Final
July 2018

2017 Investigation Report

Vapor Intrusion Study
Operable Unit 2, Area 8

Naval Base Kitsap
Keyport, Washington

Department of the Navy
Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315

Contract No. N44255-14-D-9013, Task Order No. 0026

FINAL
2017 INVESTIGATION REPORT, VAPOR INTRUSION STUDY
OPERABLE UNIT 2, AREA 8
NAVAL BASE KITSAP, KEYPORT, WASHINGTON

Prepared by
Battelle Memorial Institute
505 King Avenue
Columbus, Ohio 43201

and

Trihydro Corporation
1252 Commerce Drive
Laramie, WY 82070

Prepared for
Naval Facilities Engineering Command Northwest
Silverdale, Washington

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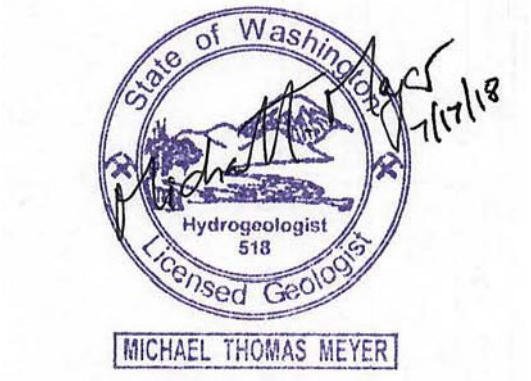
Organization Title: Address:	Naval Facilities Engineering Command Northwest 1101 Tautog Circle Silverdale, Washington 98315-1101 (360) 396-0006
Prime Contractor: Address:	Battelle Memorial Institute. 505 King Avenue Columbus, Ohio 43201 (614) 424-4873
Navy Remedial Project Manager:	Carlotta Cellucci
Battelle Program Manager:	Russell Sirabian, P.E., PMP, LEED Green Associate
Battelle Project Manager:	Michael Meyer, R.G., L.E.G., L.H.G.



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ABBREVIATIONS AND ACRONYMS

bgs	below ground surface
CH_4	methane
CO_2	carbon dioxide
COC	contaminant of concern
DCE	dichloroethene
DoD	Department of Defense
Ecology	Washington State Department of Ecology
ELAP	Environmental Laboratory Accreditation Program
EPA	Environmental Protection Agency
LOQ	limit of quantitation
LTM	long-term monitoring
mL/min	milliliter per minute
MTCA	Model Toxics Control Act
NBK	Naval Base Kitsap
NESDI	Navy's Environmental Sustainability Development to Integration
NUWC	Naval Undersea Warfare Center
O_2	oxygen
OU	Operable Unit
PAL	project action limit
PCE	tetrachloroethene
PID	photoionization detector
ppb	part per billion
ppm	part per million
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RI/FS	Remedial Investigation/ Feasibility Study
ROD	Record of Decision
RPD	relative percent difference

ABBREVIATIONS AND ACRONYMS (Continued)

SAP	sampling and analysis plan
SVOC	semivolatile organic compound
TCA	trichloroethane
TCE	trichloroethene
trans-1,2-DCE	trans-1,2-dichloroethene
1,1,2-TCA	1,1,2-trichloroethane
USCS	Unified Soil Classification System
VI	vapor intrusion
VOC	volatile organic compound

1.0 INTRODUCTION

This report summarizes the background, scope, field activities, and results of soil vapor sampling conducted in the fall of 2017 at the Area 8 Former Plating Shop at Operable Unit 2 (OU 2) of Naval Base Kitsap (NBK) Keyport in Keyport, Washington (Figure 1). This report documents a one-time sampling event at newly established locations at OU 2 Area 8 in response to a recommendation made in the fourth five-year review (U.S. Navy, 2015).

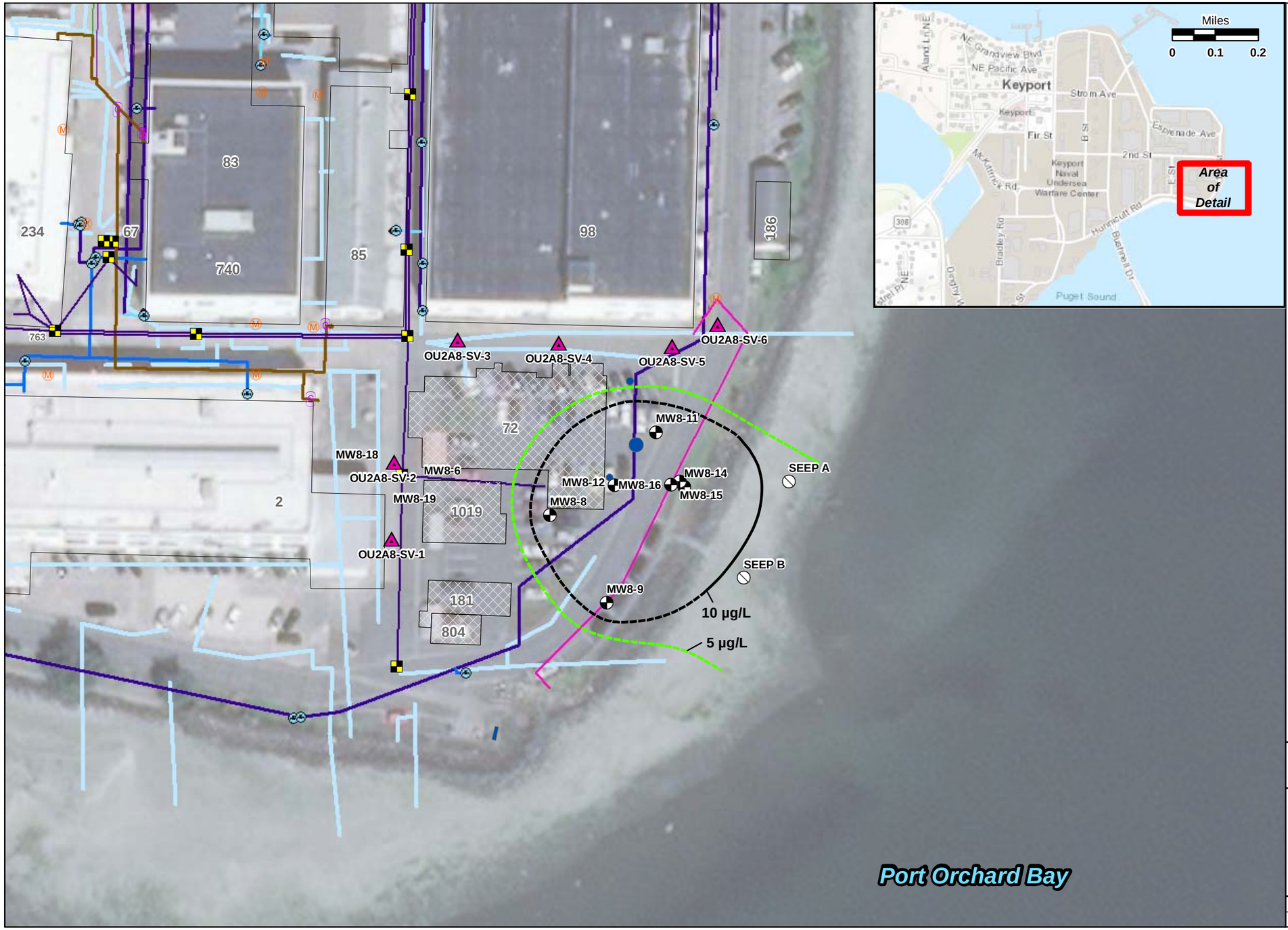
The activities documented in this report were conducted in accordance with the project-specific Area 8 sampling and analysis plan (SAP) (U.S. Navy, 2017). The activities documented in this report were conducted under Navy Contract No. N44255-14-D-9013, Delivery Order 0026 for Naval Facilities Engineering Command Northwest. As the prime contractor for this contract, Battelle Memorial Institute (Battelle), in cooperation with teaming partner Trihydro Corporation (Trihydro), conducted the field sampling and data analysis described herein and prepared this data report. Subcontractors to Battelle and Trihydro performed laboratory analytical and data validation tasks.

Responses to comments received from regulatory agency and stakeholder reviewers on the draft version of this report are included in Appendix A.

1.1 SITE DESCRIPTION AND BACKGROUND

The locations of NBK Keyport and Area 8 are shown on Figure 1. Keyport is an unincorporated community in Kitsap County, Washington, and NBK Keyport supports one of two divisions of the Naval Undersea Warfare Center (NUWC), providing Fleet readiness support for submarines, torpedoes, land attack systems and Fleet training systems. NUWC Keyport is located in the Puget Sound region between the Olympic and Cascade mountain ranges and is surrounded on three sides by water: Dogfish Bay to the west, Liberty Bay to the north, and Port Orchard Bay to the east. Area 8 occupies approximately 1 acre on the eastern portion of NBK Keyport, on a manmade peninsula within a heavily industrialized area and encompasses a parking lot. The parking lot is on the site of a former plating shop (Building 72) which was demolished in 1999. The area is predominantly flat and almost entirely paved, with surrounding industrial buildings.

Past releases at Area 8 include: chrome plating solutions spilling onto the ground; plating wastes discharging to a utility trench; and plating solutions leaking through cracks in the plating shop floor, waste disposal pipes, and sumps during plating shop operations. These chrome plating solutions and plating wastes contained chlorinated volatile organic compounds (VOCs) and metals. Petroleum hydrocarbons (diesel and heavy oil) were also released to the environment from leaky underground storage tanks and underground concrete vaults located within Area 8. Semivolatile organic compounds (SVOCs) associated with the petroleum release were detected



Legend

- Former Buildings
- Tanks
- Soil Vapor Location (Actual)
- Monitoring Well
- Spring-Seep
- Manhole
- Water Valve
- Electrical Structure (underground)
- Gas Valve

Main Utility Lines

- Distribution Main
- Hydrant Lateral
- Transmission Main
- Force Main (old South Pier)
- Electrical General
- Gas Service Line
- Water Service Line
- Storm Drain

TCE Isoconcentration contours

- Inferred Remediation Goal Contour
- Inferred Contour
- Contour

Feet
0
50
100

NAVFAC Naval Facilities Engineering Command

Figure 1
OU 2 Area 8 Location Map
and Site Plan View

Naval Base Kitsap Keyport

DATE: 7/19/2018 ANALYST: HICKSJ
REV. 5c APPROVED: MEYER

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in soil at low concentrations below Washington State Model Toxics Control Act (MTCA) Method B cleanup levels based on soil ingestion, protection of drinking water, and protection of surface water standards. For groundwater, VOCs and metals (arsenic, cadmium, and chromium) were identified as contaminants of concern (COCs) based on residential use of groundwater as drinking water and inhalation of water vapor during household use. For subsurface soil, arsenic and cadmium were identified as major contributors to future resident's risk based on ingestion of produce grown in the soil. The OU 2 Record of Decision (ROD) was signed in 1994 (U.S. Navy et al., 1994), and identified VOCs and metals as the COCs associated with Area 8. Following the signing of the OU 2 ROD, the Navy performed the following remedial actions:

1. Demolition of Building 72, the former plating shop, and removal of associated soil hotspots above the water table in July 1998 and March 1999 based on cadmium and chromium concentrations exceeding 1999 MTCA Method B cleanup levels for soil ingestion (80 mg/kg for cadmium and 400 mg/kg for chromium) (U.S. Navy, 1999).
2. Implementation of institutional controls to prevent exposure to soil and groundwater containing site COCs at concentrations exceeding the thresholds for residential use starting in 2000.
3. Installation and long-term monitoring (LTM) of four new wells starting in 1995.
4. Initiation of sediment and tissue LTM in the intertidal zone of Area 8 starting in 1996 and continuing every 4 years or less thereafter, including 2000, 2004, 2008, 2012 (sediment only), 2015, and 2016.
5. Evaluation of human health and ecological risks based on tissue and sediment data.
6. Execution of independent remedial actions under MTCA related to past petroleum releases.

The ROD also calls for implementation of contingent groundwater control actions if Area 8 groundwater is found to present an unacceptable risk to human health or the environment based on sediment and tissue monitoring; contingent groundwater control actions have not been necessary to ensure protection of human health and the environment. The Navy collected additional sediments and tissue data (in 2015 and 2016) to perform an in-depth human health and ecological risk assessment of contaminant concentrations in intertidal sediment and clam tissue. The human health risk assessment is complete (report pending), and the Navy is working with regulators and stakeholders to perform bioassay sampling to support completion of the ecological risk assessment. Groundwater controls will be implemented if the ecological risk assessment indicates that groundwater migrating from Area 8 has impacted sediment and clam tissue on the adjacent beach resulting in an unacceptable risk to the environment.

Inorganics, including arsenic, cadmium, chromium (total), hexavalent chromium, copper, lead, mercury, nickel, silver, thallium, zinc, and cyanide, were analyzed in groundwater samples

starting in 1995. Chromium was speciated during initial rounds of groundwater sampling to assess the ratio of trivalent to hexavalent chromium. The data report covering the 2000 sampling event recommended that chromium speciation be discontinued based on the conclusion that measured total chromium values could be assumed to be 100 percent hexavalent chromium (U.S. Navy, 2001). This report also recommended that cyanide be removed from the analyte list for tissue, seep, and sediment because it had not been detected in the groundwater samples since 1998. It was agreed by the Navy and Washington State Department of Ecology (Ecology) that another round of cyanide sampling would be collected in groundwater from MW8-12 (historically the highest concentrations were observed at this well) in spring 2002 (U.S. Navy, 2001). The cyanide concentration at MW8-12 during the 2002 sampling event was found to be well below both groundwater and surface water remedial goals, so groundwater analysis for cyanide was discontinued.

The fourth five-year review (U.S. Navy, 2015) concluded that a vapor intrusion (VI) study, which had not been performed as part of historical environmental investigations, was warranted for Area 8, based on new Environmental Protection Agency (EPA) risk-based VI guidance (EPA, 2015). An evaluation of the VI pathway was recommended because of VOC concentrations detected in groundwater in the vicinity of worker-occupied buildings. The primary potential human health receptors for Area 8 are workers within the buildings surrounding the area, including Buildings 82, 1074, 85, and 98. Based on the presence of VOC concentrations exceeding VI screening criteria in groundwater at Area 8, vapors emanating from the groundwater plume could impact occupants of nearby buildings should VI occur. The remedial action included excavation of contamination above the water table and therefore vapor sources in the vadose zone are less likely, but still possible.

1.2 PROBLEM STATEMENT, DECISIONS, AND SCOPE OF WORK

The problem to be addressed by this study was that concentrations of VOCs (specifically, trichloroethene [TCE]) in the groundwater beneath OU 2 Area 8 exceed VI default screening levels, potentially posing a potential risk to human health for workers in buildings within 100 feet of Area 8. Prior to this investigation no soil vapor data were available to assess the VI pathway.

Decisions to be made to address this problem were:

1. Do the concentrations of VOCs in soil vapor samples indicate the potential for VI into nearby buildings that warrant further investigation?
2. Is the lateral or vertical distribution of VOCs in soil vapor indicative of preferential vapor migration pathways that warrant further investigation?

In order to make these decisions, the scope of work consisted of collection and analysis of soil vapor samples from six locations adjacent to buildings near known concentrations of chlorinated solvents in groundwater.

1.3 DECISION RULES

The SAP established two decision rules to be used to evaluate the data collected.

1.3.1 Decision Rule 1

If the concentrations of any target VOCs in any soil vapor sample exceed the MTCA Method C sub-slab soil vapor screening levels established in Ecology's guidance (Ecology, 2016), conclude that additional investigation of the VI pathway is warranted. If concentrations do not exceed the MTCA Method C sub-slab soil vapor screening levels, conclude that no additional VI investigation is warranted.

1.3.2 Decision Rule 2

If the concentrations of target VOCs in soil vapor exhibit a vertical or lateral distribution that implies an association with utility backfill or other potential preferential pathways, and VOC concentrations exceed MTCA Method C sub-slab soil vapor screening levels, conclude that additional investigation of VOC migration along preferential pathways is warranted.

2.0 INVESTIGATION ACTIVITIES

Investigation activities performed to address the problem statement and decisions consisted of the following work elements:

1. Utility locating and soil vapor well installation
2. Soil vapor sample collection
3. Laboratory analysis of soil vapor samples and third-party validation of the data

Work elements 1 and 2 are discussed in this section, while work element 3 is discussed in Section 3.

2.1 SOIL VAPOR WELL INSTALLATION

Utility locating was performed in advance of direct-push drilling for soil vapor well installation. Locating of both conductible and non-conductible utilities was performed by Applied Professional Services, Inc., of North Bend, Washington on October 30, 2017. The planned drilling locations were marked on the ground at the time of the utility locate. A "one-call" utility locate request was also initiated. All planned locations were found to be clear of utilities.

Direct-push drilling and soil vapor well installation were performed by Holt Services, Inc of Puyallup, Washington. using a Geoprobe 7822DT drill rig. Well installation was performed on November 13 and 14, 2017. Because high rainfall and strong winds at the time of drilling did not meet the weather requirements in the SAP for sampling, the soil vapor samples were not collected immediately after installation as planned. Instead, the wells were sampled during a separate mobilization when weather conditions met the SAP criteria. Sampling was performed on November 29 and 30, 2017. Weather records are provided in Appendix B.

2.1.1 Lithologic Documentation and Soil Screening

Direct-push drilling was performed by advancing a Macro-Core sampler in 5-foot intervals and retrieving and logging each 5-foot core. Soils were collected continuously in acetate liners. A qualified geologist was onsite to record a description of the soil samples, including: lithology, texture, Unified Soil Classification System (USCS) classification, and color. An aliquot of soil from each 2-foot sample interval was placed in a zip-lock style plastic bag and allowed to equilibrate to ambient temperature. The soil headspace was then field screened for VOC concentrations using a photoionization detector (PID). Soil descriptions and VOC measurements are included on well completion forms (Appendix C).

Sands and gravels were the prevalent soil types logged, with one instance of a clay identified in boring SV-2 from 4 to 5 feet below ground surface (bgs). Field PID measurements of the soil cores ranged from no VOCs detected to 177 parts per million (ppm; SV-5 at 10 feet bgs, the depth of first water, with a petroleum odor noted). A strong hydrocarbon odor was also noted at 9.5 to 10 feet bgs in the core from boring SV-6. The highest field PID measurement in this boring was 98 ppm at 4 feet bgs. A sweet hydrocarbon odor was noted in the core from boring SV-4 between 8 and 10 feet bgs, with a maximum field PID reading of 12 ppm. Hydrocarbon odors were not noted in the cores from borings SV-1 through SV-3, and field PID measurements in these three borings ranged from no VOCs detected to 31.8 ppm (SV-3 at 4 feet bgs).

2.1.2 Soil Vapor Well Completions

A total of six soil vapor wells (SV-1 through SV-6) were installed as part of November 2017 field activities (Table 1). Five wells (SV-1 through SV-5) were installed as dual nested multi-depth probes. Each nested probe was completed with a sample point at a shallow depth (4.5 to 5 feet bgs) and a deeper depth (8 feet). Deeper depth samples were anticipated to be installed at 10 feet bgs in accordance with the SAP; however, deep sample depths were adjusted to 8 feet bgs in the field due to observations of soil moisture and/or saturation near total boring depth (10 feet). Soil vapor well SV-6 was installed as a single depth point at 5 feet bgs due to saturation in soils observed at approximately 7 feet bgs.

Table 1. Summary of Soil Vapor Wells Constructed

Location Name	Total Depth Drilled (ft bgs)	Depth to First Water Observed (ft bgs)	Screened Interval(s) (ft bgs)
OU2A8-SV-1	10	> 8[a]	4.9 - 5.0
			7.9 - 8.0
OU2A8-SV-2	10	9.1	4.4 - 4.5
			7.9 - 8.0
OU2A8-SV-3	15	9.2	4.9 - 5.0
			7.9 - 8.0
OU2A8-SV-4	10	> 10	4.9 - 5.0
			7.9 - 8.0
OU2A8-SV-5	10	> 10	4.9 - 5.0
			7.9 - 8.0
OU2A8-SV-6	10	7	4.9 - 5.0

[a] - Depth to groundwater was initially measured as 4 feet bgs immediately after drilling during a heavy rainfall. Groundwater was not observed to 8 feet bgs the next day while redrilling.
> - No groundwater was observed shallower than this depth during drilling
ft bgs - feet below ground surface

Upon reaching the target total depth, the drive rod and sampler were removed. Collapse of native material in each borehole typically occurred at the depth groundwater was encountered (typically around 7 to 10 feet bgs). The open borehole was filled with 10/20 Colorado sand to the bottom of the lowest desired screen interval (8 feet bgs), measured by a weighted tape. A 1/4-inch diameter Nylaflow tube, attached to a stainless-steel vapor point, was inserted into a 1-inch polyvinyl chloride (PVC) casing and set at the bottom of the deepest screen interval. The open end of the Nylaflow tubing was wrapped during installation to protect it from bentonite and concrete debris. A sand pack consisting of 10/20 Colorado sand was poured directly into the open borehole until the sand extended approximately 6 inches above the soil vapor sampling point. The PVC casing was removed following sand pack placement, leaving the soil vapor sampling point and Nylaflow tubing undisturbed. Above the sand pack, approximately 2 feet of fine dry granular bentonite was placed in the hole as an annular seal (to 6 inches below the bottom of the shallow screen interval, or approximately 5.5 feet bgs) and hydrated.

As with the deeper soil vapor monitoring point, 10/20 Colorado sand was used to the fill the open borehole to the bottom of the shallow screen interval of approximately 4.5 to 5 feet. A second soil vapor probe was installed via 1-inch PVC casing at a shallower depth using the same procedures as the deeper soil vapor probe. The second probe was installed, the sand pack placed, and the PVC casing extracted. The open hole was then filled with granular bentonite—hydrating in intervals—to approximately 2 feet bgs. Concrete mix was then placed on top of the hydrated bentonite, and a 5-inch steel flush-mount well vault was pushed into the concrete such that its top was slightly above the adjacent concrete or asphalt surface. The surface was finished with a concrete skirt to grade to prevent surface water from draining into the well vault. Each Nylaflow tube was labeled with the sample depth using differently colored tape and the top ends of the tubing were equipped with two-way valves for sampling.

2.2 SOIL VAPOR SAMPLE COLLECTION

A total of six wells and 11 soil vapor sampling points were installed during November 2017. Attempts were made to sample all 11 points. However, all samples from the deeper sampling depths, with the exception of the deeper sampling point installed in well SV-3, either produced water or insufficient soil vapor volume during purging and/or sampling efforts. Therefore, these samples could not be collected. Insufficient soil vapor volume in deeper samples was attributed to the likely presence of relatively high soil pore space moisture in the capillary fringe. All shallow soil vapor samples, and the deeper sample from well SV-3, were collected and submitted to the laboratory. Soil vapor samples were collected using the tracer test method for analysis by a fixed laboratory. Sample procedures are described in the subsections below.

2.2.1 Shut-in Testing

A shut-in test was performed on probes before sample collection to test the integrity of the sampling train and ensure that there were no leaks that could allow for ambient air to be drawn into the sample container. The shut-in test was accomplished by inducing a vacuum on the sampling train before soil vapor was introduced into the sampling container, and then monitoring the vacuum to document that no leakage was observed for approximately 5 minutes. When leaks were noted, the sample train was inspected and repaired, and the shut-in test was repeated until no leakage was observed for approximately 5 minutes.

2.2.2 Soil Vapor Purging

Soil vapor purging was performed using a 3-liter Tedlar bag and a peristaltic pump. A vacuum induced soil vapor to flow to the surface. Purged vapor was collected in a Tedlar bag and then field-screened for VOCs using a PID. In addition, concentrations of oxygen (O_2), carbon dioxide (CO_2), and methane (CH_4) were measured using a multi-gas meter. Soil vapor samples were collected after three volumes were purged from each sample point. Helium was used as a leak-check compound during purging to check for ambient air leaks within the equipment connections and fittings, or the annular seal in the soil vapor point. Field measurements were recorded on field forms, which are provided in Appendix D.

2.2.3 Helium Tracer Testing

A shroud was placed over each soil vapor point, sample fittings, and Summa® canister, and a steady concentration of helium (approximately 10% to 50%) was maintained under the shroud during purging and sampling. A portable helium detector was used to monitor the shroud concentration and to screen the purged soil vapor. If the helium concentration in purge vapor was less than 5% of the concentration maintained beneath the shroud (i.e., purge vapor consisted of at least 95% soil gas), then the seals and fittings were deemed to be acceptable. If the purge vapor helium concentration exceeded 5% of the shroud concentration, the equipment was inspected and repaired to remove potential sources of leaks.

2.2.4 Soil Vapor Sample Collection

Soil vapor samples were collected under the shroud in batch clean-certified 1-liter Summa® canisters using a 200 milliliter per minute (mL/min) batch clean-certified flow controller subsequent to purging the appropriate volume from each well. Steady helium concentrations were maintained beneath the shroud during sampling in the same manner explained in the purging step listed above. Purged vapor was also collected in a Tedlar bag and field-screened for VOCs, O_2, CO_2, and CH_4 using a PID and multi-gas meter. The results of these screening samples are discussed in Section 4.3.

2.2.5 Soil Vapor Sample Handling Procedures

Initial (before sample collection) and final (after sample collection but before shipment to the laboratory) vacuums of each Summa® canister were recorded in the field notes and on the sample tag attached to each canister. One blind duplicate was also collected as a quality assurance/quality control (QA/QC) sample in accordance with the approved SAP.

Summa® canisters were labeled and shipped to ALS Laboratory, located in Simi Valley, California, under chain-of-custody protocols. Soil vapor samples were analyzed for VOCs using EPA Method TO-15 and for helium by EPA Method TO-3C.

3.0 LABORATORY ANALYSIS AND QA/QC

The soil vapor samples collected following purging were analyzed by ALS Environmental of Simi Valley, California, for VOCs by EPA Method TO-15 and for helium by EPA Method TO-3C. A blind duplicate sample was collected at station SV-5, and submitted to the laboratory for analysis as "OU2A8-SV-7-5.0." Data validation was completed by Laboratory Data Consultants (Appendix E).

Soil vapor samples were shipped via a courier under chain-of-custody documentation to ALS Environmental (Simi Valley, CA) for analyses. Copies of the chain-of-custody documentation are included in Appendix E. The analytical laboratory maintained certification from Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP) and Washington State Department of Ecology for Method TO-15 during the performance of sample analysis.

The laboratory's QA oversight involved the performance of a first-level screening of the data and an indication of any deviations from their precision, accuracy, detection limit, or laboratory QA/QC criteria. A representative from the laboratory signed the data sheets, ensuring that the screening described above had been completed. Subsequently, Battelle completed a review of the data by comparing the chain-of-custody and field logbook entries with the data for each sample. This task was done by comparing copies of the laboratory analytical reports to electronically entered data by Battelle personnel. Additionally, the analytical data, along with the associated laboratory QC information, were forwarded for data validation services to Laboratory Data Consultants, Inc. (Carlsbad, CA), an independent, third-party company. An EPA Stage 2B data validation was performed on 90% of the soil vapor samples and Stage 3 data validation was performed on the remaining 10% of the samples.

Results from the November 2017 sampling event indicated that the data generally met all analytical criteria. However, there was one exception to the analytical criteria noted in the laboratory data validation report, as summarized below:

- The leak check compound, helium, was detected in samples OU2A8-SV-1-5.0, OU2A8-SV-2-5.0, and OU2A8-SV-3-5.0, however only the concentration in OU2A8-SV-1-5.0 was greater than ten times the reporting limit. All detected VOCs for OU2A8-SV-1-5.0 were qualified.
- The helium tracer results showed that the soil vapor samples were representative of soil vapor and were not influenced by ambient air.

Exceptions to the analytical criteria resulted in the assignment of "J" qualifiers to the data. The "J" qualifier indicates that the result is considered an estimated value. The laboratory data validation reports for the November 2017 sampling event are included in Appendix E. The soil vapor results are summarized in Table 2.

Table 2. Soil Vapor Sample Results (µg/m^3)

	Location Name	**OU2A8-SV-1**	**OU2A8-SV-2**	**OU2A8-SV-3**	**OU2A8-SV-3**	**OU2A8-SV-4**	**OU2A8-SV-5**	**OU2A8-SV-5**	**OU2A8-SV-6**
	Sample Name	OU2A8-SV-1-5.0	OU2A8-SV-2-5.0	OU2A8-SV-3-5.0	OU2A8-SV-3-8.0	OU2A8-SV-4-5.0	OU2A8-SV-5-5.0	OU2A8-SV-7-5.0	OU2A8-SV-6-5.0
	Sample Type	I	I	I	I	I	P	FD	I
Analyte	**PAL**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
1,1,2-Trichloroethane	6.67	6.2 U	**7.7** U	1.6 U	1.5 U	1.5 U	1.5 U	1.5 U	1.6 U
1,1-Dichloroethene	6,667	4.2 J	4.8 J	1.6 U	1.5 U	1.5 U	5.5	5.3	3
1,4-Dioxane	167	6.2 U	7.7 U	1.6 U	1.5 U	1.5 U	1.5 U	1.5 U	1.6 U
Benzene	107	6 U	7.6 U	0.63 J	1.5 J	3.4	2.1	4.7	1.5 U
Carbon Tetrachloride	139	6 U	7.6 U	1.6 U	1.5 U	33	1.5 U	1.5 U	1.5 U
cis-1,2-Dichloroethene	NE	38 J	7.7 U	1.6 U	0.94 J	0.83 J	1.5 U	1.5 U	1.6 U
Ethylbenzene	33,333	6 U	7.6 U	1.6 U	1.5 U	1.5 U	1.5 U	0.95 J	1.5 U
Tetrachloroethene	1,333	150 J	**1,500**	16	22	5.9	3.4	3.5	0.58 J
trans-1,2-Dichlorothene	2,000	**5,300** J	240	0.82 J	1.5 U	1.5 U	1.5 U	1.5 U	1.6 U
Trichloroethene	66.7	**1,300** J	**1,200**	**73**	**140**	**290** D	41	41	16
Vinyl Chloride	93.3	5.9 U	7.4 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Helium	NE	180,000	7,900	20,000	1,300 U	1,300 U	1,300 U	1,300 U	1,300 U

Volatile organic compounds analyzed by EPA Method TO 15
Helium analyzed by EPA Method 3C Modified
Bold text indicates that the result or the reporting limit exceeds the PAL.
D - Result is from laboratory-diluted sample; FD - Field Duplicate; I – Independent sample; J - Result is an estimated value; N - Parent sample; NE - Not established; U - Analyte not detected at the indicated reporting limit
PAL - Project action limit as established in the sampling and analysis plan
µg/m^3 - micrograms per cubic meter

During the November 2017 sampling event, a field duplicate QC sample was collected to ensure that a meaningful and representative dataset was generated for the OU2 Area 8 VI investigation. This field duplicate sample was collected at a rate of 10% of the soil vapor monitoring locations sampled. This sample was collected to ensure consistency and integrity of the sample collection methods. The parent sample of the field duplicate sample pair was identified as OU2A8-SV-5-5.0 and the field duplicate was identified as OU2A8-SV-7-5.0, to deliver a blind duplicate to the laboratory. Results were detected in both the parent sample and field duplicate for 1,1-dichloroethene, benzene, tetrachloroethene (PCE), and TCE (see Table 3). Results from the field duplicate sample were consistent with the parent sample results (meeting the project data quality objectives of <25% relative percent difference [RPD]), with the exception of benzene, which has a relative percent difference of 76%. The benzene results, however, were not qualified by the data validator because one or both results were less than two times the LOQ. The remaining three analytes had a range of 0 to 3.7% RPD. No other field QC samples were required by the SAP.

Table 3. Field Duplicate Pair Results

	Location Name	**OU2A8-SV-5**	**OU2A8-SV-5**		
	Sample Name	**OU2A8-SV-5-5.0**	**OU2A8-SV-7-5.0**		
	Sample Type	**Parent**	**Field Duplicate**		
Analyte	**PAL (µg/m³)**	**Result (µg/m³)**	**Result (µg/m³)**	**%RPD**	**>25%**
1,1,2-Trichloroethane	6.67	1.5 U	1.5 U	NC	
1,1-Dichloroethene	6,667	5.5	5.3	3.70%	
1,4-Dioxane	167	1.5 U	1.5 U	NC	
Benzene	107	2.1	4.7	**76.47%**	*
Carbon Tetrachloride	139	1.5 U	1.5 U	NC	
cis-1,2-Dichloroethene	NE	1.5 U	1.5 U	NC	
Ethylbenzene	33,333	1.5 U	0.95 J	NC	
Tetrachloroethene	1,333	3.4	3.5	2.90%	
trans-1,2-Dichlorothene	2,000	1.5 U	1.5 U	NC	
Trichloroethene	66.7	41	41	0.00%	
Vinyl Chloride	93.3	1.5 U	1.5 U	NC	
Helium	NE	1,300 U	1,300 U	NC	

VOCs analyzed by EPA Method TO 15
Helium analyzed by EPA Method 3C Modified
Bold text indicates that the result or the reporting limit exceeds the PAL.

Table 3. Field Duplicate Pair Results (continued)

J - Result is an estimated value; NC - not calculated; result <LOQ; NE - Not established; PAL - Project action limit as established in the sampling and analysis plan; RPD - relative percent difference; U - Analyte not detected at the indicated reporting limit
µg/m^3 - micrograms per cubic meter
* - exceeds RPD goal, but parent sample result is less than 2 times the LOQ, so data not qualified

Review of the laboratory data and data validation confirmed that the measurement quality objectives were achieved, and all soil vapor data are acceptable for use.

4.0 SOIL VAPOR RESULTS

This section describes the range of detected VOCs, compares detected concentrations to the project action limits (PALs) established in the SAP, and presents the spatial distribution of detected VOCs. This section also provides the results of helium tracer gas measurements in the field and laboratory relative to sample integrity. Fixed gases measured in the field are also briefly described with regard to interpretation of the target analyte data.

4.1 VOLATILE ORGANIC COMPOUNDS RESULTS

Between three and five of the 11 target VOC analytes were detected in each of the seven samples collected. The results are shown next to each sampling location on Figure 2 and are tabulated in Table 2. The maximum concentrations detected in the field duplicate pair are shown for sample location OU28-SV-5. The frequency of detection of each VOC, along with the minimum and maximum detected values compared to the PALs, is shown in Table 4.

4.1.1 Summary of VOCs Detected

TCE and PCE were detected in all seven samples collected, with TCE exceeding its PAL in five of the seven samples, and PCE exceeding its PAL in one of the seven samples. The only other VOC detected above the PAL was trans-1,2-dichloroethene (trans-1,2-DCE), which was detected above its PAL in one of the seven samples.

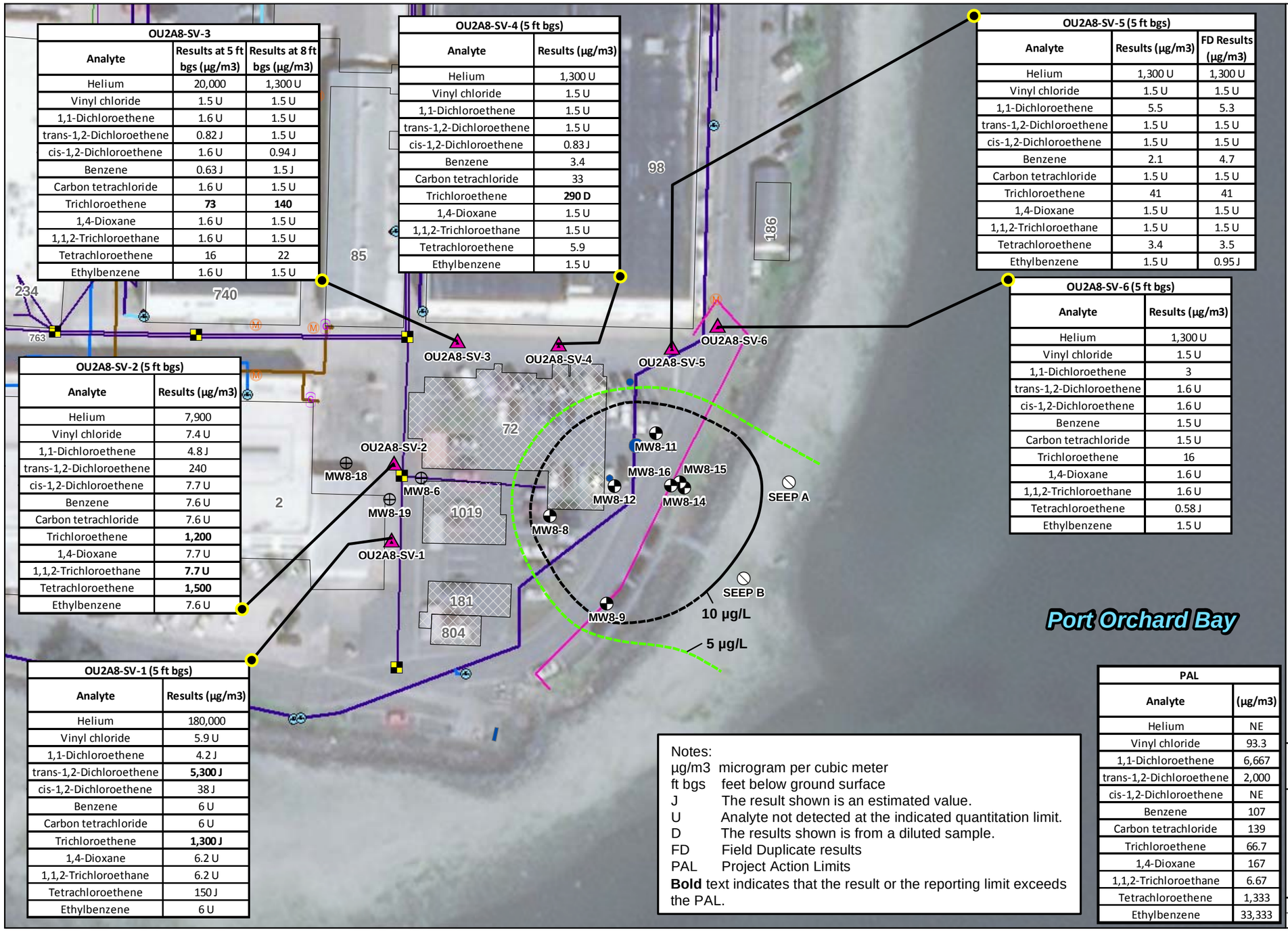
Benzene and 1,1-DCE was detected in five of the seven samples; however, the detected concentrations of benzene and 1,1-DCE did not exceed their respective PALs.

cis-1,2-DCE was detected in three of the seven samples, while carbon tetrachloride and ethylbenzene were each detected in one sample. Detections of these three analytes were below their respective PALs.

The reporting limit for 1,1,2-trichloroethane (1,1,2-TCA [7.7 µg/m^3]) exceeded the PAL (6.67 µg/m^3) in one of the seven samples. 1,1,2-TCA was not detected above the laboratory reporting limit in any of the remaining six samples. Vinyl chloride and 1,4-dioxane were also not detected above their laboratory reporting limits (which did not exceed their PALs) in any of the seven samples.

4.1.2 Spatial Distribution of Detected VOCs

The highest detected VOC concentrations were in samples from locations SV-1 and SV-2, east of Building 82. Concentrations of TCE at these two locations (1,300 µg/m^3 and 1,200 µg/m^3,



OU2A8-SV-3		
Analyte	**Results at 5 ft bgs (µg/m3)**	**Results at 8 ft bgs (µg/m3)**
Helium	20,000	1,300 U
Vinyl chloride	1.5 U	1.5 U
1,1-Dichloroethene	1.6 U	1.5 U
trans-1,2-Dichloroethene	0.82 J	1.5 U
cis-1,2-Dichloroethene	1.6 U	0.94 J
Benzene	0.63 J	1.5 J
Carbon tetrachloride	1.6 U	1.5 U
Trichloroethene	**73**	**140**
1,4-Dioxane	1.6 U	1.5 U
1,1,2-Trichloroethane	1.6 U	1.5 U
Tetrachloroethene	16	22
Ethylbenzene	1.6 U	1.5 U

OU2A8-SV-4 (5 ft bgs)	
Analyte	**Results (µg/m3)**
Helium	1,300 U
Vinyl chloride	1.5 U
1,1-Dichloroethene	1.5 U
trans-1,2-Dichloroethene	1.5 U
cis-1,2-Dichloroethene	0.83 J
Benzene	3.4
Carbon tetrachloride	33
Trichloroethene	**290 D**
1,4-Dioxane	1.5 U
1,1,2-Trichloroethane	1.5 U
Tetrachloroethene	5.9
Ethylbenzene	1.5 U

OU2A8-SV-5 (5 ft bgs)		
Analyte	**Results (µg/m3)**	**FD Results (µg/m3)**
Helium	1,300 U	1,300 U
Vinyl chloride	1.5 U	1.5 U
1,1-Dichloroethene	5.5	5.3
trans-1,2-Dichloroethene	1.5 U	1.5 U
cis-1,2-Dichloroethene	1.5 U	1.5 U
Benzene	2.1	4.7
Carbon tetrachloride	1.5 U	1.5 U
Trichloroethene	41	41
1,4-Dioxane	1.5 U	1.5 U
1,1,2-Trichloroethane	1.5 U	1.5 U
Tetrachloroethene	3.4	3.5
Ethylbenzene	1.5 U	0.95 J

OU2A8-SV-6 (5 ft bgs)	
Analyte	**Results (µg/m3)**
Helium	1,300 U
Vinyl chloride	1.5 U
1,1-Dichloroethene	3
trans-1,2-Dichloroethene	1.6 U
cis-1,2-Dichloroethene	1.6 U
Benzene	1.5 U
Carbon tetrachloride	1.5 U
Trichloroethene	16
1,4-Dioxane	1.6 U
1,1,2-Trichloroethane	1.6 U
Tetrachloroethene	0.58 J
Ethylbenzene	1.5 U

OU2A8-SV-2 (5 ft bgs)	
Analyte	**Results (µg/m3)**
Helium	7,900
Vinyl chloride	7.4 U
1,1-Dichloroethene	4.8 J
trans-1,2-Dichloroethene	240
cis-1,2-Dichloroethene	7.7 U
Benzene	7.6 U
Carbon tetrachloride	7.6 U
Trichloroethene	**1,200**
1,4-Dioxane	7.7 U
1,1,2-Trichloroethane	**7.7 U**
Tetrachloroethene	**1,500**
Ethylbenzene	7.6 U

OU2A8-SV-1 (5 ft bgs)	
Analyte	**Results (µg/m3)**
Helium	180,000
Vinyl chloride	5.9 U
1,1-Dichloroethene	4.2 J
trans-1,2-Dichloroethene	**5,300 J**
cis-1,2-Dichloroethene	38 J
Benzene	6 U
Carbon tetrachloride	6 U
Trichloroethene	**1,300 J**
1,4-Dioxane	6.2 U
1,1,2-Trichloroethane	6.2 U
Tetrachloroethene	150 J
Ethylbenzene	6 U

Notes:
µg/m3 microgram per cubic meter
ft bgs feet below ground surface
J The result shown is an estimated value.
U Analyte not detected at the indicated quantitation limit.
D The results shown is from a diluted sample.
FD Field Duplicate results
PAL Project Action Limits
Bold text indicates that the result or the reporting limit exceeds the PAL.

PAL	
Analyte	**(µg/m3)**
Helium	NE
Vinyl chloride	93.3
1,1-Dichloroethene	6,667
trans-1,2-Dichloroethene	2,000
cis-1,2-Dichloroethene	NE
Benzene	107
Carbon tetrachloride	139
Trichloroethene	66.7
1,4-Dioxane	167
1,1,2-Trichloroethane	6.67
Tetrachloroethene	1,333
Ethylbenzene	33,333

Legend

- Former Buildings
- Tanks
- Soil Vapor Location (Actual)
- Monitoring Well
- Spring-Seep
- Abandoned Monitoring Well
- Manhole
- Water Valve
- Electrical Structure (underground)
- Gas Valve

Main Utility Lines

- Distribution Main
- Hydrant Lateral
- Transmission Main
- Force Main (old South Pier)
- Electrical General
- Gas Service Line
- Water Service Line

TCE Isoconcentration contours

- Inferred Remediation Goal Contour
- Inferred Contour
- Contour

Feet
0 50 100

NAVFAC Naval Facilities Engineering Command

Figure 2
Concentrations in Soil Vapor

Naval Base Kitsap Keyport

DATE: 7/19/2018 ANALYST: HICKSJ
REV. 0 APPROVED: MEYER

FILE: C:\GIS\Keyport\Maps\OU2_Area_8_r06_DataF_4MPK.mxd

Table 4. Summary of Detected Analytes

Analyte	Number of Samples[a]	Number of Detections	Minimum Detection (µg/m^3)	Maximum Detection (µg/m^3)[b]	Maximum Reporting Limit	PAL (µg/m^3)	Number of Exceedances above PAL
1,1,2-Trichloroethane	7	0	NA	NA	**7.7**	6.67	1
1,1-Dichloroethene	7	5	3	5.5	1.6	6,667	0
1,4-Dioxane	7	0	NA	NA	7.7	167	0
Benzene	7	5	0.63 J	4.7	7.6	107	0
Carbon tetrachloride	7	1	33	33	7.6	139	0
cis-1,2-Dichloroethene	7	3	0.83 J	38 J	7.7	NE	NA
Ethylbenzene	7	1	0.95 J	0.95 J	7.6	33,333	0
Tetrachloroethene	7	7	0.58 J	**1,500**	NA	1,333	1
trans-1,2-Dichloroethene	7	3	0.82 J	**5,300 J**	1.6	2,000	1
Trichloroethene	7	7	16	**1,300 J**	NA	66.7	5
Vinyl chloride	7	0	NA	NA	7.4	93.3	0
Helium	7	3	7,900	180,000	1,300	NE	NA

[a] - Number of environmental samples, not inclusive of field duplicates
[b] - The highest concentration detected in all samples, including the duplicate sample, is presented in this column.
Bold text indicates that the result or the reporting limit exceeds the PAL.
PAL - project action limit
NA - Not applicable
NE - Not established
µg/m^3 - micrograms per cubic meter

respectively) were an order of magnitude higher than at any other location sampled. The concentration of trans-1,2-DCE at location SV-1 (5,300 µg/m^3) was over an order of magnitude higher than at location SV-2 (240 µg/m^3), and this compound was not detected at any other location sampled. The concentration of PCE at location SV-2 (1,500 µg/m^3) was an order of magnitude higher than at location SV-1 (150 J µg/m^3), and PCE concentrations at the remaining locations ranged from 0.58 J µg/m^3 to 22 µg/m^3.

The two locations exhibiting the highest VOC concentrations in soil vapor are near an underground electrical corridor, which appears to have a spur aligned to the east and terminating within the area of known VOCs in groundwater. This implies that utility corridors could be serving as a migration pathway for VOC vapors. The concentration of TCE in monitoring well MW8-8 near the terminus of the electrical line was documented to be 40 parts per billion (ppb) in 2017 and was detected between 140 and 320 (estimated) ppb during the 1993 Remedial Investigation/ Feasibility Study (RI/FS). The PCE concentration detected in monitoring well MW8-8 during the 1993 RI/FS was between 100 and 130 ppb. The concentration of TCE detected in decommissioned monitoring well MW8-6, closest to the "T" in the electrical line, during the 1993 RI/FS was 50 ppb and the PCE concentration was 95 ppb.

Concentrations in samples from the four locations south of Building 98 (SV-3 through SV-6) were lower overall than concentrations in samples from the two locations east of Building 82. South of Building 98, the only VOC that exceeded its associated PAL was TCE at locations SV-3 and SV-4.

At the one location where a deep soil vapor sample was collected (SV-3), the detected VOC concentrations were somewhat higher in the deeper (8 feet bgs) sample compared to the shallower (5 feet bgs) sample, as shown in Table 2. For example, the TCE concentration was approximately two times higher in the deeper sample.

4.2 HELIUM RESULTS

Concentrations of helium reported by the laboratory (Table 5) ranged from non-detect at the reporting limit (1,300 µg/m^3) to 180,000 µg/m^3. The amount of ambient air in the soil vapor samples was qualitatively evaluated based on the concentration of helium measured in the shroud around the sample connection, and the concentration of helium in the sample. The estimated volume of ambient air in soil vapor samples ranged from 0% to 0.22%, which is well below the established metric of 5% per the SAP.

Table 5. Estimated Volume of Ambient Air in Soil Vapor Samples

Sample ID	Date	Lab Reported Helium Concentration	Lab Reported Helium Concentration (Converted)	Lab Reported Helium Concentration (Converted)	Minimum Helium Concentration Reported in Shroud	Maximum Helium Concentration Reported in Shroud	Average Concentration of Helium Reported in Shroud	Estimated Volume of Ambient Air in Soil Vapor Sample
		(µg/m^3)	(ppmV)	(%)	(%)	(%)	(%)	(%)
OU2A8-SV-1-5.0	11/29/2017	**180,000**	**1,100.3**	0.1100	45.0	55.0	50.0	0.22
OU2A8-SV-2-5.0	11/29/2017	**7,900**	**48.3**	0.0048	32.3	54.3	43.3	0.01
OU2A8-SV-3-5.0	11/29/2017	**20,000**	**122.3**	0.0122	25.0	35.0	30.0	0.04
OU2A8-SV-3-8.0	11/29/2017	**ND (1,300)**	**ND**	0	35.0	45.0	40.0	0.00
OU2A8-SV-4-5.0	11/29/2017	**ND (1,300)**	**ND**	0	15.0	39.8	27.4	0.00
OU2A8-SV-5-5.0	11/30/2017	**ND (1,300)**	**ND**	0	NR	NR	0.0	0.00
OU2A8-SV-6-5.0	11/30/2017	**ND (1,300)**	**ND**	0	30.0	43.8	36.9	0.00
OU2A8-SV-7-5.0	11/30/2017	**ND (1,300)**	**ND**	0	NR	NR	0.0	0.00

Volumes were determined using Dalton's Law and the Ideal Gas Law
Sample OU2A8-SV-7.0-5.0 is a field duplicate of parent sample OU2A8-SV-5-5.0
% - percent
ND - not detected at limit in parentheses
NR - not recorded
µg/m^3 - micrograms per cubic meter
ppmv -parts per million by volume

4.3 FIELD MEASUREMENTS OF TOTAL ORGANIC VAPOR AND FIXED GASES

Total VOCs and fixed gases were measured during purging activities with field instruments. The ranges of these detections are summarized below:

- VOCs: 0.3 to 12.1 parts per million
- Methane: 0 percent
- Carbon Dioxide: 0 to 1.1 percent
- Oxygen: 19.3 to 22.6 percent

These field measurements are generally consistent between locations, with no exceptional readings at the stations where VOCs were found to exceed the PALs in the soil vapor samples. Since methane was not detected during field measurement, there is no evidence to support its interference with the helium tracer gas measurements.

