476.8	5.6977	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.460	PBA	69229.6	3.6775	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.471	PB	201765.7	5.0000	CLO4-89-ISTD
7.967	VBA	113315.4	0.0000	

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD08.D

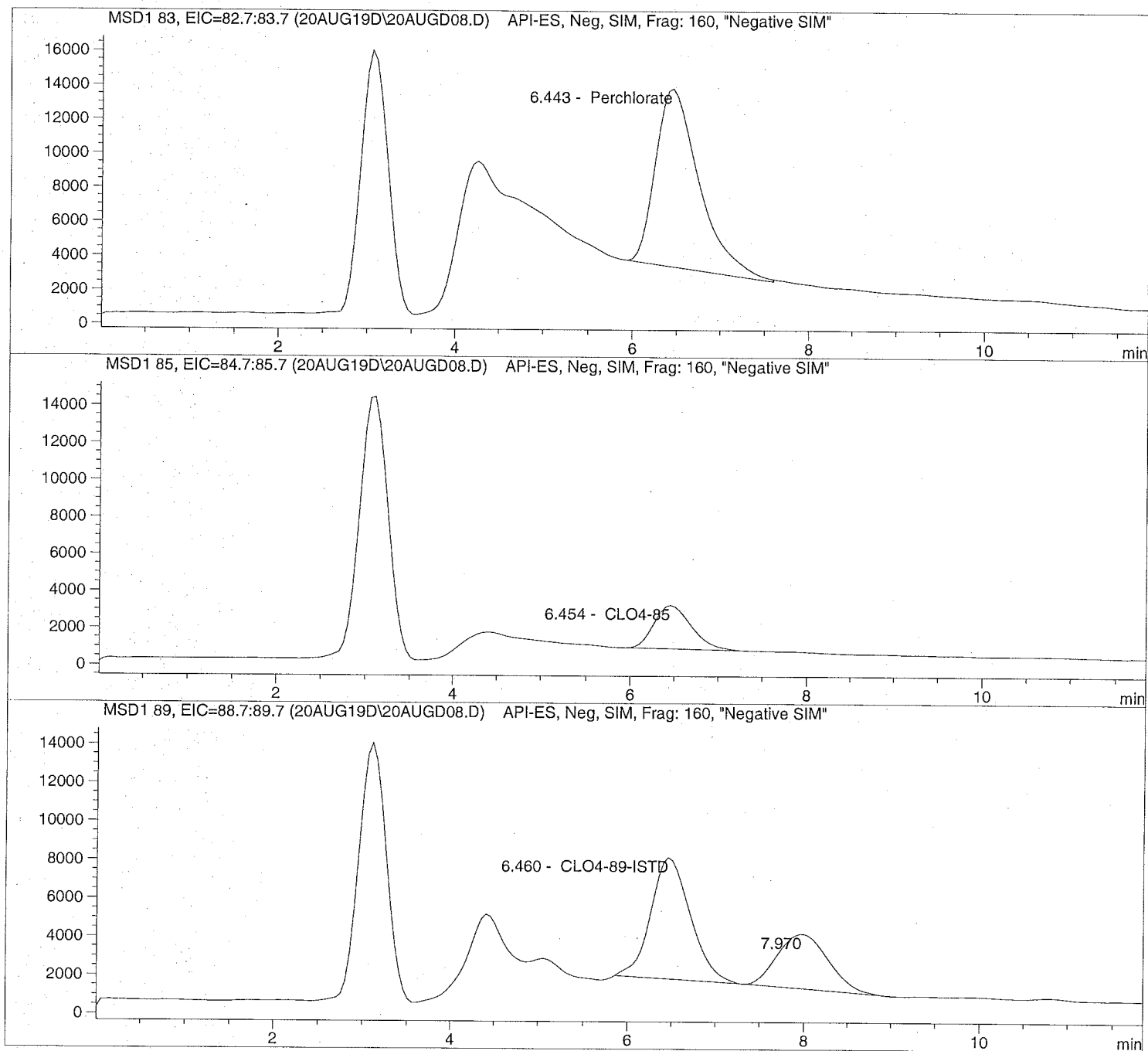
Sample Name: 1923490003 MSD

=====  
Injection Date: 8/20/2019 10:12:40  
Sample Name: 1923490003 MSD  
Acq Operator: TNB

Seq Line: 8  
Location: Vial 78  
Inj. No.: 1  
Inj. Vol.: 50 µl

=====  
Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD08.D      Sample Name: 1923490003      MSD

```

=====
Injection Date: 8/20/2019 10:12:40      Seq Line: 8
Sample Name: 1923490003      MSD      Location: Vial 78
Acq Operator: TNB      Inj. No.: 1
                                         Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 8/20/2019 12:11:08

```

Perchlorate analysis

Sample Information

```

=====
Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.443	BBA	358346.0	5.9025	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.454	PBA	69335.8	3.7791	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.460	PB	196607.1	5.0000	CLO4-89-ISTD
7.970	VBA	113071.0	0.0000	

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD11.D

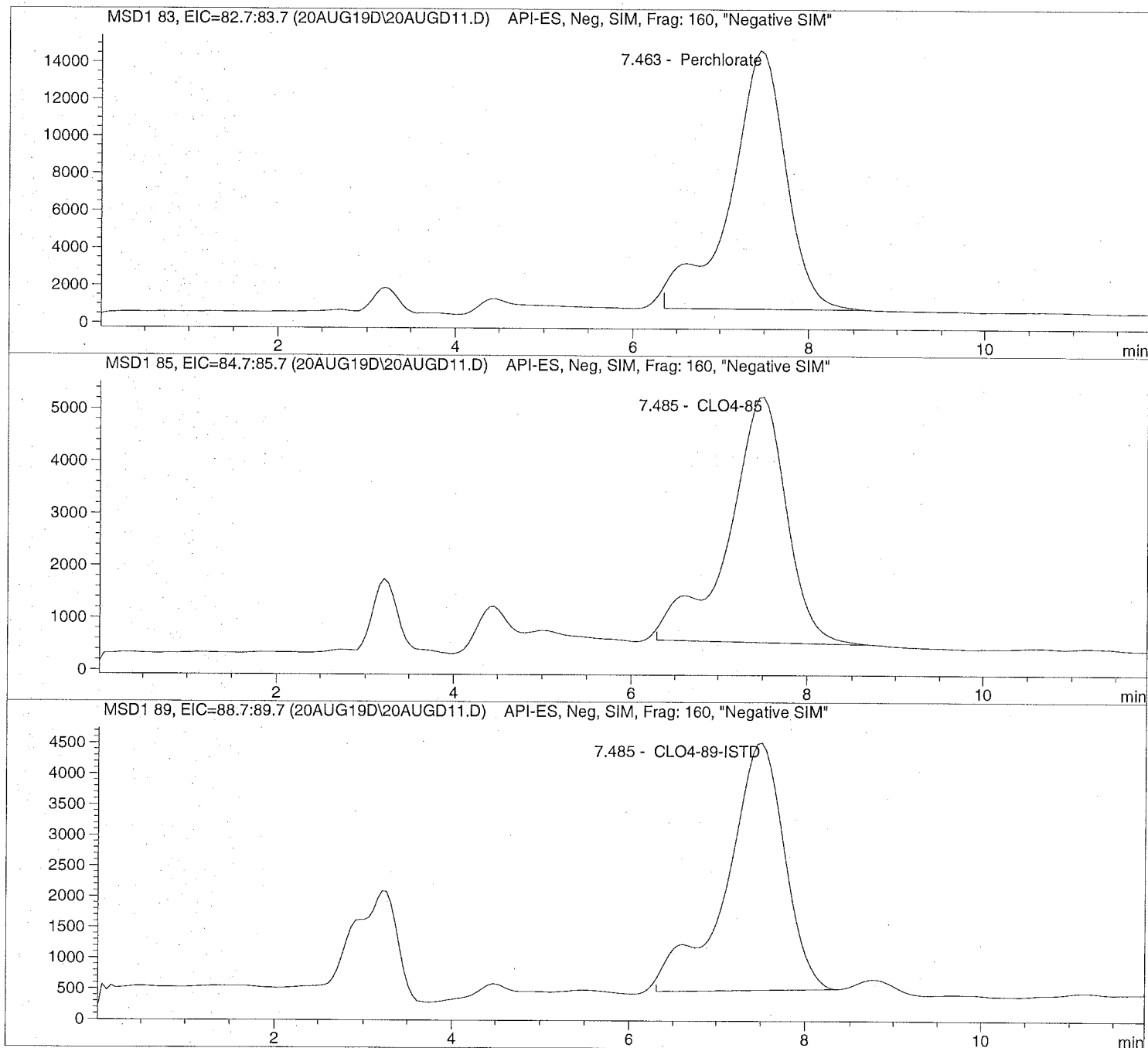
Sample Name: 1923491001

Injection Date: 8/20/2019 10:55:21  
Sample Name: 1923491001  
Acq Operator: TNB

Seq Line: 11  
Location: Vial 81  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD11.D

Sample Name: 1923491001

```

=====
Injection Date: 8/20/2019 10:55:21      Seq Line:      11
Sample Name:   1923491001                Location:      Vial 81
Acq Operator:  TNB                       Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  8/20/2019 12:11:08

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.463	BBA	609174.5	10.4556	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	BBA	215767.9	12.3076	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	BBA	184580.3	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

```

Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD13.D

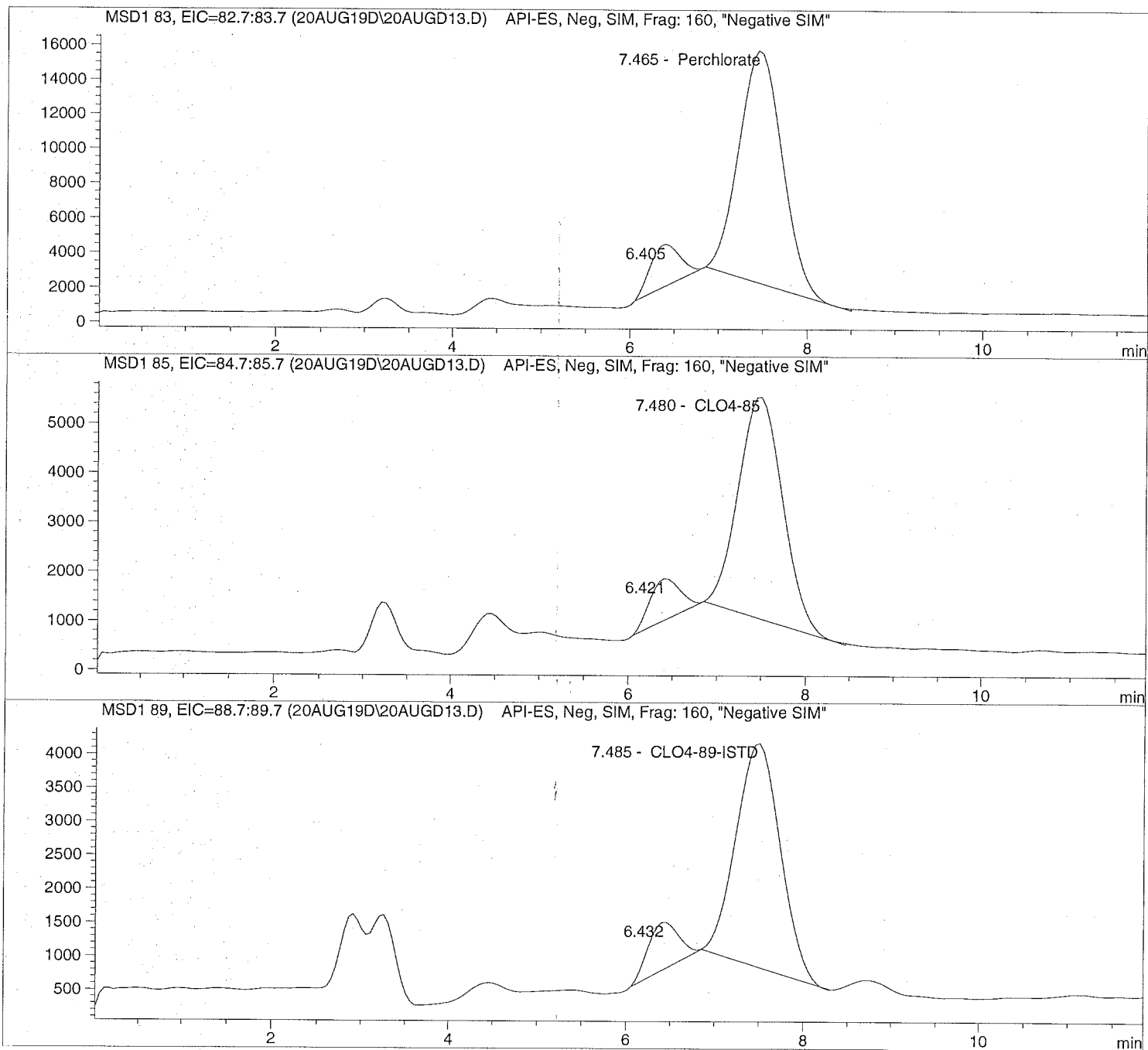
Sample Name: 1923494001

Injection Date: 8/20/2019 11:23:40  
Sample Name: 1923494001  
Acq Operator: TNB

Seq Line: 13  
Location: Vial 83  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 8/20/2019 12:11:08

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\20AUG19D\20AUGD13.D

Sample Name: 1923494001