5.0 CONCLUSIONS

This section presents the decision rules established in the SAP and the conclusions drawn based on the data collected and these decision rules.

5.1 DECISION RULE 1 CONCLUSIONS

Additional investigation of the VI pathway at Area 8 is warranted based on a strict comparison of the measured concentrations of target VOCs to PALs. Detected concentrations of VOCs in five of seven samples exceeded their respective PALs, with the concentrations of TCE in two samples exceeding the PAL for this compound by nearly two orders of magnitude. Although additional investigation is warranted, actual VI potential appears to be low at Area 8 and the soil vapor concentrations detected are likely to result in VOC concentrations in indoor air below risk-based screening levels. This conclusion is based on the fact that the current EPA VISL is calculated using a subslab attenuation factor for residential buildings of 0.03, and the Navy has established a database of VI results from commercial and industrial buildings that demonstrates subslab attenuation of vapors to indoor air is two and three orders of magnitude greater in these types of buildings than the EPA residentially-based attenuation factor (Navy's Environmental Sustainability Development to Integration [NESDI], 2015).

Based on a single location where both shallow and deep soil vapor sampling was possible, the deeper soil vapor sample exhibited higher VOC concentrations. This deeper sample is closer to groundwater containing VOCs, implying that the source of VOCs in soil vapor may be contaminated groundwater.

5.2 DECISION RULE 2 CONCLUSIONS

Additional investigation of VOC migration along preferential pathways is warranted. The highest VOC concentrations were detected in samples from two of the locations farthest from known VOC concentrations in groundwater. These two locations are near an underground electrical corridor, which appears to have a spur aligned to the east and terminating within the area of known VOCs in groundwater. One interpretation of these results is that VOC vapors are migrating along the backfill of this electrical utility.

6.0 REFERENCES

Environmental Protection Agency (EPA). 2015. *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air*. Office of Solid Waste and Emergency Response. OSWER Publication 9200.2-154. June.

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U.S. Navy. 2017. *Final Sampling and Analysis Plan for 2017 Vapor Intrusion Study at Keyport OU 2, Area 8, Naval Base Kitsap Keyport, Washington*. Prepared by Battelle Memorial Institute and Trihydro Corporation for Naval Facilities Engineering Command Northwest under Contract N44255-14-D-9013, Task Order 0026. November 2017.

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———. 1999. *Closure Report, Remedial Action, Area 8, Building 72 Plating Shop Demolition and Soil Hot Spot Removal, Naval Undersea Warfare Center Division, Keyport, Washington.* Prepared by Foster Wheeler Environmental Corporation for EFA Northwest.

U.S. Navy, U.S. Environmental Protection Agency (EPA), and Washington State Department of Ecology (Ecology). 1994. *Final Record of Decision for Operable Unit 2, Naval Undersea Warfare Center Division, Keyport, Washington.* Prepared by URS Consultants and Science Applications International Corporation for EFA NW under CLEAN Contract No. N62474-89-D-9295, CTO 10. September 28.

Washington State Department of Ecology (Ecology). 2016. *Review Draft Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action*. Publication No. 09-09-047. Toxics Cleanup Program. Published October 2009, revised February 2016.

APPENDIX A

Responses to Agency and Stakeholder Comments on the Draft Report

Document Title:
DRAFT Vapor Intrusion (VI) Study Report, 2017 Keyport Operable Unit (OU) 2, Area 8, Naval Base Kitsap (NBK) Keyport

Document dated: May 2018

Comments from: Mahbub Alam, Ecology PM
Comments dated: June 20, 2018

#	Page No./ Line No.	Comment	Proposed Response	Response Accepted?
Ecology Comments and Responses				
0	General	Ecology agrees with the conclusions to do additional investigations. At the same time, Ecology noted that the maximum reported TCE concentration (1300 ug/m3) is more than 5 times above Ecology's Vapor Intrusion Subsurface Screening Levels for Short-term Exposures to TCE (Draft Implementation Memo in preparation). Per the Draft Implementation Memo, the non-residential short-term sub-slab/soil gas VI Screening Level is 250 µg/m³. This number is based on the following: 1) TCE as a non-carcinogen, 2) receptor of concern: women of childbearing age, 3) commercial/industrial workplace scenarios, 4) short-term means a 3-week indoor exposures. As such, according to the Draft Implementation Memo, indoor air sampling should not be delayed and first indoor air sampling should be a site priority. Once one or more site buildings has been identified as a location where VI may potentially result in indoor air TCE concentrations above the short-term Action Level, investigators should quickly plan for the next assessment steps, unless it is already known at this stage that women of child-bearing age do not regularly occupy these buildings. Ecology would like to know the steps the Navy has taken or plans to take as a result of this priority.	The Navy does not consider the soil gas concentrations detected at Area 8 (maximum concentration of 1,300 ug/m3) to pose a concern for TCE short-term exposure in indoor air warranting an expedited response for several reasons: 1) Any concern for health effects associated with TCE exposure should and will be based on measured indoor air concentrations and will be determined by the occupational health and medical professionals responsible for ensuring the health and safety of building occupants (regardless of source) in Navy owned and controlled non-residential buildings. 2) The Navy is currently contracting an indoor/outdoor/ subslab vapor intrusion study of the four buildings adjacent to Area 8 for FY18 award. Once awarded, a Quality Assurance Project Plan (QAPP) will need to be prepared with concurrence from site regulators and stakeholders prior to executing the work described in the QAPP. It is anticipated that the first	Yes

Document Title:
DRAFT Vapor Intrusion (VI) Study Report, 2017 Keyport Operable Unit (OU) 2, Area 8, Naval Base Kitsap (NBK) Keyport

Document dated: May 2018

#	Page No./ Line No.	Comment	Proposed Response	Response Accepted?
			round of sampling could begin as early as February 2019. 3) It is not clear how the 250 µg/m3 referenced in the comment was derived. However, it is assumed that it is based on a calculation of the indoor air industrial RSL (8.8 [HQ=1]) and a subslab attenuation factor of .03 (EPA default based on residential buildings). This would result in 8.8 * 33, or approximately 290 µg/m3. However, assuming this reflects the 250 µg/m3 cited, this approach does not account for the following: a. The current EPA VISL is calculated using a subslab attenuation factor for residential buildings of .03; however, the Navy has established a database of VI results from 49 commercial and industrial buildings that demonstrates subslab attenuation of vapors to indoor air is 2 and 3 orders of magnitude greater in these types of buildings than the EPA residentially-based attenuation factor (NESDI 2015) b. The toxicological basis of the fetal heart malformation that triggered the TCE short-term exposure guidance was based on oral exposure (Johnson et. al.	

Document Title:
DRAFT Vapor Intrusion (VI) Study Report, 2017 Keyport Operable Unit (OU) 2, Area 8, Naval Base Kitsap (NBK) Keyport

Document dated: May 2018

#	Page No./ Line No.	Comment	Proposed Response	Response Accepted?
			2003) and five studies assessing inhalation of TCE in rodents/rabbits have not encountered this malformation (Carney et. al. 2006; Dorfmueller et.al. 1979; Hardin et.al. 1981; Healy et. al. 1982; and Schwetz et. al. 1975) c. Evaluation of the VI pathway considers multiple lines of evidence instead of single value comparison.	
1	Page 5-1, Section 5.1	"*Although additional investigation is warranted, actual VI potential remains low at Area 8, since the exposure assumptions for workers in nearby buildings, the attenuation factor typical of industrial building foundations, and the magnitude of the soil vapor concentrations detected are likely to result in VOC concentrations in indoor air below risk-based screening levels*." Ecology recommends to remove the sentence as the report did not analyze or evaluate these stated assumptions and how the levels can become below risk based screening levels. In addition, there may be a higher soil gas flowrate into the building than the screening levels assume through preferential pathways.	Please see response to Comment 1, above. The Navy will change the referenced paragraph as follows: "Although additional investigation is warranted, actual VI potential appears to be low at Area 8 and the soil vapor concentrations detected are likely to result in VOC concentrations in indoor air below risk-based screening levels, since the current EPA VISL is calculated using a subslab attenuation factor for residential buildings of .03, and the Navy has established a database of VI results from 49 commercial and industrial buildings that demonstrates subslab attenuation of vapors to indoor air is 2 and 3 orders of magnitude greater in these types of buildings than the	Yes

Document Title:
DRAFT Vapor Intrusion (VI) Study Report, 2017 Keyport Operable Unit (OU) 2, Area 8, Naval Base Kitsap (NBK) Keyport

Document dated: May 2018

#	Page No./ Line No.	Comment	Proposed Response	Response Accepted?
			EPA residentially-based attenuation factor (NESDI 2015)." The reference for NESDI 2015 will also be added to the reference section of the report.	
2	Page 5-1, Section 5.1	"*At the one location where both shallow and deep soil vapor sampling was possible, the deeper soil vapor sample exhibited higher VOC concentrations. This deeper sample is closer to groundwater containing VOCs, implying that the source of VOCs in soil vapor is contaminated groundwater.*" While contaminated groundwater may be the source but the location is further away from the presumed plume location. Section 5.2 asserts that there may be a utility corridor preferential pathway which would not likely contribute to higher VOC concentrations at deeper sample. Ecology recommends to add a caveat or limiting sentence since this is only speculation based on only one data point and further investigation is necessary to arrive at this conclusion. In addition, there exists a lot of uncertainties in VI data.	We will change "is" in the last sentence to "may be." And we will change the first part of the first sentence in the paragraph to read, "Based on a single location….."	Yes

Document Title:
DRAFT Vapor Intrusion (VI) Study Report, 2017 Keyport Operable Unit (OU) 2, Area 8, Naval Base Kitsap (NBK) Keyport

Document dated: May 2018

Comments from: Denice Taylor, Suquamish Tribe PM
Comments dated: June 20, 2018

Suquamish Tribe Comments and Responses				
#	**Page No./ Line No.**	**Comment**	**Proposed Response**	**Response Accepted?**
0	**General**	I agree that the results of the VI study indicate that additional investigation of Area 8 pathways is warranted and should be undertaken. However, the statement in Section 5 that the actual VI potential remains low at Area 8 should be removed from the report as it is an opinion and not a conclusion based on a risk assessment.	Please refer to the response to Ecology Comment No. 1, above. In addition, conclusions/opinions/ professional judgments about the potential for VI occurrence are appropriate when evaluating the VI pathway, which uses multiple lines of evidence for verification. VI pathway evaluation does not reflect risk assessment, but the potential for VI to occur in an adjacent building.	Yes
0	**General**	I agree that it is possible that groundwater could be the source of VOCs in soil vapor, and that the electrical corridor between SV-1 and SV-2 could serve as a preferential pathway for contamination. However, neither of these conclusions has been verified. Please see the specific comments below.	Please refer to the response to your comments No. 1 and 2, below.	Yes
1	Page 1-4	The report states "Based on excavation of contamination above the water table during remedy implementation, there are no known vapor sources in the vadose zone." I believe that some contaminated soils were allowed to remain in place after the remedy. Please provide additional information that can verify that all contaminated soil above the water table was removed, or delete it and subsequent conclusions based upon it.	Although records indicate that contaminated soil was removed to the water/soil interface at 9 feet bgs, given the tidally influenced nature of the site, this depth may or may not be below the water table at any one point in time. Therefore, conclusions based on total removal of contaminants from the vadose zone will be removed from the report.	Yes

Document Title:
DRAFT Vapor Intrusion (VI) Study Report, 2017 Keyport Operable Unit (OU) 2, Area 8, Naval Base Kitsap (NBK) Keyport

Document dated: May 2018

#	Page No./ Line No.	Comment	Proposed Response	Response Accepted?
2	Page 4-4	The report describes an underground electrical corridor with may act as a preferential path for migration of VOC vapors based on the soil vapor concentrations at SV-1 and SV-2, and that the electrical corridor appears to terminate within an area of known VOCs in groundwater. Suggest including some groundwater monitoring well locations and ranges of reported concentrations to backup this conclusion.	Well locations are shown on Figure 2. Concentrations of trichloroethylene (TCE) in monitoring well MW8-8 near the terminus of the electrical line were documented to be 40 parts per billion (ppb) in 2017 and was detected between 140 and 320(estimated) ppb during the 1993 Remedial Investigation/ Feasibility Study (RI/FS). The tetrachloroethylene (PCE) concentration detected in monitoring well MW8-8 during the 1993 RI/FS was between 100 and 130 ppb. The concentrations of TCE detected in decommissioned monitoring well MW8-6, closest to the "T" in the electrical line, during the 1993 RI/FS was 50 ppb and the PCE concentration was 95 ppb. This data will be added to the report to support the conclusion that the underground electrical corridor may act as a preferential path for migration of VOC vapors.	Yes
3	Page 4-4	Suggest also including monitoring well data in the vicinity of SV-3, as well as details regarding soil removal during the remediation, which would verify the assumption that higher VOC concentrations closer to the saturated zone imply that residual VOCs in groundwater are a more likely source of VOCs in soil vapor than a potential vadose-zone source.	Based on the response to your comment No. 1, above, the sentence regarding higher VOC concentrations closer to the saturated zone implying that residual VOCs in groundwater are a more likely source of VOCs in soil vapor than a potential vadose-zone source will be removed.	Yes

APPENDIX B

Weather Records

Bremerton, WA }

Bremerton National

N **1:39 PM PST on February 01, 2018** (GMT -0800)

Weather History for KPWT - November, 2017

November

13

2017

View

Monday, November 13, 2017

Daily | Weekly | Monthly | Custom

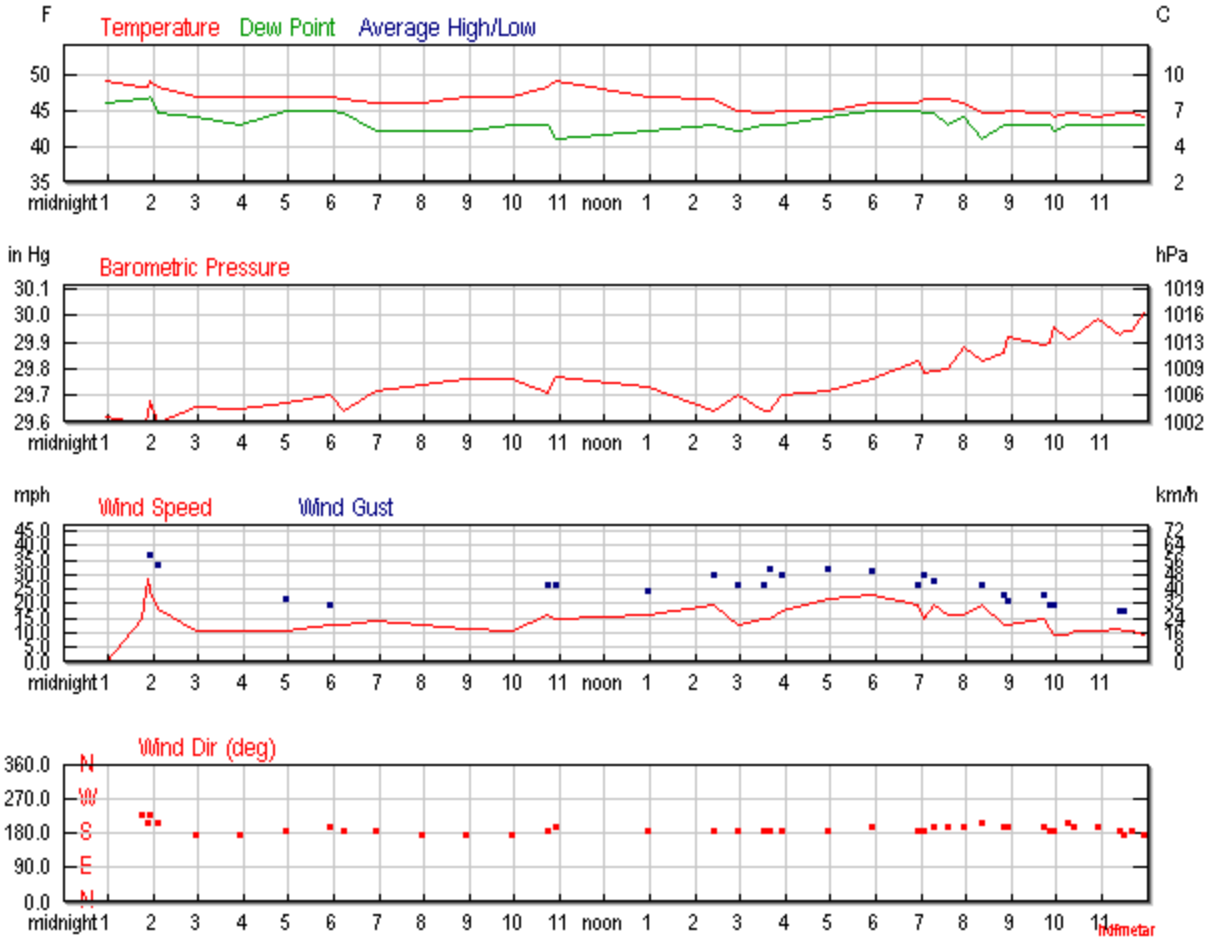
	Actual	Average	Record
Temperature			
Mean Temperature	**46** °F	-	
Max Temperature	**48** °F	**48** °F	**60** °F (1997)
Min Temperature	**44** °F	**36** °F	**23** °F (2014)
Degree Days			
Heating Degree Days	19		

	Actual	Average	Record
Moisture			
Dew Point	**43** °F		
Average Humidity	91		
Maximum Humidity	97		
Minimum Humidity	74		
Precipitation			
Precipitation	**0.27** in	-	- ()
Sea Level Pressure			
Sea Level Pressure	**29.77** in		
Wind			
Wind Speed	**13** mph (SSW)		
Max Wind Speed	**29** mph		
Max Gust Speed	**37** mph		
Visibility	**9** miles		
Events	Rain		

Averages and records for this station are not official NWS values.

T = Trace of Precipitation, MM = Missing Value Source: NWS Daily Summary

Daily Weather History Graph



Search for Another Location

Airport or City:

KPWT

Submit

Trip Planner

Search our weather history database for the weather conditions in past years. The results will help you decide how hot, cold, wet, or windy it might be!

Date:

November

13

Submit

Astronomy

Nov. 13, 2017	**Rise**	**Set**
Actual Time	7:13 AM PST	4:36 PM PST
Civil Twilight	6:40 AM PST	5:10 PM PST
Nautical Twilight	6:02 AM PST	5:47 PM PST
Astronomical Twilight	5:26 AM PST	6:23 PM PST
Moon	1:54 AM PST (11/13)	2:55 PM PST (11/13)
Length of Visible Light	10h 30m	
Length of Day	9h 23m	
Waning Crescent, 20% of the Moon is Illuminated		

Nov 13	Nov 18	Nov 26	Dec 3	Dec 9
Waning Crescent	New	First Quarter	Full	Last Quarter

Hourly Weather History & Observations

Time (PST)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
12:56 AM	**48.9** °F	-	**46.0** °F	90%	**29.62** in	**9.0** mi	Calm	Calm	-	**0.02** in		Overcast
1:46 AM	**48.2** °F	-	**46.4** °F	93%	**29.60** in	**8.0** mi	SW	**15.0** mph	-	**0.01** in	Rain	Heavy Rain
1:53 AM	**48.2** °F	-	**46.4** °F	93%	**29.62** in	**5.0** mi	SSW	**28.8** mph	**36.8** mph	**0.02** in	Rain	Heavy Rain
1:56 AM	**48.9** °F	-	**46.9** °F	93%	**29.68** in	**5.0** mi	SW	**24.2** mph	**36.8** mph	**0.02** in	Rain	Rain
2:06 AM	**48.2** °F	-	**44.6** °F	87%	**29.60** in	**10.0** mi	SSW	**18.4** mph	**33.4** mph	**0.00** in	Rain	Light Rain
2:56 AM	**46.9** °F	-	**44.1** °F	90%	**29.66** in	**10.0** mi	South	**10.4** mph	-	**0.01** in		Overcast
3:56 AM	**46.9** °F	-	**43.0** °F	86%	**29.65** in	**10.0** mi	South	**10.4** mph	**19.6** mph	**0.02** in		Overcast
4:56 AM	**46.9** °F	-	**45.0** °F	93%	**29.67** in	**10.0** mi	South	**10.4** mph	**21.9** mph	**0.01** in	Rain	Light Rain
5:56 AM	**46.9** °F	-	**45.0** °F	93%	**29.70** in	**10.0** mi	SSW	**12.7** mph	**19.6** mph	**0.02** in		Overcast
6:13 AM	**46.4** °F	**40.7** °F	**44.6** °F	93%	**29.64** in	**10.0** mi	South	**12.7** mph	-	N/A		Overcast
6:56 AM	**46.0** °F	**39.9** °F	**42.1** °F	86%	**29.72** in	**10.0** mi	South	**13.8** mph	**19.6** mph	**0.01** in		Scattered Clouds
7:56 AM	**46.0** °F	**40.2** °F	**42.1** °F	86%	**29.74** in	**10.0** mi	South	**12.7** mph	-	**0.02** in		Overcast
8:56 AM	**46.9** °F	-	**42.1** °F	83%	**29.76** in	**10.0** mi	South	**11.5** mph	-	**0.01** in		Overcast

Time (PST)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
9:56 AM	**46.9** °F	-	**43.0** °F	86%	**29.76** in	-	South	**10.4** mph	**17.3** mph	**0.02** in		Overcast
10:45 AM	**48.2** °F	-	**42.8** °F	82%	**29.71** in	-	South	**16.1** mph	**26.5** mph	N/A		Overcast
10:56 AM	**48.9** °F	-	**41.0** °F	74%	**29.77** in	**10.0** mi	SSW	**15.0** mph	**26.5** mph	**0.01** in		Overcast
12:56 PM	**46.9** °F	-	**42.1** °F	83%	**29.73** in	**10.0** mi	South	**16.1** mph	**24.2** mph	N/A		Unknown
2:26 PM	**46.4** °F	**39.0** °F	**42.8** °F	87%	**29.64** in	**8.0** mi	South	**19.6** mph	**29.9** mph	N/A	Rain	Rain
2:56 PM	**45.0** °F	**38.9** °F	**42.1** °F	90%	**29.70** in	**7.0** mi	South	**12.7** mph	**26.5** mph	N/A	Rain	Rain
3:30 PM	**44.6** °F	**37.8** °F	**42.8** °F	93%	**29.64** in	**5.0** mi	South	**15.0** mph	**26.5** mph	N/A	Rain	Heavy Rain
3:40 PM	**44.6** °F	**37.8** °F	**42.8** °F	93%	**29.64** in	**6.0** mi	South	**15.0** mph	**32.2** mph	N/A	Rain	Rain
3:56 PM	**45.0** °F	**37.6** °F	**43.0** °F	93%	**29.70** in	**7.0** mi	South	**17.3** mph	**29.9** mph	N/A	Rain	Rain
4:56 PM	**45.0** °F	**36.6** °F	**44.1** °F	97%	**29.72** in	**8.0** mi	South	**21.9** mph	**32.2** mph	N/A	Rain	Rain
5:56 PM	**46.0** °F	**37.8** °F	**45.0** °F	96%	**29.76** in	**10.0** mi	SSW	**23.0** mph	**31.1** mph	**0.02** in	Rain	Light Rain
6:56 PM	**46.0** °F	**38.5** °F	**45.0** °F	96%	**29.83** in	**10.0** mi	South	**19.6** mph	**26.5** mph	**0.01** in	Rain	Light Rain
7:03 PM	**46.4** °F	**40.1** °F	**44.6** °F	93%	**29.78** in	**10.0** mi	South	**15.0** mph	**29.9** mph	**0.00** in	Rain	Light Rain
7:16 PM	**46.4** °F	**39.0** °F	**44.6** °F	93%	**29.79** in	**10.0** mi	SSW	**19.6** mph	**27.6** mph	**0.00** in		Overcast
7:36 PM	**46.4** °F	**39.8** °F	**42.8** °F	87%	**29.80** in	**10.0** mi	SSW	**16.1** mph	-	**0.01** in		Scattered Clouds
7:56 PM	**46.0** °F	**39.3** °F	**44.1** °F	93%	**29.88** in	**10.0** mi	SSW	**16.1** mph	**21.9** mph	**0.02** in		Mostly Cloudy
8:21 PM	**44.6** °F	**36.6** °F	**41.0** °F	87%	**29.83** in	**10.0** mi	SSW	**19.6** mph	**26.5** mph	N/A		Scattered Clouds

Time (PST)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
8:50 PM	**44.6** °F	**38.4** °F	**42.8** °F	93%	**29.86** in	**10.0** mi	SSW	**12.7** mph	**23.0** mph	**0.01** in		Mostly Cloudy
8:56 PM	**45.0** °F	**38.9** °F	**43.0** °F	93%	**29.92** in	**10.0** mi	SSW	**12.7** mph	**20.7** mph	**0.01** in		Mostly Cloudy
9:42 PM	**44.6** °F	**37.8** °F	**42.8** °F	93%	**29.89** in	**10.0** mi	SSW	**15.0** mph	**23.0** mph	**0.01** in	Rain	Light Rain
9:52 PM	**44.6** °F	**38.8** °F	**42.8** °F	93%	**29.90** in	**10.0** mi	South	**11.5** mph	**19.6** mph	**0.01** in		Overcast
9:56 PM	**44.1** °F	**39.0** °F	**42.1** °F	93%	**29.96** in	**10.0** mi	South	**9.2** mph	**19.6** mph	**0.01** in		Overcast
10:14 PM	**44.6** °F	**39.7** °F	**42.8** °F	93%	**29.91** in	**10.0** mi	SSW	**9.2** mph	-	**0.01** in	Rain	Light Rain
10:23 PM	**44.6** °F	**39.2** °F	**42.8** °F	93%	**29.92** in	**10.0** mi	SSW	**10.4** mph	-	**0.01** in	Rain	Light Rain
10:56 PM	**44.1** °F	**38.6** °F	**43.0** °F	96%	**29.99** in	**10.0** mi	SSW	**10.4** mph	**17.3** mph	**0.02** in	Rain	Light Rain
11:23 PM	**44.6** °F	**38.8** °F	**42.8** °F	93%	**29.93** in	**10.0** mi	South	**11.5** mph	**17.3** mph	**0.00** in	Rain	Light Rain
11:30 PM	**44.6** °F	**39.2** °F	**42.8** °F	93%	**29.94** in	**10.0** mi	South	**10.4** mph	**17.3** mph	**0.00** in	Rain	Light Rain
11:41 PM	**44.6** °F	**39.2** °F	**42.8** °F	93%	**29.94** in	**10.0** mi	South	**10.4** mph	-	**0.01** in	Rain	Light Rain
11:56 PM	**44.1** °F	**39.0** °F	**43.0** °F	96%	**30.01** in	**10.0** mi	South	**9.2** mph	-	**0.01** in	Rain	Light Rain

Bremerton, WA }

Bremerton National

N **1:41 PM PST on February 01, 2018** (GMT -0800)

Weather History for KPWT - November, 2017

November

14

2017

View
Tuesday, November 14, 2017

Daily | Weekly | Monthly | Custom

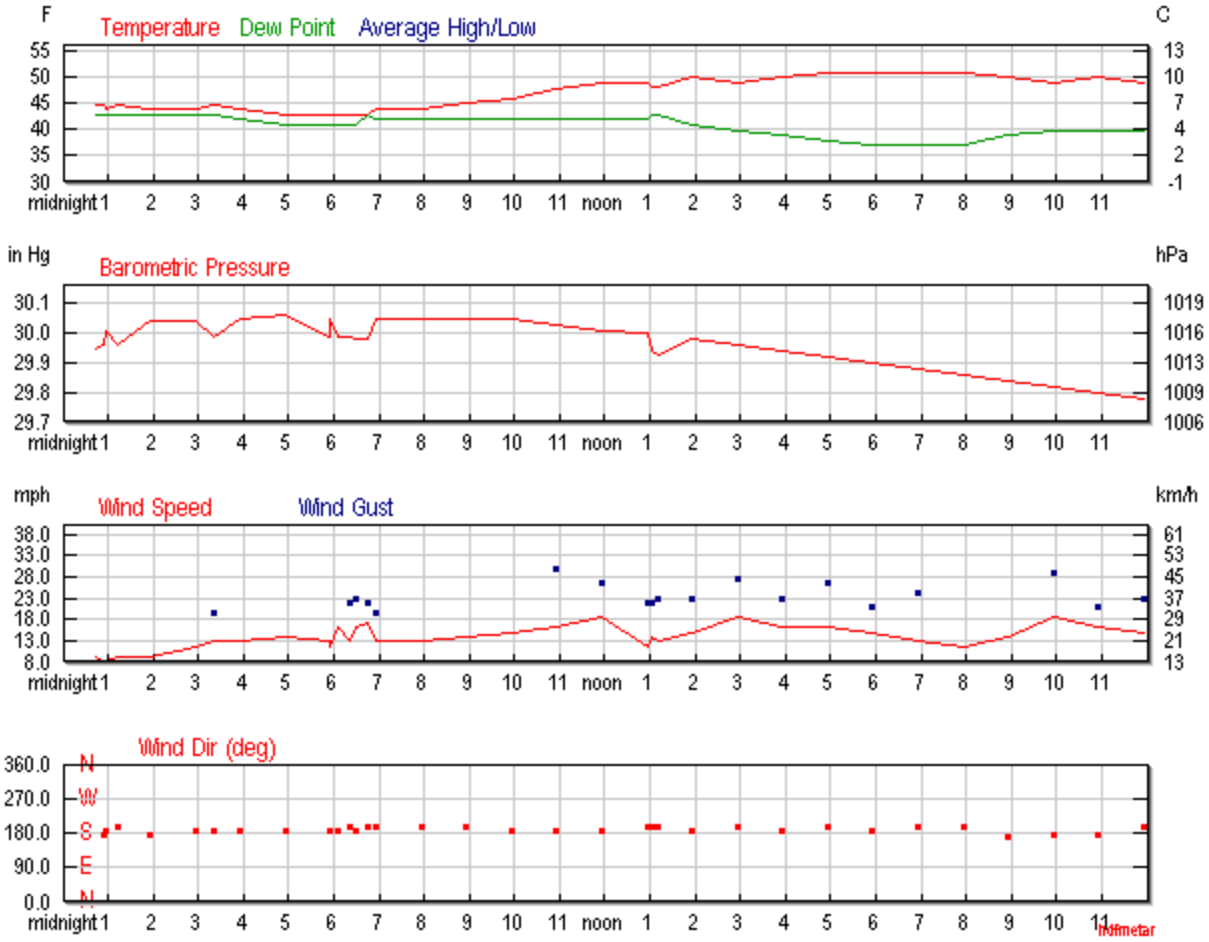
	Actual	Average	Record
Temperature			
Mean Temperature	**46** °F	-	
Max Temperature	**51** °F	**48** °F	**57** °F (2001)
Min Temperature	**42** °F	**36** °F	**21** °F (2014)
Degree Days			
Heating Degree Days	18		

	Actual	Average	Record
Moisture			
Dew Point	**41** °F		
Average Humidity	83		
Maximum Humidity	100		
Minimum Humidity	59		
Precipitation			
Precipitation	**0.29** in	-	- ()
Sea Level Pressure			
Sea Level Pressure	**29.97** in		
Wind			
Wind Speed	**12** mph (SSW)		
Max Wind Speed	**18** mph		
Max Gust Speed	**30** mph		
Visibility	**10** miles		
Events	Rain		

Averages and records for this station are not official NWS values.

T = Trace of Precipitation, MM = Missing Value Source: NWS Daily Summary

Daily Weather History Graph



Search for Another Location

Airport or City:

KPWT

Submit

Trip Planner

Search our weather history database for the weather conditions in past years. The results will help you decide how hot, cold, wet, or windy it might be!

Date:

November

14

Submit

Astronomy

Nov. 14, 2017	**Rise**	**Set**
Actual Time	7:14 AM PST	4:35 PM PST
Civil Twilight	6:41 AM PST	5:09 PM PST
Nautical Twilight	6:04 AM PST	5:46 PM PST
Astronomical Twilight	5:27 AM PST	6:22 PM PST
Moon	3:00 AM PST (11/14)	3:21 PM PST (11/14)
Length of Visible Light	10h 27m	
Length of Day	9h 20m	
Waning Crescent, 13% of the Moon is Illuminated		

Nov 14	Nov 18	Nov 26	Dec 3	Dec 9
Waning Crescent	New	First Quarter	Full	Last Quarter

Hourly Weather History & Observations

Time (PST)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
12:44 AM	**44.6** °F	**39.7** °F	**42.8** °F	93%	**29.95** in	**10.0** mi	South	**9.2** mph	-	N/A	Rain	Light Rain
12:54 AM	**44.6** °F	**40.2** °F	**42.8** °F	93%	**29.96** in	**10.0** mi	South	**8.1** mph	-	N/A	Rain	Light Rain
12:56 AM	**44.1** °F	**39.5** °F	**43.0** °F	96%	**30.01** in	**10.0** mi	South	**8.1** mph	-	N/A	Rain	Light Rain
1:13 AM	**44.6** °F	**39.7** °F	**42.8** °F	93%	**29.96** in	**10.0** mi	SSW	**9.2** mph	-	**0.01** in	Rain	Rain
1:56 AM	**44.1** °F	**39.0** °F	**43.0** °F	96%	**30.04** in	**10.0** mi	South	**9.2** mph	-	**0.02** in	Rain	Rain
2:56 AM	**44.1** °F	**38.1** °F	**43.0** °F	96%	**30.04** in	**10.0** mi	South	**11.5** mph	**18.4** mph	**0.01** in		Overcast
3:21 AM	**44.6** °F	**38.4** °F	**42.8** °F	93%	**29.99** in	**10.0** mi	South	**12.7** mph	**19.6** mph	**0.01** in	Rain	Light Rain
3:56 AM	**44.1** °F	**37.7** °F	**42.1** °F	93%	**30.05** in	**10.0** mi	South	**12.7** mph	-	**0.01** in	Rain	Rain
4:56 AM	**43.0** °F	**36.0** °F	**41.0** °F	93%	**30.06** in	**10.0** mi	South	**13.8** mph	**20.7** mph	**0.02** in		Overcast
5:54 AM	**42.8** °F	**36.2** °F	**41.0** °F	93%	**29.99** in	**10.0** mi	South	**12.7** mph	-	**0.01** in		Mostly Cloudy
5:56 AM	**43.0** °F	**36.8** °F	**41.0** °F	93%	**30.05** in	**10.0** mi	South	**11.5** mph	-	**0.01** in		Mostly Cloudy

Time (PST)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
6:06 AM	**42.8** °F	**35.1** °F	**41.0** °F	93%	**29.99** in	**10.0** mi	South	**16.1** mph	**25.3** mph	N/A		Mostly Cloudy
6:21 AM	**42.8** °F	**36.2** °F	**41.0** °F	93%	**29.99** in	**10.0** mi	SSW	**12.7** mph	**21.9** mph	N/A		Mostly Cloudy
6:30 AM	**42.8** °F	**35.1** °F	**41.0** °F	93%	**29.98** in	**10.0** mi	South	**16.1** mph	**23.0** mph	**0.01** in		Mostly Cloudy
6:46 AM	**42.8** °F	**34.8** °F	**42.8** °F	100%	**29.98** in	**10.0** mi	SSW	**17.3** mph	**21.9** mph	**0.01** in	Rain	Light Rain
6:56 AM	**44.1** °F	**37.7** °F	**42.1** °F	93%	**30.05** in	**10.0** mi	SSW	**12.7** mph	**19.6** mph	**0.01** in	Rain	Light Rain
7:56 AM	**44.1** °F	**37.7** °F	**42.1** °F	93%	**30.05** in	**10.0** mi	SSW	**12.7** mph	-	**0.01** in	Rain	Light Rain
8:56 AM	**45.0** °F	**38.5** °F	**42.1** °F	90%	**30.05** in	**10.0** mi	SSW	**13.8** mph	-	**0.02** in	Rain	Light Rain
9:56 AM	**46.0** °F	**39.6** °F	**42.1** °F	86%	**30.05** in	**10.0** mi	South	**15.0** mph	**24.2** mph	**0.01** in	Rain	Light Rain
10:56 AM	**48.0** °F	-	**42.1** °F	80%	**30.03** in	**10.0** mi	South	**16.1** mph	**29.9** mph	**0.01** in		Overcast
11:56 AM	**48.9** °F	-	**42.1** °F	77%	**30.01** in	**10.0** mi	South	**18.4** mph	**26.5** mph	**0.01** in	Rain	Light Rain
12:56 PM	**48.9** °F	-	**42.1** °F	77%	**30.00** in	**10.0** mi	SSW	**11.5** mph	**21.9** mph	**0.02** in	Rain	Light Rain
1:03 PM	**48.2** °F	-	**42.8** °F	82%	**29.94** in	**10.0** mi	SSW	**13.8** mph	**21.9** mph	**0.00** in	Rain	Light Rain
1:11 PM	**48.2** °F	-	**42.8** °F	82%	**29.93** in	**10.0** mi	SSW	**12.7** mph	**23.0** mph	**0.00** in	Rain	Light Rain
1:56 PM	**50.0** °F	-	**41.0** °F	71%	**29.98** in	**10.0** mi	South	**15.0** mph	**23.0** mph	**0.01** in		Overcast
2:56 PM	**48.9** °F	-	**39.9** °F	71%	**29.96** in	**10.0** mi	SSW	**18.4** mph	**27.6** mph	**0.01** in	Rain	Light Rain
3:56 PM	**50.0** °F	-	**39.0** °F	66%	**29.94** in	**10.0** mi	South	**16.1** mph	**23.0** mph	**0.02** in		Mostly Cloudy

Time (PST)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
4:56 PM	**51.1** °F	-	**37.9** °F	61%	**29.92** in	**10.0** mi	SSW	**16.1** mph	**26.5** mph	**0.01** in		Mostly Cloudy
5:56 PM	**51.1** °F	-	**37.0** °F	59%	**29.90** in	**10.0** mi	South	**15.0** mph	**20.7** mph	**0.01** in		Overcast
6:56 PM	**51.1** °F	-	**37.0** °F	59%	**29.88** in	**10.0** mi	SSW	**12.7** mph	**24.2** mph	**0.02** in	Rain	Light Rain
7:56 PM	**51.1** °F	-	**37.0** °F	59%	**29.86** in	**10.0** mi	SSW	**11.5** mph	-	**0.01** in	Rain	Light Rain
8:56 PM	**50.0** °F	-	**39.0** °F	66%	**29.84** in	**10.0** mi	South	**13.8** mph	**25.3** mph	**0.01** in	Rain	Light Rain
9:56 PM	**48.9** °F	-	**39.9** °F	71%	**29.82** in	**10.0** mi	South	**18.4** mph	**28.8** mph	**0.01** in	Rain	Light Rain
10:56 PM	**50.0** °F	-	**39.9** °F	68%	**29.80** in	**10.0** mi	South	**16.1** mph	**20.7** mph	**0.01** in	Rain	Light Rain
11:56 PM	**48.9** °F	-	**39.9** °F	71%	**29.78** in	**10.0** mi	SSW	**15.0** mph	**23.0** mph	**0.01** in	Rain	Light Rain

Bremerton, WA }

Bremerton National

N **1:11 PM PST on February 09, 2018** (GMT -0800)

Weather History for KPWT - November, 2017

November

29

2017

View
Wednesday, November 29, 2017

Daily | Weekly | Monthly | Custom

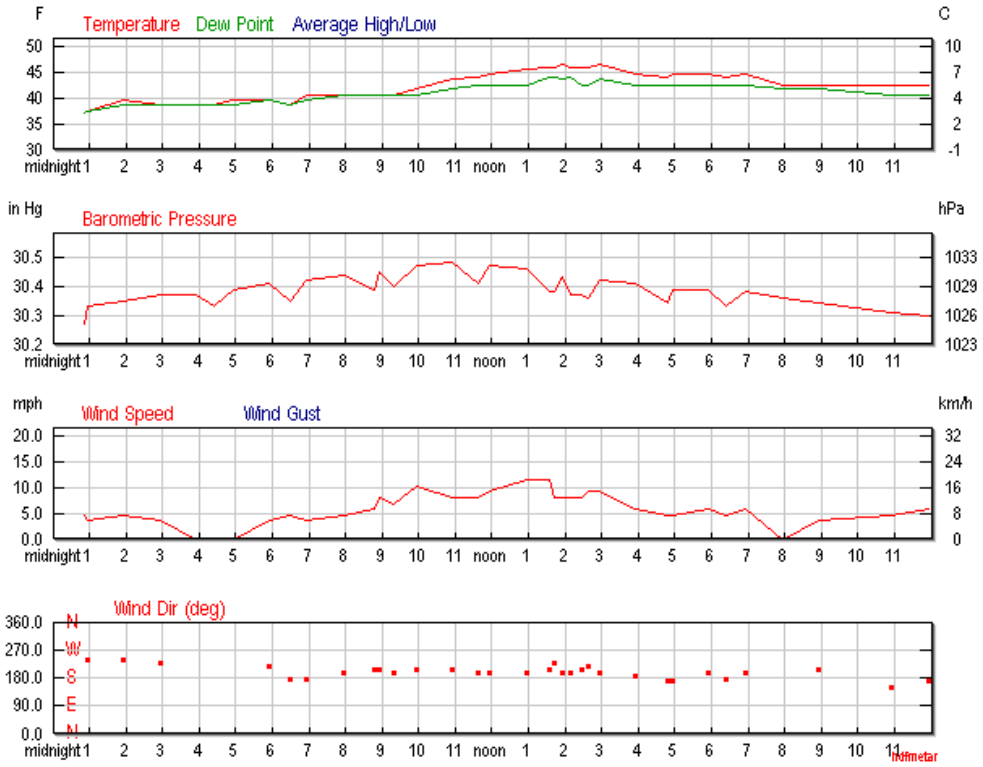
	Actual	Average	Record
Temperature			
Mean Temperature	**42** °F	-	
Max Temperature	**46** °F	**44** °F	**57** °F (2008)
Min Temperature	**37** °F	**33** °F	**17** °F (2006)
Degree Days			
Heating Degree Days	24		
Moisture			
Dew Point	**42** °F		
Average Humidity	95		
Maximum Humidity	100		
Minimum Humidity	87		
Precipitation			
Precipitation	**0.06** in	-	- ()
Sea Level Pressure			
Sea Level Pressure	**30.38** in		
Wind			
Wind Speed	**5** mph (SSW)		
Max Wind Speed	**12** mph		
Max Gust Speed	-		
Visibility	**9** miles		

	Actual	Average	Record
Events			

Averages and records for this station are not official NWS values.

T = Trace of Precipitation, MM = Missing Value Source: NWS Daily Summary

Daily Weather History Graph



Search for Another Location

Airport or City:

KPWT

Submit

Trip Planner

Search our weather history database for the weather conditions in past years. The results will help you decide how hot, cold, wet, or windy it might be!

Date:

November

29

Submit

Astronomy

Nov. 29, 2017	Rise	Set
Actual Time	7:35 AM PST	4:22 PM PST
Civil Twilight	7:00 AM PST	4:57 PM PST
Nautical Twilight	6:22 AM PST	5:36 PM PST
Astronomical Twilight	5:45 AM PST	6:13 PM PST
Moon	2:33 PM PST (11/29)	2:20 AM PST (11/29)
Length of Visible Light	9h 56m	
Length of Day	8h 47m	

Waxing Gibbous, 81% of the Moon is Illuminated

Nov 29	Dec 3	Dec 9	Dec 17	Dec 26
Waxing Gibbous	Full	Last Quarter	New	First Quarter

Hourly Weather History & Observations

Time (PST)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
12:51 AM	**37.4** °F	**33.8** °F	**37.4** °F	100%	**30.27** in	**10.0** mi	WSW	**4.6** mph	-	N/A		Mostly Cloudy
12:56 AM	**37.9** °F	**35.5** °F	**37.9** °F	100%	**30.33** in	**10.0** mi	WSW	**3.5** mph	-	N/A		Mostly Cloudy
1:56 AM	**39.9** °F	**36.7** °F	**39.0** °F	97%	**30.35** in	**10.0** mi	WSW	**4.6** mph	-	**0.01** in		Overcast
2:56 AM	**39.0** °F	**36.8** °F	**39.0** °F	100%	**30.37** in	**10.0** mi	SW	**3.5** mph	-	N/A		Overcast
3:56 AM	**39.0** °F	-	**39.0** °F	100%	**30.37** in	**10.0** mi	Calm	Calm	-	N/A		Overcast
4:25 AM	**39.2** °F	-	**39.2** °F	100%	**30.33** in	**10.0** mi	Calm	Calm	-	N/A		Overcast
4:56 AM	**39.9** °F	-	**39.0** °F	97%	**30.39** in	**10.0** mi	Calm	Calm	-	N/A		Overcast
5:56 AM	**39.9** °F	**37.8** °F	**39.9** °F	100%	**30.41** in	**5.0** mi	SW	**3.5** mph	-	**0.01** in		Overcast
6:30 AM	**39.2** °F	**35.9** °F	**39.2** °F	100%	**30.35** in	**9.0** mi	South	**4.6** mph	-	N/A		Overcast
6:56 AM	**41.0** °F	**39.0** °F	**39.9** °F	96%	**30.42** in	**8.0** mi	South	**3.5** mph	-	N/A		Overcast
7:56 AM	**41.0** °F	**38.0** °F	**41.0** °F	100%	**30.44** in	**4.0** mi	SSW	**4.6** mph	-	N/A		Overcast
8:47 AM	**41.0** °F	**37.1** °F	**41.0** °F	100%	**30.39** in	**3.0** mi	SSW	**5.8** mph	-	**0.01** in		Overcast
8:56 AM	**41.0** °F	**35.8** °F	**41.0** °F	100%	**30.45** in	**4.0** mi	SSW	**8.1** mph	-	**0.01** in		Overcast

Time (PST)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
9:18 AM	**41.0** °F	**36.4** °F	**41.0** °F	100%	**30.40** in	**10.0** mi	SSW	**6.9** mph	-	N/A		Overcast
9:56 AM	**42.1** °F	**36.1** °F	**41.0** °F	96%	**30.47** in	**10.0** mi	SSW	**10.4** mph	-	N/A		Overcast
10:56 AM	**44.1** °F	**39.5** °F	**42.1** °F	93%	**30.48** in	**10.0** mi	SSW	**8.1** mph	-	**0.00** in		Overcast
11:37 AM	**44.6** °F	**40.2** °F	**42.8** °F	93%	**30.41** in	**10.0** mi	SSW	**8.1** mph	-	N/A		Overcast
11:56 AM	**45.0** °F	**40.1** °F	**43.0** °F	93%	**30.47** in	**10.0** mi	SSW	**9.2** mph	-	N/A		Overcast
12:56 PM	**46.0** °F	**40.6** °F	**43.0** °F	89%	**30.46** in	**10.0** mi	SSW	**11.5** mph	-	**0.01** in		Overcast
1:33 PM	**46.4** °F	**41.1** °F	**44.6** °F	93%	**30.38** in	**10.0** mi	SSW	**11.5** mph	-	N/A		Mostly Cloudy
1:43 PM	**46.4** °F	**42.4** °F	**44.6** °F	93%	**30.38** in	**10.0** mi	SW	**8.1** mph	-	N/A		Mostly Cloudy
1:56 PM	**46.9** °F	-	**44.1** °F	90%	**30.43** in	**10.0** mi	SSW	**8.1** mph	-	N/A		Mostly Cloudy
2:10 PM	**46.4** °F	**42.4** °F	**44.6** °F	93%	**30.37** in	**10.0** mi	SSW	**8.1** mph	-	N/A		Scattered Clouds
2:27 PM	**46.4** °F	**42.4** °F	**42.8** °F	87%	**30.37** in	**10.0** mi	SSW	**8.1** mph	-	N/A		Mostly Cloudy
2:38 PM	**46.4** °F	**41.9** °F	**42.8** °F	87%	**30.36** in	**10.0** mi	SW	**9.2** mph	-	N/A		Mostly Cloudy
2:56 PM	**46.9** °F	-	**44.1** °F	90%	**30.42** in	**10.0** mi	SSW	**9.2** mph	-	N/A		Mostly Cloudy
3:56 PM	**45.0** °F	**41.8** °F	**43.0** °F	93%	**30.41** in	**10.0** mi	South	**5.8** mph	-	**0.01** in		Scattered Clouds
4:48 PM	**44.6** °F	**42.2** °F	**42.8** °F	93%	**30.34** in	**10.0** mi	South	**4.6** mph	-	N/A		Overcast
4:56 PM	**45.0** °F	**42.6** °F	**43.0** °F	93%	**30.39** in	**10.0** mi	South	**4.6** mph	-	N/A		Overcast
5:56 PM	**45.0** °F	**41.8** °F	**43.0** °F	93%	**30.39** in	**10.0** mi	SSW	**5.8** mph	-	N/A		Overcast
6:25 PM	**44.6** °F	**42.2** °F	**42.8** °F	93%	**30.33** in	**10.0** mi	South	**4.6** mph	-	N/A		Overcast
6:56 PM	**45.0** °F	**41.8** °F	**43.0** °F	93%	**30.38** in	**10.0** mi	SSW	**5.8** mph	-	**0.01** in		Overcast
7:56 PM	**43.0** °F	-	**42.1** °F	97%	**30.36** in	**10.0** mi	Calm	Calm	-	N/A		Partly Cloudy
8:56 PM	**43.0** °F	**41.3** °F	**42.1** °F	97%	**30.34** in	**10.0** mi	SSW	**3.5** mph	-	N/A		Overcast
10:56 PM	**43.0** °F	**40.3** °F	**41.0** °F	93%	**30.31** in	**10.0** mi	SSE	**4.6** mph	-	N/A		Clear
11:56 PM	**43.0** °F	**39.5** °F	**41.0** °F	93%	**30.30** in	**10.0** mi	South	**5.8** mph	-	N/A		Scattered Clouds

Bremerton, WA }

Bremerton National

N **1:14 PM PST on February 09, 2018** (GMT -0800)

Weather History for KPWT - November, 2017

November

30

2017

View
Thursday, November 30, 2017

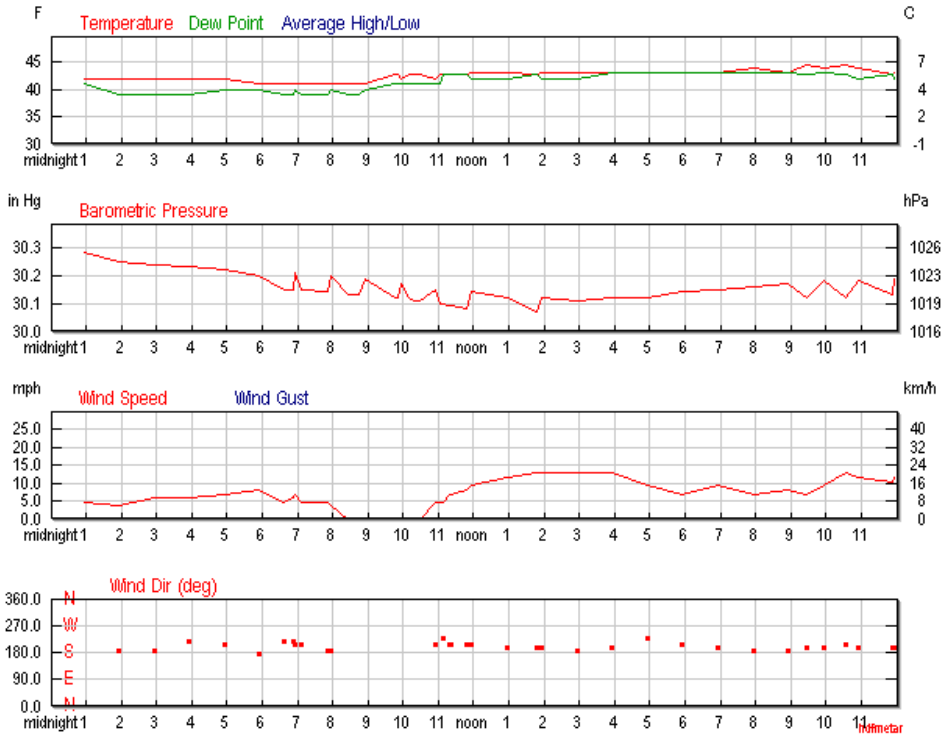
Daily | Weekly | Monthly | Custom

	Actual	Average	Record
Temperature			
Mean Temperature	**42** °F	-	
Max Temperature	**44** °F	**43** °F	**55** °F (2002)
Min Temperature	**41** °F	**33** °F	**23** °F (2014)
Degree Days			
Heating Degree Days	22		
Moisture			
Dew Point	**41** °F		
Average Humidity	96		
Maximum Humidity	100		
Minimum Humidity	89		
Precipitation			
Precipitation	**0.06** in	-	- ()
Sea Level Pressure			
Sea Level Pressure	**30.15** in		
Wind			
Wind Speed	**5** mph (SSW)		
Max Wind Speed	**13** mph		
Max Gust Speed	**20** mph		
Visibility	**7** miles		
Events	Rain		

Averages and records for this station are not official NWS values.