```

=====
Injection Date: 8/20/2019 11:23:40      Seq Line:      13
Sample Name:    1923494001              Location:      Vial 83
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   8/20/2019 12:11:08
=====

```

Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.405	PB	55558.6	0.0000	
7.465	VBA	456021.6	12.4256	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.421	PB	19909.2	0.0000	
7.480	VBA	156790.2	14.2359	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.432	PB	16677.9	0.0000	
7.485	VBA	115485.0	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

September 11, 2019

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS19081044**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia,

ALS Environmental received 2 sample(s) on Aug 21, 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval scribble.

Generated By: DAYNA.FISHER  
RJ Modashia  
Project Manager



ALS Houston, US

Date: 11-Sep-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19081044

**SAMPLE SUMMARY**

---

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19081044-01	LH18/24-SP650_082019	Water		20-Aug-2019 14:00	21-Aug-2019 08:45	<input type="checkbox"/>
HS19081044-02	LH18/24-SP650_082019_BIX	Water		20-Aug-2019 14:00	21-Aug-2019 08:45	<input type="checkbox"/>

---

**ALS Houston, US**

Date: 11-Sep-19

**Client:** Bhate Environmental Associates, Inc.**CASE NARRATIVE****Project:** Longhorn GW Treatment Plant**Work Order:** HS19081044

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**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Salt Lake City, UT. Final report attached.

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**Work Order Comments**

- The analysis for TOC was subcontracted to ALS Environmental in Kelso, WA. Final Report attached.

---

**WetChemistry by Method E365.3****Batch ID: R345028**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

---

**WetChemistry by Method E350.3****Batch ID: R344866**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 11-Sep-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_082019  
 Collection Date: 20-Aug-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19081044  
 Lab ID:HS19081044-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>AMMONIA AS N BY E350.3(ISE)</b>								Analyst: MZD
	Method:E350.3							
Nitrogen, Ammonia (As N)	8.9		0.20	0.20	0.20	mg/L	1	23-Aug-2019 14:10
<b>ORTHO PHOSPHATE (PO4) AS P BY E365.3</b>								Analyst: MZD
	Method:E365.3							
Phosphorus, Total Orthophosphate (As P)	2.53		0.100	0.250	0.250	mg/L	10	22-Aug-2019 10:58
<b>SUBCONTRACT ANALYSIS - TOC ANALYSIS</b>								Analyst: SUBK
	Method:NA							
Subcontract Analysis	See Attached		0	0		NA	1	11-Sep-2019 14:25

## ALS Houston, US

Date: 11-Sep-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_082019\_BIX  
 Collection Date: 20-Aug-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19081044  
 Lab ID:HS19081044-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>		Analyst: SUB				
Subcontract Analysis	See Attached		0	0		NA	1	05-Sep-2019 15:46

ALS Houston, US

Date: 11-Sep-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081044

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R344866 ( 0 )		<b>Test Name :</b> AMMONIA AS N BY E350.3(ISE)			<b>Matrix:</b> Water	
HS19081044-01	LH18/24-SP650_082019	20 Aug 2019 14:00			23 Aug 2019 14:10	1
<b>Batch ID:</b> R345028 ( 0 )		<b>Test Name :</b> ORTHO PHOSPHATE (PO4) AS P BY E365.3			<b>Matrix:</b> Water	
HS19081044-01	LH18/24-SP650_082019	20 Aug 2019 14:00			22 Aug 2019 10:58	10
<b>Batch ID:</b> R345608 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS19081044-02	LH18/24-SP650_082019_BIX	20 Aug 2019 14:00			05 Sep 2019 15:46	1
<b>Batch ID:</b> R346021 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - TOC ANALYSIS			<b>Matrix:</b> Water	
HS19081044-01	LH18/24-SP650_082019	20 Aug 2019 14:00			11 Sep 2019 14:25	1

ALS Houston, US

Date: 11-Sep-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081044

**QC BATCH REPORT**

Batch ID:	R344866 ( 0 )	Instrument:	WetChem_HS	Method:	AMMONIA AS N BY E350.3(ISE)					
<b>MBLK</b>	Sample ID: <b>MBLK-344866</b>	Units:	mg/L	Analysis Date:	<b>23-Aug-2019 14:10</b>					
Client ID:	Run ID: <b>WetChem_HS_344866</b>	SeqNo:	<b>5221837</b>	PrepDate:	DF: <b>1</b>					
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
<b>LCS</b>	Sample ID: <b>LCS-344866</b>	Units:	mg/L	Analysis Date:	<b>23-Aug-2019 14:10</b>					
Client ID:	Run ID: <b>WetChem_HS_344866</b>	SeqNo:	<b>5221838</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.16	0.20	10	0	102	80 - 120				
<b>MS</b>	Sample ID: <b>HS19080968-01MS</b>	Units:	mg/L	Analysis Date:	<b>23-Aug-2019 14:10</b>					
Client ID:	Run ID: <b>WetChem_HS_344866</b>	SeqNo:	<b>5221841</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.03	0.20	10	0.5681	94.6	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19080968-01MSD</b>	Units:	mg/L	Analysis Date:	<b>23-Aug-2019 14:10</b>					
Client ID:	Run ID: <b>WetChem_HS_344866</b>	SeqNo:	<b>5221842</b>	PrepDate:	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Ammonia (As N)	10.09	0.20	10	0.5681	95.2	80 - 120	10.03	0.596	20	

The following samples were analyzed in this batch: HS19081044-01

ALS Houston, US

Date: 11-Sep-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081044

**QC BATCH REPORT**

Batch ID:	R345028 ( 0 )	Instrument:	UV-2450	Method:	ORTHO PHOSPHATE (PO4) AS P BY E365.3					
<b>MBLK</b>	Sample ID: <b>MBLK-345028</b>	Units: <b>mg/L</b>		Analysis Date: <b>22-Aug-2019 10:58</b>						
Client ID:	Run ID: <b>UV-2450_345028</b>	SeqNo: <b>5225881</b>		PrepDate:		DF: <b>1</b>				
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	
<b>LCS</b>	Sample ID: <b>LCS-345028</b>	Units: <b>mg/L</b>		Analysis Date: <b>22-Aug-2019 10:58</b>						
Client ID:	Run ID: <b>UV-2450_345028</b>	SeqNo: <b>5225882</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	0.245	0.0250	0.25	0	98.0	85 - 115				
<b>MS</b>	Sample ID: <b>HS19081044-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>22-Aug-2019 10:58</b>						
Client ID: <b>LH18/24-SP650_082019</b>	Run ID: <b>UV-2450_345028</b>	SeqNo: <b>5225884</b>		PrepDate:		DF: <b>10</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	4.78	0.250	2.5	2.53	90.0	80 - 120				
<b>MSD</b>	Sample ID: <b>HS19081044-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>22-Aug-2019 10:58</b>						
Client ID: <b>LH18/24-SP650_082019</b>	Run ID: <b>UV-2450_345028</b>	SeqNo: <b>5225885</b>		PrepDate:		DF: <b>10</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Phosphorus, Total Orthophosphate (As P)	4.79	0.250	2.5	2.53	90.4	80 - 120	4.78	0.209	20	

The following samples were analyzed in this batch:

**ALS Houston, US**

Date: 11-Sep-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** **HS19081044**

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program



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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-141	31-Aug-2020
Texas	TX104704231-19-23	30-Apr-2020


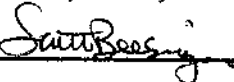
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**CHAIN OF CUSTODY**

Name Of Lab Shipping To: ALS 10450 Stancliff Rd, Suite 210 Houston, TX, 77099 (281) 530-5656 ATTN: R.J Modashia

Page 1 of 1

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001			<b>Analyses</b>																							
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT</b> <b>WEEKLY SAMPLES</b>						<b>HS19081044</b> Bshate Environmental Associates, Inc. Longhorn GW Treatment Plant 																							
<b>Prepared By:</b> Scott Beesinger			<b>P.O. Number</b>			MS / MSD	No. OF CONTAINERS	AMMONIA - N	TOTAL ORGANIC CARBON	ORTHO-PHOSPHATE	PERCHLORATE																		
<b>Field Sample I.D.</b>		<b>Sample Matrix</b>		<b>Date / Time</b>																									
LH18/24-SP650_082019		Water		08/20/19 / 14:00								2		X		X										<b>Remarks</b> (Preservatives, etc.)		<b>Lab I.D.#</b>	
LH18/24-SP650_082019		Water		08/20/19 / 14:00								1						X										NONE	
LH18/24-SP650_082019_BIX		Water		08/20/19 / 14:00		1								X										NONE					
<b>Additional Remarks: Standard TAT on all parameters</b>																													
<b>Relinquished By:</b> 		<b>Date</b> 08/20/19		<b>Time</b> 14:30		<b>Received By:</b> AC		<b>Date</b> 8/21/19		<b>Time</b> 08:45		<b>Relinquished By:</b>		<b>Date</b>		<b>Time</b>		<b>Received By:</b>		<b>Date</b>		<b>Time</b>							
<b>For Lab Use Only</b>																													
<b>Received At Lab By:</b> J/C 0.4 IR#25 CFLO		<b>Date</b>		<b>Time</b>		<b>Airbill No.</b>		<b>Opened By:</b>		<b>Date</b>		<b>Time</b>		<b>Temp of Container</b>		<b>Seal No.</b>		<b>Condition</b>											
<b>Remarks:</b> 45031																													

 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5856 Fax. +1 281 530 5887	<b>CUSTOMER SEAL</b>		Seal Broken By:
	Date: 8/20/19	Time: 1430	AC
	Name: Scott Peck	Signature: [Signature]	Date:
	Company: Smith		8/21/19

Place Label Here

**FedEx** WED - 21 AUG 10:30A  
TRK# 4809 7836 6366 PRIORITY OVERNIGHT  
10221

AB SGRA

77099  
TX-US IAH



\*45498 08/20 56743/ENE7/0582



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[www.alsglobal.com](http://www.alsglobal.com)

September 04, 2019

**Analytical Report for Service Request No: K1907749**

RJ Modashia  
ALS Laboratory Group  
10450 Stancliff Road  
Suite 210  
Houston, TX 77099-4338

**RE: ALS Houston DOD TOC / HS19081044**

Dear RJ,

Enclosed are the results of the sample(s) submitted to our laboratory August 22, 2019  
For your reference, these analyses have been assigned our service request number **K1907749**.

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](http://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](mailto:Kelley.Lovejoy@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Kelley Lovejoy  
Project Manager



---

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Acronyms

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State Certifications, Accreditations, And Licenses

Case Narrative

Chain of Custody

General Chemistry

Raw Data

    General Chemistry

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.



**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEH	<a href="http://dec.alaska.gov/eh/lab/cs/csapproval.htm">http://dec.alaska.gov/eh/lab/cs/csapproval.htm</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L16-58-R4
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	<a href="http://health.hawaii.gov/">http://health.hawaii.gov/</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	03016
Maine DHS	<a href="http://www.maine.gov/dhhs/">http://www.maine.gov/dhhs/</a>	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	WA005
New York - DOH	<a href="https://www.wadsworth.org/regulatory/elap">https://www.wadsworth.org/regulatory/elap</a>	12060
North Carolina DEQ	<a href="https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification">https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/EnvironmentalLabCertification/">http://www.scdhec.gov/environment/EnvironmentalLabCertification/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water">https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	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](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636-1 068  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** ALS Environmental - US  
**Project:** ALS Houston DOD TOC  
**Sample Matrix:** Water

**Service Request:** K1907749  
**Date Received:** 08/22/2019

### 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 08/22/2019. 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

09/04/2019



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
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K1907749



10450 Stancliff Rd, Ste 210  
 Houston, TX 77099  
 T: +1 281 530 5656  
 F: +1 281 530 5887  
 www.alsglobal.com

### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 12026

**SUBCONTRACT TO:**

ALS Environmental Kelso  
 1317 S. 13th Avenue  
 Kelso, WA 98626

**Phone:** +1 360 501 3312

**CUSTOMER INFORMATION:**

**Company:** ALS Houston  
**Contact:** RJ Modashia  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RJ.Modashia@alsglobal.com  
**Alternate Contact:**  
**Email:**

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS19081044  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19081044-01	LH18/24-SP650_082019	Water	20 Aug 2019 14:00
TOC Analysis for DOD Level IV			05 Sep 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: \_\_\_\_\_  
 Received By: [Signature] ALS Kelso Date/Time: 8/22/19 1020  
 Cooler ID(s): \_\_\_\_\_ Temperature(s): \_\_\_\_\_

RIGHT SOLUTIONS | RIGHT PARTNER



PC KL

**Cooler Receipt and Preservation Form**

Client ALS - Houston Service Request K1907749

Received: 8/22/19 Opened: 8/22/19 By: Bm Unloaded: 8/22/19 By: R

- Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
- Samples were received in: (circle) Cooler Box Envelope Other NA
- Were custody seals on coolers? NA Y N If yes, how many and where? 2 Front  
If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
0.1	-0.1	1.4	1.2	-0.2	322	12026 <u>NA</u>	4809 7836 9571		

- Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA Y N
- 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
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
- Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
- Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below NA Y N
- Were VOA vials received without headspace? Indicate in the table below. NA Y N
- 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: COC not signed



## General Chemistry

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1317 South 13th Avenue, Kelso, WA 98626  
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[www.alsglobal.com](http://www.alsglobal.com)

Analytical Report

**Client:** ALS Environmental - US  
**Project:** ALS Houston DOD TOC/HS19081044  
**Sample Matrix:** Water  
**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Service Request:** K1907749  
**Date Collected:** 08/20/19  
**Date Received:** 08/22/19  
**Units:** mg/L  
**Basis:** NA

**Carbon, Total Organic**

Sample Name	Lab Code	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
LH18/24-SP650_082019	K1907749-001	2.30	0.50	0.20	0.07	1	08/30/19 17:10	
Method Blank	K1907749-MB	ND U	0.50	0.20	0.07	1	08/30/19 01:15	



## ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** ALS Houston DOD TOC/HS19081044  
**Sample Matrix:** Water

**Service Request:** K1907749  
**Date Collected:** 08/20/19  
**Date Received:** 08/22/19  
**Date Analyzed:** 08/30/19

**Replicate Sample Summary**  
**General Chemistry Parameters**

**Sample Name:** LH18/24-SP650\_082019  
**Lab Code:** K1907749-001

**Units:** mg/L  
**Basis:** NA

Analyte Name	Analysis Method	LOQ	LOD	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
						K1907749-001DUP Result			
Carbon, Total Organic	SM 5310 C	0.50	0.20	0.07	2.30	2.33	2.32	<1	10

Results flagged with an asterisk (\*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** ALS Houston DOD TOC/HS19081044  
**Sample Matrix:** Water

**Service Request:** K1907749  
**Date Analyzed:** 08/30/19  
**Date Extracted:** NA

**Lab Control Sample Summary**  
**Carbon, Total Organic**

**Analysis Method:** SM 5310 C  
**Prep Method:** None

**Units:** mg/L  
**Basis:** NA  
**Analysis Lot:** 649436

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>	<b>Spike Amount</b>	<b>% Rec</b>	<b>% Rec Limits</b>
Lab Control Sample	K1907749-LCS	24.3	25.0	97	83-117

**Client:** ALS Environmental - US  
**Project:** ALS Houston DOD TOC/HS19081044

**Service Request:** K1907749

**Continuing Calibration Verification (CCV) Summary**

**Carbon, Total Organic**

**Analysis Method:** SM 5310 C

**Units:** mg/L

	<b>Analysis</b>		<b>Date</b>	<b>True</b>	<b>Measured</b>	<b>Percent</b>	<b>Acceptance Limits</b>
	<b>Lot</b>	<b>Lab Code</b>	<b>Analyzed</b>	<b>Value</b>	<b>Value</b>	<b>Recovery</b>	
CCV1	649436	KQ1912381-01	08/30/19 00:42	25.0	23.9	96	90-110
CCV2	649436	KQ1912381-02	08/30/19 05:50	25.0	23.9	96	90-110
CCV3	649436	KQ1912381-03	08/30/19 11:44	25.0	23.7	95	90-110
CCV4	649436	KQ1912381-04	08/30/19 16:36	25.0	24.0	96	90-110
CCV5	649436	KQ1912381-05	08/30/19 22:31	25.0	23.6	94	90-110

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** ALS Environmental - US  
**Project:** ALS Houston DOD TOC/HS19081044

**Service Request:**K1907749

**Continuing Calibration Blank (CCB) Summary**  
**Carbon, Total Organic**

**Analysis Method:** SM 5310 C**Units:**mg/L

	<b>Analysis Lot</b>	<b>Lab Code</b>	<b>Date Analyzed</b>	<b>LOQ</b>	<b>LOD</b>	<b>MDL</b>	<b>Result</b>	<b>Q</b>
CCB1	649436	KQ1912381-06	08/30/19 00:59	0.50	0.20	0.07	ND	U
CCB2	649436	KQ1912381-07	08/30/19 06:06	0.50	0.20	0.07	ND	U
CCB3	649436	KQ1912381-08	08/30/19 12:01	0.50	0.20	0.07	ND	U
CCB4	649436	KQ1912381-09	08/30/19 16:53	0.50	0.20	0.07	ND	U
CCB5	649436	KQ1912381-10	08/30/19 22:47	0.50	0.20	0.07	ND	U



## Raw Data

**ALS Environmental—Kelso Laboratory**  
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## General Chemistry

**ALS Environmental—Kelso Laboratory**  
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[www.alsglobal.com](http://www.alsglobal.com)

Work Request # <sup>Original</sup> ( ) K1907440, 7588, 7744, 7719, 7749, 7762, 7517, 7645, 7670, 7693, 7728, 7762, 780  
 Tier: II II II IV IV IV IV I II I II IV II  
 Date Analyzed: 8/29/19 TOC: 649435,  
 Analyst: BCD 649436,  
 Run # 649437  
 Analysis: TOC

**DATA QUALITY REPORT  
INORGANICS**

Explain any "no" responses to questions below, and any corrective actions in the comments section below.

1. Is the method name and number correct and appropriate?  yes/no/NA
2. Holding times met for all analyses and for all samples?  yes/no/NA
3. Are calculations correct?  yes/no/NA
4. Is the reporting basis correct? (Dry Weight) yes/no/ NA
5. All quality control criteria met?  yes/no
6. Is the calibration curve correlation coefficient  $\geq 0.995$ ?  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 *REP 8/31/19*

COMMENTS: K1907802-1/1d, 7719-2/1/2d, 7588-6/6d, 7588-2/2d report a high % RSD, but these samples are less than 5x the MRL. K1907588-7MS reports a low % Recovery due to salt water matrix interference.

Final Approved by: [Signature] Date: 8/31/19 DQREPORT

# Analytical Results Summary

00951576

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 649435 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
K1907440-001	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 00:10:00	N	II
K1907440-002	Carbon, Total Organic	N/A		Water	0.10 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 01:49:00	N	II
K1907440-003	Carbon, Total Organic	N/A		Water	0.21 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 02:21:00	N	II
K1907440-004	Carbon, Total Organic	N/A		Water	0.17 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 02:53:00	N	II
K1907440-005	Carbon, Total Organic	N/A		Water	0.13 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 03:25:00	N	II
K1907440-006	Carbon, Total Organic	N/A		Water	0.28 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 03:57:00	N	II
K1907440-007	Carbon, Total Organic	N/A		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 04:29:00	N	II
K1907588-001	Carbon, Total Organic	N/A		Brackish Water	1.29 mg/L	10 mL	2.6 mg/L	2	0.2	1.0			8/29/19 16:39:00	N	II
K1907588-002	Carbon, Total Organic	N/A		Brackish Water	0.14 mg/L	10 mL	0.3 mg/L J	2	0.2	1.0			8/29/19 17:11:00	N	II
K1907588-003	Carbon, Total Organic	N/A		Brackish Water	0.00 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0			8/29/19 17:43:00	N	II
K1907588-004	Carbon, Total Organic	N/A		Brackish Water	0.00 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0			8/29/19 18:16:00	N	II
K1907588-005	Carbon, Total Organic	N/A		Brackish Water	0.14 mg/L	10 mL	0.3 mg/L J	2	0.2	1.0			8/29/19 19:21:00	N	II
K1907588-006	Carbon, Total Organic	N/A		Brackish Water	0.10 mg/L	10 mL	0.2 mg/L J	2	0.2	1.0			8/29/19 19:54:00	N	II
K1907588-007	Carbon, Total Organic	N/A		Brackish Water	0.10 mg/L	10 mL	0.2 mg/L J	2	0.2	1.0			8/29/19 15:34:00	Y	II
K1907588-008	Carbon, Total Organic	N/A		Brackish Water	0.03 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0			8/29/19 20:26:00	N	II
K1907588-009	Carbon, Total Organic	N/A		Brackish Water	0.00 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0			8/29/19 20:58:00	N	II
K1907588-010	Carbon, Total Organic	N/A		Brackish Water	0.00 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0			8/29/19 21:30:00	N	II
K1907588-011	Carbon, Total Organic	N/A		Brackish Water	7.33 mg/L	10 mL	14.7 mg/L	2	0.2	1.0			8/29/19 22:02:00	N	II
K1907588-012	Carbon, Total Organic	N/A		Brackish Water	1.37 mg/L	10 mL	2.7 mg/L	2	0.2	1.0			8/29/19 22:34:00	N	II
K1907744-001	Carbon, Total Organic	N/A		Brackish Water	18.79 mg/L	10 mL	37.6 mg/L	2	0.2	1.0			8/30/19 23:06:00	N	II
KQ1912380-01	Carbon, Total Organic	CCV		Brackish Water	24.32 mg/L	10 mL	24.3 mg/L	1					8/29/19 14:10:00	N	II
KQ1912380-02	Carbon, Total Organic	CCV		Brackish Water	24.48 mg/L	10 mL	24.5 mg/L	1					8/29/19 18:48:00	N	II
KQ1912380-03	Carbon, Total Organic	CCV		Brackish Water	23.91 mg/L	10 mL	23.9 mg/L	1					8/30/19 00:42:00	N	II
KQ1912380-04	Carbon, Total Organic	CCV		Brackish Water	23.88 mg/L	10 mL	23.9 mg/L	1					8/30/19 05:50:00	N	II
KQ1912380-05	Carbon, Total Organic	CCB		Brackish Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/29/19 14:27:00	N	II
KQ1912380-06	Carbon, Total Organic	CCB		Brackish Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/29/19 19:05:00	N	II
KQ1912380-07	Carbon, Total Organic	CCB		Brackish Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 00:59:00	N	II
KQ1912380-08	Carbon, Total Organic	CCB		Brackish Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 06:06:00	N	II

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# indicates Final Result is not yet adjusted for Solids because it has not yet been determined.



# Analytical Results Summary

00951577

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 649435 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
KQ1912380-09	Carbon, Total Organic	MB		Brackish Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/29/19 14:44:00	N	II
KQ1912380-10	Carbon, Total Organic	LCS		Brackish Water	24.72 mg/L	10 mL	24.7 mg/L	1	0.07	0.50	99		8/29/19 15:00:00	N	II
KQ1912380-11	Carbon, Total Organic	MS	K1907588-007	Brackish Water	16.60 mg/L	10 mL	33.2 mg/L	2	0.2	1.0	66*		8/29/19 16:06:00	N	II
KQ1912380-12	Carbon, Total Organic	DUP	K1907588-007	Brackish Water	0.05 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0		NC	8/29/19 15:34:00	N	II
KQ1912380-13	Carbon, Total Organic	DUP	K1907588-001	Brackish Water	1.24 mg/L	10 mL	2.5 mg/L	2	0.2	1.0		4	8/29/19 16:39:00	N	II
KQ1912380-14	Carbon, Total Organic	DUP	K1907588-002	Brackish Water	0.20 mg/L	10 mL	0.4 mg/L J	2	0.2	1.0		36*	8/29/19 17:11:00	N	II
KQ1912380-15	Carbon, Total Organic	DUP	K1907588-003	Brackish Water	0.00 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0		NC	8/29/19 17:43:00	N	II
KQ1912380-16	Carbon, Total Organic	DUP	K1907588-004	Brackish Water	0.00 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0		NC	8/29/19 18:16:00	N	II
KQ1912380-17	Carbon, Total Organic	DUP	K1907588-005	Brackish Water	0.14 mg/L	10 mL	0.3 mg/L J	2	0.2	1.0		4	8/29/19 19:21:00	N	II
KQ1912380-18	Carbon, Total Organic	DUP	K1907588-006	Brackish Water	0.13 mg/L	10 mL	0.3 mg/L J	2	0.2	1.0		27*	8/29/19 19:54:00	N	II
KQ1912380-19	Carbon, Total Organic	DUP	K1907588-008	Brackish Water	0.00 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0		NC	8/29/19 20:26:00	N	II
KQ1912380-20	Carbon, Total Organic	DUP	K1907588-009	Brackish Water	0.00 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0		NC	8/29/19 20:58:00	N	II
KQ1912380-21	Carbon, Total Organic	DUP	K1907588-010	Brackish Water	0.00 mg/L	10 mL	1.0 mg/L U	2	0.2	1.0		NC	8/29/19 21:30:00	N	II
KQ1912380-22	Carbon, Total Organic	DUP	K1907588-011	Brackish Water	7.29 mg/L	10 mL	14.6 mg/L	2	0.2	1.0		<1	8/29/19 22:02:00	N	II
KQ1912380-23	Carbon, Total Organic	DUP	K1907588-012	Brackish Water	1.25 mg/L	10 mL	2.5 mg/L	2	0.2	1.0		10	8/29/19 22:34:00	N	II
KQ1912380-24	Carbon, Total Organic	DUP	K1907744-001	Brackish Water	18.76 mg/L	10 mL	37.5 mg/L	2	0.2	1.0		<1	8/30/19 23:06:00	N	II
KQ1912380-25	Carbon, Total Organic	DUP	K1907440-001	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	8/30/19 00:10:00	N	II
KQ1912380-26	Carbon, Total Organic	DUP	K1907440-002	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	8/30/19 01:49:00	N	II
KQ1912380-27	Carbon, Total Organic	DUP	K1907440-003	Water	0.20 mg/L	10 mL	0.20 mg/L J	1	0.07	0.50		NC	8/30/19 02:21:00	N	II
KQ1912380-28	Carbon, Total Organic	DUP	K1907440-004	Water	0.14 mg/L	10 mL	0.14 mg/L J	1	0.07	0.50		NC	8/30/19 02:53:00	N	II
KQ1912380-29	Carbon, Total Organic	DUP	K1907440-005	Water	0.18 mg/L	10 mL	0.18 mg/L J	1	0.07	0.50		NC	8/30/19 03:25:00	N	II
KQ1912380-30	Carbon, Total Organic	DUP	K1907440-006	Water	0.31 mg/L	10 mL	0.31 mg/L J	1	0.07	0.50		NC	8/30/19 03:57:00	N	II
KQ1912380-31	Carbon, Total Organic	DUP	K1907440-007	Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	8/30/19 04:29:00	N	II

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# indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

# Analytical Results Summary

00951578

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 649436 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
K1907719-005	Carbon, Total Organic	N/A		Water	1.01 mg/L	10 mL	1.01 mg/L	1	0.07	0.50			8/30/19 06:23:00	N	IV
K1907719-006	Carbon, Total Organic	N/A		Water	3.69 mg/L	10 mL	3.69 mg/L	1	0.07	0.50			8/30/19 06:55:00	N	IV
K1907719-007	Carbon, Total Organic	N/A		Water	0.60 mg/L	10 mL	0.60 mg/L	1	0.07	0.50			8/30/19 07:27:00	N	IV
K1907719-008	Carbon, Total Organic	N/A		Water	0.13 mg/L	10 mL	0.13 mg/L	J 1	0.07	0.50			8/30/19 07:59:00	N	IV
K1907719-009	Carbon, Total Organic	N/A		Water	0.07 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			8/30/19 08:31:00	N	IV
K1907719-010	Carbon, Total Organic	N/A		Water	0.90 mg/L	10 mL	0.90 mg/L	1	0.07	0.50			8/30/19 05:01:00	Y	IV
K1907719-011	Carbon, Total Organic	N/A		Water	1.53 mg/L	10 mL	1.53 mg/L	1	0.07	0.50			8/30/19 09:03:00	N	IV
K1907719-012	Carbon, Total Organic	N/A		Water	0.80 mg/L	10 mL	0.80 mg/L	1	0.07	0.50			8/30/19 09:36:00	N	IV
K1907719-013	Carbon, Total Organic	N/A		Water	3.28 mg/L	10 mL	3.28 mg/L	1	0.07	0.50			8/30/19 10:08:00	N	IV
K1907719-014	Carbon, Total Organic	N/A		Water	1.71 mg/L	10 mL	1.71 mg/L	1	0.07	0.50			8/30/19 10:40:00	N	IV
K1907719-015	Carbon, Total Organic	N/A		Water	0.78 mg/L	10 mL	0.78 mg/L	1	0.07	0.50			8/30/19 11:12:00	Y	IV
K1907719-017	Carbon, Total Organic	N/A		Water	2.13 mg/L	10 mL	2.13 mg/L	1	0.07	0.50			8/30/19 13:24:00	N	IV
K1907719-018	Carbon, Total Organic	N/A		Water	3.28 mg/L	10 mL	3.28 mg/L	1	0.07	0.50			8/30/19 13:56:00	N	IV
K1907719-019	Carbon, Total Organic	N/A		Water	1.15 mg/L	10 mL	1.15 mg/L	1	0.07	0.50			8/30/19 14:28:00	N	IV
K1907719-020	Carbon, Total Organic	N/A		Water	7.94 mg/L	10 mL	7.94 mg/L	1	0.07	0.50			8/30/19 15:00:00	N	IV
K1907719-021	Carbon, Total Organic	N/A		Water	1.04 mg/L	10 mL	1.04 mg/L	1	0.07	0.50			8/30/19 15:32:00	N	IV
K1907719-022	Carbon, Total Organic	N/A		Water	6.22 mg/L	10 mL	6.22 mg/L	1	0.07	0.50			8/30/19 16:04:00	N	IV
K1907749-001	Carbon, Total Organic	N/A		Water	2.30 mg/L	10 mL	2.30 mg/L	1	0.07	0.50			8/30/19 17:10:00	N	IV
K1907762-004	Carbon, Total Organic	N/A		Water	19.21 mg/L	10 mL	19.2 mg/L	1	0.07	0.50			8/30/19 17:42:00	N	IV
K1907762-005	Carbon, Total Organic	N/A		Water	9.55 mg/L	10 mL	9.55 mg/L	1	0.07	0.50			8/30/19 18:14:00	N	IV
KQ1912381-01	Carbon, Total Organic	CCV		Water	23.91 mg/L	10 mL	23.9 mg/L	1					8/30/19 00:42:00	N	IV
KQ1912381-02	Carbon, Total Organic	CCV		Water	23.88 mg/L	10 mL	23.9 mg/L	1					8/30/19 05:50:00	N	IV
KQ1912381-03	Carbon, Total Organic	CCV		Water	23.69 mg/L	10 mL	23.7 mg/L	1					8/30/19 11:44:00	N	IV
KQ1912381-04	Carbon, Total Organic	CCV		Water	23.97 mg/L	10 mL	24.0 mg/L	1					8/30/19 16:36:00	N	IV
KQ1912381-05	Carbon, Total Organic	CCV		Water	23.62 mg/L	10 mL	23.6 mg/L	1					8/30/19 22:31:00	N	IV
KQ1912381-06	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			8/30/19 00:59:00	N	IV
KQ1912381-07	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			8/30/19 06:06:00	N	IV
KQ1912381-08	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			8/30/19 12:01:00	N	IV
KQ1912381-09	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			8/30/19 16:53:00	N	IV
KQ1912381-10	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			8/30/19 22:47:00	N	IV
KQ1912381-11	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50			8/30/19 01:15:00	N	IV
KQ1912381-12	Carbon, Total Organic	LCS		Water	24.25 mg/L	10 mL	24.3 mg/L	1	0.07	0.50	97		8/30/19 01:32:00	N	IV
KQ1912381-13	Carbon, Total Organic	MS	K1907719-010	Water	26.77 mg/L	10 mL	26.8 mg/L	1	0.07	0.50	103		8/30/19 05:33:00	N	IV
KQ1912381-14	Carbon, Total Organic	MS	K1907719-015	Water	26.31 mg/L	10 mL	26.3 mg/L	1	0.07	0.50	102		8/30/19 12:51:00	N	IV
KQ1912381-15	Carbon, Total Organic	DUP	K1907719-010	Water	0.93 mg/L	10 mL	0.93 mg/L	1	0.07	0.50		3	8/30/19 05:01:00	N	IV
KQ1912381-16	Carbon, Total Organic	DUP	K1907719-005	Water	0.96 mg/L	10 mL	0.96 mg/L	1	0.07	0.50		5	8/30/19 06:23:00	N	IV

# indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

# Analytical Results Summary

00951579

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 649436 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
KQ1912381-17	Carbon, Total Organic	DUP	K1907719-006	Water	3.63 mg/L	10 mL	3.63 mg/L	1	0.07	0.50		2	8/30/19 06:55:00	N	IV
KQ1912381-18	Carbon, Total Organic	DUP	K1907719-007	Water	0.57 mg/L	10 mL	0.57 mg/L	1	0.07	0.50		5	8/30/19 07:27:00	N	IV
KQ1912381-19	Carbon, Total Organic	DUP	K1907719-008	Water	0.13 mg/L	10 mL	0.13 mg/L	1	0.07	0.50		<1	8/30/19 07:59:00	N	IV
KQ1912381-20	Carbon, Total Organic	DUP	K1907719-009	Water	0.05 mg/L	10 mL	0.50 mg/L	U 1	0.07	0.50		NC	8/30/19 08:31:00	N	IV
KQ1912381-21	Carbon, Total Organic	DUP	K1907719-011	Water	1.50 mg/L	10 mL	1.50 mg/L	1	0.07	0.50		2	8/30/19 09:03:00	N	IV
KQ1912381-22	Carbon, Total Organic	DUP	K1907719-012	Water	0.77 mg/L	10 mL	0.77 mg/L	1	0.07	0.50		3	8/30/19 09:36:00	N	IV
KQ1912381-23	Carbon, Total Organic	DUP	K1907719-013	Water	3.18 mg/L	10 mL	3.18 mg/L	1	0.07	0.50		3	8/30/19 10:08:00	N	IV
KQ1912381-24	Carbon, Total Organic	DUP	K1907719-014	Water	1.72 mg/L	10 mL	1.72 mg/L	1	0.07	0.50		<1	8/30/19 10:40:00	N	IV
KQ1912381-25	Carbon, Total Organic	DUP	K1907719-015	Water	0.80 mg/L	10 mL	0.80 mg/L	1	0.07	0.50		2	8/30/19 11:12:00	N	IV
KQ1912381-26	Carbon, Total Organic	DUP	K1907719-017	Water	2.14 mg/L	10 mL	2.14 mg/L	1	0.07	0.50		<1	8/30/19 13:24:00	N	IV
KQ1912381-27	Carbon, Total Organic	DUP	K1907719-018	Water	3.30 mg/L	10 mL	3.30 mg/L	1	0.07	0.50		<1	8/30/19 13:56:00	N	IV
KQ1912381-28	Carbon, Total Organic	DUP	K1907719-019	Water	1.13 mg/L	10 mL	1.13 mg/L	1	0.07	0.50		2	8/30/19 14:28:00	N	IV
KQ1912381-29	Carbon, Total Organic	DUP	K1907719-020	Water	8.18 mg/L	10 mL	8.18 mg/L	1	0.07	0.50		3	8/30/19 15:00:00	N	IV
KQ1912381-30	Carbon, Total Organic	DUP	K1907719-021	Water	0.86 mg/L	10 mL	0.86 mg/L	1	0.07	0.50		19*	8/30/19 15:32:00	N	IV
KQ1912381-31	Carbon, Total Organic	DUP	K1907719-022	Water	6.46 mg/L	10 mL	6.46 mg/L	1	0.07	0.50		4	8/30/19 16:04:00	N	IV
KQ1912381-32	Carbon, Total Organic	DUP	K1907749-001	Water	2.33 mg/L	10 mL	2.33 mg/L	1	0.07	0.50		<1	8/30/19 17:10:00	N	IV
KQ1912381-33	Carbon, Total Organic	DUP	K1907762-004	Water	19.62 mg/L	10 mL	19.6 mg/L	1	0.07	0.50		2	8/30/19 17:42:00	N	IV
KQ1912381-34	Carbon, Total Organic	DUP	K1907762-005	Water	9.44 mg/L	10 mL	9.44 mg/L	1	0.07	0.50		1	8/30/19 18:14:00	N	IV

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# indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

# Analytical Results Summary

00951580

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 649437 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
K1907517-001	Carbon, Total Organic	N/A		Water	8.01 mg/L	10 mL	8.01 mg/L	1	0.07	0.50			8/30/19 21:58:00	N	IV
K1907517-002	Carbon, Total Organic	N/A		Water	7.46 mg/L	10 mL	7.46 mg/L	1	0.07	0.50			8/30/19 23:37:00	Y	IV
K1907517-003	Carbon, Total Organic	N/A		Water	7.99 mg/L	10 mL	7.99 mg/L	1	0.07	0.50			8/31/19 00:43:00	N	IV
K1907517-004	Carbon, Total Organic	N/A		Water	2.45 mg/L	10 mL	2.45 mg/L	1	0.07	0.50			8/31/19 01:15:00	N	IV
K1907517-005	Carbon, Total Organic	N/A		Water	4.37 mg/L	10 mL	4.37 mg/L	1	0.07	0.50			8/31/19 01:47:00	N	IV
K1907517-006	Carbon, Total Organic	N/A		Water	8.56 mg/L	10 mL	8.56 mg/L	1	0.07	0.50			8/31/19 02:19:00	N	IV
K1907517-007	Carbon, Total Organic	N/A		Water	4.37 mg/L	10 mL	4.37 mg/L	1	0.07	0.50			8/31/19 02:51:00	N	IV
K1907517-008	Carbon, Total Organic	N/A		Water	0.71 mg/L	10 mL	0.71 mg/L	1	0.07	0.50			8/31/19 03:57:00	N	IV
K1907517-009	Carbon, Total Organic	N/A		Water	11.95 mg/L	10 mL	11.9 mg/L	1	0.07	0.50			8/31/19 04:29:00	N	IV
K1907517-010	Carbon, Total Organic	N/A		Water	15.41 mg/L	10 mL	15.4 mg/L	1	0.07	0.50			8/31/19 05:01:00	N	IV
K1907645-001	Carbon, Total Organic	N/A		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/31/19 06:05:00	N	I
K1907645-002	Carbon, Total Organic	N/A		Reagent Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/31/19 06:38:00	N	I
K1907670-001	Carbon, Total Organic	N/A		Water	4.65 mg/L	10 mL	465 mg/L	100	7	50			8/30/19 19:18:00	N	II
K1907670-002	Carbon, Total Organic	N/A		Water	6.78 mg/L	10 mL	678 mg/L	100	7	50			8/30/19 19:50:00	N	II
K1907670-003	Carbon, Total Organic	N/A		Water	6.36 mg/L	10 mL	636 mg/L	100	7	50			8/30/19 20:22:00	N	II
K1907693-002	Carbon, Total Organic	N/A		Drinking Water	0.34 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 20:54:00	N	I
K1907728-001	Carbon, Total Organic	N/A		Water	1.27 mg/L	10 mL	1.27 mg/L	1	0.07	0.50			8/30/19 21:26:00	N	II
K1907762-006	Carbon, Total Organic	N/A		Water	4.76 mg/L	10 mL	4.76 mg/L	1	0.07	0.50			8/30/19 18:46:00	N	IV
K1907802-001	Carbon, Total Organic	N/A		Water	0.95 mg/L	10 mL	0.95 mg/L	1	0.07	0.50			8/31/19 05:33:00	N	IV
KQ1912382-01	Carbon, Total Organic	MS	K1907517-002	Water	32.99 mg/L	10 mL	33.0 mg/L	1	0.07	0.50	102		8/31/19 00:09:00	N	IV
KQ1912382-02	Carbon, Total Organic	CCV		Water	23.97 mg/L	10 mL	24.0 mg/L	1					8/30/19 16:36:00	N	IV
KQ1912382-03	Carbon, Total Organic	CCV		Water	23.62 mg/L	10 mL	23.6 mg/L	1					8/30/19 22:31:00	N	IV
KQ1912382-04	Carbon, Total Organic	CCV		Water	23.66 mg/L	10 mL	23.7 mg/L	1					8/31/19 03:24:00	N	IV
KQ1912382-05	Carbon, Total Organic	CCV		Water	23.31 mg/L	10 mL	23.3 mg/L	1					8/31/19 07:26:00	N	IV
KQ1912382-06	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 16:53:00	N	IV
KQ1912382-07	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 22:47:00	N	IV
KQ1912382-08	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/31/19 03:40:00	N	IV
KQ1912382-09	Carbon, Total Organic	CCB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/31/19 07:43:00	N	IV
KQ1912382-10	Carbon, Total Organic	MB		Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50			8/30/19 12:17:00	N	IV
KQ1912382-11	Carbon, Total Organic	LCS		Water	24.04 mg/L	10 mL	24.0 mg/L	1	0.07	0.50	96		8/30/19 12:34:00	N	IV
KQ1912382-12	Carbon, Total Organic	DUP	K1907762-006	Water	4.71 mg/L	10 mL	4.71 mg/L	1	0.07	0.50			8/30/19 18:46:00	N	IV
KQ1912382-13	Carbon, Total Organic	DUP	K1907670-001	Water	4.62 mg/L	10 mL	462 mg/L	100	7	50			8/30/19 19:18:00	N	II
KQ1912382-14	Carbon, Total Organic	DUP	K1907670-002	Water	6.77 mg/L	10 mL	677 mg/L	100	7	50			8/30/19 19:50:00	N	II
KQ1912382-15	Carbon, Total Organic	DUP	K1907670-003	Water	6.41 mg/L	10 mL	641 mg/L	100	7	50			8/30/19 20:22:00	N	II

# indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

# Analytical Results Summary

00951581

Instrument Name: K-TOC-03

Analyst: BDITZLER

Analysis Lot: 649437 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
KQ1912382-16	Carbon, Total Organic	DUP	K1907693-002	Drinking Water	0.24 mg/L	10 mL	0.24 mg/L J	1	0.07	0.50		NC	8/30/19 20:54:00	N	I
KQ1912382-17	Carbon, Total Organic	DUP	K1907728-001	Water	1.22 mg/L	10 mL	1.22 mg/L	1	0.07	0.50		4	8/30/19 21:26:00	N	II
KQ1912382-18	Carbon, Total Organic	DUP	K1907517-001	Water	7.93 mg/L	10 mL	7.93 mg/L	1	0.07	0.50		<1	8/30/19 21:58:00	N	IV
KQ1912382-19	Carbon, Total Organic	DUP	K1907517-002	Water	7.41 mg/L	10 mL	7.41 mg/L	1	0.07	0.50		<1	8/30/19 23:37:00	N	IV
KQ1912382-20	Carbon, Total Organic	DUP	K1907517-003	Water	7.95 mg/L	10 mL	7.95 mg/L	1	0.07	0.50		<1	8/31/19 00:43:00	N	IV
KQ1912382-21	Carbon, Total Organic	DUP	K1907517-004	Water	2.44 mg/L	10 mL	2.44 mg/L	1	0.07	0.50		<1	8/31/19 01:15:00	N	IV
KQ1912382-22	Carbon, Total Organic	DUP	K1907517-005	Water	4.35 mg/L	10 mL	4.35 mg/L	1	0.07	0.50		<1	8/31/19 01:47:00	N	IV
KQ1912382-23	Carbon, Total Organic	DUP	K1907517-006	Water	8.55 mg/L	10 mL	8.55 mg/L	1	0.07	0.50		<1	8/31/19 02:19:00	N	IV
KQ1912382-24	Carbon, Total Organic	DUP	K1907517-007	Water	4.47 mg/L	10 mL	4.47 mg/L	1	0.07	0.50		2	8/31/19 02:51:00	N	IV
KQ1912382-25	Carbon, Total Organic	DUP	K1907517-008	Water	0.72 mg/L	10 mL	0.72 mg/L	1	0.07	0.50		1	8/31/19 03:57:00	N	IV
KQ1912382-26	Carbon, Total Organic	DUP	K1907517-009	Water	12.02 mg/L	10 mL	12.0 mg/L	1	0.07	0.50		<1	8/31/19 04:29:00	N	IV
KQ1912382-27	Carbon, Total Organic	DUP	K1907517-010	Water	15.57 mg/L	10 mL	15.6 mg/L	1	0.07	0.50		1	8/31/19 05:01:00	N	IV
KQ1912382-28	Carbon, Total Organic	DUP	K1907802-001	Water	0.83 mg/L	10 mL	0.83 mg/L	1	0.07	0.50		14*	8/31/19 05:33:00	N	IV
KQ1912382-29	Carbon, Total Organic	DUP	K1907645-001	Reagent Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	8/31/19 06:05:00	N	I
KQ1912382-30	Carbon, Total Organic	DUP	K1907645-002	Reagent Water	0.00 mg/L	10 mL	0.50 mg/L U	1	0.07	0.50		NC	8/31/19 06:38:00	N	I

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# indicates Final Result is not yet adjusted for Solids because it has not yet been determined.

TOC:649435,  
649436,  
649437

## Schedule: 08292019

Version: 6

Instrument: Fusion1

Last Saved by: Fusion1 (Fusion1)

Last Saved on: 2019/08/29 16:35 - Thursday

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps
(Clean)	Clean	Clean		1
(Clean)	Clean	Clean		1
(Clean)	Clean	Clean		1
(Blank)	Blank	Reagent/Acid Blank		1
D	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
1	Sample	MB1	Extended Reaction 021711 (Extended Reaction 021711)	1
C	Check Standard	[TOC] LCS ER [25.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
2	Sample	ICS	Extended Reaction 021711 (Extended Reaction 021711)	1
3	Sample	K1907588-007.08 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
4	Sample	K1907588-007.08 ms 2x	Extended Reaction 021711 (Extended Reaction 021711)	1
5	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
6	Sample	K1907588-001.09 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
7	Sample	K1907588-002.08 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
8	Sample	K1907588-003.08 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
9	Sample	K1907588-004.08 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
10	Sample	K1907588-005.08 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
11	Sample	K1907588-006.08 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
12	Sample	K1907588-008.08 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
13	Sample	K1907588-009.08 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
14	Sample	K1907588-010.08 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
15	Sample	K1907588-011.08 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
16	Sample	K1907588-012.08 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
17	Sample	K1907744-001.08 2x	Extended Reaction 021711 (Extended Reaction 021711)	2
18	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	2
19	Sample	K1907440-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
20	Sample	MB2	Extended Reaction 021711 (Extended Reaction 021711)	1
C	Check Standard	[TOC] LCS ER [25.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
21	Sample	K1907440-002.01	Extended Reaction 021711 (Extended Reaction 021711)	2
22	Sample	K1907440-003.01	Extended Reaction 021711 (Extended Reaction 021711)	2
23	Sample	K1907440-004.01	Extended Reaction 021711 (Extended Reaction 021711)	2
24	Sample	K1907440-005.01	Extended Reaction 021711 (Extended Reaction 021711)	2
25	Sample	K1907440-006.01	Extended Reaction 021711 (Extended Reaction 021711)	2
26	Sample	K1907440-007.01	Extended Reaction 021711 (Extended Reaction 021711)	2
27	Sample	K1907719-010.12	Extended Reaction 021711 (Extended Reaction 021711)	2
28	Sample	K1907719-010.12 ms	Extended Reaction 021711 (Extended Reaction 021711)	1
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
29	Sample	K1907719-005.12	Extended Reaction 021711 (Extended Reaction 021711)	2
30	Sample	K1907719-006.12	Extended Reaction 021711 (Extended Reaction 021711)	2
31	Sample	K1907719-007.12	Extended Reaction 021711 (Extended Reaction 021711)	2
32	Sample	K1907719-008.12	Extended Reaction 021711 (Extended Reaction 021711)	2
33	Sample	K1907719-009.12	Extended Reaction 021711 (Extended Reaction 021711)	2
34	Sample	K1907719-011.12	Extended Reaction 021711 (Extended Reaction 021711)	2
35	Sample	K1907719-012.12	Extended Reaction 021711 (Extended Reaction 021711)	2
36	Sample	K1907719-013.12	Extended Reaction 021711 (Extended Reaction 021711)	2
37	Sample	K1907719-014.12	Extended Reaction 021711 (Extended Reaction 021711)	2
38	Sample	K1907719-015.12	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1

Printed on: August 31, 2019 09:03:00

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## Schedule: 08292019

Position	Sample Type	Sample ID	Method ID (Calibration ID)	Reps
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
39	Sample	MB3	Extended Reaction 021711 (Extended Reaction 021711)	1
C	Check Standard	[TOC] LCS ER [25.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
40	Sample	K1907719-015.12 ms	Extended Reaction 021711 (Extended Reaction 021711)	1
41	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
42	Sample	K1907719-017.12	Extended Reaction 021711 (Extended Reaction 021711)	2
43	Sample	K1907719-018.12	Extended Reaction 021711 (Extended Reaction 021711)	2
44	Sample	K1907719-019.12	Extended Reaction 021711 (Extended Reaction 021711)	2
45	Sample	K1907719-020.12	Extended Reaction 021711 (Extended Reaction 021711)	2
46	Sample	K1907719-021.12	Extended Reaction 021711 (Extended Reaction 021711)	2
47	Sample	K1907719-022.12	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
48	Sample	K1907749-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
49	Sample	K1907762-004.10	Extended Reaction 021711 (Extended Reaction 021711)	2
50	Sample	K1907762-005.10	Extended Reaction 021711 (Extended Reaction 021711)	2
51	Sample	K1907762-006.10	Extended Reaction 021711 (Extended Reaction 021711)	2
52	Sample	K1907670-001.01 100x	Extended Reaction 021711 (Extended Reaction 021711)	2
53	Sample	K1907670-002.01 100x	Extended Reaction 021711 (Extended Reaction 021711)	2
54	Sample	K1907670-003.01 100x	Extended Reaction 021711 (Extended Reaction 021711)	2
55	Sample	K1907693-002.01	Extended Reaction 021711 (Extended Reaction 021711)	2
56	Sample	K1907728-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
57	Sample	K1907517-001.04	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
58	Sample	MB4	Extended Reaction 021711 (Extended Reaction 021711)	1
C	Check Standard	[TOC] LCS ER [25.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
59	Sample	K1907517-002.14	Extended Reaction 021711 (Extended Reaction 021711)	2
60	Sample	K1907517-002.14 ms	Extended Reaction 021711 (Extended Reaction 021711)	1
61	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
62	Sample	K1907517-003.04	Extended Reaction 021711 (Extended Reaction 021711)	2
63	Sample	K1907517-004.04	Extended Reaction 021711 (Extended Reaction 021711)	2
64	Sample	K1907517-005.04	Extended Reaction 021711 (Extended Reaction 021711)	2
65	Sample	K1907517-006.04	Extended Reaction 021711 (Extended Reaction 021711)	2
66	Sample	K1907517-007.04	Extended Reaction 021711 (Extended Reaction 021711)	2
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
67	Sample	K1907517-008.94	Extended Reaction 021711 (Extended Reaction 021711)	2
68	Sample	K1907517-009.04	Extended Reaction 021711 (Extended Reaction 021711)	2
69	Sample	K1907517-010.04	Extended Reaction 021711 (Extended Reaction 021711)	2
70	Sample	K1907802-001.09	Extended Reaction 021711 (Extended Reaction 021711)	2
71	Sample	K1907645-001.01	Extended Reaction 021711 (Extended Reaction 021711)	2
72	Sample	K1907645-002.01	Extended Reaction 021711 (Extended Reaction 021711)	2
73	Sample	RB	Extended Reaction 021711 (Extended Reaction 021711)	1
B	Check Standard	[TOC] CCV 021711 [25 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1
D	Check Standard	[TOC] CCB 021711 [0.0 ppm]	Extended Reaction 021711 (Extended Reaction 021711)	1

## Fusion Report - 08292019

### Thursday, August 29, 2019 12:13 PM

(View - Repts, Unused Repts, Meta-Data, Signature, History)  
 Printed on 2019/08/31 09:03 - Saturday

### Report Summary Information

Company Location: Gen Chem Lab  
 Schedule Name: 08292019  
 Instrument Name: Fusion1  
 Report Version: 1 of 1  
 Report Creation by Operators (schedule version): Fusion1 (Fusion1) (v1)  
 Fusion1 (Fusion1) (v2)  
 Fusion1 (Fusion1) (v3)  
 Fusion1 (Fusion1) (v4)  
 Fusion1 (Fusion1) (v5)  
 Fusion1 (Fusion1) (v6)

Engine Version: 1.1.5.1  
 Firmware Version: 1.2.0696  
 Connection: RS232 COM1

Comment:

### Report Results

Sample Type: Clean							From Schedule Version 1
Pos	Analysis Type	Sample ID			Start Time		
◆ (clean)		Clean			2019/08/29 12:14		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	12.32	15.99	3.67	49.65	05:23	
2	TC Clean	5.89	9.29	3.40	50.04	04:03	
3	TC Clean	2.35	5.69	3.34	50.18	03:51	
4	TC Clean	1.70	5.10	3.40	50.18	03:49	

Sample Type: Clean							From Schedule Version 2
Pos	Analysis Type	Sample ID			Start Time		
◆ (clean)		Clean			2019/08/29 12:36		
Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time	
1	IC Clean	9.98	13.39	3.41	49.59	05:12	
2	TC Clean	3.67	6.95	3.29	50.14	04:03	



3	TC Clean	1.61	5.01	3.41	50.20	03:45
4	TC Clean	1.28	4.65	3.37	50.19	03:47

**Sample Type:** Clean From Schedule Version 3

Pos	Analysis Type	Sample ID			Start Time	
♦ (clean)		Clean			2019/08/29 12:58	

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	10.30	13.44	3.14	49.68	05:11
2	TC Clean	3.29	6.53	3.25	50.18	04:04
3	TC Clean	1.57	4.94	3.37	50.21	03:48
4	TC Clean	1.18	4.76	3.58	50.16	03:47

**Sample Type:** Blank (Creating v1289) From Schedule Version 3

Pos	Analysis Type	Sample ID			Start Time	
♦ (blank)		Reagent/Acid Blank			2019/08/29 13:20	

Rep #	Base Analysis Type	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	IC Clean	0.99	4.37	3.38	49.71	05:20
2	TC Clean	3.02	6.50	3.48	50.09	03:58
3	TC Clean	1.47	4.81	3.34	50.17	03:46
4	TC Clean	1.17	4.71	3.54	50.22	03:48
5	Reagent Blank	4.01	7.51	3.50	50.20	05:04
6	Acid Blank	1.48	4.82	3.34	49.66	05:27

**Sample Type:** Sample From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ D	TOC	RB	0.1717 ppm	0.0000 ppm	0.0000%	2019/08/29 13:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1717	1.7172	11.55	14.99	3.44	50.30	12:33

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711 From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊ B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity (NA / NA)	24.3240 ppm (PASS)	0.0000 ppm	0%	2019/08/29 14:10

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.3240	243.2397	185.57	188.99	3.41	50.26	12:31

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos B</b>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

**Sample Type:** Check Standard --> CCB 021711 From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊ D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity (NA / NA)	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/29 14:27

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	7.93	11.62	3.69	50.27	12:31

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos D</b>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

**Sample Type:** Sample From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 1	TOC	MB1	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/29 14:44

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.25	10.59	3.34	50.32	12:31

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> LCS ER From Schedule Version 3

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊ C	TOC	25.0000	1:1	[TOC] LCS ER [25.0 ppm]	0 / infinity (NA / NA)	24.7192 ppm (PASS)	0.0000 ppm	0%	2019/08/29 15:00

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.7192	247.1922	188.41	191.65	3.25	50.35	12:30

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos C</u>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	25 ppmC

**Sample Type:** Sample From Schedule Version 3

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
2	TOC	ICS	0.0360 ppm	0.0000 ppm	0.0000%	2019/08/29 15:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0360	0.3602	10.57	13.92	3.34	50.32	12:32

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
3	TOC	K1907588-007.08 2x	0.0786 ppm	0.0372 ppm	47.2900%	2019/08/29 15:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1049	1.0491	11.07	14.31	3.24	50.31	12:25
2	TOC	0.0523	0.5233	10.69	14.01	3.32	50.30	12:31

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

**Sample Type:** Sample From Schedule Version 4

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
4	TOC	K1907588-007.08 ms 2x	16.5998 ppm	0.0000 ppm	0.0000%	2019/08/29 16:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	16.5998	165.9979	129.34	132.69	3.35	50.37	12:30

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

**Sample Type:** Sample From Schedule Version 5

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.40	11.70	3.30	50.39	12:30
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 10.3147 (IC) (v1289)		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
6	TOC	K1907588-001.09 2x	1.2628 ppm	0.0390 ppm	3.0800%	2019/08/29 16:39		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.2904	12.9036	19.57	22.89	3.32	50.32	12:29
2	TOC	1.2353	12.3527	19.17	22.59	3.41	50.35	12:24
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 10.3147 (IC) (v1289)		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
7	TOC	K1907588-002.08 2x	0.1691 ppm	0.0432 ppm	25.5500%	2019/08/29 17:11		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1385	1.3852	11.31	14.69	3.38	50.33	12:29
2	TOC	0.1996	1.9961	11.75	15.11	3.37	50.37	12:27
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 10.3147 (IC) (v1289)		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
8	TOC	K1907588-003.08 2x	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/29 17:43		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.01	11.37	3.36	50.36	12:27
2	TOC	0.0000	0.0000	8.24	11.55	3.31	50.38	12:23
<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>		
1:10		(TC) 10.3147 (IC) (v1289)		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time		
9	TOC	K1907588-004.08 2x	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/29 18:16		
Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.19	11.46	3.27	50.38	12:27

2	TOC	0.0000	0.0000	8.00	11.42	3.42	50.35	12:27
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 10.3147 (IC) (v1289)		Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)			

**Sample Type:** Check Standard --> CCV 021711 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 021711 [25 ppm]	0 / infinity ( NA / NA )	24.4818 ppm (PASS)	0.0000 ppm	0%	2019/08/29 18:48

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	24.4818	244.8185	186.71	190.04	3.34	50.32	12:33

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos B</u>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

**Sample Type:** Check Standard --> CCB 021711 From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
* D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/29 19:05

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	7.19	10.76	3.56	50.29	12:30

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos D</u>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
* 10	TOC	K1907588-005.08 2x	0.1417 ppm	0.0040 ppm	2.8500%	2019/08/29 19:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1388	1.3880	11.31	14.85	3.54	50.25	12:28
2	TOC	0.1445	1.4452	11.35	14.63	3.28	50.23	12:27

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

<u>Analysis</u>	<u>Std. Dev.</u>
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Pos	Type	Sample ID	Result (ppmC)	(ppmC)	RSD	Start Time
11	TOC	K1907588-006.08 2x	0.1186 ppm	0.0226 ppm	19.0300%	2019/08/29 19:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1027	1.0268	11.05	14.40	3.35	50.28	12:25
2	TOC	0.1346	1.3462	11.28	14.45	3.17	50.20	12:29

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
12	TOC	K1907588-008.08 2x	0.0164 ppm	0.0232 ppm	141.4200%	2019/08/29 20:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0328	0.3281	10.55	13.85	3.30	50.19	12:30
2	TOC	0.0000	0.0000	10.18	13.63	3.45	50.17	12:25

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
13	TOC	K1907588-009.08 2x	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/29 20:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	8.38	11.90	3.52	50.17	12:27
2	TOC	0.0000	0.0000	8.73	11.97	3.24	50.16	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
14	TOC	K1907588-010.08 2x	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/29 21:30

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.32	12.81	3.49	50.17	12:26
2	TOC	0.0000	0.0000	9.66	13.04	3.37	50.18	12:25

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
15	TOC	K1907588-011.08 2x	7.3101 ppm	0.0309 ppm	0.4200%	2019/08/29 22:02

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.3320	73.3196	62.89	66.32	3.43	50.17	12:30
2	TOC	7.2883	72.8831	62.57	66.03	3.45	50.19	12:26

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
16	TOC	K1907588-012 08 2x	1.3116 ppm	0.0887 ppm	6.7600%	2019/08/29 22:34

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.3743	13.7432	20.17	23.51	3.34	50.22	12:29
2	TOC	1.2489	12.4894	19.27	22.56	3.29	50.23	12:25

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
17	TOC	K1907744-001.08 2x	18.7771 ppm	0.0243 ppm	0.1300%	2019/08/29 23:06

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	18.7943	187.9426	145.08	148.44	3.36	50.22	12:29
2	TOC	18.7600	187.5995	144.83	148.15	3.32	50.24	12:25

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
18	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/29 23:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	7.29	10.59	3.30	50.25	12:29
2	TOC	0.0000	0.0000	6.83	10.34	3.51	50.27	12:25

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
19	TOC	K1907440-001.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/30 00:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.40	12.74	3.33	50.26	12:28
2	TOC	0.0000	0.0000	9.37	12.87	3.50	50.26	12:29

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711

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 021711 [25 ppm]	0 / infinity ( NA / NA )	23.9102 ppm (PASS)	0.0000 ppm	0%	2019/08/30 00:42

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.9102	239.1018	182.61	185.94	3.33	50.28	12:27

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos B</u>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

**Sample Type:** Check Standard --> CCB 021711 From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/30 00:59

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	6.53	9.90	3.37	50.30	12:34

<u>Completion State</u>	<u>Success Action</u>	<u>Method</u>	<u>Calibration</u>	<u>STD Conc - Pos D</u>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 20	TOC	MB2	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/30 01:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.51	9.03	3.52	50.29	12:34

<u>Dilution</u>	<u>Blank Contribution</u>	<u>Method</u>	<u>Calibration</u>
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> LCS ER From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ C	TOC	25.0000	1:1	[TOC] LCS ER [25.0 ppm]	0 / infinity ( NA / NA )	24.2509 ppm (PASS)	0.0000 ppm	0%	2019/08/30 01:32

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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Type	25.0 ppm	1	24.2509	242.5090	185.05	188.39	3.34	50.31	12:31
C	TOC								
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos C</b>	
Success - Criteria met.		Do Nothing		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		25 ppmC	

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
21	TOC	K1907440-002.01	0.0504 ppm	0.0712 ppm	141.4200%	2019/08/30 01:49

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1007	1.0073	11.04	14.36	3.33	50.30	12:30
2	TOC	0.0000	0.0000	10.14	13.59	3.45	50.31	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
22	TOC	K1907440-003.01	0.2090 ppm	0.0065 ppm	3.1100%	2019/08/30 02:21

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2136	2.1356	11.85	15.31	3.47	50.30	12:27
2	TOC	0.2044	2.0435	11.78	15.17	3.39	50.32	12:25

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
23	TOC	K1907440-004.01	0.1554 ppm	0.0235 ppm	15.1000%	2019/08/30 02:53

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1720	1.7200	11.55	14.83	3.29	50.32	12:29
2	TOC	0.1388	1.3880	11.31	14.63	3.32	50.33	12:30

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
24	TOC	K1907440-005.01	0.1509 ppm	0.0367 ppm	24.3100%	2019/08/30 03:25

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1250	1.2500	11.21	14.64	3.43	50.32	12:28
2	TOC	0.1769	1.7688	11.58	14.96	3.38	50.33	12:24

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
25	TOC	K1907440-006.01	0.2970 ppm	0.0177 ppm	5.9400%	2019/08/30 03:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.2845	2.8454	12.36	15.71	3.35	50.34	12:27
2	TOC	0.3095	3.0951	12.53	15.88	3.35	50.33	12:29

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
26	TOC	K1907440-007.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/30 04:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	9.23	12.62	3.39	50.34	12:29
2	TOC	0.0000	0.0000	9.39	12.77	3.39	50.35	12:28

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
27	TOC	K1907719-010.12	0.9128 ppm	0.0176 ppm	1.9200%	2019/08/30 05:01

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9004	9.0042	16.77	20.20	3.43	50.36	12:30
2	TOC	0.9252	9.2524	16.95	20.29	3.34	50.35	12:24

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
28	TOC	K1907719-010.12 ms	26.7658 ppm	0.0000 ppm	0.0000%	2019/08/30 05:33

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.7658	267.6577	202.23	205.78	3.55	50.34	12:31

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711

From Schedule Version 6

Concentration	Min / Max

Pos	BAT	(ppm)	Dil	Sample ID	(% dev)	Result	Std. Dev.	RSD	Start Time
♦ B	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity ( NA / NA )	23.8817 ppm (PASS)	0.0000 ppm	0%	2019/08/30 05:50

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.8817	238.8173	182.40	185.79	3.38	50.38	12:30

Completion State	Success Action	Method	Calibration	STD Conc - Pos B
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	50 ppmC

**Sample Type:** Check Standard --> CCB 021711 From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/30 06:06

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	6.76	10.11	3.35	50.37	12:29

Completion State	Success Action	Method	Calibration	STD Conc - Pos D
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	0 ppmC

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 29	TOC	K1907719-005.12	0.9845 ppm	0.0351 ppm	3.5700%	2019/08/30 06:23

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0093	10.0934	17.55	20.78	3.23	50.38	12:27
2	TOC	0.9597	9.5969	17.20	20.59	3.39	50.37	12:27

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 30	TOC	K1907719-006.12	3.6603 ppm	0.0467 ppm	1.2800%	2019/08/30 06:55

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.6933	36.9333	36.80	40.17	3.38	50.39	12:27
2	TOC	3.6272	36.2723	36.32	39.78	3.45	50.38	12:29

Dilution	Blank Contribution	Method	Calibration
1:10	(TC) 10.3147 (IC)	Extended Reaction	Extended Reaction

(v1289)

021711 (v4)

021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
31	TOC	K1907719-007.12	0.5842 ppm	0.0220 ppm	3.7600%	2019/08/30 07:27

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.5997	5.9973	14.61	17.79	3.18	50.37	12:27
2	TOC	0.5686	5.6863	14.39	17.68	3.29	50.40	12:25

Dilution

1:10

Blank Contribution(TC) 10.3147 (IC)  
(v1289)MethodExtended Reaction  
021711 (v4)CalibrationExtended Reaction  
021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
32	TOC	K1907719-008.12	0.1254 ppm	0.0000 ppm	0.0000%	2019/08/30 07:59

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.1254	1.2541	11.21	14.51	3.29	50.40	12:25
2	TOC	0.1254	1.2541	11.21	14.58	3.37	50.40	12:24

Dilution

1:10

Blank Contribution(TC) 10.3147 (IC)  
(v1289)MethodExtended Reaction  
021711 (v4)CalibrationExtended Reaction  
021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
33	TOC	K1907719-009.12	0.0604 ppm	0.0091 ppm	15.0200%	2019/08/30 08:31

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0668	0.6684	10.79	14.15	3.35	50.39	12:23
2	TOC	0.0540	0.5401	10.70	14.08	3.38	50.40	12:29

Dilution

1:10

Blank Contribution(TC) 10.3147 (IC)  
(v1289)MethodExtended Reaction  
021711 (v4)CalibrationExtended Reaction  
021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
34	TOC	K1907719-011.12	1.5148 ppm	0.0206 ppm	1.3600%	2019/08/30 09:03

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.5294	15.2940	21.28	24.53	3.25	50.38	12:25
2	TOC	1.5003	15.0025	21.07	24.46	3.38	50.35	12:25

Dilution

1:10

Blank Contribution(TC) 10.3147 (IC)  
(v1289)MethodExtended Reaction  
021711 (v4)CalibrationExtended Reaction  
021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
35	TOC	K1907719-012.12	0.7854 ppm	0.0171 ppm	2.1700%	2019/08/30 09:36

Rep	Base	ppm	µg	Adjusted	NDIR (Abs)	Baseline	Pressure	Run
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#	Analysis Type			(Abs)		(Abs)	(psig)	Time
1	TOC	0.7975	7.9749	16.03	19.43	3.39	50.35	12:25
2	TOC	0.7734	7.7337	15.86	19.15	3.29	50.32	12:27

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
36	TOC	K1907719-013.12	3.2337 ppm	0.0707 ppm	2.1900%	2019/08/30 10:08

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.2837	32.8372	33.86	37.21	3.35	50.32	12:28
2	TOC	3.1837	31.8373	33.14	36.51	3.37	50.31	12:28

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
37	TOC	K1907719-014.12	1.7134 ppm	0.0041 ppm	0.2400%	2019/08/30 10:40

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.7104	17.1043	22.58	25.94	3.36	50.29	12:28
2	TOC	1.7163	17.1628	22.62	25.99	3.37	50.28	12:25

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
38	TOC	K1907719-015.12	0.7911 ppm	0.0097 ppm	1.2200%	2019/08/30 11:12

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.7842	7.8424	15.94	19.24	3.30	50.38	12:28
2	TOC	0.7979	7.9791	16.04	19.37	3.33	50.44	12:24

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711

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 021711 [25 ppm]	0 / infinity (NA / NA)	23.6898 ppm (PASS)	0.0000 ppm	0%	2019/08/30 11:44

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
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B	TOC	25 ppm	1	23.6898	236.8983	181.03	184.25	3.22	50.55	12:30
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos B</b>		
Success - Criteria met.		Do Nothing		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		50 ppmC		

**Sample Type:** Check Standard --> CCB 021711 From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/30 12:01

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	5.52	9.05	3.53	50.66	12:31

<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos D</b>		
Success - Criteria met.		Do Nothing		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		0 ppmC		

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
♦ 39	TOC	MB3	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/30 12:17

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.38	8.56	3.18	50.74	12:32

<b>Dilution</b>		<b>Blank Contribution</b>		<b>Method</b>		<b>Calibration</b>	
1:10		(TC) 10.3147 (IC) (v1289)		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)	

**Sample Type:** Check Standard --> LCS ER From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
♦ C	TOC	25.0000	1:1	[TOC] LCS ER [25.0 ppm]	0 / infinity ( NA / NA )	24.0411 ppm (PASS)	0.0000 ppm	0%	2019/08/30 12:34

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.0411	240.4114	183.55	186.99	3.44	50.78	12:31

<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos C</b>		
Success - Criteria met.		Do Nothing		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		25 ppmC		

Sample Type: Sample

From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
40	TOC	K1907719-015.12 ms	26.3093 ppm	0.0000 ppm	0.0000%	2019/08/30 12:51

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	26.3093	263.0930	198.96	202.45	3.49	50.76	12:32

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
41	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/30 13:07

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.22	9.56	3.34	50.78	12:30

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
42	TOC	K1907719-017.12	2.1329 ppm	0.0041 ppm	0.1900%	2019/08/30 13:24

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.1299	21.2994	25.59	28.94	3.35	50.81	12:28
2	TOC	2.1358	21.3579	25.63	28.88	3.25	50.83	12:25

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
43	TOC	K1907719-018.12	3.2910 ppm	0.0137 ppm	0.4200%	2019/08/30 13:56

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	3.2814	32.8135	33.84	37.24	3.40	50.84	12:27
2	TOC	3.3007	33.0074	33.98	37.28	3.30	50.88	12:30

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
44	TOC	K1907719-019.12	1.1397 ppm	0.0187 ppm	1.6400%	2019/08/30 14:28

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.1530	11.5299	18.58	21.89	3.31	50.89	12:26
2	TOC	1.1265	11.2649	18.39	21.56	3.17	50.94	12:27

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
45	TOC	K1907719-020.12	8.0599 ppm	0.1715 ppm	2.1300%	2019/08/30 15:00

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.9386	79.3863	67.24	70.59	3.35	50.93	12:24
2	TOC	8.1812	81.8116	68.98	72.36	3.39	50.98	12:26

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
46	TOC	K1907719-021.12	0.9536 ppm	0.1271 ppm	13.3300%	2019/08/30 15:32

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.0435	10.4351	17.80	20.98	3.19	50.94	12:26
2	TOC	0.8637	8.6374	16.51	19.91	3.40	50.90	12:29

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
47	TOC	K1907719-022.12	6.3391 ppm	0.1749 ppm	2.7600%	2019/08/30 16:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.2154	62.1541	54.88	58.24	3.36	50.77	12:31
2	TOC	6.4628	64.6282	56.65	59.98	3.33	50.73	12:27

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711

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 021711 [25 ppm]	0 / infinity ( NA / NA )	23.9746 ppm (PASS)	0.0000 ppm	0%	2019/08/30 16:36

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.9746	239.7462	183.07	186.41	3.34	50.68	12:33

**Completion State** Success - Criteria      **Success Action** Do Nothing      **Method** Extended Reaction      **Calibration** Extended Reaction      **STD Conc - Pos B** 50 ppmC



met.

021711 (v4)

021711 (v27)

**Sample Type:** Check Standard --> CCB 021711

From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
* D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/30 16:53

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	6.14	9.52	3.37	50.62	12:29

**Completion State**

Success - Criteria met.

**Success Action**

Do Nothing

**Method**Extended Reaction  
021711 (v4)**Calibration**Extended Reaction  
021711 (v27)**STD Conc - Pos D**

0 ppmC

**Sample Type:** Sample

From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
* 48	TOC	K1907749-001.01	2.3151 ppm	0.0151 ppm	0.6500%	2019/08/30 17:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.3044	23.0441	26.84	30.17	3.33	50.59	12:29
2	TOC	2.3257	23.2574	26.99	30.09	3.10	50.56	12:27

**Dilution**

1:10

**Blank Contribution**(TC) 10.3147 (IC)  
(v1289)**Method**Extended Reaction  
021711 (v4)**Calibration**Extended Reaction  
021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
* 49	TOC	K1907762-004.10	19.4125 ppm	0.2915 ppm	1.5000%	2019/08/30 17:42

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	19.2064	192.0638	148.03	151.39	3.36	50.53	12:27
2	TOC	19.6186	196.1863	150.99	154.40	3.42	50.55	12:27

**Dilution**

1:10

**Blank Contribution**(TC) 10.3147 (IC)  
(v1289)**Method**Extended Reaction  
021711 (v4)**Calibration**Extended Reaction  
021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
* 50	TOC	K1907762-005.10	9.4960 ppm	0.0807 ppm	0.8500%	2019/08/30 18:14

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	9.5531	95.5307	78.81	82.30	3.49	50.52	12:30
2	TOC	9.4390	94.3899	78.00	81.37	3.38	50.46	12:28

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
51	TOC	K1907762-006.10	4.7310 ppm	0.0360 ppm	0.7600%	2019/08/30 18:46

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.7565	47.5647	44.42	47.60	3.18	50.45	12:28
2	TOC	4.7056	47.0556	44.06	47.41	3.36	50.42	12:26

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
52	TOC	K1907670-001.01 100x	4.6346 ppm	0.0185 ppm	0.4000%	2019/08/30 19:18

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.6477	46.4769	43.64	46.81	3.17	50.41	12:27
2	TOC	4.6215	46.2147	43.45	46.74	3.29	50.39	12:24

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
53	TOC	K1907670-002.01 100x	6.7717 ppm	0.0079 ppm	0.1200%	2019/08/30 19:50

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.7773	67.7731	58.91	62.14	3.23	50.41	12:27
2	TOC	6.7662	67.6615	58.83	62.09	3.26	50.41	12:24

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
54	TOC	K1907670-003.01 100x	6.3841 ppm	0.0311 ppm	0.4900%	2019/08/30 20:22

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	6.3621	63.6212	55.93	59.33	3.39	50.42	12:30
2	TOC	6.4061	64.0605	56.25	59.49	3.25	50.41	12:27

**Dilution** 1:10  
**Blank Contribution** (TC) 10.3147 (IC) (v1289)  
**Method** Extended Reaction 021711 (v4)  
**Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
55	TOC	K1907693-002.01	0.2910 ppm	0.0692 ppm	23.7900%	2019/08/30 20:54

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.3399	3.3991	12.75	16.04	3.29	50.44	12:25
2	TOC	0.2420	2.4201	12.05	15.53	3.48	50.46	12:25

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
56	TOC	K1907728-001.01	1.2445 ppm	0.0312 ppm	2.5000%	2019/08/30 21:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	1.2665	12.6651	19.40	22.67	3.27	50.47	12:27
2	TOC	1.2224	12.2244	19.08	22.45	3.37	50.47	12:26

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
57	TOC	K1907517-001.04	7.9685 ppm	0.0528 ppm	0.6600%	2019/08/30 21:58

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	8.0059	80.0585	67.72	71.08	3.36	50.48	12:29
2	TOC	7.9312	79.3124	67.18	70.60	3.42	50.48	12:30

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711

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 021711 [25 ppm]	0 / infinity ( NA / NA )	23.6209 ppm (PASS)	0.0000 ppm	0%	2019/08/30 22:31

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.6209	236.2093	180.53	183.81	3.28	50.51	12:30

**Completion State** Success - Criteria met.      **Success Action** Do Nothing      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)      **STD Conc - Pos B** 50 ppmC

**Sample Type:** Check Standard --> CCB 021711

From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time

◊	D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/30 22:47
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	5.77	9.14	3.37	50.51	12:28
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos D</b>		
Success - Criteria met.		Do Nothing		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		0 ppmC		

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 58	TOC	MB4	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/30 23:04

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	5.35	8.69	3.34	50.52	12:30

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> LCS ER From Schedule Version 6

Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time
◊ C	TOC	25.0000	1:1	[TOC] LCS ER [25.0 ppm]	0 / infinity ( NA / NA )	24.1648 ppm (PASS)	0.0000 ppm	0%	2019/08/30 23:21

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
C	TOC	25.0 ppm	1	24.1648	241.6485	184.43	187.77	3.34	50.59	12:32

<b>Completion State</b>	<b>Success Action</b>	<b>Method</b>	<b>Calibration</b>	<b>STD Conc - Pos C</b>
Success - Criteria met.	Do Nothing	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)	25 ppmC

**Sample Type:** Sample From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
◊ 59	TOC	K1907517-002.14	7.4324 ppm	0.0374 ppm	0.5000%	2019/08/30 23:37

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.4589	74.5887	63.80	67.04	3.24	50.54	12:28
2	TOC	7.4060	74.0601	63.42	66.74	3.32	50.54	12:24

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
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1:10 (TC) 10.3147 (IC) (v1289) Extended Reaction 021711 (v4) Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
60	TOC	K1907517-002.14 ms	32.9899 ppm	0.0000 ppm	0.0000%	2019/08/31 00:09

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	32.9899	329.8992	246.86	250.19	3.33	50.54	12:33

Dilution 1:10 Blank Contribution (TC) 10.3147 (IC) (v1289) Method Extended Reaction 021711 (v4) Calibration Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
61	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/31 00:26

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	6.96	10.35	3.38	50.56	12:30

Dilution 1:10 Blank Contribution (TC) 10.3147 (IC) (v1289) Method Extended Reaction 021711 (v4) Calibration Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
62	TOC	K1907517-003.04	7.9712 ppm	0.0251 ppm	0.3200%	2019/08/31 00:43

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	7.9890	79.8897	67.60	70.89	3.29	50.58	12:31
2	TOC	7.9534	79.5341	67.34	70.67	3.33	50.56	12:25

Dilution 1:10 Blank Contribution (TC) 10.3147 (IC) (v1289) Method Extended Reaction 021711 (v4) Calibration Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
63	TOC	K1907517-004.04	2.4441 ppm	0.0072 ppm	0.2900%	2019/08/31 01:15

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	2.4492	24.4917	27.88	31.21	3.34	50.58	12:28
2	TOC	2.4390	24.3899	27.80	31.19	3.39	50.60	12:24

Dilution 1:10 Blank Contribution (TC) 10.3147 (IC) (v1289) Method Extended Reaction 021711 (v4) Calibration Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
64	TOC	K1907517-005.04	4.3594 ppm	0.0174 ppm	0.4000%	2019/08/31 01:47

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	4.3717	43.7169	41.66	44.94	3.28	50.60	12:28

2	TOC	4.3471	43.4714	41.48	44.81	3.33	50.60	12:26
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 10.3147 (IC) (v1289)		Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)			
<u>Pos</u>	<u>Analysis Type</u>	<u>Sample ID</u>	<u>Result (ppmC)</u>	<u>Std. Dev. (ppmC)</u>	<u>RSD</u>	<u>Start Time</u>		
65	TOC	K1907517-006.04	8.5538 ppm	0.0097 ppm	0.1100%	2019/08/31 02:19		
<u>Rep #</u>	<u>Base Analysis Type</u>	<u>ppm</u>	<u>µg</u>	<u>Adjusted (Abs)</u>	<u>NDIR (Abs)</u>	<u>Baseline (Abs)</u>	<u>Pressure (psig)</u>	<u>Run Time</u>
1	TOC	8.5606	85.6064	71.70	75.04	3.34	50.64	12:30
2	TOC	8.5470	85.4697	71.60	74.88	3.28	50.63	12:25
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 10.3147 (IC) (v1289)		Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)			
<u>Pos</u>	<u>Analysis Type</u>	<u>Sample ID</u>	<u>Result (ppmC)</u>	<u>Std. Dev. (ppmC)</u>	<u>RSD</u>	<u>Start Time</u>		
66	TOC	K1907517-007.04	4.4230 ppm	0.0722 ppm	1.6300%	2019/08/31 02:51		
<u>Rep #</u>	<u>Base Analysis Type</u>	<u>ppm</u>	<u>µg</u>	<u>Adjusted (Abs)</u>	<u>NDIR (Abs)</u>	<u>Baseline (Abs)</u>	<u>Pressure (psig)</u>	<u>Run Time</u>
1	TOC	4.3720	43.7197	41.66	45.02	3.36	50.65	12:30
2	TOC	4.4741	44.7405	42.40	45.67	3.28	50.66	12:28
<u>Dilution</u>		<u>Blank Contribution</u>		<u>Method</u>	<u>Calibration</u>			
1:10		(TC) 10.3147 (IC) (v1289)		Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)			

**Sample Type:** Check Standard --> CCV 021711 From Schedule Version 6

<u>Pos</u>	<u>BAT</u>	<u>Concentration (ppm)</u>	<u>Dil</u>	<u>Sample ID</u>	<u>Min / Max (% dev)</u>	<u>Result</u>	<u>Std. Dev.</u>	<u>RSD</u>	<u>Start Time</u>	
6	TOC	25.0000	1:2	[TOC] CCV 021711 [25 ppm]	0 / infinity ( NA / NA )	23.6618 ppm (PASS)	0.0000 ppm	0%	2019/08/31 03:24	
<u>Pos</u>	<u>Base Analysis Type</u>	<u>ID</u>	<u>Rep #</u>	<u>ppm</u>	<u>µg</u>	<u>Adjusted</u>	<u>NDIR</u>	<u>Baseline</u>	<u>Pressure</u>	<u>Run Time</u>
B	TOC	25 ppm	1	23.6618	236.6180	180.83	184.19	3.37	50.66	12:32
<u>Completion State</u>		<u>Success Action</u>		<u>Method</u>	<u>Calibration</u>		<u>STD Conc - Pos B</u>			
Success - Criteria met.		Do Nothing		Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)		50 ppmC			

**Sample Type:** Check Standard --> CCB 021711 From Schedule Version 6

<u>Pos</u>	<u>BAT</u>	<u>Concentration (ppm)</u>	<u>Dil</u>	<u>Sample ID</u>	<u>Min / Max (% dev)</u>	<u>Result</u>	<u>Std. Dev.</u>	<u>RSD</u>	<u>Start Time</u>
6	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/31 03:40

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
D	TOC	0.0 ppm	1	0.0000	0.0000	6.03	9.43	3.40	50.66	12:32
<b>Completion State</b>		<b>Success Action</b>		<b>Method</b>		<b>Calibration</b>		<b>STD Conc - Pos D</b>		
Success - Criteria met.		Do Nothing		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		0 ppmC		

Sample Type: Sample

From Schedule Version 6

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
67	TOC	K1907517-008.94	0.7153 ppm	0.0053 ppm	0.7400%	2019/08/31 03:57

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.7116	7.1158	15.42	18.86	3.44	50.67	12:27
2	TOC	0.7191	7.1911	15.47	18.87	3.40	50.66	12:26

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
68	TOC	K1907517-009.04	11.9839 ppm	0.0515 ppm	0.4300%	2019/08/31 04:29

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	11.9475	119.4753	95.98	99.41	3.42	50.68	12:29
2	TOC	12.0203	120.2033	96.50	99.84	3.34	50.71	12:26

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
69	TOC	K1907517-010.04	15.4933 ppm	0.1131 ppm	0.7300%	2019/08/31 05:01

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	15.4134	154.1336	120.83	124.17	3.33	50.71	12:28
2	TOC	15.5733	155.7333	121.98	125.53	3.55	50.70	12:25

<b>Dilution</b>	<b>Blank Contribution</b>	<b>Method</b>	<b>Calibration</b>
1:10	(TC) 10.3147 (IC) (v1289)	Extended Reaction 021711 (v4)	Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
70	TOC	K1907802-001.09	0.8924 ppm	0.0871 ppm	9.7600%	2019/08/31 05:33

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.9540	9.5397	17.16	20.54	3.38	50.73	12:30
2	TOC	0.8308	8.3082	16.27	19.73	3.46	50.72	12:28

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
71	TOC	K1907645-001.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/31 06:05

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.94	8.39	3.45	50.75	12:29
2	TOC	0.0000	0.0000	5.28	8.61	3.33	50.74	12:29

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
72	TOC	K1907645-002.01	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/31 06:38

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.68	8.01	3.33	50.75	12:28
2	TOC	0.0000	0.0000	5.02	8.36	3.34	50.76	12:28

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

Pos	Analysis Type	Sample ID	Result (ppmC)	Std. Dev. (ppmC)	RSD	Start Time
73	TOC	RB	0.0000 ppm	0.0000 ppm	0.0000%	2019/08/31 07:10

Rep #	Base Analysis Type	ppm	µg	Adjusted (Abs)	NDIR (Abs)	Baseline (Abs)	Pressure (psig)	Run Time
1	TOC	0.0000	0.0000	4.74	8.01	3.27	50.78	12:30

**Dilution** 1:10      **Blank Contribution** (TC) 10.3147 (IC) (v1289)      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)

**Sample Type:** Check Standard --> CCV 021711

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 021711 [25 ppm]	0 / infinity (NA / NA)	23.3148 ppm (PASS)	0.0000 ppm	0%	2019/08/31 07:26

Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time
B	TOC	25 ppm	1	23.3148	233.1481	178.34	181.57	3.23	50.87	12:30

**Completion State** Success - Criteria met.      **Success Action** Do Nothing      **Method** Extended Reaction 021711 (v4)      **Calibration** Extended Reaction 021711 (v27)      **STD Conc - Pos B** 50 ppmC



Sample Type: Check Standard --> CCB 021711										From Schedule Version 6	
Pos	BAT	Concentration (ppm)	Dil	Sample ID	Min / Max (% dev)	Result	Std. Dev.	RSD	Start Time		
◆ D	TOC	0.0000	1:2	[TOC] CCB 021711 [0.0 ppm]	0 / infinity ( NA / NA )	0.0000 ppm (PASS)	0.0000 ppm	0%	2019/08/31 07:43		
Pos	Base Analysis Type	ID	Rep #	ppm	µg	Adjusted	NDIR	Baseline	Pressure	Run Time	
D	TOC	0.0 ppm	1	0.0000	0.0000	5.32	8.82	3.50	50.79	12:32	
Completion State		Success Action		Method		Calibration		STD Conc - Pos D			
Success - Criteria met.		Do Nothing		Extended Reaction 021711 (v4)		Extended Reaction 021711 (v27)		0 ppmC			

### Meta Data Used in this Report

#### Blanks

Version	Reagent (Abs)	Acid (Abs)	DI IC (Abs)	DI TC (Abs)	DI TOC (Abs)	Save Time	Operator
v1288	1.7847	1.4960	0.0000	0.0000	0.0000	2019/08/27 13:39	Fusion1 (Fusion1)
v1289	1.3353	1.4780	0.0000	0.0000	0.0000	2019/08/29 13:53	Fusion1 (Fusion1)

#### Calibrations

##### Name: Extended Reaction 021711 (TOC)

Version: v27  
 Calibration curve formula: TOC:  $y = 7.170x + 11.164$   
 Ver Creation: 2019/03/11 21:51  
 $r^2$  value: TOC:  $r^2 = 0.99991$   
 Comment:  
 Operator: Fusion1 (Fusion1)  
 Basic Analysis Type: TOC

##### Basic Analysis Type: TOC

Sample ID	Y Raw Value	X Expected	Message	End Time
0.0 ppm	10.4100	0.0000		2019/03/11 20:12
0.50 ppm	14.7740	0.5000		2019/03/11 20:28
1.00 ppm	18.0020	1.0000		2019/03/11 20:44
5.00 ppm	47.2310	5.0000		2019/03/11 21:01
10.0 ppm	85.1320	10.0000		2019/03/11 21:17
25.0 ppm	188.5200	25.0000		2019/03/11 21:33
50.0 ppm	370.1610	50.0000		2019/03/11 21:49

**Methods****Name: Extended Reaction 021711 (TOC)**

Version: v4

Operator: Fusion1 (Fusion1)

Ver Creation: 2019/01/31 11:21

Comment:

Parameter	Value	Advanced Parameter	Value
SampleVolume	10.0 mL	NeedleRinseVolume	5.0 ml
Dilution	1:10	VialPrimeVolume	2.0 ml
AcidVolume	0.5 ml	ICSamplePrimeVolume	2.0 ml
ReagentVolume	2.0 ml	ICSpurgeRinseVolume	12.0 ml
UVReactorPrerinse	Off	BaselineStabilizeTime	0.70 min
UVReactorPrerinseVolume	5.0	DetectorPressureFlow	150 ml/min
NumberOfUVReactorPrerinses	1	SyringeSpeedWaste	10
ICSpurgeTime	1.00 mins	SyringeSpeedAcid	7
DetectorSweepFlow	500 ml/min	SyringeSpeedReagent	7
PreSpurgeTime	4.00 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	Acceptance	Reason	Date

Report Version	User Name	System Reason	User Reason	Date
1	Fusion1 (Fusion1)	Schedule completed	Schedule completed	2019/08/31 08:00

StarLIMS Run: 649435, 649436, 649437  
 Analysis: DOC/TOC  
 Method: SM 5310 C, 9060A, 415.1, 9060

CCV: 11-GEN-05-79K 50 ppm      LCS: 11-GEN-05-79J 25.0 ppm

ICAL Date: 3/6/19

ICAL ID: 11-GEN-05-76H

ICS ID: 11-GEN-05-78M

ICS TV: 25.0 ppm

ICS % R < 1

Spike ID: 11-GEN-05-77J      0.05 ml of 5000 ppm stock ---> 10.0 ml = 25.0 ppm x dilution factor

Sodium Persulfate: 11-GEN-05-80D

21 % H3PO4: 11-GEN-05-80E

Equipment ID: K-TOC-03

PIPETTE ID: 124276B, 129001F, N11314F, Marge

FILTER ID: 100559

Analyzed By: <u>BCP</u>	Date Analyzed: <u>8/29/19</u>
Reviewed By: <u>[Signature]</u>	Date Reviewed: <u>8/31/19</u>



## Case Narrative

**Method:** 6850  
**Analysis:** Perchlorate  
**Analysis SOP:** LC-MS-CLO4  
**ALS WO ID(s):** 1924077; 1924078; 1925000

**Client:** ALS Laboratories (Houston, TX)  
**Matrix:** Water  
**ELMS Batch (HBN):** 2287 (247020)

**General Set Information:** There were three 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  $^{18}\text{O}$  labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in quantitation.

**Sample Preparation:** A 10.0mL aliquot of each sample was transferred into a 15-mL centrifuge tube. 50 $\mu\text{L}$  of an  $^{18}\text{O}$  labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45 $\mu\text{m}$  Syringe filters.

**Holding Times:** Holding times were met for all analyses.

**Dilutions:** NA

**Method QC data:** The method blank (LMB 671758) was less than 1/2 the CRDL. The recovery for the LCS (671759) was within acceptable parameters.





# ANALYTICAL REPORT

Report Date: September 05, 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: **34-1924078**

Project ID: HS19081044

Purchase Order: HS19081044

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_082019_BIX	1924078001	08/20/19	08/22/19	



## ANALYTICAL REPORT

Workorder: 34-1924078

Client: ALS Environmental  
(Houston)

Project Manager: Kevin W. Griffiths

## Analytical Results

Sample ID: <b>LH18/24-SP650_082019_BIX</b>	Sampling Site: NA	Collected: 08/20/2019				
Lab ID: 1924078001	Media: 125 mL Nalgene	Received: 08/22/2019				
Matrix: Water	Sampling Parameter: NA					
<b>Analysis Method - EPA 6850, DoD QSM</b>						
Preparation: Not Applicable	Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2287 (HBN: 247020) Analyzed: 09/04/2019 11:18	Instrument ID: LCMS04 %Solids: NA Report Basis: Wet				
<b>Analyte</b>	<b>Result (ug/L)</b>	<b>DL (ug/L)</b>	<b>LOD (ug/L)</b>	<b>LOQ (ug/L)</b>	<b>Dilution</b>	<b>Qual</b>
Perchlorate	ND	1.0	2.0	4.0	1	U

## Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
EPA 6850, DoD QSM	/S/ Thomas Bosch 09/04/2019 13:14	/S/ Stephen Brose 09/05/2019 09:49

## Laboratory Contact Information

ALS Environmental  
960 W Levoy Drive  
Salt Lake City, Utah 84123Phone: (801) 266-7700  
Email: als@alst.com  
Web: www.alst.com





## ANALYTICAL REPORT

**Workorder:** 34-1924078

**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	<a href="http://www.pjllabs.com">http://www.pjllabs.com</a>
	PJLA (ISO 17025)	L17-507-R1	<a href="http://www.pjllabs.com">http://www.pjllabs.com</a>
	Utah (TNI)	UT00953	<a href="http://lams.nelac-institute.org/search">http://lams.nelac-institute.org/search</a>
	Iowa (TNI)	IA# 376	<a href="http://www.shl.uiowa.edu/labcert/idnr/">http://www.shl.uiowa.edu/labcert/idnr/</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/envlab/disclaimer.html">http://www.kdheks.gov/envlab/disclaimer.html</a>
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	DOECAP-AP	L18-606	<a href="http://www.pjllabs.com">http://www.pjllabs.com</a>
	Washington	C596	<a href="https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation">https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation</a>
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	<a href="http://www.pjllabs.com">http://www.pjllabs.com</a>

### 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

00951618

## Analysis Information

**Workorder:** 1924078

**Limits:** Client SOW/Contract Specified  
**Basis:** DoD QSM

**Preparation:** NA  
**Batch:** NA  
**Prepared By:** NA

**Analysis:** EPA 6850, DoD QSM  
**Batch:** ELMS/2287 (HBN: 247020)  
**Analyzed By:** Thomas Bosch

## Blank

<b>LMB:</b> 671758 <b>Analyzed:</b> 09/04/2019 10:21 <b>Units:</b> ug/L			
Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

## Laboratory Control Sample

<b>LCS:</b> 671759 <b>Analyzed:</b> 09/04/2019 09:53 <b>Dilution:</b> 1 <b>Units:</b> ug/L					
Analyte	Result	Target	% Rec	QC Limits	
Perchlorate	4.20	4.00	105	78.8	123.8

## Matrix Spike - Matrix Spike Duplicate

<b>Sample:</b> 1924077001 <b>Analyzed:</b> 09/04/2019 10:35 <b>Dilution:</b> 1 <b>Units:</b> ug/L			<b>MS:</b> 671760 <b>Analyzed:</b> 09/04/2019 10:49 <b>Dilution:</b> 1 <b>Units:</b> ug/L				<b>MSD:</b> 671761 <b>Analyzed:</b> 09/04/2019 11:04 <b>Dilution:</b> 1 <b>Units:</b> ug/L				
Analyte	Result	Result	Target	% Rec	QC Limits		Result	% Rec	RPD	QC Limits	
Perchlorate	ND	4.36	4	109	78.8	123.8	4.14	103	5.09	0.0	20.0

## QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Analyst	Peer Review
/S/ Thomas Bosch 09/04/2019 13:17	/S/ Stephen Brose 09/05/2019 09:48

## 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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### Subcontract Chain of Custody

**SAMPLING STATE:** Dept of Defense

**COC ID:** 12027

**SUBCONTRACT TO:**

ALS Laboratory Group  
960 LeVoy Dr  
Salt Lake City, UT 84123

**Phone:** +1 801 266 7700

*18698/#2*

*1924078*

**CUSTOMER INFORMATION:**

**Company:** ALS Houston  
**Contact:** RJ Modashia  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RJ.Modashia@alsglobal.com  
**Alternate Contact:**  
**Email:**

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS19081044  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19081044-02	LH18/24-SP650_082019_BIX	Water	20 Aug 2019 14:00
	SUB_Perch-6850		05 Sep 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. [Signature] Date/Time: 8/21/19 18:00  
 Received By: Lulu Warrick [Signature] Date/Time: 8/22/19 0948  
 Cooler ID(s): \_\_\_\_\_ Temperature(s): \_\_\_\_\_

ALS-SALT LAKE CITY-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

1924678

Client Name: _____		Project/Task/Site: _____							
Date/Time of Receipt: <u>8/22/19 0948</u>		Number of Coolers Received: <u>1</u>							
Condition of Coolers: <u>Acceptable/Unacceptable</u>		Temperature Control: <u>Present/Not Included</u>							
Cooler Custody Seals: <u>Present/Absent/NA</u>		Location Temp Taken: <u>Control/Between Samples</u>							
Container Custody Seals: <u>Present/Absent/NA</u>		Are all temperatures within project specific guidelines? <u>Yes/No/NA</u>							
Ice Present: <u>Yes/No/NA</u>		VOA Headspace Present? <u>Yes/No/NA</u>							
pH Check Performed:	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA			
	Cyanide	Yes/No/NA	TPH - 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA			
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA			
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA			
Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	
1	C19-9844	3 °C	4	C19	°C	7	C19	°C	
2	C19	°C	5	C19	°C	8	C19	°C	
3	C19	°C	6	C19	°C	9	C19	°C	
Taken By: <u>Lulu Warrath</u>		Signature		<u>Julie Warrath</u>		Printed Name		<u>8/22/19</u>	
								Date	

CLIENT-RELATED INFORMATION

- |  |   |  |   |
|--|---|--|---|
| <input type="checkbox"/> Missing Cooler                  | <input type="checkbox"/> Missing Samples/Bottles          | <input type="checkbox"/> Incorrect Preservation    | <input type="checkbox"/> Insufficient Sample Volume |
| <input type="checkbox"/> Cooler Conditions               | <input type="checkbox"/> Broken/Leaking Samples           | <input type="checkbox"/> pH Criteria Not Met       | <input type="checkbox"/> Chain of Custody Problems  |
| <input type="checkbox"/> Missing Paperwork               | <input type="checkbox"/> Incorrect Bottle Type            | <input type="checkbox"/> Residual Chlorine Present | <input type="checkbox"/> Other:                     |
| <input type="checkbox"/> Missing/Incorrect Bottle Labels | <input type="checkbox"/> Cooler Temperatures Out of Range | <input type="checkbox"/> Head Space in Bottles     |   |

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES  NO

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: \_\_\_\_\_ Returned to Sample Receipt by: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name Signature

Must Deliver Next Business Day  
Time and Tempature Sensitive!



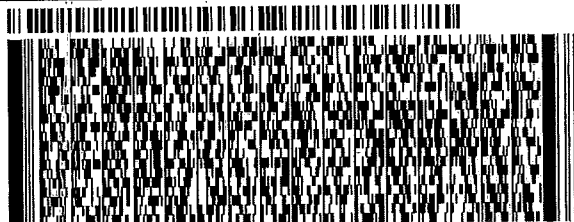
ORIGIN ID:SGRA (281) 530-5656  
CLIENT SERVICES  
ALS LABORATORY GROUP  
10450 STANCLIFF ROAD  
SUITE 210  
HOUSTON, TX 77099  
UNITED STATES US

SHIP DATE: 21AUG19  
ACTWGT: 14.60 LB  
CAD: 300130/CAFE3211  
DIMS: 19x16x13 IN  
BILL THIRD PARTY

TO **SAMPLE RECEIVING**  
**ALS ENVIRONMENTAL**  
**960 W. LEVOY DRIVE**

**SALT LAKE CITY UT 84123**

(801) 288-7700  
REF: HS19081046



**FedEx**  
Express



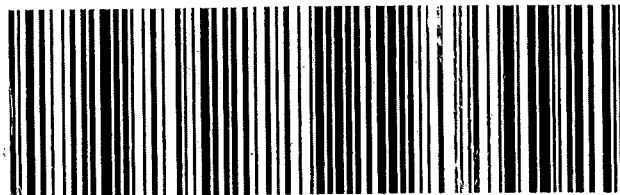
J16T1188680101

TRK# 4809 7836 9560  
0201

**THU - 22 AUG 3:00P**  
**STANDARD OVERNIGHT**

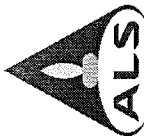
**AX BTFA**

**84123**  
**UT-US SLC**



PAID BY 190808-434 INTL EXP 02/20

551C2/F551/104C



# Batch Worklist

Batch: ELMS/ 2287

Created: 9/4/2019 08:20

Instrument:

Rule: EPA 6850, DoD QSM Water

Analyst: T. Bosch

Status: WP

Workorder: 1924077 [ENV\_LVL4]  
 Workorder: 1924078 [ENV\_LVL4]  
 Workorder: 1925000 [ENV\_LVL4]

HBN: 247020



Pos	Lab ID	Sample ID	Prep Initial	Prep Final	Dust Weight	Type	Mx	Container	Procedure	Mgr	Expire Date	Due Date	Run Date
1	671755	CCV for HBN 247020 [ELMS/2287]				CCV	3		E685041C3Q	5311		9/5/2019	
2	671756	RLVS for HBN 247020 [ELMS/2287]				RLVS	3		E685041C3Q	5311		9/5/2019	
3	671757	ICS for HBN 247020 [ELMS/2287]				ICS	3		E6850.D3Q	5311		9/5/2019	
4	671758	LMB for HBN 247020 [ELMS/2287]				LMB	3		E6850Q413Q	5311		9/5/2019	
5	671759	LCS for HBN 247020 [ELMS/2287]				LCS	3		E6850Q413Q	5311		9/5/2019	
6	1924077001	LH18/24-SP650_082019_AIX				SAMPLE	3	1924077001-A	E6850Q41.3	5480	9/17/2019	9/5/2019	
7	671760	LH18/24-SP650...(1924077001MS)				MS	3		E6850Q413Q	5311		9/5/2019	
8	671761	LH18/24-SP65...(1924077001MSD)				MSD	3		E6850Q413Q	5311		9/5/2019	
9	1924078001	LH18/24-SP650_082019_BIX				SAMPLE	3	1924078001-A	E6850Q41.3	5480	9/17/2019	9/5/2019	
10	1925000001	LH18/24-SP650_082719_AIX				SAMPLE	3	1925000001-A	E6850Q41.3	5480	9/24/2019	9/13/2019	
11	671762	CCV for HBN 247020 [ELMS/2287]				CCV	3		E685041C3Q	5311		9/5/2019	



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Analytical Documentation**



Analyst Write-upALS Work Order #'s & Sample #( )'s: 1924077 (001); 1924078 (001) 1925000 (001)ELMS Batch/HBN ID: 2287 (247020)Prep Date: 09/04/2019 Analysis Date: 09/04/2019 Analyst: T. BoschAnalyte: **Perchlorate** Matrix: **Water** Method: **6850**Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\SEP\04SEP19D.sReported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**SAMPLE PREPARATION/ANALYSIS:

**Water:** Samples were prepared by Thomas Bosch. 10.0mL of each sample was pipetted into a 15-mL centrifuge tube, and 50µL of an oxygen-18 labeled perchlorate solution was added as an internal standard. The samples were capped, vortexed, and filtered with Phenex PES membrane 0.45µm Syringe filters prior to analysis.

**REAGENTS:** Eluent A1: 95% ASTM Type II water (ALS)/ 5% ACN (B&J Lot AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).  
Eluent B1: 95% ACN (B&J Lot AH015-4) / 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

**STANDARDS:** Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

**CALIBRATION CURVE:** Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.M

**INSTRUMENT CONDITIONS:** Samples were analyzed with an Agilent 1100 LC/MSD system, in negative SIM mode, monitoring m/z 83, 85, and 89.

**Instrument ID:** LCMS04 Online Acquisition Method: CLO4-AQN.M Fragmentor: 160 Output Gain: 10 Injection Volume: 50µL  
Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

FLOW GRADIENT:

Time (min.)	Flow (mL/min)
0	0.65
5.8	0.65
5.9	0.25
10.3	0.25
10.5	0.65
12.0	0.65

**QC DATA:** 4.0µL of QC Solution Horizon ID 47516 was used for LCS 671759; Target = 4.0µg/L. ASTM type II water was used for LMB 671758.

**MS/MSD:** The Matrix Spike and duplicate (MS/MSD) were performed on sample 1924077001 (Client ID: LH18/24-SP650\_082019\_AIX). 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: \\ALS\TWS013\LCMS\LCMS04\2019\SEP\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\alsltws013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\247020-DoD-ALS-Hstn LCMS4 or through \\ALS\TWS013\DATA\REVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 671756) is reported from the analysis of the Laboratory Control Sample (LCS – 671759) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03) along with datafiles 04SEP05-09.

### 5.5 Chromatography (GC, HPLC and LC/MS) Technical Review

Note: It is the peer reviewer's responsibility to ensure that appropriate criteria are used as defined in the HORIZON PROFILE. The evaluation criteria are prioritized as per Section 2.2 of this SOP. These items must be checked for all projects. The following checklist will be completed by both the analyst and the peer reviewer and scanned into the HBN folder with the raw data.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
<u>Batch(es)/SDG: ELMS: 2287 HBN: 247020</u>		
<u>Sample Set IDs if Applicable: 1924077/1924078/1925000</u>		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SB
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR# _____</u>	—	—
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB



## STANDARD REPORT

## Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850.WKG Std:100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	0.1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 STOCK

CLO4 STOCK			Description - 6850 Stock AccStd 1,000ug/mL
Standard: 43659		Created By: Thomas Bosch	Amount: 100 mL
MFG: AccuStandard		Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020
MFG Lot: 218065075			Usable: No
Part ID: IC-PER-10X-1			Lab Lot: CLO4 STOCK
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

ASTM H2O		Description - ASTM Type II Water	
Standard: 109	Created By: ALS Support (Lims)	Amount: 1000 L	
MFG: DCL In House	Create Date: 10/06/2005 09:10AM	Expires: 11/07/2025	
MFG Lot: Not Provided		Usable: Yes	
Part ID: Not Provided		Lab Lot: LAB 109	
Pos	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 INT

CLO4 INT			Description - 6850 Intermdt AccStd 10.ug/mL		
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020



## STANDARD REPORT

## Working Standard - CLO4 QC WRK

CLO4 QC WRK		Description - 6850 QC WKG STD 100ug/L			
Standard: 47516		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC WRK 100.ug/L	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020



## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

ASTM H2O		Description - ASTM Type II Water	
Standard: 109	Created By: ALS Support (Lims)	Amount: 1000 L	
MFG: DCL In House	Create Date: 10/06/2005 09:10AM	Expires: 11/07/2025	
MFG Lot: Not Provided		Usable: Yes	
Part ID: Not Provided		Lab Lot: LAB 109	
Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			





## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL	
Standard: 36748	Created By: Thomas Bosch	Amount: 100 mL	
MFG: Ultra Scientific	Create Date: 05/11/2017 01:05PM	Expires: 03/31/2020	
MFG Lot: CP-0860		Usable: Yes	
Part ID: ICC-013		Lab Lot: CLO4 QC STOCK	
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL



## STANDARD REPORT

## Constituent

## Working Standard - CLO4 QC INT

CLO4 QC INT		Description - 6850 QC Intrmdt Std-QC 10ug/mL			
Standard: 47515		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC INT 10.ug/mL	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020



## STANDARD REPORT

## Working Standard - CLO4ISTDWRK

CLO4ISTDWRK			Description - Perchlorate ISTD Wrk 1,000ug/L		
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		Verified By: Thomas Bosch		Usable: Yes	
Pipette ID: Not Provided		Verify Date:		Lab Lot: CLO4ISTDWRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L		
2	14797-73-0-89	Perchlorate 89	1000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026



## STANDARD REPORT

## Constituent

## Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK		Description - Perchlorate ISTD Stock	
Standard: 43729		Created By: Thomas Bosch	Amount: 1 mL
MFG: Cambridge Isotope		Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026
MFG Lot: SDFF-012A		Verified By: Thomas Bosch	Usable: Yes
Part ID: OLM-7310-S		Verify Date:	Lab Lot: CLO4ISTDSTK
Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL



## Certificate of Analysis



### ISO Guide 34 Reference Material

Product Number: ICC-013  
Lot Number: CP-0860

Lot Issue Date: 29-Feb 2016  
Expiration Date: 31-Mar 2020

Product Name: Perchlorate IC Standard

#### Description:

This Reference Material (RM) was gravimetrically prepared in accordance with ISO Guide 34 and under ULTRA Scientific's ISO 9001 registered quality system. The neat materials used for this product have been verified by ULTRA's ISO 17025 laboratory and under ULTRA's ISO Guide 34 accreditation. The analyte concentrations were verified by ULTRA's ISO 17025 accredited laboratory. For each analyte, the true value, with its uncertainty value calculated at the 95% confidence level, is reported below.

Analyte	Starting Material	Lot Number	Purity (%)	Calculated Value	True Value	Traceability & Method
perchlorate	potassium perchlorate	RM07987	100	1001 ± 5 µg/mL	976 ± 6 µg/mL	NIST SRM 3141A; ICP-OES

Solvent: water (low TOC, < 50 ppb)

Storage: Store at Room Temperature (15° to 30°C).

#### Traceability:

Traceability has been established through an unbroken chain of comparisons, each having stated uncertainties. Comparisons are based on appropriate physical or chemical measurements, including gravimetric or volumetric dilution, where the mass or volume of a solution before and after dilution is measured. The balances used for these measurements are calibrated with weights traceable to NIST in compliance with ANSI/NCSL Z-540-1, ISO 9001, ISO 17025, and ISO Guide 34. Calibrated Class A glassware is used for volumetric measurements. Thermometers are calibrated against a NIST traceable thermometer in accordance with NIST Special Publication 819.

#### Estimation of Uncertainties:

The true value is reported, with its uncertainty value calculated at the 95% confidence level.

#### Homogeneity:

This RM was formulated and unitized according to an in-house procedure and is guaranteed to be homogeneous. There is no minimum sub-sample size required.

#### Intended Use:

This RM is intended for the preparation of working reference samples for use in routine laboratory analyses, calibration of instruments, validation of analytical methods, assessments of measurement methods and continuing calibration verification.

#### Instructions for Use:

Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the bottle after removing any material and store according to the instructions noted above.

#### Hazards:

Refer to the Safety Data Sheet for information regarding this RM.

#### Expiration of Certification:

The certification of this RM is valid, within the measurement uncertainty specified, until the expiration date specified above, provided the RM is handled and stored in accordance with the instructions given in this certificate. This certification is nullified if the RM is damaged, contaminated, or otherwise modified.





# Certificate of Analysis



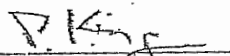
## ISO Guide 34 Reference Material

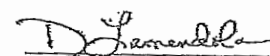
Product Number: ICC-013  
Lot Number: CP-0860

Lot Issue Date: 29-Feb 2016  
Expiration Date: 31-Mar 2020

### Maintenance of Certification:

The real-time, long term stability of the RM may be monitored over the lifetime of the certification. If substantive changes occur that affect the certification before the expiration of this certificate, ULTRA Scientific will notify the purchaser.

  
Peter A. King, Ph.D.  
VP, Technical Operations

  
Daniel J. Lamendola  
Director of QAVRA



125 Market Street  
New Haven, CT 06513  
USA



AccuStandard®

Tel (203)786-5290  
Fax (203)786-5287  
www.AccuStandard.com

# CERTIFICATE OF ANALYSIS



S 43659

AccuTrace™ Reference Standard

Catalog No: IC-PER-10X-1  
Description: Perchlorate Standard  
Element: Perchlorate (ClO<sub>4</sub>)  
SRM: Ind. Std.  
Lot: 218065075  
Matrix: Water  
Hazards: Refer to SDS for complete safety information

Date Certified: Jun 25, 2018  
Expiration: Jul 25, 2020  
Sample Size: 100 mL  
Components: 1  
Storage Condition: Ambient (>5 °C)  
Included on ISO/IEC 17025 Scope of Accreditation: Yes  
Included on ISO 17034 Scope of Accreditation: Yes



Signal Word: None

Component	SRM #	Prepared Concentration (µg/mL)
ClO <sub>4</sub> Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is ±0.24%.

The final solution was checked against an independent standard to verify its concentration.

We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.

All solutions are filtered through a 0.2 µm filter prior to being bottled.

All glassware used in preparation is Class A and calibrated regularly.

All weights are traceable through NIST Test No. 822-275872-11

All bottles are triple rinsed with deionized water prior to use.

Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.

We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By:

*Meigan O'Leary*

Meigan O'Leary, Inorganic QC Manager



Cambridge Isotope Laboratories, Inc.

## Certificate of Analysis

Quality Standards:  
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

Product Name: PERCHLORIC ACID, SODIUM SALT  
(Isotopic Label & Enrichment Specification) (18O4, 90%+) 100 UG/ML IN WATER

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

## Product Information

Chemical Purity Specification:  $\geq 98\%$

Labeled CAS Number: NA

Unlabeled CAS Number: 7601-89-0

MW\*: 130.4

Chemical Formula: NaCl<sup>+</sup>O<sub>4</sub>

Storage: Store at room temperature away from light and moisture.

Stability: See storage and expiration data.

## Certification

Cambridge Isotope Laboratories, Inc. guarantees that this material meets or exceeds the specifications stated. Absolute identity as well as chemical and isotopic purities are assured by the use of unambiguous synthetic routes and multiple chemical analyses whenever possible. Results are representative of QC testing at time of release from Quality Control unless otherwise stated.

Volumetric measurements were made with Class A glassware. Gravimetry is traceable to the NIST through calibrated balances and certified, calibrated, standard weights. The calibrations are traceable to the NIST under Test No. 822/270236-04. The calibrations also meet specifications outlined in ISO 9001, ISO/IEC 17025, ANSI/NSCL Z540-1-1994, NCR Document 10CFR50 Appendix B, and applicable subdocuments.

This COA references the bulk catalog number before packaging. The COA also applies to the CIL finished good catalog number. Some possible packaging sizes and their corresponding suffix are -1.2, -1, -0.5, -10, or -0.1.

\* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

## Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 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

['#' ==&gt; Run has not been reprocessed with Batch Review Method

['\*' ==&gt; Run has been saved with batch file]

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount	
*	671755	CCV@25	Vial 71	1	Control	1	2.50134e6	7.746	26.60067
*	671759	QC@4.0	Vial 72	1	Control	2	4.25137e5	7.705	4.19744
*	671757	ICS@4.0	Vial 73	1	Control	3	4.00928e5	7.551	4.86408
*	671758	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1924077001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	671760	240771S	Vial 76	1	Sample	6	2.51039e5	7.489	4.35557
*	671761	240771D	Vial 77	1	Sample	7	2.33940e5	7.470	4.13952
*	1924078001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1925000001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	671762	CCV@25	Vial 71	1	Control	10	2.46708e6	7.642	26.04469

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	671755	CCV@25	Vial 71	1	Control	1	7.43865e5	7.772	26.65922
*	671759	QC@4.0	Vial 72	1	Control	2	1.37190e5	7.730	4.41015
*	671757	ICS@4.0	Vial 73	1	Control	3	1.32103e5	7.568	5.24525
*	671758	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1924077001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	671760	240771S	Vial 76	1	Sample	6	8.31783e4	7.512	4.70443
*	671761	240771D	Vial 77	1	Sample	7	7.89548e4	7.485	4.54456
*	1924078001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1925000001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	671762	CCV@25	Vial 71	1	Control	10	7.35698e5	7.663	26.16643

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	671755	CCV@25	Vial 71	1	Control	1	2.85000e5	7.774	5.00000
*	671759	QC@4.0	Vial 72	1	Control	2	3.32955e5	7.737	5.00000
*	671757	ICS@4.0	Vial 73	1	Control	3	2.69122e5	7.569	5.00000
*	671758	LMB	Vial 74	1	Control	4	3.11424e5	7.861	5.00000
*	1924077001		Vial 75	1	Sample	5	2.01971e5	7.497	5.00000
*	671760	240771S	Vial 76	1	Sample	6	1.89135e5	7.510	5.00000
*	671761	240771D	Vial 77	1	Sample	7	1.85904e5	7.500	5.00000
*	1924078001		Vial 78	1	Sample	8	1.85766e5	7.472	5.00000
*	1925000001		Vial 79	1	Sample	9	1.92863e5	7.486	5.00000
*	671762	CCV@25	Vial 71	1	Control	10	2.87475e5	7.670	5.00000

\*\*\* End of Report \*\*\*

## Sequence Table:

## Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
1	Vial 71	671755	CCV@25	CLO4-AQN	1	Ctrl Samp	
2	Vial 72	671759	QC@4.0	CLO4-AQN	1	Ctrl Samp	
3	Vial 73	671757	ICS@4.0	CLO4-AQN	1	Ctrl Samp	
4	Vial 74	671758	LMB	CLO4-AQN	1	Ctrl Samp	
5	Vial 75	1924077001		CLO4-AQN	1	Sample	
6	Vial 76	671760	240771S	CLO4-AQN	1	Sample	
7	Vial 77	671761	240771D	CLO4-AQN	1	Sample	
8	Vial 78	1924078001		CLO4-AQN	1	Sample	
9	Vial 79	1925000001		CLO4-AQN	1	Sample	
10	Vial 71	671762	CCV@25	CLO4-AQN	1	Ctrl Samp	

Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD01.D

Sample Name: 671755 CCV@25

Injection Date: 9/04/2019 09:28:08

Seq Line: 1

Sample Name: 671755 CCV@25

Location: Vial 71

Acq Operator: TNB

Inj. No.: 1

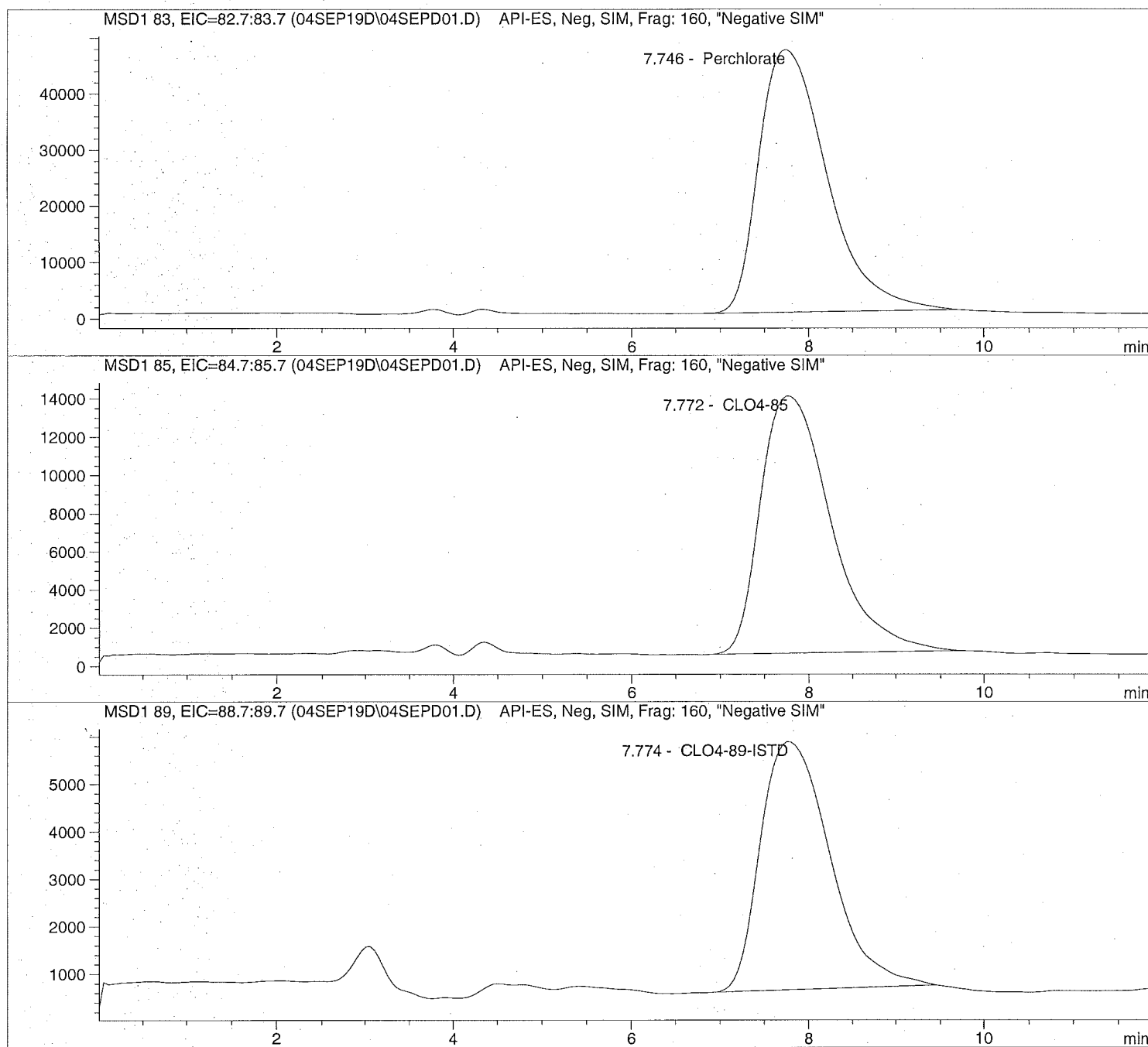
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD01.D. Sample Name: 671755 CCV@25

=====  
Injection Date: 9/04/2019 09:28:08 Seq Line: 1  
Sample Name: 671755 CCV@25 Location: Vial 71  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis

=====  
Sample Information  
=====

Sorted By: Signal  
Calib. Data Modified: Tue, 20. Aug. 2019, 10:15:00 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
7.746	PBA	2501336.5	26.6007	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.772	PBA	743865.2	26.6592	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.774	PBA	285000.0	5.0000	CLO4-89-ISTD

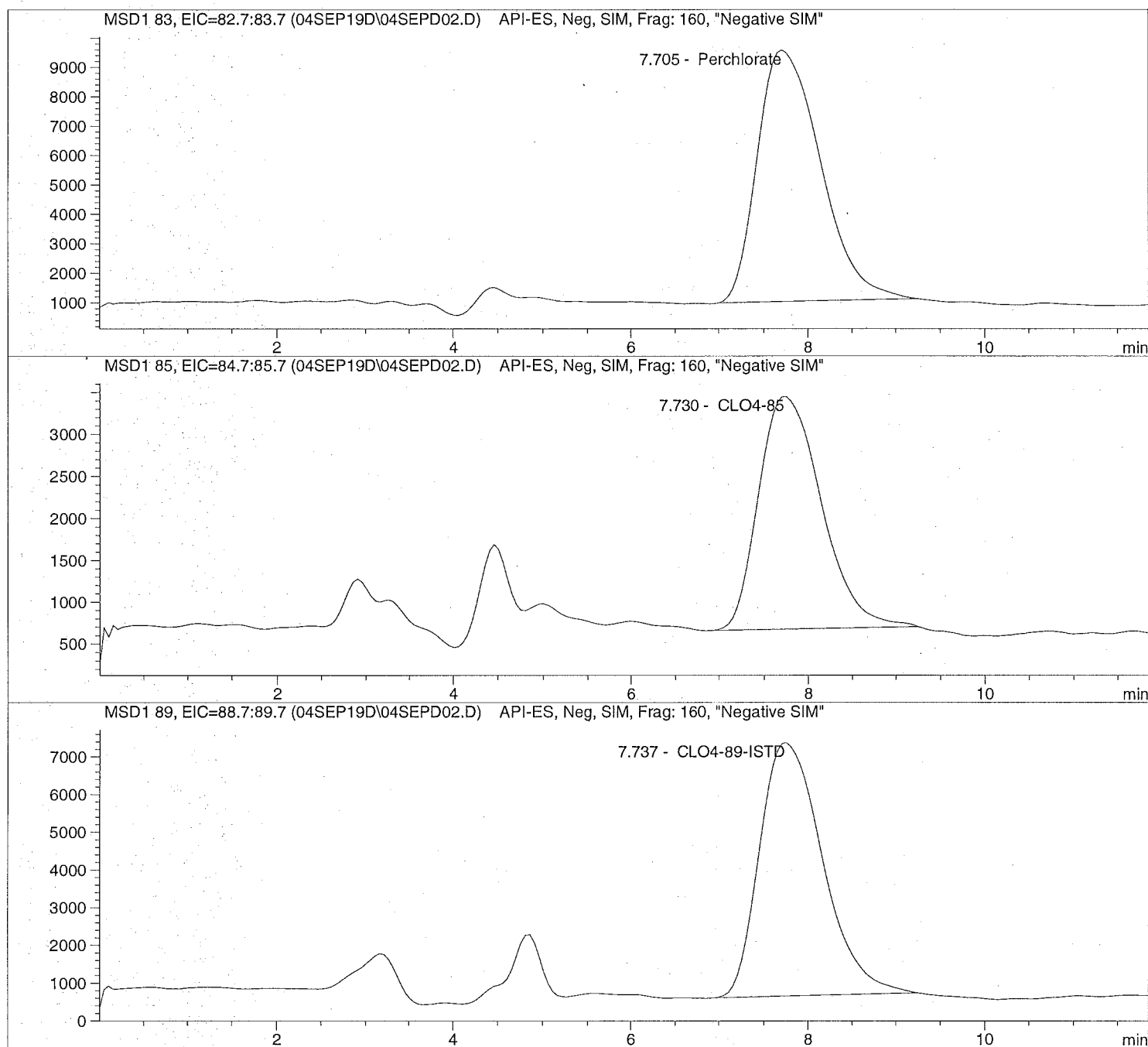
=====  
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD02.D Sample Name: 671759 QC@4.0

=====  
Injection Date: 9/04/2019 09:53:07 Seq Line: 2  
Sample Name: 671759 QC@4.0 Location: Vial 72  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis  
=====



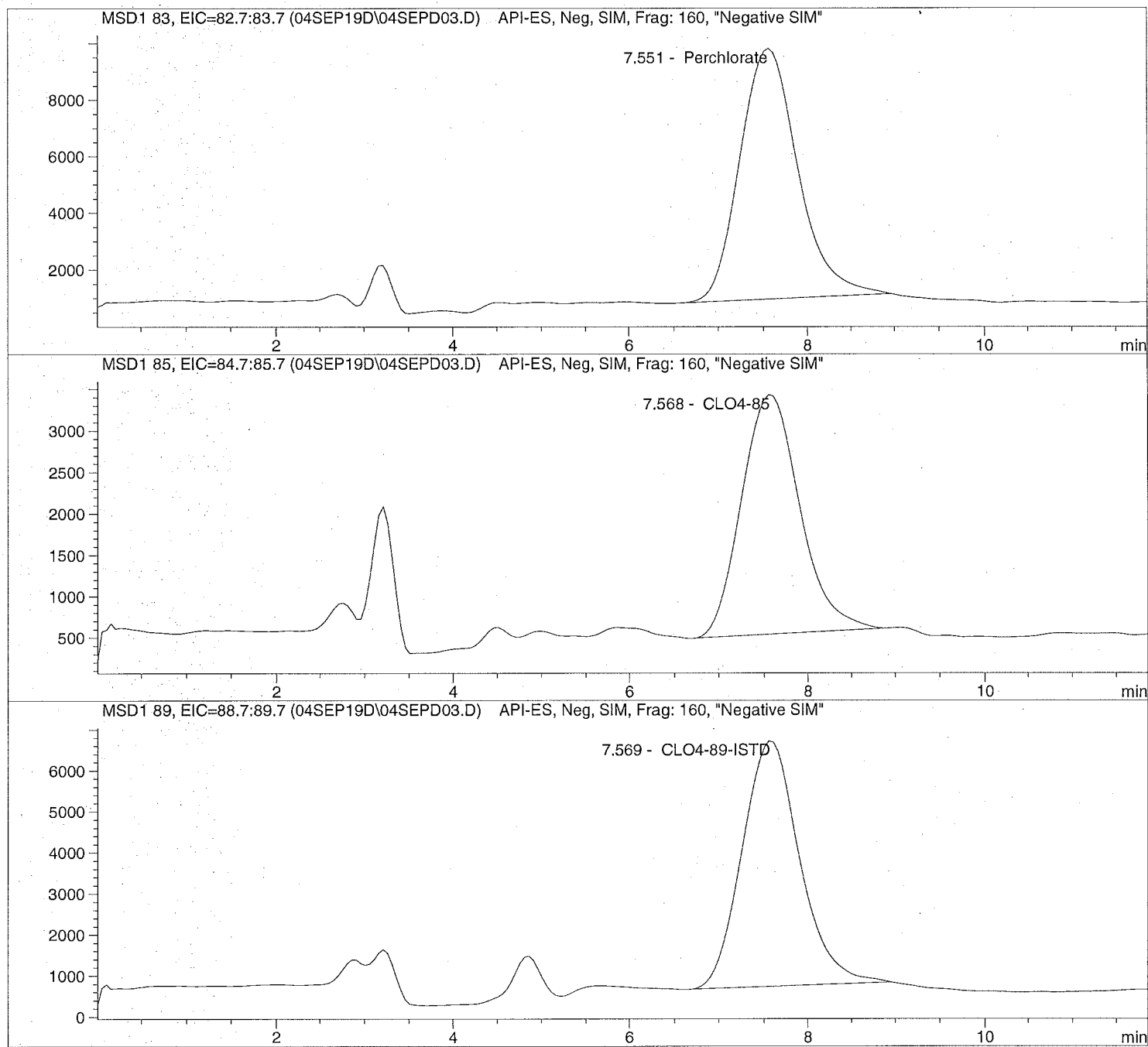


Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD03.D Sample Name: 671757 ICS@4.0

Injection Date: 9/04/2019 10:07:21 Seq Line: 3  
Sample Name: 671757 ICS@4.0 Location: Vial 73  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

## Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD03.D Sample Name: 671757 ICS@4.0