T = Trace of Precipitation, MM = Missing Value Source: NWS Daily Summary

Daily Weather History Graph



Search for Another Location

Airport or City:

KPWT

Submit

Trip Planner

Search our weather history database for the weather conditions in past years. The results will help you decide how hot, cold, wet, or windy it might be!

Date:

November

30

Submit

Astronomy

Nov. 30, 2017	Rise	Set
Actual Time	7:37 AM PST	4:22 PM PST
Civil Twilight	7:02 AM PST	4:57 PM PST

Nov. 30, 2017	Rise	Set
Nautical Twilight	6:23 AM PST	5:35 PM PST
Astronomical Twilight	5:46 AM PST	6:12 PM PST
Moon	3:03 PM PST (11/30)	3:32 AM PST (11/30)
Length of Visible Light	9h 55m	
Length of Day	8h 45m	

Waxing Gibbous, 89% of the Moon is Illuminated

Nov 30	Dec 3	Dec 9	Dec 17	Dec 26
Waxing Gibbous	Full	Last Quarter	New	First Quarter

Hourly Weather History & Observations

Time (PST)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
12:56 AM	**42.1** °F	**39.2** °F	**41.0** °F	96%	**30.28** in	**10.0** mi	South	**4.6** mph	-	N/A		Overcast
1:56 AM	**42.1** °F	**40.2** °F	**39.0** °F	89%	**30.25** in	**10.0** mi	South	**3.5** mph	-	**0.01** in		Mostly Cloudy
2:56 AM	**42.1** °F	**38.4** °F	**39.0** °F	89%	**30.24** in	**10.0** mi	South	**5.8** mph	-	N/A		Scattered Clouds
3:56 AM	**42.1** °F	**38.4** °F	**39.0** °F	89%	**30.23** in	**10.0** mi	SW	**5.8** mph	-	N/A		Mostly Cloudy
4:56 AM	**42.1** °F	**37.7** °F	**39.9** °F	92%	**30.22** in	**10.0** mi	SSW	**6.9** mph	-	**0.01** in	Rain	Light Rain
5:56 AM	**41.0** °F	**35.8** °F	**39.9** °F	96%	**30.20** in	**10.0** mi	South	**8.1** mph	-	**0.00** in	Rain	Light Rain
6:36 AM	**41.0** °F	**38.0** °F	**39.2** °F	93%	**30.15** in	**10.0** mi	SW	**4.6** mph	-	**0.00** in	Rain	Light Rain
6:54 AM	**41.0** °F	**37.1** °F	**39.2** °F	93%	**30.15** in	**9.0** mi	SW	**5.8** mph	-	**0.00** in	Rain	Light Rain
6:56 AM	**41.0** °F	**36.4** °F	**39.9** °F	96%	**30.21** in	**9.0** mi	SSW	**6.9** mph	-	**0.00** in	Rain	Light Rain
7:07 AM	**41.0** °F	**38.0** °F	**39.2** °F	93%	**30.15** in	**8.0** mi	SSW	**4.6** mph	-	**0.00** in	Rain	Rain
7:51 AM	**41.0** °F	**38.0** °F	**39.2** °F	93%	**30.14** in	**7.0** mi	South	**4.6** mph	-	N/A	Rain	Rain
7:56 AM	**41.0** °F	**39.0** °F	**39.9** °F	96%	**30.20** in	**7.0** mi	South	**3.5** mph	-	N/A	Rain	Rain
8:26 AM	**41.0** °F	-	**39.2** °F	93%	**30.13** in	**5.0** mi	Calm	Calm	-	N/A	Rain	Rain
8:46 AM	**41.0** °F	-	**39.2** °F	93%	**30.13** in	**5.0** mi	Calm	Calm	-	N/A	Rain	Rain
8:56 AM	**41.0** °F	-	**39.9** °F	96%	**30.19** in	**4.0** mi	Calm	Calm	-	N/A	Rain	Rain

Time (PST)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
9:46 AM	**42.8** °F	-	**41.0** °F	93%	**30.12** in	**2.5** mi	Calm	Calm	-	N/A	Rain	Light Rain
9:52 AM	**42.8** °F	-	**41.0** °F	93%	**30.12** in	**3.0** mi	Calm	Calm	-	N/A	Rain	Light Rain
9:56 AM	**42.1** °F	-	**41.0** °F	96%	**30.17** in	**3.0** mi	Calm	Calm	-	N/A	Rain	Rain
10:09 AM	**42.8** °F	-	**41.0** °F	93%	**30.12** in	**2.5** mi	Calm	Calm	-	N/A	Rain	Light Rain
10:19 AM	**42.8** °F	-	**41.0** °F	93%	**30.11** in	**3.0** mi	Calm	Calm	-	N/A	Rain	Light Rain
10:29 AM	**42.8** °F	-	**41.0** °F	93%	**30.11** in	**4.0** mi	Calm	Calm	-	N/A	Rain	Light Rain
10:56 AM	**42.1** °F	**39.2** °F	**41.0** °F	96%	**30.15** in	**4.0** mi	SSW	**4.6** mph	-	N/A	Rain	Light Rain
11:02 AM	**42.8** °F	**40.1** °F	**41.0** °F	93%	**30.10** in	**3.0** mi	Variable	**4.6** mph	-	**0.00** in	Rain	Light Rain
11:07 AM	**42.8** °F	**40.1** °F	**42.8** °F	100%	**30.10** in	**2.5** mi	SW	**4.6** mph	-	**0.00** in	Rain	Light Rain
11:20 AM	**42.8** °F	**38.6** °F	**42.8** °F	100%	**30.09** in	**2.5** mi	SSW	**6.9** mph	-	**0.00** in	Rain	Light Rain
11:22 AM	**42.8** °F	**38.6** °F	**42.8** °F	100%	**30.09** in	**3.0** mi	SSW	**6.9** mph	-	**0.00** in	Rain	Light Rain
11:49 AM	**42.8** °F	**38.0** °F	**42.8** °F	100%	**30.08** in	**6.0** mi	SSW	**8.1** mph	-	**0.00** in	Rain	Light Rain
11:56 AM	**43.0** °F	**37.7** °F	**42.1** °F	97%	**30.14** in	**5.0** mi	SSW	**9.2** mph	-	**0.00** in	Rain	Light Rain
12:56 PM	**43.0** °F	**36.8** °F	**42.1** °F	97%	**30.12** in	**9.0** mi	SSW	**11.5** mph	**19.6** mph	**0.00** in		Overcast
1:48 PM	**42.8** °F	**36.2** °F	**42.8** °F	100%	**30.07** in	**4.0** mi	SSW	**12.7** mph	-	**0.00** in	Rain	Light Rain
1:56 PM	**43.0** °F	**36.4** °F	**42.1** °F	97%	**30.12** in	**7.0** mi	SSW	**12.7** mph	-	**0.00** in	Rain	Light Rain
2:56 PM	**43.0** °F	**36.4** °F	**42.1** °F	97%	**30.11** in	**10.0** mi	South	**12.7** mph	**18.4** mph	**0.01** in		Overcast
3:56 PM	**43.0** °F	**36.4** °F	**43.0** °F	100%	**30.12** in	**10.0** mi	SSW	**12.7** mph	-	N/A		Overcast
4:56 PM	**43.0** °F	**37.7** °F	**43.0** °F	100%	**30.12** in	**10.0** mi	SW	**9.2** mph	-	**0.01** in		Overcast
5:56 PM	**43.0** °F	**38.8** °F	**43.0** °F	100%	**30.14** in	**10.0** mi	SSW	**6.9** mph	-	N/A		Overcast
6:56 PM	**43.0** °F	**37.7** °F	**43.0** °F	100%	**30.15** in	**9.0** mi	SSW	**9.2** mph	-	N/A		Overcast
7:56 PM	**44.1** °F	**40.1** °F	**43.0** °F	96%	**30.16** in	**10.0** mi	South	**6.9** mph	-	N/A		Overcast
8:56 PM	**43.0** °F	**38.2** °F	**43.0** °F	100%	**30.17** in	**10.0** mi	South	**8.1** mph	-	**0.01** in		Overcast
9:27 PM	**44.6** °F	**40.7** °F	**42.8** °F	93%	**30.12** in	**10.0** mi	SSW	**6.9** mph	-	N/A		Overcast

Time (PST)	Temp.	Windchill	Dew Point	Humidity	Pressure	Visibility	Wind Dir	Wind Speed	Gust Speed	Precip	Events	Conditions
9:56 PM	**44.1** °F	**39.0** °F	**43.0** °F	96%	**30.18** in	**10.0** mi	SSW	**9.2** mph	-	N/A		Overcast
10:33 PM	**44.6** °F	**38.4** °F	**42.8** °F	93%	**30.12** in	**10.0** mi	SSW	**12.7** mph	-	N/A		Overcast
10:56 PM	**44.1** °F	**38.1** °F	**42.1** °F	93%	**30.18** in	**10.0** mi	SSW	**11.5** mph	-	N/A		Overcast
11:53 PM	**42.8** °F	**37.0** °F	**42.8** °F	100%	**30.13** in	**10.0** mi	SSW	**10.4** mph	-	**0.01** in		Overcast
11:56 PM	**43.0** °F	**36.8** °F	**42.1** °F	97%	**30.19** in	**10.0** mi	SSW	**11.5** mph	-	**0.01** in		Overcast

APPENDIX C

Boring and Well Logs

BATTELLE

Project: NBK Keyport
Site: OU 2 Area 8
Boring Log: OU2A8-SV-1

Permit Number:	18-EP011	Drilling Contractor:	Holt Services	Northing (NAD 83):	260157.062
Project Number:	100100157	Driller:	Michael Running	Easting (NAD 83):	1201674.95
Contract Number:	N44255-14-D-9013	Drilling Equipment:	Geoprobe 7822DT	Surface Elevation (NAVD 88):	15.941
Task Order Number:	TO 0026	Drilling Method:	DPT	Borehole Abandoned:	Y
Date Logged:	11/13/2017, 1509	Boring Diameter:	2.5"	Backfill Method:	Gravity; see well construction
Geologist:	Sam Moore	Sampler Type:	Macrocore	Device Type:	soil vapor points- 5.0', 8.0'
Total Depth (ft bgs):	10	Hammer Type:	Hydraulic		
Reviewer:	Michael Meyer				

Depth (ft bgs)	USCS Symbol	Sample Description	Blow Counts	Sample Recovery	Sample ID	Headspace Readings	Lithology	Well Construction
0	SW	Gravelly SAND, medium dense, damp, gray/brown (2.5Y 3/2); (G:S:F: 40/60/0); concrete top (0.0' to 0.8').		60%		2.1		**Surface Completion:** 5" steel vault.
1								**Casing Seal:** Bentonite Crumble
2								**Sand:** 10/20 Colorado Silica sand
3								**Probes:** EON products SVP200/201.
4						1.8		**DTW:** 4.0 ft bgs immediately after drilling (during rain); >8.0 ft bgs upon re-drilling the following day.
5								**Screen:** 4.9'-5'; 7.9'-8'
6						1.2		**TD:** 10'
7				100%				**Notes:** Used 5" concrete saw to drill through concrete layer.
8						0		
9	SW	Silty SAND between 8.5' to 9.0'.						
10						0		
11								
12								
13								
14								
15								

BATTELLE

Project: NBK Keyport
Site: OU 2 Area 8
Boring Log: OU2A8-SV-2

Permit Number:	18-EP011	Drilling Contractor:	Holt Services	Northing (NAD 83):	260206.845
Project Number:	100100157	Driller:	Michael Running	Easting (NAD 83):	1201676.49
Contract Number:	N44255-14-D-9013	Drilling Equipment:	Geoprobe 7822DT	Surface Elevation (NAVD 88):	16.733
Task Order Number:	TO 0026	Drilling Method:	DPT	Borehole Abandoned:	Y
Date Logged:	11/13/2017, 1412	Boring Diameter:	2.5"	Backfill Method:	Gravity; see well construction
Geologist:	Sam Moore	Sampler Type:	Macrocore	Device Type:	soil vapor points- 4.5', 8'
Total Depth (ft bgs):	10	Hammer Type:	Hydraulic		
Reviewer:	Michael Meyer				

Depth (ft bgs)	USCS Symbol	Sample Description	Blow Counts	Sample Recovery	Sample ID	Headspace Readings	Lithology	Well Construction
0	SW	Gravelly SAND, dense, damp (from concrete cutting), gray-brown (2.5Y 4/2); (G:S:F 40/60/0); (concrete 0.0' to 0.7').		60%		4.9		**Surface Completion:** 5" steel vault. **Casing Seal:** Bentonite Crumble **Sand:** 10/20 Colorado Silica sand **Probes:** EON products SVP200/201. **DTW:** 9.1 ft bgs **Screen:** 4.4'-4.5'; 7.9'-8' **TD:** 10' **Notes:** Used 5" concrete saw to drill through concrete layer.
4	CH	Fat CLAY, very stiff, damp, gray-brown (2.5Y 4/2); (G:S:F 0/0/100).				4		
5	GM	Silty GRAVEL, loose, wet, gray-brown (2.5Y 4/2); (G:S:F 70/10/20).		90%		7.6		
7	SP	Gravelly SAND, medium dense, wet, gray/brown (10YR 3/2); (G:S:F 40/60/0).				8.2		
10						5.4		
15								

BATTELLE

Project: NBK Keyport
Site: OU 2 Area 8
Boring Log: OU2A8-SV-3

Permit Number:	18-EP011	Drilling Contractor:	Holt Services	Northing (NAD 83):	260286.023
Project Number:	100100157	Driller:	Michael Running	Easting (NAD 83):	1201717.81
Contract Number:	N44255-14-D-9013	Drilling Equipment:	Geoprobe 7822DT	Surface Elevation (NAVD 88):	18.147
Task Order Number:	TO 0026	Drilling Method:	DPT	Borehole Abandoned:	Y
Date Logged:	11/13/2017, 1032	Boring Diameter:	2.5"	Backfill Method:	Gravity; see well construction
Geologist:	Sam Moore	Sampler Type:	Macrocore	Device Type:	soil vapor points- 5.0', 8.0'
Total Depth (ft bgs):	15	Hammer Type:	Hydraulic		
Reviewer:	Michael Meyer				

Depth (ft bgs)	USCS Symbol	Sample Description	Blow Counts	Sample Recovery	Sample ID	Headspace Readings	Lithology	Well Construction
0	GW	Sandy GRAVEL, medium dense, dry, brown-gray (10YR 4/2); (G:S:F 60/40/0); asphalt top.		80%		16.8		**Surface Completion:** 5" steel vault. **Casing Seal:** Bentonite Crumble **Sand:** 10/20 Colorado Silica sand **Probes:** EON products SVP200/201. **DTW:** 9.2 ft bgs **Screen:** 4.9'-5'; 7.9'-8' **TD:** 15' **Notes:** Used 5" concrete saw to drill through asphalt layer.
3	SW	Gravelly medium SAND, medium dense, damp, brown-gray (10YR 4/2); (G:S:F 35/60/5).				31.8		
5				100%		8.4		
8						9		
9								
10						10		
12				100%		11.1		
14						11.8		
15						9.3		

BATTELLE

Project: NBK Keyport
Site: OU 2 Area 8
Boring Log: OU2A8-SV-4

Permit Number:	18-EP011	Drilling Contractor:	Holt Services	Northing (NAD 83):	260284.099
Project Number:	100100157	Driller:	Michael Running	Easting (NAD 83):	1201783.56
Contract Number:	N44255-14-D-9013	Drilling Equipment:	Geoprobe 7822DT	Surface Elevation (NAVD 88):	16.46
Task Order Number:	TO 0026	Drilling Method:	DPT	Borehole Abandoned:	Y
Date Logged:	11/14/2017, 1256	Boring Diameter:	2.5"	Backfill Method:	Gravity; see well construction
Geologist:	Sam Moore	Sampler Type:	Macrocore	Device Type:	soil vapor points- 5.0', 8.0'
Total Depth (ft bgs):	10	Hammer Type:	Hydraulic		
Reviewer:	Michael Meyer				

Depth (ft bgs)	USCS Symbol	Sample Description	Blow Counts	Sample Recovery	Sample ID	Headspace Readings	Lithology	Well Construction
0	GP	Sandy GRAVEL, dense, damp, brown (10YR 4/3); (G:S:F 55/45/0).		60%		0		**Surface Completion:** 5" steel vault. **Casing Seal:** Bentonite Crumble **Sand:** 10/20 Colorado Silica sand **Probes:** EON products SVP200/201. **DTW:** >10.0 ft bgs **Screen:** 4.9'-5'; 7.9'-8' **TD:** 10' **Notes:** Measured water level @ 9.2' bgs.
1						0		
2						0		
3						0		
4						0		
5				100%		0.8		
6	GP	Sandy GRAVEL, medium dense, damp, gray (Gley I 5/10Y); (G:S:F 55/45/0). Sweet hydrocarbon odor at bottom of core.				12.4		
7								
8								
9								
10								
11								
12								
13								
14								
15								

BATTELLE

Project: NBK Keyport
Site: OU 2 Area 8
Boring Log: OU2A8-SV-5

Permit Number:	18-EP011	Drilling Contractor:	Holt Services	Northing (NAD 83):	260282.176
Project Number:	100100157	Driller:	Michael Running	Easting (NAD 83):	1201857.33
Contract Number:	N44255-14-D-9013	Drilling Equipment:	Geoprobe 7822DT	Surface Elevation (NAVD 88):	16.806
Task Order Number:	TO 0026	Drilling Method:	DPT	Borehole Abandoned:	Y
Date Logged:	11/14/2017, 1136	Boring Diameter:	2.5"	Backfill Method:	Gravity; see well construction
Geologist:	Sam Moore	Sampler Type:	Macrocore	Device Type:	soil vapor points- 5.0', 8.0'
Total Depth (ft bgs):	10	Hammer Type:	Hydraulic		
Reviewer:	Michael Meyer				

Depth (ft bgs)	USCS Symbol	Sample Description	Blow Counts	Sample Recovery	Sample ID	Headspace Readings	Lithology	Well Construction
0	GP	Sandy GRAVEL, medium dense, damp, brown (10YR 4/3); (G:S:F 60/35/5); asphalt top (0.0' to 0.4').		50%		0.6		**Surface Completion:** 5" steel vault. **Casing Seal:** Bentonite Crumble **Sand:** 10/20 Colorado Silica sand **Probes:** EON products SVP200/201. **DTW:** >10.0 ft bgs **Screen:** 4.9'-5'; 7.9'-8' **TD:** 10' **Notes:**
4	GP	Concrete debris.				0.6		
5	GP	Sandy GRAVEL, medium dense, dry, brown (10YR 4/3); (G:S:F 60/40/0).		100%		1.1		
7	SP	Gravelly SAND with clay, damp, medium dense, brown (10YR 4/3); (G:S:F 20/70/10). 9.7' to 10.0' is gray (Gley 1 2.5/N) and has an odor of petroleum.				1.2		
10						176.6		
15								

BATTELLE

Project: NBK Keyport
Site: OU 2 Area 8
Boring Log: OU2A8-SV-6

Permit Number:	18-EP011	Drilling Contractor:	Holt Services	Northing (NAD 83):	260296.338
Project Number:	100100157	Driller:	Michael Running	Easting (NAD 83):	1201886.94
Contract Number:	N44255-14-D-9013	Drilling Equipment:	Geoprobe 7822DT	Surface Elevation (NAVD 88):	16.636
Task Order Number:	TO 0026	Drilling Method:	DPT	Borehole Abandoned:	Y
Date Logged:	11/14/2017, 0955	Boring Diameter:	2.5"	Backfill Method:	Gravity; see well construction
Geologist:	Sam Moore	Sampler Type:	Macrocore	Device Type:	soil vapor point- 5.0
Total Depth (ft bgs):	10	Hammer Type:	Hydraulic		
Reviewer:	Michael Meyer				

Depth (ft bgs)	USCS Symbol	Sample Description	Blow Counts	Sample Recovery	Sample ID	Headspace Readings	Lithology	Well Construction
0	SP	Gravelly SAND, medium dense, damp, brown (10YR 4/3), (G:S:F 35/65/0); asphalt top (0.0' to 0.3'); very soft 0.0' to 5.0'. Brick debris from 5.0' to 6.0'.		30%		0.3		**Surface Completion:** 5" steel vault. **Casing Seal:** Bentonite Crumble **Sand:** 10/20 Colorado Silica sand **Probes:** EON products SVP200/201. **DTW:** 7.0 ft bgs **Screen:** 4.9'-5' **TD:** 10' **Notes:**
1								
2								
3								
4						98		
5								
6				40%		54.6		
7								
8	SP	Medium to coarse SAND with some gravel, wet, medium dense, brown (10YR 6/3); (G:S:F 85/15/0).						
9								
10	SP	Medium to coarse SAND, medium dense, wet, dark gray (Gley 1 2.5/N), (G:S:F 0/100/0); strong hydrocarbon smell 9.5' to 10'.						
11								
12								
13								
14								
15								

APPENDIX D

Daily Field Reports and Soil Vapor Sampling Forms

SOIL VAPOR FIELD FORM

Well ID ~~OU2A8-SV-1-5.0~~ ☒ Sub-slab Probe ☐ Nested Probe ☐ Single-depth Probe

MJ OU2A8-SV-1-5.0

Date:	11-29-17	PID (make/model/serial number):	Mini-Rae Lite I SN 590-000327
Project Name:	Keyport	Landtech (model/serial number):	LT/GEM 2000+ SN 474-007
Project Number:	240-010-GOV	Helium Detector (make/model/serial number):	Dielectric MGD-2002 112741
Site Location:	Keyport, WA	Manometer (make/model/serial number):	Series 475 Mark III
Field Personnel:	MJ		

Initial Vac = 0.00 in H_2O 11-29-17 @ ~~1022~~ MJ 1021

Surface Type:	Concrete	Asphalt	Grass	Other	Surface Thickness (inches):	Unknown
	☒	☐	☐	☐		☒

Shut-in Testing			Weather:	Cloudy Cool
Prior to Purge	OK ☒ @	1050	Air Temperature (°C/°F):	MJ 45 41°
Prior to Sample Collection	OK ☒ @	1120	Atmospheric Pressure (in. Hg):	30.5

Date	Start Time	End Time	Elapsed Time (min)	Bag Volume (L)	Purge Rate (LPM)	CH_4 (%)	CO_2 (%)	O_2 (%)	Total Organic Vapors (ppmv)	Helium beneath Shroud (%)		Helium in Purge Interval (%)
										Min	Max	
11-29-17	1059	1104	5	1	0.2	0	0.9	20.4	4.1	44	48	0
11-29-17	1105	1110	5	1	0.2	0	0.9	20.6	4.2	20	26	0
11-29-17	1111 MJ	~~1116~~	5	1	0.2	0	0.9	20.6	4.2	20	30	0

Date	Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Helium beneath Shroud (%)	
								Min	Max
11-29-17	1124	OU2A8-SV-1-5.0	1550036	0A02091	AVG04002	-30.39	-3.18	45	55

Comments:

SOIL VAPOR FIELD FORM

Well ID OU2A8-SV-1A (1-6.0 ft, NW-2) ☒ Sub-slab Probe ☐ Nested Probe ☐ Single-depth Probe

Date:	11-29-17	PID (make/model/serial number):	MiniRae Lite / SN 590-00304
Project Name:	Keyport	Landtech (model/serial number):	LT/GEM 2000+ SN 474-407
Project Number:	240+010-GOV	Helium Detector (make/model/serial number):	Dielectric MGD-2002 1127417
Site Location:	Keyport, WA	Manometer (make/model/serial number):	Series 475 Mark III
Field Personnel:	MHz		

Initial Vac = +21.24 in H_2O 11-29-17 @ 1021

Surface Type:	☒ Concrete	☐ Asphalt	☐ Grass	☐ Other	Surface Thickness (inches):		☒ Unknown

Shut-in Testing			
Prior to Purge	OK ☒ @ 1145	Weather:	--
Prior to Sample Collection	OK ☐ @	Air Temperature (°C/°F):	--
		Atmospheric Pressure (in. Hg):	--

Date	Start Time	End Time	Elapsed Time (min)	Bag Volume (L)	Purge Rate (LPM)	CH_4 (%)	CO_2 (%)	O_2 (%)	Total Organic Vapors (ppmv)	Helium beneath Shroud (%)		Helium in Purge Interval (%)
										Min	Max	
11-29-17	1151	1156	5	X0.3 NW	0.2	0.2	0.2	16.5	58.5	20	25	3.4

Date	Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Helium beneath Shroud (%)	
								Min	Max
--	--	--	ISC00337	0402006	AVG-04445	-29.35	--	--	--

Comments:

Pulled moisture & no soil gas after ~0.3L

SOIL VAPOR FIELD FORM

Well ID OU2A3-SV-1-5.0 ☐ Sub-slab Probe ☒ Nested Probe ☐ Single-depth Probe

Date:	11-29-17	PID (make/model/serial number):	MiniRae Lite SN 590-00304
Project Name:	Keyport	Landtech (model/serial number):	LT/GEM 2000+ SN 474-007
Project Number:	240-010-GOV	Helium Detector (make/model/serial number):	Dielectric MGD 2002 162747
Site Location:	Keyport, WA	Manometer (make/model/serial number):	Series 475 Mark III
Field Personnel:	MB/AM		

Surface Type:	☒ Concrete ☐ Asphalt ☐ Grass ☐ Other	Surface Thickness (inches):	☒ Unknown
Shut-in Testing		Weather:	Cool / Breezy / Partly Cloudy
Prior to Purge	OK ☒ @ 1305	Air Temperature (°C/°F):	~45° F
Prior to Sample Collection	OK ☐ @	Atmospheric Pressure (in. Hg):	30.51

Initial Vacuum 11-29-17 @ 1255 +2.14 in H_2O

Date	Start Time	End Time	Elapsed Time (min)	Bag Volume (L)	Purge Rate (LPM)	CH_4 (%)	CO_2 (%)	O_2 (%)	Total Organic Vapors (ppmv)	Helium beneath Shroud (%)		Helium in Purge Interval (%)
										Min	Max	
11-29-17	1314	1319	5	~0.3	0.2	0	0	19.7	8.3	25	35	150 ppm
11-29-17	1320	1325	5	~0.5	0.2	0	0	20.0	1.2	20	30	7500 ppm
11-29-17	1327	1332	5	~0.3	0.2	0	0	22.1	0.4	20	30	15,500 ppm

Date	Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Helium beneath Shroud (%)	
								Min	Max
--	--	--	1SC00857	0A01530	NO ID	-30.37	--	--	--

Comments:

Sample started @ 1343

Pulled water during sampling

Due to water pulled during sampling it is assumed this sample is the 8' depth

SOIL VAPOR FIELD FORM

Well ID OU2AS-SV-2-5.0 ☒ Sub-slab Probe ☒ Nested Probe ☐ Single-depth Probe

Date:	11-29-17	PID (make/model/serial number):	Mini Rae Lite SN 590-003M
Project Name:	Keyport	Landtech (model/serial number):	LTGEM 2000+ SN ~~447~~ 474-07
Project Number:	240-010-GOV	Helium Detector (make/model/serial number):	Dielectric MGD-2002 112717
Site Location:	Keyport, WA	Manometer (make/model/serial number):	Sears 475 Mark III
Field Personnel:	MS/MM		

Initial V_{ac} 11-29-17 @ 1355 0.00 in H_2O

Surface Type:	☒ Concrete	☐ Asphalt	☐ Grass	☐ Other	Surface Thickness (inches):	☒ Unknown	
Shut-in Testing					Weather:	Cool, breezy, partly cloudy	
Prior to Purge	OK ☒ @	1405			Air Temperature (°C/°F):	~45° F	
Prior to Sample Collection	OK ☒ @	1429			Atmospheric Pressure (in. Hg):	30.49	

Date	Start Time	End Time	Elapsed Time (min)	Bag Volume (L)	Purge Rate (LPM)	CH_4 (%)	CO_2 (%)	O_2 (%)	Total Organic Vapors (ppmv)	Helium beneath Shroud (%)		Helium in Purge Interval (%)
										Min	Max	
11-29-17	1406	1413	5	~0.5	0.2	0	0.3	21.5	1.2	20	35	0
11-29-17	1414	1419	5	~0.5	0.2	0	0.3	21.8	0.3	35	45	0
11-29-17	1420	1425	5	~0.5	0.2	0	0.3	22.1	1.2	35	40	0

Date	Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Helium beneath Shroud (%)	
								Min	Max
11-29-17	1435	OU2A-SV-2-5.0	SC00648	OA0052	unreadable	-30.46	-1.67	32.3	54.3

Comments:

Due to water pulled at, assumed shallow depth; & the fact this assumed deeper depth provided a vapor sample; It is assumed this sample is the 5' depth

SOIL VAPOR FIELD FORM

Well ID: OU2A6-SV-~~3~~ 3 MM-5.0 ☐ Sub-slab Probe ☒ Nested Probe ☐ Single-depth Probe

Date:	11-24-17	PID (make/model/serial number):	Mini Rae Lite SN 590-6634
Project Name:	Keyport	Landtech (model/serial number):	LTGEM 2000+ SN 474-007
Project Number:	246-010-GOV	Helium Detector (make/model/serial number):	Dielectric MD-2002 162717
Site Location:	Keyport, WA	Manometer (make/model/serial number):	Series 475 Mark III
Field Personnel:	MB/MM		

Surface Type:	Concrete ☐	Asphalt ☒	Grass ☐	Other ☐	Surface Thickness (inches):	Unknown ☒	
Shut-in Testing					Weather:	Cool, mostly cloudy	
Prior to Purge	OK ☒ @ 1508				Air Temperature (°C/°F):	~43° F	
Prior to Sample Collection	OK ☒ @ 1540				Atmospheric Pressure (in. Hg):	30.46	

Date	Start Time	End Time	Elapsed Time (min)	Bag Volume (L)	Purge Rate (LPM)	CH_4 (%)	CO_2 (%)	O_2 (%)	Total Organic Vapors (ppmv)	Helium beneath Shroud (%)		Helium in Purge Interval (%)
										Min	Max	
11-24-17	1514	1519	5	~0.7	~~0.05~~ 0.2	0	0.1	21.7	1.8	20	30	1300 ppm
11-24-17	1520	1525	5	~0.5	0.2	0	0.1	22.4	0.7	25	30	0
11-24-17	1525	1530	5	~0.5	0.2	0	0.1	22.6	0.6	25	30	0

Date	Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Helium beneath Shroud (%)	
								Min	Max
11-24-17		OU2A6-SV-5.0	~~1550163~~ MM	CA-0104	No ID	~~-30~~ -30			
	1548		1550140			-30.7	-4.09	25	35
						MM			

Comments:

SOIL VAPOR FIELD FORM

Well ID ☐ Sub-slab Probe ☒ Nested Probe ☐ Single-depth Probe

OU2A4-SV-3-8.0

Date:	11-29-17	PID (make/model/serial number):	MiniRae Lite SN 590-003x
Project Name:	Keyport	Landtech (model/serial number):	LTGEM 2000+
Project Number:	240-010-C-GOV	Helium Detector (make/model/serial number):	Dielectric MD-2002 102417
Site Location:	Keyport, WA	Manometer (make/model/serial number):	Series 475 Mark III
Field Personnel:	MB/MM		

Surface Type: ☐ Concrete ☒ Asphalt ☐ Grass ☐ Other		Surface Thickness (inches): ☒ Unknown	
Shut-in Testing		Weather:	Cold/Cloudy
Prior to Purge	OK ☒ @ 1600	Air Temperature (°C/°F):	≈ 40°F
Prior to Sample Collection	OK ☒ @ 1623	Atmospheric Pressure (in. Hg):	30.47

Not enough sample

Date	Start Time	End Time	Elapsed Time (min)	Bag Volume (L)	Purge Rate (LPM)	CH_4 (%)	CO_2 (%)	O_2 (%)	Total Organic Vapors (ppmv)	Helium beneath Shroud (%)		Helium in Purge Interval (%)
										Min	Max	
11-29-17	1605	1610	5	0.5	0.2	0.1	0.1	18.6	8.3	25	35	3475 ppm
11-29-17	1610	1615	5	~0.3	0.2		0.2		3.7	30	35	5025 ppm
11-29-17	1615	1620	5	~0.5	0.2	0.0	0.2	21.3	3.1	30	35	7450 ppm

Date	Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Helium beneath Shroud (%)	
								Min	Max
11-29-17	1630	OU2A4-SV-3-8.0	15C00582	0A01544	No ID	-30.7	-3.02	35	45

Comments:

SOIL VAPOR FIELD FORM

Well ID: OU2~~8A~~ A8 MMy -SV-4-5'

☐ Sub-slab Probe ☒ Nested Probe ☐ Single-depth Probe

Date:	11-30-2017	PID (make/model/serial number):	Mini-Rae Lite SN 590-00304
Project Name:	Keyport WA	Landtech (model/serial number):	LT/GEM 2000+ SN 474-001
Project Number:	240-010-GOV	Helium Detector (make/model/serial number):	Dielectric MGD-2002 1127411
Site Location:	Keyport WA	Manometer (make/model/serial number):	Series 475 Mark III
Field Personnel:	MS/M		

Initial Vacuum on 5' +1.05 IV on 10' +13.20

Surface Type:	Concrete ☐	Asphalt ☒	Grass ☐	Other ☐	Surface Thickness (inches):	Unknown ☒

Shut-in Testing				
Prior to Purge	OK ☒ @ 0834		Weather:	Rain/Cold
Prior to Sample Collection	OK ☐ @ 0855		Air Temperature (°C/°F):	43°F
			Atmospheric Pressure (in. Hg):	30.33

Date	Start Time	End Time	Elapsed Time (min)	Bag Volume (L)	Purge Rate (LPM)	CH_4 (%)	CO_2 (%)	O_2 (%)	Total Organic Vapors (ppmv)	Helium beneath Shroud (%)		Helium in Purge Interval (%)
										Min	Max	
11-30-17	0837	0842	5	~0.7	0.5	0	0.4	12.4	6.9	110	115	6900 ppm
11-30-17	0842	0847	5	~0.3	0.5	0	1.0	20.6	3.0	50	55	0
11-30-17	0847	0852	5	~0.5	0.5	0	1.1	21.4	2.3	50	55	0

Date	Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Helium beneath Shroud (%)	
								Min	Max
11-30	0902	OU2~~8A~~ A8 MMy -SV4-5'	15C00605	OA01867	None	~30.54	-3.72	15	34.8

Comments:

SOIL VAPOR FIELD FORM

Well ID A6 ☐ Sub-slab Probe ☒ Nested Probe ☐ Single-depth Probe

OU2A-SV-4-8.0

Date:	11-30-2017	PID (make/model/serial number):	MiniRae LITE SN 590-000304
Project Name:	Keyport	Landtech (model/serial number):	LT/GEM 2000+ SN4TH-007
Project Number:	240-010-GOV	Helium Detector (make/model/serial number):	Dielectric MGD-2002 112417
Site Location:	Keyport, WA	Manometer (make/model/serial number):	Series 475 Mark III
Field Personnel:	INSIMNT		

Surface Type: ☐ Concrete ☒ Asphalt ☐ Grass ☐ Other		Surface Thickness (inches): ☒ Unknown	
Shut-in Testing		Weather:	Cold Rain
Prior to Purge	OK ☒ @ 0924	Air Temperature (°C/°F):	--
Prior to Sample Collection	OK ☐ @ --	Atmospheric Pressure (in. Hg):	--

Date	Start Time	End Time	Elapsed Time (min)	Bag Volume (L)	Purge Rate (LPM)	CH_4 (%)	CO_2 (%)	O_2 (%)	Total Organic Vapors (ppmv)	Helium beneath Shroud (%) Min	Helium beneath Shroud (%) Max	Helium in Purge Interval (%)
11-30-17	0432	0937	5	~0.1	0.2	Not enough sample				10	15	3
11-30-17	0937	0942	5	0	0.2	No Sample						

Date	Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Helium beneath Shroud (%) Min	Helium beneath Shroud (%) Max
11-30-17	--	--	1550016	0A01737	No gauge	-30	--	--	--

Comments:

No vapor obtained during purging; likely due to water; although no water observed in flow

SOIL VAPOR FIELD FORM

MJ

Well ID A6 ☐ Sub-slab Probe ☒ Nested Probe ☐ Single-depth Probe

MJ 30

→ OU2A-SV-5-5.0

Date:	11-29-17	PID (make/model/serial number):	MiniRae Lite SN 590-002364
Project Name:	Keyport	Landtech (model/serial number):	LTX-EM 2000+ SN 474407
Project Number:	240-10560	Helium Detector (make/model/serial number):	Dielectric MED 2002 197417
Site Location:	Keyport, WA	Manometer (make/model/serial number):	Series 475 Mark III
Field Personnel:	MJ/M		

Initial Vac on Bellhart @ 5' 80 MJ

Surface Type:	☐ Concrete ☒ Asphalt ☐ Grass ☐ Other	Surface Thickness (inches):	☒ Unknown

Shut-in Testing			
Prior to Purge	OK ☒ @	1030	
Prior to Sample Collection	OK ☒ @	1050	

Weather:	Cold / Cloudy
Air Temperature (°C/°F):	~45°
Atmospheric Pressure (in. Hg):	30.29 ↓ Mg

Date	Start Time	End Time	Elapsed Time (min)	Bag Volume (L)	Purge Rate (LPM)	CH_4 (%)	CO_2 (%)	O_2 (%)	Total Organic Vapors (ppmv)	Helium beneath Shroud (%)		Helium in Purge Interval (%)
										Min	Max	
MJ 30 11-29-17	1034	1039	5	~0.7	0.5	0	0	14.3	10.4	10	35	1026 ppm
30 11-29-17	1039	1044	5	~0.6	0.5	0	0.1	22.1	12.9	25	35	0
MJ 30 11-29-17	1045	1050	5	~0.6	0.5	0	0.1	22.3	12.1	25	35	0

Date	Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Helium beneath Shroud (%)	
								Min	Max
MJ 30 11-29-17	1106	OU2A-SV-5-5.0	1550044	OA02048	AVG-04643	-30.91	-3.52		
		A6	1500154			-30.40	-3.59		
		MJ							

Comments:

Duplicate Sample Recorded on COC as OU2A6-SV-7-5.0

SOIL VAPOR FIELD FORM

Well ID AS Mgr ☐ Sub-slab Probe ☒ Nested Probe ☐ Single-depth Probe

30 Mgr OU24A-5-8.0

Date:	11-21-17	PID (make/model/serial number):	MiniRae Lite SN 590-00394
Project Name:	Keppar	Landtech (model/serial number):	LTC-EM 2000+ SN 474-007
Project Number:	240-010-(-01	Helium Detector (make/model/serial number):	Dielectric M-D 2002 187417
Site Location:	Keppar, WA	Manometer (make/model/serial number):	Series 475 Mark III
Field Personnel:	MS/MM		

Surface Type: ☐ Concrete ☒ Asphalt ☐ Grass ☐ Other		Surface Thickness (inches): ☒ Unknown	
Shut-in Testing		Weather:	Cool / Mostly Cloudy
Prior to Purge	OK ☒ @ 1126	Air Temperature (°C/°F):	45°F
Prior to Sample Collection	OK ☐ @ -	Atmospheric Pressure (in. Hg):	30.25 in Hg

Date	Start Time	End Time	Elapsed Time (min)	Bag Volume (L)	Purge Rate (LPM)	CH_4 (%)	CO_2 (%)	O_2 (%)	Total Organic Vapors (ppmv)	Helium beneath Shroud (%) Min	Helium beneath Shroud (%) Max	Helium in Purge Interval (%)
30 Mgr 11-21-17	1129	1134	5	~0.3	0.2	0.3	0.1	12	16.6	10	19.1	7.7
30 Mgr 11-21-17	1134	1139		No	Sample							

Date	Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Helium beneath Shroud (%) Min	Helium beneath Shroud (%) Max
- -	- -	- -	15500220	OA01693	No ID	-30.02	- -	- -	- -

Comments:

0.3% Methane reading may be causing helium in purge interval

No Sample after initial purge

SOIL VAPOR FIELD FORM

Well ID AS Mw- 30 00298A-SV-6-5.0 ☐ Sub-slab Probe ☒ Nested Probe ☐ Single-depth Probe

Date:	11-29-17	PID (make/model/serial number):	MiniRae LITE SN 590-023[illegible]
Project Name:	Kapowsin	Landtech (model/serial number):	LTX/GEM 2000+ SN 474-207
Project Number:	240-010-E-00	Helium Detector (make/model/serial number):	Dielectric MD-2002 162477
Site Location:	Kapowsin, WA	Manometer (make/model/serial number):	Series 475 Mark III
Field Personnel:	MS/MM		

Surface Type:	Concrete ☐	Asphalt ☒	Grass ☐	Other ☐	Surface Thickness (inches): Unknown ☒

Shut-in Testing			Weather:	Cold / Windy / Mostly Cloudy
Prior to Purge	OK ☒ @	1200	Air Temperature (°C/°F):	~45°F
Prior to Sample Collection	OK ☒ @	1225	Atmospheric Pressure (in. Hg):	30.03

Date	Start Time	End Time	Elapsed Time (min)	Bag Volume (L)	Purge Rate (LPM)	CH_4 (%)	CO_2 (%)	O_2 (%)	Total Organic Vapors (ppmv)	Helium beneath Shroud (%) Min	Helium beneath Shroud (%) Max	Helium in Purge Interval (%)
11-30-17	1206	1211	5	~0.5	0.2	0	0	22.2	8.7	10	16	1825 ppm
11-30-17	1212	1217	5	~0.5	0.2	0	0	22.5	8.9	10	15	0
11-30-17	1217	1222	5	~0.5	0.2	0	0	22.6	9.1	20	35	0

Date	Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Helium beneath Shroud (%) Min	Helium beneath Shroud (%) Max
11-30-17	1230	00298A-SV6-5.0 AS Mw	~~ISS00034~~ ~~ISS00159~~ ISS00039	OA1007	NO ID	-30	-3.54	30	43.8

Comments:

BATTELLE
It can be done

DAILY FIELD REPORT 11 / 29 / 2017	**Contract No.** N44255-14-D-9013, TO 026 **Reference** Sampling and Analysis Plan (Battelle 2017) Accident Prevention Plan (Battelle 2017)
Project: 100100157 Naval Base Kitsap Keyport, WA OU2 Area 8 Vapor Intrusion Study	
Location: Naval Base Kitsap Keyport, WA OU1	
Client: Naval Facilities Engineering Command Northwest	**Contractor:** Battelle
Weather: Overcast, high 50 F, breezy	
To: Carlotta Cellucci	
From: Michael Meyer	

PERSONNEL ON SITE:

Michael Meyer (Battelle)
Matt Jones (Trihydro)
Carlotta Cellucci (NAVFAC)

SUMMARY OF WORK COMPLETED:

- Sampled three soil vapor sampling locations (OU2A8-SV-1 through -3)
- Prepared drum inventory and met with Keyport Hazardous Waste personnel regarding waste characterization

DEVIATIONS FROM WORKPLAN:

- The SAP anticipated that a lung box would be used to pull a vacuum on the sample ports during purging, but a peristaltic pump was used instead
- SAP called for sampling from two depths at each location, however water entered the tubing at the deeper sample depths (8 feet bgs) at both OU2A8-SV-1 and -SV-2 and therefore no sample could be collected.

SAFETY OBSERVATIONS AND GOOD CATCHES:

Discussed the need for careful handling of the pressurized helium canister to avoid damage to the regulator/valve assembly.

FIELD ACTIVITY CHRONOLOGY

0830 M. Meyer on site. Created drum inventory
1000 Matt Jones (Trihydro) on site at Area 8, set up for sampling at OU2A8-SV-1
1040 M. Meyer joined M. Jones at Area 8. Held safety meeting – discussed pressurized canister safety, traffic safety. Make sure to wear reflective vests. M. Meyer supplies traffic cones.
1129 Following successful shut-in and helium tracer testing, collected sample OU2A8-SV-1-5.0
1148 During purging of OU2A8-SV-1-8.0 at 8 feet bgs, entrained water in the sampling tube. Abandoned sampling effort at this depth.
1200 Lunch
1245 M. Jones set up on OU2A8-SV-2. M. Meyer meet with C. Cellucci (NAVFAC NW), Dale Hunt (Keyport Hazardous Waste), and Christine Hull (Keyport Hazardous Waste) regarding plan for characterization

sampling of drums from OU 1 and Area 8. Battelle to contract laboratory. Keyport to sample drums. Christine will send list of required analytical methods, to include TCLP, VOC, total cyanide, total sulfides, and pH field data. Agree to composite in 10-drum groups. M. Meyer and C. Cellucci to identify drum sample groups.

1350 M. Meyer returned to Area 8. M. Jones identified a possible error in sample tube depth identification at OU2A8-SV-2. The sample attempt in the tube marked shallow (5 feet bgs) was not successful because water entered the sample tubing.

1430 Successfully collected OU2A8-SV-2 from tubing marked as deep (8 feet bgs). Suspect this is actually the shallow sample depth. Attempt to verify by running thin wire down tubing, but unable to reach total depth with wire. Will assess sample depth based on performance at other points.
C. Cellucci on site briefly.

1500 Set up for sampling on OU2A8-SV-3.

1547 Following successful shut-in and helium tracer testing, collected sample OU2A8-SV-3-5.0. Had to replace one failed canister to collect sample.

1628 Following successful shut-in and helium tracer testing, collected sample OU2A8-SV-3-8.0

1640 All off site.

SUMMARY OF FINDINGS

Soil vapor sampling was successfully completed at the shallow depths at locations 1, 2, and 3. Samples were not successful at the deeper depths at locations 1 and 2 because water entered the sample tubing.

PLANS FOR THE FOLLOWING DAY:

Complete soil vapor sampling and demobilize from the site.

ATTACHMENTS:

Drum inventory.

Copies to: Michael Meyer	**Battelle - DAILY FIELD REPORT** Signed: Michael Meyer

DAILY FIELD REPORT 11 / 30 / 2017	**Contract No.** N44255-14-D-9013, TO 026 **Reference** Sampling and Analysis Plan (Battelle 2017) Accident Prevention Plan (Battelle 2017)
Project: 100100157 Naval Base Kitsap Keyport, WA OU2 Area 8 Vapor Intrusion Study	
Location: Naval Base Kitsap Keyport, WA OU1	
Client: Naval Facilities Engineering Command Northwest	**Contractor:** Battelle
Weather: Rain, heavy in the morning and decreasing by noon. 45 F, breezy	
To: Carlotta Cellucci	
From: Michael Meyer	

PERSONNEL ON SITE:

Michael Meyer (Battelle)
Matt Jones (Trihydro)

SUMMARY OF WORK COMPLETED:

- Sampled three soil vapor sampling locations (OU2A8-SV-4 through -6)
- Demobilized from site

DEVIATIONS FROM WORKPLAN:

- SAP called for sampling from two depths at each location, no vapor could be recovered from the deeper sample depth (8 feet bgs) at both OU2A8-SV-4 and -SV-5 and therefore no sample could be collected. An 8-foot deep sample point was not installed at OU2A8-SV-6 because of groundwater conditions observed during drilling.

SAFETY OBSERVATIONS AND GOOD CATCHES:

Discussed the risk of hypothermia with low temperatures, heavy rain, and wind. Set up canopy to keep work area dry, dressed warmly in layers and rain gear.

FIELD ACTIVITY CHRONOLOGY

0720 M. Meyer on site at OU 1 shed, loaded up for work day.
0745 M. Meyer and Matt Jones (Trihydro) on site at Area 8.
0755 Held safety meeting – discussed hypothermia potential, traffic safety. Set up canopy to keep work area dry, dressed warmly in layers and rain gear. Setup traffic cones around work areas.
0800 Set up to sample at OU2A8-SV-4.
0902 Following successful shut-in and helium tracer testing, collected sample OU2A8-SV-4-5.0. Set up to sample 8-foot depth at same location.
0930 Initial shut-in test prior to purging implied small leaks. Tightened all fittings and retested for a successful shut-in test. Some vapor recovered in first purge volume, but no vapor recovered in subsequent purge volume. No water directly observed, but implied by response of point to applied vacuum. Abandoned attempt to sample vapor at 8-foot depth.
0957 Moved to OU2A8-SV-5.