```

=====
Injection Date: 9/04/2019 10:07:21      Seq Line: 3
Sample Name: 671757 ICS@4.0           Location: Vial 73
Acq Operator: TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.551	PBA	400927.9	4.8641	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.568	PBA	132102.7	5.2452	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.569	PBA	269121.9	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD04.D

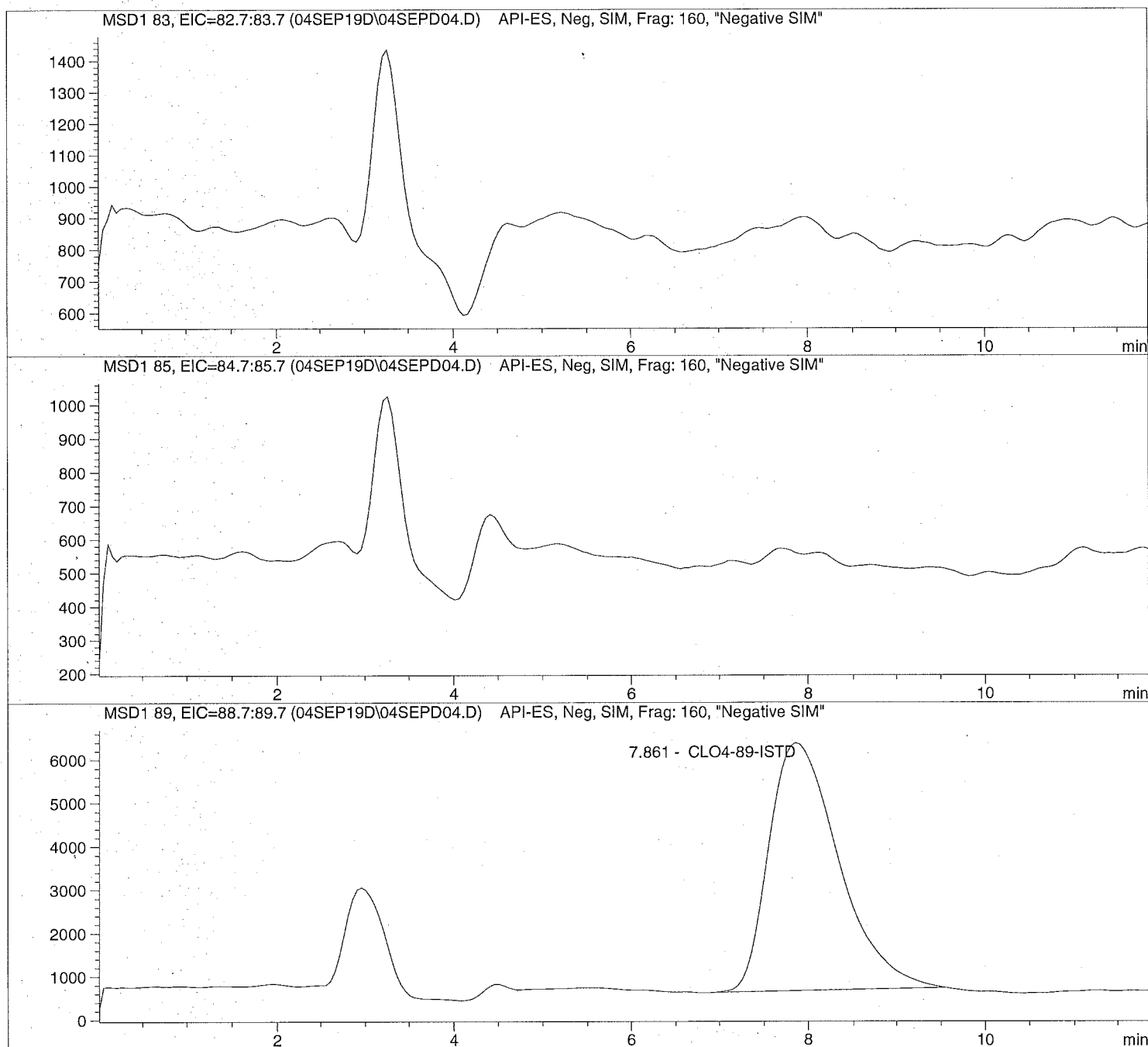
Sample Name: 671758 LMB

Injection Date: 9/04/2019 10:21:37  
Sample Name: 671758 LMB  
Acq Operator: TNB

Seq Line: 4  
Location: Vial 74  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

## Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD05.D

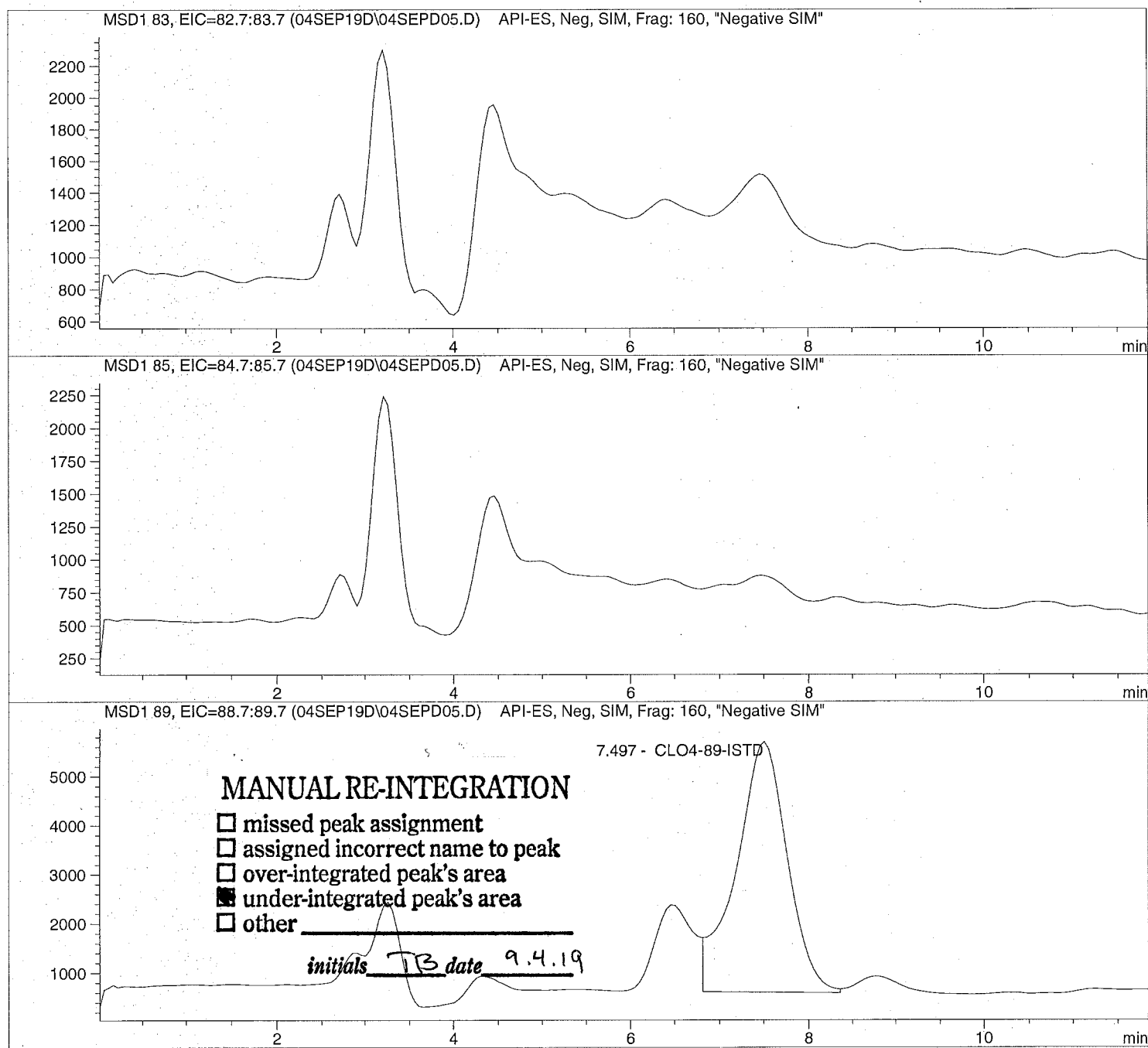
Sample Name: 1924077001

Injection Date: 9/04/2019 10:35:47  
 Sample Name: 1924077001  
 Acq Operator: TNB

Seq Line: 5  
 Location: Vial 75  
 Inj. No.: 1  
 Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD05.D

Sample Name: 1924077001

```

=====
Injection Date: 9/04/2019 10:35:47      Seq Line: 5
Sample Name: 1924077001                Location: Vial 75
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019, 10:15:00 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
7.497	MF	201970.8	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD06.D

Sample Name: 671760 240771S

Injection Date: 9/04/2019 10:49:59

Seq Line: 6

Sample Name: 671760 240771S

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

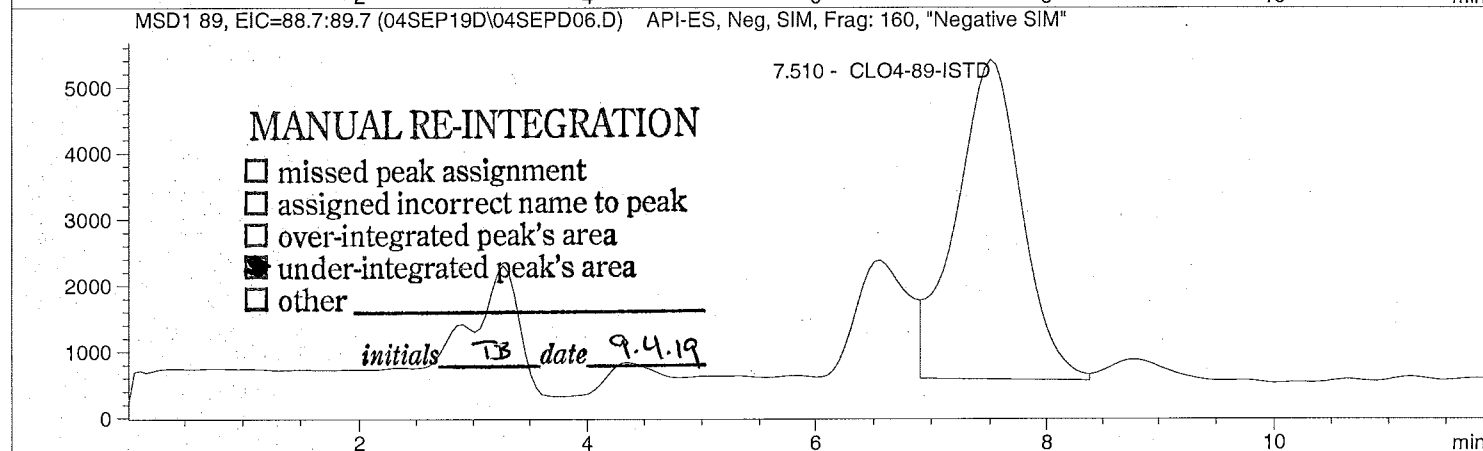
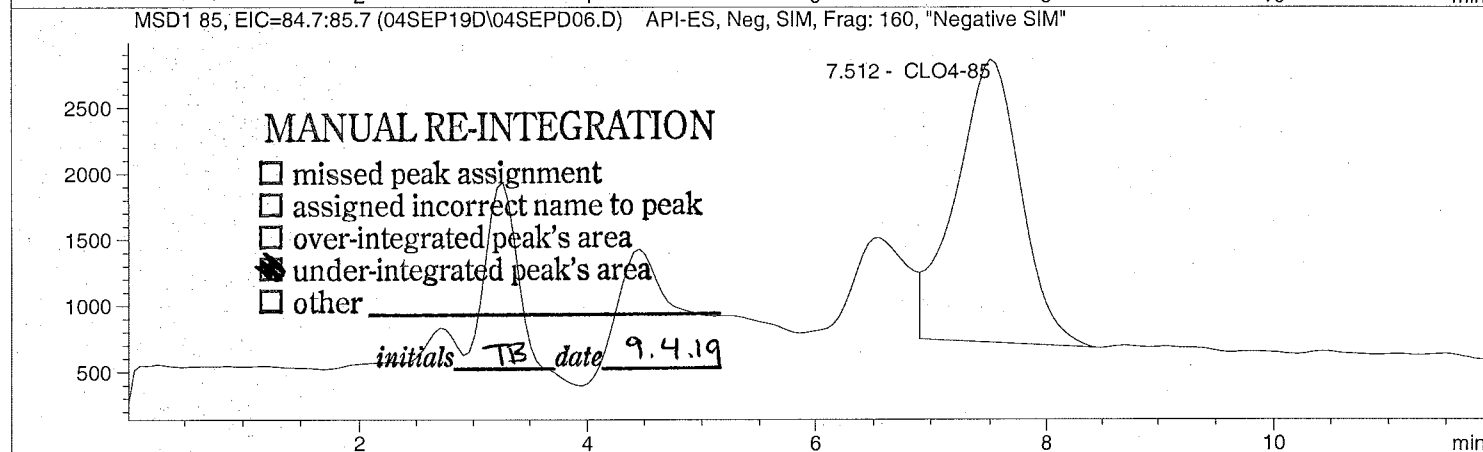
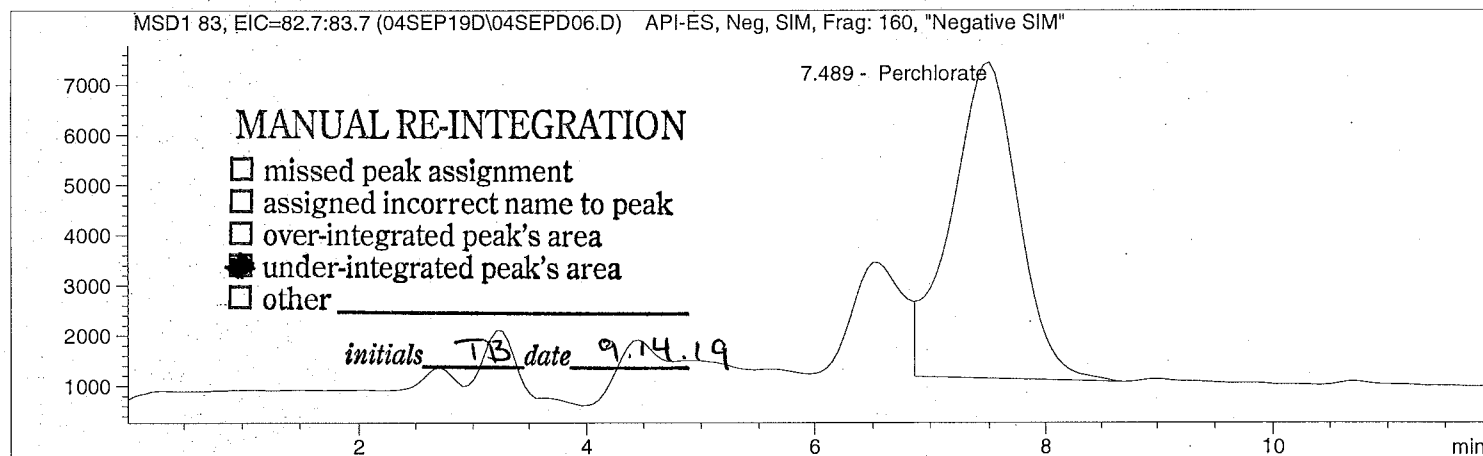
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD06.D      Sample Name: 671760 240771S

=====  
Injection Date: 9/04/2019 10:49:59      Seq Line: 6  
Sample Name: 671760 240771S      Location: Vial 76  
Acq Operator: TNB      Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis

=====  
Sample Information  
=====

Sorted By: Signal  
Calib. Data Modified: Tue, 20. Aug. 2019, 10:15:00 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
7.489	FM	251038.9	4.3556	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.512	FM	83178.3	4.7044	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.510	MF	189134.7	5.0000	CLO4-89-ISTD

=====  
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD07.D

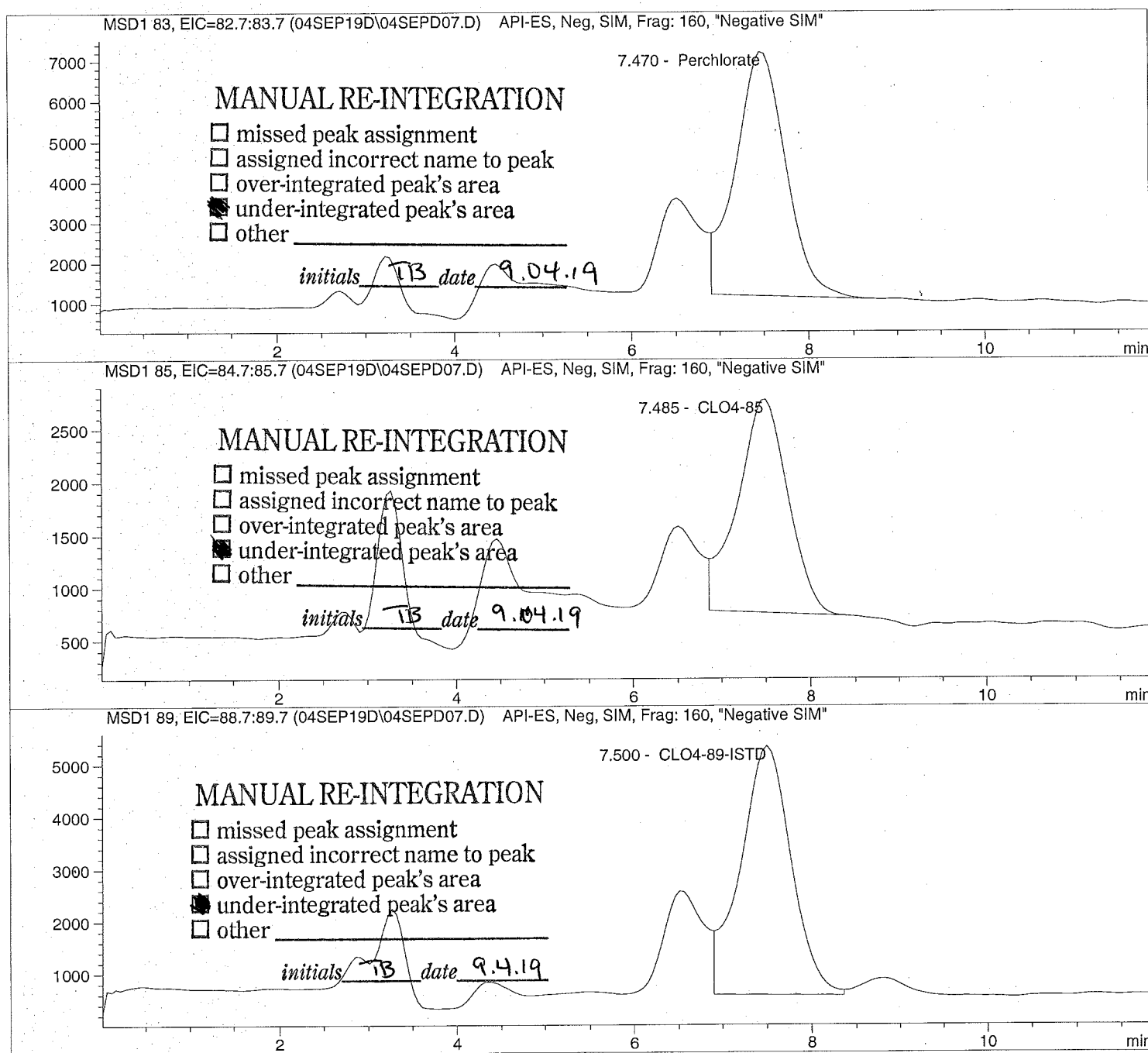
Sample Name: 671761 240771D

Injection Date: 9/04/2019 11:04:10  
 Sample Name: 671761 240771D  
 Acq Operator: TNB

Seq Line: 7  
 Location: Vial 77  
 Inj. No.: 1  
 Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 9/4/2019 12:03:36

Perchlorate analysis







Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD08.D

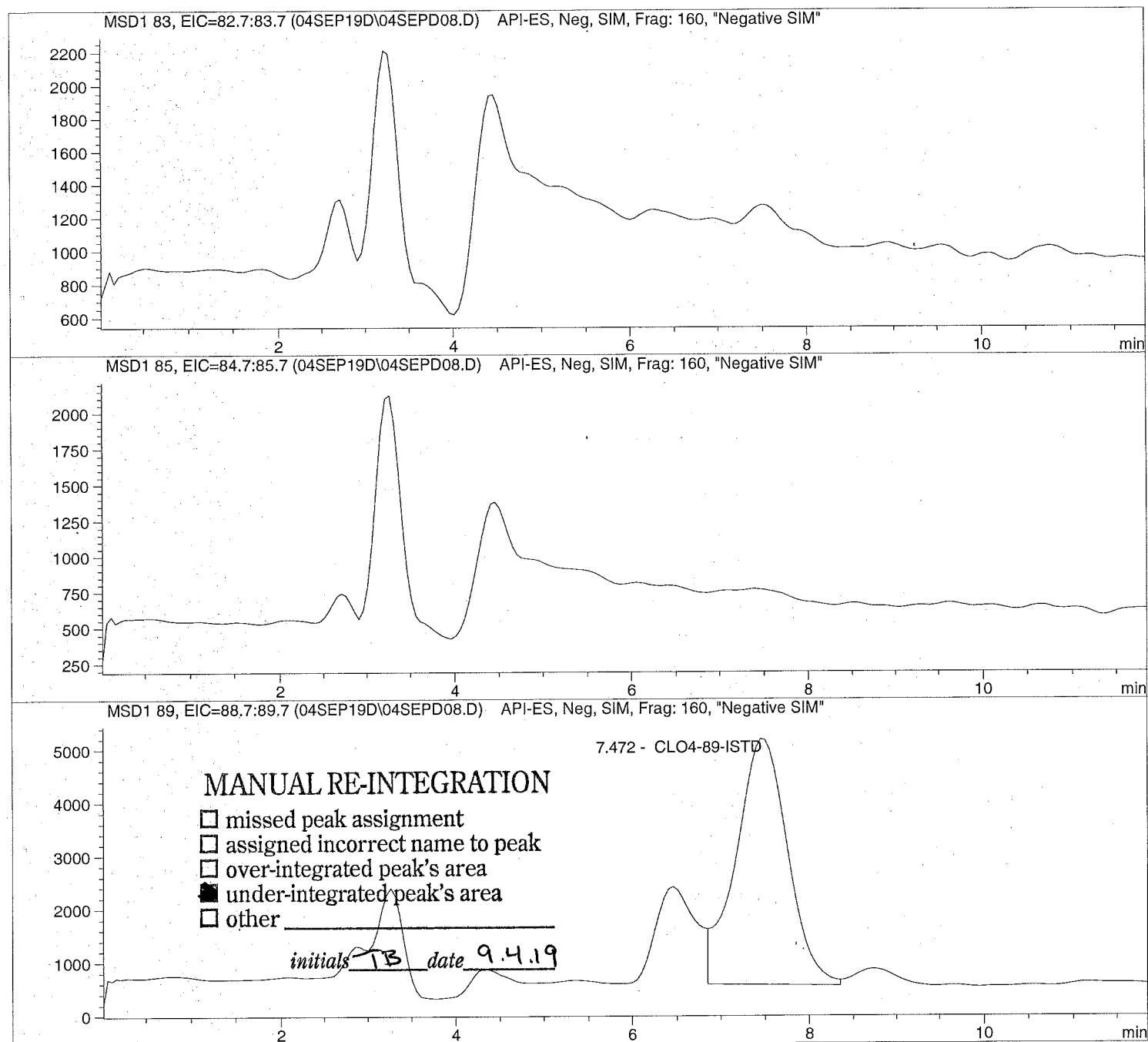
Sample Name: 1924078001

Injection Date: 9/04/2019 11:18:22  
 Sample Name: 1924078001  
 Acq Operator: TNB

Seq Line: 8  
 Location: Vial 78  
 Inj. No.: 1  
 Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD08.D

Sample Name: 1924078001