1106 Following successful shut-in and helium tracer testing, collected sample OU2A8-SV-5-5.0 and **FIELD DUPLICATE "OU2A8-SV-7-5.0."**

1128 Following successful pre-purge shut-in test, began purging OU2A8-SV-5-8.0. One partial purge volume recovered – noted relatively high methane concentration at 0.3 percent. No vapor recovery in second or third attempted purge volume. No water directly observed, but implied by response of point to applied vacuum. Abandoned attempt to sample vapor at 8-foot depth.

1150 Moved to OU2A8-SV-6.

1231 Following successful shut-in and helium tracer testing, collected sample OU2A8-SV-6-5.0. An 8-foot deep sample point was not installed at OU2A8-SV-6 because of groundwater conditions observed during drilling.

1300 M. Jones demobilized and off site. M. Meyer to OU 1 for meetings with C. Cellucci (NAVFAC NW) and others.

SUMMARY OF FINDINGS

Soil vapor sampling was successfully completed at the shallow depths at locations 4, 5, and 6. Samples were not successful at the deeper depths at locations 4 and 5 because no vapor could be recovered. An 8-foot deep sample point was not installed at OU2A8-SV-6 because of groundwater conditions observed during drilling.

PLANS FOR THE FOLLOWING DAY:

None – work is complete.

ATTACHMENTS:

None.

Copies to: Michael Meyer	**Battelle - DAILY FIELD REPORT** Signed: Michael T. Meyer

DAILY FIELD REPORT 11 / 13 / 2017	**Contract No.** N44255-14-D-9013, TO 026 **Reference** Sampling and Analysis Plan (Battelle 2017) Accident Prevention Plan (Battelle 2017)
Project: 100100157 Naval Base Kitsap Keyport, WA OU2 Area 8 Vapor Intrusion Study	
Location: Naval Base Kitsap Keyport, WA OU2	
Client: Naval Facilities Engineering Command Northwest	**Contractor:** Battelle
Weather: Cloudy with rain showers, high 50 F, winds E 25 mph	
To: Carlotta Cellucci	
From: Samuel Moore	

PERSONNEL ON SITE:

Samuel Moore, Michael Meyer (Battelle)
Matt Jones (Trihydro)
Michael Running, Louis Fehner (Holt Services)
Carlotta Cellucci (NAVFAC)

SUMMARY OF WORK COMPLETED:

- Completed badging
- Held Pre-construction meeting
- Installed two soil vapor sampling locations (OU2A8-SV-3 and -2)
- Characterized an additional soil vapor sampling location (OU2A8-SV-1)

DEVIATIONS FROM WORKPLAN:

- The Plan specifies that bentonite pellets and chips be installed with a thickness of a minimum of 2 feet and minimum of 1 foot, respectively. For locations OU2A8-SV-3 and -2, only bentonite pellets were installed.
- The Plan specifies that the shallow depth sample would be installed to a depth of 5 ft bgs in each boring. At OU2A8-SV-2, the shallow depth was installed at a depth of 4.5 ft bgs.

SAFETY OBSERVATIONS AND GOOD CATCHES:

Discussed hazards of inhalation of crystalline silica dust, and the required exposure monitoring for this event.

FIELD ACTIVITY CHRONOLOGY

0740 Michael Meyer on site. Samuel Moore at OU1 preparing equipment and supplies.
0800 Samuel Moore on site.
0810 Carlotta Cellucci on site. Discussed utility clearance markings, traffic control, and sampling given the significant rain event criterion.
0915 Matt Jones and Michael Running on site. Held pre-construction meeting. Walked area to look at locates and discussed plan for the day, which is to install SV-3 first and then move to the wells closer to Liberty Bay.
0945 Prepared equipment, discussed with the Battelle Safety Manager over the phone the conduct of personal exposure sampling for crystalline silica dust.

1032 Started drilling OU2A8-SV-3. Completed to 15.0 ft bgs, with groundwater measured at 9.2 ft bgs.

1133 Installed soil vapor probes. Borehole was open to 15.0 ft bgs, but collapsed to 8.5 ft bgs while preparing to install monument. Installed sand, then deep soil vapor monitoring point at 8.0 ft bgs, then more sand to 7.5 ft bgs. Installed bentonite pellets to 5.5 ft bgs. Installed sand, then shallow soil vapor monitoring point at 5.0 ft bgs, then more sand to 4.5 ft bgs. Installed bentonite pellets to 2 ft bgs. Soil vapor monitoring points consisted of EON Products SVP200/201 with ¼" outer diameter Nylaflow tubing. Marked deep and shallow points with black and green tape, respectively. Installed stainless shut-off valves.

1300 Left site for lunch.

1330 Returned to site. Louis Fehner on site. Calibrated crystalline silica dust exposure monitoring equipment.

1350 Completed OU2A8-SV-3.

1412 Began drilling OU2A8-SV-2. Completed to 10.0 ft bgs, with groundwater measured at 9.1 ft bgs.

1449 Installed soil vapor probes. Borehole was open to 10.0 ft bgs, but collapsed to 8.5 ft bgs while preparing to install monument. Installed sand, then deep soil vapor monitoring point at 8.0 ft bgs, then more sand to 7.0 ft bgs. Installed bentonite pellets to 5.0 ft bgs. Installed sand, then shallow soil vapor monitoring point at 4.5 ft bgs, then more sand to 4.0 ft bgs. Installed bentonite pellets to 2 ft bgs. Soil vapor monitoring points consisted of EON Products SVP200/201 with ¼" outer diameter Nylaflow tubing. Marked deep and shallow points with black and green tape, respectively. Installed stainless shut-off valves.

1509 Began drilling OU2A8-SV-1. Completed to 10.0 ft bgs, with groundwater measured at 4.0 ft bgs. Attempted to install but the high groundwater levels induced collapse of the borehole during installation. Placed a temporary slip cover onto the borehole and delayed installation until better, drier weather the following morning.

1600 Holt Services and M. Jones off site. Unloaded equipment into OU1 shed and secured site.

1630 All off site.

SUMMARY OF FINDINGS

Soil vapor monitoring points were installed at two locations (OU2A8-SV-3 and -2) and nearly completed at a third (OU2A8-SV-1). Two nested points were installed at each location: one at approximately 5 ft bgs and one just above the saturated zone interface. Poor weather precluded completion of the third location, with too much rainfall threatening to collapse the borehole.

PLANS FOR THE FOLLOWING DAY:

Evaluate weather conditions. If there is a sufficient break in the rainy conditions, complete the remaining installations. Otherwise, demobilize the site.

ATTACHMENTS:

None

Copies to: Michael Meyer	**Battelle - DAILY FIELD REPORT** Signed: _____

DAILY FIELD REPORT 11 / 14 / 2017	**Contract No.** N44255-14-D-9013, TO 026 **Reference** Sampling and Analysis Plan (Battelle 2017) Accident Prevention Plan (Battelle 2017)
Project: 100100157 Naval Base Kitsap Keyport, WA OU2 Area 8 Vapor Intrusion Study	
Location: Naval Base Kitsap Keyport, WA OU1	
Client: Naval Facilities Engineering Command Northwest	**Contractor:** Battelle
Weather: Cloudy with rain showers, high 50 F, winds S 17 mph	
To: Carlotta Cellucci	
From: Samuel Moore	

PERSONNEL ON SITE:

Samuel Moore (Battelle)
Matt Jones (Trihydro)
Michael Running (Holt Services)

SUMMARY OF WORK COMPLETED:

- Installed four soil vapor sampling locations (OU2A8-SV-1, -4, -5, and -6)
- Demobilized construction equipment from site

DEVIATIONS FROM WORKPLAN:

- The Plan specifies that bentonite pellets and chips be installed with a thickness of a minimum of 2 feet and minimum of 1 foot, respectively. For all locations, only bentonite pellets were installed.
- The Plan specifies that two sample depths would be installed at each location; however, at OU2A8-SV-6, the groundwater elevation was high enough that only one depth (5 ft bgs) was appropriate and therefore only one sample depth was installed at OU2A8-SV-6.

SAFETY OBSERVATIONS AND GOOD CATCHES:

Discussed hazards of high winds and emphasized that all workers have stop-work authority.

FIELD ACTIVITY CHRONOLOGY

0740 Samuel Moore at OU1 preparing equipment and supplies.

0800 S. Moore, Michael Running, and Matt Jones on site. Held tailgate safety meeting.

0848 Redrilled OU2A8-SV-1 to install soil vapor points. Water level was significantly lower than the previous day. Installed soil vapor probes. Installed sand, then deep soil vapor monitoring point at 8.0 ft bgs, then more sand to 7.5 ft bgs. Installed bentonite pellets to 5.5 ft bgs. Installed sand, then shallow soil vapor monitoring point at 5.0 ft bgs, then more sand to 4.5 ft bgs. Installed bentonite pellets to 2 ft bgs. Soil vapor monitoring points consisted of EON Products SVP200/201 with ¼" outer diameter Nylaflow tubing. Marked deep and shallow points with black and green tape, respectively. Installed stainless shut-off valves.

0920 Initiated crystalline silica dust exposure monitoring. Completed mixing of concrete at 0940. Recorded exposure times and prepared exposure monitoring sample for shipment.

0955 Started drilling OU2A8-SV-6. Completed to 10.0 ft bgs, with groundwater measured at 7.0 ft bgs. Strong hydrocarbon odors and staining were identified from 9.0 to 10.0 ft bgs in the core collected.

1056 Installed soil vapor probes. Borehole was open to 7.0 ft bgs. Installed sand, then deep soil vapor monitoring point at 5.0 ft bgs, then more sand to 4.5 ft bgs. Installed bentonite pellets to 2.0 ft bgs. Soil vapor monitoring point consisted of EON Products SVP200/201 with ¼" outer diameter Nylaflow tubing. Installed stainless shut-off valve. Only one depth was installed at this location due to the high groundwater elevation.

1136 Started drilling OU2A8-SV-5. Completed to 10.0 ft bgs, with no groundwater measured in the boring. Hydrocarbon odors were identified from 9.5 to 10.0 ft bgs in the core collected.

1200 Installed soil vapor probes. Borehole was open to 10.0 ft bgs. Installed sand, then deep soil vapor monitoring point at 8.0 ft bgs, then more sand to 7.5 ft bgs. Installed bentonite pellets to 5.5 ft bgs. Installed sand, then shallow soil vapor monitoring point at 5.0 ft bgs, then more sand to 4.5 ft bgs. Installed bentonite pellets to 2 ft bgs. Soil vapor monitoring points consisted of EON Products SVP200/201 with ¼" outer diameter Nylaflow tubing. Marked deep and shallow points with black and green tape, respectively. Installed stainless shut-off valves.

1256 Started drilling OU2A8-SV-4. Completed to 10.0 ft bgs, with no groundwater measured in the boring. A slightly sweet, mild hydrocarbon odor was identified from 10.0 ft bgs in the core collected.

1343 Installed soil vapor probes. Borehole was open to 10.0 ft bgs. Installed sand, then deep soil vapor monitoring point at 8.0 ft bgs, then more sand to 7.5 ft bgs. Installed bentonite pellets to 5.5 ft bgs. Installed sand, then shallow soil vapor monitoring point at 5.0 ft bgs, then more sand to 4.5 ft bgs. Installed bentonite pellets to 2 ft bgs. Soil vapor monitoring points consisted of EON Products SVP200/201 with ¼" outer diameter Nylaflow tubing. Marked deep and shallow points with black and green tape, respectively. Installed stainless shut-off valves. A slightly smaller concrete corer was used to remove the asphalt at this location, and therefore while concrete was used to seal in the vault, no concrete "skirt" was placed around the well vault, which fit the cored hole perfectly.

1400 M. Jones left the site. Packed up remaining construction equipment and secured site.

1500 M. Running left the site. S. Moore transferred the remaining equipment to the OU1 storage shed, performed post-calibrations, and secured site.

1530 All off site.

SUMMARY OF FINDINGS

Soil vapor monitoring points were installed at four locations (OU2A8-SV-1, -4, -5, and -6). Two nested points were installed at 5.0 and 8.0 ft bgs at OU2A8-SV-1, -4, and -5. Only one depth (5.0 ft bgs) was installed at location OU2A8-SV-6 due to high groundwater encountered at that boring. Strong hydrocarbon odors and high PID readings were encountered in borings at OU2A8-SV-5 and -6 (176.6 and 98.0 ppm, respectively).

PLANS FOR THE FOLLOWING DAY:

Survey all six locations. Demobilize site. Sample the locations at a later date that meets the criterion for avoiding a significant rain event.

ATTACHMENTS:

None

Copies to: Michael Meyer	**Battelle - DAILY FIELD REPORT**

	Signed: _____

BATTELLE
It can be done

DAILY FIELD REPORT 11 / 16 / 2017	**Contract No.** N44255-14-D-9013, TO 026 **Reference** Sampling and Analysis Plan (Battelle 2017) Accident Prevention Plan (Battelle 2017)
Project: 100100157 Naval Base Kitsap Keyport, WA OU2 Area 8 Vapor Intrusion Study	
Location: Naval Base Kitsap Keyport, WA OU2	
Client: Naval Facilities Engineering Command Northwest	**Contractor:** Battelle
Weather: Cloudy with rain showers, high 46 F, winds S 10 mph	
To: Carlotta Cellucci	
From: Samuel Moore	

PERSONNEL ON SITE:

Samuel Moore (Battelle)

SUMMARY OF WORK COMPLETED:

- Surveyed soil vapor sampling locations OU2A8-SV-1 through -6
- Demobilized equipment from site

DEVIATIONS FROM WORKPLAN:

- None

SAFETY OBSERVATIONS AND GOOD CATCHES:

None.

FIELD ACTIVITY CHRONOLOGY

0800 Samuel Moore on site at OU1 preparing equipment.

0850 Pre-calibrated GNSS surveying instrument. Surveyed soil vapor monitoring locations OU2A8-SV-1 through -6.

0915 Performed post-calibrations and demobilized site.

1245 All off site.

SUMMARY OF FINDINGS

Soil vapor monitoring points OU2A8-SV-1 through -6 were surveyed to within 1 ft.

PLANS FOR THE FOLLOWING DAY:

None. Sample the locations at a later date that meets the criterion for avoiding a significant rain event.

ATTACHMENTS:

None

Copies to: Michael Meyer	**Battelle - DAILY FIELD REPORT**

	Signed: _____

APPENDIX E

Laboratory Data Packages and Validation Reports

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Battelle
505 King Avenue
Columbus, OH 43201
ATTN: Mrs. Betsy Branch

January 22, 2018

SUBJECT: NBK Keyport, OU2, Area 8, Data Validation

Dear Mrs. Branch

Enclosed are the final validation reports for the fractions listed below. This SDG was received on December 29, 2017. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #40139:

SDG #	Fraction
P1706106	Volatiles, Helium

The data validation was performed under Level III & IV validation guidelines. The analyses were validated using the following documents and variances, as applicable to each method:

- Final Sampling and Analysis Plan for 2017 Vapor Intrusion Study at Keyport OU2, Area 8, Naval Base Kitsap. Keyport, Washington, November 2017
- U.S. Department of Defense, Quality Systems Manual for Environmental Laboratories, Version 5.0, July 2013

Please feel free to contact us if you have any questions.

Sincerely,

Pei Geng
Project Manager/Senior Chemist

90/10 (Client Select)

LDC #40139 (Battelle-Columbus, OH / NBK Keyport, OU2, Area 8)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Short VOA (TO-15)		Helium (3C)																													
Matrix:	Air/Water/Soil			A	S	A	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	P1706106	12/29/17	01/22/18	7	0	7	0																												
A	P1706106	12/29/17	01/22/18	1	0	1	0																												
Total	T/PG			8	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16

Shaded cells indicate Level IV validation (all other cells are Level III validation).

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NBK Keyport, OU2, Area 8

LDC Report Date: January 22, 2018

Parameters: Volatiles

Validation Level: Level III & IV

Laboratory: ALS Environmental

Sample Delivery Group (SDG): P1706106

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OU2A8-SV-1-5.0	P1706106-001	Air	11/29/17
OU2A8-SV-2-5.0	P1706106-002	Air	11/29/17
OU2A8-SV-3-5.0**	P1706106-003**	Air	11/29/17
OU2A8-SV-3-8.0	P1706106-004	Air	11/29/17
OU2A8-SV-4-5.0	P1706106-005	Air	11/30/17
OU2A8-SV-5-5.0	P1706106-006	Air	11/30/17
OU2A8-SV-6-5.0	P1706106-007	Air	11/30/17
OU2A8-SV-7-5.0	P1706106-008	Air	11/30/17
OU2A8-SV-2-5.0DUP	P1706106-002DUP	Air	11/29/17

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for 2017 Vapor Intrusion Study at Keyport OU2, Area 8, Naval Base Kitsap, Keyport, Washington (November 2017) and the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) Method TO-15

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound for analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

The canisters were properly pressurized and handled.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 24 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 30.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

All canisters were cleaned as required by the method. The laboratory indicated that canister certification was performed by batch. No contaminants were found in the representative canister blank.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Although surrogates were not required by the method, surrogate analysis was performed by the laboratory. Surrogate recoveries (%R) were within QC limits.

VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples OU2A8-SV-5-5.0 and OU2A8-SV-7-5.0 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/m³)		RPD (Limits)	Flag	A or P
	OU2A8-SV-5-5.0	OU2A8-SV-7-5.0			
1,1-Dichloroethene	5.5	5.3	4 (≤25)	-	-
Benzene	2.1	4.7	76 (≤25)	NQ	-
Trichloroethene	41	41	0 (≤25)	-	-
Tetrachloroethene	3.4	3.5	3 (≤25)	-	-
Ethylbenzene	1.5U	0.95	Not calculable	-	-

NQ = One or both results were less than 2x the limit of quantitation, therefore no data were qualified.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation.

The leak check compound, Helium, was not detected in samples with the following exceptions:

Sample	Compound	Leak Check Compound Helium concentration	Flag	A or P
OU2A8-SV-1-5.0	All compounds	180000 ug/m³	J (all detects)	A
OU2A8-SV-2-5.0	All compounds	7900 ug/m³	NQ	-
OU2A8-SV-3-5.0**	All compounds	2000 ug/m³	NQ	-

NQ = Results were less than 10x the reporting limit, therefore no data were qualified.

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to helium check, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

NBK Keyport, OU2, Area 8
Volatiles - Data Qualification Summary - SDG P1706106

Sample	Compound	Flag	A or P	Reason
OU2A8-SV-1-5.0	All compounds	J (all detects)	A	Compound quantitation (helium check)

NBK Keyport, OU2, Area 8
Volatiles - Laboratory Blank Data Qualification Summary - SDG P1706106

No Sample Data Qualified in this SDG

NBK Keyport, OU2, Area 8
Volatiles - Field Blank Data Qualification Summary - SDG P1706106

No Sample Data Qualified in this SDG

LDC #: 40139A48 **VALIDATION COMPLETENESS WORKSHEET** Date: 01/15/18
SDG #: P1706106 Level III/IV Page: 1 of 1
Laboratory: ALS Environmental Reviewer: DK
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA Method TO-15)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	ICAL ≤ 30%, ICV ≤ 30%
IV.	Continuing calibration	A	CCV ≤ 30%
V.	Laboratory Blanks/Canister Blanks	A	(individually qrt.)
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates /LD	N/A	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D = 6/8
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	SW	Not reviewed for Level III validation.
XIII.	Target compound identification	A	Not reviewed for Level III validation.
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank
** Indicates sample underwent Level IV validation

	Client ID	Lab ID	Matrix	Date
1	OU2A8-SV-1-5.0	P1706106-001	Air	11/29/17
2	OU2A8-SV-2-5.0	P1706106-002	Air	11/29/17
3	OU2A8-SV-3-5.0**	P1706106-003**	Air	11/29/17
4	OU2A8-SV-3-8.0	P1706106-004	Air	11/29/17
5	OU2A8-SV-4-5.0	P1706106-005	Air	11/30/17
6	OU2A8-SV-5-5.0 b	P1706106-006	Air	11/30/17
7	OU2A8-SV-6-5.0	P1706106-007	Air	11/30/17
8	OU2A8-SV-7-5.0 b	P1706106-008	Air	11/30/17
9	OU2A8-SV-2-5.0DUP	P1706106-002DUP	Air	11/29/17
10				
11				
12	P171211-HB			
13				

(11 cpds)

LDC #: 40134 A48

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: [signature]

Method: Volatiles (EPA Method TO-15)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was canister pressure criteria met?	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 24 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 30%?	✓			
IIIb. Initial calibration verificattion				
Was an initial calibration verification standard analyzed after every ICAL for each instrument?	✓			
Were all percent differences (%D) ≤ 30% or percent recoveries (%R) 70-130%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 24 hours for each instrument?	✓			
Were all percent differences (%D) ≤ 30% or percent recoveries (%R) 70-130%?	✓			
V. Laboratory Blanks/Canister Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 24 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
Was a canister blank analyzed for every canister?	✓			
Was there contamination in the canister blanks? If yes, please see the Canister Blanks validation completeness worksheet.		✓		
VI. Field Blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VII. Surrogate spikes (Optional)				
Were all surrogate percent recoveries (%R) within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VIII. Laboratory Duplicate				
Was a laboratory duplicate analyzed for this SDG?				
Were the relative percent differences (RPD) within the QC limits?				

Validation Area	Yes	No	NA	Findings/Comments
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
XI. Internal standards				
Were internal standard area counts within ± 40% from the associated calibration standard?	✓			
Were retention times within ± 20.0 seconds from the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene	A2.
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane	B2.
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane	C2.
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene	D2.
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11	E2.
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12	F2.
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113	G2.
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114	H2.
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane	I2.
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide	J2.
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane	K2.
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane	L2.
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane	M2.
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane	N2.
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane	O2.
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane	P2.
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane	Q2.
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane	R2.
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane	S2.
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane	T2.
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal	U2.
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene	V2.
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol	W2.
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene	X2.
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.	Y2.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.	Z2.

LDC#: 40139A48

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd Reviewer:

METHOD: GCMS VOA (EPA Method TO15)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/m3)		RPD (≤25%)	Qualifications (Parent only)
	6	8		
H	5.5	5.3	4	
V	2.1	4.7	76	NQ (<2XLOQ)
S	41	41	0	
AA	3.4	3.5	3	
EE	1.5U	0.95	NC	

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LDC #: 40139 A51

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and RLs

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA Method TO-15)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Compound	Findings	Qualifications
		1	Helium (Leak check cpd)	Detected at 180 000 ug/m3	J / UJ / A
		2		7900	Text (< 10x RL)
		3		20 000	

Comments: See sample calculation verification worksheet for recalculations

(RL = 5900)

LDC #: 40139A48

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA Method TO-15)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of Compound
C_x = Concentration of compound,
S= Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (1.0 ng)	Recalculated RRF (1.0 ng)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL MS13	11/6/2017	cis-1,2-DCE (BCM)	1.877	1.877	1.878	1.878	11.66	11.66
			Trichloroethene (DFB)	0.331	0.331	0.375	0.375	25.45	25.45
			Tretrachloroethene (CBZ)	0.848	0.848	0.849	0.849	8.43	8.42

LDC #_40139A48

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:__JVG__
2nd Reviewer:_____

METHOD: GC/MS VOA (EPA Method TO-15)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound,
Cx = Concentration of compound,
Ais = Area of associated internal standard
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (IS)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported % D	Recalculated %D
1	12111701	12/11/17	cis-1,2-DCE (BCM)	1.878	1.746	1.746	7.0	7.0
			Trichloroethene (DFB)	0.375	0.282	0.282	24.8	24.8
			Tretrachloroethene (CBZ)	0.849	0.746	0.746	12.1	12.1

LDC #: 40139 A48

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd reviewer:

METHOD: GC/MS VOA (EPA Method TO-15)

Y N N/A Were all reported results recalculated and verified for all level IV samples?

Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. 3 , TCE

Conc. = $\frac{(210566)(12.5)(1.48)}{(357735)(0.375)(0.4L)(\quad)}$

= 72.59

≈ 73 ug/m3

#	Sample ID	Compound	Reported Concentration (ug/m3)	Calculated Concentration ( )	Qualification
			73		

LDC Report# 40139A50

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NBK Keyport, OU2, Area 8

LDC Report Date: January 22, 2018

Parameters: Helium

Validation Level: Level III & IV

Laboratory: ALS Environmental

Sample Delivery Group (SDG): P1706106

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OU2A8-SV-1-5.0	P1706106-001	Air	11/29/17
OU2A8-SV-2-5.0	P1706106-002	Air	11/29/17
OU2A8-SV-3-5.0**	P1706106-003**	Air	11/29/17
OU2A8-SV-3-8.0	P1706106-004	Air	11/29/17
OU2A8-SV-4-5.0	P1706106-005	Air	11/30/17
OU2A8-SV-5-5.0	P1706106-006	Air	11/30/17
OU2A8-SV-6-5.0	P1706106-007	Air	11/30/17
OU2A8-SV-7-5.0	P1706106-008	Air	11/30/17

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for 2017 Vapor Intrusion Study at Keyport OU2, Area 8, Naval Base Kitsap, Keyport, Washington (November 2017) and the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Helium by Environmental Protection Agency (EPA) Method 3C

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 30.0%.

Retention time windows were established as required by the method for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0%.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0%.

Retention times of all compounds in the calibration standards were within the established retention time windows for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Field Duplicates

Samples OU2A8-SV-5-5.0 and OU2A8-SV-7-5.0 were identified as field duplicates. No results were detected in any of the samples.

IX. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

X. Target Compound Identification

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

NBK Keyport, OU2, Area 8
Helium - Data Qualification Summary - SDG P1706106

No Sample Data Qualified in this SDG

NBK Keyport, OU2, Area 8
Helium - Laboratory Blank Data Qualification Summary - SDG P1706106

No Sample Data Qualified in this SDG

NBK Keyport, OU2, Area 8
Helium - Field Blank Data Qualification Summary - SDG P1706106

No Sample Data Qualified in this SDG

LDC #: 40139A50 **VALIDATION COMPLETENESS WORKSHEET** Date: 01/15/18
SDG #: P1706106 Level III/IV Page: 1 of 1
Laboratory: ALS Environmental Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Helium (EPA Method 3C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	Initial calibration/ICV	A / A	ICAL ≤ 30% ICV ≤ 30%
III.	Continuing calibration	A	CCV ≤ 30%
IV.	Laboratory Blanks	A	
V.	Field blanks	N	
VI.	Matrix spike/Matrix spike duplicates	N	
VII.	Laboratory control samples	A	LCS/D
VIII.	Field duplicates	ND	D = 6/8
IX.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Level III validation.
X.	Target compound identification	A	Not reviewed for Level III validation.
XI.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank
** Indicates sample underwent Level IV validation

	Client ID		Lab ID	Matrix	Date
1	OU2A8-SV-1-5.0		P1706106-001	Air	11/29/17
2	OU2A8-SV-2-5.0		P1706106-002	Air	11/29/17
3	OU2A8-SV-3-5.0**		P1706106-003**	Air	11/29/17
4	OU2A8-SV-3-8.0		P1706106-004	Air	11/29/17
5	OU2A8-SV-4-5.0		P1706106-005	Air	11/30/17
6	OU2A8-SV-5-5.0	D	P1706106-006	Air	11/30/17
7	OU2A8-SV-6-5.0		P1706106-007	Air	11/30/17
8	OU2A8-SV-7-5.0	D	P1706106-008	Air	11/30/17
9					
10					
11					
12					
13					

Notes:

	P171211-MB						

LDC #: 40139A50

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
IIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ ~~20%~~ 30?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?			✓	
Were the RT windows properly established?	✓			
IIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ ~~20%~~ 30 or percent recoveries (%R) ~~80-120%~~?	✓			
III. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ ~~20%~~ 30 or percent recoveries (%R) 80-~~120%~~?	✓			
Were all the retention times within the acceptance windows?	✓			
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. Field Blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VI. Surrogate spikes				
Were all surrogate percent recovery (%R) within the QC limits?		✓		
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	

LDC #: 40129A50

VALIDATION FINDINGS CHECKLIST

Reviewer: JMG
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓	NA		
Were target compounds detected in the field duplicates?		✓	NA	
X. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: 40139A50

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC / HPLC _____

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where:
A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (1000 std)	Recalculated CF (1000 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL HP5890	9/25/2017	Helium	37.73	37.73	36.01	36.01	10.17	10.17

LDC #_40139A50

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:_JVG_
2nd Reviewer:_____

METHOD: GC_✓_HPLC_____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Percent difference (%D) = 100 * (N - C)/N N = Initial Calibration Factor or Nominal Amount
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

#	Standard ID	Calibration Date	Compound	Conc (ppm)	Reported Conc	Recalculated Conc	Reported %D	Recalculated %D
1	12111702	12/11/17	Helium	10000.0	9168.79	9169.44	8.31	8.31

LDC #: 40159A50

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: / GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC/SA)
RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration
LCS = Laboratory Control Sample
SA = Spike added
LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: P171211- LCS/D

Compound	Spike Added (ug/m3)		Spike Sample Concentration (ug/m3)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
Phorate (8141A)										
Malathion (8141A)										
Formaldehyde (8315A)										
He (3C)	1640000	1640000	1710000	1750000	104	104	107	107	3	3

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 40139A50

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 3 Compound Name He

Concentration = $\frac{(2906)(1.48)(4.002)}{(36.01)(0.001L)(24.45)} = 19539$

$\approx 20000 ng/m^3$

#	Sample ID	Compound	Reported Concentrations (ng/m3)	Recalculated Results Concentrations ( )	Qualifications
			20 000		

Comments:

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

LABORATORY REPORT

December 27, 2017

Matt Jones
Trihydro Corporation
6227 Hamilton Avenue
Ferndale, WA 98248

RE: Keyport, WA / 240-010-GOU

Dear Matt:

Enclosed are the results of the samples submitted to our laboratory on December 6, 2017. For your reference, these analyses have been assigned our service request number P1706106.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

By Sue Anderson at 5:16 pm, Dec 27, 2017

Sue Anderson
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

Client: Trihydro Corporation
Project: Keyport, WA / 240-010-GOU

Service Request No: P1706106

CASE NARRATIVE

The samples were received intact under chain of custody on December 6, 2017 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Helium Analysis

The samples were analyzed for helium according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This method is not included on the laboratory's NELAP or DoD-ELAP scope of accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. For projects requiring DoD QSM 5.1 compliance canisters were cleaned to <1/2 the MRL. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2016036
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1177034
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-004
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-17-8
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272017-8
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Trihydro Corporation
Project ID: Keyport, WA / 240-010-GOU
Service Request: P1706106

Date Received: 12/6/2017
Time Received: 10:00

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	3C Modified - Helium Can	TO-15 - VOC Cans
OU2A8-SV-1-5.0	P1706106-001	Air	11/29/2017	11:29	1SS00036	-0.48	5.74	X	X
OU2A8-SV-2-5.0	P1706106-002	Air	11/29/2017	14:35	1SC00648	0.16	5.33	X	X
OU2A8-SV-3-5.0	P1706106-003	Air	11/29/2017	15:48	1SS00180	-0.99	5.63	X	X
OU2A8-SV-3-8.0	P1706106-004	Air	11/29/2017	16:30	1SC00582	-0.40	5.60	X	X
OU2A8-SV-4-5.0	P1706106-005	Air	11/30/2017	09:02	1SC00605	-0.62	5.37	X	X
OU2A8-SV-5-5.0	P1706106-006	Air	11/30/2017	11:06	1SS00088	-0.60	5.55	X	X
OU2A8-SV-6-5.0	P1706106-007	Air	11/30/2017	12:30	1SS00039	-0.59	5.87	X	X
OU2A8-SV-7-5.0	P1706106-008	Air	11/30/2017	11:06	1SS00154	-0.60	5.61	X	X

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) **10-Day-Standard**

ALS Project No. P170606

Company Name & Address (Reporting Information)
Trihydro Corporation
6227 Hamilton Avenue
Ferndale, WA 98248

Project Name: Keyport, WA
Project Number: 240-010-GOV
P.O. # / Billing Information: 240-010-GOV

Project Manager: Matthew Jones
Phone: 360-32-9109
Fax: 307-745-7729
Email Address for Result Reporting: mjones@trihydro.com
Sampler (Print & Sign): Matthew Jones

ALS Contact:

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Select List VOCs TO-15	Helium 3A	Comments e.g. Actual Preservative or specific instructions
OU2AG-SV-1-5.0	1	11-29-17	1129	15500036	OA00291	-30.39	-3.18	1L	X	X	See Lab
OU2AG-SV-2-5.0	2	11-29-17	1435	15C00648	OA00052	-30.46	-1.87	1L	X	X	SOW
OU2AG-SV-3-5.0	3	11-29-17	1546	15500180	OA01041	-30.76	-4.09	1L	X	X	for list
OU2AG-SV-3-8.0	4	11-29-17	1630	15C00562	OA01544	-30.47	-3.02	1L	X	X	of VOCs
OU2AG-SV-4-5.0	5	11-30-17	0902	15C00605	OA01867	-30.54	-3.72	1L	X	X	& other
OU2AG-SV-5-5.0	6	11-30-17	1106	15C00066	OA02048	-30.91	-3.52	1L	X	X	reporting
OU2AG-SV-6-5.0	7	11-30-17	1230	~~15500039~~	OA1007	-30.75	-3.54	1L	X	X	requirements
OU2AG-SV-7-5.0	8	11-30-17	1106	~~15500066~~	OA02046	-30.80	-3.59	1L	X	X	
				15500154	for SV-7-5.0						
				15500039	for SV-6-5.0						

Report Tier Levels - please select
Tier I - Results (Default in not specified) _____
Tier II (Results + QC Summaries _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Date Validation Package) 10% Surcharge X

EDD required YES / No
Type: See Lab SOW Units: _____

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP): See Lab SOW

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Matthew Jones	12-4-17	1500			
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date: 12-6-17	Time: 1000

Cooler / Blank Temperature _____ °C

ALS Environmental
Sample Acceptance Check Form

Client: Trihydro Corporation Work order: P1706106

Project: Keyport, WA / 240-010-GOU

Sample(s) received on: 12/6/17 Date opened: 12/6/17 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1706106-001.01	1.0 L Source Silonite Canister					
P1706106-002.01	1.0 L Source Can					
P1706106-003.01	1.0 L Source Silonite Canister					
P1706106-004.01	1.0 L Source Can					
P1706106-005.01	1.0 L Source Can					
P1706106-006.01	1.0 L Source Silonite Canister					
P1706106-007.01	1.0 L Source Silonite Canister					
P1706106-008.01	1.0 L Source Silonite Canister					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Project ID: P1706106

Helium

Test Code: EPA 3C Modified
Instrument ID: HP5890 II/GC8/TCD Date(s) Collected: 11/29 - 11/30/17
Analyst: Mike Conejo Date Received: 12/6/17
Sample Type: 1.0 L Silonite Summa Canister(s) Date Analyzed: 12/11/17
Test Notes:

Client Sample ID	ALS Sample ID	Injection Volume ml(s)	Container Dilution Factor	Result µg/m³	MRL µg/m³	MDL µg/m³	Data Qualifier
OU2A8-SV-1-5.0	P1706106-001	1.00	1.44	**180,000**	5,900	1,300	
OU2A8-SV-2-5.0	P1706106-002	1.00	1.35	**7,900**	5,500	1,200	
OU2A8-SV-3-5.0	P1706106-003	1.00	1.48	**20,000**	6,100	1,300	
OU2A8-SV-3-8.0	P1706106-004	1.00	1.42	1,300	5,800	1,300	**U**
OU2A8-SV-4-5.0	P1706106-005	1.00	1.43	1,300	5,900	1,300	**U**
OU2A8-SV-5-5.0	P1706106-006	1.00	1.44	1,300	5,900	1,300	**U**
OU2A8-SV-6-5.0	P1706106-007	1.00	1.46	1,300	6,000	1,300	**U**
OU2A8-SV-7-5.0	P1706106-008	1.00	1.44	1,300	5,900	1,300	**U**
Method Blank	P171211-MB	1.00	1.00	900	4,100	900	**U**

U = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Duplicate Lab Control Sample** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Sample ID: P171211-DLCS

Test Code: EPA 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 12/11/17
Sample Type: 1.0 L Silonite Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount LCS / DLCS µg/m³	Result LCS µg/m³	Result DLCS µg/m³	% Recovery LCS	% Recovery DLCS	ALS Acceptance Limits	RPD	RPD Limit	Data Qualifier
7440-59-7	Helium	1,640,000	1,710,000	1,750,000	**104**	**107**	81-125	3	14	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Project ID: P1706106

Method Blank Summary

Test Code: EPA 3C Modified
Instrument ID: HP5890 II/GC8/TCD Lab File ID: 12111703.D
Analyst: Mike Conejo Date Analyzed: 12/11/17
Sample Type: 1.0 L Silonite Summa Canister(s) Time Analyzed: 09:50
Test Notes:

Client Sample ID	ALS Sample ID	Lab File ID	Time Analyzed
Lab Control Sample	P171211-LCS	12111704.D	10:01
Duplicate Lab Control Sample	P171211-DLCS	12111705.D	10:12
OU2A8-SV-1-5.0	P1706106-001	12111706.D	10:49
OU2A8-SV-2-5.0	P1706106-002	12111707.D	11:10
OU2A8-SV-3-5.0	P1706106-003	12111708.D	11:28
OU2A8-SV-3-8.0	P1706106-004	12111709.D	11:40
OU2A8-SV-4-5.0	P1706106-005	12111710.D	11:54
OU2A8-SV-5-5.0	P1706106-006	12111711.D	12:09
OU2A8-SV-6-5.0	P1706106-007	12111712.D	12:18
OU2A8-SV-7-5.0	P1706106-008	12111713.D	12:24

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **OU2A8-SV-1-5.0** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Sample ID: P1706106-001

Test Code: EPA TO-15 Date Collected: 11/29/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 12/6/17
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Silonite Summa Canister Volume(s) Analyzed: 0.10 Liter(s)
Test Notes: 0.015 Liter(s)
Container ID: 1SS00036

Initial Pressure (psig): -0.48 Final Pressure (psig): 5.74

Container Dilution Factor: 1.44

CAS #	Compound	Result µg/m³	LOQ µg/m³	LOD µg/m³	MDL µg/m³	Data Qualifier
75-01-4	Vinyl Chloride	5.9	7.2	5.9	2.4	**U**
75-35-4	1,1-Dichloroethene	**4.2**	7.2	6.0	2.4	**J**
156-60-5	trans-1,2-Dichloroethene	**5,300**	48	41	18	**D**
156-59-2	cis-1,2-Dichloroethene	**38**	7.2	6.2	2.3	
71-43-2	Benzene	6.0	7.2	6.0	2.3	**U**
56-23-5	Carbon Tetrachloride	6.0	7.2	6.0	2.2	**U**
79-01-6	Trichloroethene	**1,300**	7.2	6.0	2.0	
123-91-1	1,4-Dioxane	6.2	7.2	6.2	2.3	**U**
79-00-5	1,1,2-Trichloroethane	6.2	7.2	6.2	2.3	**U**
127-18-4	Tetrachloroethene	**150**	7.2	6.2	2.0	
100-41-4	Ethylbenzene	6.0	7.2	6.0	2.3	**U**

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **OU2A8-SV-2-5.0** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Sample ID: P1706106-002

Test Code: EPA TO-15 Date Collected: 11/29/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 12/6/17
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.075 Liter(s)
Test Notes:
Container ID: 1SC00648

Initial Pressure (psig): 0.16 Final Pressure (psig): 5.33

Container Dilution Factor: 1.35

CAS #	Compound	Result µg/m³	LOQ µg/m³	LOD µg/m³	MDL µg/m³	Data Qualifier
75-01-4	Vinyl Chloride	7.4	9.0	7.4	3.1	**U**
75-35-4	1,1-Dichloroethene	**4.8**	9.0	7.6	3.1	**J**
156-60-5	trans-1,2-Dichloroethene	**240**	9.0	7.7	3.4	
156-59-2	cis-1,2-Dichloroethene	7.7	9.0	7.7	2.9	**U**
71-43-2	Benzene	7.6	9.0	7.6	2.9	**U**
56-23-5	Carbon Tetrachloride	7.6	9.0	7.6	2.7	**U**
79-01-6	Trichloroethene	**1,200**	9.0	7.6	2.5	
123-91-1	1,4-Dioxane	7.7	9.0	7.7	2.9	**U**
79-00-5	1,1,2-Trichloroethane	7.7	9.0	7.7	2.9	**U**
127-18-4	Tetrachloroethene	**1,500**	9.0	7.7	2.5	
100-41-4	Ethylbenzene	7.6	9.0	7.6	2.9	**U**

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **OU2A8-SV-3-5.0** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Sample ID: P1706106-003

Test Code: EPA TO-15 Date Collected: 11/29/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 12/6/17
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Silonite Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SS00180

Initial Pressure (psig): -0.99 Final Pressure (psig): 5.63

Container Dilution Factor: 1.48

CAS #	Compound	Result µg/m³	LOQ µg/m³	LOD µg/m³	MDL µg/m³	Data Qualifier
75-01-4	Vinyl Chloride	1.5	1.9	1.5	0.63	**U**
75-35-4	1,1-Dichloroethene	1.6	1.9	1.6	0.63	**U**
156-60-5	trans-1,2-Dichloroethene	**0.82**	1.9	1.6	0.70	**J**
156-59-2	cis-1,2-Dichloroethene	1.6	1.9	1.6	0.59	**U**
71-43-2	Benzene	**0.63**	1.9	1.6	0.59	**J**
56-23-5	Carbon Tetrachloride	1.6	1.9	1.6	0.56	**U**
79-01-6	Trichloroethene	**73**	1.9	1.6	0.52	
123-91-1	1,4-Dioxane	1.6	1.9	1.6	0.59	**U**
79-00-5	1,1,2-Trichloroethane	1.6	1.9	1.6	0.59	**U**
127-18-4	Tetrachloroethene	**16**	1.9	1.6	0.52	
100-41-4	Ethylbenzene	1.6	1.9	1.6	0.59	**U**

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **OU2A8-SV-3-8.0** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Sample ID: P1706106-004

Test Code: EPA TO-15 Date Collected: 11/29/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 12/6/17
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00582

Initial Pressure (psig): -0.40 Final Pressure (psig): 5.60

Container Dilution Factor: 1.42

CAS #	Compound	Result µg/m³	LOQ µg/m³	LOD µg/m³	MDL µg/m³	Data Qualifier
75-01-4	Vinyl Chloride	1.5	1.8	1.5	0.60	**U**
75-35-4	1,1-Dichloroethene	1.5	1.8	1.5	0.60	**U**
156-60-5	trans-1,2-Dichloroethene	1.5	1.8	1.5	0.67	**U**
156-59-2	cis-1,2-Dichloroethene	**0.94**	1.8	1.5	0.57	**J**
71-43-2	Benzene	**1.5**	1.8	1.5	0.57	**J**
56-23-5	Carbon Tetrachloride	1.5	1.8	1.5	0.53	**U**
79-01-6	Trichloroethene	**140**	1.8	1.5	0.50	
123-91-1	1,4-Dioxane	1.5	1.8	1.5	0.57	**U**
79-00-5	1,1,2-Trichloroethane	1.5	1.8	1.5	0.57	**U**
127-18-4	Tetrachloroethene	**22**	1.8	1.5	0.50	
100-41-4	Ethylbenzene	1.5	1.8	1.5	0.57	**U**

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **OU2A8-SV-4-5.0** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Sample ID: P1706106-005

Test Code: EPA TO-15 Date Collected: 11/30/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 12/6/17
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes: 0.040 Liter(s)
Container ID: 1SC00605

Initial Pressure (psig): -0.62 Final Pressure (psig): 5.37

Container Dilution Factor: 1.43

CAS #	Compound	Result µg/m³	LOQ µg/m³	LOD µg/m³	MDL µg/m³	Data Qualifier
75-01-4	Vinyl Chloride	1.5	1.8	1.5	0.61	**U**
75-35-4	1,1-Dichloroethene	1.5	1.8	1.5	0.61	**U**
156-60-5	trans-1,2-Dichloroethene	1.5	1.8	1.5	0.68	**U**
156-59-2	cis-1,2-Dichloroethene	**0.83**	1.8	1.5	0.57	**J**
71-43-2	Benzene	**3.4**	1.8	1.5	0.57	
56-23-5	Carbon Tetrachloride	**33**	1.8	1.5	0.54	
79-01-6	Trichloroethene	**290**	18	15	5.0	**D**
123-91-1	1,4-Dioxane	1.5	1.8	1.5	0.57	**U**
79-00-5	1,1,2-Trichloroethane	1.5	1.8	1.5	0.57	**U**
127-18-4	Tetrachloroethene	**5.9**	1.8	1.5	0.50	
100-41-4	Ethylbenzene	1.5	1.8	1.5	0.57	**U**

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **OU2A8-SV-5-5.0** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Sample ID: P1706106-006

Test Code: EPA TO-15 Date Collected: 11/30/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 12/6/17
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Silonite Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SS00088

Initial Pressure (psig): -0.60 Final Pressure (psig): 5.55

Container Dilution Factor: 1.44

CAS #	Compound	Result µg/m³	LOQ µg/m³	LOD µg/m³	MDL µg/m³	Data Qualifier
75-01-4	Vinyl Chloride	1.5	1.8	1.5	0.61	**U**
75-35-4	1,1-Dichloroethene	**5.5**	1.8	1.5	0.61	
156-60-5	trans-1,2-Dichloroethene	1.5	1.8	1.5	0.68	**U**
156-59-2	cis-1,2-Dichloroethene	1.5	1.8	1.5	0.58	**U**
71-43-2	Benzene	**2.1**	1.8	1.5	0.58	
56-23-5	Carbon Tetrachloride	1.5	1.8	1.5	0.54	**U**
79-01-6	Trichloroethene	**41**	1.8	1.5	0.50	
123-91-1	1,4-Dioxane	1.5	1.8	1.5	0.58	**U**
79-00-5	1,1,2-Trichloroethane	1.5	1.8	1.5	0.58	**U**
127-18-4	Tetrachloroethene	**3.4**	1.8	1.5	0.50	
100-41-4	Ethylbenzene	1.5	1.8	1.5	0.58	**U**

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **OU2A8-SV-6-5.0** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Sample ID: P1706106-007

Test Code: EPA TO-15 Date Collected: 11/30/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 12/6/17
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Silonite Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SS00039

Initial Pressure (psig): -0.59 Final Pressure (psig): 5.87

Container Dilution Factor: 1.46

CAS #	Compound	Result µg/m³	LOQ µg/m³	LOD µg/m³	MDL µg/m³	Data Qualifier
75-01-4	Vinyl Chloride	1.5	1.8	1.5	0.62	**U**
75-35-4	1,1-Dichloroethene	**3.0**	1.8	1.5	0.62	
156-60-5	trans-1,2-Dichloroethene	1.6	1.8	1.6	0.69	**U**
156-59-2	cis-1,2-Dichloroethene	1.6	1.8	1.6	0.58	**U**
71-43-2	Benzene	1.5	1.8	1.5	0.58	**U**
56-23-5	Carbon Tetrachloride	1.5	1.8	1.5	0.55	**U**
79-01-6	Trichloroethene	**16**	1.8	1.5	0.51	
123-91-1	1,4-Dioxane	1.6	1.8	1.6	0.58	**U**
79-00-5	1,1,2-Trichloroethane	1.6	1.8	1.6	0.58	**U**
127-18-4	Tetrachloroethene	**0.58**	1.8	1.6	0.51	**J**
100-41-4	Ethylbenzene	1.5	1.8	1.5	0.58	**U**

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LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **OU2A8-SV-7-5.0** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Sample ID: P1706106-008

Test Code: EPA TO-15 Date Collected: 11/30/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 12/6/17
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Silonite Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SS00154

Initial Pressure (psig): -0.60 Final Pressure (psig): 5.61

Container Dilution Factor: 1.44

CAS #	Compound	Result µg/m³	LOQ µg/m³	LOD µg/m³	MDL µg/m³	Data Qualifier
75-01-4	Vinyl Chloride	1.5	1.8	1.5	0.61	**U**
75-35-4	1,1-Dichloroethene	**5.3**	1.8	1.5	0.61	
156-60-5	trans-1,2-Dichloroethene	1.5	1.8	1.5	0.68	**U**
156-59-2	cis-1,2-Dichloroethene	1.5	1.8	1.5	0.58	**U**
71-43-2	Benzene	**4.7**	1.8	1.5	0.58	
56-23-5	Carbon Tetrachloride	1.5	1.8	1.5	0.54	**U**
79-01-6	Trichloroethene	**41**	1.8	1.5	0.50	
123-91-1	1,4-Dioxane	1.5	1.8	1.5	0.58	**U**
79-00-5	1,1,2-Trichloroethane	1.5	1.8	1.5	0.58	**U**
127-18-4	Tetrachloroethene	**3.5**	1.8	1.5	0.50	
100-41-4	Ethylbenzene	**0.95**	1.8	1.5	0.58	**J**

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation**
Client Sample ID: **Method Blank** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Sample ID: P171211-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Silonite Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	LOQ µg/m³	LOD µg/m³	MDL µg/m³	Data Qualifier
75-01-4	Vinyl Chloride	0.41	0.50	0.41	0.17	**U**
75-35-4	1,1-Dichloroethene	0.42	0.50	0.42	0.17	**U**
156-60-5	trans-1,2-Dichloroethene	0.43	0.50	0.43	0.19	**U**
156-59-2	cis-1,2-Dichloroethene	0.43	0.50	0.43	0.16	**U**
71-43-2	Benzene	0.42	0.50	0.42	0.16	**U**
56-23-5	Carbon Tetrachloride	0.42	0.50	0.42	0.15	**U**
79-01-6	Trichloroethene	0.42	0.50	0.42	0.14	**U**
123-91-1	1,4-Dioxane	0.43	0.50	0.43	0.16	**U**
79-00-5	1,1,2-Trichloroethane	0.43	0.50	0.43	0.16	**U**
127-18-4	Tetrachloroethene	0.43	0.50	0.43	0.14	**U**
100-41-4	Ethylbenzene	0.42	0.50	0.42	0.16	**U**

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **Trihydro Corporation**
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Project ID: P1706106