```

=====
Injection Date: 9/04/2019 11:18:22      Seq Line:      8
Sample Name:    1924078001              Location:      Vial 78
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.472	MF	185766.2	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD09.D

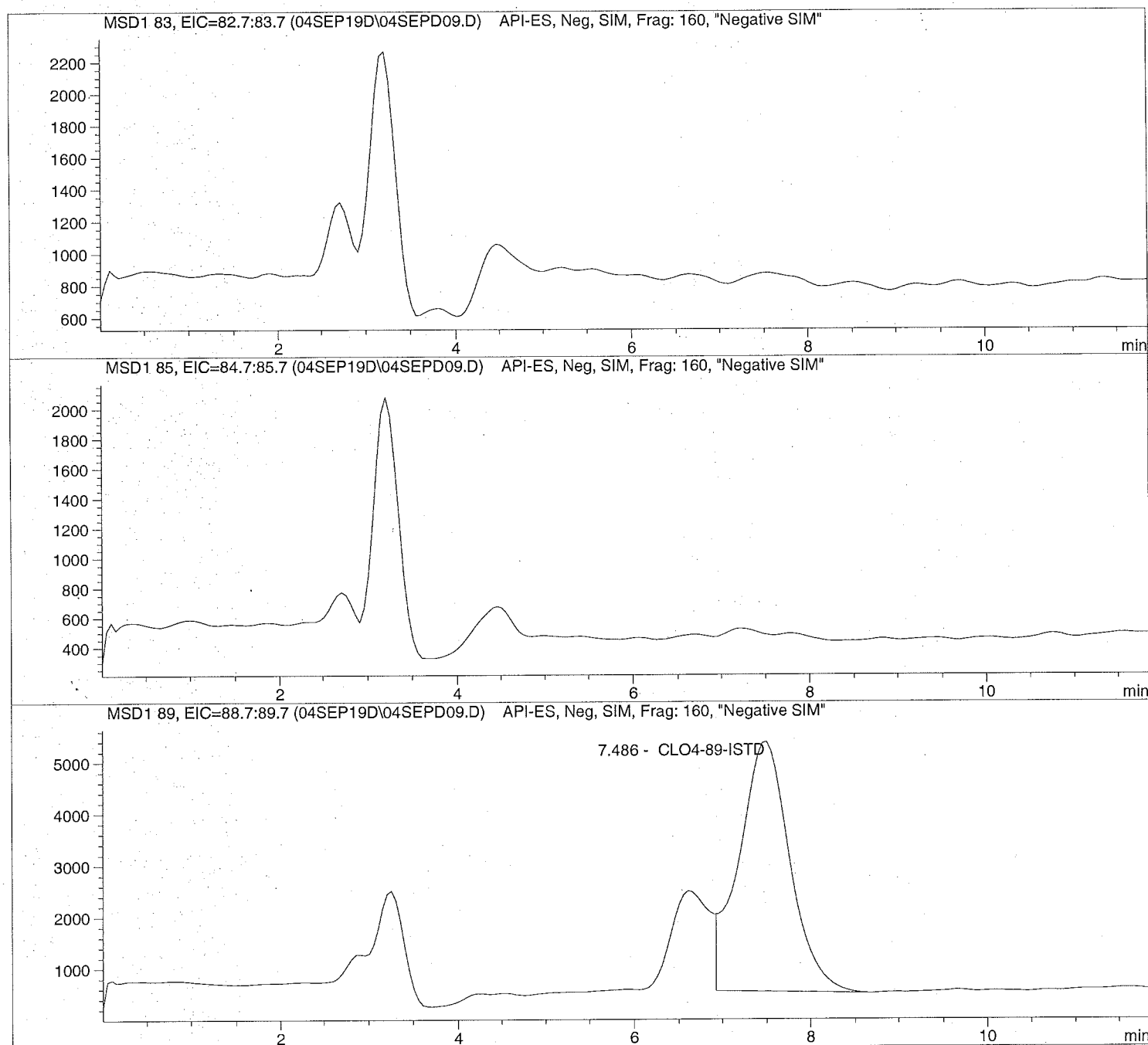
Sample Name: 1925000001

Injection Date: 9/04/2019 11:32:35  
Sample Name: 1925000001  
Acq Operator: TNB

Seq Line: 9  
Location: Vial 79  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD09.D Sample Name: 1925000001

```

=====
Injection Date: 9/04/2019 11:32:35 Seq Line: 9
Sample Name: 1925000001 Location: Vial 79
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 50 µl

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36

```

Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019, 10:15:00 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
7.486	FM	192863.5	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

```

Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD10.D

Sample Name: 671762 CCV@25

Injection Date: 9/04/2019 11:46:49

Seq Line: 10

Sample Name: 671762 CCV@25

Location: Vial 71

Acq Operator: TNB

Inj. No.: 1

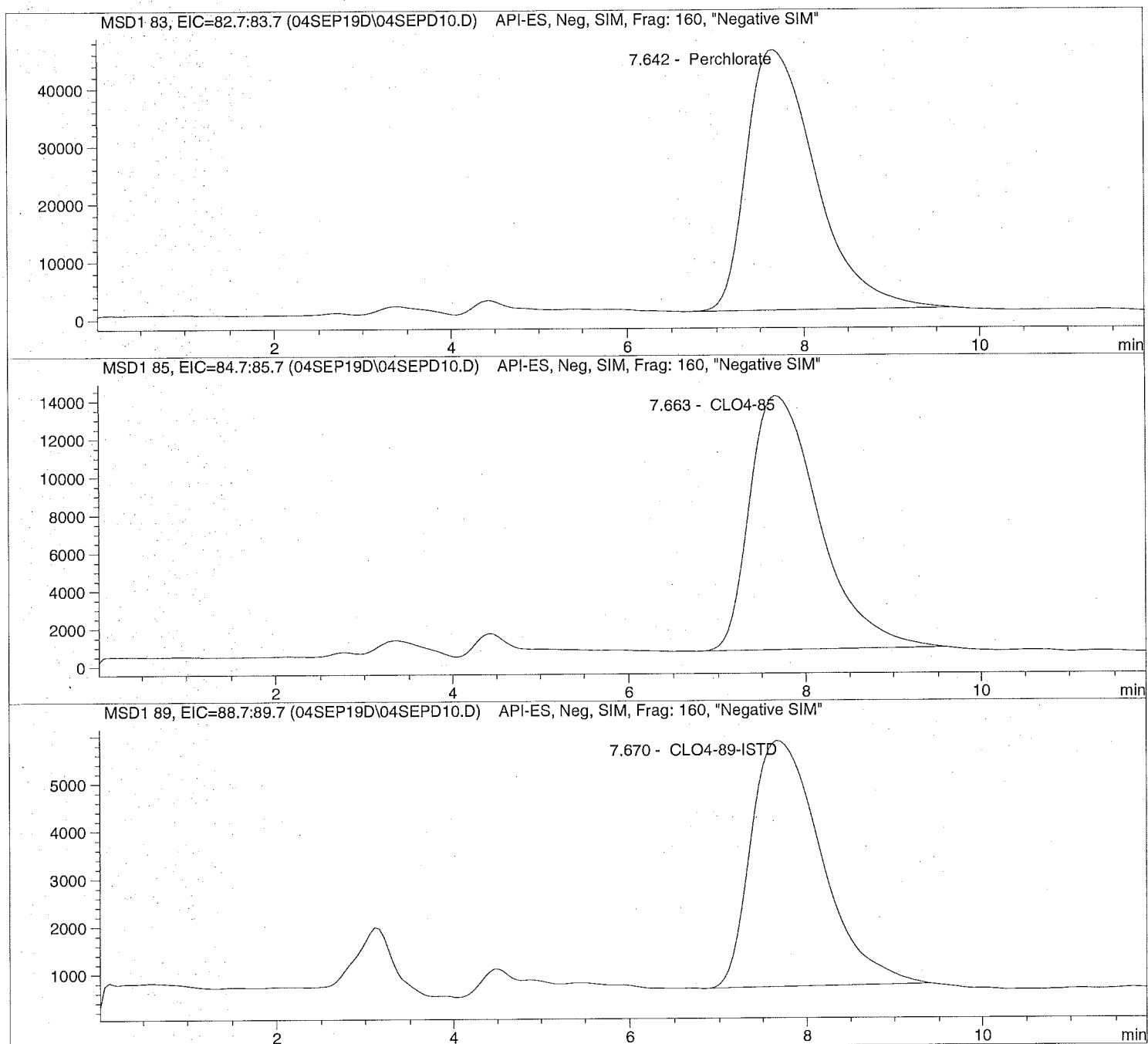
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 9/4/2019 12:03:36

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD10.D Sample Name: 671762 CCV@25

```

=====
Injection Date: 9/04/2019 11:46:49      Seq Line: 10
Sample Name: 671762 CCV@25             Location: Vial 71
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.642	PBA	2467083.8	26.0447	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.663	PBA	735697.6	26.1664	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.670	PBA	287475.3	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

```



**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Raw Data**

**Initial  
Calibration**



=====  
 Calibration Table  
 =====

Perchlorate

Calib. Data Modified : 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
		2.00000	1.35273e5	1.47849e-5		
		5.00000	3.37764e5	1.48033e-5		
		10.00000	6.83454e5	1.46316e-5		
		25.00000	2.08433e6	1.19943e-5		
		50.00000	4.13334e6	1.20968e-5		
		75.00000	5.99313e6	1.25143e-5		
8.755	2 1	1.00000	2.36780e4	4.22333e-5	1	CLO4-85
		2.00000	4.69486e4	4.25998e-5		
		5.00000	1.06124e5	4.71147e-5		
		10.00000	2.13523e5	4.68335e-5		
		25.00000	6.14295e5	4.06971e-5		
		50.00000	1.19814e6	4.17315e-5		
		75.00000	1.78355e6	4.20509e-5		
8.766	3 1	5.00000	2.73208e5	1.83011e-5	+I1	CLO4-89-ISTD
		5.00000	2.24886e5	2.22335e-5		
		5.00000	2.33196e5	2.14412e-5		
		5.00000	2.34454e5	2.13262e-5		
		5.00000	2.50568e5	1.99547e-5		
		5.00000	2.30977e5	2.16472e-5		

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

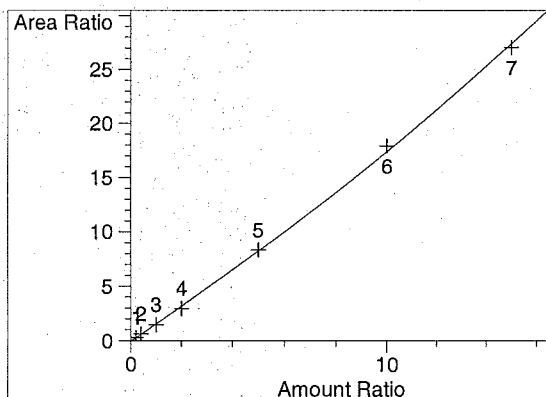
Compound: CLO4-89-ISTD

Time Window : From 6.659 min To 12.466 min  
 Curve Type : Linear  
 Origin : Included  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

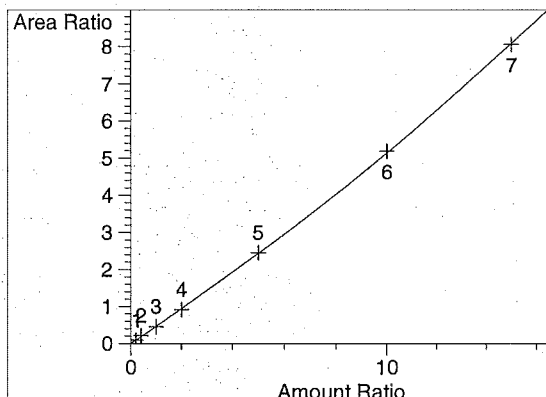
=====  
 Peak Sum Table  
 =====

\*\*\*No Entries in table\*\*\*

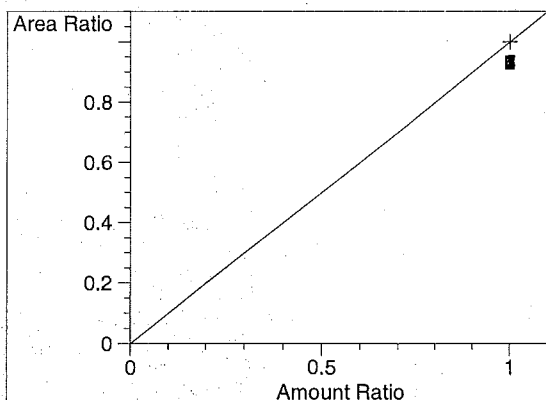
=====  
 Calibration Curves  
 =====



Perchlorate at exp. RT: 8.744  
 MSD1 83, EIC=82.7:83.7  
 Correlation: 0.99957  
 Residual Std. Dev.: 0.30744  
 Formula:  $y = ax^2 + bx + c$   
 a: 1.76988e-2  
 b: 1.56480  
 c: -4.92430e-2  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755  
 MSD1 85, EIC=84.7:85.7  
 Correlation: 0.99983  
 Residual Std. Dev.: 0.03473  
 Formula:  $y = ax^2 + bx + c$   
 a: 5.13396e-3  
 b: 4.62055e-1  
 c: 4.97209e-4  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766  
 MSD1 89, EIC=88.7:89.7  
 Correlation: 1.00000  
 Residual Std. Dev.: 0.00000  
 Formula:  $y = mx + b$   
 m: 1.00000  
 b: 0.00000  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

## Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

['#' ==&gt; Run has not been reprocessed with Batch Review Method

['\*' ==&gt; 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

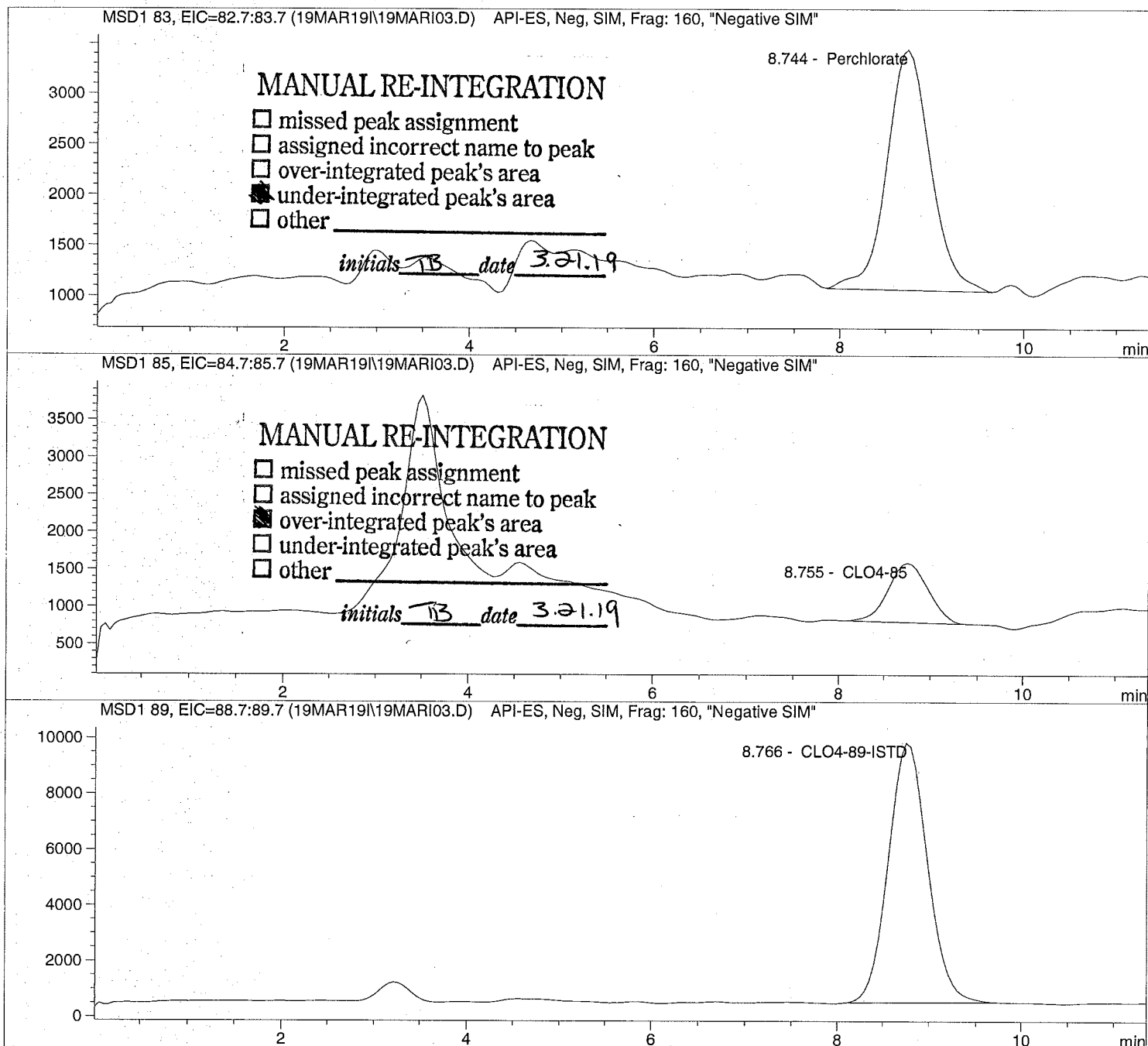
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\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\19MAR19\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

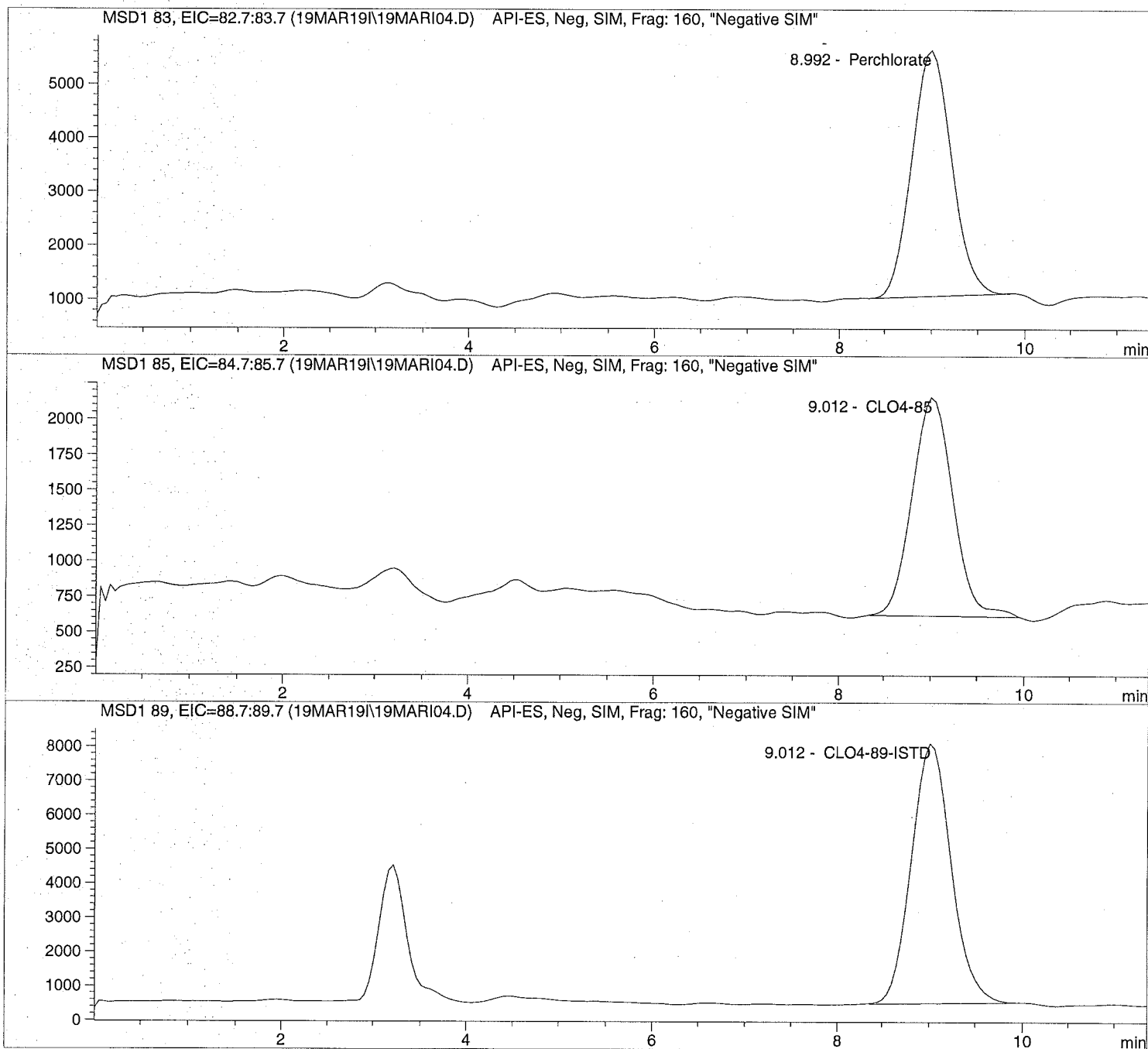
Inj. Vol.: 30 µl

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

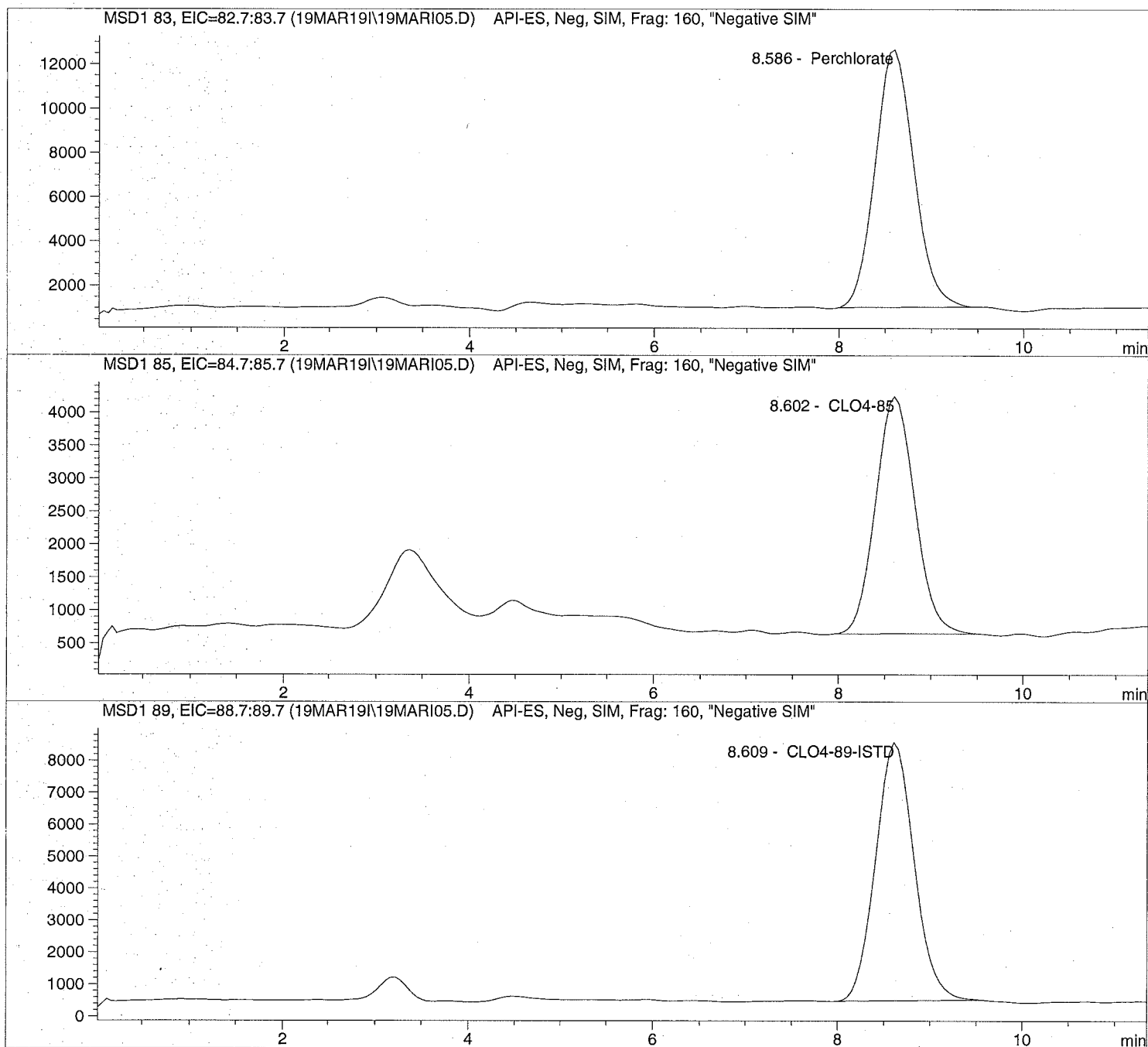
Inj. Vol.: 30 µl

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 ***
=====

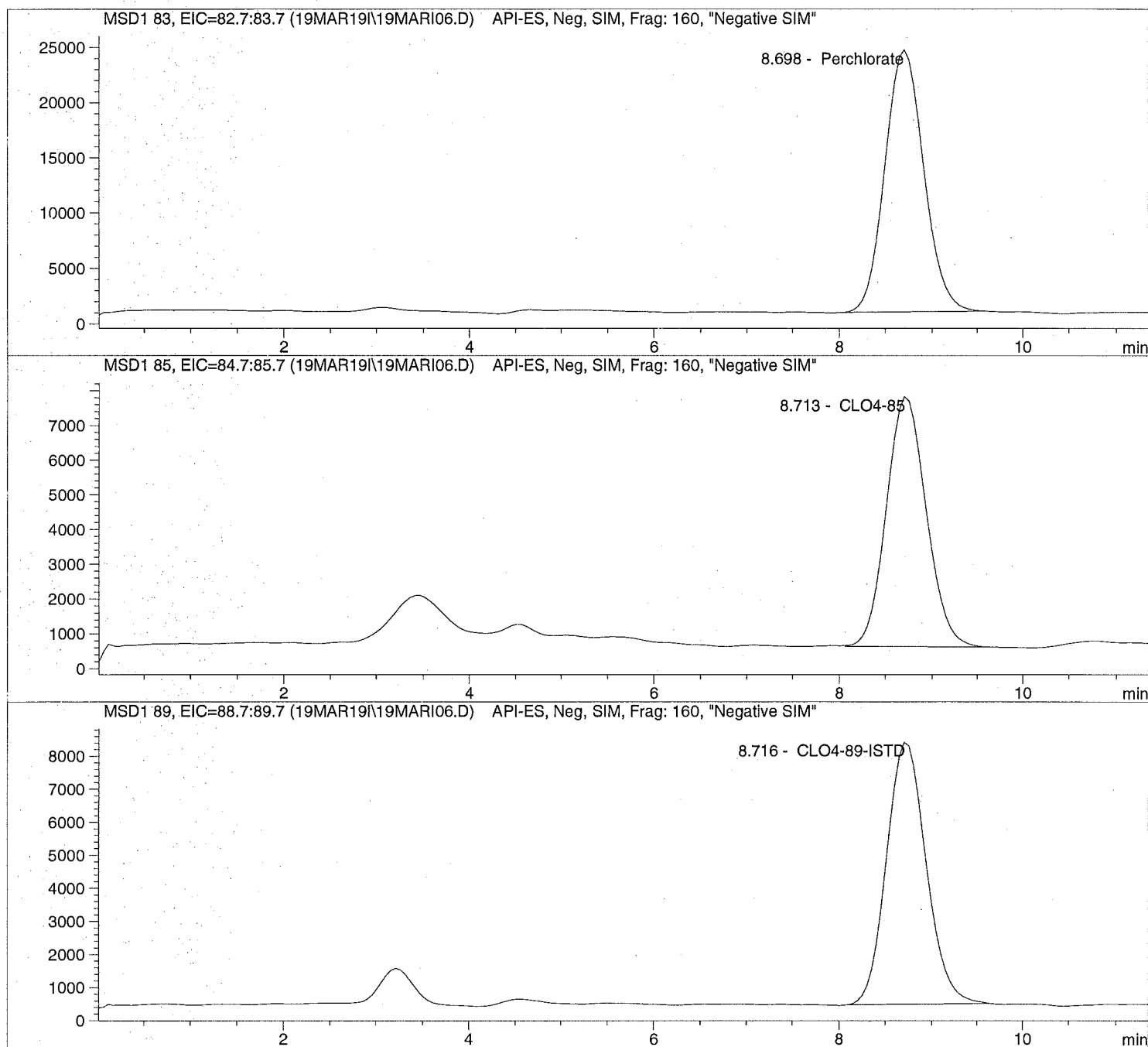
```

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

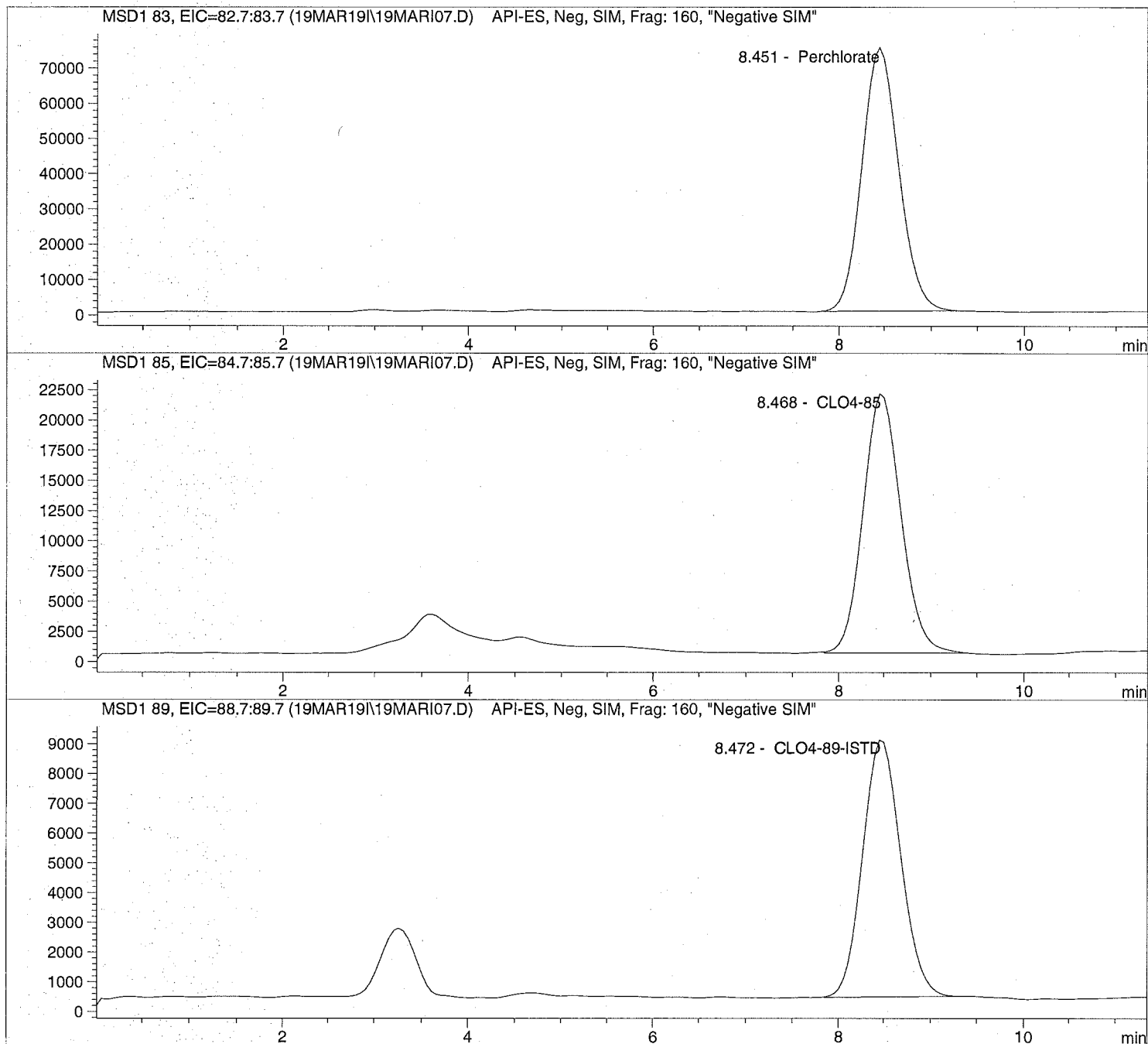
=====  
\*\*\* End of Report \*\*\*

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

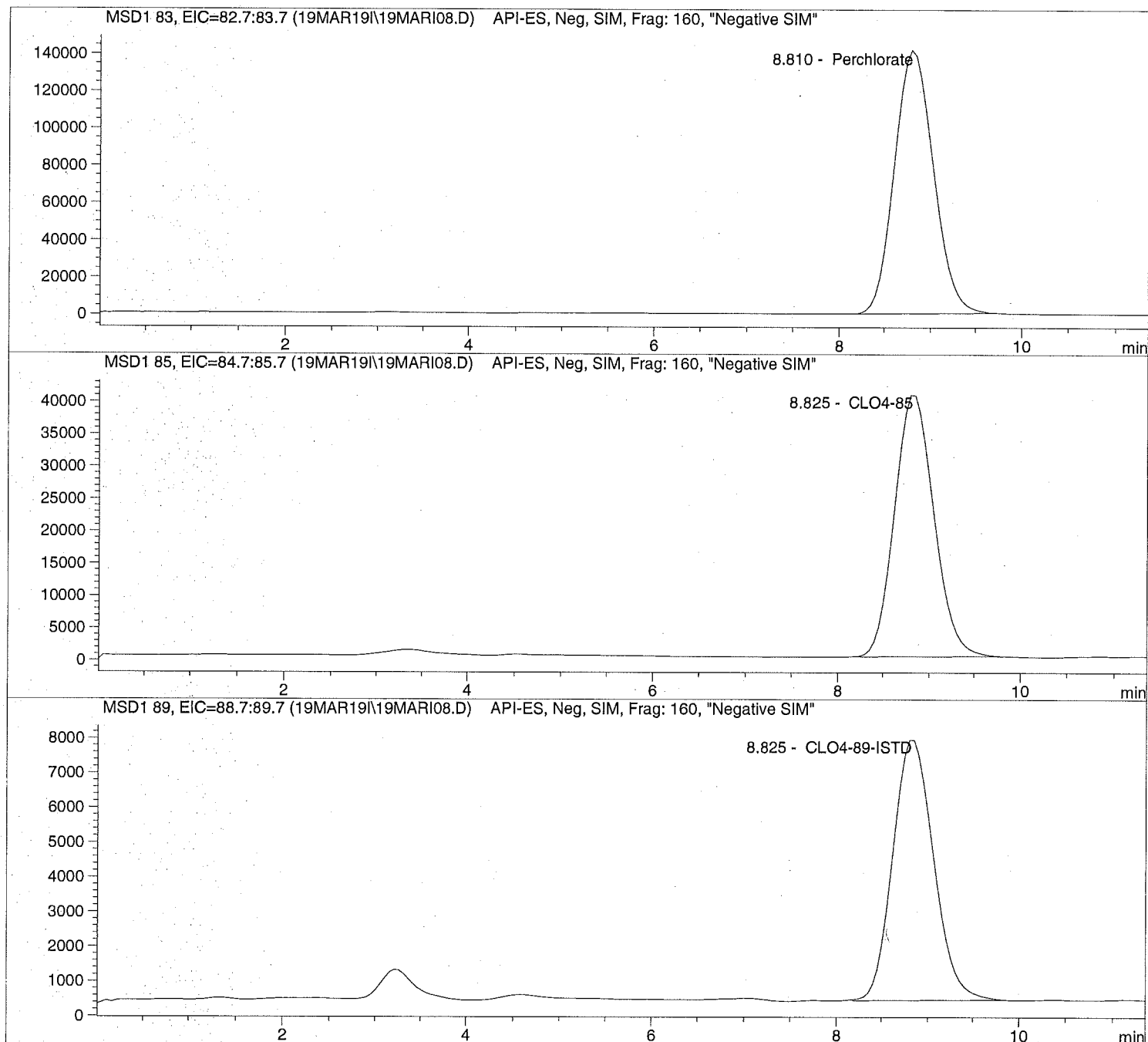
Inj. Vol.: 30 µl

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

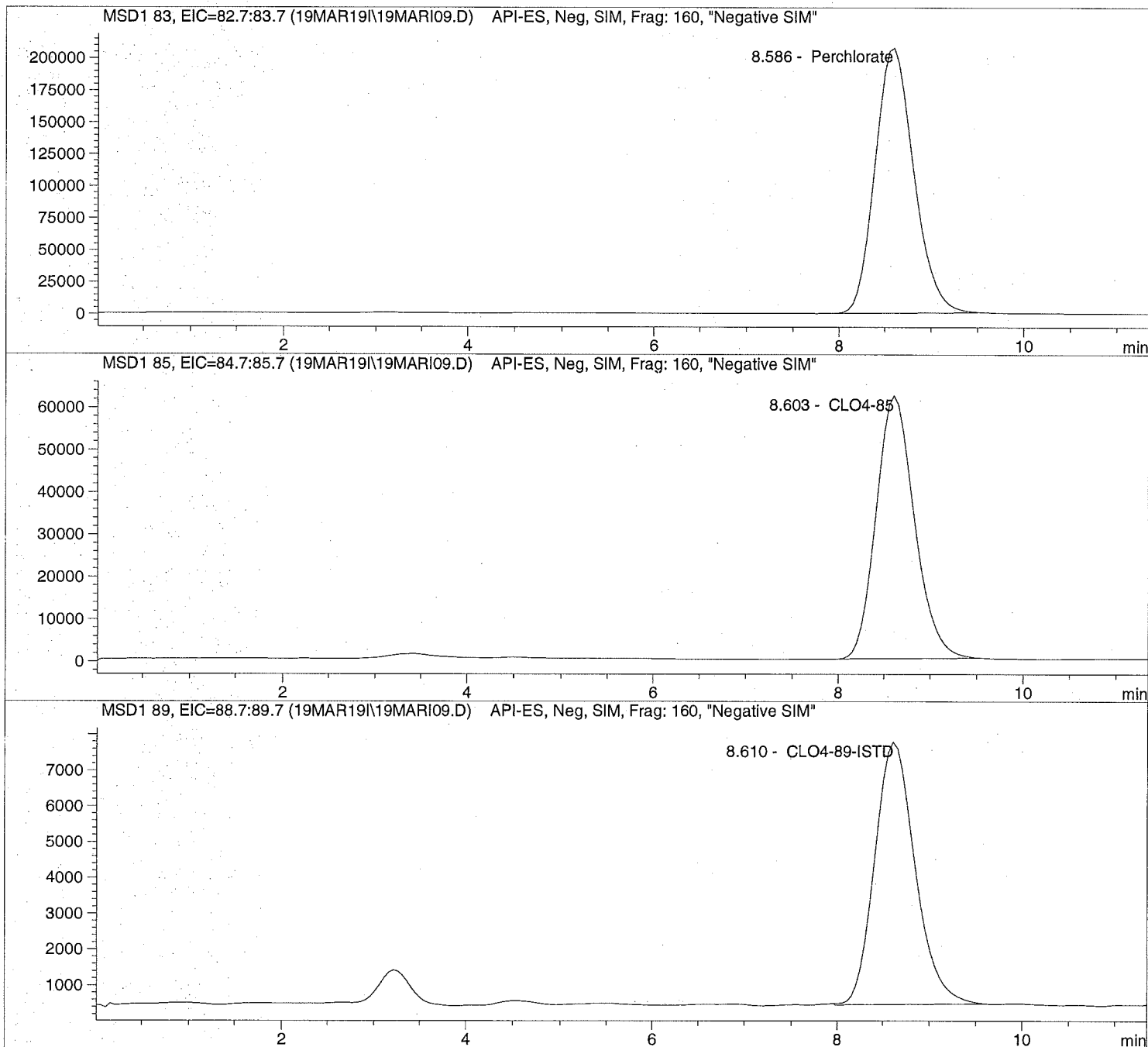
Inj. Vol.: 30 µl

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

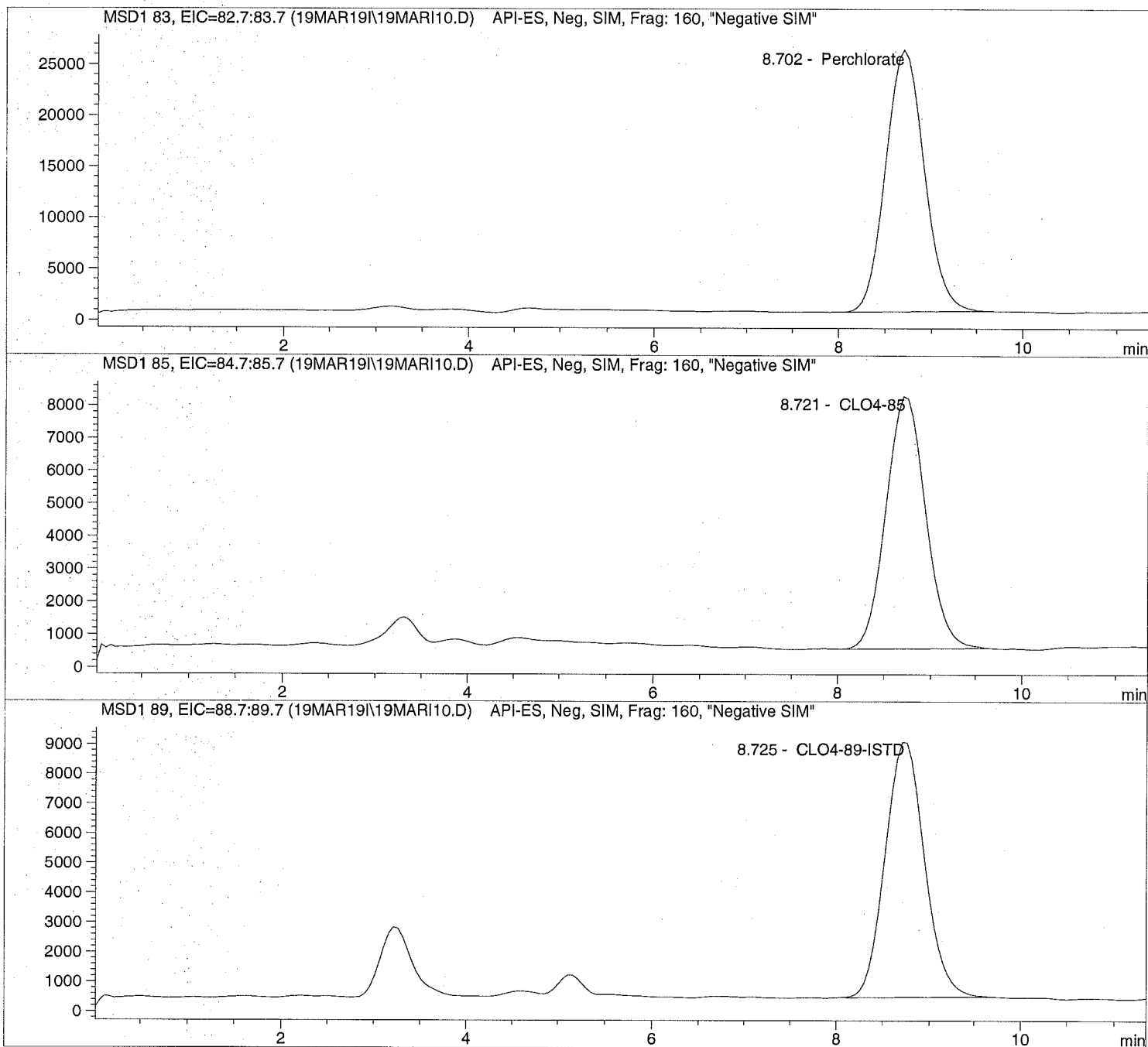
Inj. Vol.: 30 µl

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\19MAR19\19MARI03.D

Sample Name: CLO4@ 1.0ug/L

Injection Date: 3/19/2019 09:39:40

Seq Line: 3

Sample Name: CLO4@ 1.0ug/L

Location: Vial 73

Acq Operator: TNB

Inj. No.: 1

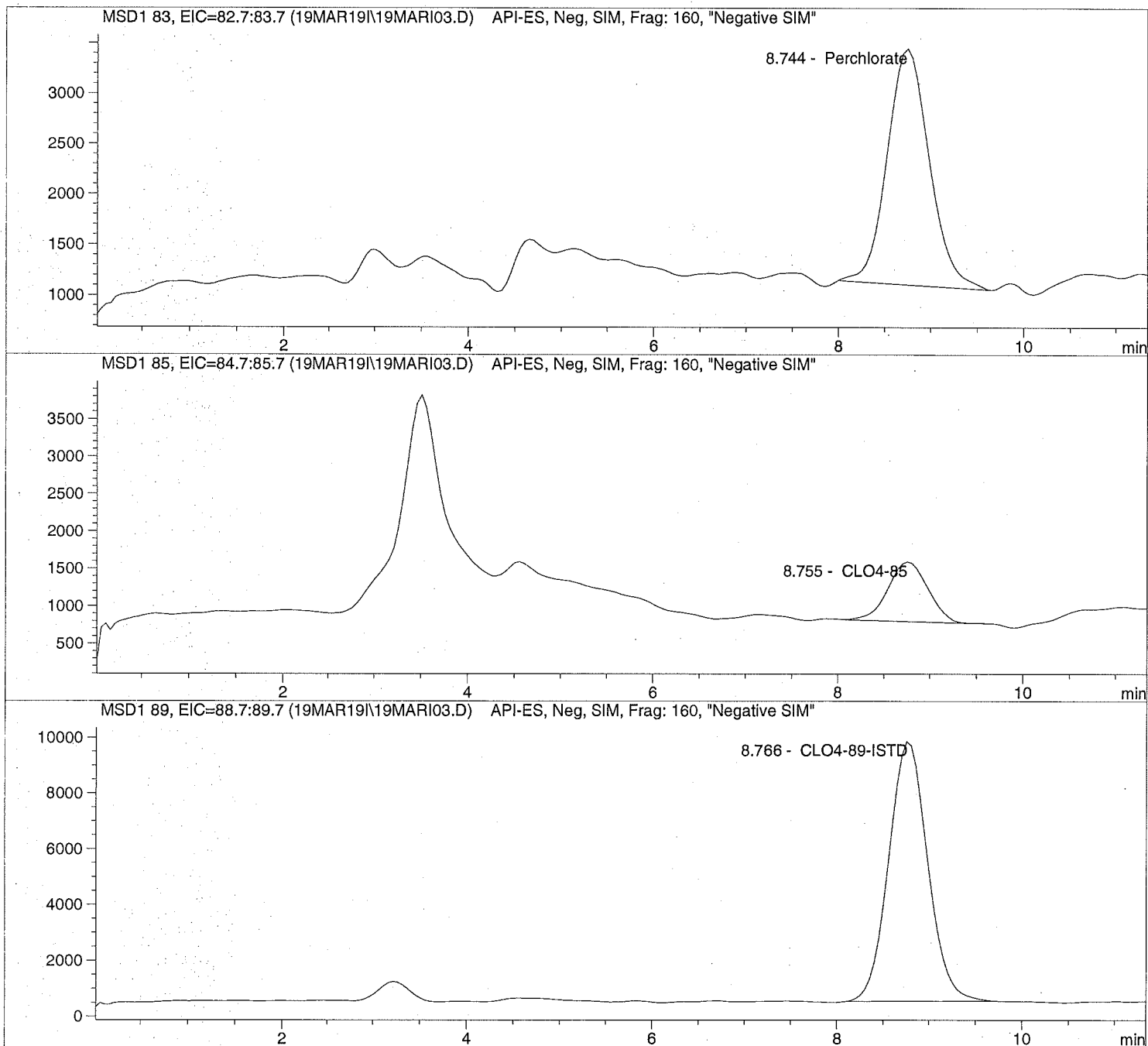
Inj. Vol.: 30  $\mu$ l

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 \*\*\*



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD05.D

Sample Name: 1924077001

Injection Date: 9/04/2019 10:35:47

Seq Line: 5

Sample Name: 1924077001

Location: Vial 75

Acq Operator: TNB

Inj. No.: 1

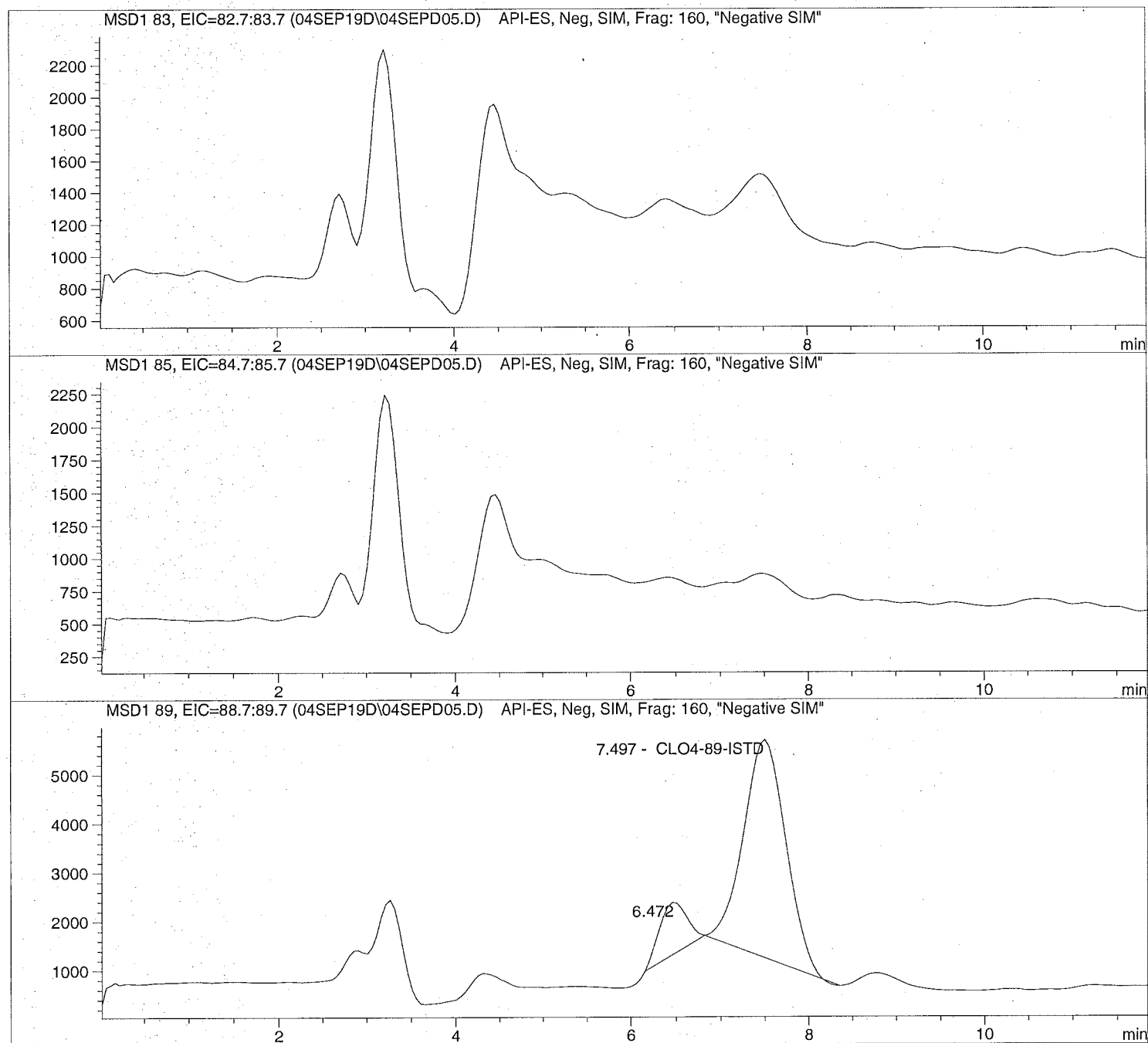
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD05.D

Sample Name: 1924077001

```

=====
Injection Date: 9/04/2019 10:35:47      Seq Line: 5
Sample Name: 1924077001                Location: Vial 75
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.472	PB	22484.4	0.0000	
7.497	VBA	149227.0	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD06.D

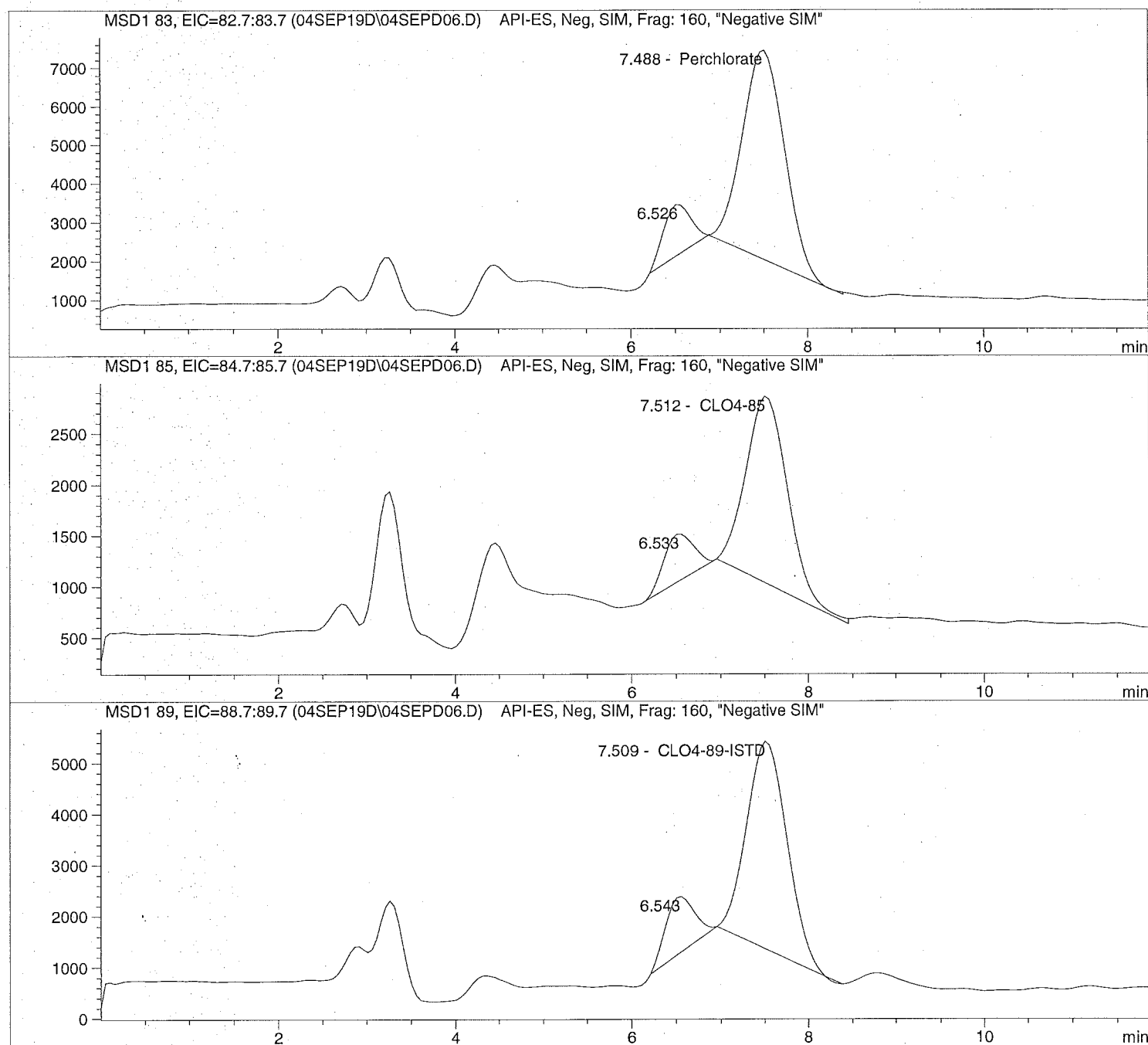
Sample Name: 671760 240771S

Injection Date: 9/04/2019 10:49:59  
Sample Name: 671760 240771S  
Acq Operator: TNB

Seq Line: 6  
Location: Vial 76  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD06.D Sample Name: 671760 240771S

```

=====
Injection Date: 9/04/2019 10:49:59      Seq Line: 6
Sample Name: 671760 240771S           Location: Vial 76
Acq Operator: TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.526	PB	28324.4	0.0000	
7.488	VBA	181668.4	4.5246	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.533	PB	11043.3	0.0000	
7.512	VBA	61081.2	4.9653	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.543	PB	25427.6	0.0000	
7.509	VBA	131523.7	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

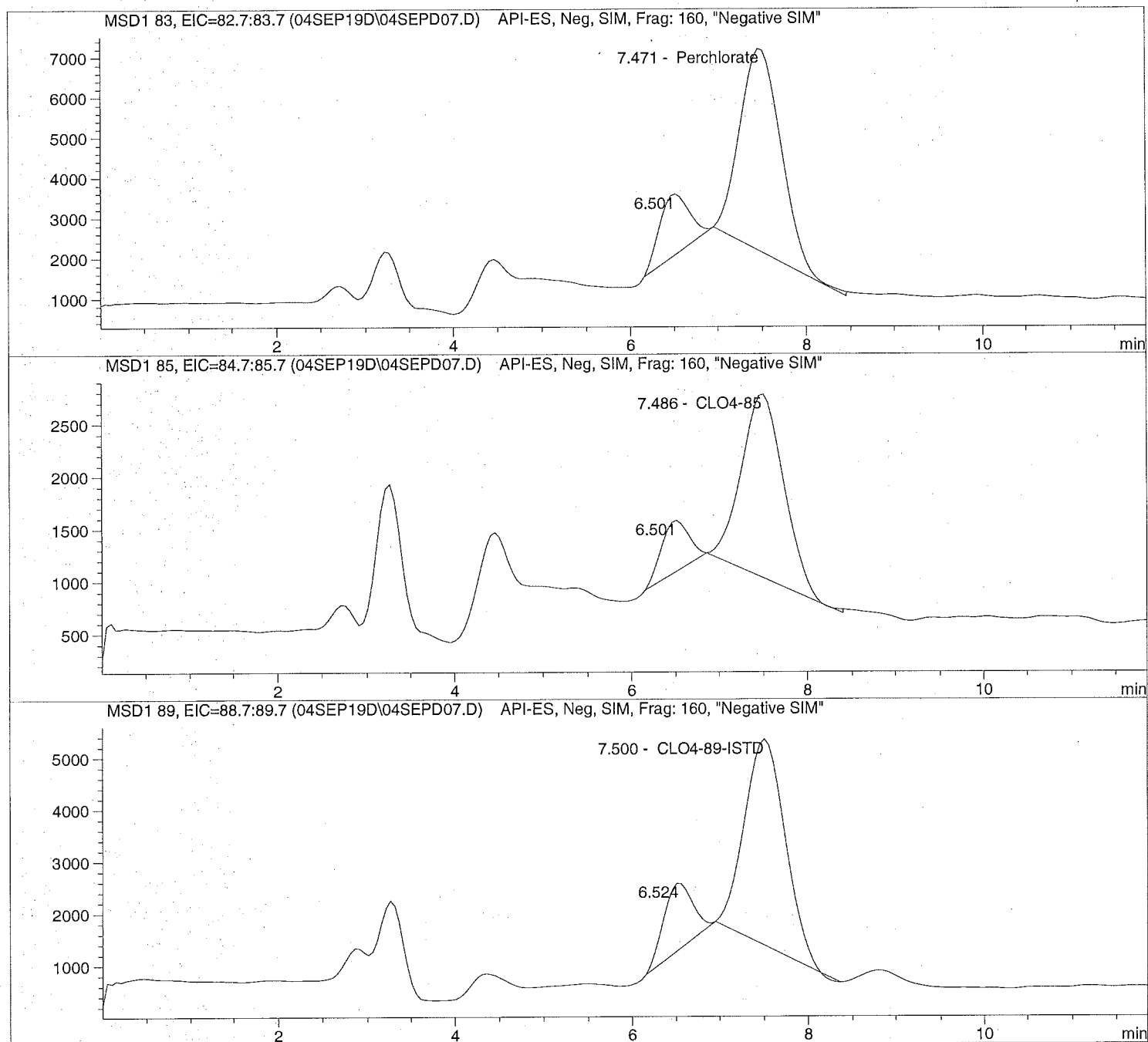
```

Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD07.D Sample Name: 671761 240771D

```
=====
Injection Date: 9/04/2019 11:04:10 Seq Line: 7
Sample Name: 671761 240771D Location: Vial 77
Acq Operator: TNB Inj. No.: 1
Inj. Vol.: 50 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
```

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD08.D

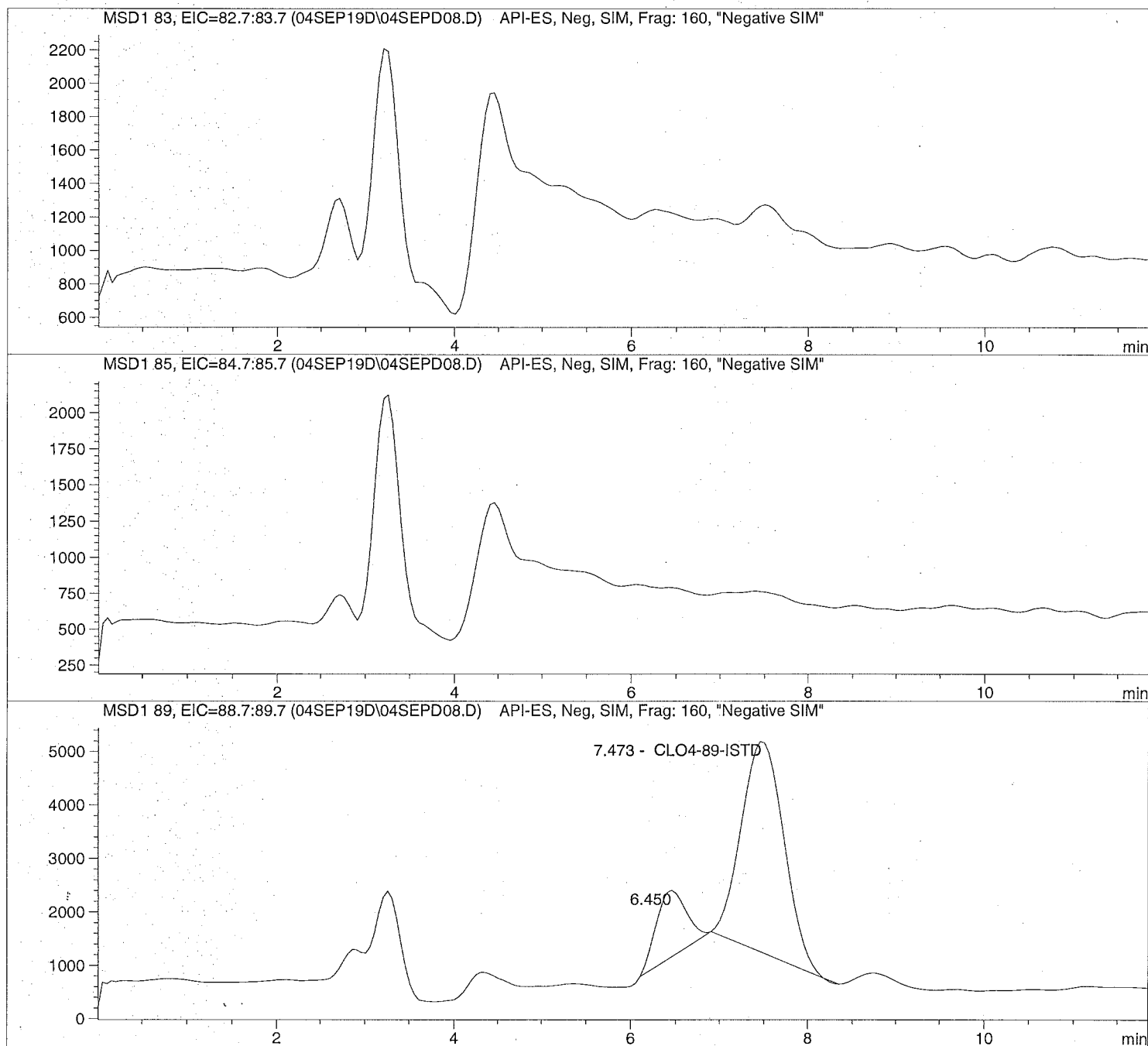
Sample Name: 1924078001

Injection Date: 9/04/2019 11:18:22  
Sample Name: 1924078001  
Acq Operator: TNB

Seq Line: 8  
Location: Vial 78  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD08.D Sample Name: 1924078001

```

=====
Injection Date: 9/04/2019 11:18:22      Seq Line:      8
Sample Name:    1924078001              Location:      Vial 78
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.450	PB	29359.0	0.0000	
7.473	VBA	133454.4	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD09.D

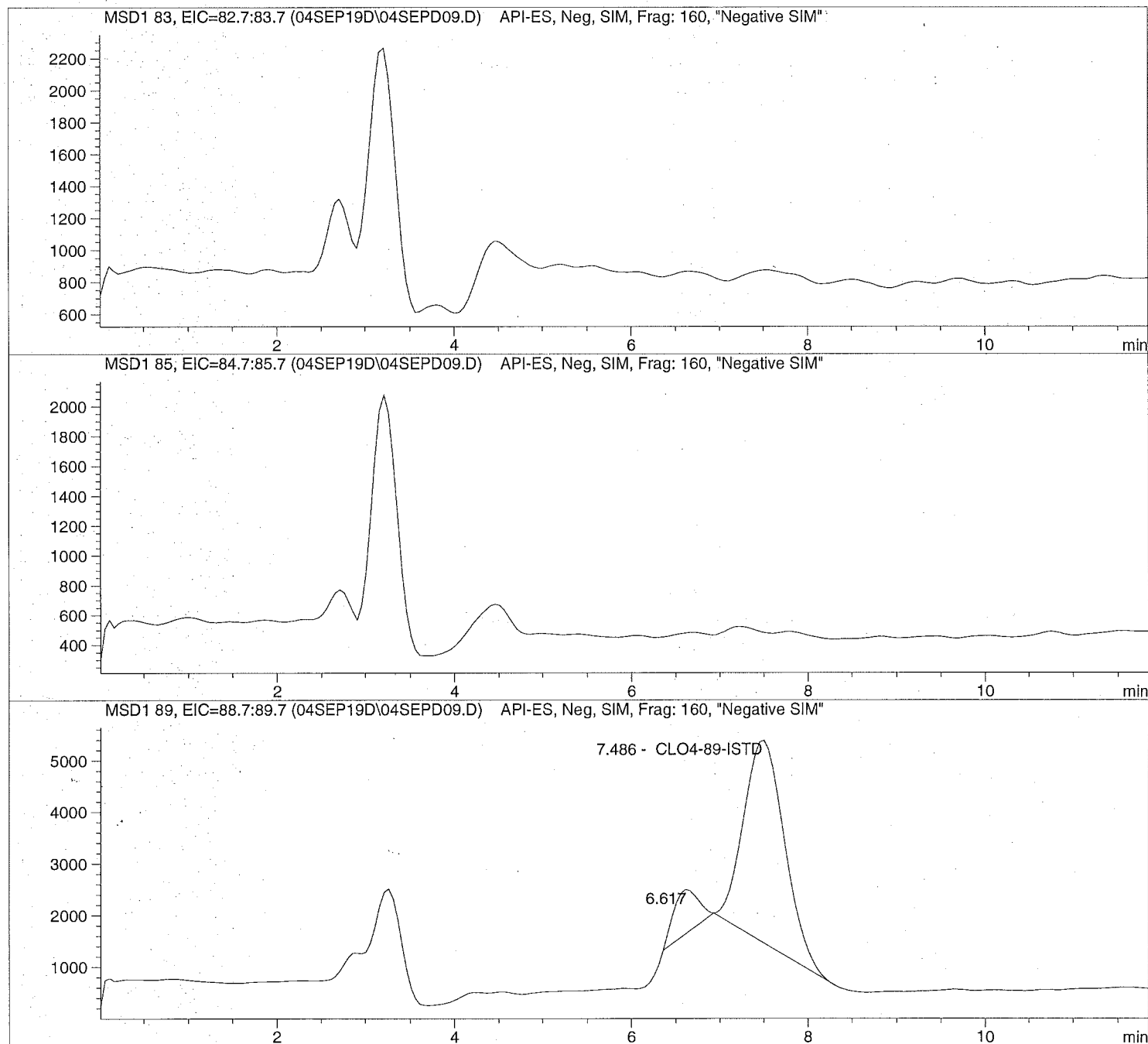
Sample Name: 1925000001

Injection Date: 9/04/2019 11:32:35  
Sample Name: 1925000001  
Acq Operator: TNB

Seq Line: 9  
Location: Vial 79  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD09.D

Sample Name: 1925000001

```

=====
Injection Date:  9/04/2019  11:32:35      Seq Line:      9
Sample Name:    1925000001      Location:      Vial 79
Acq Operator:   TNB              Inj. No.:     1
                                      Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   9/4/2019  12:03:36
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.617	BB	16665.3	0.0000	
7.486	VBA	127478.8	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
[www.alsglobal.com](http://www.alsglobal.com)

# WorkOrder: HS19081046

## Longhorn GW Treatment Plant

### **Bhate Environmental Associates, Inc.**

Marcia Olive  
445 Union Blvd Ste 129  
Lakewood CO 80228

**05-Sep-2019**





---

10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

September 05, 2019

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS19081046**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia,

ALS Environmental received 1 sample(s) on Aug 21, 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,

A handwritten signature in black ink, appearing to read "Raj. P. Modashia", enclosed in a simple black oval.

Generated By: JUMOKE.LAWAL  
RJ Modashia  
Project Manager



**ALS Houston, US**

Date: 05-Sep-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19081046

**SAMPLE SUMMARY**

---

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19081046-01	LH18/24-SP650_082019_AIX	Water		20-Aug-2019 14:00	21-Aug-2019 08:45	<input type="checkbox"/>



---

**Client:** Bhate Environmental Associates, Inc.

**CASE NARRATIVE**

**Project:** Longhorn GW Treatment Plant

**Work Order:**

---

**Work Order Comments**

- The analysis for Perchlorate was subcontracted to ALS Salt Lake City, UT. Final report attached.
- 



## ALS Houston, US

Date: 05-Sep-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_082019\_AIX  
 Collection Date: 20-Aug-2019 14:00

**ANALYTICAL REPORT**

WorkOrder:HS19081046  
 Lab ID:HS19081046-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)</b>		<b>Method:NA</b>		Analyst: SUB				
Subcontract Analysis	See Attached		0	0		NA	1	05-Sep-2019 15:46

Note: See Qualifiers Page for a list of qualifiers and their explanation.



ALS Houston, US

Date: 05-Sep-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081046

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R345608 ( 0 )		<b>Test Name :</b> SUBCONTRACT ANALYSIS - PERCHLORATE (EPA 6850)			<b>Matrix:</b> Water	
HS19081046-01	LH18/24-SP650_082019_AIX	20 Aug 2019 14:00			05 Sep 2019 15:46	1





**ALS Houston, US**

Date: 05-Sep-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081046

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

---



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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-141	31-Aug-2020
Texas	TX104704231-19-23	30-Apr-2020



Sample Receipt Checklist

Client Name: Bhate Environmental  
 Work Order: HS19081046

Date/Time Received: **21-Aug-2019 08:45**  
 Received by: **AC**

Checklist completed by: Paresh M. Giga 21-Aug-2019  
 eSignature Date

Reviewed by: RJ Modashia 21-Aug-2019  
 eSignature 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): 

0.4c U/C	IR25
----------	------

Cooler(s)/Kit(s): 

45031
-------

Date/Time sample(s) sent to storage: 

8/21/19 13:10
---------------

Water - VOA vials have zero headspace? Yes  No  No VOA vials submitted

Water - pH acceptable upon receipt? Yes  No  N/A

pH adjusted? Yes  No  N/A

pH adjusted by: 

--

Login Notes:

Client Contacted: \_\_\_\_\_ Date Contacted: \_\_\_\_\_ Person Contacted: \_\_\_\_\_

Contacted By: \_\_\_\_\_ Regarding: \_\_\_\_\_

Comments: 

--

Corrective Action: 

--





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 / GWP weekly

Client Name: \_\_\_\_\_

Collected by: Scott Beesinger

Sample Analyst Requested <sup>(1)</sup> \_\_\_\_\_

Quality Assurance Samples <sup>(4)</sup> \_\_\_\_\_

Field Sample ID (10 Characters Max)	EPRI/AS LCCID (15 Characters Max)	Date Collected (dd-mm-yyyy)	Time Collected (Military (hh:mm))	Sample Depth (beginning - ending)	SA Code (1)	Sample Number (2)	Sample Matrix (3)	Number of containers	Ambient Blank Lot Control Number	Equipment Blank Lot Control Number	Trip Blank Lot Control Number	Cooler ID
<u>211824-SPLSD-28019-ADK</u>		<u>20 AUG 2019</u>	<u>1400</u>		<u>N</u>		<u>WQ</u>	<u>1</u>				

**HS19081046**

Bhate Environmental Associates, Inc.  
 -orghom GW Treatment Plant



COMMENTS:

Relinquished by (Signed) Scott Beesinger Date 08/21/19 Time 1430

Received by (Signed) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

Delivered Directly to Lab: \_\_\_\_\_ Method of Shipment: \_\_\_\_\_

Sample Delivery Details / Laboratory Receipt No. \_\_\_\_\_

Analytical Lab: ALS - 16430 - Standard - Rd. - Suite 210 - Houston, TX 77099 - (281) 510-5656


Lab Recipient: ATTN: SONIA YEST Delivery Date/Time: \_\_\_\_\_

Number: \_\_\_\_\_

- Chain of Custody Number = date collected + custody number (e.g. 09-02-1999-01)
- Sample Type (SA) Code: N = Normal Sample, TB = Trip Blank (-) Sample, FD = Field Duplicate (-) Samples, EB = Equipment Blank (-) Samples, MS = Matrix Spike, SD = Matrix Spike Duplicate, AB = Ambient Blank (-)
- 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 10/16/99 = 02, etc.)
- Matrix Codes: G3 = Soil Gas, WQ = Groundwater, WS = Surface Water, SO = Soil, SE = Sediment, SL = Sludge, SS = Surface Sed Samples, WQ = Aqueous Sol Samples, WQ = Aqueous Blank Samples (trip, equipment, ambient, etc.), SD = Soil Blanks
- Sample Analyst Requested. Analytical method requested and number of containers provided for each.
- 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

UIC  
014  
16430 4503  
0820



 <b>ALS</b> 10450 Stenciliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5856 Fax. +1 281 530 5887	<b>CUSTOMER SEAL</b>		Seal Broken By:
	Date: 8/20/19	Time: 1430	AC
	Name: Scott Bee	Signature: [Signature]	Date: 8/21/19

Place Label Here

FedEx WED - 21 AUG 10:30A  
 TRK# 4809 7836 6366 PRIORITY OVERNIGHT  
 10221

**AB SGRA** 77099  
 TX-US IAH



\*451242 08/20 567.13/EGE2/0582





## Case Narrative

**Method:** 6850  
**Analysis:** Perchlorate  
**Analysis SOP:** LC-MS-CLO4  
**ALS WO ID(s):** 1924077; 1924078; 1925000

**Client:** ALS Laboratories (Houston, TX)  
**Matrix:** Water  
**ELMS Batch (HBN):** 2287 (247020)

**General Set Information:** There were three 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  $^{18}\text{O}$  labeled perchlorate was added to each sample to establish the perchlorate peak retention time and used in quantitation.

**Sample Preparation:** A 10.0mL aliquot of each sample was transferred into a 15-mL centrifuge tube. 50 $\mu\text{L}$  of an  $^{18}\text{O}$  labeled perchlorate solution was added to each sample as an internal standard. The samples were then capped, vortexed, and filtered into autosampler vial using Phenex PES membrane 0.45 $\mu\text{m}$  Syringe filters.

**Holding Times:** Holding times were met for all analyses.

**Dilutions:** NA

**Method QC data:** The method blank (LMB 671758) was less than 1/2 the CRDL. The recovery for the LCS (671759) was within acceptable parameters.





**MS/MSD Analysis:** MS/MSD was performed on sample 1924077001 (Client ID: LH18/24-SP650\_082019\_AIX). 4.0 $\mu$ l of Working Standard Solution Horizon ID 43701 was added to 10.0mL of sample preparation. The spike target was 4. $\mu$ g/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  $\mu$ g/L. Results were calculated in  $\mu$ g/L by the equation (A)x(B),

where: A = Analyte concentration from the standard curve ( $\mu$ g/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 – 671756) is reported from the analysis of the Laboratory Control Sample (LCS – 671759) at a level of 4.0 $\mu$ g/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) along with datafiles 04SEPD05-09.

Thomas Bosch      September 4, 2019  
Analyst                      Date





## ANALYTICAL REPORT

Report Date: September 05, 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: **34-1924077**

Project ID: HS19081046

Purchase Order: HS19081046

Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
LH18/24-SP650_082019_AIX	1924077001	08/20/19	08/22/19	

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992

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Environmental 

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Thu, 09/05/19 10:23 AM

ENVREP-V4.8







# ANALYTICAL REPORT

**Workorder:** 34-1924077

**Client:** ALS Environmental  
(Houston)

**Project Manager:** Kevin W. Griffiths

## Analytical Results

Sample ID: <b>LH18/24-SP650_082019_AIX</b>	Sampling Site: NA	Collected: 08/20/2019
Lab ID: 1924077001	Media: 125 mL Nalgene	Received: 08/22/2019
Matrix: Water	Sampling Parameter: NA	

Analysis Method - EPA 6850, DoD QSM		
Preparation: Not Applicable	Analysis: EPA 6850, DoD QSM Water Batch: ELMS/2287 (HBN: 247020) Analyzed: 09/04/2019 10:35	Instrument ID: LCMS04 %Solids: NA Report Basis: Wet

Analyte	Result (ug/L)	DL (ug/L)	LOD (ug/L)	LOQ (ug/L)	Dilution	Qual
Perchlorate	ND	1.0	2.0	4.0	1	U

## Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
EPA 6850, DoD QSM	/S/ Thomas Bosch 09/04/2019 13:14	/S/ Stephen Brose 09/05/2019 09:49

## Laboratory Contact Information

ALS Environmental  
960 W Levoy Drive  
Salt Lake City, Utah 84123

Phone: (801) 266-7700  
Email: [alslt.lab@ALSGlobal.com](mailto:alslt.lab@ALSGlobal.com)  
Web: [www.alsslc.com](http://www.alsslc.com)





## ANALYTICAL REPORT

**Workorder:** 34-1924077

**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	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>
	PJLA (ISO 17025)	L17-507-R1	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>
	Utah (TNI)	UT00953	<a href="http://lams.nelac-institute.org/search">http://lams.nelac-institute.org/search</a>
	Iowa (TNI)	IA# 376	<a href="http://www.shl.uiowa.edu/labcert/idnr/">http://www.shl.uiowa.edu/labcert/idnr/</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/envlab/disclaimer.html">http://www.kdheks.gov/envlab/disclaimer.html</a>
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	DOECAP-AP	L18-606	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>
	Washington	C596	<a href="https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation">https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation</a>
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>

### 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

00951715

## Analysis Information

**Workorder:** 1924077

**Limits:** Client SOW/Contract Specified  
**Basis:** DoD QSM

**Preparation:** NA  
**Batch:** NA  
**Prepared By:** NA

**Analysis:** EPA 6850, DoD QSM  
**Batch:** ELMS/2287 (HBN: 247020)  
**Analyzed By:** Thomas Bosch

## Blank

<b>LMB:</b> 671758 <b>Analyzed:</b> 09/04/2019 10:21 <b>Units:</b> ug/L			
Analyte	Result	MDL	RL
Perchlorate	ND	1	2.00

## Laboratory Control Sample

<b>LCS:</b> 671759 <b>Analyzed:</b> 09/04/2019 09:53 <b>Dilution:</b> 1 <b>Units:</b> ug/L				
Analyte	Result	Target	% Rec	QC Limits
Perchlorate	4.20	4.00	105	78.8   123.8

## Matrix Spike - Matrix Spike Duplicate

<b>Sample:</b> 1924077001 <b>Analyzed:</b> 09/04/2019 10:35 <b>Dilution:</b> 1 <b>Units:</b> ug/L		<b>MS:</b> 671760 <b>Analyzed:</b> 09/04/2019 10:49 <b>Dilution:</b> 1 <b>Units:</b> ug/L				<b>MSD:</b> 671761 <b>Analyzed:</b> 09/04/2019 11:04 <b>Dilution:</b> 1 <b>Units:</b> ug/L			
Analyte	Result	Result	Target	% Rec	QC Limits	Result	% Rec	RPD	QC Limits
Perchlorate	ND	4.36	4	109	78.8   123.8	4.14	103	5.09	0.0   20.0

## QC Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Analyst	Peer Review
/S/ Thomas Bosch 09/04/2019 13:17	/S/ Stephen Brose 09/05/2019 09:48

## 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







1924077

10450 Stancliff Rd, Ste 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887  
www.alsglobal.com

### Subcontract Chain of Custody

18698#2

SAMPLING STATE: Dept of Defense

COC ID: 12028

**SUBCONTRACT TO:**

ALS Laboratory Group  
960 LeVoy Dr  
Salt Lake City, UT 84123

Phone: +1 801 266 7700

1924077

**CUSTOMER INFORMATION:**

**Company:** ALS Houston  
**Contact:** RJ Modashia  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Email:** RJ.Modashia@alsglobal.com  
**Alternate Contact:**  
**Email:**

**INVOICE INFORMATION:**

**Company:** ALS Houston  
**Contact:** Accounts Payable  
**Address:** 10450 Stancliff Rd, Ste 210  
**Phone:** +1 281 530 5656  
**Reference:** HS19081046  
**TSR:** Danielle Winnings

LAB SAMPLE ID	CLIENT SAMPLE ID	MATRIX	COLLECT DATE
ANALYSIS REQUESTED			DUE DATE
1. HS19081046-01	LH18/24-SP650_082019_AIX	Water	20 Aug 2019 14:00
	SUB_Perch-6850		05 Sep 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: Lia J. [Signature] Date/Time: 8/21/19 18:00  
 Received By: Lia Warden/ALS Date/Time: 8/22/19 0948  
 Cooler ID(s): \_\_\_\_\_ Temperature(s): \_\_\_\_\_

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ALS-SALT LAKE CITY-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: _____		Project/Task/Site: <u>1927477</u>						
Date/Time of Receipt: <u>8/22/19 0948</u>		Number of Coolers Received: <u>1</u>						
Condition of Coolers: <u>Acceptable/Unacceptable</u>	Temperature Control: <u>Present/Not Included</u>							
Cooler Custody Seals: <u>Present/Absent/NA</u>	Location Temp Taken: <u>Control/Between Samples</u>							
Container Custody Seals: <u>Present/Absent/NA</u>	Are all temperatures within project specific guidelines? <u>Yes/No/NA</u>							
Ice Present: <u>Yes/No/NA</u>	VOA Headspace Present? <u>Yes/No/NA</u>							
pH Check Performed:	Metals: Yes/No/NA	Total Phenolics: Yes/No/NA	NO3/NO2: Yes/No/NA					
	Cyanide: Yes/No/NA	TPH - 418.1: Yes/No/NA	Oil & Grease: Yes/No/NA					
	Sulfide: Yes/No/NA	COD: Yes/No/NA	Total Phosphorous: Yes/No/NA					
	Ammonia: Yes/No/NA	TKN: Yes/No/NA	Gross A.B, Gamma Spec: Yes/No/NA					
Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C19-9844	3 °C	4	C19	°C	7	C19	°C
2	C19	°C	5	C19	°C	8	C19	°C
3	C19	°C	6	C19	°C	9	C19	°C
Taken By: <u>Lili Warath</u>		Signature		<u>Julie Warath</u>		Printed Name		<u>8/22/19</u>
								Date

CLIENT-RELATED INFORMATION

<input type="checkbox"/> Missing Cooler	<input type="checkbox"/> Missing Samples/Bottles	<input type="checkbox"/> Incorrect Preservation	<input type="checkbox"/> Insufficient Sample Volume
<input type="checkbox"/> Cooler Conditions	<input type="checkbox"/> Broken/Leaking Samples	<input type="checkbox"/> pH Criteria Not Met	<input type="checkbox"/> Chain of Custody Problems
<input type="checkbox"/> Missing Paperwork	<input type="checkbox"/> Incorrect Bottle Type	<input type="checkbox"/> Residual Chlorine Present	<input type="checkbox"/> Other:
<input type="checkbox"/> Missing/Incorrect Bottle Labels	<input type="checkbox"/> Cooler Temperatures Out of Range	<input type="checkbox"/> Head Space in Bottles	

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Client Notified? YES  NO

Response Required Within 24 Hours

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

ALS Project Manager: \_\_\_\_\_ Returned to Sample Receipt by: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name Signature





**Must Deliver Next Business Day  
Time and Tempature Sensitive!**

Part # 159459-434 1512 EXP 10/20  
55102/F551/104C

ORIGIN ID:SGRA (281) 530-5656  
CLIENT SERVICES  
ALS LABORATORY GROUP  
10450 STANCLIFF ROAD  
SUITE 210  
HOUSTON, TX 77099  
UNITED STATES US

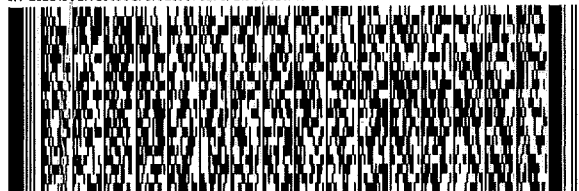
SHIP DATE: 21AUG19  
ACTWGT: 14.60 LB  
CAD: 300130/CAFE3211  
DIMS: 19x16x13 IN  
BILL THIRD PARTY

TO **SAMPLE RECEIVING  
ALS ENVIRONMENTAL  
960 W. LEVOY DRIVE**

**SALT LAKE CITY UT 84123**

(801) 286-7700

REF: HS19081046



**FedEx  
Express**



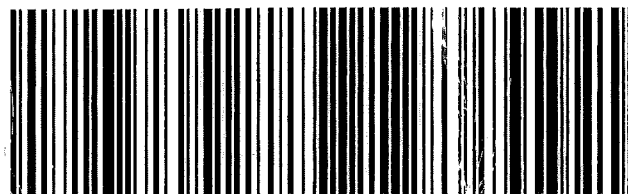
J181118060501uv

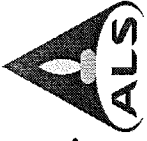
**THU - 22 AUG 3:00P  
STANDARD OVERNIGHT**

TRK# 4809 7836 9560  
0201

**AX BTFA**

**84123  
UT-US SLC**





# tch Worklist

Batch: ELMS/ 2287

Created: 9/4/2019 08:20

Instrument:

Rule: EPA 6850, DoD QSM Water

Analyst: T. Bosch

Status: WP



HBN: 247020

Workorder: 1924077 [ENV\_LVL4]  
Workorder: 1924078 [ENV\_LVL4]  
Workorder: 1925000 [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	671755	CCV for HBN 247020 [ELMS/2287]				CCV	3		E685041C3Q	5311		9/5/2019	
2	671756	RLVS for HBN 247020 [ELMS/2287]				RLVS	3		E685041C3Q	5311		9/5/2019	
3	671757	ICS for HBN 247020 [ELMS/2287]				ICS	3		E6850.D3Q	5311		9/5/2019	
4	671758	LMB for HBN 247020 [ELMS/2287]				LMB	3		E6850Q413Q	5311		9/5/2019	
5	671759	LCS for HBN 247020 [ELMS/2287]				LCS	3		E6850Q413Q	5311		9/5/2019	
6	1924077001	LH18/24-SP650_082019_AIX				SAMPLE	3	1924077001-A	E6850Q41.3	5480	9/17/2019	9/5/2019	
7	671760	LH18/24-SP650...(1924077001MS)				MS	3		E6850Q413Q	5311		9/5/2019	
8	671761	LH18/24-SP65...(1924077001MSD)				MSD	3		E6850Q413Q	5311		9/5/2019	
9	1924078001	LH18/24-SP650_082019_BIX				SAMPLE	3	1924078001-A	E6850Q41.3	5480	9/17/2019	9/5/2019	
10	1925000001	LH18/24-SP650_082719_AIX				SAMPLE	3	1925000001-A	E6850Q41.3	5480	9/24/2019	9/13/2019	
11	671762	CCV for HBN 247020 [ELMS/2287]				CCV	3		E685041C3Q	5311		9/5/2019	







**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# **Analytical Documentation**



Analyst Write-upALS Work Order #'s & Sample #( )'s: 1924077 (001); 1924078 (001) 1925000 (001)ELMS Batch/HBN ID: 2287 (247020)Prep Date: 09/04/2019 Analysis Date: 09/04/2019 Analyst: T. BoschAnalyte: **Perchlorate** Matrix: **Water** Method: **6850**Sequence: \\HPCHEM\1\SEQUENCE\CLO4\2019\SEP\04SEP19D.sReported DL: **1.0µg/L** Reported LOD: **2.0µg/L** Reported LOQ: **4.0µg/L**SAMPLE PREPARATION/ANALYSIS:

**Water:** Samples were prepared by Thomas Bosch. 10.0mL of each sample was pipetted into a 15-mL centrifuge tube, and 50µL of an oxygen-18 labeled perchlorate solution was added as an internal standard. The samples were capped, vortexed, and filtered with Phenex PES membrane 0.45µm Syringe filters prior to analysis.

**REAGENTS:** Eluent A1: 95% ASTM Type II water (ALS)/ 5% ACN (B&J Lot AH015-4)/0.1% glacial acetic acid (JT-Baker Lot 04802).  
Eluent B1: 95% ACN (B&J Lot AH015-4) / 5% ASTM Type II water (ALS)/0.1% glacial acetic acid (JT-Baker Lot 04802).

**STANDARDS:** Internal Standard Spiking Solution Horizon# 43730. Dilutions of Working Standard Solution ID 43702 used for CCV's, LODV's, RLVS and IPC.

**CALIBRATION CURVE:** Used curve from 03/19/2019, sequence 19MAR19D.s Offline Quantitation Method: CLO4-DP2.M

**INSTRUMENT CONDITIONS:** Samples were analyzed with an Agilent 1100 LC/MSD system, in negative SIM mode, monitoring m/z 83, 85, and 89.

**Instrument ID:** LCMS04 Online Acquisition Method: CLO4-AQN.M Fragmentor: 160 Output Gain: 10 Injection Volume: 50µL  
Column: KP-RPPX C8 separator, 250mm Mobile Phase: 70% Eluent A1; 30% Eluent B1

FLOW GRADIENT:

Time (min.)	Flow (mL/min)
0	0.65
5.8	0.65
5.9	0.25
10.3	0.25
10.5	0.65
12.0	0.65

**QC DATA:** 4.0µL of QC Solution Horizon ID 47516 was used for LCS 671759; Target = 4.0µg/L. ASTM type II water was used for LMB 671758.

**MS/MSD:** The Matrix Spike and duplicate (MS/MSD) were performed on sample 1924077001 (Client ID: LH18/24-SP650\_082019\_AIX). 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: \\ALS\TWS013\LCMS\LCMS04\2019\SEP\HBN# or through NuGenesis\Tree\PrintData\LCMS\DefaultView.
- 4) Notebook: \\als\TWS013\ORGANIC\BOSCH\LCMS\Perchlorates\Waters\2019\247020-DoD-ALS-Hstn LCMS4 or through \\ALS\TWS013\DATA\REVIEW\HBN#
- 5) The Reporting Limit Verification Standard (RLVS – 671756) is reported from the analysis of the Laboratory Control Sample (LCS – 671759) at a level of 4.0µg/L.
- 6) Due to limitations of the Chemstation Software, some of the chromatographic peaks require manual integration. Manual Integrations were performed for one of the Initial Calibration analyses (datafile: 19MARI03) along with datafiles 04SEP05-09.



### 5.5 Chromatography (GC, HPLC and LC/MS) Technical Review

Note: It is the peer reviewer's responsibility to ensure that appropriate criteria are used as defined in the HORIZON PROFILE. The evaluation criteria are prioritized as per Section 2.2 of this SOP. These items must be checked for all projects. The following checklist will be completed by both the analyst and the peer reviewer and scanned into the HBN folder with the raw data.

<u>Chromatography (GC, HPLC, LC/MS) Technical Review Criteria</u>	<u>Analyst Initials</u>	<u>Reviewer Initials</u>
<u>Batch(es)/SDG: ELMS: 2287 HBN: 247020</u>		
<u>Sample Set IDs if Applicable: 1924077/1924078/1925000</u>		
<u>Calibration standards analyzed and meets criteria</u>	TB	SB
<u>Standards traceability checked and meets criteria</u>	TB	SB
<u>Standard curve coefficients evaluated and meet criteria</u>	TB	SB
<u>ICVs analyzed and meet acceptance criteria</u>	TB	SB
<u>CCVs analyzed and meet acceptance criteria</u>	TB	SB
<u>Method Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>Retention Time Windows checked</u>	TB	SB
<u>For method 8081A, Endrin/DDT Breakdown is checked for compliance</u>	—	—
<u>Surrogate recoveries checked and appropriately addressed</u>	—	—
<u>Method Preparation Blanks analyzed and meet acceptance criteria</u>	TB	SB
<u>MSs, MSDs, and/or MDs analyzed and calculations checked; applicable flags applied on QC reports; LCSs analyzed and meet acceptance criteria when performed</u>	TB	SB
<u>RLVS analyzed</u>	TB	SB
<u>Preparation and analysis hold times met</u>	TB	SB
<u>Preparation deviations and re-preparations noted when performed</u>	TB	SB
<u>Analysis deviations and re-analyses noted when performed</u>	TB	SB
<u>Sample dilution factors noted on reports</u>	TB	SB
<u>Electronic records in HBN transcription accuracy and completeness checked</u>	TB	SB
<u>Preparation and analysis calculations checked</u>	TB	SB
<u>NCRs are completed as necessary NC/CAR# _____</u>	—	—
<u>Report forms are complete and accurate</u>	TB	SB
<u>Manual integrations checked</u>	TB	SB





## STANDARD REPORT

## Working Standard - CLO4 WRK

CLO4 WRK			Description - 6850.WKG Std:100.ug/L		
Standard: 43702		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 WRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	0.1 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43701	CLO4 INT	6850 Intermdt AccStd 10.ug/mL	CLO4 INT	0.1 mL	09/18/2019





STANDARD REPORT

Constituent

Stock Standard - CLO4 STOCK

CLO4 STOCK		Description - 6850 Stock AccStd 1,000ug/mL	
Standard: 43659	Created By: Thomas Bosch	Amount: 100 mL	
MFG: AccuStandard	Create Date: 09/17/2018 09:09AM	Expires: 07/25/2020	
MFG Lot: 218065075		Usable: No	
Part ID: IC-PER-10X-1		Lab Lot: CLO4 STOCK	
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL





## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

ASTM H2O		Description - ASTM Type II Water	
Standard: 109	Created By: ALS Support (Lims)	Amount: 1000 L	
MFG: DCL In House	Create Date: 10/06/2005 09:10AM	Expires: 11/07/2025	
MFG Lot: Not Provided		Usable: Yes	
Part ID: Not Provided		Lab Lot: LAB 109	
Pos	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			





## STANDARD REPORT

## Constituent

## Working Standard - CLO4 INT

CLO4 INT			Description - 6850 Intermdt AccStd 10.ug/mL		
Standard: 43701		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 09/18/2018 02:09PM		Expires: 09/18/2019	
MFG Lot: TNB: 09/18/2018				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 INT	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
43659	CLO4 STOCK	6850 Stock AccStd 1,000ug/mL	CLO4 STOCK	0.1 mL	07/25/2020





## STANDARD REPORT

## Working Standard - CLO4 QC WRK

CLO4 QC WRK		Description - 6850 QC WKG STD 100ug/L			
Standard: 47516		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC WRK 100.ug/L	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	100 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
47515	CLO4 QC INT	6850 QC Intrmdt Std-QC 10ug/mL	CLO4 QC INT 10.ug/mL	0.1 mL	03/31/2020







## STANDARD REPORT

## Constituent

## Solvent Standard - ASTM H2O

ASTM H2O		Description - ASTM Type II Water	
Standard: 109	Created By: ALS Support (Lims)	Amount: 1000 L	
MFG: DCL In House	Create Date: 10/06/2005 09:10AM	Expires: 11/07/2025	
MFG Lot: Not Provided		Usable: Yes	
Part ID: Not Provided		Lab Lot: LAB 109	
Pos.	Analyte	Name	Concentration
Solvent - Analyte(s) not applicable			





## STANDARD REPORT

## Constituent

## Stock Standard - CLO4 QCSTOCK

CLO4 QCSTOCK		Description - 6850 QC Stock STD 1,000ug/mL	
Standard: 36748	Created By: Thomas Bosch	Amount: 100 mL	
MFG: Ultra Scientific	Create Date: 05/11/2017 01:05PM	Expires: 03/31/2020	
MFG Lot: CP-0860		Usable: Yes	
Part ID: ICC-013		Lab Lot: CLO4 QC STOCK	
Pos.	Analyte	Name	Concentration
1	14797-73-0	Perchlorate	1000 ug/mL





## STANDARD REPORT

## Constituent

Working Standard - CLO4 QC INT

CLO4 QC INT		Description - 6850 QC Intrmdt Std-QC 10ug/mL			
Standard: 47515		Created By: Thomas Bosch		Amount: 10 mL	
MFG: ALS/SLC		Create Date: 05/06/2019 03:05PM		Expires: 03/31/2020	
MFG Lot: TNB: 05/06/2019				Usable: Yes	
Pipette ID: Not Provided				Lab Lot: CLO4 QC INT 10.ug/mL	
Pos.	Analyte	Name	Concentration		
1	14797-73-0	Perchlorate	10 ug/mL		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
109	ASTM H2O	ASTM Type II Water	LAB 109	9.9 mL	11/07/2025
36748	CLO4 QCSTOCK	6850 QC Stock STD 1,000ug/mL	CLO4 QC STOCK	0.1 mL	03/31/2020





## STANDARD REPORT

## Working Standard - CLO4ISTDWRK

CLO4ISTDWRK			Description - Perchlorate ISTD Wrk 1,000ug/L		
Standard: 43730		Created By: Thomas Bosch		Amount: 25 mL	
MFG: ALS/SLC		Create Date: 09/20/2018 09:09AM		Expires: 09/20/2019	
MFG Lot: TNB: 05/09/2018		Verified By: Thomas Bosch		Usable: Yes	
Pipette ID: Not Provided		Verify Date:		Lab Lot: CLO4ISTDWRK	
Pos.	Analyte	Name	Concentration		
1	14797-73-0-8385	Perchlorate 83:85 Ratio	1000 ug/L		
2	14797-73-0-89	Perchlorate 89	1000 ug/L		
Composition					
Standard	Standard ID	Description	Lab Lot ID	Volume	Expires
43729	CLO4ISTDSTK	Perchlorate ISTD Stock	CLO4ISTDSTK	0.25 mL	04/28/2026





## STANDARD REPORT

## Constituent

## Stock Standard - CLO4ISTDSTK

CLO4ISTDSTK		Description - Perchlorate ISTD Stock	
Standard: 43729		Created By: Thomas Bosch	Amount: 1 mL
MFG: Cambridge Isotope		Create Date: 09/20/2018 09:09AM	Expires: 04/28/2026
MFG Lot: SDFF-012A		Verified By: Thomas Bosch	Usable: Yes
Part ID: OLM-7310-S		Verify Date:	Lab Lot: CLO4ISTDSTK
Pos.	Analyte	Name	Concentration
1	14797-73-0-8385	Perchlorate 83:85 Ratio	100 ug/mL
2	14797-73-0-89	Perchlorate 89	100 ug/mL





## Certificate of Analysis



### ISO Guide 34 Reference Material

Product Number: ICC-013  
Lot Number: CP-0860

Lot Issue Date: 29-Feb 2016  
Expiration Date: 31-Mar 2020

Product Name: Perchlorate IC Standard

#### Description:

This Reference Material (RM) was gravimetrically prepared in accordance with ISO Guide 34 and under ULTRA Scientific's ISO 9001 registered quality system. The neat materials used for this product have been verified by ULTRA's ISO 17025 laboratory and under ULTRA's ISO Guide 34 accreditation. The analyte concentrations were verified by ULTRA's ISO 17025 accredited laboratory. For each analyte, the true value, with its uncertainty value calculated at the 95% confidence level, is reported below.

Analyte	Starting Material	Lot Number	Purity (%)	Calculated Value	True Value	Traceability & Method
perchlorate	potassium perchlorate	RM07987	100	1001 ± 5 µg/mL	976 ± 6 µg/mL	NIST SRM 3141A; ICP-OES

Solvent: water (low TOC, < 50 ppb)

Storage: Store at Room Temperature (15° to 30°C).

#### Traceability:

Traceability has been established through an unbroken chain of comparisons, each having stated uncertainties. Comparisons are based on appropriate physical or chemical measurements, including gravimetric or volumetric dilution, where the mass or volume of a solution before and after dilution is measured. The balances used for these measurements are calibrated with weights traceable to NIST in compliance with ANSI/NCSL Z-540-1, ISO 9001, ISO 17025, and ISO Guide 34. Calibrated Class A glassware is used for volumetric measurements. Thermometers are calibrated against a NIST traceable thermometer in accordance with NIST Special Publication 819.

#### Estimation of Uncertainties:

The true value is reported, with its uncertainty value calculated at the 95% confidence level.

#### Homogeneity:

This RM was formulated and unitized according to an in-house procedure and is guaranteed to be homogeneous. There is no minimum sub-sample size required.

#### Intended Use:

This RM is intended for the preparation of working reference samples for use in routine laboratory analyses, calibration of instruments, validation of analytical methods, assessments of measurement methods and continuing calibration verification.

#### Instructions for Use:

Sample aliquots for analysis should be withdrawn at 20°C to 25°C immediately after opening and should be processed without delay for the true value to be valid within the stated uncertainties. Do not pipet from the bottle. Do not return any material removed for pipetting to the bottle. Tightly cap the bottle after removing any material and store according to the instructions noted above.

#### Hazards:

Refer to the Safety Data Sheet for information regarding this RM.

#### Expiration of Certification:

The certification of this RM is valid, within the measurement uncertainty specified, until the expiration date specified above, provided the RM is handled and stored in accordance with the instructions given in this certificate. This certification is nullified if the RM is damaged, contaminated, or otherwise modified.





# Certificate of Analysis



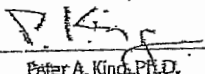
## ISO Guide 34 Reference Material

Product Number: ICC-013  
Lot Number: CP-0860

Lot Issue Date: 29-Feb 2016  
Expiration Date: 31-Mar 2020

### Maintenance of Certification:

The real-time, long term stability of the RM may be monitored over the lifetime of the certification. If substantive changes occur that affect the certification before the expiration of this certificate, ULTRA Scientific will notify the purchaser.

  
Peter A. King, Ph.D.  
VP, Technical Operations

  
Daniel J. Lamendola  
Director of QA/RA



125 Market Street  
New Haven, CT 06513  
USA



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<sub>4</sub>)  
SRM: Ind. Std.  
Lot: 218065075  
Matrix: Water  
Hazards: Refer to SDS for complete safety information

Date Certified: Jun 25, 2018  
Expiration: Jul 25, 2020  
Sample Size: 100 mL  
Components: 1  
Storage Condition: Ambient (>5 °C)  
Included on ISO/IEC 17025 Scope of Accreditation: Yes  
Included on ISO 17034 Scope of Accreditation: Yes



Signal Word: None

Component	SRM #	Prepared Concentration (µg/mL)
ClO <sub>4</sub> Perchlorate	Ind. Std.	1000

The gravimetric uncertainty for this product is ±0.24%.

The final solution was checked against an independent standard to verify its concentration.

We use the highest purity raw materials available to minimize impurity levels in the final solution. Typically 99.999%+ pure starting materials are used as well as ASTM Type I 18 megohm deionized water.

All solutions are filtered through a 0.2 µm filter prior to being bottled.

All glassware used in preparation is Class A and calibrated regularly.

All weights are traceable through NIST Test No. 822-275872-11

All bottles are triple rinsed with deionized water prior to use.

Shake bottle prior to use and do not pipette directly out of the bottle. Use only cleaned Class A volumetric glassware.

We certify the accuracy of this standard to be ±0.5% of the stated value until its expiration date provided it is kept tightly capped and stored under the conditions stated above.

Certified By:

*Meigan O'Leary*

Meigan O'Leary, Inorganic QC Manager





Cambridge Isotope Laboratories, Inc.

## Certificate of Analysis

Quality Standards:  
ISO Guide 34 • ISO/IEC 17025 • ISO 13485 • cGMP



23118

Product Name: PERCHLORIC ACID, SODIUM SALT  
(Isotopic Label & Enrichment Specification) (18O4, 90%+) 100 UG/ML IN WATER

Lot Number: SDDG-013

Catalog Number: OLM-7310-S

## Product Information

Chemical Purity Specification:  $\geq 98\%$   
Labeled CAS Number: NA  
Unlabeled CAS Number: 7601-89-0  
MW\*: 130.4  
Chemical Formula:  $\text{NaCl}^*\text{O}_4$   
Storage: Store at room temperature away from light and moisture.  
Stability: See storage and expiration date.

## Certification

Cambridge Isotope Laboratories, Inc. guarantees that this material meets or exceeds the specifications stated. Absolute identity as well as chemical and isotopic purities are assured by the use of unambiguous synthetic routes and multiple chemical analyses whenever possible. Results are representative of QC testing at time of release from Quality Control unless otherwise stated.

Volumetric measurements were made with Class A glassware. Gravimetry is traceable to the NIST through calibrated balances and certified, calibrated, standard weights. The calibrations are traceable to the NIST under Test No. 822/270236-04. The calibrations also meet specifications outlined in ISO 9001, ISO/IEC 17025, ANSI/NSCL Z540-1-1994, NCR Document 10CFR50 Appendix B, and applicable subdocuments.

This COA references the bulk catalog number before packaging. The COA also applies to the CIL finished good catalog number. Some possible packaging sizes and their corresponding suffix are -1.2, -1, -0.5, -10, or -0.1.

\* For isotopically labeled compounds, MW listed is for the fully enriched product.

Approved by: T. J. Eckersley

Timothy J. Eckersley, Ph.D., Quality Assurance

## Quality Control Tests and Results

QC Release Date	2/27/2014
Expiration Date	2/27/2024
Concentration Based on Gravimetry	102 $\mu\text{g/mL}$
Chemical Purity of Neat Material(s)	98%
$\sqrt{\text{MS}}$ for Concentration	109.4 $\pm$ 2.8 $\mu\text{g/mL}$ (k=2)





**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# Raw Data



Batch Review Method:  
 C:\HPCHEM\1\METHODS\CLO4-DP2.M

['#'] ==> Run has not been reprocessed with Batch Review Method  
 ['\*'] ==> Run has been saved with batch file]

#*	Sample	Location	Inj	SampleType	Run	Perchlorate Area	Perchlorat RT	Perchlorate Amount	
*	671755	CCV@25	Vial 71	1	Control	1	2.50134e6	7.746	26.60067
*	671759	QC@4.0	Vial 72	1	Control	2	4.25137e5	7.705	4.19744
*	671757	ICS@4.0	Vial 73	1	Control	3	4.00928e5	7.551	4.86408
*	671758	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1924077001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	671760	240771S	Vial 76	1	Sample	6	2.51039e5	7.489	4.35557
*	671761	240771D	Vial 77	1	Sample	7	2.33940e5	7.470	4.13952
*	1924078001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1925000001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	671762	CCV@25	Vial 71	1	Control	10	2.46708e6	7.642	26.04469

#*	Sample	Location	Inj	SampleType	Run	CLO4-85 Area	CLO4-85 RT	CLO4-85 Amount	
*	671755	CCV@25	Vial 71	1	Control	1	7.43865e5	7.772	26.65922
*	671759	QC@4.0	Vial 72	1	Control	2	1.37190e5	7.730	4.41015
*	671757	ICS@4.0	Vial 73	1	Control	3	1.32103e5	7.568	5.24525
*	671758	LMB	Vial 74	1	Control	4	0.00000	0.000	0.00000
*	1924077001		Vial 75	1	Sample	5	0.00000	0.000	0.00000
*	671760	240771S	Vial 76	1	Sample	6	8.31783e4	7.512	4.70443
*	671761	240771D	Vial 77	1	Sample	7	7.89548e4	7.485	4.54456
*	1924078001		Vial 78	1	Sample	8	0.00000	0.000	0.00000
*	1925000001		Vial 79	1	Sample	9	0.00000	0.000	0.00000
*	671762	CCV@25	Vial 71	1	Control	10	7.35698e5	7.663	26.16643

#*	Sample	Location	Inj	SampleType	Run	CLO4-89-ISTD Area	CLO4-89-IS RT	CLO4-89-ISTD Amount	
*	671755	CCV@25	Vial 71	1	Control	1	2.85000e5	7.774	5.00000
*	671759	QC@4.0	Vial 72	1	Control	2	3.32955e5	7.737	5.00000
*	671757	ICS@4.0	Vial 73	1	Control	3	2.69122e5	7.569	5.00000
*	671758	LMB	Vial 74	1	Control	4	3.11424e5	7.861	5.00000
*	1924077001		Vial 75	1	Sample	5	2.01971e5	7.497	5.00000
*	671760	240771S	Vial 76	1	Sample	6	1.89135e5	7.510	5.00000
*	671761	240771D	Vial 77	1	Sample	7	1.85904e5	7.500	5.00000
*	1924078001		Vial 78	1	Sample	8	1.85766e5	7.472	5.00000
*	1925000001		Vial 79	1	Sample	9	1.92863e5	7.486	5.00000
*	671762	CCV@25	Vial 71	1	Control	10	2.87475e5	7.670	5.00000

\*\*\* End of Report \*\*\*



## Sequence Table:

## Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
1	Vial 71	671755	CCV@25	CLO4-AQN	1	Ctrl Samp	
2	Vial 72	671759	QC@4.0	CLO4-AQN	1	Ctrl Samp	
3	Vial 73	671757	ICS@4.0	CLO4-AQN	1	Ctrl Samp	
4	Vial 74	671758	LMB	CLO4-AQN	1	Ctrl Samp	
5	Vial 75	1924077001		CLO4-AQN	1	Sample	
6	Vial 76	671760	240771S	CLO4-AQN	1	Sample	
7	Vial 77	671761	240771D	CLO4-AQN	1	Sample	
8	Vial 78	1924078001		CLO4-AQN	1	Sample	
9	Vial 79	1925000001		CLO4-AQN	1	Sample	
10	Vial 71	671762	CCV@25	CLO4-AQN	1	Ctrl Samp	



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD01.D

Sample Name: 671755 CCV@25

Injection Date: 9/04/2019 09:28:08

Seq Line: 1

Sample Name: 671755 CCV@25

Location: Vial 71

Acq Operator: TNB

Inj. No.: 1

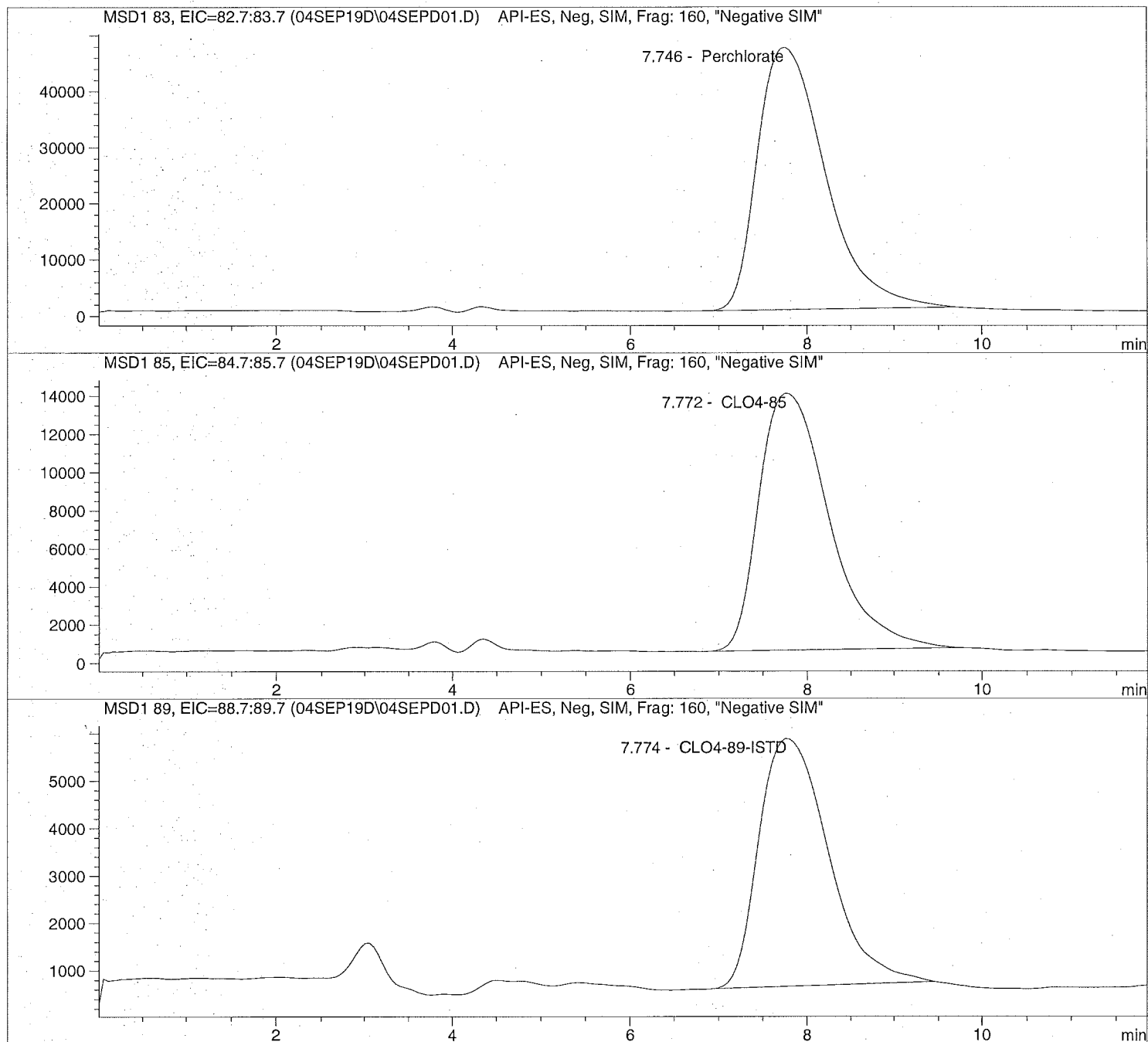
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 9/4/2019 12:03:36

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD01.D. Sample Name: 671755 CCV@25