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date(s) Collected: 11/29 - 11/30/17
Analyst: Wida Ang Date(s) Received: 12/6/17
Sampling Media: 1.0 L Silonite Summa Canister(s) / 1.0 L Summa Canister(s) Date(s) Analyzed: 12/11/17
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P171211-MB	**94**	**101**	**96**	70-130	
Lab Control Sample	P171211-LCS	**93**	**100**	**96**	70-130	
Duplicate Lab Control Sample	P171211-DLCS	**94**	**100**	**100**	70-130	
OU2A8-SV-1-5.0	P1706106-001	**93**	**100**	**97**	70-130	
OU2A8-SV-2-5.0	P1706106-002	**95**	**99**	**97**	70-130	
OU2A8-SV-2-5.0	P1706106-002DUP	**94**	**100**	**98**	70-130	
OU2A8-SV-3-5.0	P1706106-003	**97**	**99**	**96**	70-130	
OU2A8-SV-3-8.0	P1706106-004	**96**	**98**	**96**	70-130	
OU2A8-SV-4-5.0	P1706106-005	**96**	**100**	**96**	70-130	
OU2A8-SV-5-5.0	P1706106-006	**97**	**97**	**96**	70-130	
OU2A8-SV-6-5.0	P1706106-007	**96**	**101**	**97**	70-130	
OU2A8-SV-7-5.0	P1706106-008	**96**	**99**	**96**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Client: **Trihydro Corporation**
Client Sample ID: **Duplicate Lab Control Sample** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Sample ID: P171211-DLCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Silonite Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount LCS / DLCS µg/m³	Result LCS µg/m³	Result DLCS µg/m³	% Recovery LCS	% Recovery DLCS	DOD Acceptance Limits	RPD	RPD Limit	Data Qualifier
75-01-4	Vinyl Chloride	211	190	191	**90**	**91**	64-127	1	25	
75-35-4	1,1-Dichloroethene	213	193	194	**91**	**91**	61-133	0	25	
156-60-5	trans-1,2-Dichloroethene	214	213	213	**100**	**100**	67-124	0	25	
156-59-2	cis-1,2-Dichloroethene	212	197	198	**93**	**93**	70-121	0	25	
71-43-2	Benzene	213	184	186	**86**	**87**	69-119	1	25	
56-23-5	Carbon Tetrachloride	214	186	188	**87**	**88**	68-132	1	25	
79-01-6	Trichloroethene	212	158	159	**75**	**75**	71-123	0	25	
123-91-1	1,4-Dioxane	213	208	209	**98**	**98**	71-122	0	25	
79-00-5	1,1,2-Trichloroethane	212	200	202	**94**	**95**	73-119	1	25	
127-18-4	Tetrachloroethene	212	184	188	**87**	**89**	66-124	2	25	
100-41-4	Ethylbenzene	212	189	188	**89**	**89**	70-124	0	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **Trihydro Corporation**
Client Sample ID: **OU2A8-SV-2-5.0** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU** ALS Sample ID: P1706106-002DUP

Test Code: EPA TO-15 Date Collected: 11/29/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 12/6/17
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.075 Liter(s)
Test Notes:
Container ID: 1SC00648

Initial Pressure (psig): 0.16 Final Pressure (psig): 5.33

Container Dilution Factor: 1.35

Compound	Sample Result µg/m³	Duplicate Sample Result µg/m³	Average µg/m³	% RPD	RPD Limit	Data Qualifier
Vinyl Chloride	ND	ND	-	-	25	
1,1-Dichloroethene	4.75	4.07	4.41	**15**	25	**J**
trans-1,2-Dichloroethene	236	222	229	**6**	25	
cis-1,2-Dichloroethene	ND	ND	-	-	25	
Benzene	ND	ND	-	-	25	
Carbon Tetrachloride	ND	ND	-	-	25	
Trichloroethene	1,250	1,210	1230	**3**	25	
1,4-Dioxane	ND	ND	-	-	25	
1,1,2-Trichloroethane	ND	ND	-	-	25	
Tetrachloroethene	1,460	1,420	1440	**3**	25	
Ethylbenzene	ND	ND	-	-	25	

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

Client: **Trihydro Corporation** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU**

Method Blank Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Lab File ID: 12111703.D
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Silonite Summa Canister(s) Time Analyzed: 08:13
Test Notes:

Client Sample ID	ALS Sample ID	Lab File ID	Time Analyzed
Lab Control Sample	P171211-LCS	12111704.D	08:47
Duplicate Lab Control Sample	P171211-DLCS	12111712.D	13:42
OU2A8-SV-1-5.0	P1706106-001	12111713.D	15:12
OU2A8-SV-1-5.0 (Dilution)	P1706106-001	12111714.D	15:48
OU2A8-SV-2-5.0	P1706106-002	12111715.D	16:21
OU2A8-SV-2-5.0 (Lab Duplicate)	P1706106-002DUP	12111716.D	17:05
OU2A8-SV-3-5.0	P1706106-003	12111718.D	18:12
OU2A8-SV-3-8.0	P1706106-004	12111719.D	18:46
OU2A8-SV-4-5.0	P1706106-005	12111720.D	19:19
OU2A8-SV-4-5.0 (Dilution)	P1706106-005	12111721.D	19:52
OU2A8-SV-5-5.0	P1706106-006	12111722.D	20:26
OU2A8-SV-6-5.0	P1706106-007	12111723.D	21:00
OU2A8-SV-7-5.0	P1706106-008	12111724.D	21:33

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Trihydro Corporation** ALS Project ID: P1706106
Client Project ID: **Keyport, WA / 240-010-GOU**

Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Lab File ID: 12111701.D
Analyst: Wida Ang Date Analyzed: 12/11/17
Sampling Media: 1.0 L Silonite Summa Canister(s) Time Analyzed: 07:00
Test Notes:

		IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	24 Hour Standard	80504	11.14	385667	13.23	159539	17.51
	Upper Limit	112706	11.47	539934	13.56	223355	17.84
	Lower Limit	48302	10.81	231400	12.90	95723	17.18
	Client Sample ID						
01	Method Blank	75211	11.13	376740	13.22	155335	17.51
02	Lab Control Sample	76317	11.15	371111	13.23	154029	17.52
03	Duplicate Lab Control Sample	76414	11.15	372269	13.23	155877	17.52
04	OU2A8-SV-1-5.0	78474	11.13	385932	13.22	160459	17.51
05	OU2A8-SV-1-5.0 (Dilution)	80085	11.13	388365	13.22	163466	17.51
06	OU2A8-SV-2-5.0	76323	11.13	378855	13.22	161100	17.51
07	OU2A8-SV-2-5.0 (Lab Duplicate)	79389	11.13	383000	13.22	161612	17.51
08	OU2A8-SV-3-5.0	71375	11.13	357735	13.22	151021	17.51
09	OU2A8-SV-3-8.0	72108	11.14	358495	13.23	151470	17.51
10	OU2A8-SV-4-5.0	70069	11.13	352588	13.22	148035	17.51
11	OU2A8-SV-4-5.0 (Dilution)	74976	11.13	375227	13.22	156919	17.51
12	OU2A8-SV-5-5.0	69696	11.13	345614	13.22	148631	17.51
13	OU2A8-SV-6-5.0	70254	11.13	351984	13.22	146844	17.51
14	OU2A8-SV-7-5.0	71468	11.13	352324	13.22	149378	17.51
15							
16							
17							
18							
19							
20							

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area
AREA LOWER LIMIT = 60% of internal standard area
RT UPPER LIMIT = 0.33 minutes of internal standard RT
RT LOWER LIMIT = 0.33 minutes of internal standard RT

# Column used to flag values outside QC limits with an I.
I = Internal standard not within the specified limits.

Quantitation Report (Not Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111706.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 10:49:47
Operator : MC
Sample : P1706106-001 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:15:42 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

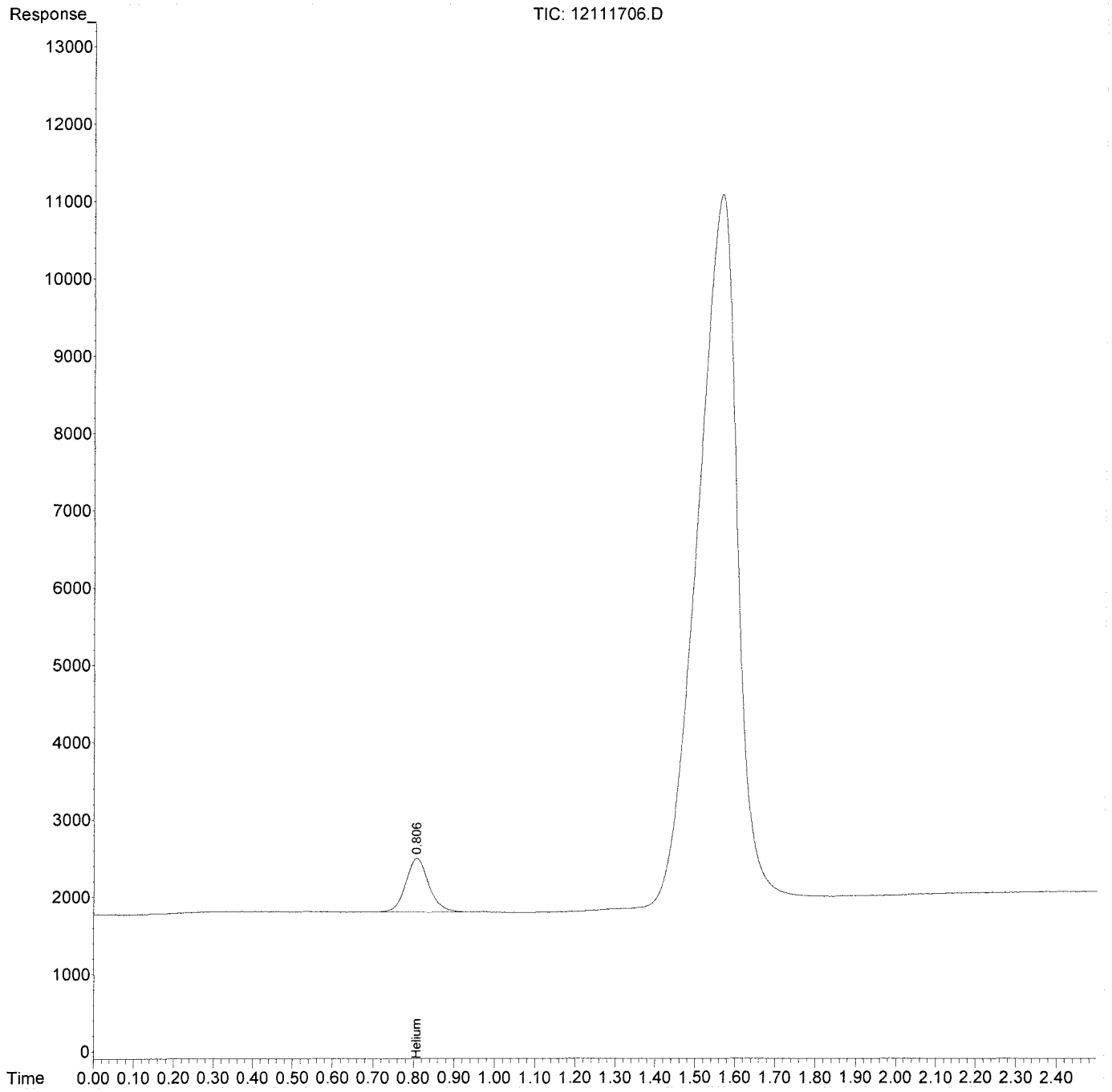
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.807	27751	770.545	ppm
2)	Hydrogen	0.000	0	N.D.	ppm

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

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111706.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 10:49:47
Operator : MC
Sample : P1706106-001 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:15:42 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111707.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 11:10:02
Operator : MC
Sample : P1706106-002 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:15:48 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

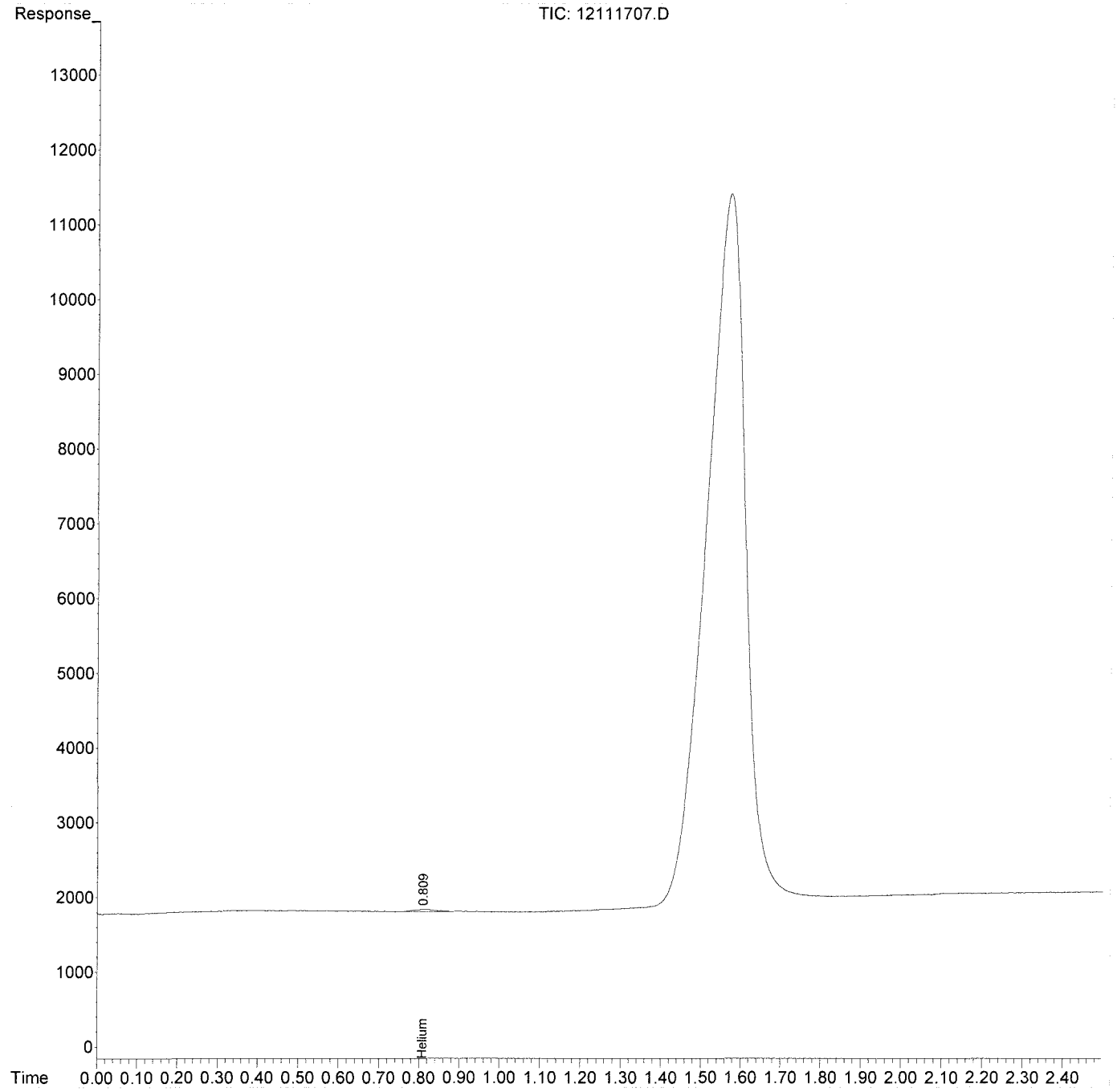
	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Helium	0.809	1293	35.916	ppm	m
2)	Hydrogen	0.000	0	N.D.	ppm	

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

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111707.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 11:10:02
Operator : MC
Sample : P1706106-002 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:15:48 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

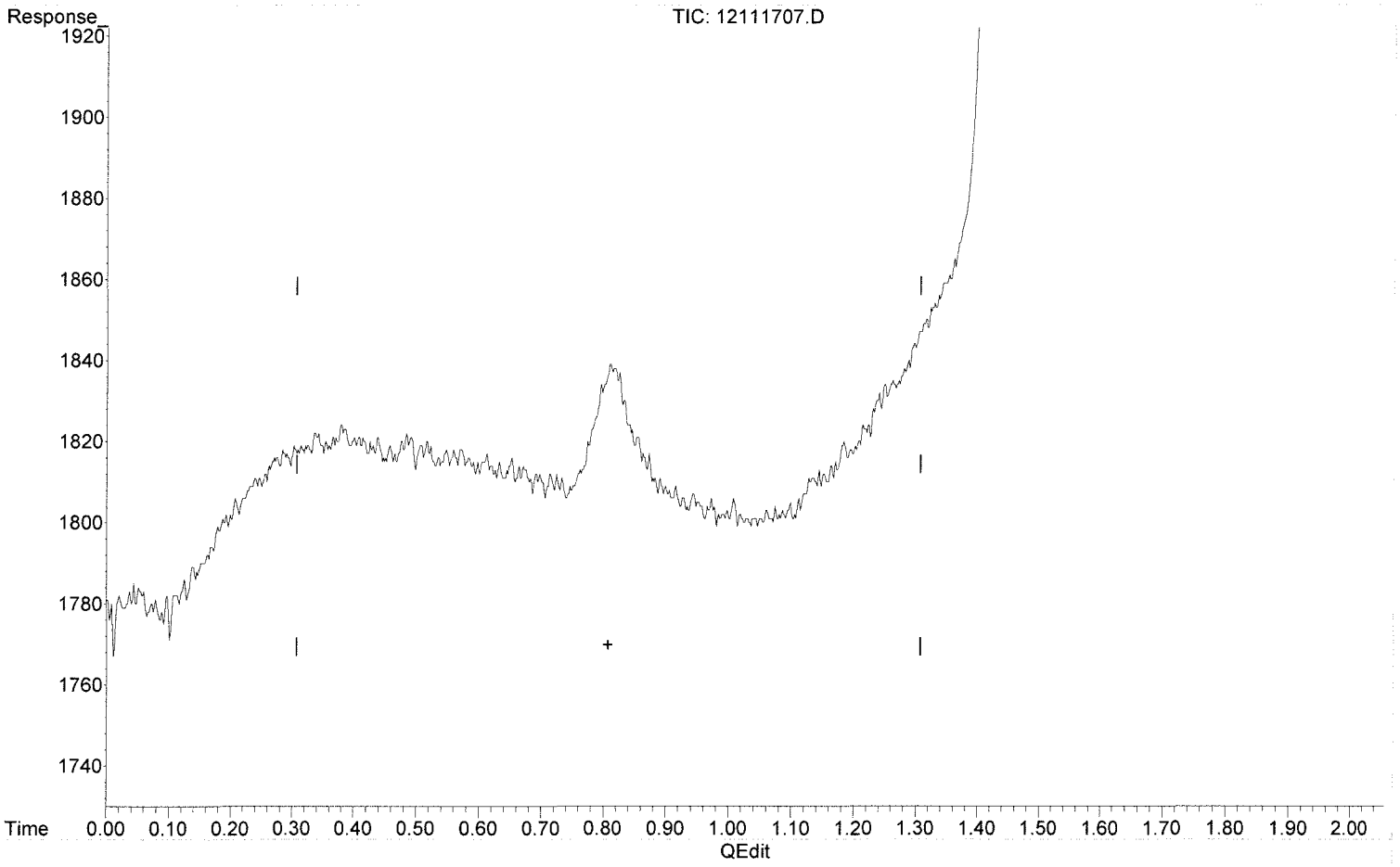
Volume Inj. :
Signal Phase :
Signal Info :



Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111707.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 11:10:02
Operator : MC
Sample : P1706106-002 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:15:48 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(1) Helium

0.807min 0.000 ppm

response 0

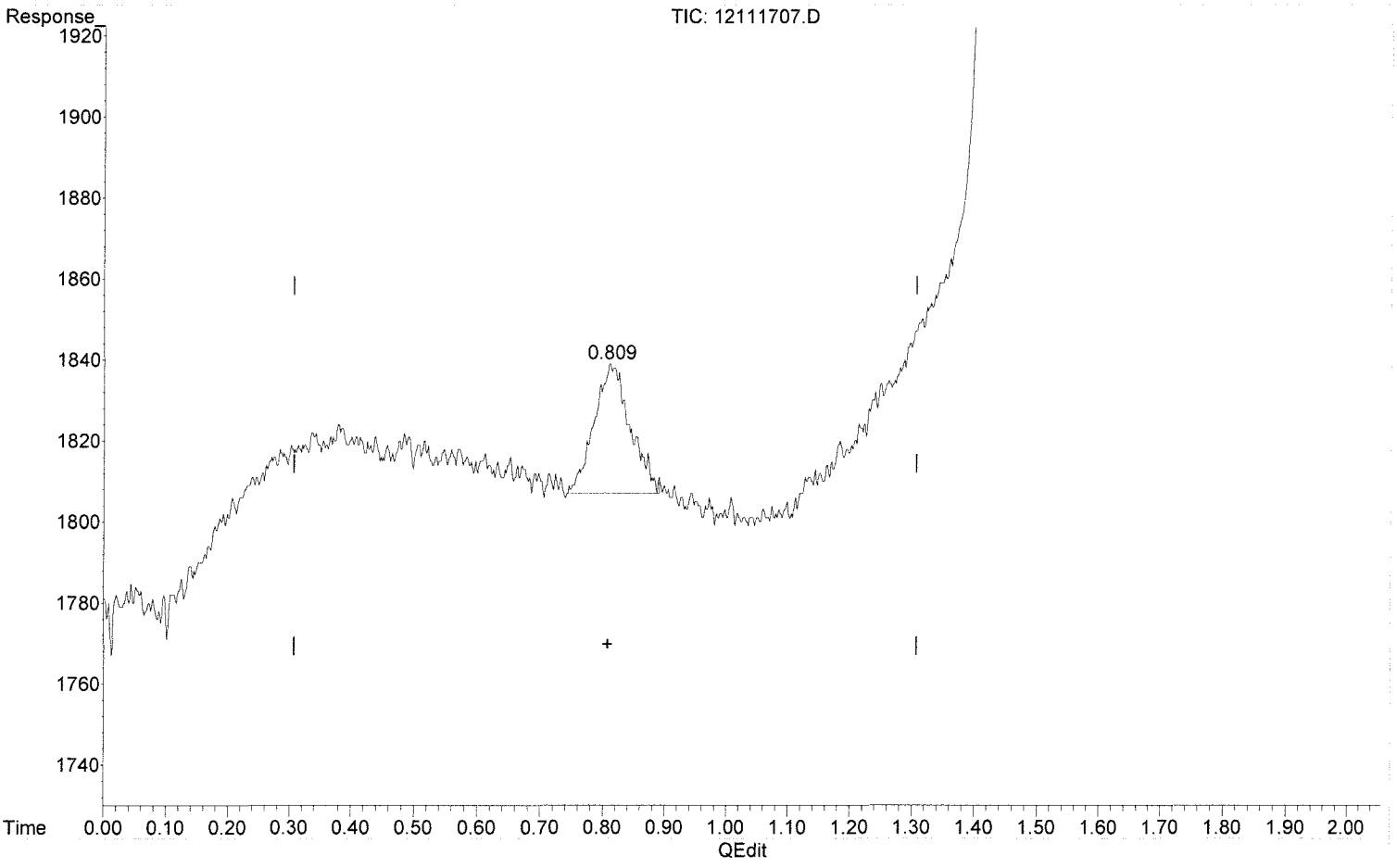
(+) = Expected Retention Time

Quantitation Report (Qedit)

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111707.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 11:10:02
Operator : MC
Sample : P1706106-002 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:15:48 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



(1) Helium

0.809min 35.916 ppm m

response 1293

12/14/17

(+) = Expected Retention Time

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111708.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 11:28:25
Operator : MC
Sample : P1706106-003 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:16:17 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

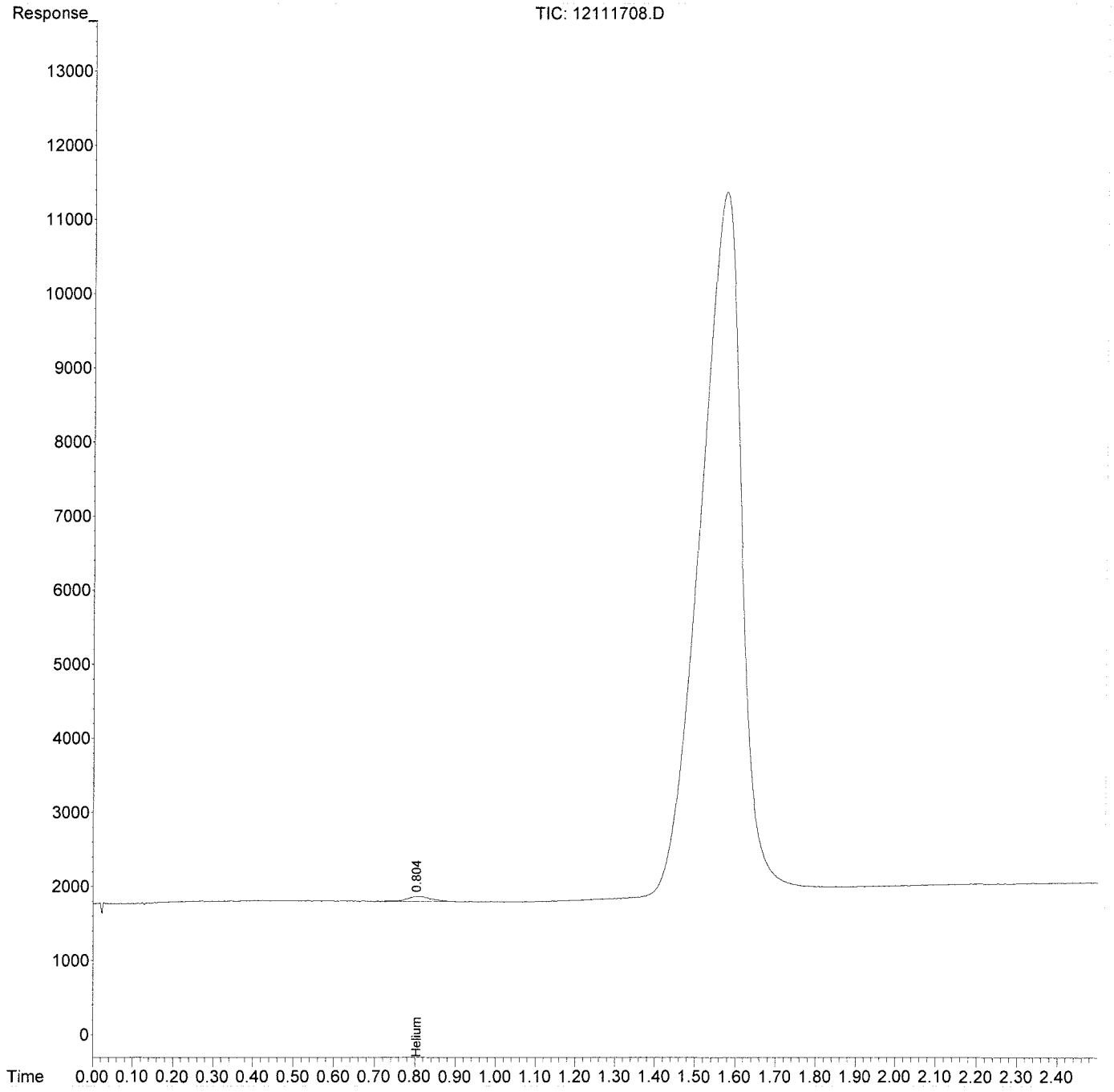
Compound	R.T.	Response	Conc	Units
Target Compounds				
1) Helium	0.813	2906	80.697	ppm
2) Hydrogen	0.000	0	N.D.	ppm

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

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111708.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 11:28:25
Operator : MC
Sample : P1706106-003 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:16:17 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (Not Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111709.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 11:40:51
Operator : MC
Sample : P1706106-004 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 12:07:28 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

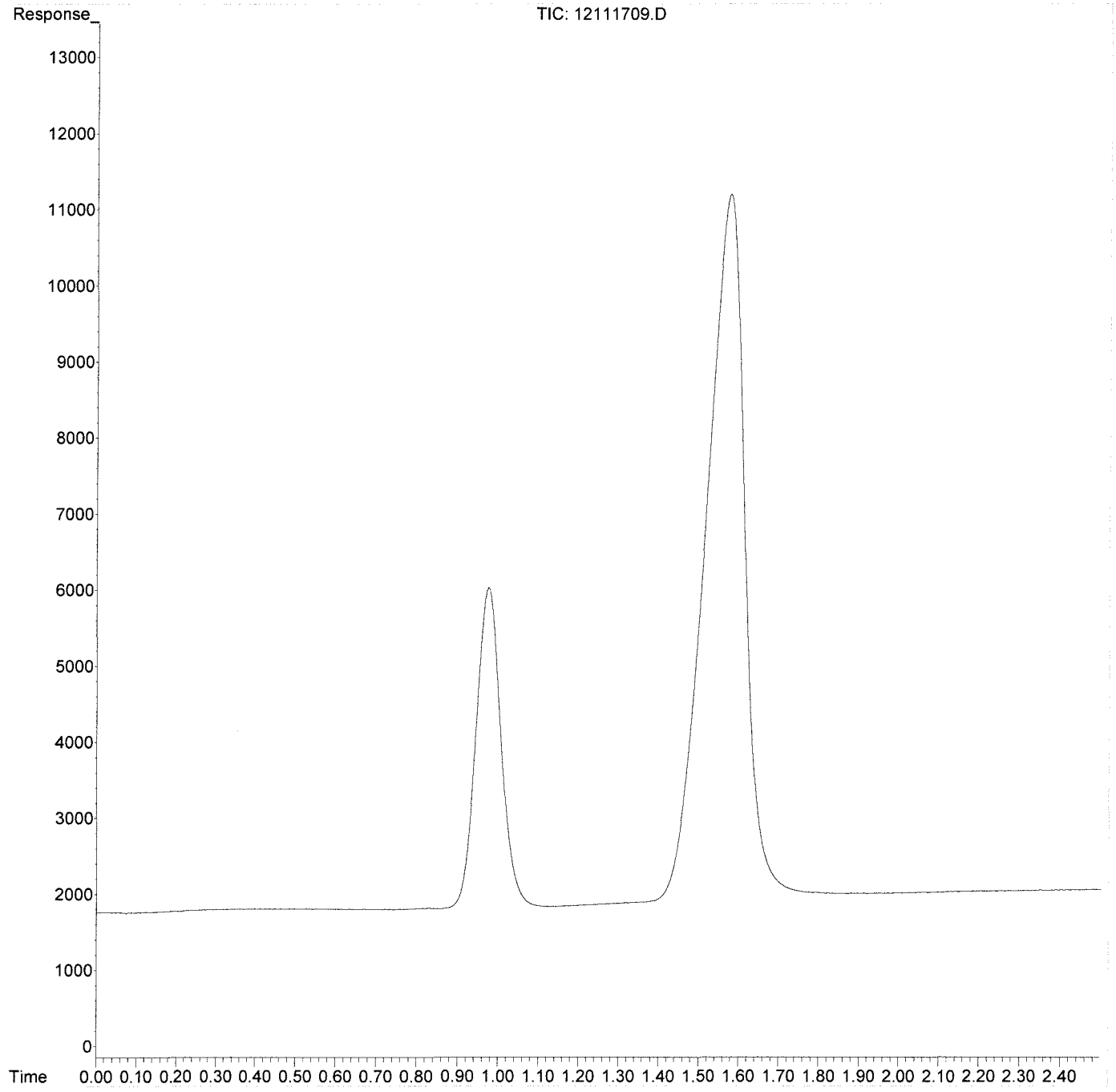
Compound	R.T.	Response	Conc	Units
Target Compounds				
1) Helium	0.000	0	N.D.	ppm
2) Hydrogen	0.000	0	N.D.	ppm

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

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111709.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 11:40:51
Operator : MC
Sample : P1706106-004 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 12:07:28 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (Not Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111710.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 11:54:11
Operator : MC
Sample : P1706106-005 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:26:03 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

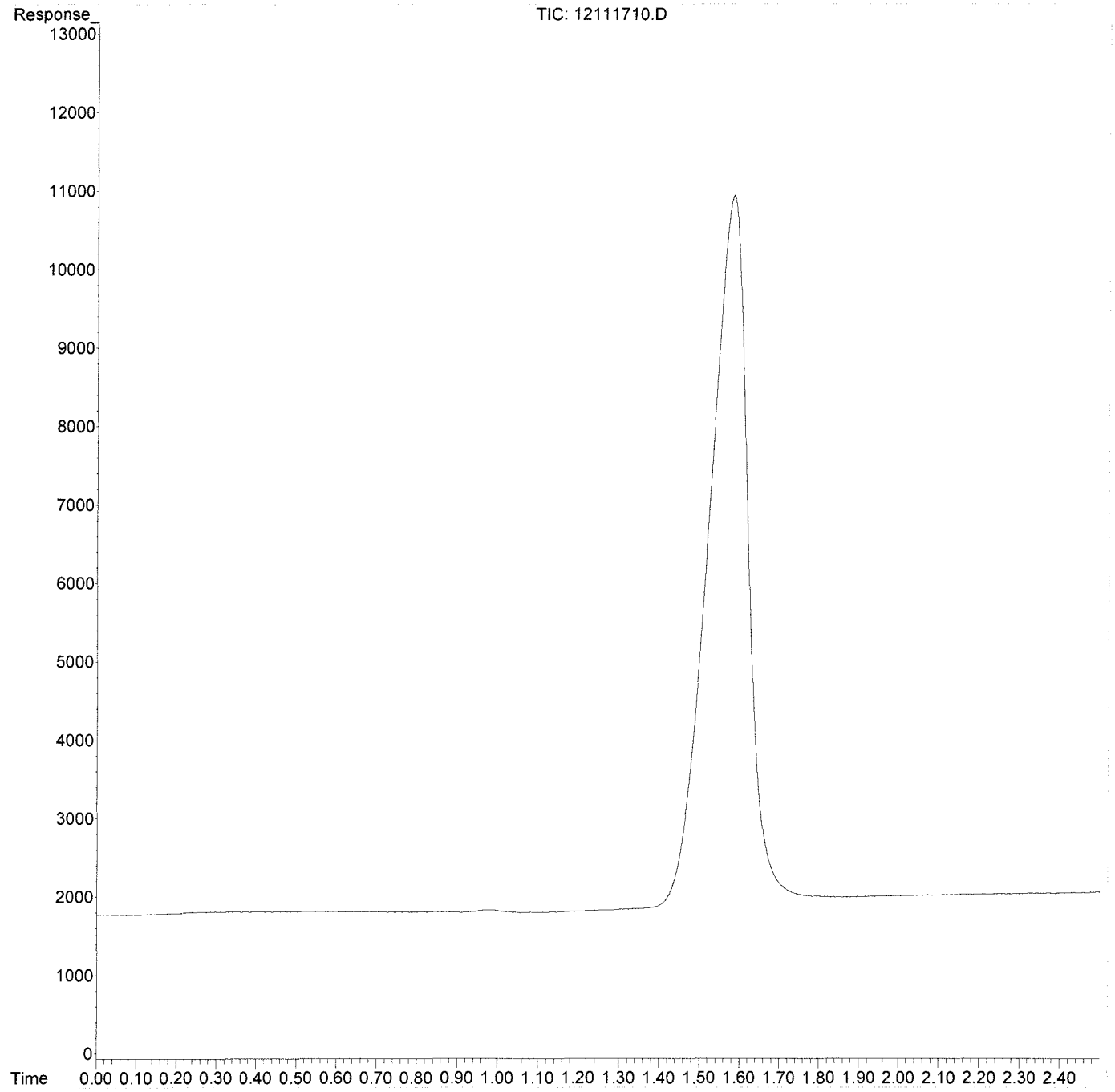
Compound	R.T.	Response	Conc	Units
Target Compounds				
1) Helium	0.000	0	N.D.	ppm
2) Hydrogen	0.000	0	N.D.	ppm

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

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111710.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 11:54:11
Operator : MC
Sample : P1706106-005 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:26:03 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (Not Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111711.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 12:09:26
Operator : MC
Sample : P1706106-006 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:28:51 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

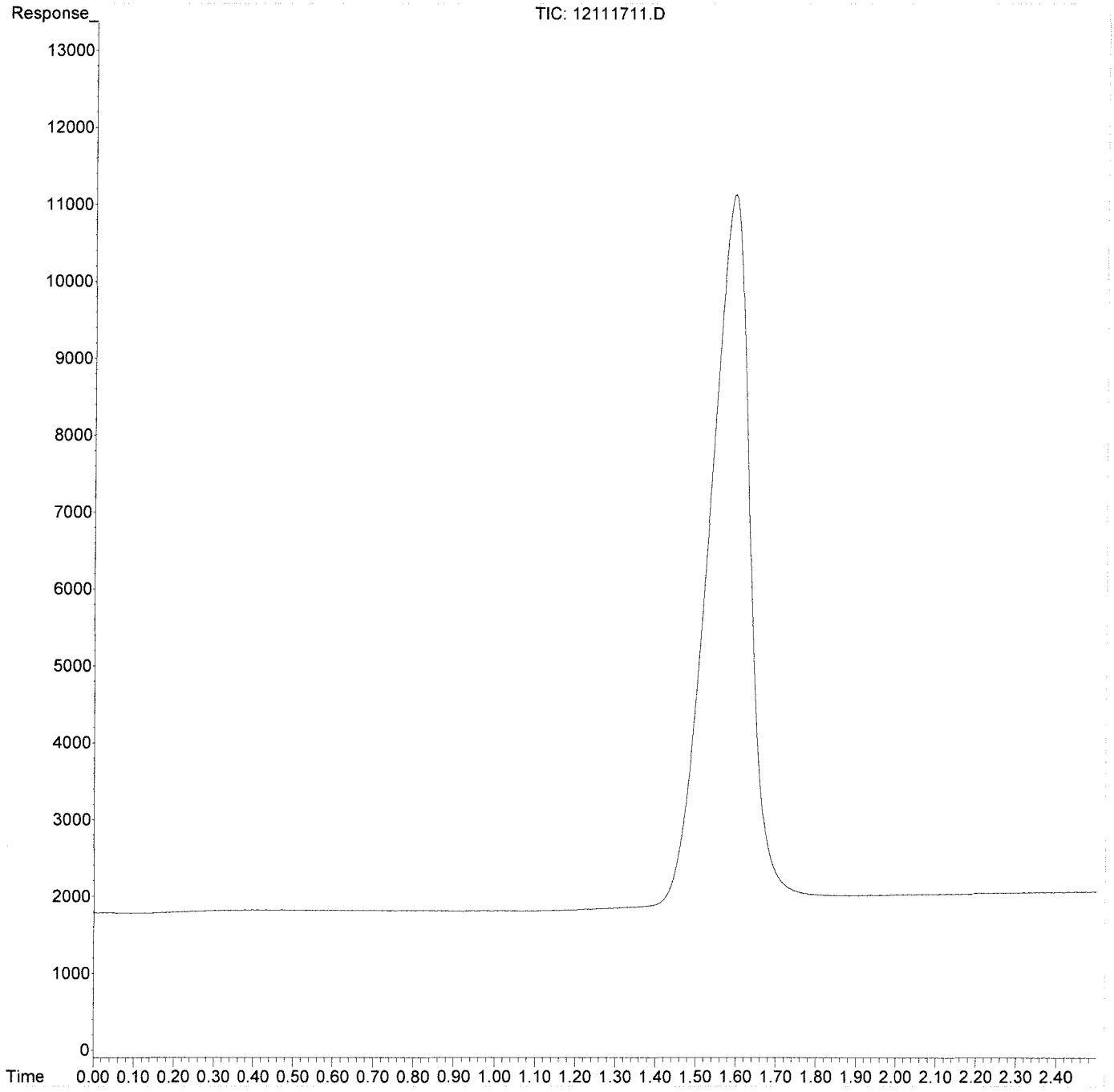
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.000	0	N.D.	ppm
2)	Hydrogen	0.000	0	N.D.	ppm

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

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111711.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 12:09:26
Operator : MC
Sample : P1706106-006 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:28:51 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111712.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 12:18:23
Operator : MC
Sample : P1706106-007 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:28:59 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

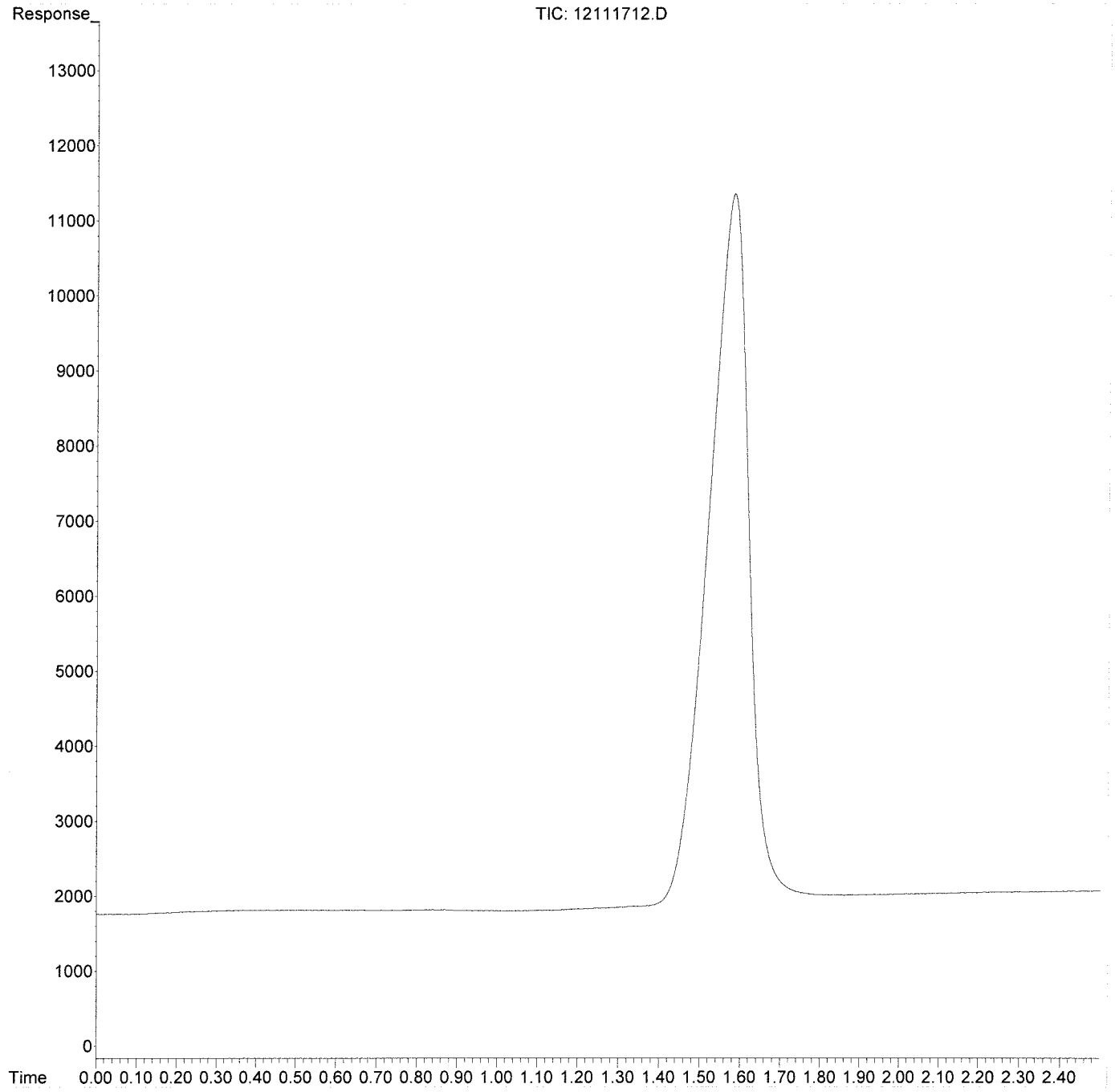
Compound	R.T.	Response	Conc	Units
Target Compounds				
1) Helium	0.000	0	N.D.	ppm
2) Hydrogen	0.000	0	N.D.	ppm

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

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111712.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 12:18:23
Operator : MC
Sample : P1706106-007 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:28:59 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111713.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 12:24:37
Operator : MC
Sample : P1706106-008 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:32:07 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

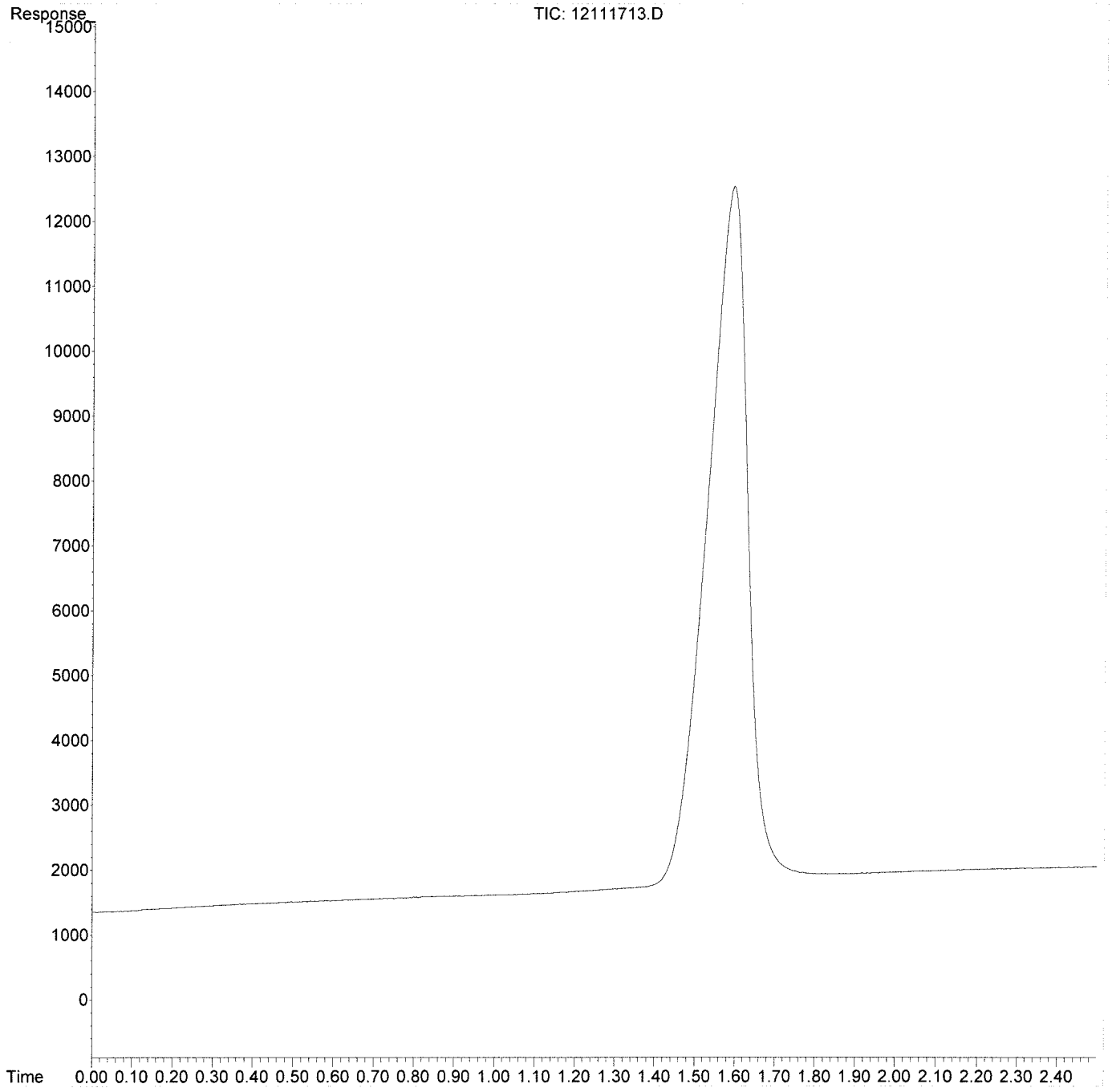
Compound	R.T.	Response	Conc	Units
Target Compounds				
1) Helium	0.000	0	N.D.	ppm
2) Hydrogen	0.000	0	N.D.	ppm

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

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111713.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 12:24:37
Operator : MC
Sample : P1706106-008 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:32:07 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111703.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 09:50:33
Operator : MC
Sample : mb 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:15:19 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

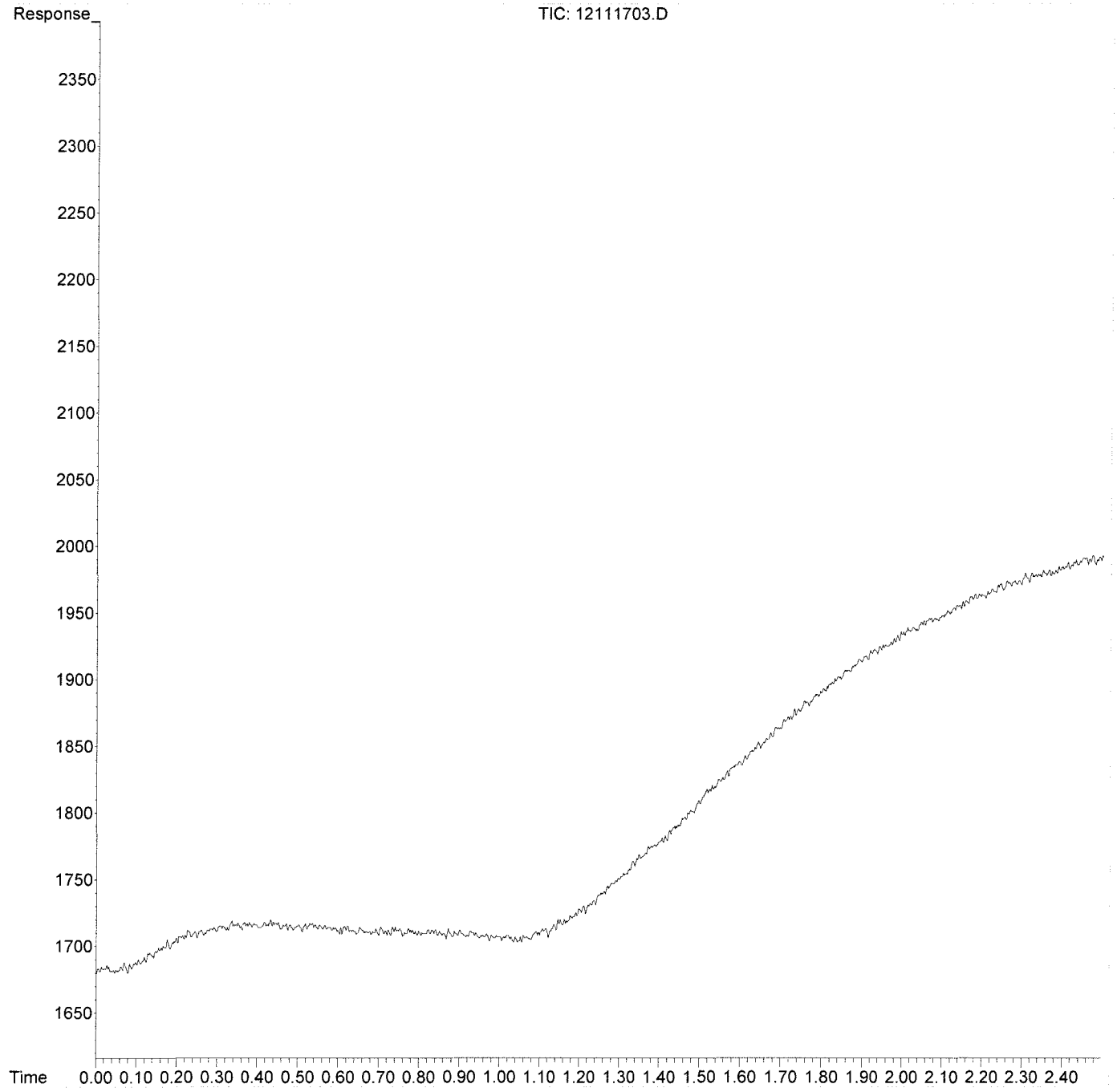
Compound	R.T.	Response	Conc	Units
Target Compounds				
1) Helium	0.000	0	N.D.	ppm
2) Hydrogen	0.000	0	N.D.	ppm