```

=====
Injection Date: 9/04/2019 09:28:08      Seq Line: 1
Sample Name:    671755  CCV@25          Location:  Vial 71
Acq Operator:   TNB                    Inj. No.: 1
                                           Inj. Vol.: 50 µl
  
```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   9/4/2019 12:03:36
  
```

Perchlorate analysis

Sample Information

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.746	PBA	2501336.5	26.6007	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.772	PBA	743865.2	26.6592	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.774	PBA	285000.0	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD02.D

Sample Name: 671759 QC@4.0

Injection Date: 9/04/2019 09:53:07

Seq Line: 2

Sample Name: 671759 QC@4.0

Location: Vial 72

Acq Operator: TNB

Inj. No.: 1

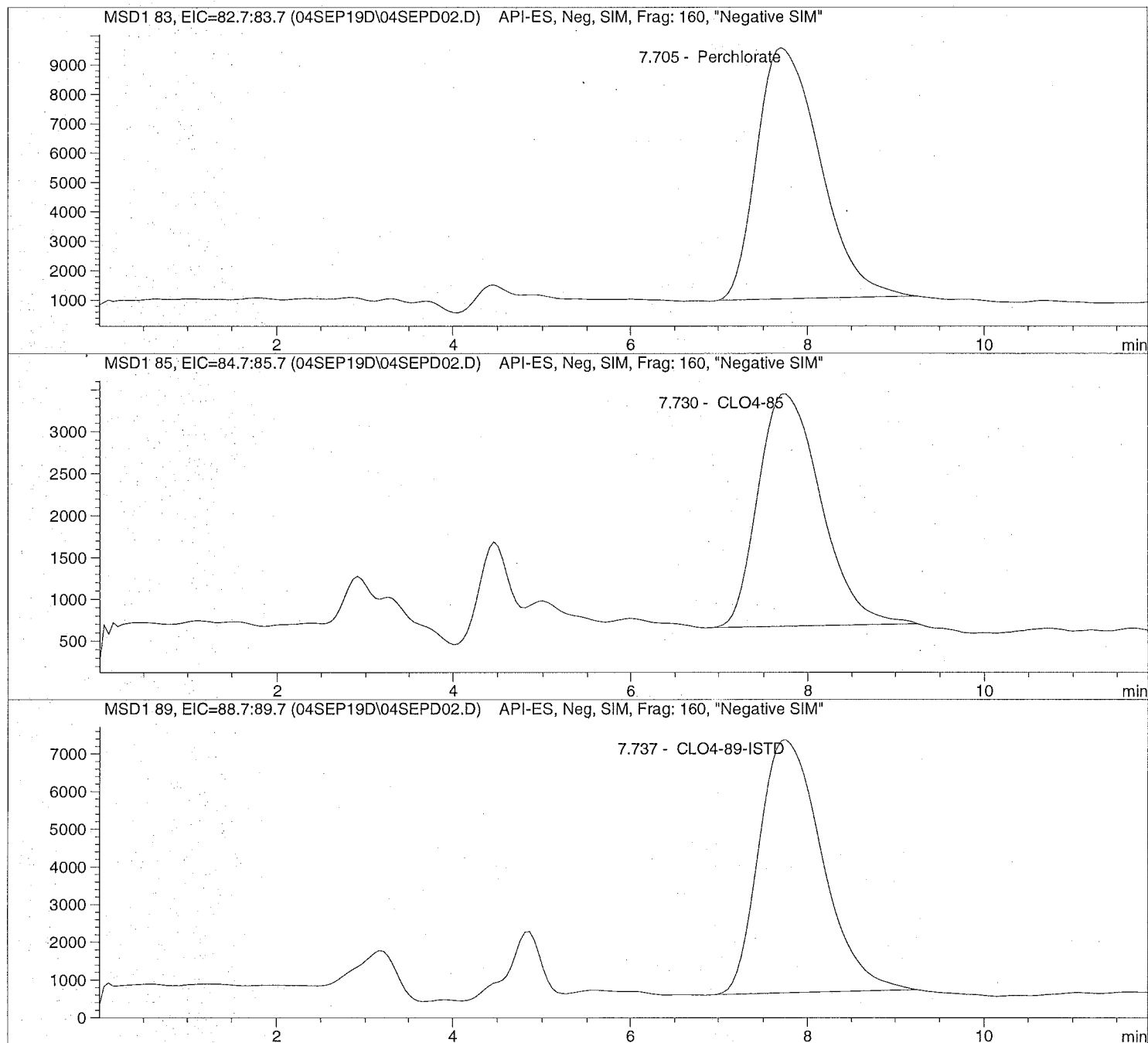
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD02.D Sample Name: 671759 QC@4.0

```

=====
Injection Date: 9/04/2019 09:53:07      Seq Line:      2
Sample Name:    671759 QC@4.0           Location:      Vial 72
Acq Operator:   TNB                     Inj. No.:     1
                                           Inj. Vol.:    50 µl
=====

```

```

Acq. Method:    CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:   9/4/2019 12:03:36
=====

```

Perchlorate analysis

Sample Information

```

=====
Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019, 10:15:00 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
7.705	PBA	425136.7	4.1974	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.730	PBA	137190.2	4.4102	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.737	PBA	332955.3	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*



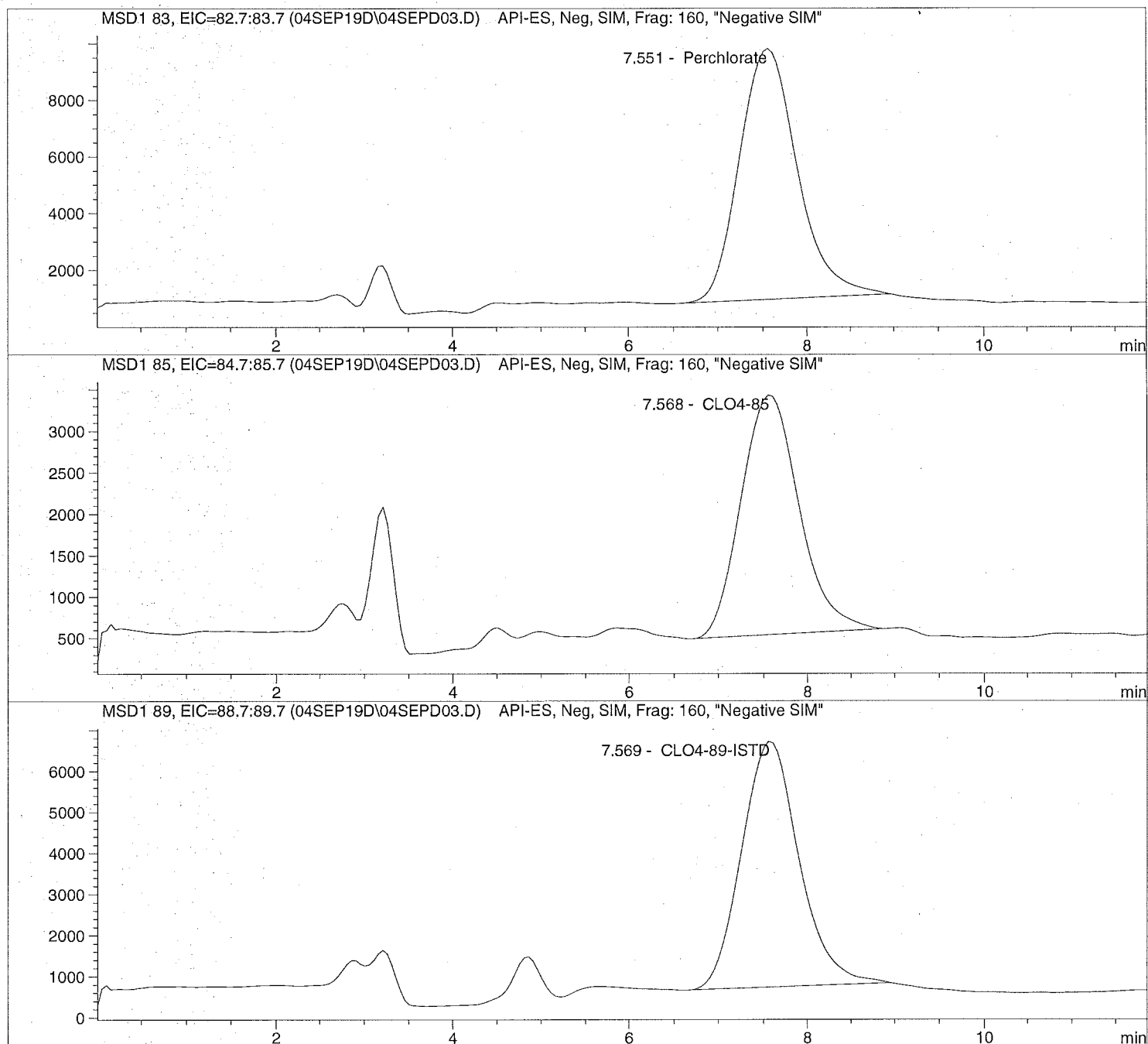


Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD03.D Sample Name: 671757 ICS@4.0

Injection Date: 9/04/2019 10:07:21 Seq Line: 3  
Sample Name: 671757 ICS@4.0 Location: Vial 73  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD03.D Sample Name: 671757 ICS@4.0

```

=====
Injection Date: 9/04/2019 10:07:21      Seq Line: 3
Sample Name: 671757 ICS@4.0           Location: Vial 73
Acq Operator: TNB                      Inj. No.: 1
                                         Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.551	PBA	400927.9	4.8641	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.568	PBA	132102.7	5.2452	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.569	PBA	269121.9	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD04.D

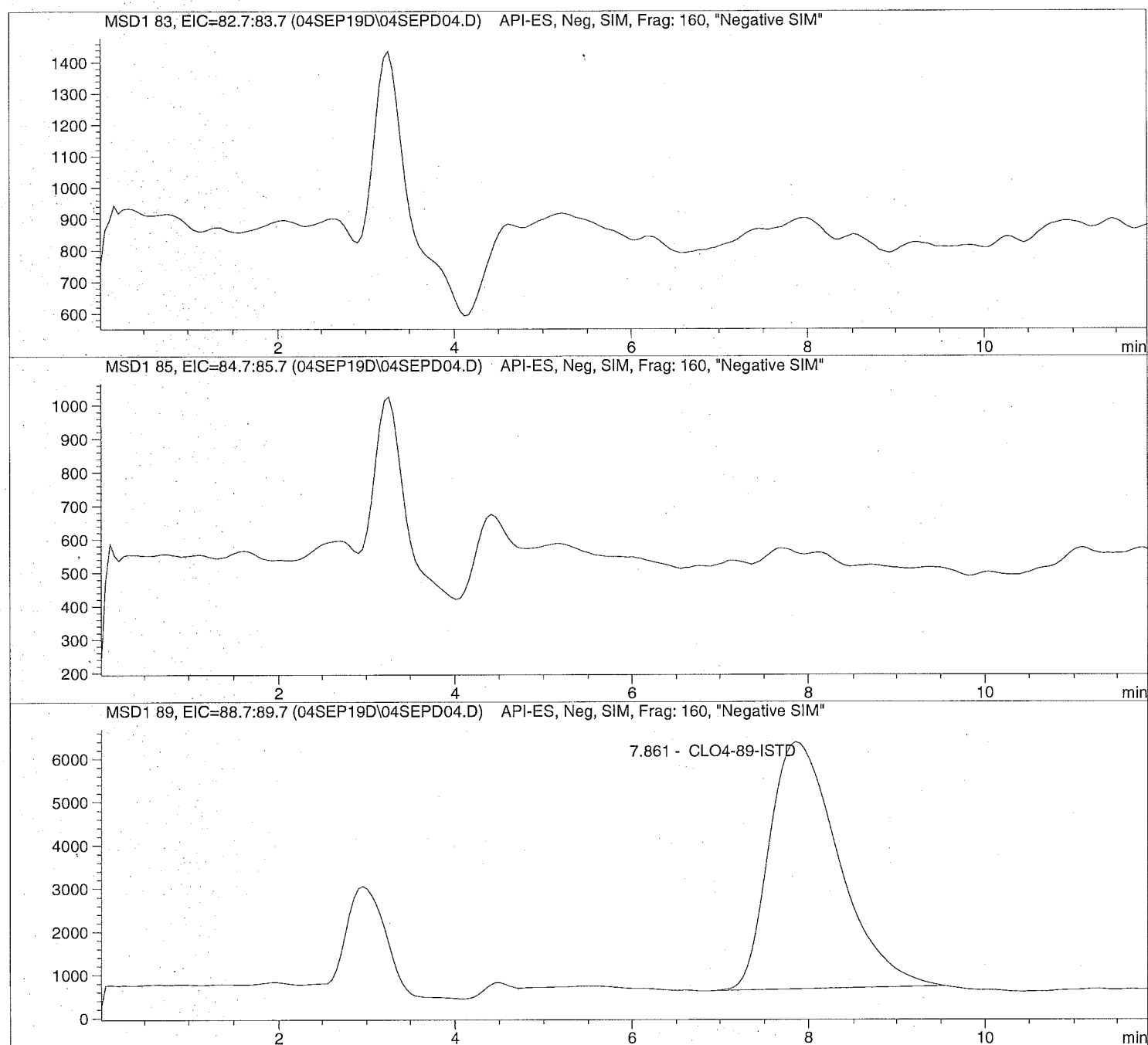
Sample Name: 671758 LMB

Injection Date: 9/04/2019 10:21:37  
Sample Name: 671758 LMB  
Acq Operator: TNB

Seq Line: 4  
Location: Vial 74  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD04.D Sample Name: 671758 LMB

```

=====
Injection Date: 9/04/2019 10:21:37      Seq Line: 4
Sample Name: 671758 LMB                  Location: Vial 74
Acq Operator: TNB                        Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.861	PBA	311424.2	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

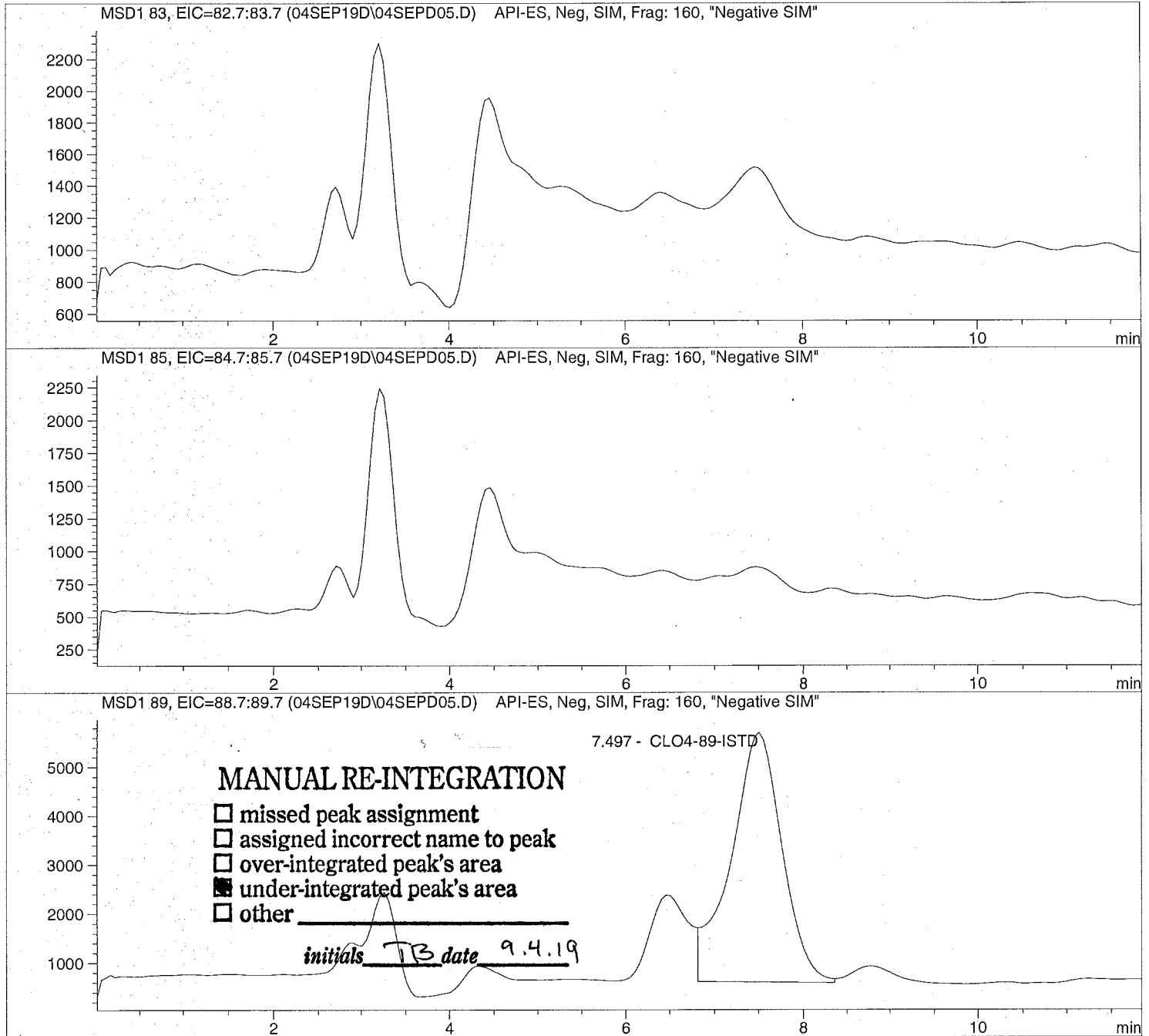


Injection Date: 9/04/2019 10:35:47  
Sample Name: 1924077001  
Acq Operator: TNB

Seq Line: 5  
Location: Vial 75  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



```
=====
Injection Date: 9/04/2019 10:35:47      Seq Line: 5
Sample Name: 1924077001                 Location: Vial 75
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====
```

```
Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
=====
```

## Perchlorate analysis

## Sample Information

```
Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.497	MF	201970.8	5.0000	CLO4-89-ISTD

\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD06.D

Sample Name: 671760 240771S

Injection Date: 9/04/2019 10:49:59

Seq Line: 6

Sample Name: 671760 240771S

Location: Vial 76

Acq Operator: TNB

Inj. No.: 1

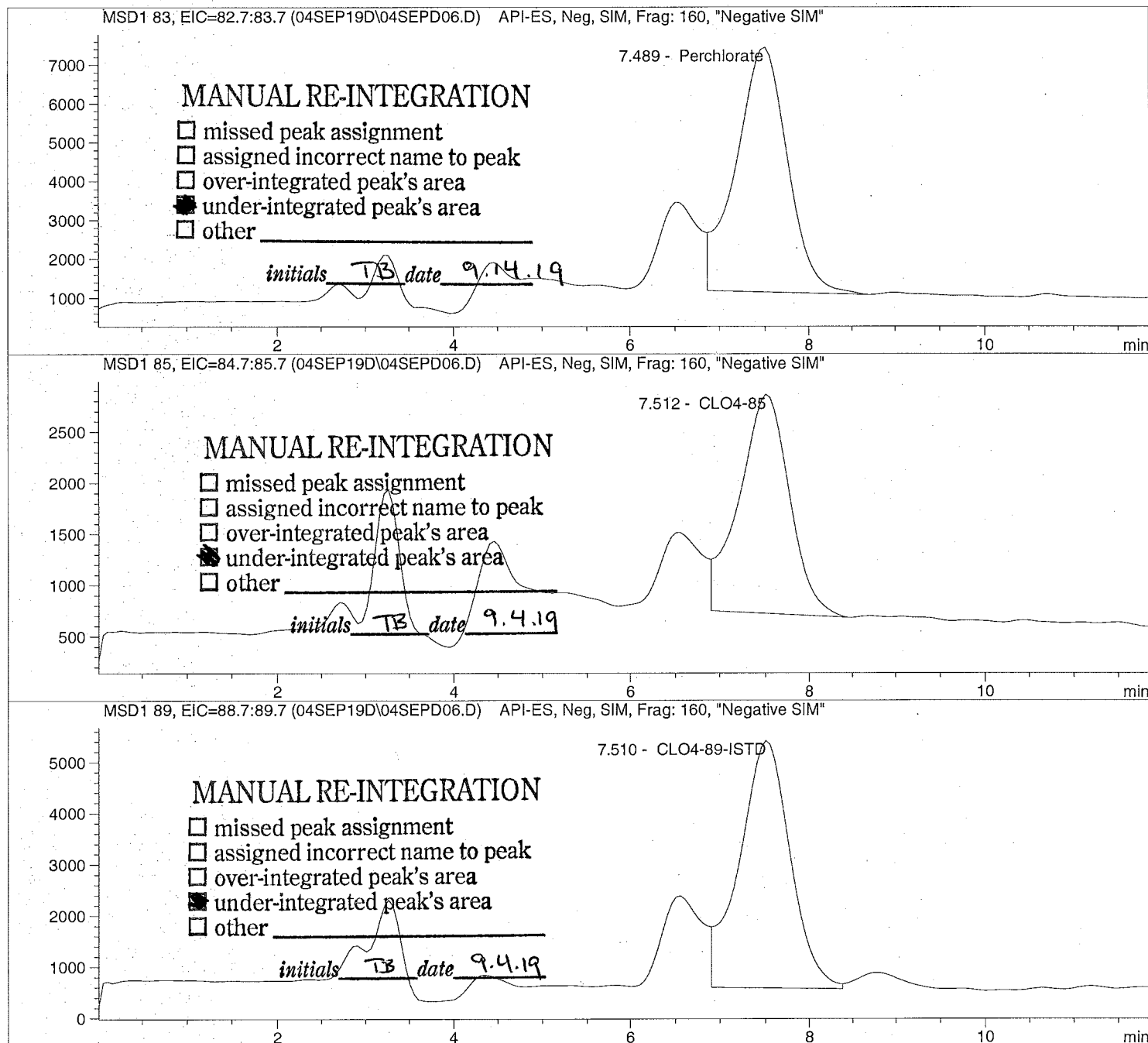
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD06.D Sample Name: 671760 240771S

```

=====
Injection Date: 9/04/2019 10:49:59      Seq Line: 6
Sample Name: 671760 240771S           Location: Vial 76
Acq Operator: TNB                      Inj. No.: 1
                                         Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.489	FM	251038.9	4.3556	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.512	FM	83178.3	4.7044	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.510	MF	189134.7	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```





Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD07.D

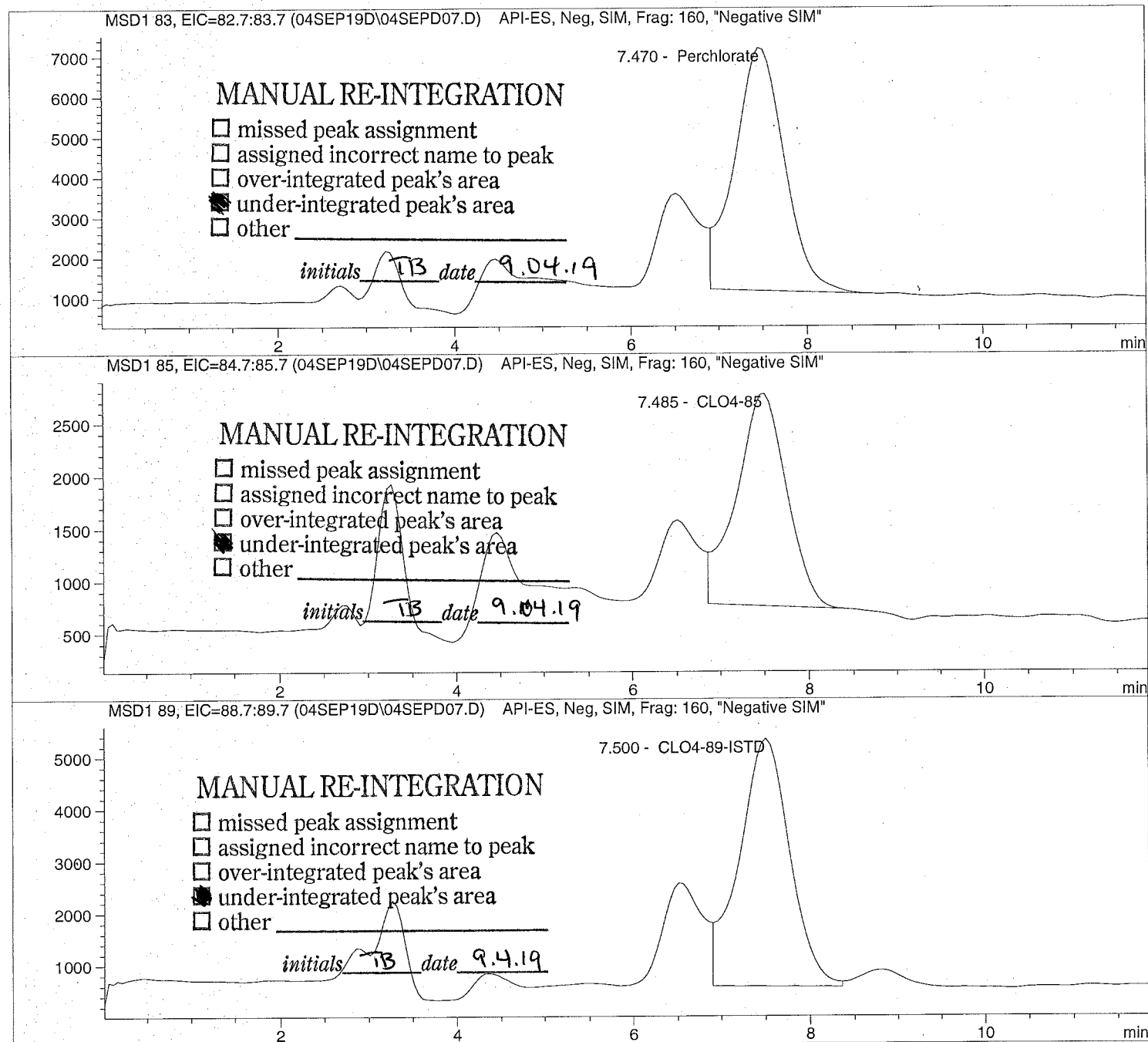
Sample Name: 671761 240771D

Injection Date: 9/04/2019 11:04:10  
 Sample Name: 671761 240771D  
 Acq Operator: TNB

Seq Line: 7  
 Location: Vial 77  
 Inj. No.: 1  
 Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD07.D Sample Name: 671761 240771D

```

=====
Injection Date: 9/04/2019 11:04:10      Seq Line: 7
Sample Name: 671761 240771D           Location: Vial 77
Acq Operator: TNB                      Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.470	FM	233940.2	4.1395	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.485	FM	78954.8	4.5446	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
7.500	MF	185904.5	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

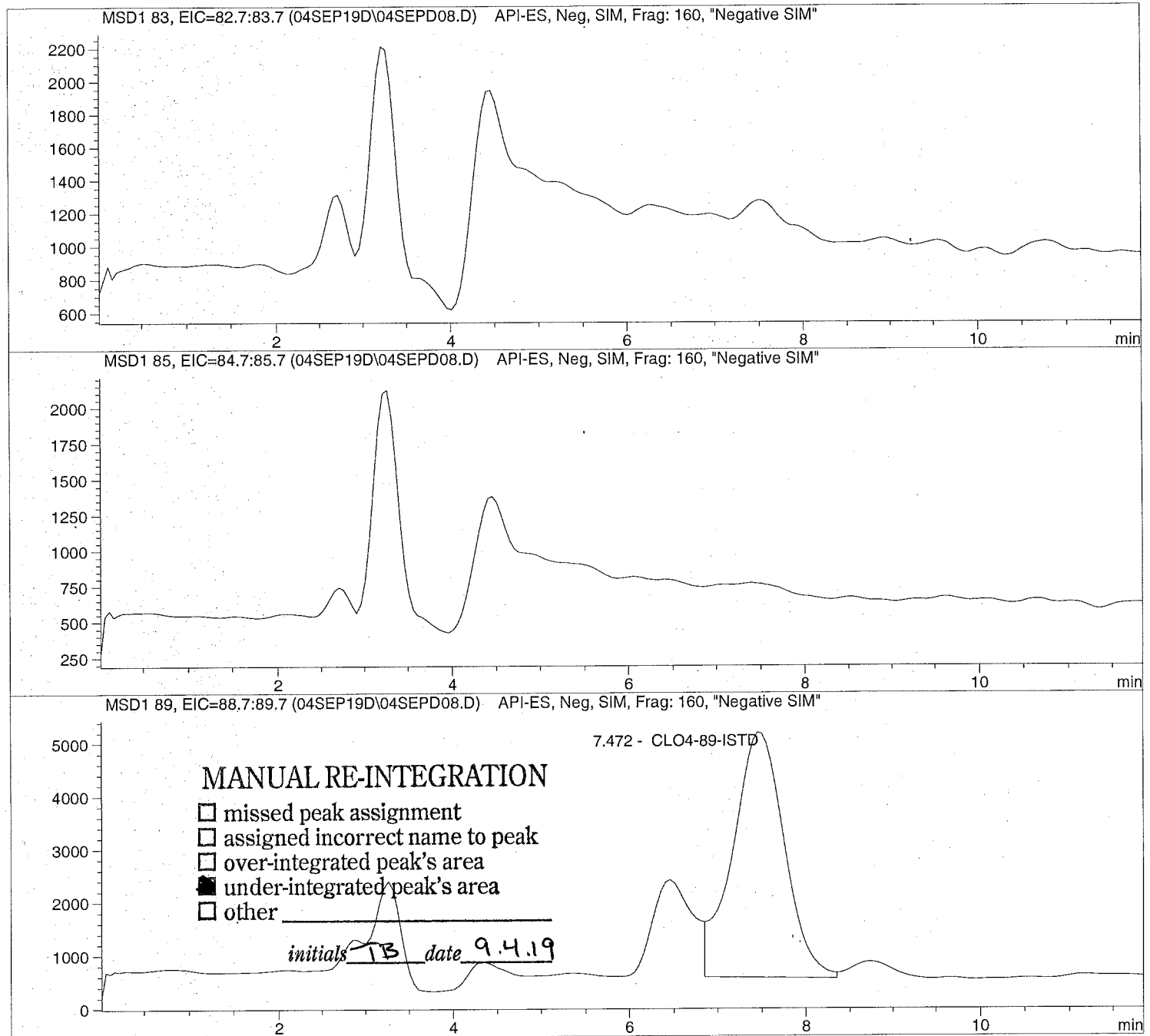
```

Injection Date: 9/04/2019 11:18:22  
Sample Name: 1924078001  
Acq Operator: TNB

Seq Line: 8  
Location: Vial 78  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



```

=====
Injection Date: 9/04/2019 11:18:22      Seq Line:      8
Sample Name:   1924078001              Location:      Vial 78
Acq Operator:  TNB                      Inj. No.:     1
                                           Inj. Vol.:    50 µl

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  9/4/2019 12:03:36

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
7.472	MF	185766.2	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

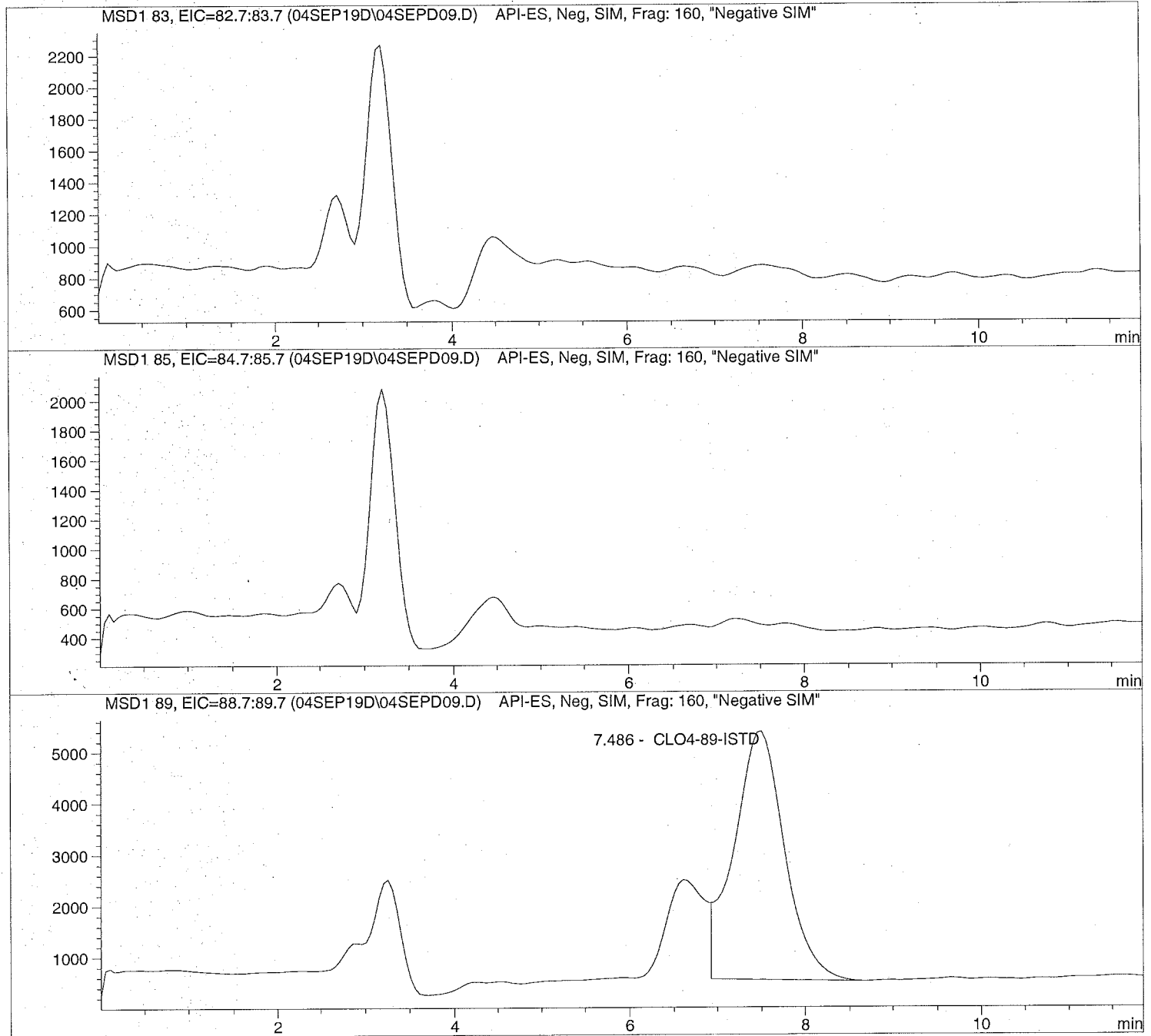
```

Injection Date: 9/04/2019 11:32:35  
Sample Name: 1925000001  
Acq Operator: TNB

Seq Line: 9  
Location: Vial 79  
Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



=====  
Injection Date: 9/04/2019 11:32:35 Seq Line: 9  
Sample Name: 1925000001 Location: Vial 79  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis

=====  
Sample Information  
=====

Sorted By: Signal  
Calib. Data Modified: Tue, 20. Aug. 2019, 10:15:00 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
7.486	FM	192863.5	5.0000	CLO4-89-ISTD

=====  
\*\*\* End of Report \*\*\*

Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD10.D

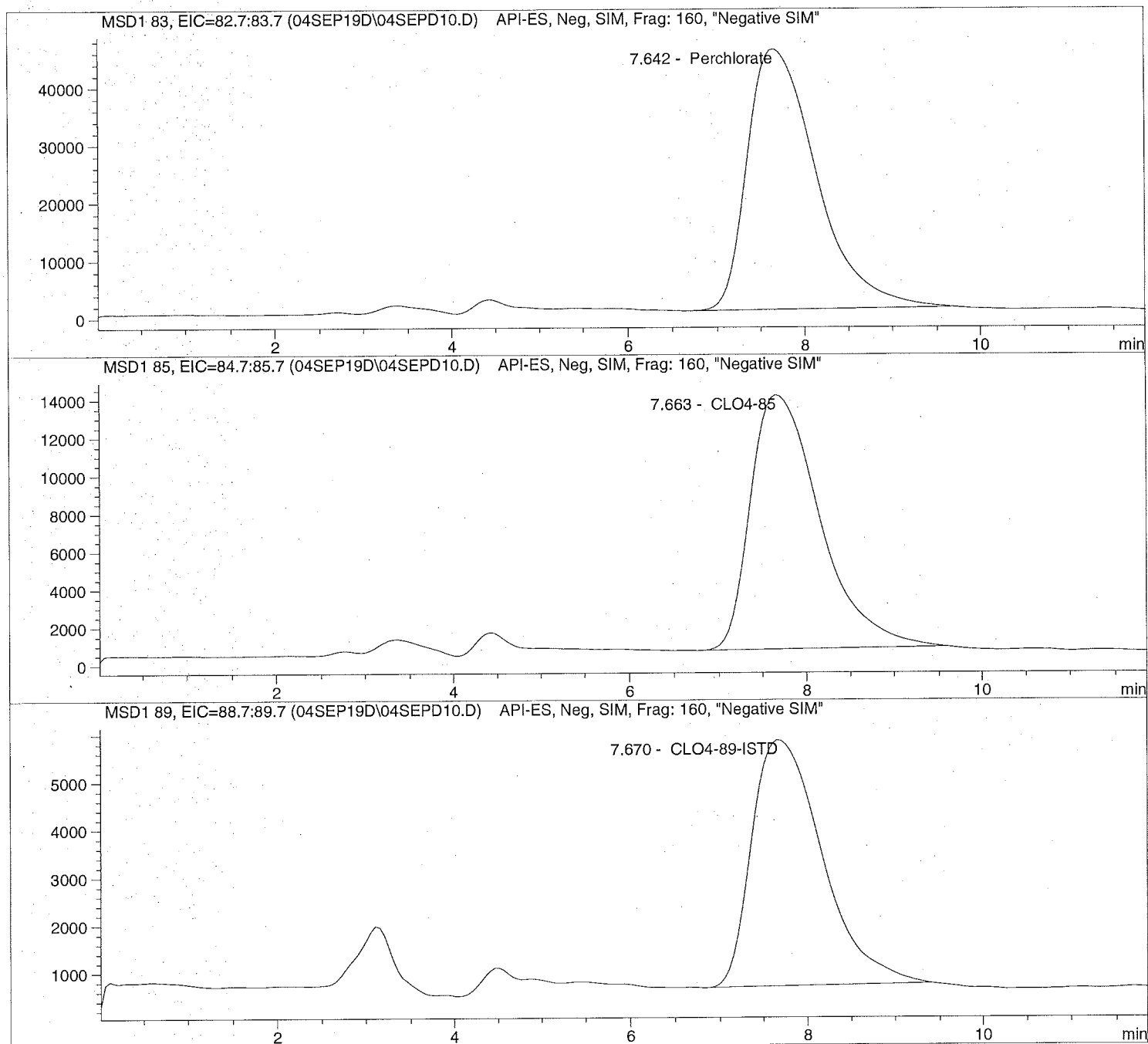
Sample Name: 671762 CCV@25

Injection Date: 9/04/2019 11:46:49  
Sample Name: 671762 CCV@25  
Acq Operator: TNB

Seq Line: 10  
Location: Vial 71  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

## Perchlorate analysis









**ALS Laboratory Group**  
ANALYTICAL CHEMISTRY & TESTING SERVICES

**Environmental Division**

# Raw Data

## Initial Calibration



=====  
 Calibration Table  
 =====

Perchlorate

Calib. Data Modified : 3/19/2019 2:35:19 PM

Calculate : Internal Standard  
 Based on : Peak Area

Rel. Reference Window : 20.000 %  
 Abs. Reference Window : 0.000 min  
 Rel. Non-ref. Window : 20.000 %  
 Abs. Non-ref. Window : 0.000 min

Use Multiplier & Dilution Factor with ISTDs  
 Uncalibrated Peaks : not reported  
 Partial Calibration : No recalibration if peaks missing

Curve Type : Quadratic (some peaks differ, see below)  
 Origin : Ignored (some peaks differ, see below)  
 Weight : Linear (Amnt) (some peaks differ, see below)

Recalibration Settings:  
 Average Response : Average all calibrations  
 Average Retention Time: Floating Average New 75%

Calibration Report Options :  
 Printout of recalibrations within a sequence:  
     Calibration Table after Recalibration  
     Normal Report after Recalibration  
 If the sequence is done with bracketing:  
     Results of first cycle (ending previous bracket)

Default Sample ISTD Information (if not set in sample table):

ISTD #	ISTD Amount	Name
1	5.00000	CLO4-89-ISTD

Signal 1: MSD1 83, EIC=82.7:83.7  
 Signal 2: MSD1 85, EIC=84.7:85.7  
 Signal 3: MSD1 89, EIC=88.7:89.7

RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp	Name
8.744	1 1	1.00000	7.76074e4	1.28854e-5	1	Perchlorate
	2	2.00000	1.35273e5	1.47849e-5		
	3	5.00000	3.37764e5	1.48033e-5		
	4	10.00000	6.83454e5	1.46316e-5		
	5	25.00000	2.08433e6	1.19943e-5		
	6	50.00000	4.13334e6	1.20968e-5		
	7	75.00000	5.99313e6	1.25143e-5		
8.755	2 1	1.00000	2.36780e4	4.22333e-5	1	CLO4-85
	2	2.00000	4.69486e4	4.25998e-5		
	3	5.00000	1.06124e5	4.71147e-5		
	4	10.00000	2.13523e5	4.68335e-5		
	5	25.00000	6.14295e5	4.06971e-5		
	6	50.00000	1.19814e6	4.17315e-5		
	7	75.00000	1.78355e6	4.20509e-5		
8.766	3 1	5.00000	2.73208e5	1.83011e-5	+I1	CLO4-89-ISTD
	2	5.00000	2.24886e5	2.22335e-5		
	3	5.00000	2.33196e5	2.14412e-5		
	4	5.00000	2.34454e5	2.13262e-5		
	5	5.00000	2.50568e5	1.99547e-5		
	6	5.00000	2.30977e5	2.16472e-5		



RetTime [min]	Lvl Sig	Amount	Area	Amt/Area	Ref Grp Name
7		5.00000	2.21504e5	2.25729e-5	

More compound-specific settings:

Compound: Perchlorate

Time Window : From 6.654 min To 12.544 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

Compound: CLO4-85

Time Window : From 6.650 min To 12.505 min  
 Curve Type : Quadratic  
 Origin : Ignored  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333

Compound: CLO4-89-ISTD

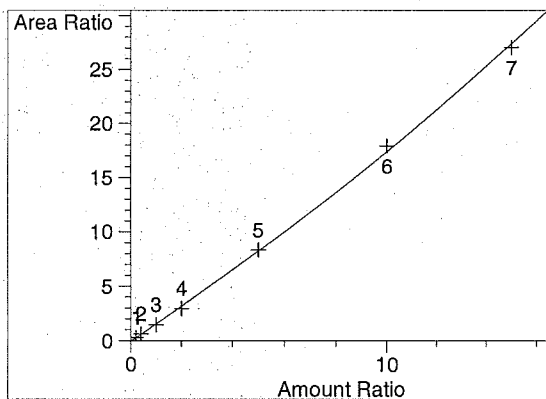
Time Window : From 6.659 min To 12.466 min  
 Curve Type : Linear  
 Origin : Included  
 Calibration Level Weights:/  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1

=====  
 Peak Sum Table  
 =====

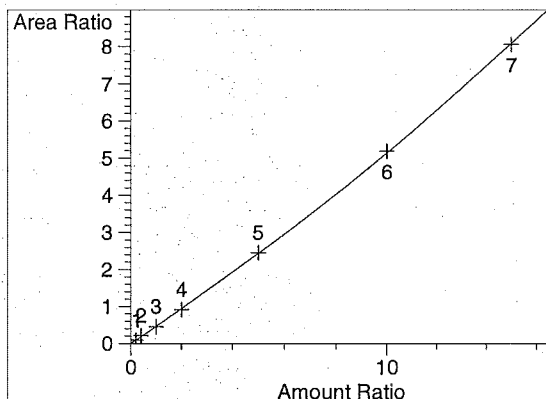
\*\*\*No Entries in table\*\*\*



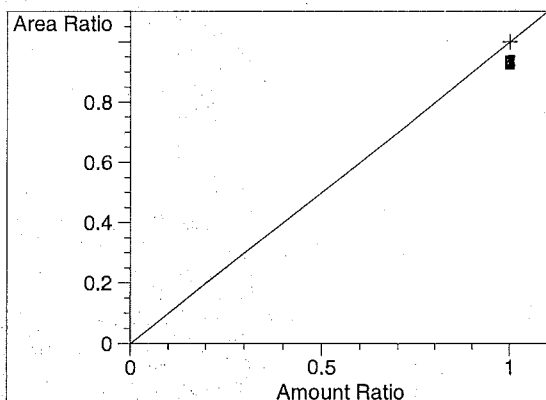
=====  
 Calibration Curves  
 =====



Perchlorate at exp. RT: 8.744  
 MSD1 83, EIC=82.7:83.7  
 Correlation: 0.99957  
 Residual Std. Dev.: 0.30744  
 Formula:  $y = ax^2 + bx + c$   
 a: 1.76988e-2  
 b: 1.56480  
 c: -4.92430e-2  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-85 at exp. RT: 8.755  
 MSD1 85, EIC=84.7:85.7  
 Correlation: 0.99983  
 Residual Std. Dev.: 0.03473  
 Formula:  $y = ax^2 + bx + c$   
 a: 5.13396e-3  
 b: 4.62055e-1  
 c: 4.97209e-4  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 0.5  
 Level 3 : 0.2  
 Level 4 : 0.1  
 Level 5 : 0.04  
 Level 6 : 0.02  
 Level 7 : 0.013333



CLO4-89-ISTD at exp. RT: 8.766  
 MSD1 89, EIC=88.7:89.7  
 Correlation: 1.00000  
 Residual Std. Dev.: 0.00000  
 Formula:  $y = mx + b$   
 m: 1.00000  
 b: 0.00000  
 x: Amount Ratio  
 y: Area Ratio  
 Calibration Level Weights:  
 Level 1 : 1  
 Level 2 : 1  
 Level 3 : 1  
 Level 4 : 1  
 Level 5 : 1  
 Level 6 : 1  
 Level 7 : 1



## Batch Review Method:

C:\HPCHEM\1\METHODS\CLO4-DP2.M

['#' ==&gt; Run has not been reprocessed with Batch Review Method

['\*' ==&gt; 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\19MAR19\19MARI03.D

Sample Name: CLO4@ 1.0ug/L

Injection Date: 3/19/2019 09:39:40

Seq Line: 3

Sample Name: CLO4@ 1.0ug/L

Location: Vial 73

Acq Operator: TNB

Inj. No.: 1

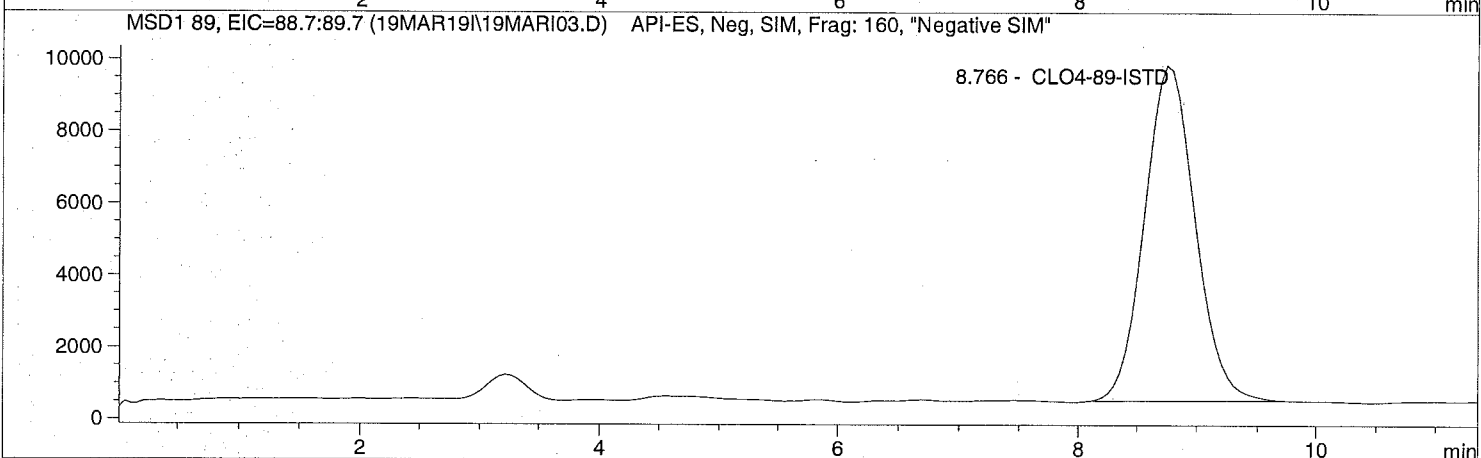
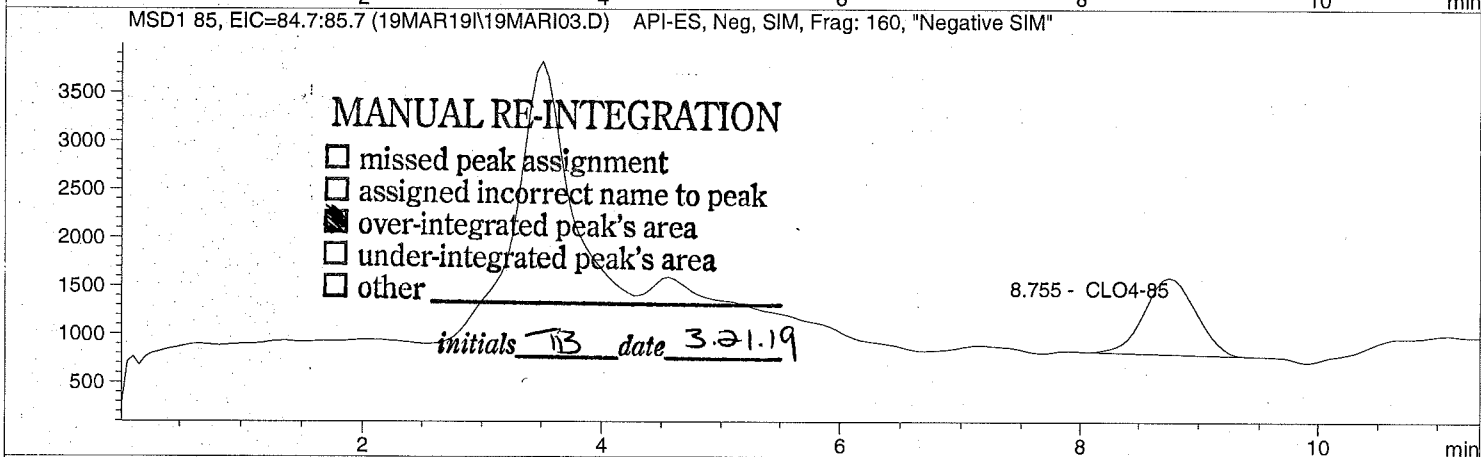
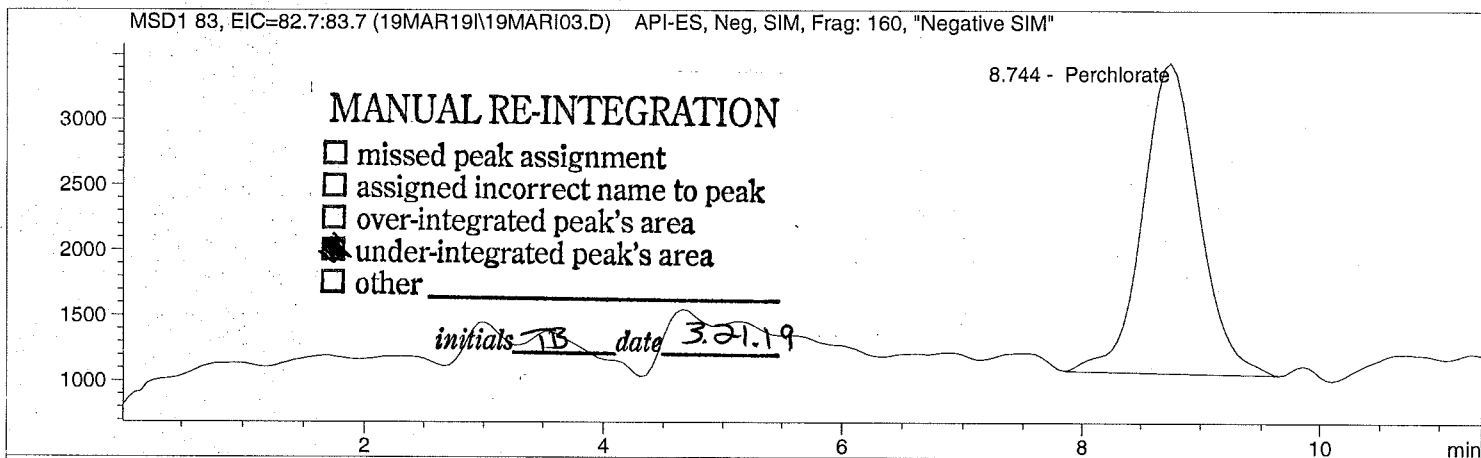
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\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

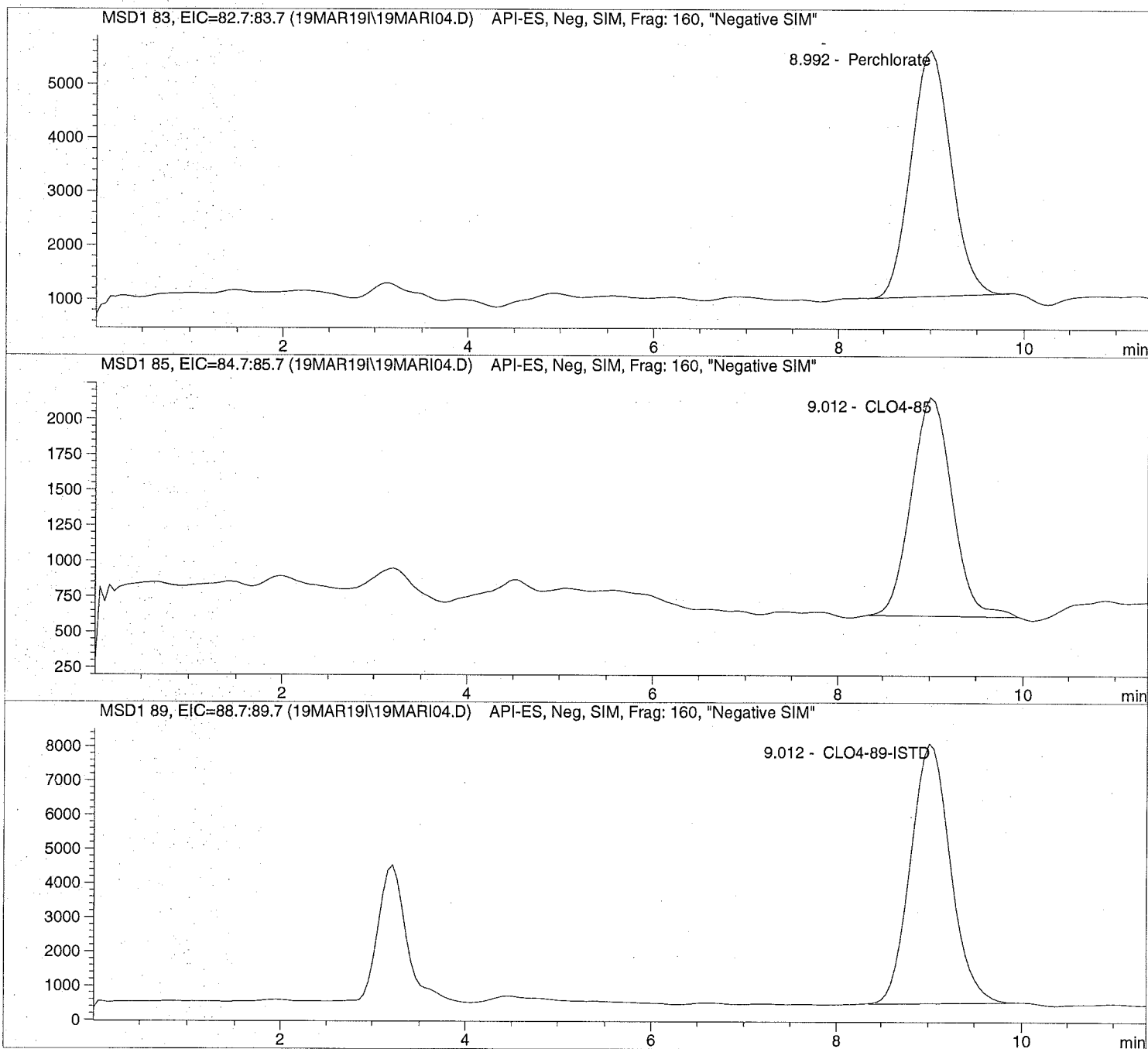
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\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

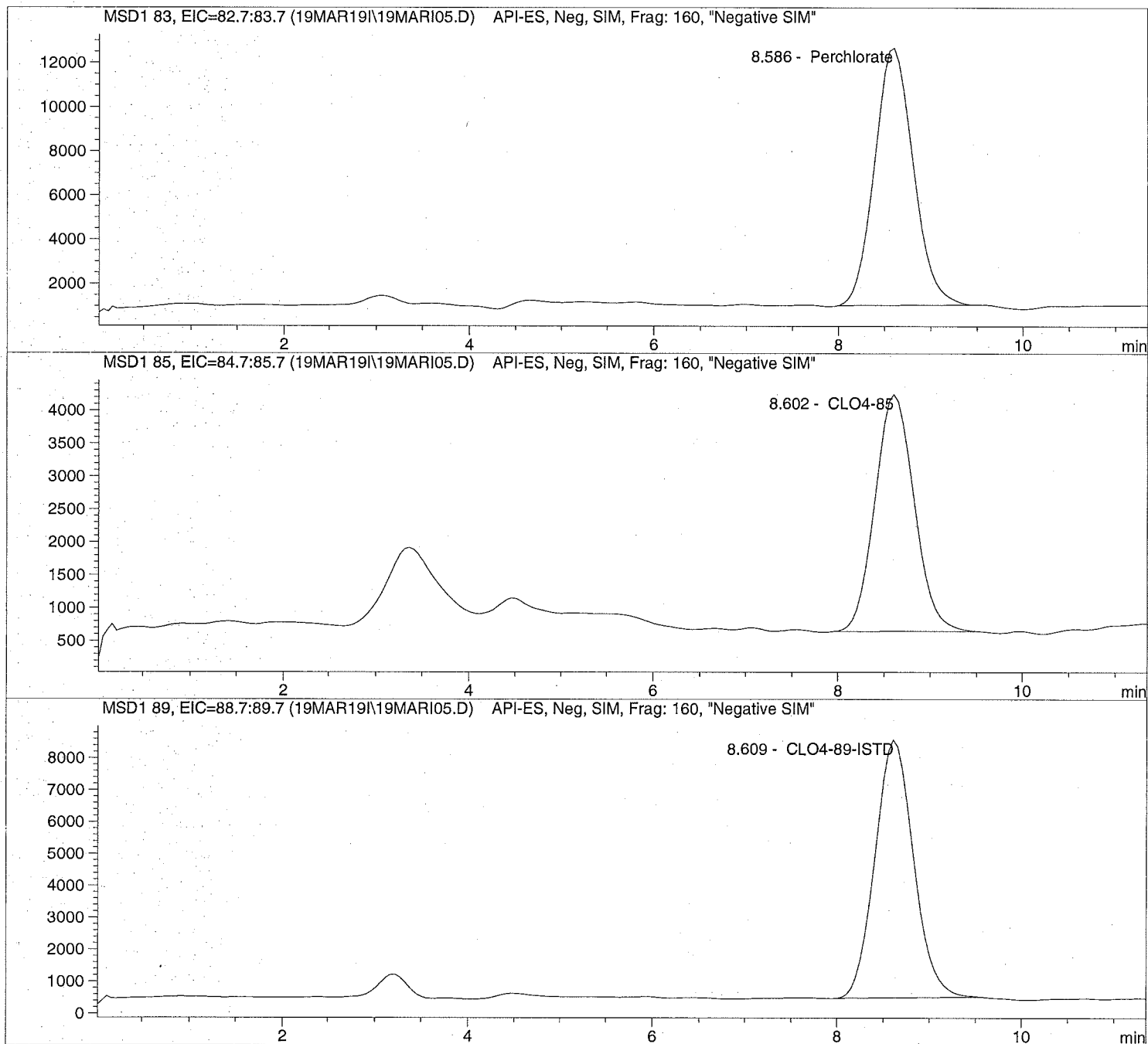
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\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\19MAR19\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

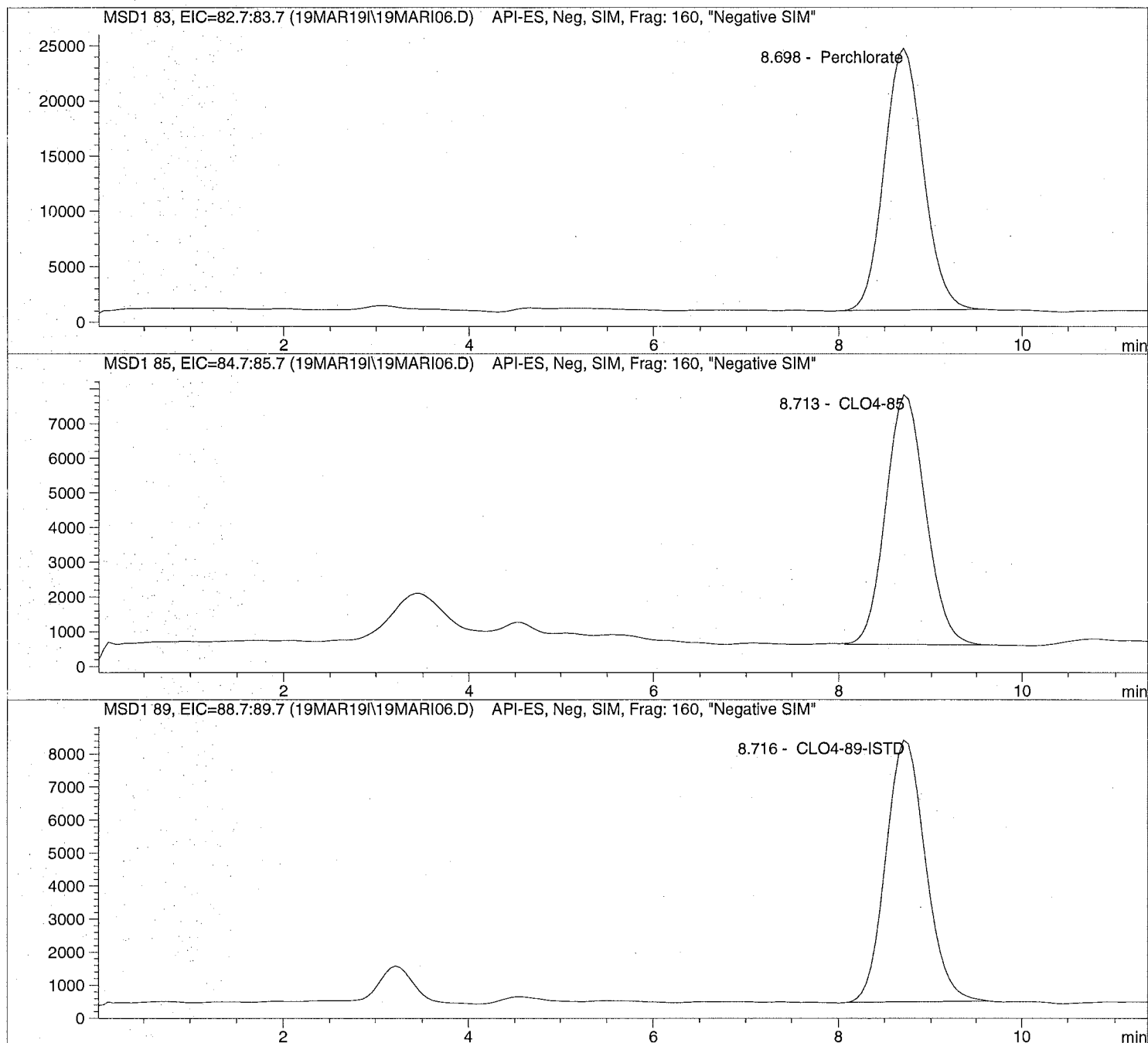
Inj. Vol.: 30 µl

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:  10.0000
=====

```

```

=====
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

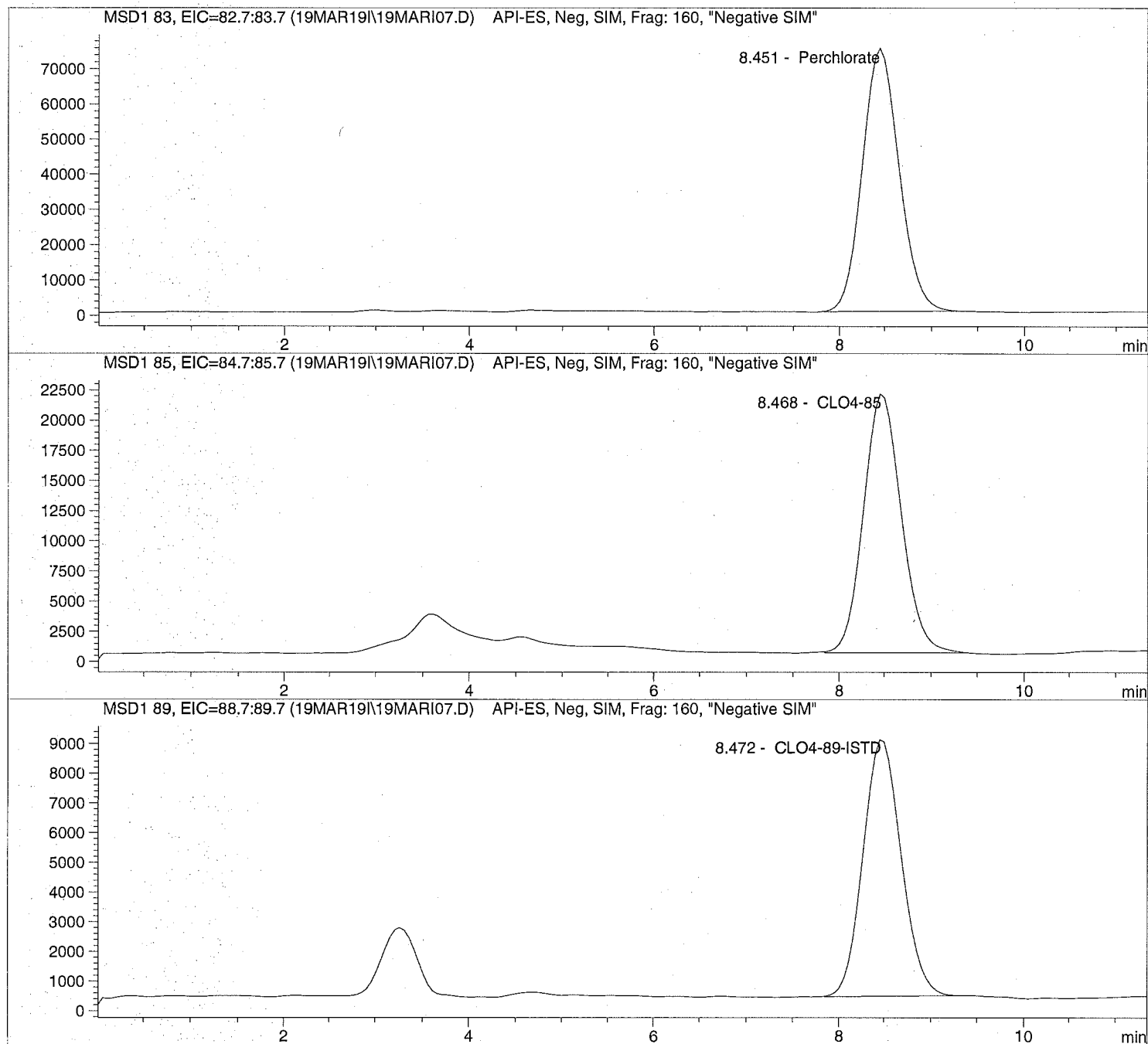
Inj. Vol.: 30  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 3/19/2019 14:35:22

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\19MAR19I\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\19MAR19\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

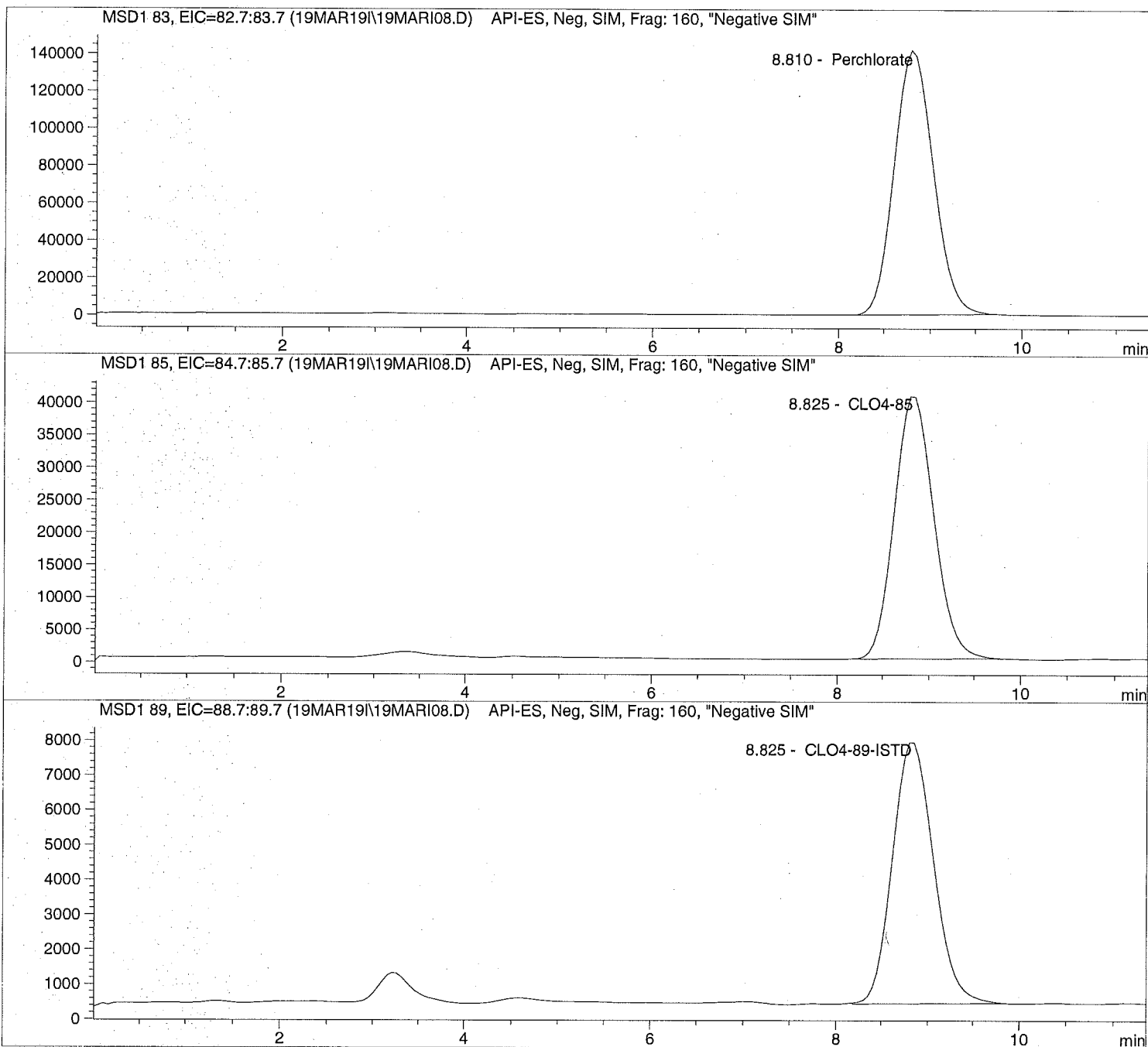
Inj. Vol.: 30 µl

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

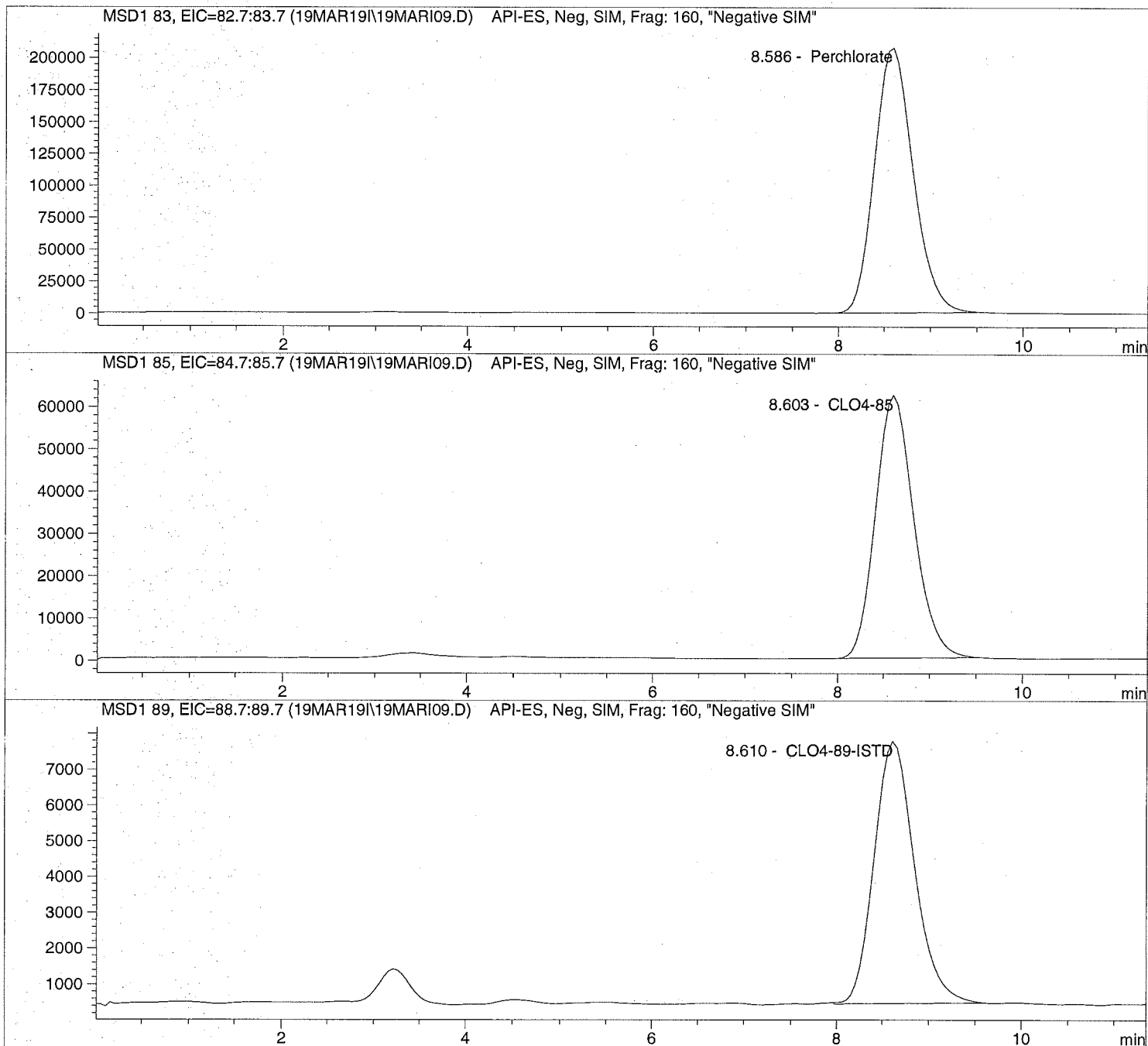
Inj. Vol.: 30 µl

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

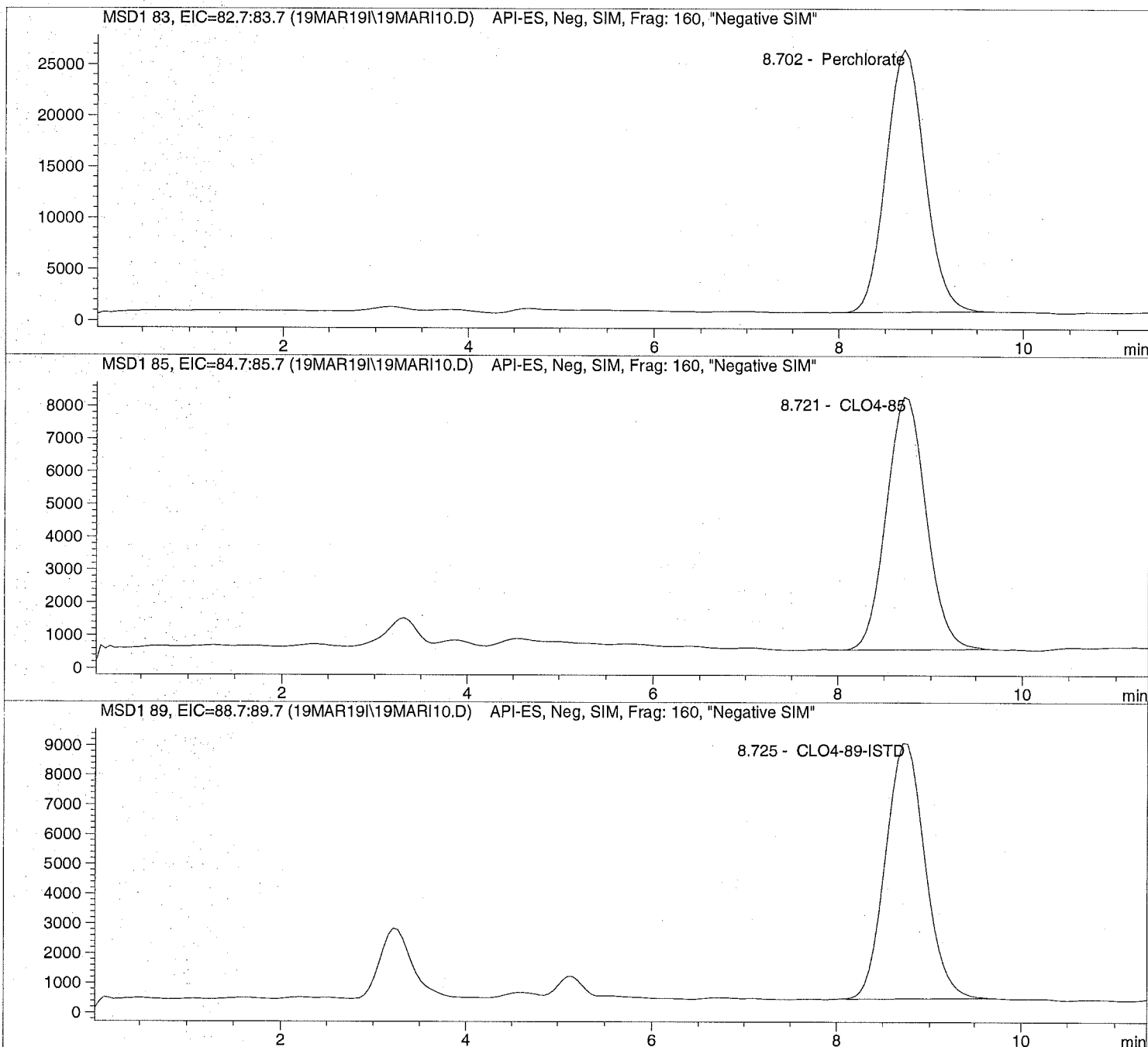
Inj. Vol.: 30 µl

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

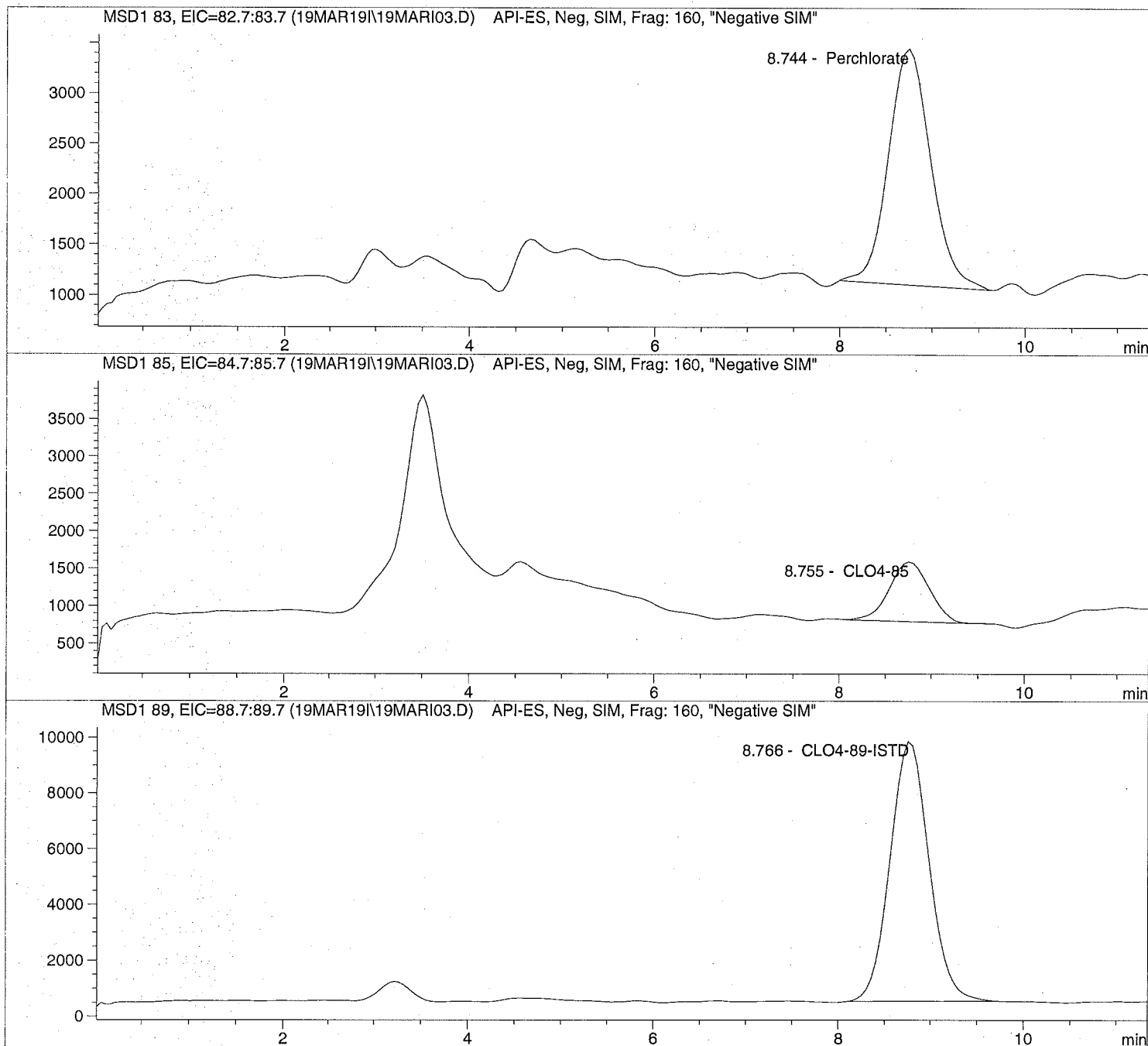
Inj. Vol.: 30 µl

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 \*\*\*



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD05.D

Sample Name: 1924077001

Injection Date: 9/04/2019 10:35:47

Seq Line: 5

Sample Name: 1924077001

Location: Vial 75

Acq Operator: TNB

Inj. No.: 1

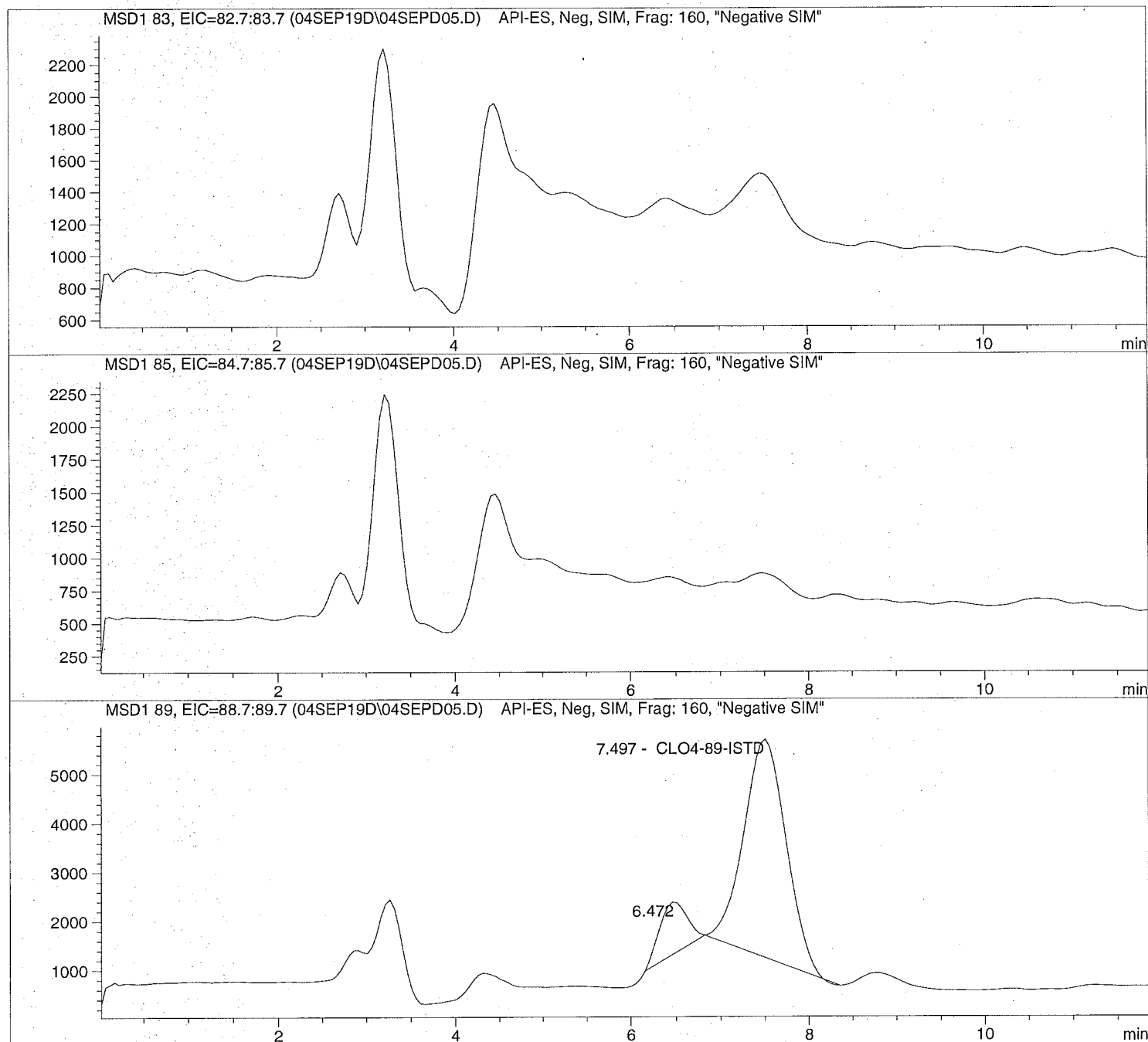
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD05.D

Sample Name: 1924077001

```

=====
Injection Date: 9/04/2019 10:35:47      Seq Line: 5
Sample Name: 1924077001                Location: Vial 75
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.472	PB	22484.4	0.0000	
7.497	VBA	149227.0	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```

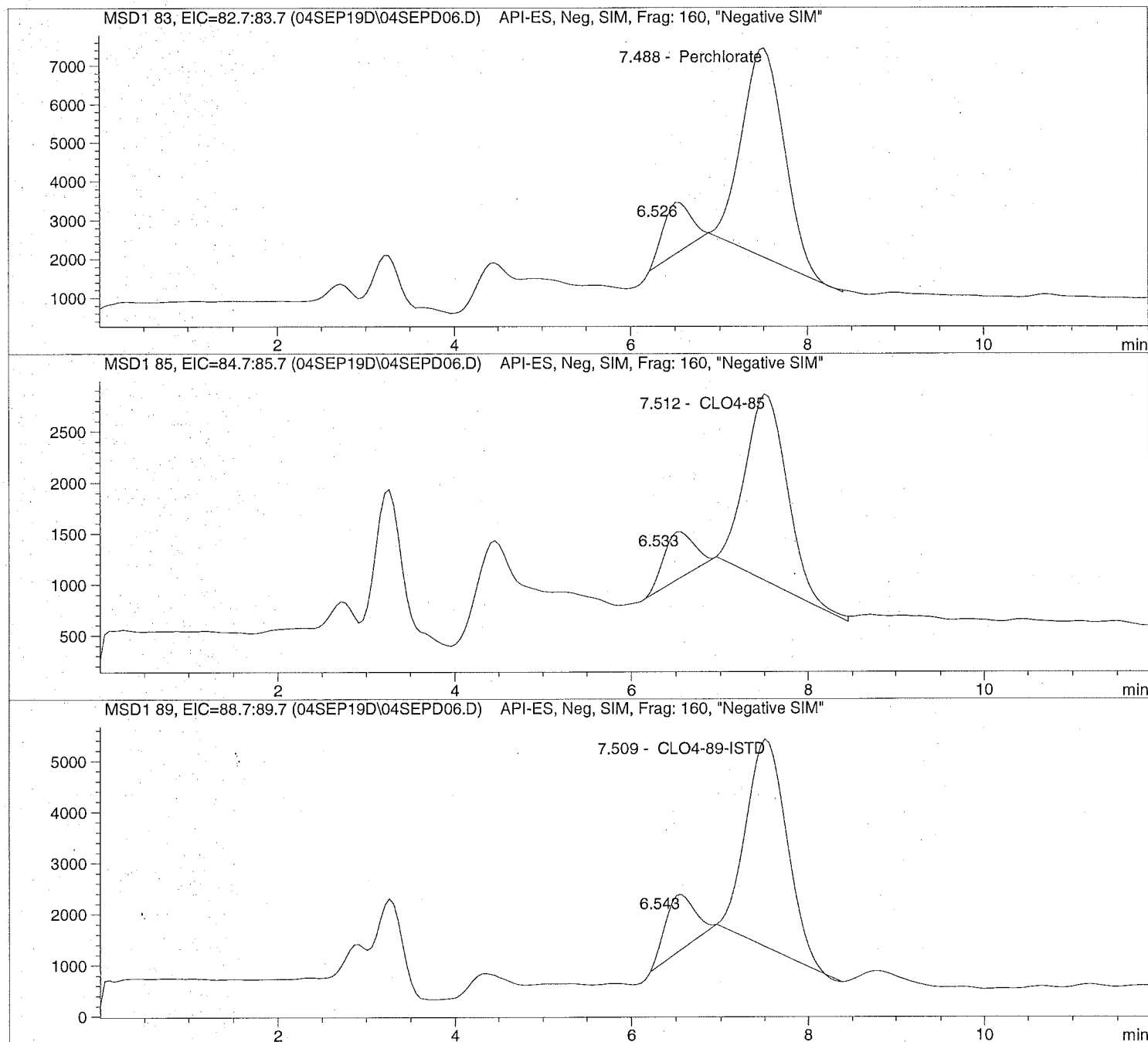


Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD06.D Sample Name: 671760 240771S

=====  
Injection Date: 9/04/2019 10:49:59 Seq Line: 6  
Sample Name: 671760 240771S Location: Vial 76  
Acq Operator: TNB Inj. No.: 1  
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

## Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD06.D Sample Name: 671760 240771S

```

=====
Injection Date: 9/04/2019 10:49:59      Seq Line: 6
Sample Name: 671760 240771S           Location: Vial 76
Acq Operator: TNB                      Inj. No.: 1
                                         Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.526	PB	28324.4	0.0000	
7.488	VBA	181668.4	4.5246	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.533	PB	11043.3	0.0000	
7.512	VBA	61081.2	4.9653	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.543	PB	25427.6	0.0000	
7.509	VBA	131523.7	5.0000	CLO4-89-ISTD