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

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111703.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 09:50:33
Operator : MC
Sample : mb 1ml
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:15:19 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111704.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 10:01:07
Operator : MC
Sample : lcs S32-12111702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:15:30 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

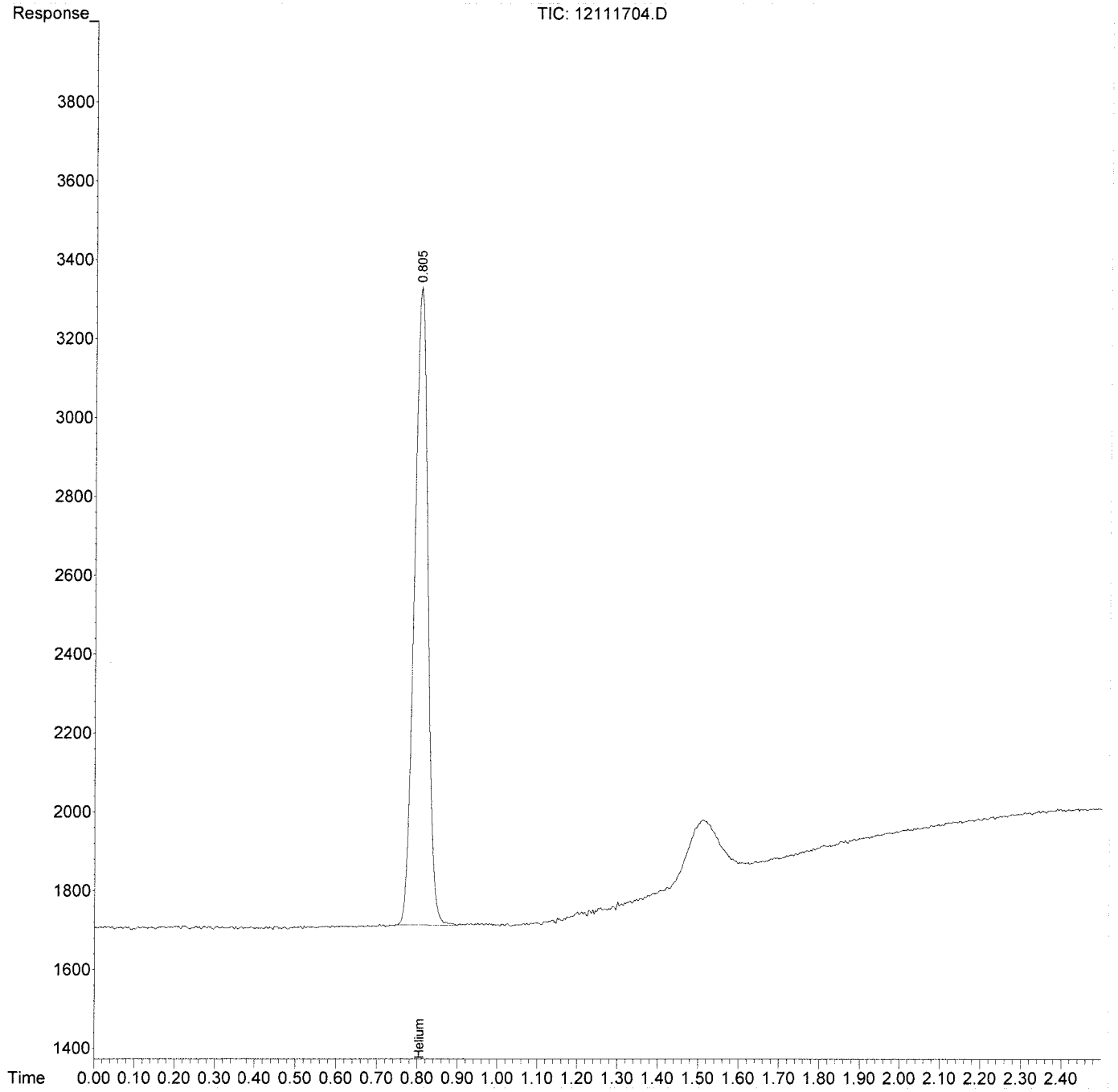
Compound	R.T.	Response	Conc	Units
Target Compounds				
1) Helium	0.806	37553	1042.725	ppm
2) Hydrogen	0.000	0	N.D.	ppm

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

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111704.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 10:01:07
Operator : MC
Sample : lcs S32-12111702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:15:30 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111705.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 10:12:00
Operator : MC
Sample : lcsd S32-12111702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:15:36 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

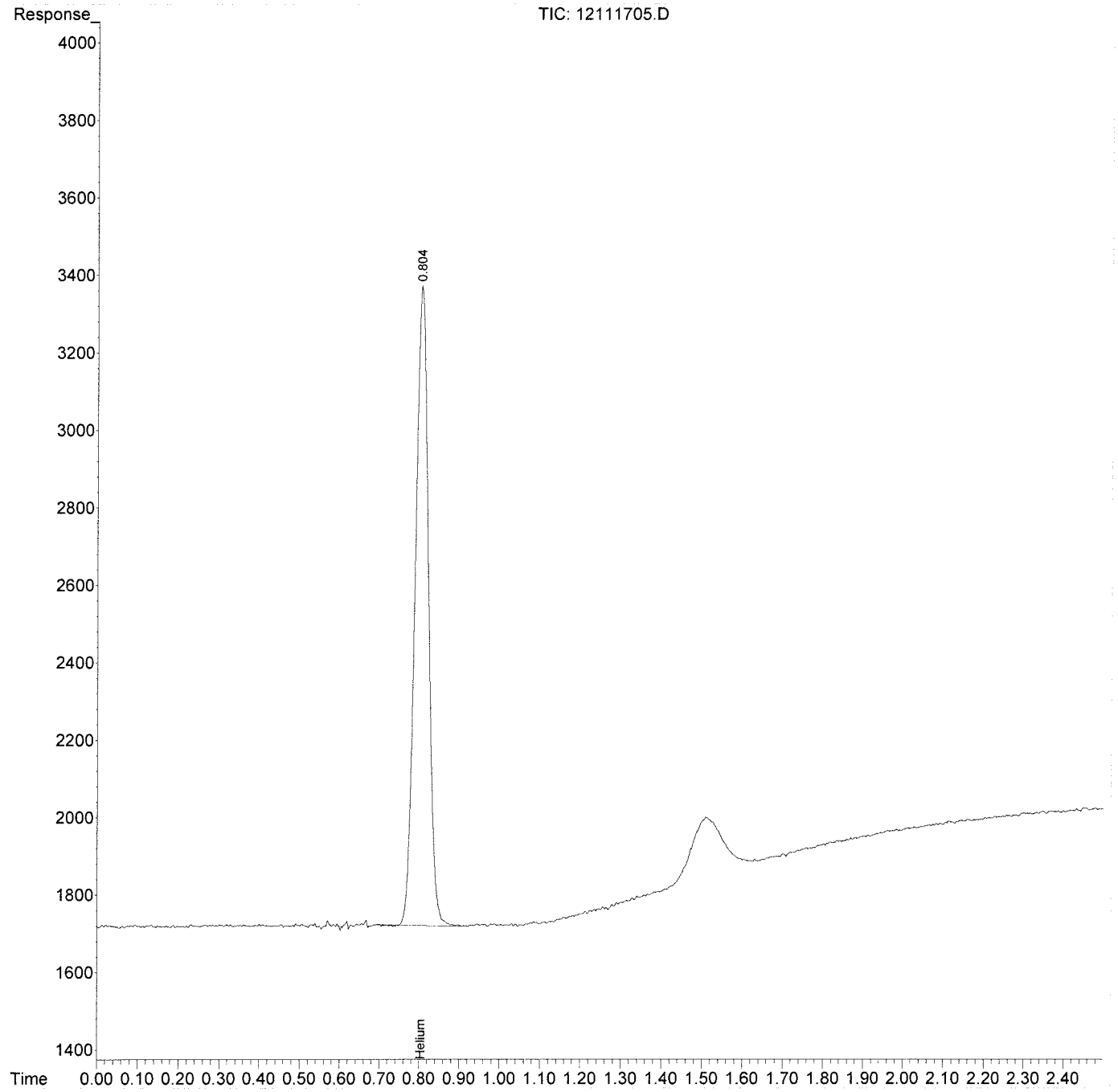
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.805	38519	1069.556	ppm
2)	Hydrogen	0.000	0	N.D.	ppm

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

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111705.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 10:12:00
Operator : MC
Sample : lcsd S32-12111702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:15:36 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Response Factor Report HP5890

Method Path : I:\GC08\METHODS\
Method File : H2HE092517.M
Title : Hydrogen and Helium by EPA Method 3C
Last Update : Tue Sep 26 13:09:57 2017
Response Via : Initial Calibration

Calibration Files
1 =09251703.D 2 =09251704.D 3 =09251705.D
4 =09251706.D 5 =09251707.D

	Compound	1	2	3	4	5	Avg	%RSD
1)	Helium	3.697	2.953	3.773	3.842	3.741	3.601 E1	10.17
2)	Hydrogen	5.493	4.748	5.681	5.795	5.694	5.482 E1	7.75

(#) = Out of Range

H2HE092517.M Tue Oct 10 09:59:28 2017

pounds -- Compound #2 -- Hydrogen

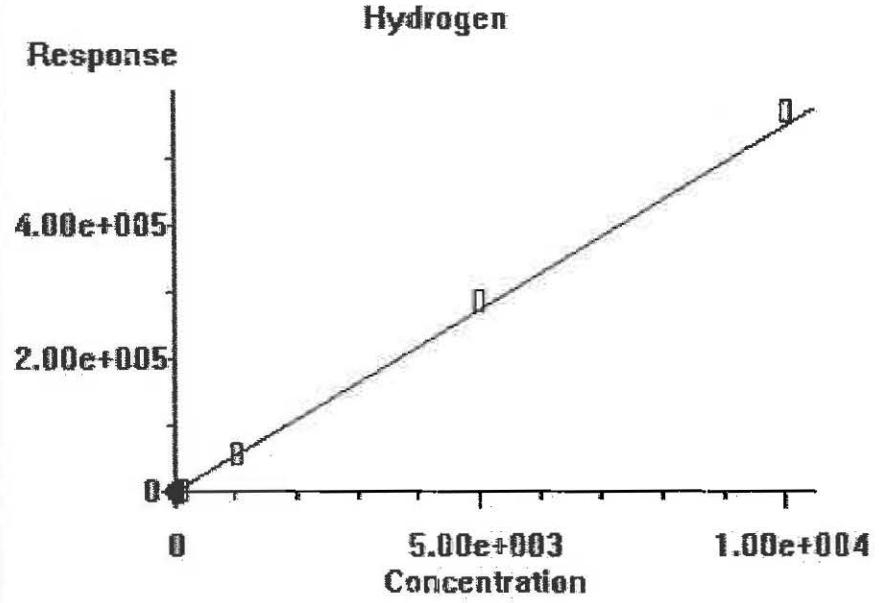
Search by: Ret Time | Name | Index | Find Compound

Compound Database
External Standard Compoun
Helium
Hydrogen

Identification | Calibration | User-Defined | Advanced | Reporting

Lvl ID	Concentration	Response
1	20.000000	1098.662566
2	100.000000	4747.620750
3	1000.000000	56811.425000
4	5000.000000	289740.073715
5	10000.000000	569434.835823

Lvl ID	Concentration	Response



0.000e+000	Quadratic term
5.482e+001	Linear term
0.000e+000	Constant term
8%	RF Rel Std Dev

OK | Cancel | Help | Print Calibration Curve | Copy Calibration Curve

pounds -- Compound #1 -- Helium

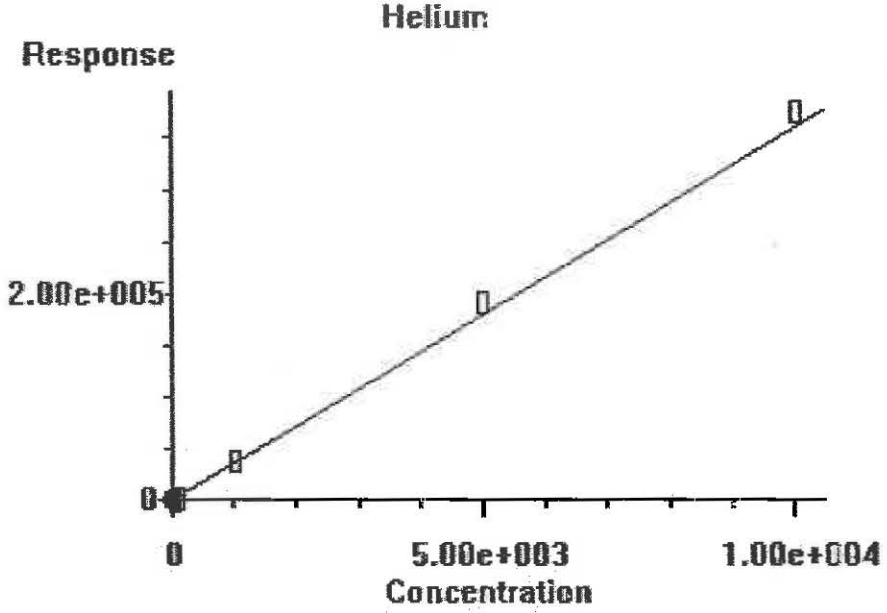
Search by: Ret Time | Name | Index | Find Compound

Compound Database
External Standard Compoun
- Helium
- Hydrogen

Identification | Calibration | User-Defined | Advanced | Reporting

Lvl ID	Concentration	Response
1	20.000000	739.481516
2	100.000000	2953.330737
3	1000.000000	37734.456000
4	5000.000000	192081.649285
5	10000.000000	374130.495177

Lvl ID	Concentration	Response



0.000e+000	Quadratic term
3.601e+001	Linear term
0.000e+000	Constant term
10%	RF Rel Std Dev

OK | Cancel | Help | Print Calibration Curve | Copy Calibration Curve

Calibration Status Report HP5890

Method Path : I:\GC08\METHODS\
Method File : H2HE092517.M
Title : Hydrogen and Helium by EPA Method 3C
Last Update : Tue Sep 26 13:09:57 2017
Response Via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	1	20	0	I:\GC08\DATA\TO_3M\2017_09\25HEH2\09251703.D
2	2	100	0	I:\GC08\DATA\TO_3M\2017_09\25HEH2\09251704.D
3	3	1000	0	I:\GC08\DATA\TO_3M\2017_09\25HEH2\09251705.D
4	4	5000	0	I:\GC08\DATA\TO_3M\2017_09\25HEH2\09251706.D
5	5	10000	0	I:\GC08\DATA\TO_3M\2017_09\25HEH2\09251707.D

#	ID	Update Time	Quant Time	Acquisition Time
1	1	Sep 26 13:08 2017	Sep 26 11:17 2017	25-Sep-2017, 09:02:44
2	2	Sep 26 13:09 2017	Sep 25 09:23 2017	25-Sep-2017, 09:13:33
3	3	Sep 26 13:09 2017	Sep 25 09:31 2017	25-Sep-2017, 09:27:09
4	4	Sep 26 13:09 2017	Sep 25 09:47 2017	25-Sep-2017, 09:38:45
5	5	Sep 26 13:09 2017	Sep 25 10:05 2017	25-Sep-2017, 09:51:09

H2HE092517.M Tue Oct 10 09:59:52 2017

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\TO_3M\2017_09\25HEH2\
Data File : 09251703.D
Signal(s) : TCD1A.CH
Acq On : 25-Sep-2017, 09:02:44
Operator : RS
Sample : 20ppm s32-09251702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 26 11:16:47 2017
Quant Method : I:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Sep 25 10:05:52 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Compound	R.T.	Response	Conc	Units	
Target Compounds					
1) Helium	0.796	739	17.187	ppm	m
2) Hydrogen	0.946	1099	16.747	ppm	m

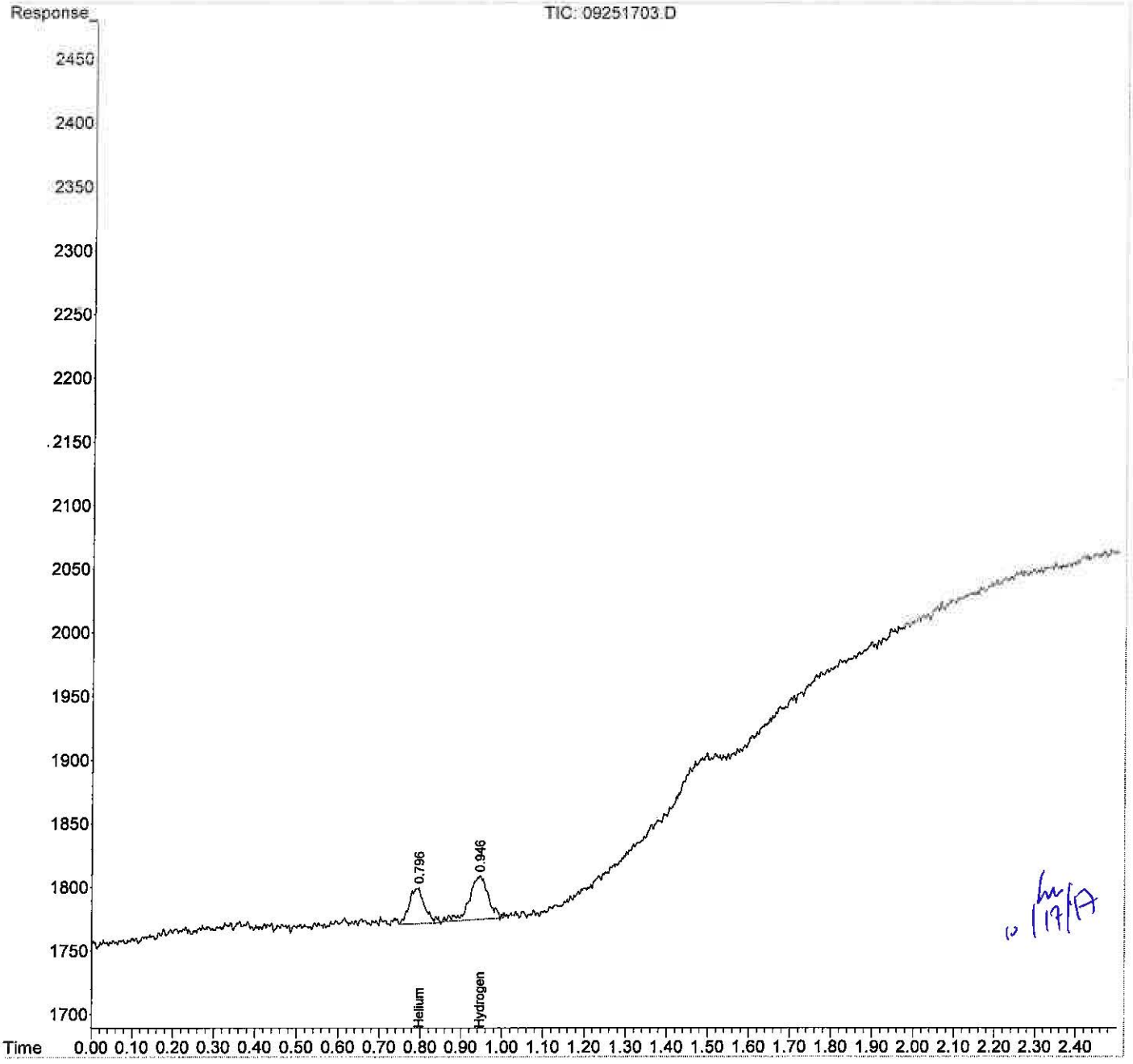
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\TO_3M\2017_09\25HEH2\
Data File : 09251703.D
Signal(s) : TCD1A.CH
Acq On : 25-Sep-2017, 09:02:44
Operator : RS
Sample : 20ppm s32-09251702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 26 11:16:47 2017
Quant Method : I:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Sep 25 10:05:52 2017
Response via : Initial Calibration
Integrator: ChemStation

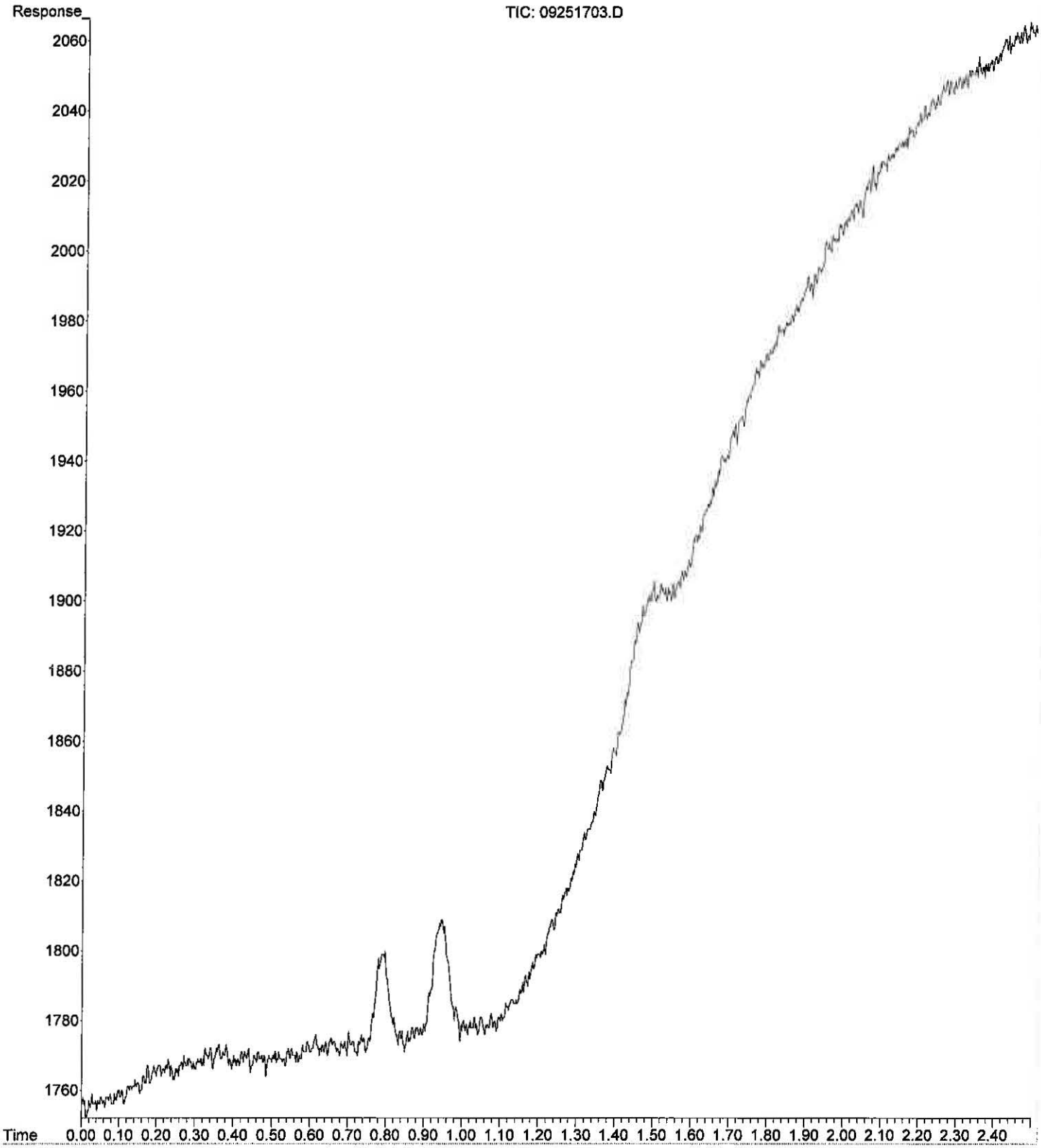
Volume Inj. :
Signal Phase :
Signal Info :



RS 9/26/17

MP

File :I:\GC08\DATA\TO_3M\2017_09\25HEH2\09251703.D
Operator : RS
Acquired : 25-Sep-2017, 09:02:44 using AcqMethod H2_HE.M
Instrument : HP5890
Sample Name: 20ppm s32-09251702
Misc Info :
Vial Number: 1



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\TO_3M\2017_09\25HEH2\
Data File : 09251704.D
Signal(s) : TCD1A.CH
Acq On : 25-Sep-2017, 09:13:33
Operator : RS
Sample : 100ppm s32-09251702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 25 09:21:50 2017
Quant Method : I:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Sep 25 09:16:25 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units	
Target Compounds						
1)	Helium	0.783	2953	69.001	ppm	m
2)	Hydrogen	0.936	4748	70.884	ppm	

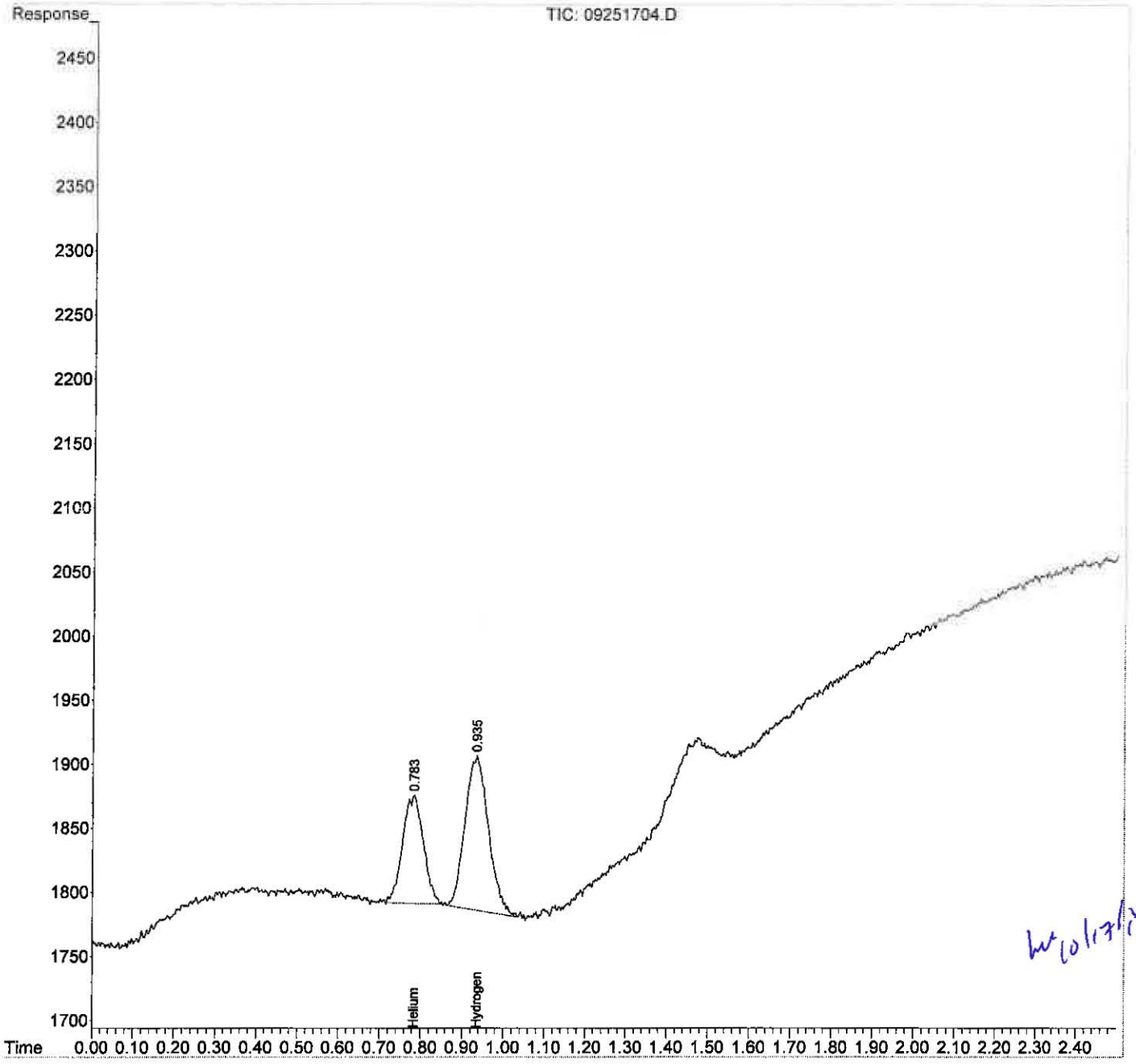
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\TO_3M\2017_09\25HEH2\
Data File : 09251704.D
Signal(s) : TCD1A.CH
Acq On : 25-Sep-2017, 09:13:33
Operator : RS
Sample : 100ppm s32-09251702
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 25 09:21:50 2017
Quant Method : I:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Sep 25 09:16:25 2017
Response via : Initial Calibration
Integrator: ChemStation

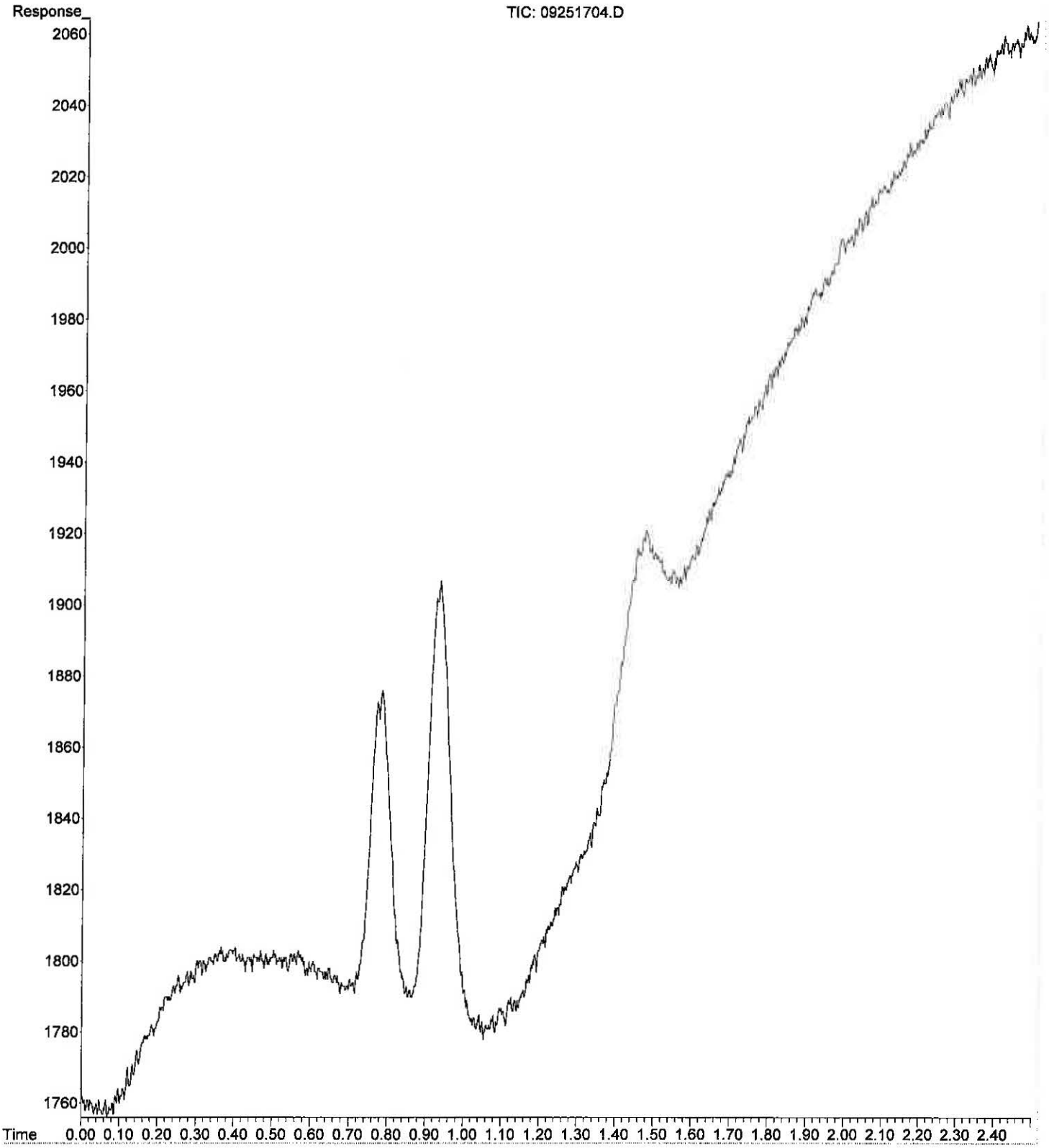
Volume Inj. :
Signal Phase :
Signal Info :



10/17/17

RS 9/26/17
MF

File :I:\GC08\DATA\TO_3M\2017_09\25HEH2\09251704.D
Operator : RS
Acquired : 25-Sep-2017, 09:13:33 using AcqMethod H2_HE.M
Instrument : HP5890
Sample Name: 100ppm s32-09251702
Misc Info :
Vial Number: 1



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\TO_3M\2017_09\25HEH2\
Data File : 09251705.D
Signal(s) : TCD1A.CH
Acq On : 25-Sep-2017, 09:27:09
Operator : RS
Sample : 1000ppm s32-09251701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 25 09:31:38 2017
Quant Method : I:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Sep 25 09:23:40 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

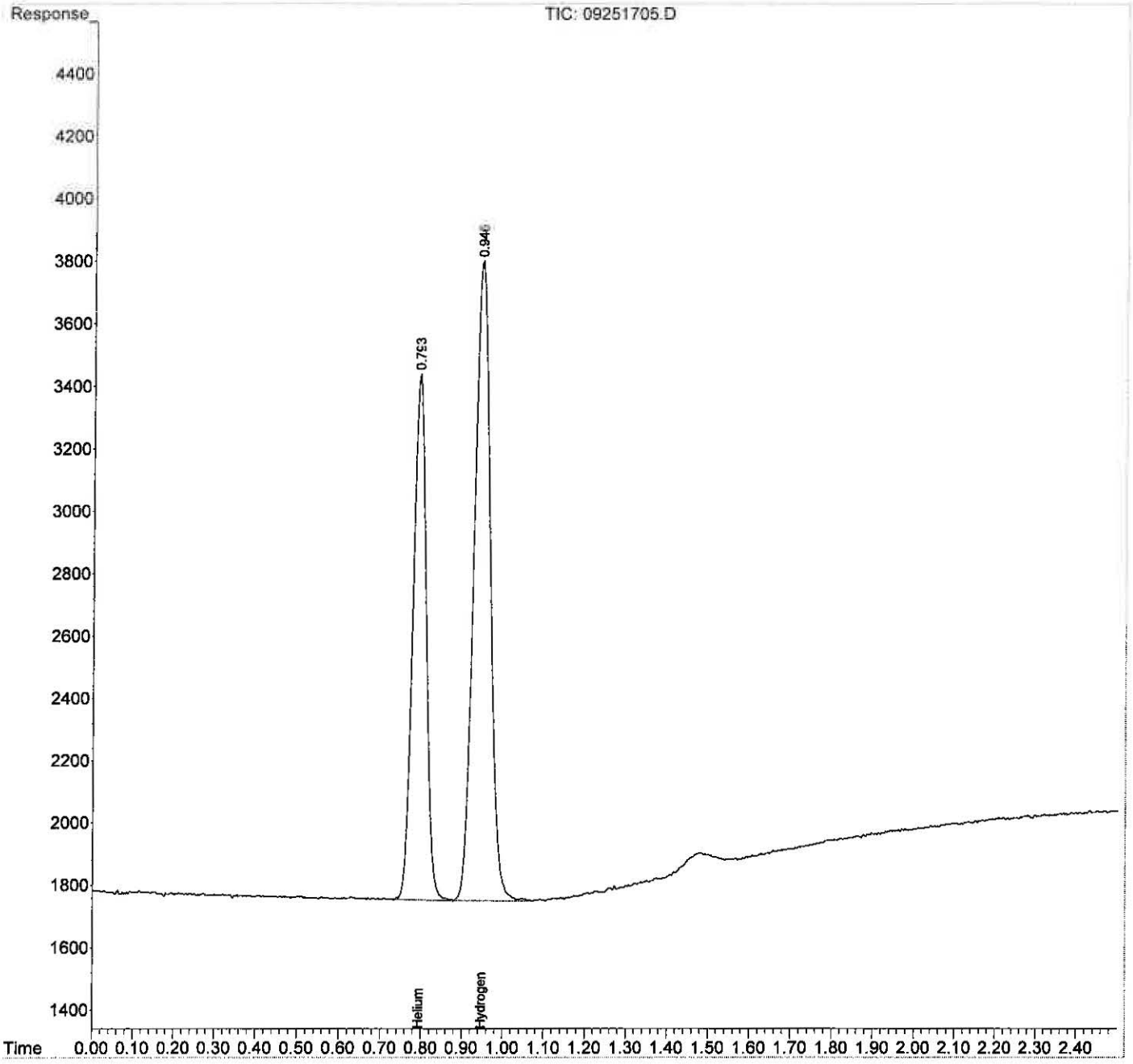
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.794	37734	918.944	ppm
2)	Hydrogen	0.946	56811	883.819	ppm

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

Data Path : I:\GC08\DATA\TO_3M\2017_09\25HEH2\
Data File : 09251705.D
Signal(s) : TCD1A.CH
Acq On : 25-Sep-2017, 09:27:09
Operator : RS
Sample : 1000ppm s32-09251701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 25 09:31:38 2017
Quant Method : I:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Sep 25 09:23:40 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\TO_3M\2017_09\25HEH2\
Data File : 09251706.D
Signal(s) : TCD1A.CH
Acq On : 25-Sep-2017, 09:38:45
Operator : RS
Sample : 5000ppm s32-09251701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 25 09:47:15 2017
Quant Method : I:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Sep 25 09:37:21 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

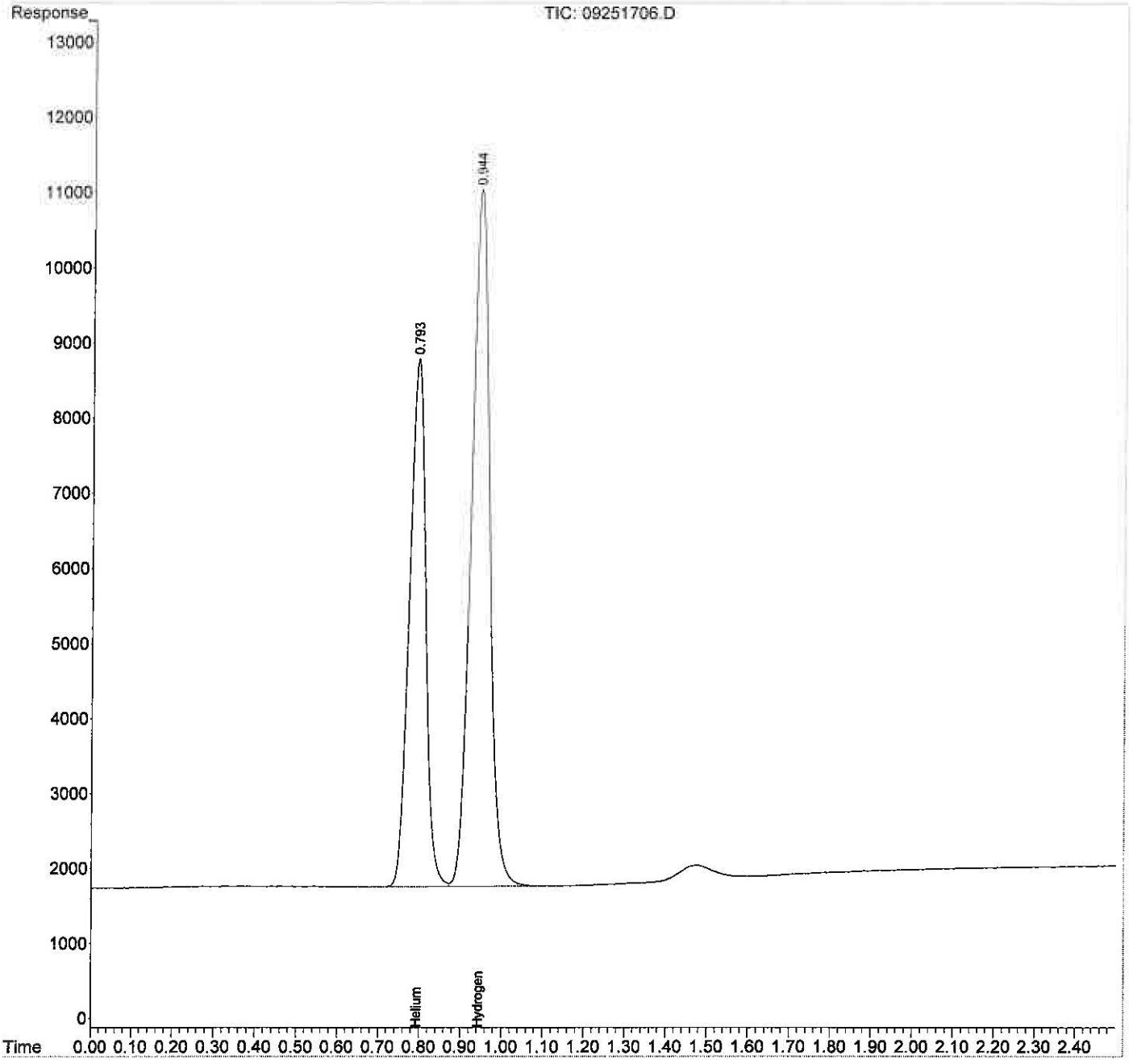
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.794	192082	4561.698	ppm
2)	Hydrogen	0.945	289740	4534.333	ppm

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

Data Path : I:\GC08\DATA\TO_3M\2017_09\25HEH2\
Data File : 09251706.D
Signal(s) : TCD1A.CH
Acq On : 25-Sep-2017, 09:38:45
Operator : RS
Sample : 5000ppm s32-09251701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 25 09:47:15 2017
Quant Method : I:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Sep 25 09:37:21 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\TO_3M\2017_09\25HEH2\
Data File : 09251707.D
Signal(s) : TCD1A.CH
Acq On : 25-Sep-2017, 09:51:09
Operator : RS
Sample : 10000ppm s32-09251701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 25 10:05:31 2017
Quant Method : I:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Sep 25 09:47:45 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.788	374130	8695.568	ppm
2)	Hydrogen	0.939	569435	8679.983	ppm

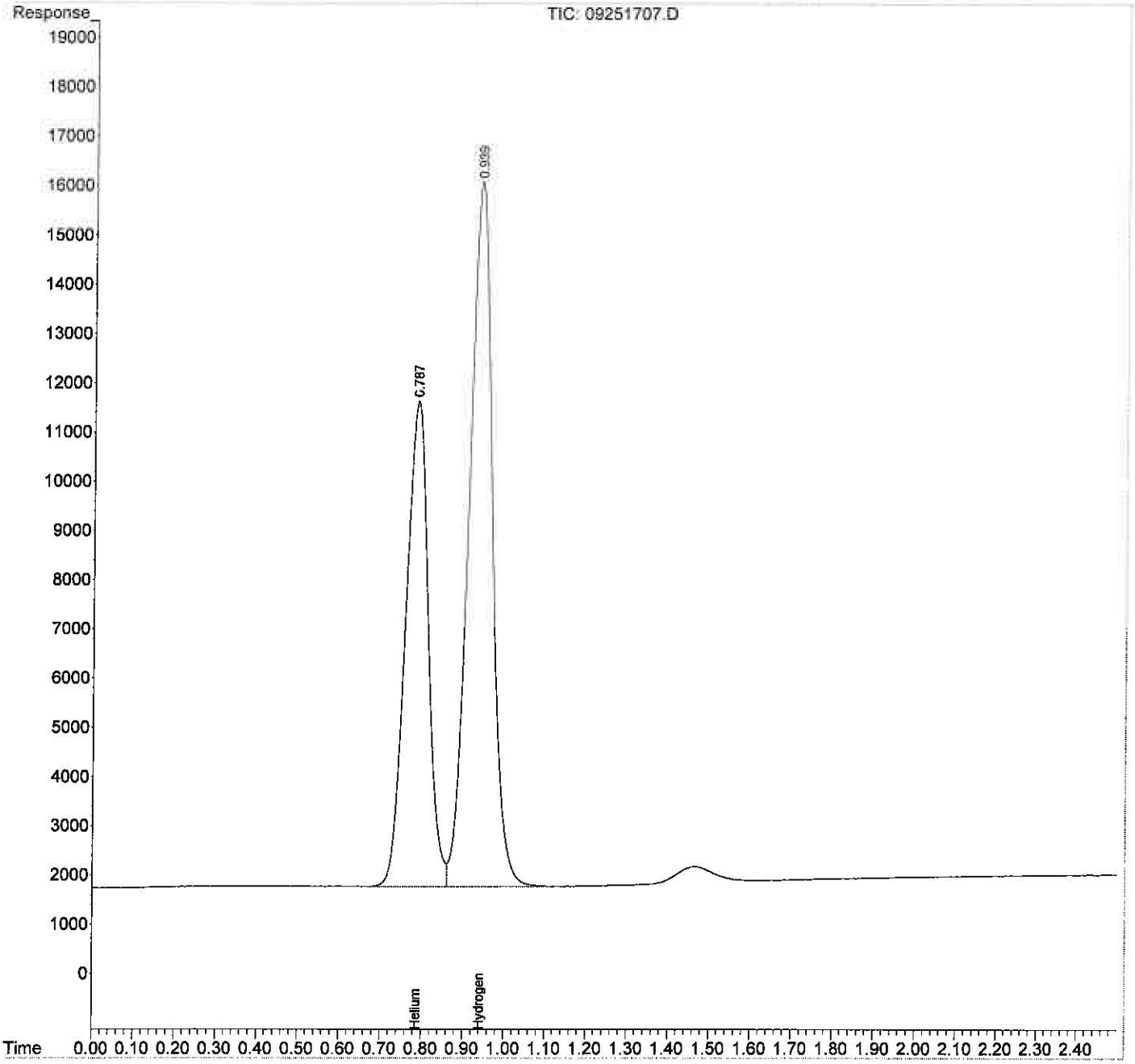
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\TO_3M\2017_09\25HEH2\
Data File : 09251707.D
Signal(s) : TCD1A.CH
Acq On : 25-Sep-2017, 09:51:09
Operator : RS
Sample : 10000ppm s32-09251701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 25 10:05:31 2017
Quant Method : I:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Sep 25 09:47:45 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (QT Reviewed)

Data Path : I:\GC08\DATA\TO_3M\2017_09\25HEH2\
Data File : 09251709.D
Signal(s) : TCD1A.CH
Acq On : 25-Sep-2017, 10:17:24
Operator : RS
Sample : ICV s32-09251703
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 26 13:10:30 2017
Quant Method : I:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Compound	R.T.	Response	Conc	Units
Target Compounds				
1) Helium	0.804	40923	1136.305	ppm
2) Hydrogen	0.956	61315	1118.436	ppm

actual %D 113.6%

actual %D 111.9%

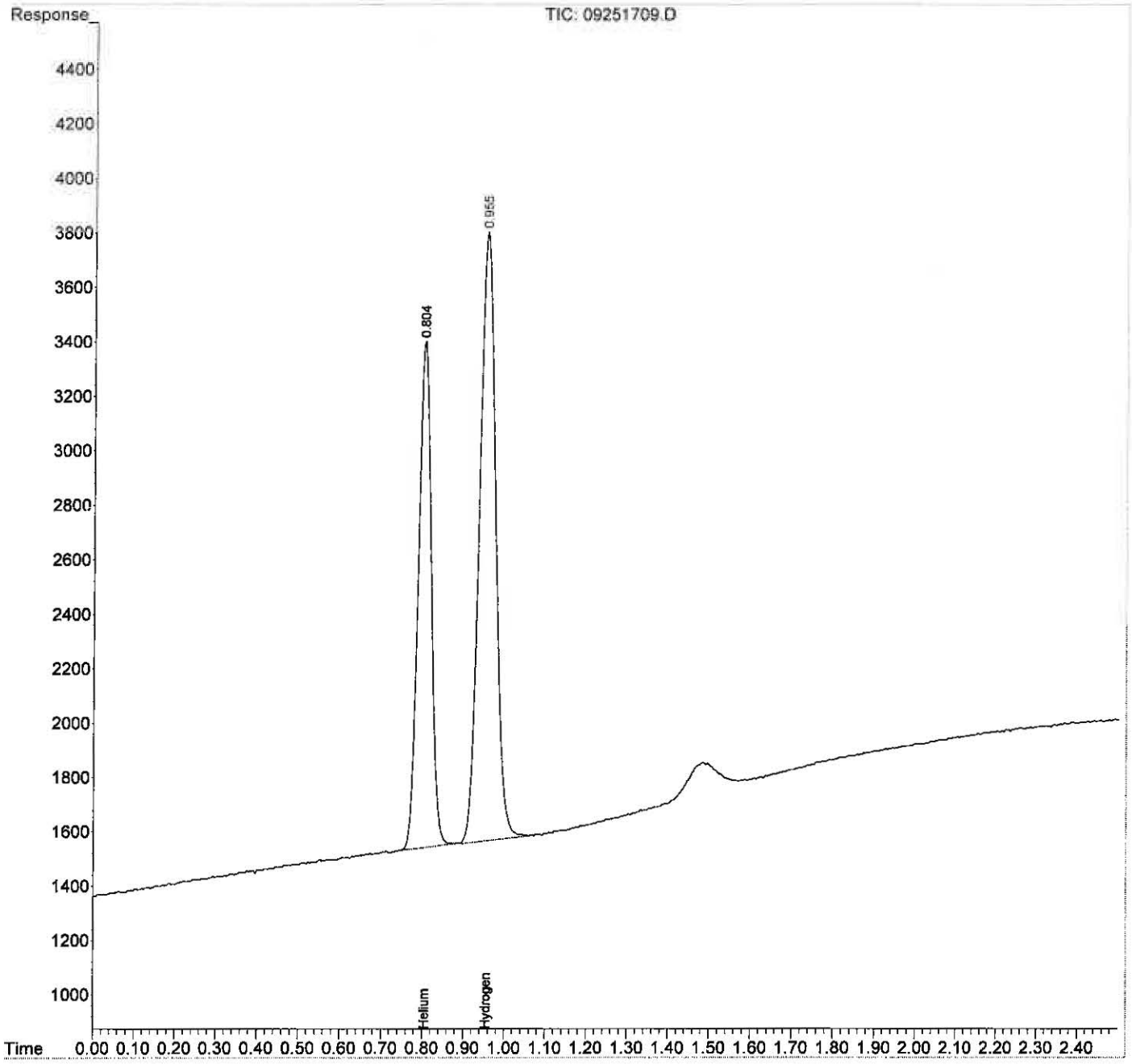
(f)=RT Delta > 1/2 Window (m)=manual int.

10/7/17

Data Path : I:\GC08\DATA\TO_3M\2017_09\25HEH2\
Data File : 09251709.D
Signal(s) : TCD1A.CH
Acq On : 25-Sep-2017, 10:17:24
Operator : RS
Sample : ICV s32-09251703
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Sep 26 13:10:30 2017
Quant Method : I:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Tue Sep 26 13:09:57 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



ALS Enviromental

REPORT SUMMARY

Method : Helium by modified EPA 3C
Client : Trihydro Corporation
Analyst : MC

Service Request : P1706106
Instrument : Instrument #8 / TCD #8
Date Acquired : 12/11/2017
Sample Amount : 1 mL

Opening CCV[1]

std S32-12111701		He
Sample result (ppm)	**inj vol.**	9168.79
ACTUAL	0.10	10000.00
%Difference		8.31%

Closing CCV[1]

std S32-12111701		He
Sample result (ppm)	**inj vol.**	11048.78
ACTUAL	0.10	10000.00
%Difference		10.49%

Laboratory Control Spike[2]

lcs S32-12111702	He
sample result ppm	10427.25
spike amount	10000
% recovery	104.27%

Laboratory Control Spike[2]

lcsd S32-12111702	He
sample result ppm	10695.56
spike amount	10000
% recovery	106.96%
% RPD	2.54%

FINAL SAMPLE RESULT SUMMARIES

Sample ID	Inject. Vol(ml)	Dilution DF	Pi	Pf	PiPf DF	He Result (ppm)	H2 Result (ppm)	FINAL HELIUM RESULT ppm	FINAL HELIUM RESULT mg/M3	FINAL HYDRGEN RESULT ppm	FINAL HYDRGEN RESULT mg/M3	File ID	Acq time
Reporting Limit								25.0	4.09	25.0	2.04		
mb 1ml	1.000	1.0			1.00	0.00	0.00	**ND**	**ND**				09:50:33
P1706106-001 1ml	1.00	1.0	-0.48	5.74	1.44	770.55	0.00	**1107.591**	**181.245**	**ND**	**ND**	12111706.D	10:49:47
P1706106-002 1ml	1.00	1.0	0.16	5.33	1.35	35.92	0.00	**48.412**	**7.922**	**ND**	**ND**	12111707.D	11:10:02
P1706106-003 1ml	1.00	1.0	-0.99	5.63	1.48	80.70	0.00	**119.662**	**19.581**	**ND**	**ND**	12111708.D	11:28:25
P1706106-004 1ml	1.00	1.0	-0.40	5.60	1.42	0.00	0.00	**ND**	**ND**	**ND**	**ND**	12111709.D	11:40:51
P1706106-005 1ml	1.00	1.0	-0.62	5.37	1.43	0.00	0.00	**ND**	**ND**	**ND**	**ND**	12111710.D	11:54:11
P1706106-006 1ml	1.00	1.0	-0.60	5.55	1.44	0.00	0.00	**ND**	**ND**	**ND**	**ND**	12111711.D	12:09:26
P1706106-007 1ml	1.00	1.0	-0.59	5.87	1.46	0.00	0.00	**ND**	**ND**	**ND**	**ND**	12111712.D	12:18:23
P1706106-008 1ml	1.00	1.0	-0.60	5.61	1.44	0.00	0.00	**ND**	**ND**	**ND**	**ND**	12111713.D	12:24:37

1. 15% difference allowed for the opening and closing standards.
2. 81-125% helium recovery for the lab control spike.
3. 14% helium RPD allowed between duplicate samples.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111702.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 09:40:56
Operator : MC
Sample : std S32-12111701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:14:59 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Dec 11 14:14:52 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

Compound	R.T.	Response	Conc	Units
Target Compounds				
1) Helium	0.808	33021	916.879	ppm
2) Hydrogen	0.000	0	N.D.	ppm

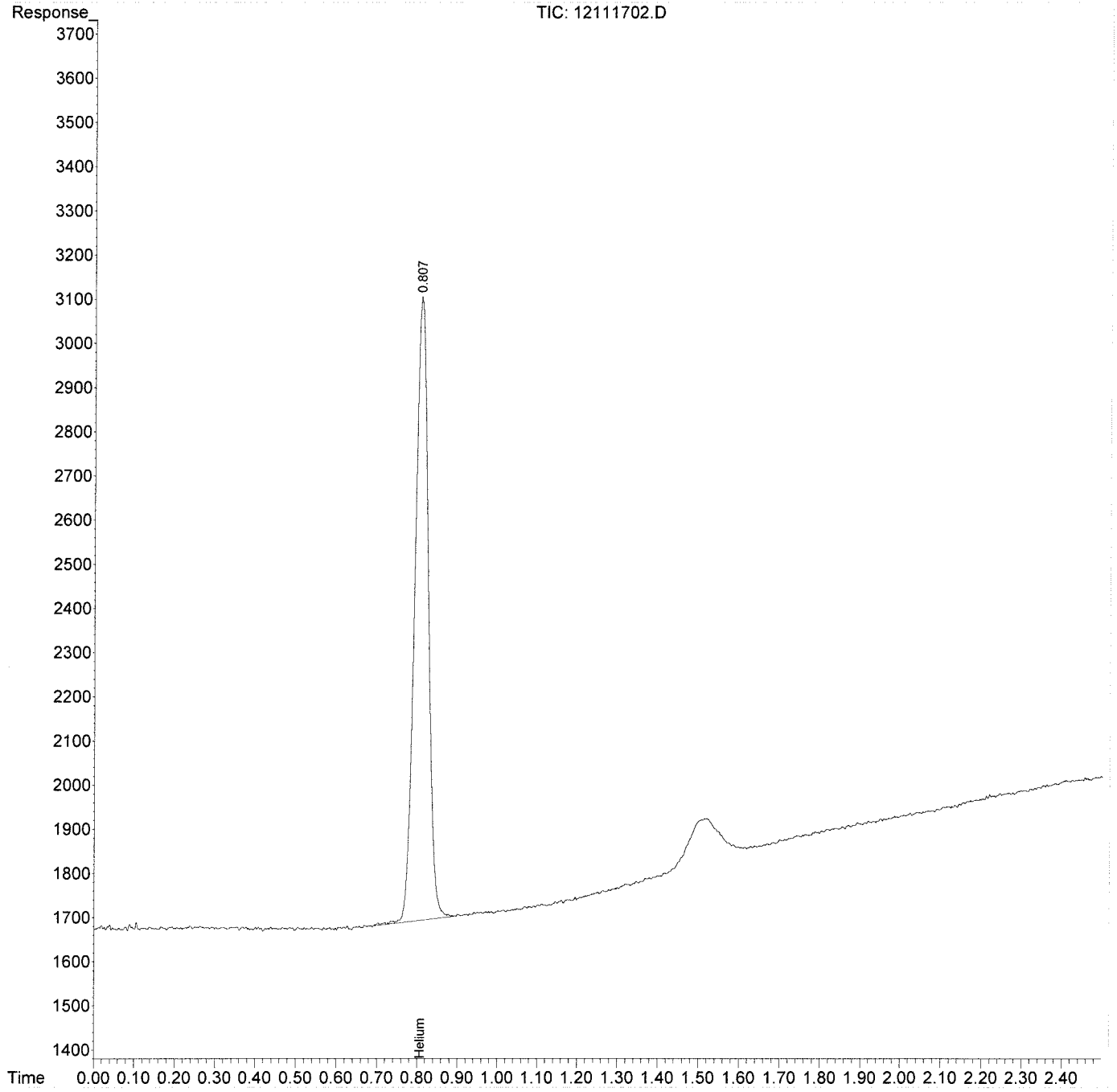
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report (QT Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111702.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 09:40:56
Operator : MC
Sample : std S32-12111701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:14:59 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Dec 11 14:14:52 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Quantitation Report (Not Reviewed)

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111715.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 12:37:00
Operator : MC
Sample : std S32-12111701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:32:27 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Dec 11 14:32:21 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :

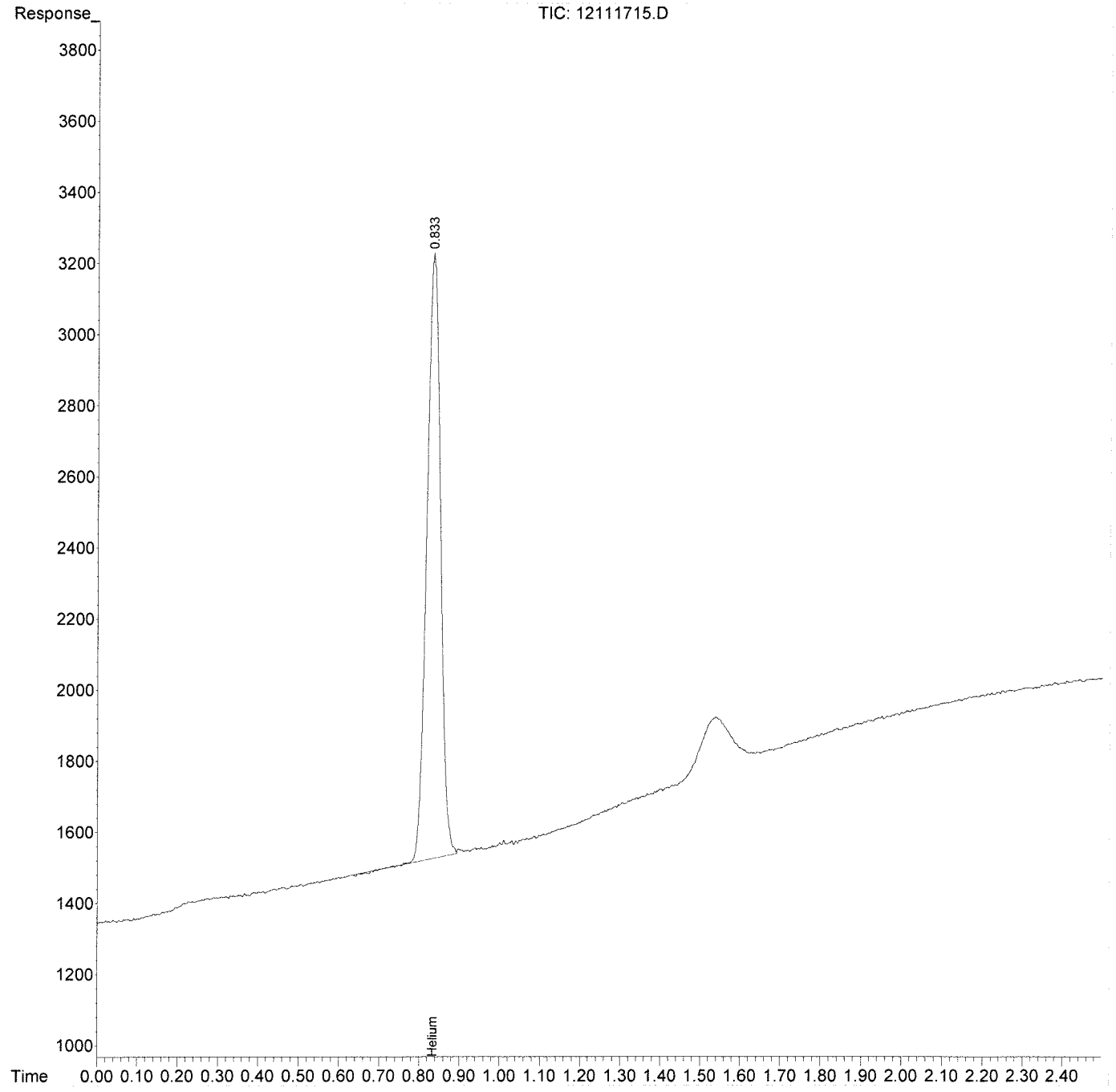
	Compound	R.T.	Response	Conc	Units
Target Compounds					
1)	Helium	0.834	39791	1104.878	ppm
2)	Hydrogen	0.000	0	N.D.	ppm

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

Data Path : J:\GC08\DATA\H2_He\2017_12\11HE\
Data File : 12111715.D
Signal(s) : TCD1A.CH
Acq On : 11-Dec-2017, 12:37:00
Operator : MC
Sample : std S32-12111701
Misc :
ALS Vial : 1 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Dec 11 14:32:27 2017
Quant Method : J:\GC08\METHODS\H2HE092517.M
Quant Title : Hydrogen and Helium by EPA Method 3C
QLast Update : Mon Dec 11 14:32:21 2017
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. :
Signal Phase :
Signal Info :



Injection Log

Directory: I:\GC08\DATA\H2_HE\2017_09\25\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	25-Sep-17, 08:37:44	09251701.D	test		RS	H2_HE.M	
2	25-Sep-17, 08:53:41	09251702.D	test		RS	H2_HE.M	
3	25-Sep-17, 09:02:44	09251703.D	20ppm s32-09251702		RS	H2_HE.M	Pass
4	25-Sep-17, 09:13:33	09251704.D	100ppm s32-09251702		RS	H2_HE.M	Pass
5	25-Sep-17, 09:27:09	09251705.D	1000ppm s32-09251701		RS	H2_HE.M	Pass
6	25-Sep-17, 09:38:45	09251706.D	5000ppm s32-09251701		RS	H2_HE.M	Pass
7	25-Sep-17, 09:51:09	09251707.D	10000ppm s32-09251701		RS	H2_HE.M	Pass
8	25-Sep-17, 10:10:45	09251708.D	mb 1ml		RS	H2_HE.M	Pass
9	25-Sep-17, 10:17:24	09251709.D	ICV s32-09251703		RS	H2_HE.M	Pass

Injection Log

Directory: I:\GC08\DATA\H2_HE\2017_12\11\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Acquisition Method	Comments
1	11-Dec-17, 09:21:53	12111701.D	std		MC	H2_HE.M	Fail
2	11-Dec-17, 09:40:56	12111702.D	std S32-12111701		MC	H2_HE.M	Pass
3	11-Dec-17, 09:50:33	12111703.D	mb 1ml		MC	H2_HE.M	Pass
4	11-Dec-17, 10:01:07	12111704.D	lcs S32-12111702		MC	H2_HE.M	Pass
5	11-Dec-17, 10:12:00	12111705.D	lcsd S32-12111702		MC	H2_HE.M	Pass
6	11-Dec-17, 10:49:47	12111706.D	P1706106-001 1ml		MC	H2_HE.M	
7	11-Dec-17, 11:10:02	12111707.D	P1706106-002 1ml		MC	H2_HE.M	
8	11-Dec-17, 11:28:25	12111708.D	P1706106-003 1ml		MC	H2_HE.M	
9	11-Dec-17, 11:40:51	12111709.D	P1706106-004 1ml		MC	H2_HE.M	
10	11-Dec-17, 11:54:11	12111710.D	P1706106-005 1ml		MC	H2_HE.M	
11	11-Dec-17, 12:09:26	12111711.D	P1706106-006 1ml		MC	H2_HE.M	
12	11-Dec-17, 12:18:23	12111712.D	P1706106-007 1ml		MC	H2_HE.M	
13	11-Dec-17, 12:24:37	12111713.D	P1706106-008 1ml		MC	H2_HE.M	
14	11-Dec-17, 12:30:51	12111714.D	std		MC	H2_HE.M	fail
15	11-Dec-17, 12:37:00	12111715.D	std S32-12111701		MC	H2_HE.M	Pass

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111713.D Vial: 5
Acq On : 11 Dec 2017 15:12 Operator: WA
Sample : P1706106-001 (100mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 11:50:38 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

RS 12/12/17
12/13/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	78474	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.22	114	385932	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	160459	12.500	ng		-0.01
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	117792	11.646	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 93.20%				
57) Toluene-d8 (SS2)	15.65	98	399374	12.531	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.24%				
73) Bromofluorobenzene (SS3)	18.91	174	131976	12.120	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.96%				
Target Compounds							Qvalue
2) Propene	4.36	42	15010m	1.376	ng		
3) Dichlorodifluoromethan...	4.53	85	2625	0.148	ng	#	91
4) Chloromethane	0.00	50	0	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.45	54	251	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.50	45	10268	1.664	ng		89
11) Acetonitrile	6.72	41	424	N.D.			
12) Acrolein	0.00	56	0	N.D.			
13) Acetone	7.20	58	2808	0.440	ng	#	4
14) Trichlorofluoromethane	7.38	101	1160	N.D.			
15) 2-Propanol (Isopropanol)	0.00	45	0	N.D.	d		
16) Acrylonitrile	7.80	53	608	N.D.			
17) 1,1-Dichloroethene	8.29	96	2402	0.289	ng		96
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.			
19) Methylene Chloride	8.49	84	5318	0.578	ng		98
20) 3-Chloro-1-propene (Al...	8.59	41	322	N.D.			
21) Trichlorotrifluoroethane	8.91	151	4870	0.605	ng		97
22) Carbon Disulfide	8.76	76	46173	1.406	ng		98
23) trans-1,2-Dichloroethene	9.73	61	4853284	418.912	ng		95
24) 1,1-Dichloroethane	0.00	63	0	N.D.	d		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D.			
27) 2-Butanone (MEK)	0.00	72	0	N.D.			
28) cis-1,2-Dichloroethene	10.96	61	31067	2.634	ng		98
29) Diisopropyl Ether	11.30	87	427	N.D.			
30) Ethyl Acetate	11.25	61	111	N.D.			
31) n-Hexane	11.25	57	1139	N.D.			
32) Chloroform	11.30	83	5548	0.361	ng		97
34) Tetrahydrofuran (THF)	11.77	72	481	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	0.00	62	0	N.D.			
38) 1,1,1-Trichloroethane	12.36	97	144541	9.947	ng		100
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D.	d		
41) Benzene	12.84	78	3673	0.103	ng		97
42) Carbon Tetrachloride	0.00	117	0	N.D.			
43) Cyclohexane	13.13	84	957	N.D.			
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.	d		
47) Trichloroethene	13.91	130	1055981	91.211	ng		99
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	13.98	57	735	N.D.			
50) Methyl Methacrylate	0.00	100	0	N.D.	d		

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111713.D Vial: 5
Acq On : 11 Dec 2017 15:12 Operator: WA
Sample : P1706106-001 (100mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 11:50:38 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

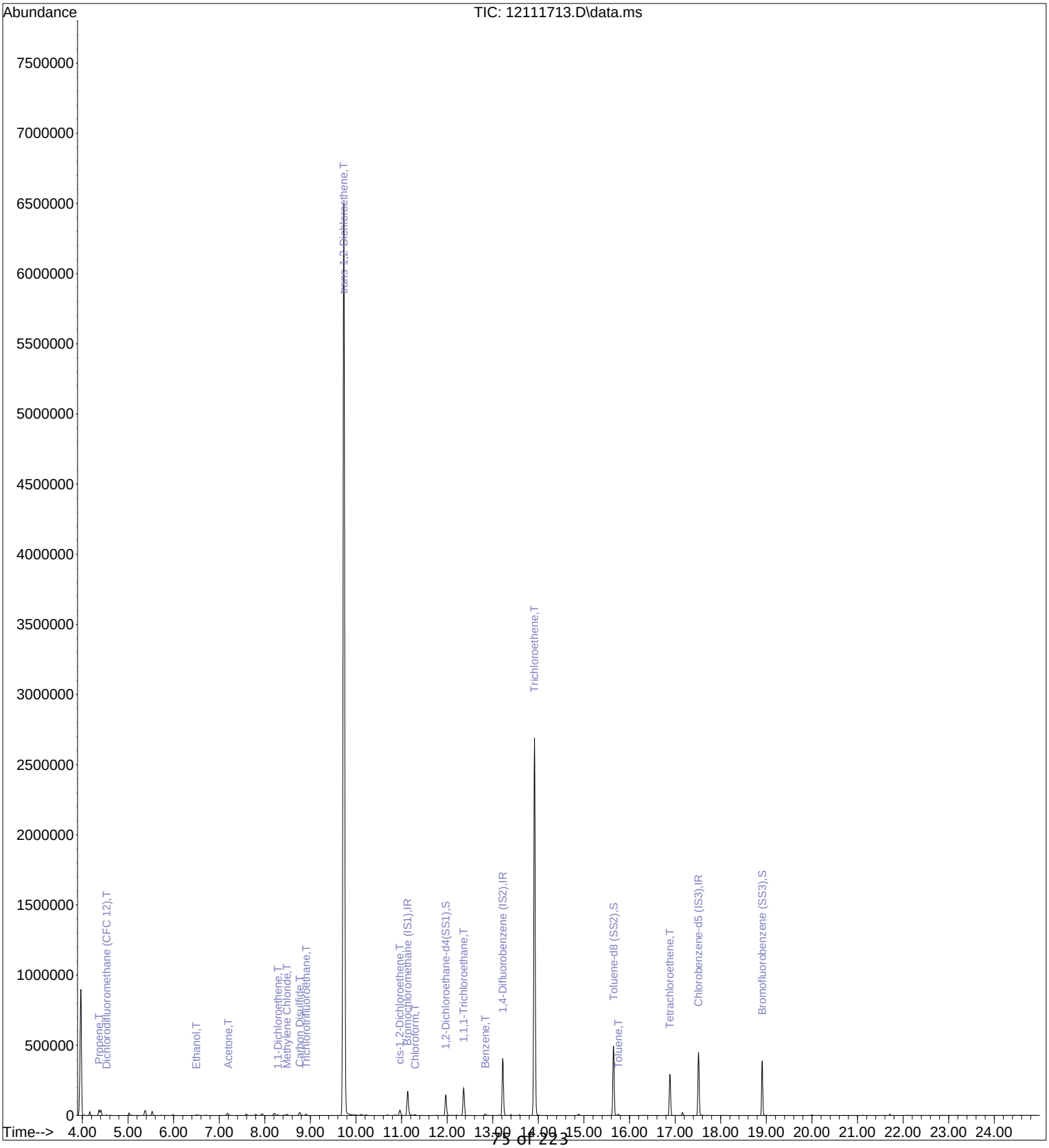
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.75	91	7133	0.197 ng	97
59) 2-Hexanone	16.18	43	107	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	16.75	43	247	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	16.89	166	109759	10.077 ng	100
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	17.92	91	1016	N.D.	
67) m- & p-Xylenes	18.08	91	2264	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	18.51	91	882	N.D.	
71) n-Nonane	18.72	43	251	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	0.00	105	0	N.D.	
75) alpha-Pinene	0.00	93	0	N.D.	
76) n-Propylbenzene	19.50	91	855	N.D.	
77) 3-Ethyltoluene	19.59	105	432	N.D.	
78) 4-Ethyltoluene	19.59	105	432	N.D.	
79) 1,3,5-Trimethylbenzene	19.59	105	432	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	20.05	105	608	N.D.	
82) 1,2,4-Trimethylbenzene	20.05	105	608	N.D.	
83) n-Decane	20.13	57	895	N.D.	
84) Benzyl Chloride	0.00	91	0	N.D.	
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	20.05	105	416	N.D.	
88) 4-Isopropyltoluene (p-...	20.42	119	340	N.D.	
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.56	68	549	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.24	57	381	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.16	128	539	N.D.	
96) n-Dodecane	22.15	57	663	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D.	
99) tert-Butylbenzene	0.00	119	0	N.D.	
100) n-Butylbenzene	20.79	91	614	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111713.D Vial: 5
Acq On : 11 Dec 2017 15:12 Operator: WA
Sample : P1706106-001 (100mL) Inst : MS13
Misc : S31-12011701

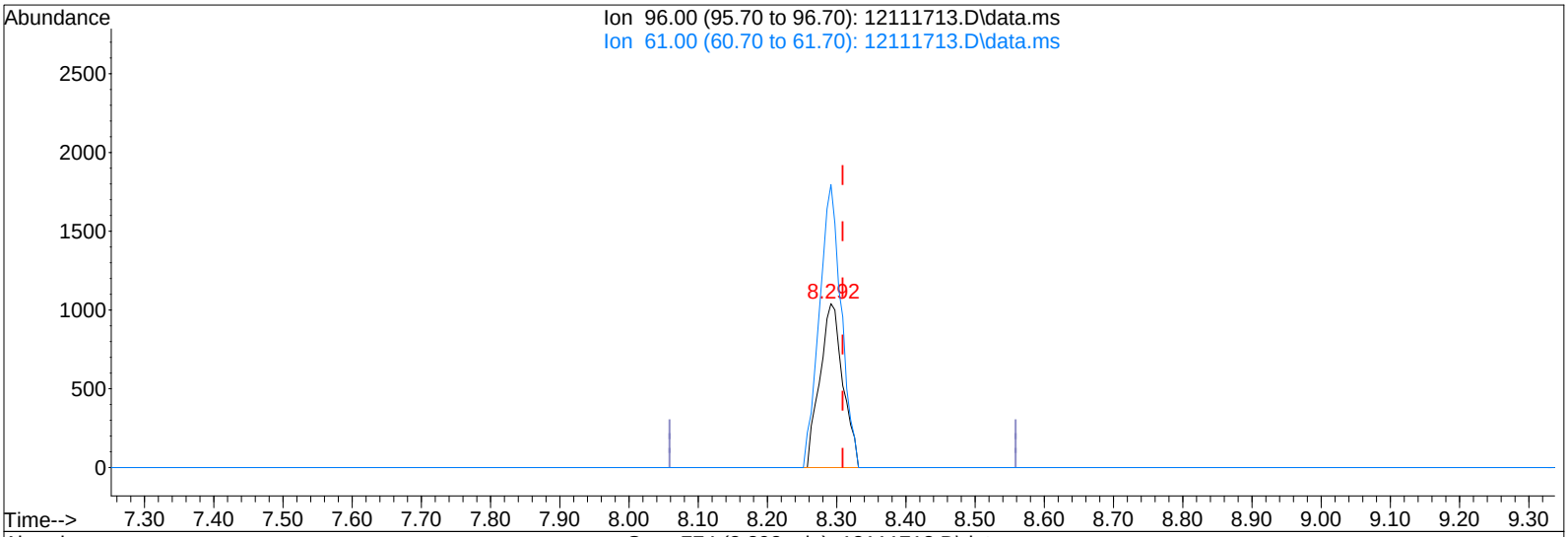
Quant Time: Dec 12 11:50:38 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

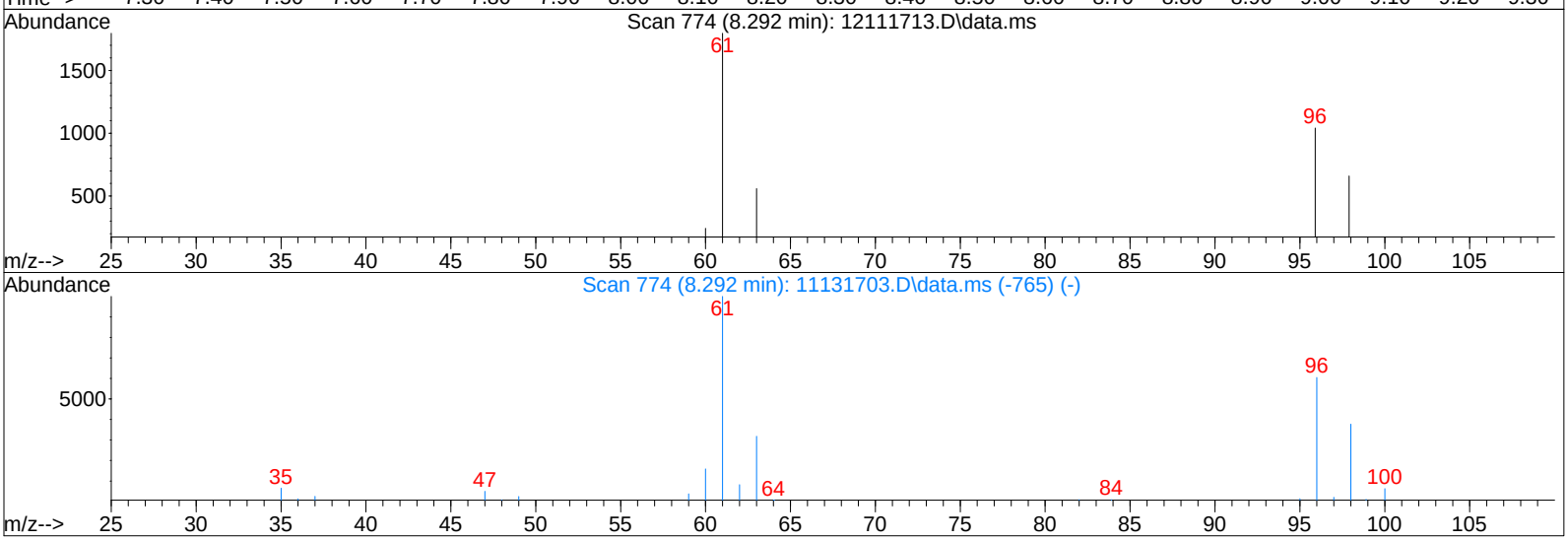


Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111713.D Vial: 5
Acq On : 11 Dec 2017 15:12 Operator: WA
Sample : P1706106-001 (100mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 11 16:55:16 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12111713.D\data.ms

(17) 1,1-Dichloroethene (T)

8.292min (-0.017) 0.29ng

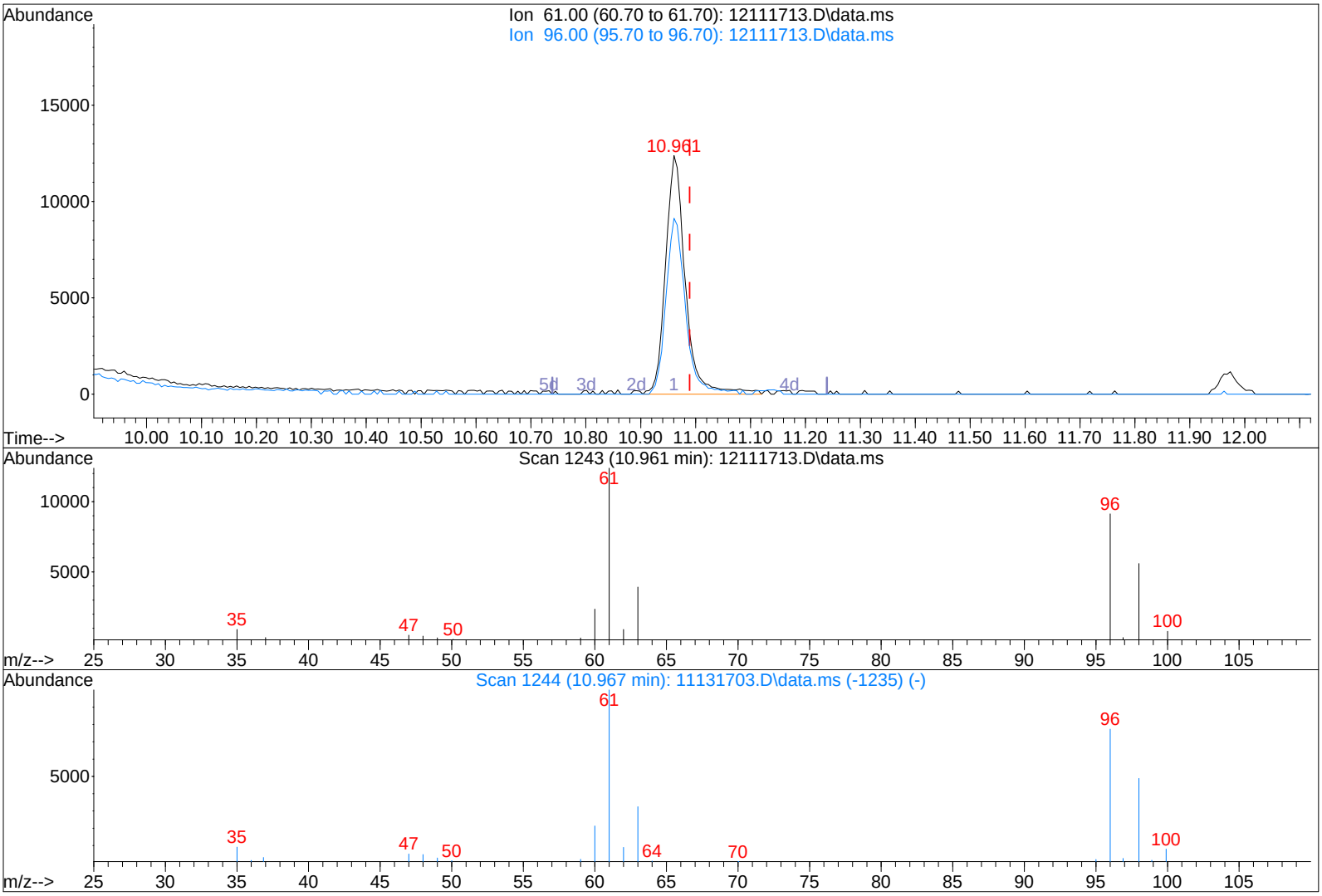
response 2402

Ion	Exp%	Act%
96.00	100	100
61.00	170.40	164.49
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111713.D Vial: 5
Acq On : 11 Dec 2017 15:12 Operator: WA
Sample : P1706106-001 (100mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 11 16:55:16 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111713.D\data.ms

(28) cis-1,2-Dichloroethene (T)

10.961min (-0.028) 2.63ng

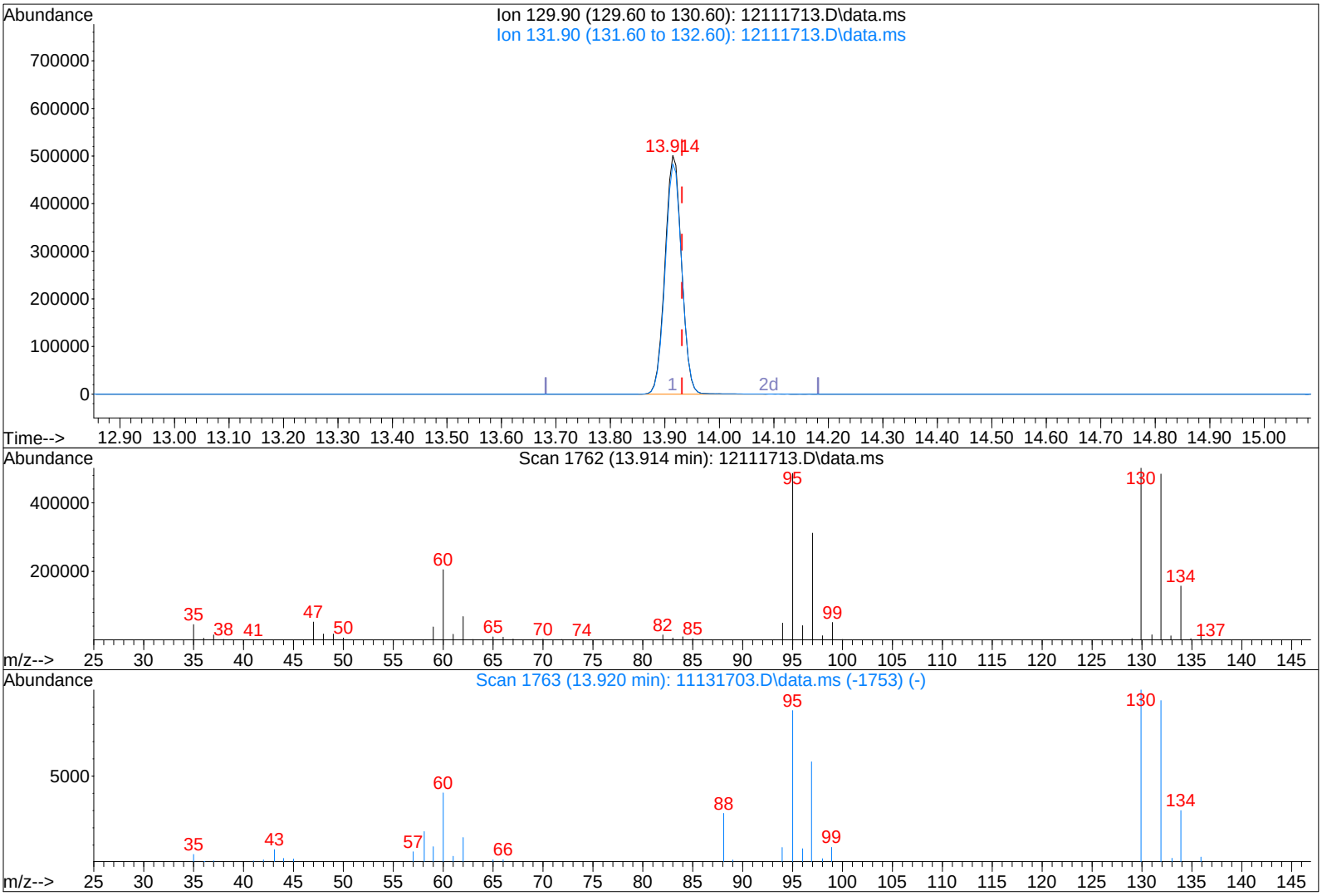
response 31067

Ion	Exp%	Act%
61.00	100	100
96.00	74.60	73.06
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111713.D Vial: 5
Acq On : 11 Dec 2017 15:12 Operator: WA
Sample : P1706106-001 (100mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 11 16:55:16 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111713.D\data.ms

(47) Trichloroethene (T)

13.914min (-0.017) 91.21ng

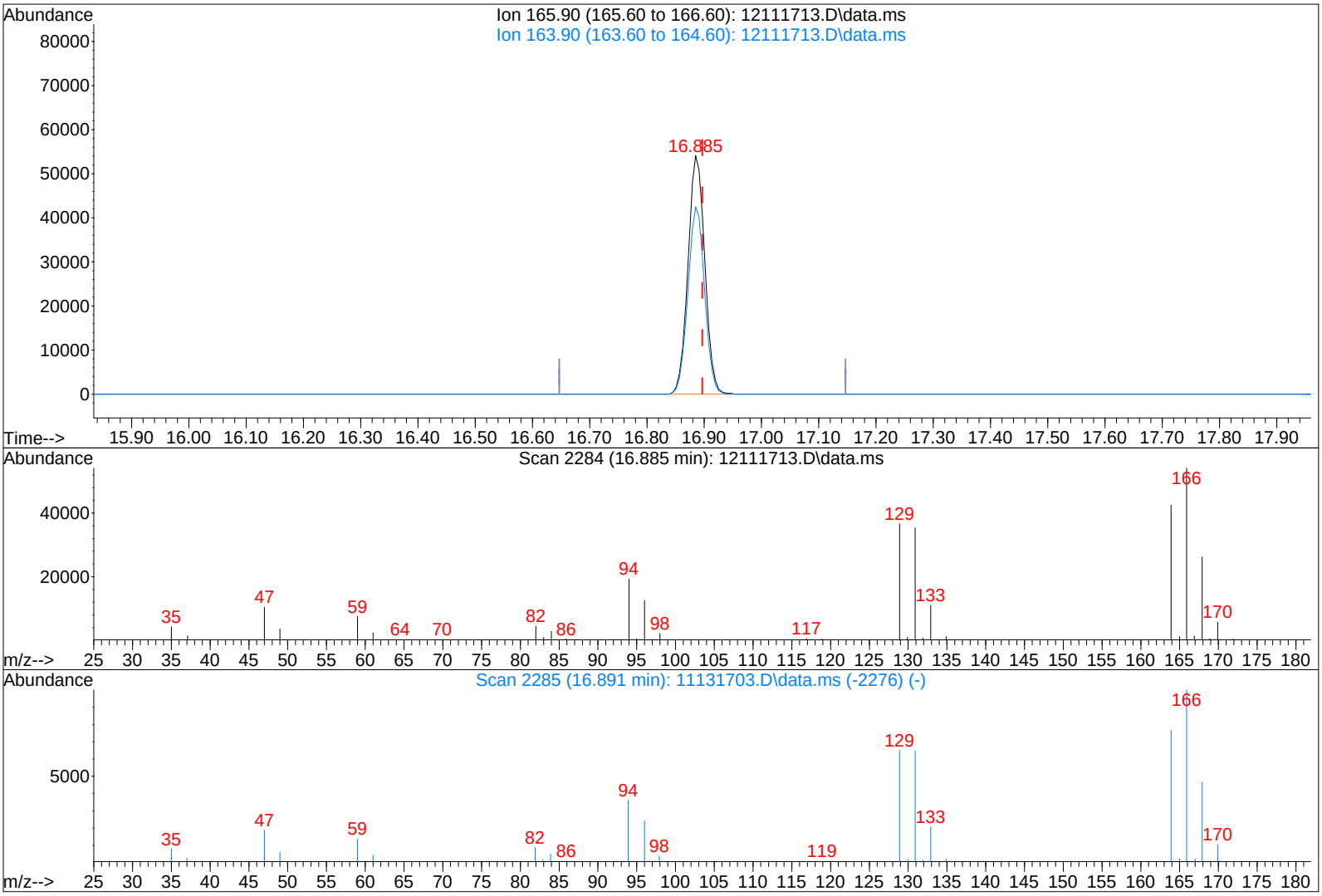
response 1055981

Ion	Exp%	Act%
129.90	100	100
131.90	95.90	96.57
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111713.D Vial: 5
Acq On : 11 Dec 2017 15:12 Operator: WA
Sample : P1706106-001 (100mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 11 16:55:16 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111713.D\data.ms

(64) Tetrachloroethene (T)

16.885min (-0.012) 10.08ng

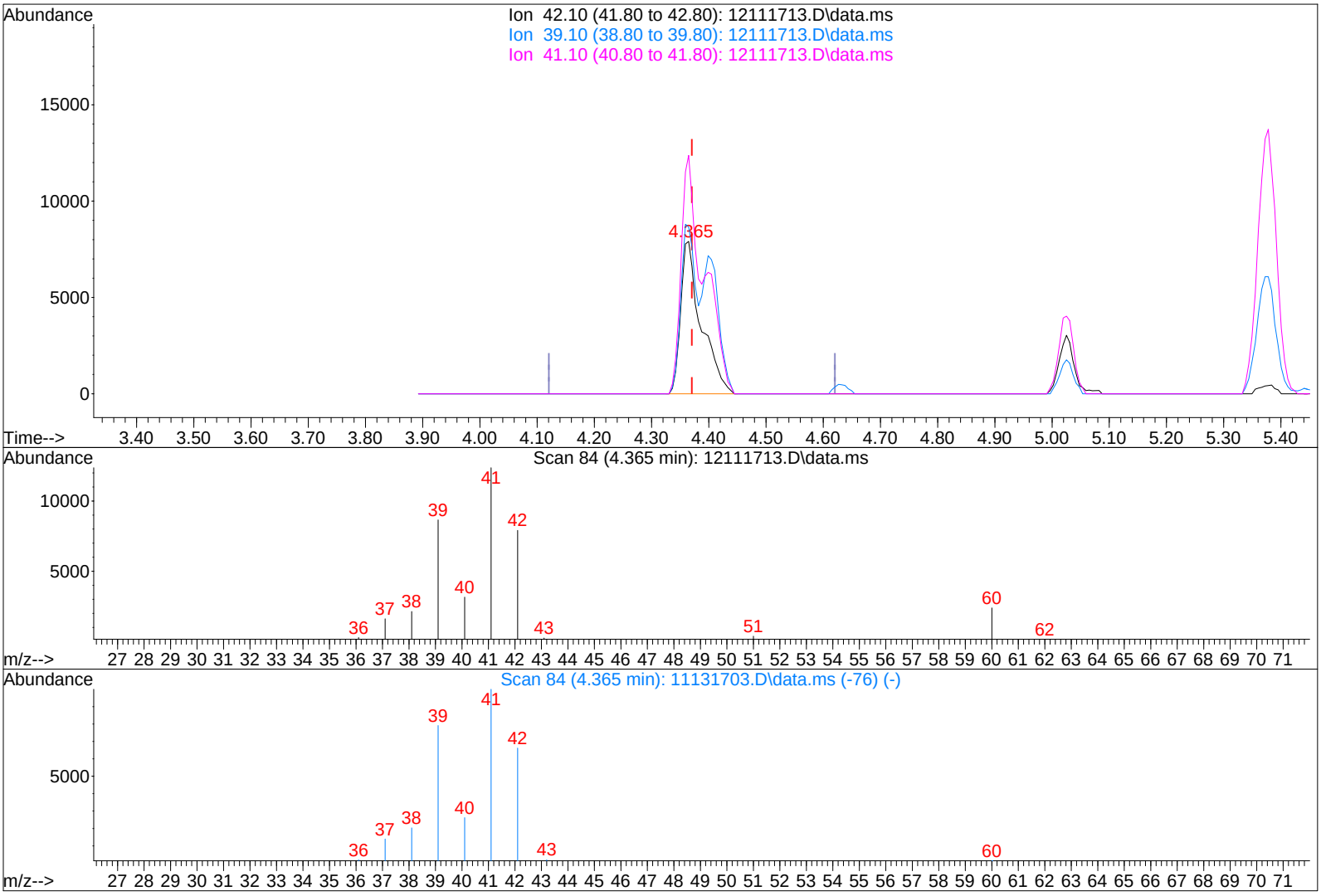
response 109759

Ion	Exp%	Act%
165.90	100	100
163.90	78.30	78.26
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111713.D Vial: 5
Acq On : 11 Dec 2017 15:12 Operator: WA
Sample : P1706106-001 (100mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 11:35:49 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111713.D\data.ms

(2) Propene (T)

4.365min (-0.006) 1.80ng

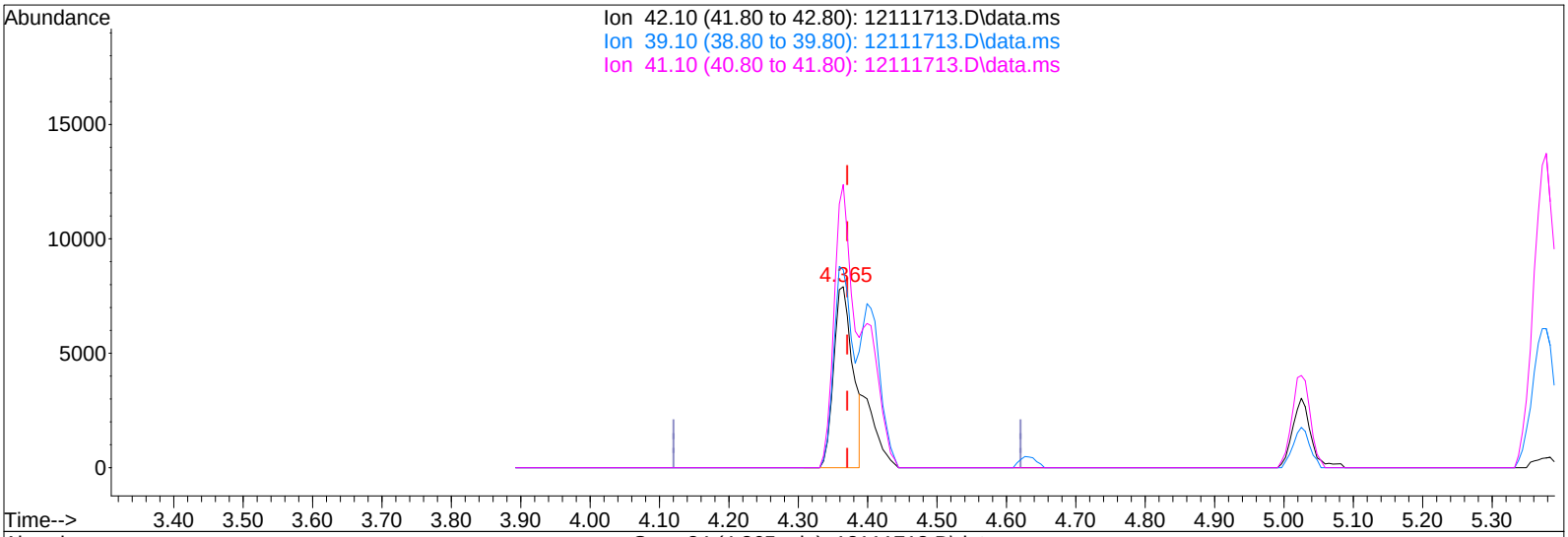
response 19620

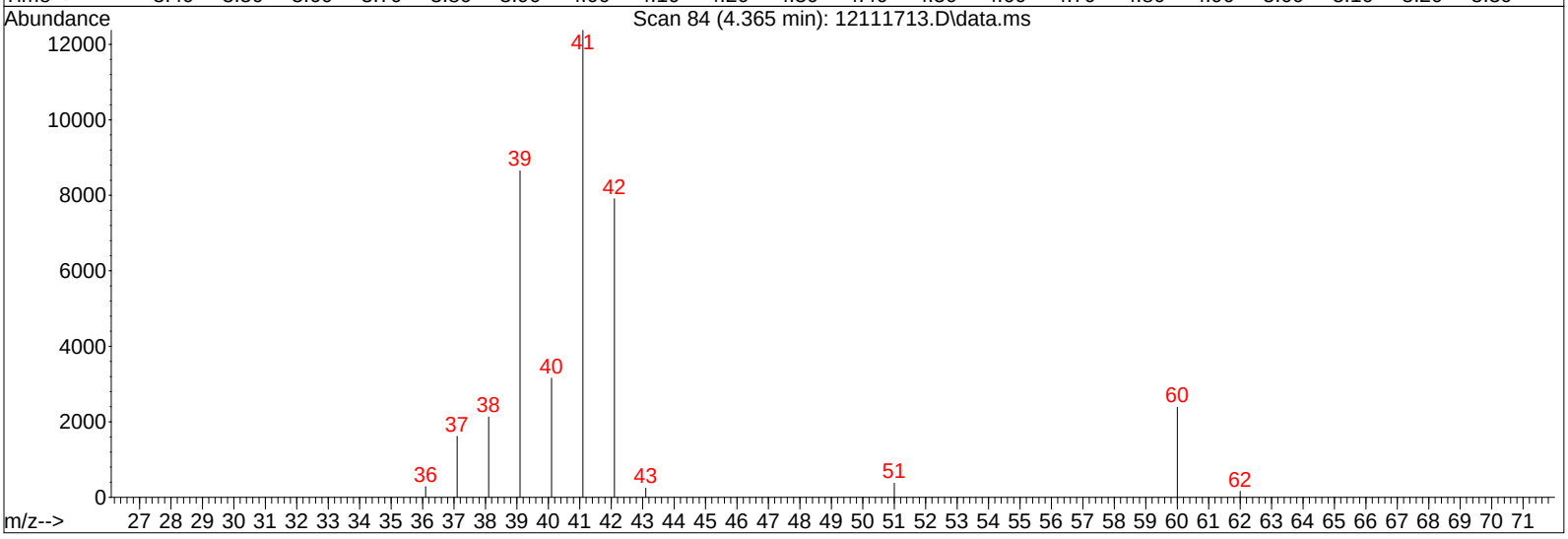
Ion	Exp%	Act%
42.10	100	100
39.10	114.80	80.70#
41.10	151.20	174.91#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111713.D Vial: 5
Acq On : 11 Dec 2017 15:12 Operator: WA
Sample : P1706106-001 (100mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 11:35:49 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M





TIC: 12111713.D\data.ms

(2) Propene (T)

4.365min (-0.006) 1.38ng m

response 15010

Ion	Exp%	Act%
42.10	100	100
39.10	114.80	105.49
41.10	151.20	228.63#
0.00	0.00	0.00

IPC

RS 12/12/17 12/13/17

LH 12/14/17

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111714.D Vial: 5
Acq On : 11 Dec 2017 15:48 Operator: WA
Sample : P1706106-001dil (15mL) Inst : MS13
Misc : S31-12011701

RS 12/13/17
WA 12/13/17

Quant Time: Dec 12 11:53:42 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	80085	12.500	ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.22	114	388365	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	163466	12.500	ng	-0.01
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	11.97	65	119424	11.570	ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 92.56%			
57) Toluene-d8 (SS2)	15.65	98	403821	12.438	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.52%			
73) Bromofluorobenzene (SS3)	18.91	174	136632	12.317	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.56%			
Target Compounds						Qvalue
2) Propene	4.39	42	2630	0.236	ng	# 73
3) Dichlorodifluoromethan...	4.54	85	214	N.D.		
4) Chloromethane	0.00	50	0	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.		
6) Vinyl Chloride	0.00	62	0	N.D.		
7) 1,3-Butadiene	0.00	54	0	N.D.		
8) Bromomethane	0.00	94	0	N.D.		
9) Chloroethane	0.00	64	0	N.D.		
10) Ethanol	6.60	45	62	N.D.		
11) Acetonitrile	0.00	41	0	N.D.		
12) Acrolein	0.00	56	0	N.D.		
13) Acetone	0.00	58	0	N.D.		
14) Trichlorofluoromethane	0.00	101	0	N.D.		
15) 2-Propanol (Isopropanol)	0.00	45	0	N.D.		
16) Acrylonitrile	0.00	53	0	N.D.		
17) 1,1-Dichloroethene	8.29	96	110	N.D.		
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.		
19) Methylene Chloride	8.49	84	1052	0.112	ng	97
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.		
21) Trichlorotrifluoroethane	8.90	151	486	N.D.		
22) Carbon Disulfide	0.00	76	0	N.D.	d	
23) trans-1,2-Dichloroethene	9.72	61	651134	55.072	ng	99
24) 1,1-Dichloroethane	9.96	63	350	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	0.00	86	0	N.D.		
27) 2-Butanone (MEK)	0.00	72	0	N.D.		
28) cis-1,2-Dichloroethene	10.96	61	3449	0.287	ng	98
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	0.00	61	0	N.D.		
31) n-Hexane	0.00	57	0	N.D.		
32) Chloroform	11.30	83	493	N.D.		
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	0.00	62	0	N.D.		
38) 1,1,1-Trichloroethane	12.36	97	17908	1.225	ng	99
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	0.00	56	0	N.D.		
41) Benzene	12.83	78	629	N.D.		
42) Carbon Tetrachloride	0.00	117	0	N.D.		
43) Cyclohexane	0.00	84	0	N.D.		
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.		
45) 1,2-Dichloropropane	0.00	63	0	N.D.		
46) Bromodichloromethane	0.00	83	0	N.D.	d	
47) Trichloroethene	13.91	130	129607	11.125	ng	100
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.		
50) Methyl Methacrylate	0.00	100	0	N.D.		