```

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*** End of Report ***
=====

```



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD07.D

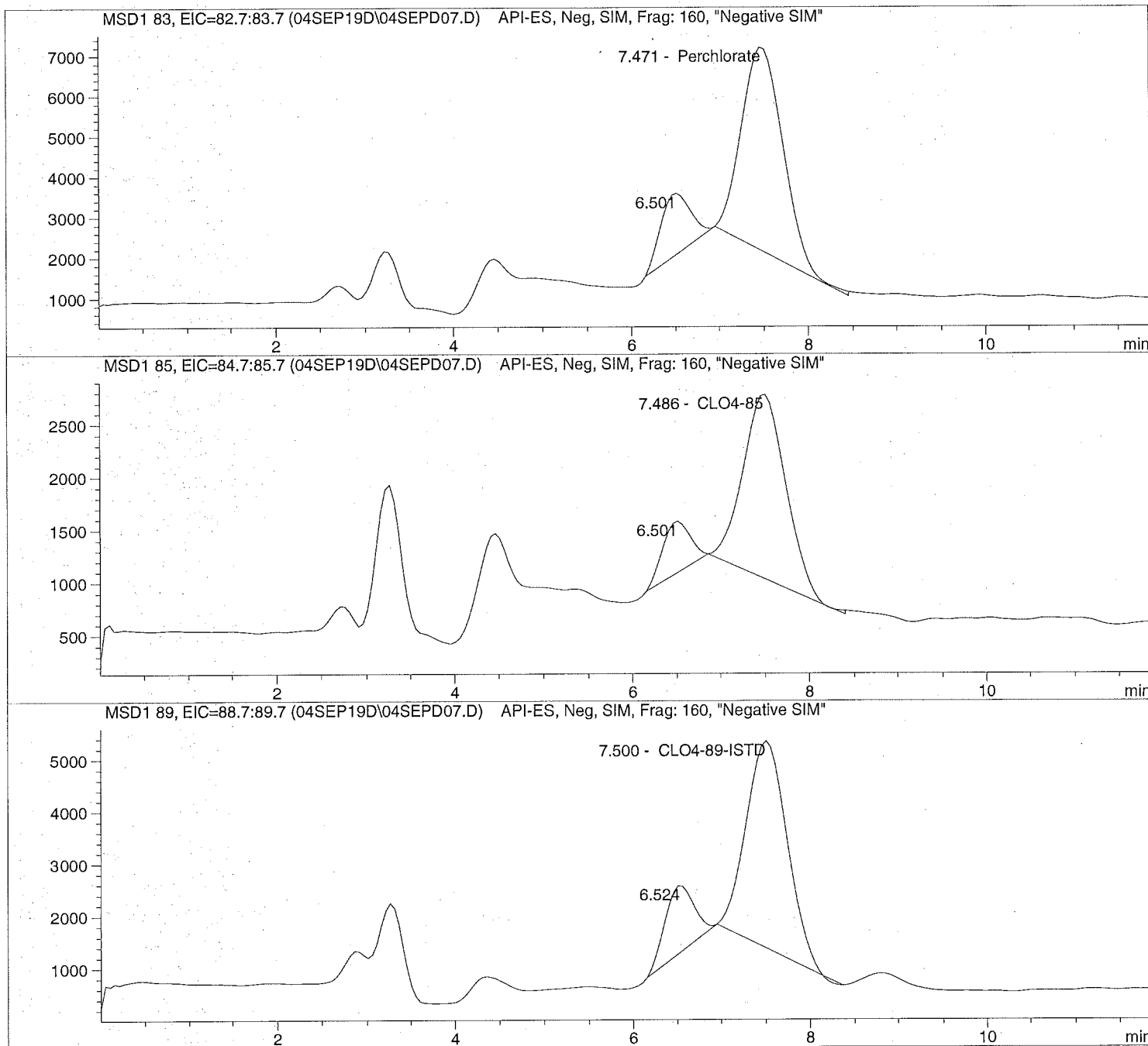
Sample Name: 671761 240771D

Injection Date: 9/04/2019 11:04:10  
 Sample Name: 671761 240771D  
 Acq Operator: TNB

Seq Line: 7  
 Location: Vial 77  
 Inj. No.: 1  
 Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M  
 Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
 Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD07.D Sample Name: 671761 240771D

```

=====
Injection Date: 9/04/2019 11:04:10      Seq Line: 7
Sample Name: 671761 240771D           Location: Vial 77
Acq Operator: TNB                      Inj. No.: 1
                                         Inj. Vol.: 50 µl

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36

```

## Perchlorate analysis

```

=====
Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.501	PB	36136.0	0.0000	
7.471	VBA	163374.0	4.2267	Perchlorate

Signal2: MSD1 85, EIC=84.7:85.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.501	PB	10843.8	0.0000	
7.486	VBA	58416.5	4.9175	CLO4-85

Signal3: MSD1 89, EIC=88.7:89.7

RT [min]	Type	Area	Amount [ug/sample]	Compound Name
6.524	PB	30077.9	0.0000	
7.500	VBA	127021.3	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

```



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD08.D

Sample Name: 1924078001

Injection Date: 9/04/2019 11:18:22

Seq Line: 8

Sample Name: 1924078001

Location: Vial 78

Acq Operator: TNB

Inj. No.: 1

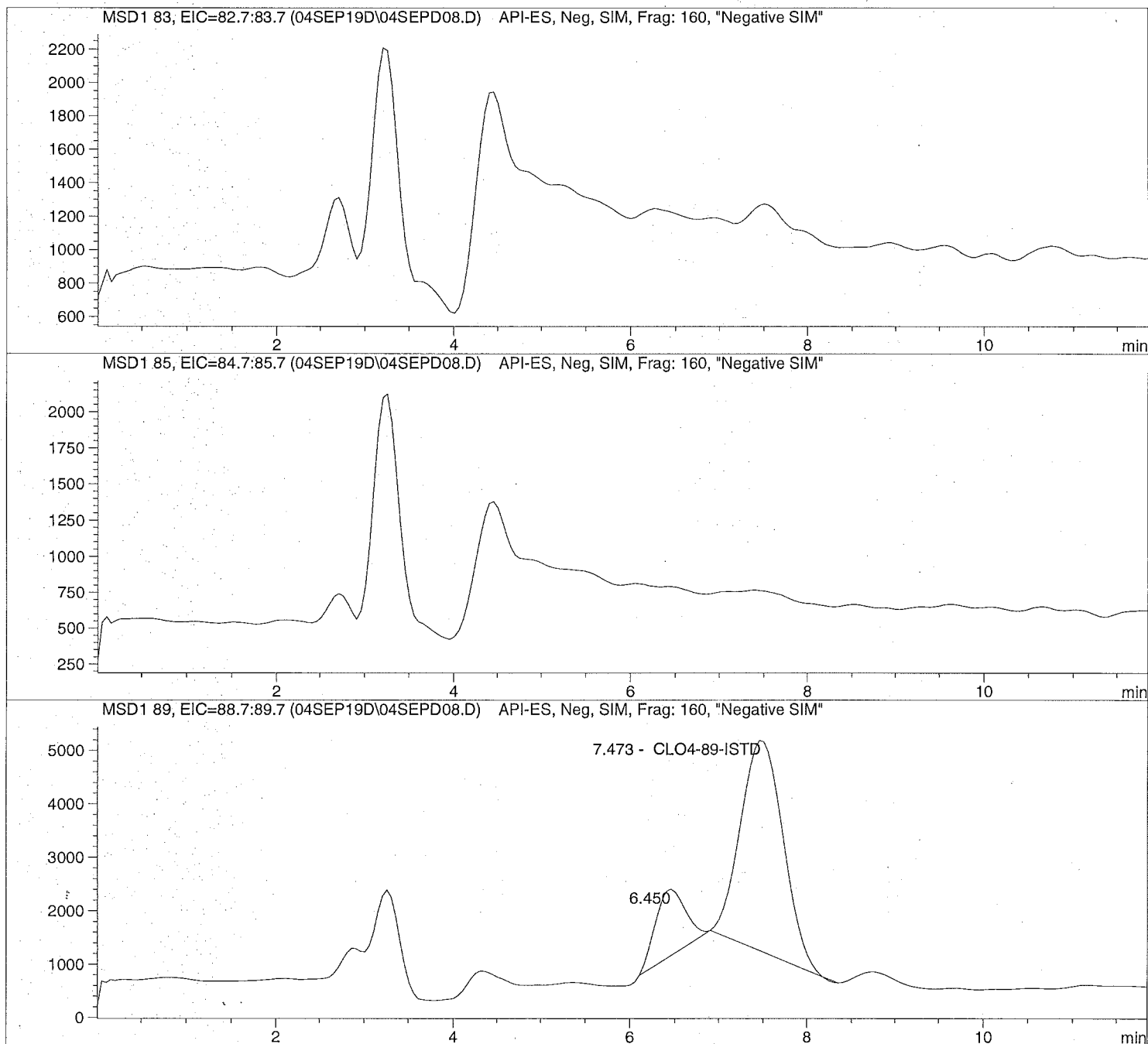
Inj. Vol.: 50 µl

Acq. Method: CLO4-AQN.M

Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M

Last Changed: 9/4/2019 12:03:36

Perchlorate analysis





Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD08.D

Sample Name: 1924078001

```

=====
Injection Date: 9/04/2019 11:18:22      Seq Line:      8
Sample Name:   1924078001                Location:      Vial 78
Acq Operator:  TNB                       Inj. No.:     1
                                           Inj. Vol.:    50 µl

```

```

Acq. Method:   CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed:  9/4/2019 12:03:36

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By:      Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.450	PB	29359.0	0.0000	
7.473	VBA	133454.4	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***

```



Data file: C:\HPCHEM\1\DATA\04SEP19D\04SEPD09.D

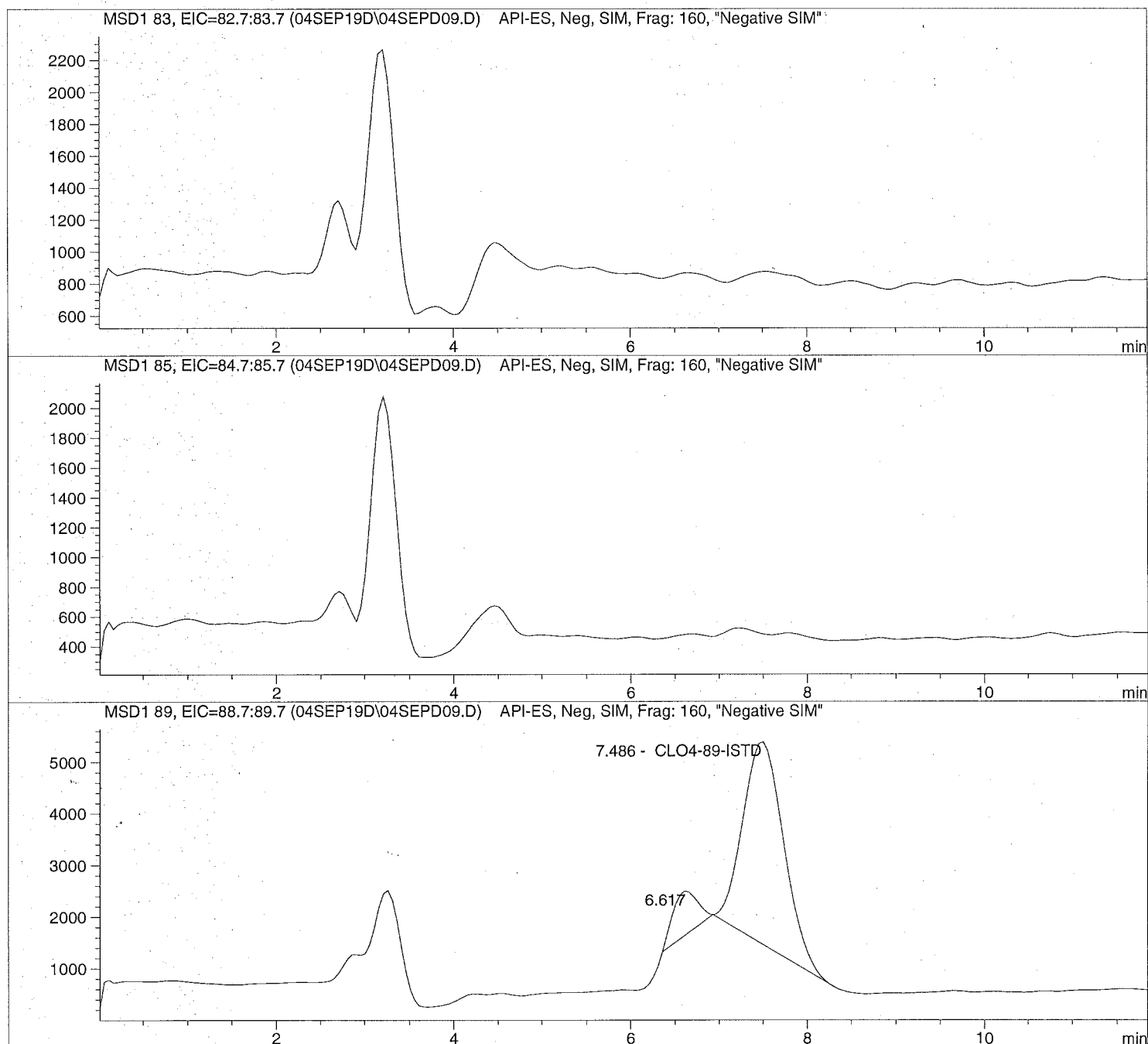
Sample Name: 1925000001

Injection Date: 9/04/2019 11:32:35  
Sample Name: 1925000001  
Acq Operator: TNB

Seq Line: 9  
Location: Vial 79  
Inj. No.: 1  
Inj. Vol.: 50  $\mu$ l

Acq. Method: CLO4-AQN.M  
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M  
Last Changed: 9/4/2019 12:03:36

Perchlorate analysis



Data file: C:\HPCHEM\1\DATA\04SEP19\04SEPD09.D

Sample Name: 1925000001

```

=====
Injection Date: 9/04/2019 11:32:35      Seq Line: 9
Sample Name: 1925000001                 Location: Vial 79
Acq Operator: TNB                       Inj. No.: 1
                                           Inj. Vol.: 50 µl
=====

```

```

Acq. Method: CLO4-AQN.M
Analysis Method: C:\HPCHEM\1\METHODS\CLO4-DP2.M
Last Changed: 9/4/2019 12:03:36
=====

```

## Perchlorate analysis

```

=====
                          Sample Information
=====

```

```

Sorted By: Signal
Calib. Data Modified: Tue, 20. Aug. 2019,10:15:00 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
6.617	BB	16665.3	0.0000	
7.486	VBA	127478.8	5.0000	CLO4-89-ISTD

```

=====
*** End of Report ***
=====

```





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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

August 29, 2019

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS19081048**

Laboratory Results for: **Longhorn GW Treatment Plant**

Dear Marcia,

ALS Environmental received 2 sample(s) on Aug 21, 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,

A handwritten signature in black ink, appearing to read 'Raj. P. Modashia', enclosed in a simple oval scribble.

Generated By: DAYNA.FISHER  
RJ Modashia  
Project Manager

ALS Houston, US

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19081048

**SAMPLE SUMMARY**

---

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19081048-01	LH18/24-SP650_082019	Water		20-Aug-2019 14:00	21-Aug-2019 08:45	<input type="checkbox"/>
HS19081048-02	Trip Blank	Water	C&G- 101618-289	20-Aug-2019 00:00	21-Aug-2019 08:45	<input type="checkbox"/>

---

**ALS Houston, US**

Date: 29-Aug-19

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**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**Work Order:** HS19081048

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**CASE NARRATIVE**

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**GCMS Volatiles by Method SW8260****Batch ID: R344960****Sample ID: LH18/24-SP650\_082019 (HS19081048-01MS)**

- MS and/or MSD recovered outside control limits for select target compounds.

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**WetChemistry by Method SW9056****Batch ID: R345140**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

## ALS Houston, US

Date: 29-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_082019  
 Collection Date: 20-Aug-2019 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19081048  
 Lab ID:HS19081048-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						
<b>8260C</b>								Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	26-Aug-2019 14:02
<b>1,2-Dichloroethane</b>	<b>0.53</b>	<b>J</b>	<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	<b>1</b>	26-Aug-2019 14:02
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 14:02
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	26-Aug-2019 14:02
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	26-Aug-2019 14:02
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 14:02
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	26-Aug-2019 14:02
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	26-Aug-2019 14:02
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 14:02
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 14:02
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 14:02
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	26-Aug-2019 14:02
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	26-Aug-2019 14:02
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 29-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: LH18/24-SP650\_082019  
 Collection Date: 20-Aug-2019 14:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19081048  
 Lab ID:HS19081048-01  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
<b>cis-1,2-Dichloroethene</b>	<b>2.6</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	26-Aug-2019 14:02	
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	26-Aug-2019 14:02	
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	26-Aug-2019 14:02	
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	26-Aug-2019 14:02	
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
<b>Trichloroethene</b>	<b>1.2</b>		<b>0.20</b>	<b>0.50</b>	<b>1.0</b>	<b>UG/L</b>	1	26-Aug-2019 14:02	
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 14:02	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>85.5</i>			<b>0</b>	<i>81-118</i>	<b>%REC</b>	1	26-Aug-2019 14:02	
<i>Surr: 4-Bromofluorobenzene</i>	<i>103</i>			<b>0</b>	<i>85-114</i>	<b>%REC</b>	1	26-Aug-2019 14:02	
<i>Surr: Dibromofluoromethane</i>	<i>91.8</i>			<b>0</b>	<i>80-119</i>	<b>%REC</b>	1	26-Aug-2019 14:02	
<i>Surr: Toluene-d8</i>	<i>101</i>			<b>0</b>	<i>89-112</i>	<b>%REC</b>	1	26-Aug-2019 14:02	
<b>ANIONS BY SW9056A</b>		<b>Method:SW9056</b>							Analyst: KMU
<b>Chloride</b>	<b>444</b>		<b>2.00</b>	<b>5.00</b>	<b>5.00</b>	<b>mg/L</b>	10	27-Aug-2019 15:17	
<b>Sulfate</b>	<b>36.7</b>		<b>2.00</b>	<b>5.00</b>	<b>5.00</b>	<b>mg/L</b>	10	27-Aug-2019 15:17	

Note: See Qualifiers Page for a list of qualifiers and their explanation.



## ALS Houston, US

Date: 29-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: Trip Blank  
 Collection Date: 20-Aug-2019 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19081048  
 Lab ID:HS19081048-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>VOLATILES ORGANICS BY METHOD</b>		<b>Method:SW8260</b>						
<b>8260C</b>								Analyst: PC
1,1,1,2-Tetrachloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,1,1-Trichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,1,2,2-Tetrachloroethane	0.50	U	0.50	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,1,2-Trichloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,1-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,1-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,1-Dichloropropene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,2,3-Trichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,2,3-Trichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,2,4-Trichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,2,4-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,2-Dibromo-3-chloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,2-Dibromoethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,2-Dichlorobenzene	0.50	U	0.50	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,2-Dichloroethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,2-Dichloropropane	0.50	U	0.50	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,3,5-Trimethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,3-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,3-Dichloropropane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38
1,4-Dichlorobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 13:38
2,2-Dichloropropane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38
2-Butanone	1.0	U	0.50	1.0	2.0	UG/L	1	26-Aug-2019 13:38
2-Chlorotoluene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38
2-Hexanone	1.0	U	1.0	1.0	2.0	UG/L	1	26-Aug-2019 13:38
4-Chlorotoluene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 13:38
4-Isopropyltoluene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38
4-Methyl-2-pentanone	1.0	U	0.70	1.0	2.0	UG/L	1	26-Aug-2019 13:38
Acetone	1.0	U	0.40	1.0	2.0	UG/L	1	26-Aug-2019 13:38
Benzene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38
Bromobenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 13:38
Bromochloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38
Bromodichloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38
Bromoform	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 13:38
Bromomethane	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 13:38
Carbon disulfide	1.0	U	0.60	1.0	2.0	UG/L	1	26-Aug-2019 13:38
Carbon tetrachloride	0.50	U	0.50	0.50	1.0	UG/L	1	26-Aug-2019 13:38
Chlorobenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38
Chloroethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38
Chloroform	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38

Note: See Qualifiers Page for a list of qualifiers and their explanation.

## ALS Houston, US

Date: 29-Aug-19

Client: Bhate Environmental Associates, Inc.  
 Project: Longhorn GW Treatment Plant  
 Sample ID: Trip Blank  
 Collection Date: 20-Aug-2019 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS19081048  
 Lab ID:HS19081048-02  
 Matrix:Water

ANALYSES	RESULT	QUAL	DL	LOD	LOQ	UNITS	DILUTION FACTOR	DATE ANALYZED	
<b>VOLATILES ORGANICS BY METHOD 8260C</b>		<b>Method:SW8260</b>							Analyst: PC
Chloromethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
cis-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
cis-1,3-Dichloropropene	0.50	U	0.10	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
Dibromochloromethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
Dibromomethane	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
Dichlorodifluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
Ethylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
Hexachlorobutadiene	1.0	U	1.0	1.0	1.0	UG/L	1	26-Aug-2019 13:38	
Isopropylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
m,p-Xylene	1.0	U	0.50	1.0	2.0	UG/L	1	26-Aug-2019 13:38	
Methylene chloride	1.0	U	0.40	1.0	2.0	UG/L	1	26-Aug-2019 13:38	
n-Butylbenzene	0.50	U	0.40	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
n-Propylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
Naphthalene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
o-Xylene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
sec-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
Styrene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
tert-Butylbenzene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
Tetrachloroethene	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
Toluene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
trans-1,2-Dichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
trans-1,3-Dichloropropene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
Trichloroethene	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
Trichlorofluoromethane	0.50	U	0.30	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
Vinyl chloride	0.50	U	0.20	0.50	1.0	UG/L	1	26-Aug-2019 13:38	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>85.4</i>			<i>0</i>	<i>81-118</i>	<i>%REC</i>	<i>1</i>	<i>26-Aug-2019 13:38</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>105</i>			<i>0</i>	<i>85-114</i>	<i>%REC</i>	<i>1</i>	<i>26-Aug-2019 13:38</i>	
<i>Surr: Dibromofluoromethane</i>	<i>91.8</i>			<i>0</i>	<i>80-119</i>	<i>%REC</i>	<i>1</i>	<i>26-Aug-2019 13:38</i>	
<i>Surr: Toluene-d8</i>	<i>103</i>			<i>0</i>	<i>89-112</i>	<i>%REC</i>	<i>1</i>	<i>26-Aug-2019 13:38</i>	

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Houston, US

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081048

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID:</b> R344960 ( 0 )		<b>Test Name :</b> VOLATILES ORGANICS BY METHOD 8260C			<b>Matrix:</b> Water	
HS19081048-01	LH18/24-SP650_082019	20 Aug 2019 14:00			26 Aug 2019 14:02	1
HS19081048-02	Trip Blank	20 Aug 2019 00:00			26 Aug 2019 13:38	1
<b>Batch ID:</b> R345140 ( 0 )		<b>Test Name :</b> ANIONS BY SW9056A			<b>Matrix:</b> Water	
HS19081048-01	LH18/24-SP650_082019	20 Aug 2019 14:00			27 Aug 2019 15:17	10



## ALS Houston, US

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081048

## QC BATCH REPORT

Batch ID: R344960 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MBLK	Sample ID: VBLKW-190826	Units: UG/L			Analysis Date: 26-Aug-2019 12:50					
Client ID:	Run ID: VOA6_344960	SeqNo: 5224035	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	1.0	2.0								U
Carbon tetrachloride	0.50	1.0								U
Chlorobenzene	0.50	1.0								U
Chloroethane	0.50	1.0								U
Chloroform	0.50	1.0								U
Chloromethane	0.50	1.0								U
cis-1,2-Dichloroethene	0.50	1.0								U
cis-1,3-Dichloropropene	0.50	1.0								U
Dibromochloromethane	0.50	1.0								U
Dibromomethane	0.50	1.0								U
Dichlorodifluoromethane	0.50	1.0								U
Ethylbenzene	0.50	1.0								U
Hexachlorobutadiene	1.0	1.0								U
Isopropylbenzene	0.50	1.0								U
m,p-Xylene	1.0	2.0								U
Methylene chloride	1.0	2.0								U
Naphthalene	0.50	1.0								U
n-Butylbenzene	0.50	1.0								U
n-Propylbenzene	0.50	1.0								U
o-Xylene	0.50	1.0								U
sec-Butylbenzene	0.50	1.0								U
Styrene	0.50	1.0								U
tert-Butylbenzene	0.50	1.0								U
Tetrachloroethene	0.50	1.0								U
Toluene	0.50	1.0								U
trans-1,2-Dichloroethene	0.50	1.0								U
trans-1,3-Dichloropropene	0.50	1.0								U
Trichloroethene	0.50	1.0								U
Trichlorofluoromethane	0.50	1.0								U
Vinyl chloride	0.50	1.0								U
Surr: 1,2-Dichloroethane-d4	42.67	1.0	50	0	85.3	81 - 118				
Surr: 4-Bromofluorobenzene	50.77	1.0	50	0	102	85 - 114				
Surr: Dibromofluoromethane	45.51	1.0	50	0	91.0	80 - 119				
Surr: Toluene-d8	51.73	1.0	50	0	103	89 - 112				

ALS Houston, US

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081048

**QC BATCH REPORT**

Batch ID: R344960 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS	Sample ID: VLCSW-190826	Units: UG/L			Analysis Date: 26-Aug-2019 12:02					
Client ID:	Run ID: VOA6_344960	SeqNo: 5224034	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	18.88	1.0	20	0	94.4	78 - 124				
1,1,1-Trichloroethane	18.39	1.0	20	0	91.9	74 - 131				
1,1,2,2-Tetrachloroethane	19.26	1.0	20	0	96.3	71 - 121				
1,1,2-Trichloroethane	18.94	1.0	20	0	94.7	80 - 119				
1,1-Dichloroethane	19.23	1.0	20	0	96.1	77 - 125				
1,1-Dichloroethene	20.76	1.0	20	0	104	71 - 131				
1,1-Dichloropropene	18.29	1.0	20	0	91.5	78 - 125				
1,2,3-Trichlorobenzene	18.64	1.0	20	0	93.2	69 - 129				
1,2,3-Trichloropropane	18.91	1.0	20	0	94.5	73 - 122				
1,2,4-Trichlorobenzene	18.74	1.0	20	0	93.7	69 - 130				
1,2,4-Trimethylbenzene	18.63	1.0	20	0	93.2	76 - 124				
1,2-Dibromo-3-chloropropane	18.7	1.0	20	0	93.5	62 - 128				
1,2-Dibromoethane	18.56	1.0	20	0	92.8	77 - 121				
1,2-Dichlorobenzene	19.36	1.0	20	0	96.8	80 - 119				
1,2-Dichloroethane	17.6	1.0	20	0	88.0	73 - 128				
1,2-Dichloropropane	20.39	1.0	20	0	102	78 - 122				
1,3,5-Trimethylbenzene	18.66	1.0	20	0	93.3	75 - 124				
1,3-Dichlorobenzene	18.7	1.0	20	0	93.5	80 - 119				
1,3-Dichloropropane	19.24	1.0	20	0	96.2	80 - 119				
1,4-Dichlorobenzene	19.21	1.0	20	0	96.1	79 - 118				
2,2-Dichloropropane	18.64	1.0	20	0	93.2	60 - 139				
2-Butanone	36.13	2.0	40	0	90.3	56 - 143				
2-Chlorotoluene	18.67	1.0	20	0	93.4	79 - 122				
2-Hexanone	36.94	2.0	40	0	92.3	57 - 139				
4-Chlorotoluene	18.22	1.0	20	0	91.1	78 - 122				
4-Isopropyltoluene	18.44	1.0	20	0	92.2	77 - 127				
4-Methyl-2-pentanone	37.33	2.0	40	0	93.3	67 - 130				
Acetone	37.34	2.0	40	0	93.3	39 - 160				
Benzene	19.56	1.0	20	0	97.8	79 - 120				
Bromobenzene	18.29	1.0	20	0	91.4	80 - 120				
Bromochloromethane	18.88	1.0	20	0	94.4	78 - 123				
Bromodichloromethane	18.56	1.0	20	0	92.8	79 - 125				
Bromoform	18.32	1.0	20	0	91.6	66 - 130				
Bromomethane	24.1	1.0	20	0	120	53 - 141				

## ALS Houston, US

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081048

## QC BATCH REPORT

Batch ID: R344960 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
LCS	Sample ID: VLCSW-190826	Units: UG/L			Analysis Date: 26-Aug-2019 12:02					
Client ID:	Run ID: VOA6_344960	SeqNo: 5224034	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	43.58	2.0	40	0	109	64 - 133				
Carbon tetrachloride	17.66	1.0	20	0	88.3	72 - 136				
Chlorobenzene	18.79	1.0	20	0	94.0	82 - 118				
Chloroethane	23.51	1.0	20	0	118	60 - 138				
Chloroform	18.71	1.0	20	0	93.5	79 - 124				
Chloromethane	21.48	1.0	20	0	107	50 - 139				
cis-1,2-Dichloroethene	19.2	1.0	20	0	96.0	78 - 123				
cis-1,3-Dichloropropene	19.86	1.0	20	0	99.3	75 - 124				
Dibromochloromethane	18.79	1.0	20	0	94.0	74 - 126				
Dibromomethane	18.71	1.0	20	0	93.5	79 - 123				
Dichlorodifluoromethane	17.44	1.0	20	0	87.2	32 - 152				
Ethylbenzene	19.3	1.0	20	0	96.5	79 - 121				
Hexachlorobutadiene	20.55	1.0	20	0	103	66 - 134				
Isopropylbenzene	18.8	1.0	20	0	94.0	72 - 131				
m,p-Xylene	37.96	2.0	40	0	94.9	80 - 121				
Methylene chloride	22.53	2.0	20	0	113	74 - 124				
Naphthalene	18	1.0	20	0	90.0	61 - 128				
n-Butylbenzene	17.83	1.0	20	0	89.1	75 - 128				
n-Propylbenzene	18.45	1.0	20	0	92.2	76 - 126				
o-Xylene	19.45	1.0	20	0	97.3	78 - 122				
sec-Butylbenzene	18.27	1.0	20	0	91.3	77 - 126				
Styrene	19.48	1.0	20	0	97.4	78 - 123				
tert-Butylbenzene	18.12	1.0	20	0	90.6	78 - 124				
Tetrachloroethene	18.78	1.0	20	0	93.9	74 - 129				
Toluene	19.31	1.0	20	0	96.5	80 - 121				
trans-1,2-Dichloroethene	19.4	1.0	20	0	97.0	75 - 124				
trans-1,3-Dichloropropene	19.1	1.0	20	0	95.5	73 - 127				
Trichloroethene	19.27	1.0	20	0	96.4	79 - 123				
Trichlorofluoromethane	19.48	1.0	20	0	97.4	65 - 141				
Vinyl chloride	21.76	1.0	20	0	109	58 - 137				
Surr: 1,2-Dichloroethane-d4	46.95	1.0	50	0	93.9	81 - 118				
Surr: 4-Bromofluorobenzene	49.86	1.0	50	0	99.7	85 - 114				
Surr: Dibromofluoromethane	49.85	1.0	50	0	99.7	80 - 119				
Surr: Toluene-d8	47.57	1.0	50	0	95.1	89 - 112				

ALS Houston, US

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081048

**QC BATCH REPORT**

Batch ID: R344960 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS		Sample ID: HS19081048-01MS		Units: UG/L		Analysis Date: 26-Aug-2019 14:26				
Client ID: LH18/24-SP650_082019		Run ID: VOA6_344960		SeqNo: 5225556		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
1,1,1,2-Tetrachloroethane	18.24	1.0	20	0	91.2	78 - 124				
1,1,1-Trichloroethane	16.98	1.0	20	0	84.9	74 - 131				
1,1,2,2-Tetrachloroethane	18.57	1.0	20	0	92.9	71 - 121				
1,1,2-Trichloroethane	17.73	1.0	20	0	88.7	80 - 119				
1,1-Dichloroethane	16.9	1.0	20	0	84.5	77 - 125				
1,1-Dichloroethene	18.72	1.0	20	0	93.6	71 - 131				
1,1-Dichloropropene	18.32	1.0	20	0	91.6	78 - 125				
1,2,3-Trichlorobenzene	19.16	1.0	20	0	95.8	69 - 129				
1,2,3-Trichloropropane	18.52	1.0	20	0	92.6	73 - 122				
1,2,4-Trichlorobenzene	20.18	1.0	20	0	101	69 - 130				
1,2,4-Trimethylbenzene	20.15	1.0	20	0	101	76 - 124				
1,2-Dibromo-3-chloropropane	16.99	1.0	20	0	85.0	62 - 128				
1,2-Dibromoethane	17.44	1.0	20	0	87.2	77 - 121				
1,2-Dichlorobenzene	19.71	1.0	20	0	98.5	80 - 119				
1,2-Dichloroethane	16.03	1.0	20	0.5252	77.5	73 - 128				
1,2-Dichloropropane	18.15	1.0	20	0	90.8	78 - 122				
1,3,5-Trimethylbenzene	20.77	1.0	20	0	104	75 - 124				
1,3-Dichlorobenzene	19.27	1.0	20	0	96.4	80 - 119				
1,3-Dichloropropane	17.95	1.0	20	0	89.7	80 - 119				
1,4-Dichlorobenzene	19.64	1.0	20	0	98.2	79 - 118				
2,2-Dichloropropane	17.43	1.0	20	0	87.2	60 - 139				
2-Butanone	41.63	2.0	40	0	104	56 - 143				
2-Chlorotoluene	19.48	1.0	20	0	97.4	79 - 122				
2-Hexanone	49.79	2.0	40	0	124	57 - 139				
4-Chlorotoluene	19.18	1.0	20	0	95.9	78 - 122				
4-Isopropyltoluene	21.76	1.0	20	0	109	77 - 127				
4-Methyl-2-pentanone	50.68	2.0	40	0	127	67 - 130				
Acetone	40.56	2.0	40	0	101	39 - 160				
Benzene	18.18	1.0	20	0	90.9	79 - 120				
Bromobenzene	18.42	1.0	20	0	92.1	80 - 120				
Bromochloromethane	15.88	1.0	20	0	79.4	78 - 123				
Bromodichloromethane	16.92	1.0	20	0	84.6	79 - 125				
Bromoform	16.98	1.0	20	0	84.9	66 - 130				
Bromomethane	17.05	1.0	20	0	85.3	53 - 141				



## ALS Houston, US

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081048

## QC BATCH REPORT

Batch ID: R344960 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MS		Sample ID: HS19081048-01MS		Units: UG/L		Analysis Date: 26-Aug-2019 14:26				
Client ID: LH18/24-SP650_082019		Run ID: VOA6_344960		SeqNo: 5225556		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Carbon disulfide	55.54	2.0	40	0	139	64 - 133			S	
Carbon tetrachloride	17.77	1.0	20	0	88.9	72 - 136				
Chlorobenzene	18.3	1.0	20	0	91.5	82 - 118				
Chloroethane	20.17	1.0	20	0	101	60 - 138				
Chloroform	16.27	1.0	20	0	81.4	79 - 124				
Chloromethane	18.2	1.0	20	0	91.0	50 - 139				
cis-1,2-Dichloroethene	19.62	1.0	20	2.64	84.9	78 - 123				
cis-1,3-Dichloropropene	17.76	1.0	20	0	88.8	75 - 124				
Dibromochloromethane	17.74	1.0	20	0	88.7	74 - 126				
Dibromomethane	16.38	1.0	20	0	81.9	79 - 123				
Dichlorodifluoromethane	15.91	1.0	20	0	79.5	32 - 152				
Ethylbenzene	19.54	1.0	20	0	97.7	79 - 121				
Hexachlorobutadiene	27.15	1.0	20	0	136	66 - 134			S	
Isopropylbenzene	20.31	1.0	20	0	102	72 - 131				
m,p-Xylene	39.05	2.0	40	0	97.6	80 - 121				
Methylene chloride	17.61	2.0	20	0	88.0	74 - 124				
Naphthalene	17.21	1.0	20	0	86.1	61 - 128				
n-Butylbenzene	22.26	1.0	20	0	111	75 - 128				
n-Propylbenzene	20.86	1.0	20	0	104	76 - 126				
o-Xylene	19.21	1.0	20	0	96.0	78 - 122				
sec-Butylbenzene	22.13	1.0	20	0	111	77 - 126				
Styrene	18.95	1.0	20	0	94.8	78 - 123				
tert-Butylbenzene	21.16	1.0	20	0	106	78 - 124				
Tetrachloroethene	19.96	1.0	20	0	99.8	74 - 129				
Toluene	19.29	1.0	20	0	96.5	80 - 121				
trans-1,2-Dichloroethene	17.19	1.0	20	0	85.9	75 - 124				
trans-1,3-Dichloropropene	16.79	1.0	20	0	83.9	73 - 127				
Trichloroethene	19.27	1.0	20	1.161	90.5	79 - 123				
Trichlorofluoromethane	18.36	1.0	20	0	91.8	65 - 141				
Vinyl chloride	20.35	1.0	20	0	102	58 - 137				
Surr: 1,2-Dichloroethane-d4	42.76	1.0	50	0	85.5	81 - 118				
Surr: 4-Bromofluorobenzene	50.64	1.0	50	0	101	85 - 114				
Surr: Dibromofluoromethane	46.09	1.0	50	0	92.2	80 - 119				
Surr: Toluene-d8	51.1	1.0	50	0	102	89 - 112				

ALS Houston, US

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081048

**QC BATCH REPORT**

Batch ID: R344960 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD	Sample ID: HS19081048-01MSD	Units: UG/L			Analysis Date: 26-Aug-2019 14:50					
Client ID: LH18/24-SP650_082019	Run ID: VOA6_344960	SeqNo: 5225557	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1,2-Tetrachloroethane	18.04	1.0	20	0	90.2	78 - 124	18.24	1.12	20	
1,1,1-Trichloroethane	16.42	1.0	20	0	82.1	74 - 131	16.98	3.32	20	
1,1,2,2-Tetrachloroethane	19.13	1.0	20	0	95.7	71 - 121	18.57	2.98	20	
1,1,2-Trichloroethane	18.2	1.0	20	0	91.0	80 - 119	17.73	2.62	20	
1,1-Dichloroethane	16.38	1.0	20	0	81.9	77 - 125	16.9	3.11	20	
1,1-Dichloroethene	18.39	1.0	20	0	91.9	71 - 131	18.72	1.79	20	
1,1-Dichloropropene	17.8	1.0	20	0	89.0	78 - 125	18.32	2.87	20	
1,2,3-Trichlorobenzene	19.96	1.0	20	0	99.8	69 - 129	19.16	4.08	20	
1,2,3-Trichloropropane	18.54	1.0	20	0	92.7	73 - 122	18.52	0.127	20	
1,2,4-Trichlorobenzene	20.07	1.0	20	0	100	69 - 130	20.18	0.551	20	
1,2,4-Trimethylbenzene	19.54	1.0	20	0	97.7	76 - 124	20.15	3.07	20	
1,2-Dibromo-3-chloropropane	18.54	1.0	20	0	92.7	62 - 128	16.99	8.68	20	
1,2-Dibromoethane	17.38	1.0	20	0	86.9	77 - 121	17.44	0.337	20	
1,2-Dichlorobenzene	19.34	1.0	20	0	96.7	80 - 119	19.71	1.89	20	
1,2-Dichloroethane	16.16	1.0	20	0.5252	78.2	73 - 128	16.03	0.79	20	
1,2-Dichloropropane	18.01	1.0	20	0	90.1	78 - 122	18.15	0.775	20	
1,3,5-Trimethylbenzene	19.69	1.0	20	0	98.4	75 - 124	20.77	5.35	20	
1,3-Dichlorobenzene	18.75	1.0	20	0	93.7	80 - 119	19.27	2.76	20	
1,3-Dichloropropane	18.08	1.0	20	0	90.4	80 - 119	17.95	0.751	20	
1,4-Dichlorobenzene	19.28	1.0	20	0	96.4	79 - 118	19.64	1.81	20	
2,2-Dichloropropane	17.08	1.0	20	0	85.4	60 - 139	17.43	2.03	20	
2-Butanone	43.13	2.0	40	0	108	56 - 143	41.63	3.53	20	
2-Chlorotoluene	19.13	1.0	20	0	95.6	79 - 122	19.48	1.82	20	
2-Hexanone	51.3	2.0	40	0	128	57 - 139	49.79	2.98	20	
4-Chlorotoluene	18.58	1.0	20	0	92.9	78 - 122	19.18	3.2	20	
4-Isopropyltoluene	20.08	1.0	20	0	100	77 - 127	21.76	8	20	
4-Methyl-2-pentanone	51.39	2.0	40	0	128	67 - 130	50.68	1.39	20	
Acetone	40.95	2.0	40	0	102	39 - 160	40.56	0.971	20	
Benzene	17.77	1.0	20	0	88.8	79 - 120	18.18	2.29	20	
Bromobenzene	18.35	1.0	20	0	91.7	80 - 120	18.42	0.381	20	
Bromochloromethane	15.29	1.0	20	0	76.5	78 - 123	15.88	3.8	20	S
Bromodichloromethane	16.63	1.0	20	0	83.2	79 - 125	16.92	1.68	20	
Bromoform	17.4	1.0	20	0	87.0	66 - 130	16.98	2.44	20	
Bromomethane	15.66	1.0	20	0	78.3	53 - 141	17.05	8.49	20	

## ALS Houston, US

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081048

## QC BATCH REPORT

Batch ID: R344960 ( 0 )		Instrument: VOA6		Method: VOLATILES ORGANICS BY METHOD 8260C						
MSD	Sample ID: HS19081048-01MSD	Units: UG/L			Analysis Date: 26-Aug-2019 14:50					
Client ID: LH18/24-SP650_082019	Run ID: VOA6_344960	SeqNo: 5225557	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Carbon disulfide	53.9	2.0	40	0	135	64 - 133	55.54	3	20	S
Carbon tetrachloride	17.31	1.0	20	0	86.5	72 - 136	17.77	2.66	20	
Chlorobenzene	18.15	1.0	20	0	90.7	82 - 118	18.3	0.864	20	
Chloroethane	18.76	1.0	20	0	93.8	60 - 138	20.17	7.25	20	
Chloroform	15.77	1.0	20	0	78.8	79 - 124	16.27	3.17	20	S
Chloromethane	16.46	1.0	20	0	82.3	50 - 139	18.2	10	20	
cis-1,2-Dichloroethene	18.81	1.0	20	2.64	80.9	78 - 123	19.62	4.22	20	
cis-1,3-Dichloropropene	17.91	1.0	20	0	89.6	75 - 124	17.76	0.868	20	
Dibromochloromethane	17.69	1.0	20	0	88.4	74 - 126	17.74	0.287	20	
Dibromomethane	16.72	1.0	20	0	83.6	79 - 123	16.38	2.04	20	
Dichlorodifluoromethane	15.05	1.0	20	0	75.3	32 - 152	15.91	5.51	20	
Ethylbenzene	18.95	1.0	20	0	94.7	79 - 121	19.54	3.11	20	
Hexachlorobutadiene	23.55	1.0	20	0	118	66 - 134	27.15	14.2	20	
Isopropylbenzene	19.32	1.0	20	0	96.6	72 - 131	20.31	4.99	20	
m,p-Xylene	38.26	2.0	40	0	95.7	80 - 121	39.05	2.05	20	
Methylene chloride	17	2.0	20	0	85.0	74 - 124	17.61	3.53	20	
Naphthalene	18.71	1.0	20	0	93.5	61 - 128	17.21	8.32	20	
n-Butylbenzene	20.25	1.0	20	0	101	75 - 128	22.26	9.47	20	
n-Propylbenzene	20.04	1.0	20	0	100	76 - 126	20.86	4.02	20	
o-Xylene	18.87	1.0	20	0	94.3	78 - 122	19.21	1.81	20	
sec-Butylbenzene	20.32	1.0	20	0	102	77 - 126	22.13	8.55	20	
Styrene	18.76	1.0	20	0	93.8	78 - 123	18.95	1.03	20	
tert-Butylbenzene	19.98	1.0	20	0	99.9	78 - 124	21.16	5.74	20	
Tetrachloroethene	19.43	1.0	20	0	97.2	74 - 129	19.96	2.71	20	
Toluene	18.97	1.0	20	0	94.8	80 - 121	19.29	1.7	20	
trans-1,2-Dichloroethene	16.64	1.0	20	0	83.2	75 - 124	17.19	3.22	20	
trans-1,3-Dichloropropene	16.91	1.0	20	0	84.6	73 - 127	16.79	0.741	20	
Trichloroethene	19.23	1.0	20	1.161	90.3	79 - 123	19.27	0.199	20	
Trichlorofluoromethane	17.64	1.0	20	0	88.2	65 - 141	18.36	4	20	
Vinyl chloride	19.49	1.0	20	0	97.4	58 - 137	20.35	4.33	20	
Surr: 1,2-Dichloroethane-d4	42.35	1.0	50	0	84.7	81 - 118	42.76	0.951	20	
Surr: 4-Bromofluorobenzene	50.84	1.0	50	0	102	85 - 114	50.64	0.385	20	
Surr: Dibromofluoromethane	45.69	1.0	50	0	91.4	80 - 119	46.09	0.884	20	
Surr: Toluene-d8	51.31	1.0	50	0	103	89 - 112	51.1	0.396	20	

ALS Houston, US

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081048

**QC BATCH REPORT****Batch ID:** R344960 ( 0 )**Instrument:** VOA6**Method:** VOLATILES ORGANICS BY METHOD  
8260C

The following samples were analyzed in this batch: HS19081048-01 HS19081048-02

ALS Houston, US

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081048

**QC BATCH REPORT**

Batch ID: R345140 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A						
<b>MBLK</b>	Sample ID: <b>WBLKW2-082619</b>	Units: <b>mg/L</b>			Analysis Date: <b>27-Aug-2019 01:03</b>					
Client ID:	Run ID: <b>ICS-Integrion_345140</b>	SeqNo: <b>5228131</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	0.500	0.500							U	
Sulfate	0.500	0.500							U	
<b>LCS</b>	Sample ID: <b>WLCSW2-082619</b>	Units: <b>mg/L</b>			Analysis Date: <b>27-Aug-2019 01:20</b>					
Client ID:	Run ID: <b>ICS-Integrion_345140</b>	SeqNo: <b>5228132</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	20.18	0.500	20	0	101	80 - 120				
Sulfate	20.38	0.500	20	0	102	80 - 120				
<b>LCSD</b>	Sample ID: <b>WLCSDW2-082619</b>	Units: <b>mg/L</b>			Analysis Date: <b>27-Aug-2019 01:37</b>					
Client ID:	Run ID: <b>ICS-Integrion_345140</b>	SeqNo: <b>5228133</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	20.09	0.500	20	0	100	80 - 120	20.18	0.437	20	
Sulfate	20.26	0.500	20	0	101	80 - 120	20.38	0.586	20	
<b>MS</b>	Sample ID: <b>HS19080842-03MS</b>	Units: <b>mg/L</b>			Analysis Date: <b>27-Aug-2019 14:27</b>					
Client ID:	Run ID: <b>ICS-Integrion_345140</b>	SeqNo: <b>5228148</b>		PrepDate:			DF: <b>10</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	254.1	5.00	100	160.1	94.0	80 - 120				
Sulfate	115.3	5.00	100	18.89	96.4	80 - 120				
<b>MS</b>	Sample ID: <b>HS19080684-02MS</b>	Units: <b>mg/L</b>			Analysis Date: <b>27-Aug-2019 02:10</b>					
Client ID:	Run ID: <b>ICS-Integrion_345140</b>	SeqNo: <b>5228135</b>		PrepDate:			DF: <b>20</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
Chloride	490	10.0	200	299.4	95.3	80 - 120				
Sulfate	918.5	10.0	200	739.6	89.5	80 - 120				

ALS Houston, US

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081048

**QC BATCH REPORT**

Batch ID: R345140 ( 0 )		Instrument: ICS-Integrion		Method: ANIONS BY SW9056A						
<b>MSD</b>	Sample ID: <b>HS19080842-03MSD</b>	Units: <b>mg/L</b>			Analysis Date: <b>27-Aug-2019 14:44</b>					
Client ID:	Run ID: <b>ICS-Integrion_345140</b>	SeqNo: <b>5228149</b>		PrepDate:			DF: <b>10</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	254.7	5.00	100	160.1	94.6	80 - 120	254.1	0.256	20	
Sulfate	115.7	5.00	100	18.89	96.9	80 - 120	115.3	0.404	20	
<b>MSD</b>	Sample ID: <b>HS19080684-02MSD</b>	Units: <b>mg/L</b>			Analysis Date: <b>27-Aug-2019 02:26</b>					
Client ID:	Run ID: <b>ICS-Integrion_345140</b>	SeqNo: <b>5228136</b>		PrepDate:			DF: <b>20</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	492.6	10.0	200	299.4	96.6	80 - 120	490	0.517	20	
Sulfate	923.9	10.0	200	739.6	92.2	80 - 120	918.5	0.582	20	

The following samples were analyzed in this batch: HS19081048-01

**ALS Houston, US**

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.  
**Project:** Longhorn GW Treatment Plant  
**WorkOrder:** HS19081048

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

<b>Unit Reported</b>	<b>Description</b>
mg/L	Milligrams per Liter

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

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<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Carolina	624-2019	31-Dec-2019
North Dakota	R-193 2019	30-Apr-2020
Oklahoma	2019-141	31-Aug-2020
Oklahoma	2018-156	31-Aug-2019
Texas	TX104704231-19-23	30-Apr-2020

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**ALS Houston, US**

Date: 29-Aug-19

**Client:** Bhate Environmental Associates, Inc.**Project:** Longhorn GW Treatment Plant**Work Order:** HS19081048**SAMPLE TRACKING**

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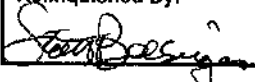
<b>Lab Samp ID</b>	<b>Client Sample ID</b>	<b>Action</b>	<b>Date</b>	<b>Person</b>	<b>New Location</b>
HS19081048-01	LH18/24-SP650_082019	Login	8/21/2019 1:09:54 PM	PMG	Sub


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**CHAIN OF CUSTODY**

Name Of Lab Shipping To: ALS 10450 Stancliff Rd, Suite 210, Houston, Tx, 77099 ATTN: R.J. Modashia

<b>Project:</b> BHATE LONGHORN ARMY AMMN. PLANT (LHAAP) GROUNDWATER TREATMENT PLANT (GWTP) KARNACK, TEXAS			<b>Project No.</b> NWO1312.0150.0 16.0001		<b>Analyses</b>										<b>HS19081048</b> Bhate Environmental Associates, Inc. Longhorn GW Treatment Plant 					
<b>Job:</b> <b>GROUNDWATER TREATMENT PLANT</b> <b>BI-WEEKLY SAMPLES</b>					MS / MSD	No. OF CONTAINERS	VOC	CHLORIDE, SULFATE											Remarks (Preservatives, etc.)	Lab I.D.#
<b>Prepared By:</b> Scott Beesinger			<b>P.O Number</b>																	
Field Sample I.D.	Sample Matrix	Date / Time																		
LH18/24-SP650_082019	Water	08/20/19 / 14:00	3	3											HCL					
LH18/24-SP650_082019	Water	08/20/19 / 14:00	1	1											NONE					
Trip Blank	Water	08/20/19	2	2											HCL					
<b>Additional Remarks: STANDARD TAT ON ALL PARAMETERS.</b>																				
<b>Relinquished By:</b> 		<b>Date</b> 08/20/19	<b>Time</b> 14:30	<b>Received By:</b> AC		<b>Date</b> 8/21/19	<b>Time</b> 08:45	<b>Relinquished By:</b>		<b>Date</b>	<b>Time</b>	<b>Received By:</b>		<b>Date</b>	<b>Time</b>					
<b>9 For Lab Use Only</b>																				
<b>Received At Lab By:</b> J/C 0.4 IR#25 CFO.O		<b>Date</b>	<b>Time</b>	<b>Airbill No.</b>	<b>Opened By:</b>		<b>Date</b>	<b>Time</b>	<b>Temp of Container</b>	<b>Seal No.</b>	<b>Condition</b>									
<b>Remarks</b> 45031																				

 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>45031</b>	<b>CUSTOMER SEAL</b>	
		Date: <u>8/20/19</u> TM Name: <u>Scott Bee</u> Company: <u>SGRA</u>	Seal Broken By: <u>AC</u> Date: <u>8/21/19</u>

Place Label Here

**FedEx**  
 TRK# 4809 7836 6366  
 0221

**WED - 21 AUG 10:30A**  
**PRIORITY OVERNIGHT**

AB SGRA

77099  
 TX - US IAH



0454392 08/20 56733/EK7/05A2

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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

September 12, 2019

Marcia Olive  
Bhate Environmental Associates, Inc.  
445 Union Blvd Ste 129  
Lakewood, CO 80228

Work Order: **HS19081495**

Laboratory Results for: **Longhorn GW Treatment Plant - GWTP Weekly Effluent**

Dear Marcia,

ALS Environmental received 3 sample(s) on Aug 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,

A handwritten signature in black ink, appearing to read "Raj. P. Modashia", enclosed in a simple black oval.

Generated By: DAYNA.FISHER  
RJ Modashia  
Project Manager