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111714.D Vial: 5
Acq On : 11 Dec 2017 15:48 Operator: WA
Sample : P1706106-001dil (15mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 11:53:42 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

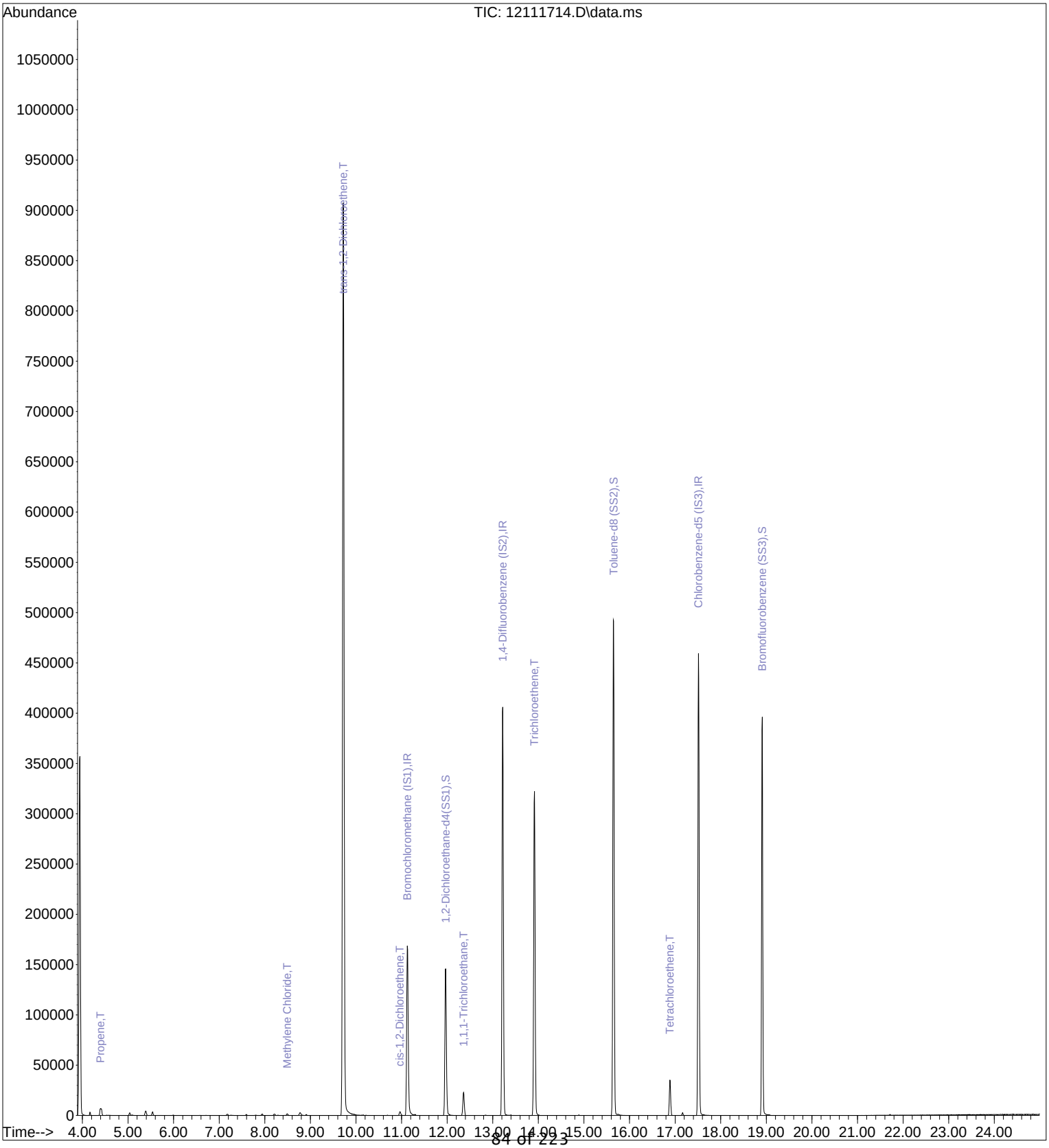
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.75	91	918	N.D.	
59) 2-Hexanone	0.00	43	0	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	0.00	43	0	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	16.89	166	13754	1.239 ng	99
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	0.00	91	0	N.D.	
67) m- & p-Xylenes	0.00	91	0	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	0.00	91	0	N.D.	
71) n-Nonane	0.00	43	0	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	0.00	105	0	N.D.	
75) alpha-Pinene	0.00	93	0	N.D.	
76) n-Propylbenzene	0.00	91	0	N.D.	
77) 3-Ethyltoluene	0.00	105	0	N.D.	
78) 4-Ethyltoluene	0.00	105	0	N.D.	
79) 1,3,5-Trimethylbenzene	0.00	105	0	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	0.00	105	0	N.D.	
82) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.	
83) n-Decane	0.00	57	0	N.D.	
84) Benzyl Chloride	0.00	91	0	N.D.	
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	0.00	105	0	N.D.	
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D.	
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	0.00	68	0	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	0.00	57	0	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	0.00	128	0	N.D.	
96) n-Dodecane	0.00	57	0	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D.	
99) tert-Butylbenzene	0.00	119	0	N.D.	
100) n-Butylbenzene	0.00	91	0	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111714.D Vial: 5
Acq On : 11 Dec 2017 15:48 Operator: WA
Sample : P1706106-001dil (15mL) Inst : MS13
Misc : S31-12011701

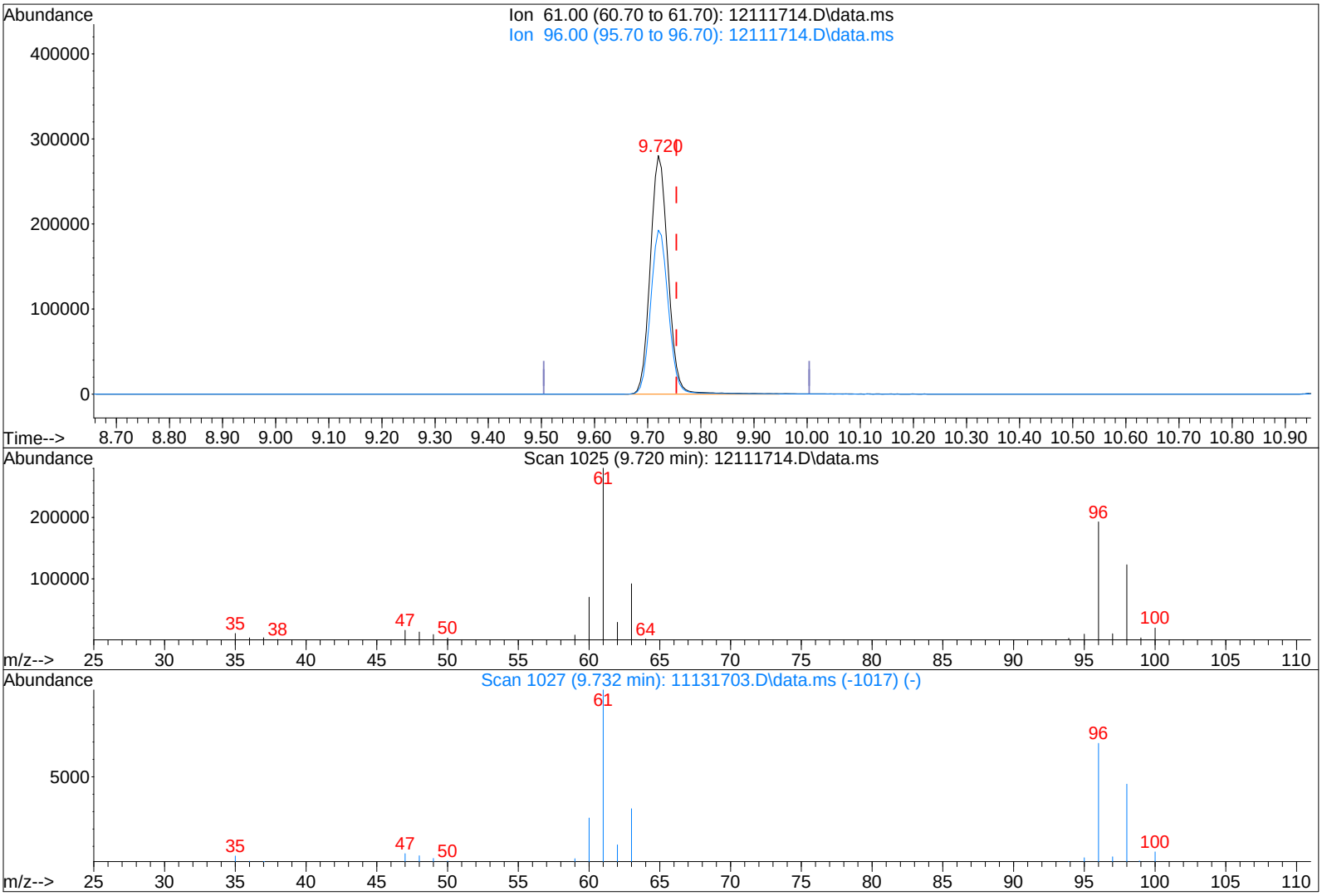
Quant Time: Dec 12 11:53:42 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111714.D Vial: 5
Acq On : 11 Dec 2017 15:48 Operator: WA
Sample : P1706106-001dil (15mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 11:53:42 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111714.D\data.ms

(23) trans-1,2-Dichloroethene (T)

9.720min (-0.034) 55.07ng

response 651134

Ion	Exp%	Act%
61.00	100	100
96.00	68.00	69.06
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111715.D Vial: 6
Acq On : 11 Dec 2017 16:21 Operator: WA
Sample : P1706106-002 (75mL) Inst : MS13
Misc : S31-12011701

RS 12/12/17
12/13/17

Quant Time: Dec 12 14:22:00 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	76323	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.22	114	378855	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	161100	12.500	ng		-0.01
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	116748	11.868	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.96%				
57) Toluene-d8 (SS2)	15.65	98	395139	12.349	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.80%				
73) Bromofluorobenzene (SS3)	18.91	174	132205	12.093	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.72%				
Target Compounds							Qvalue
2) Propene	4.36	42	29653	2.795	ng		97
3) Dichlorodifluoromethan...	4.52	85	11004	0.639	ng		99
4) Chloromethane	4.79	50	753	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.44	54	788	0.093	ng		96
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.64	45	59	N.D.			
11) Acetonitrile	6.82	41	53	N.D.			
12) Acrolein	0.00	56	0	N.D.			
13) Acetone	7.16	58	14748	2.377	ng	#	64
14) Trichlorofluoromethane	7.38	101	1373	N.D.			
15) 2-Propanol (Isopropanol)	7.71	45	112	N.D.			
16) Acrylonitrile	7.93	53	58	N.D.			
17) 1,1-Dichloroethene	8.29	96	2139	0.264	ng		95
18) 2-Methyl-2-Propanol (t...	8.57	59	52	N.D.			
19) Methylene Chloride	8.49	84	632	N.D.			
20) 3-Chloro-1-propene (Al...	8.59	41	783	N.D.			
21) Trichlorotrifluoroethane	8.91	151	39130	4.994	ng		97
22) Carbon Disulfide	8.76	76	21233	0.665	ng		96
23) trans-1,2-Dichloroethene	9.72	61	147716	13.109	ng		99
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D.	d		
27) 2-Butanone (MEK)	10.49	72	4934	0.919	ng	#	81
28) cis-1,2-Dichloroethene	10.97	61	1156	0.101	ng		88
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	0.00	61	0	N.D.			
31) n-Hexane	11.25	57	3190	0.226	ng	#	91
32) Chloroform	11.30	83	1956	0.131	ng		93
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	0.00	62	0	N.D.			
38) 1,1,1-Trichloroethane	12.36	97	118738	8.324	ng		100
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	12.87	56	756	N.D.			
41) Benzene	12.84	78	4160	0.119	ng		90
42) Carbon Tetrachloride	0.00	117	0	N.D.			
43) Cyclohexane	13.12	84	4159	0.315	ng		96
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.	d		
47) Trichloroethene	13.91	130	786696	69.220	ng		99
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	13.98	57	187	N.D.			
50) Methyl Methacrylate	14.25	100	281	N.D.			

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111715.D Vial: 6
Acq On : 11 Dec 2017 16:21 Operator: WA
Sample : P1706106-002 (75mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 14:22:00 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

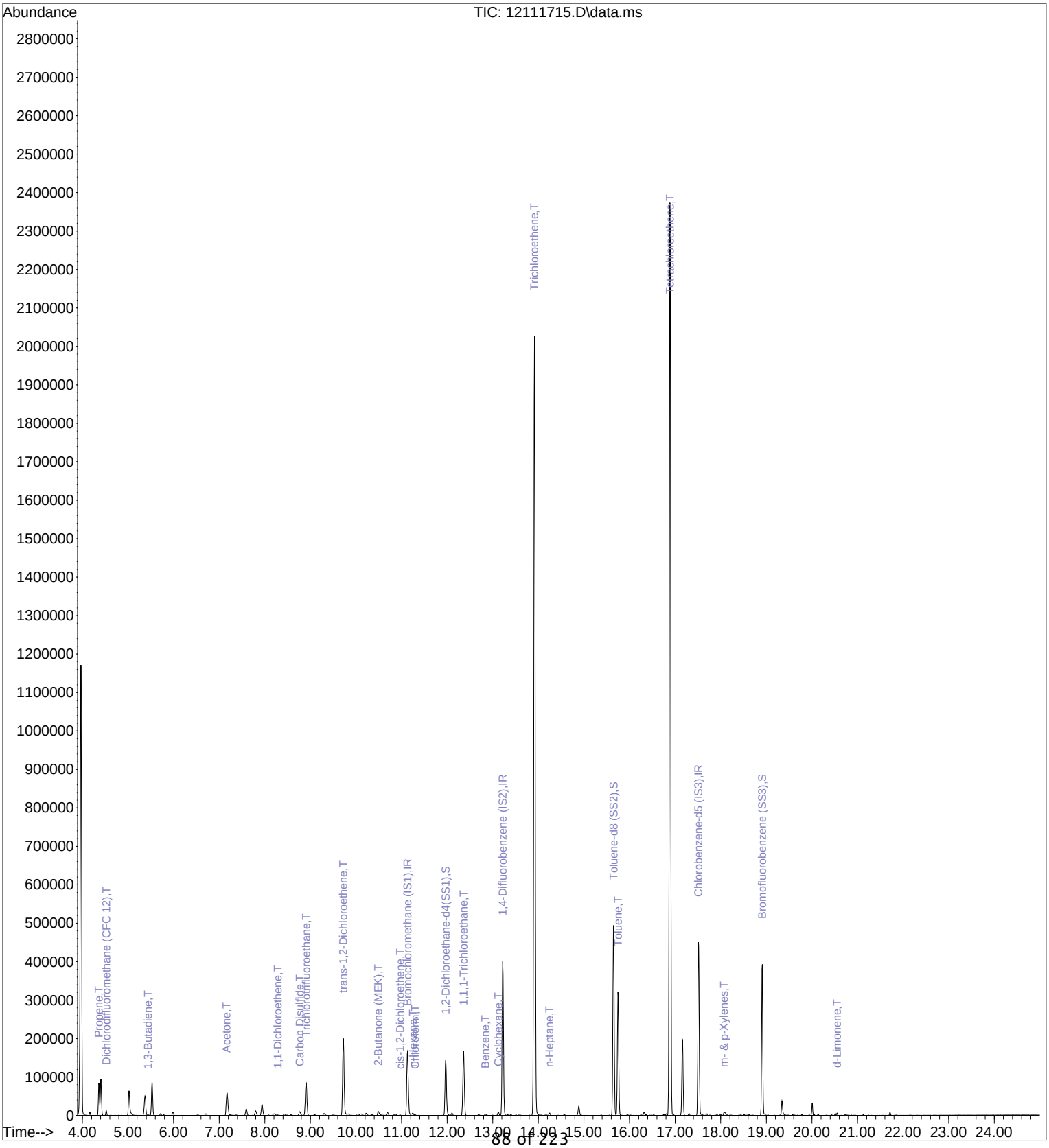
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.24	71	1631	0.192 ng	93
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.75	91	276327	7.603 ng	100
59) 2-Hexanone	16.03	43	1403	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	16.75	43	1561	N.D.	
63) n-Octane	16.75	57	451	N.D.	
64) Tetrachloroethene	16.89	166	885402	80.963 ng	99
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	17.92	91	2641	N.D.	
67) m- & p-Xylenes	18.07	91	8227	0.249 ng	100
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.42	104	682	N.D.	
70) o-Xylene	18.51	91	2265	N.D.	
71) n-Nonane	18.71	43	593	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	19.04	105	813	N.D.	
75) alpha-Pinene	19.38	93	264	N.D.	
76) n-Propylbenzene	19.49	91	980	N.D.	
77) 3-Ethyltoluene	19.58	105	2128	N.D.	
78) 4-Ethyltoluene	19.62	105	1272	N.D.	
79) 1,3,5-Trimethylbenzene	19.69	105	630	N.D.	
80) alpha-Methylstyrene	19.83	118	240	N.D.	
81) 2-Ethyltoluene	19.86	105	598	N.D.	
82) 1,2,4-Trimethylbenzene	20.05	105	2000	N.D.	
83) n-Decane	20.13	57	1299	N.D.	
84) Benzyl Chloride	20.17	91	168	N.D.	
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	20.42	105	225	N.D.	
88) 4-Isopropyltoluene (p-...	20.43	119	966	N.D.	
89) 1,2,3-Trimethylbenzene	20.42	105	225	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.55	68	1643	0.117 ng	92
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.24	57	485	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.17	128	336	N.D.	
96) n-Dodecane	22.15	57	350	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	18.23	55	401	N.D.	
99) tert-Butylbenzene	20.05	119	127	N.D.	
100) n-Butylbenzene	20.78	91	229	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111715.D Vial: 6
Acq On : 11 Dec 2017 16:21 Operator: WA
Sample : P1706106-002 (75mL) Inst : MS13
Misc : S31-12011701

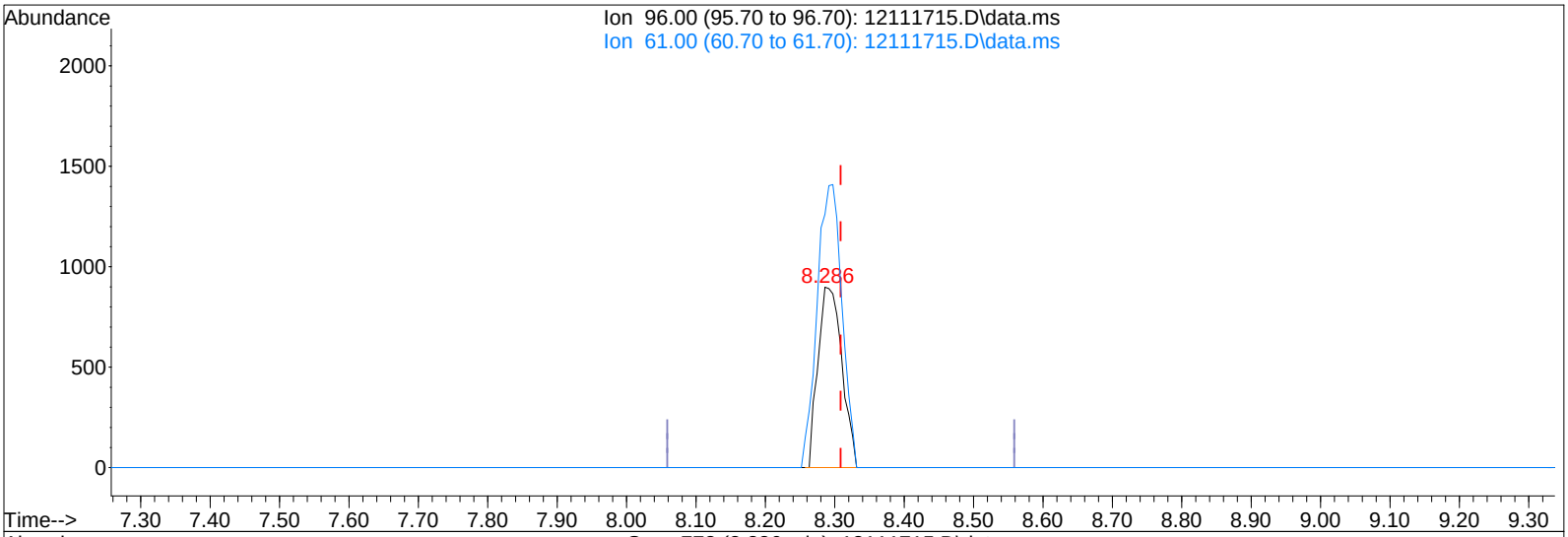
Quant Time: Dec 12 14:22:00 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

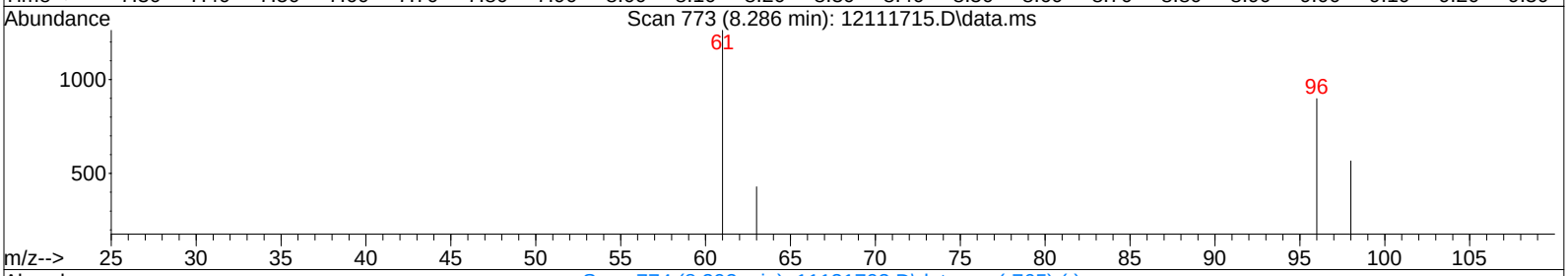


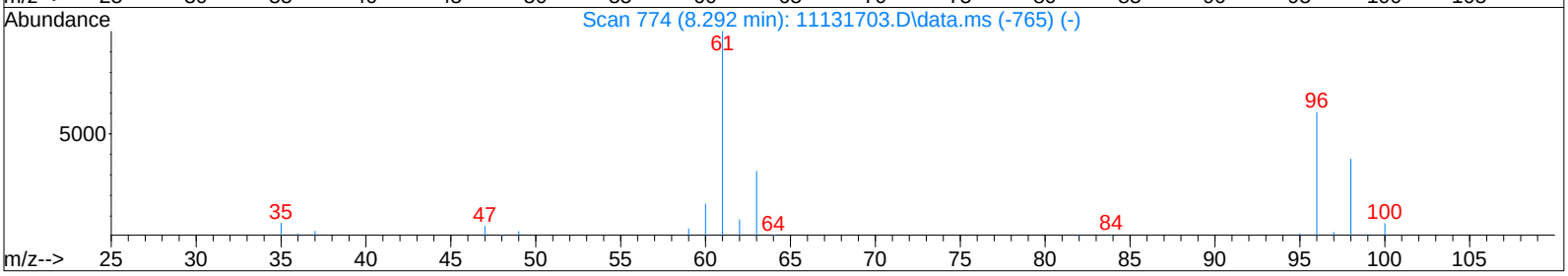
Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111715.D Vial: 6
Acq On : 11 Dec 2017 16:21 Operator: WA
Sample : P1706106-002 (75mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 11 16:55:38 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 12111715.D\data.ms

(17) 1,1-Dichloroethene (T)

8.286min (-0.023) 0.26ng

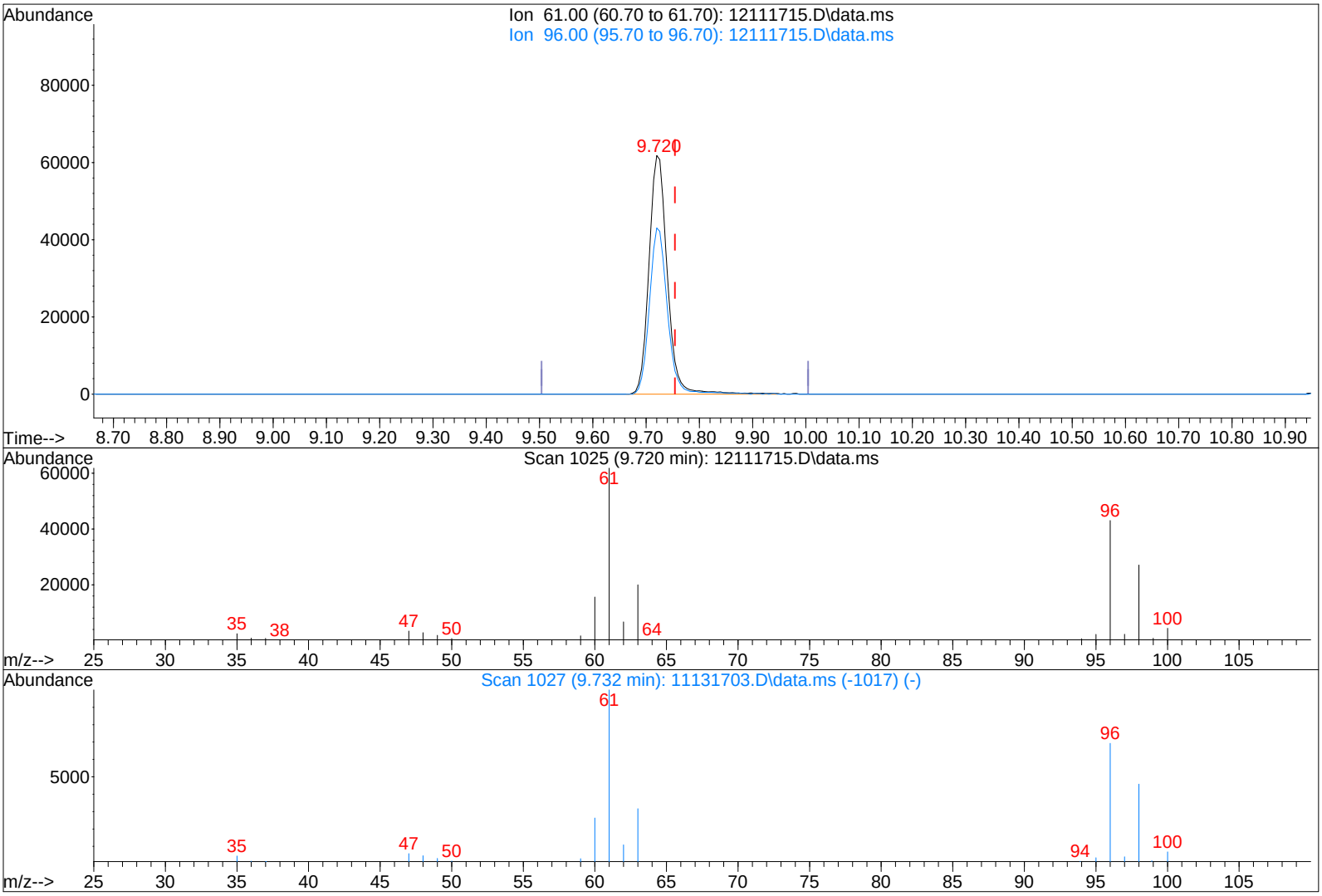
response 2139

Ion	Exp%	Act%
96.00	100	100
61.00	170.40	163.72
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111715.D Vial: 6
Acq On : 11 Dec 2017 16:21 Operator: WA
Sample : P1706106-002 (75mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 11 16:55:38 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111715.D\data.ms

(23) trans-1,2-Dichloroethene (T)

9.720min (-0.034) 13.11ng

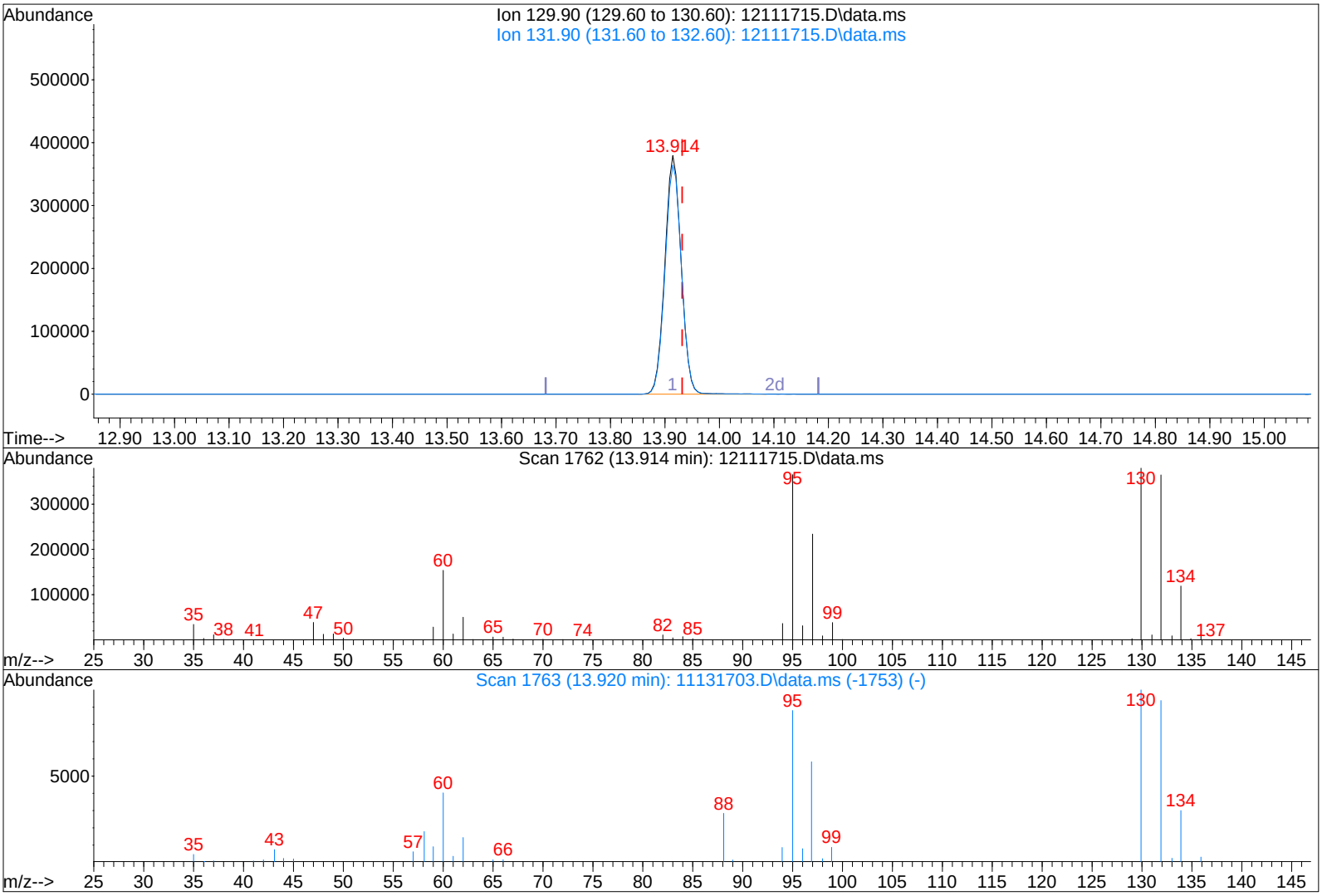
response 147716

Ion	Exp%	Act%
61.00	100	100
96.00	68.00	68.45
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111715.D Vial: 6
Acq On : 11 Dec 2017 16:21 Operator: WA
Sample : P1706106-002 (75mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 11 16:55:38 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111715.D\data.ms

(47) Trichloroethene (T)

13.914min (-0.017) 69.22ng

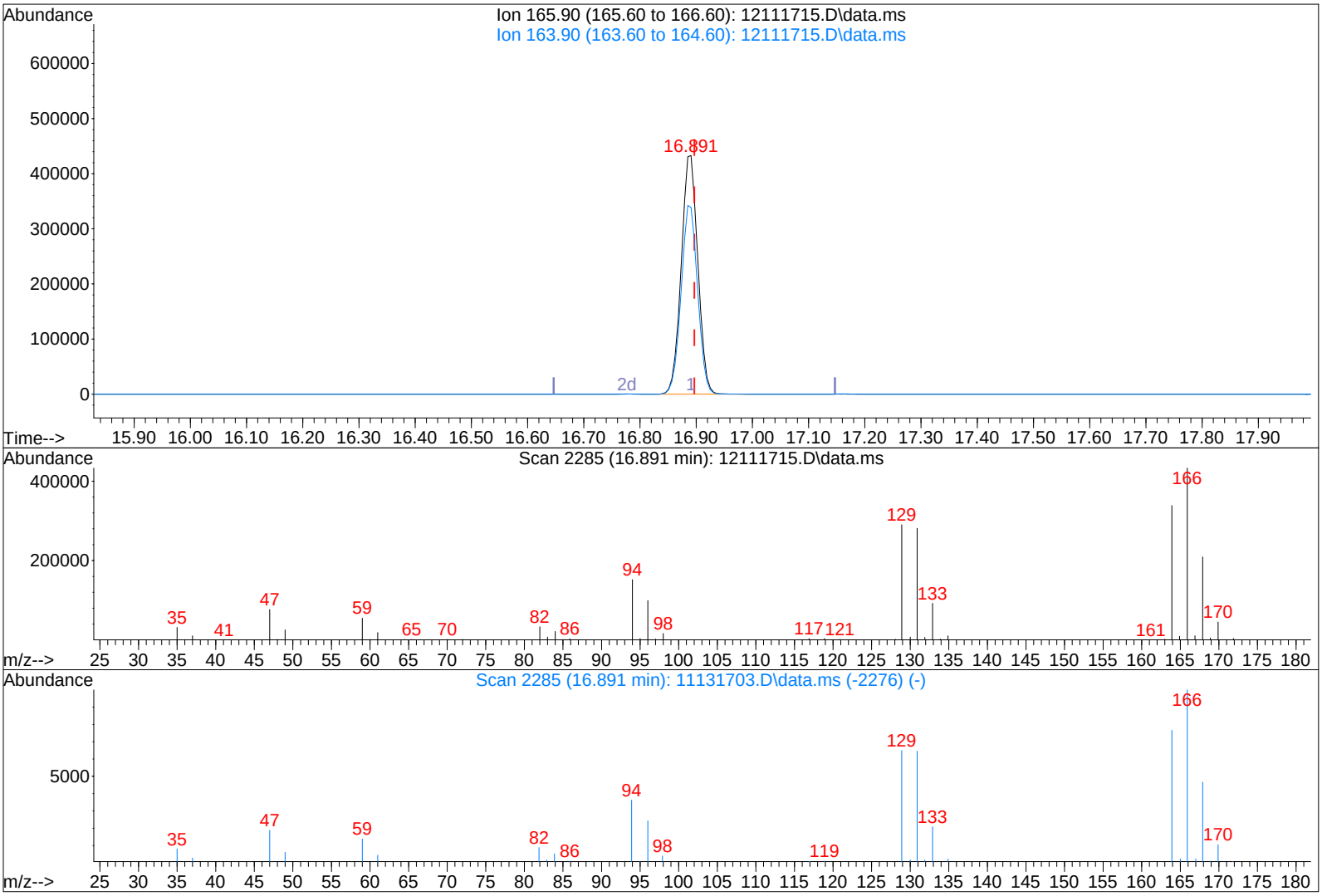
response 786696

Ion	Exp%	Act%
129.90	100	100
131.90	95.90	96.78
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111715.D Vial: 6
Acq On : 11 Dec 2017 16:21 Operator: WA
Sample : P1706106-002 (75mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 11 16:55:38 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111715.D\data.ms

(64) Tetrachloroethene (T)

16.891min (-0.006) 80.96ng

response 885402

Ion	Exp%	Act%
165.90	100	100
163.90	78.30	78.77
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111718.D Vial: 7
Acq On : 11 Dec 2017 18:12 Operator: WA
Sample : P1706106-003 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 15:19:08 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

RS 12/13/17

12/13/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	71375	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.22	114	357735	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	151021	12.500	ng		-0.01
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	111248	12.093	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.72%				
57) Toluene-d8 (SS2)	15.65	98	371034	12.369	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.96%				
73) Bromofluorobenzene (SS3)	18.91	174	123534	12.054	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.40%				
Target Compounds							Qvalue
2) Propene	4.35	42	78741	7.935	ng		99
3) Dichlorodifluoromethan...	4.51	85	9981	0.620	ng		99
4) Chloromethane	4.77	50	112	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.43	54	2747	0.348	ng		97
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.49	45	42075	7.498	ng		99
11) Acetonitrile	6.77	41	2804	0.208	ng		93
12) Acrolein	6.98	56	315	N.D.			
13) Acetone	0.00	58	0	N.D.	d		
14) Trichlorofluoromethane	7.37	101	4506	0.311	ng		94
15) 2-Propanol (Isopropanol)	7.64	45	10128	0.511	ng	#	50
16) Acrylonitrile	0.00	53	0	N.D.	d		
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.	d		
19) Methylene Chloride	8.49	84	16575	1.982	ng		99
20) 3-Chloro-1-propene (Al...	8.66	41	910	N.D.			
21) Trichlorotrifluoroethane	8.91	151	5232	0.714	ng		98
22) Carbon Disulfide	8.76	76	163435	5.470	ng		99
23) trans-1,2-Dichloroethene	9.73	61	2326	0.221	ng		88
24) 1,1-Dichloroethane	9.96	63	256	N.D.			
25) Methyl tert-Butyl Ether	10.10	73	125	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D.	d		
27) 2-Butanone (MEK)	10.50	72	1701	0.339	ng	#	49
28) cis-1,2-Dichloroethene	10.96	61	562	N.D.			
29) Diisopropyl Ether	0.00	87	0	N.D.	d		
30) Ethyl Acetate	0.00	61	0	N.D.	d		
31) n-Hexane	0.00	57	0	N.D.	d		
32) Chloroform	11.29	83	69724	4.990	ng		99
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.	d		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	0.00	62	0	N.D.			
38) 1,1,1-Trichloroethane	12.36	97	168539	12.513	ng		100
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D.	d		
41) Benzene	12.83	78	5596	0.169	ng		97
42) Carbon Tetrachloride	12.99	117	805	N.D.			
43) Cyclohexane	13.12	84	12064	0.967	ng		91
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	13.86	83	5171	0.473	ng		100
47) Trichloroethene	13.91	130	210566	19.621	ng		99
48) 1,4-Dioxane	0.00	88	0	N.D.	d		
49) 2,2,4-Trimethylpentane...	13.97	57	1557	N.D.			
50) Methyl Methacrylate	14.14	100	991	0.295	ng	#	66

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111718.D Vial: 7
Acq On : 11 Dec 2017 18:12 Operator: WA
Sample : P1706106-003 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 15:19:08 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

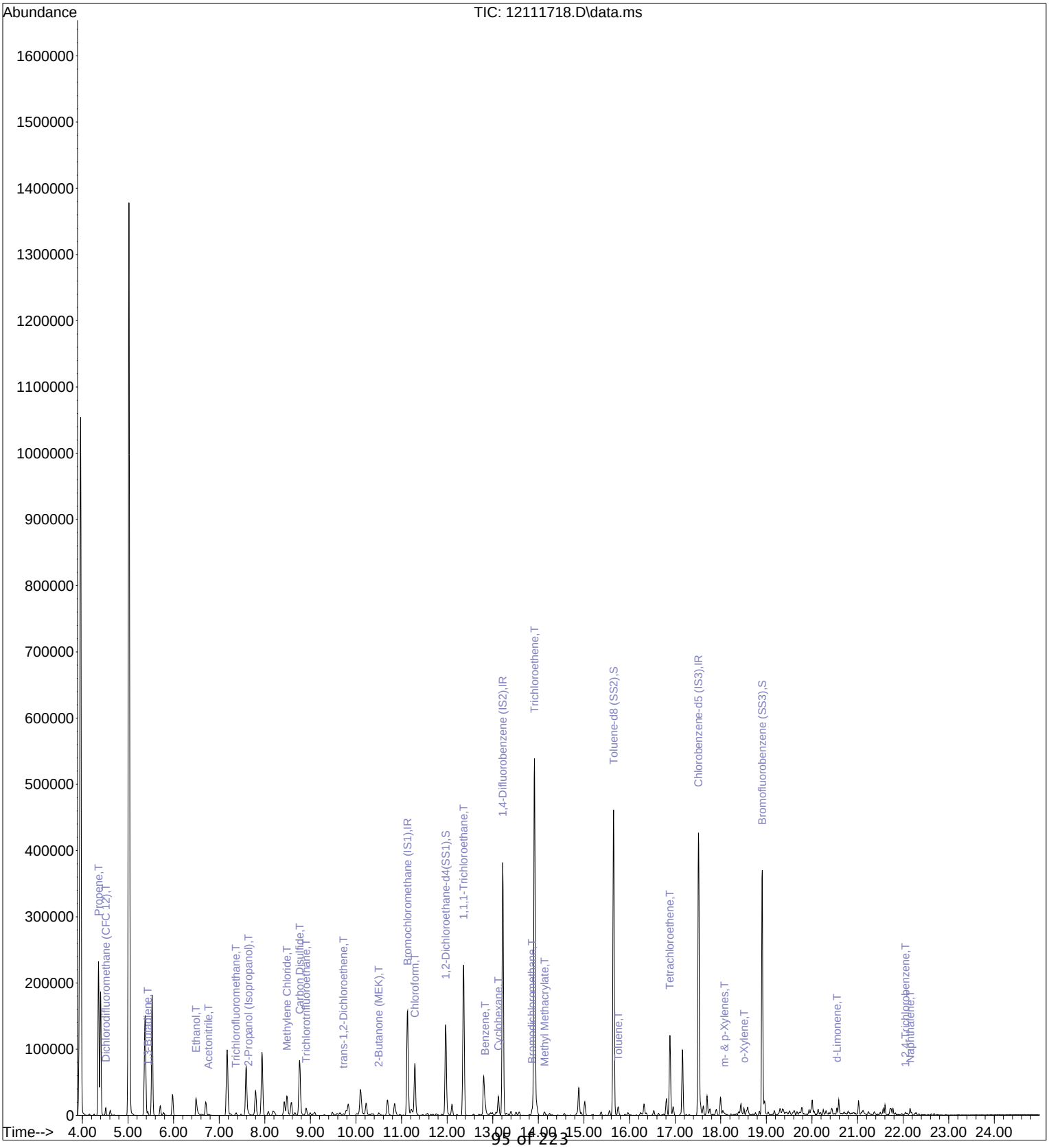
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.24	71	634	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	14.83	58	308	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.75	91	12150	0.357 ng	99
59) 2-Hexanone	16.03	43	1356	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	16.65	43	1255	N.D.	
63) n-Octane	16.75	57	453	N.D.	
64) Tetrachloroethene	16.89	166	43738	4.266 ng	98
65) Chlorobenzene	0.00	112	0	N.D. d	
66) Ethylbenzene	17.92	91	2881	N.D.	
67) m- & p-Xylenes	18.08	91	4922	0.159 ng	87
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.42	104	1088	N.D.	
70) o-Xylene	18.51	91	3521	0.113 ng	90
71) n-Nonane	18.70	43	990	N.D.	
72) 1,1,2,2-Tetrachloroethane	18.51	83	113	N.D.	
74) Cumene	19.04	105	633	N.D.	
75) alpha-Pinene	19.38	93	354	N.D.	
76) n-Propylbenzene	19.49	91	3150	N.D.	
77) 3-Ethyltoluene	19.58	105	1723	N.D.	
78) 4-Ethyltoluene	19.62	105	1098	N.D.	
79) 1,3,5-Trimethylbenzene	19.69	105	1846	N.D.	
80) alpha-Methylstyrene	20.01	118	131	N.D.	
81) 2-Ethyltoluene	19.85	105	1633	N.D.	
82) 1,2,4-Trimethylbenzene	20.05	105	2796	N.D.	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.17	91	1085	N.D.	
85) 1,3-Dichlorobenzene	20.18	146	378	N.D.	
86) 1,4-Dichlorobenzene	20.24	146	1486	N.D.	
87) sec-Butylbenzene	20.28	105	461	N.D.	
88) 4-Isopropyltoluene (p-...	20.42	119	1378	N.D.	
89) 1,2,3-Trimethylbenzene	20.42	105	1102	N.D.	
90) 1,2-Dichlorobenzene	20.55	146	903	N.D.	
91) d-Limonene	20.55	68	1937	0.147 ng	79
92) 1,2-Dibromo-3-Chloropr...	20.93	157	127	N.D.	
93) n-Undecane	21.24	57	846	N.D.	
94) 1,2,4-Trichlorobenzene	22.05	180	1504	0.101 ng	98
95) Naphthalene	22.16	128	7303	0.161 ng	96
96) n-Dodecane	22.15	57	964	N.D.	
97) Hexachlorobutadiene	22.47	225	195	N.D.	
98) Cyclohexanone	18.22	55	1005	N.D.	
99) tert-Butylbenzene	20.04	119	470	N.D.	
100) n-Butylbenzene	20.79	91	2144	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111718.D Vial: 7
Acq On : 11 Dec 2017 18:12 Operator: WA
Sample : P1706106-003 (400mL) Inst : MS13
Misc : S31-12011701

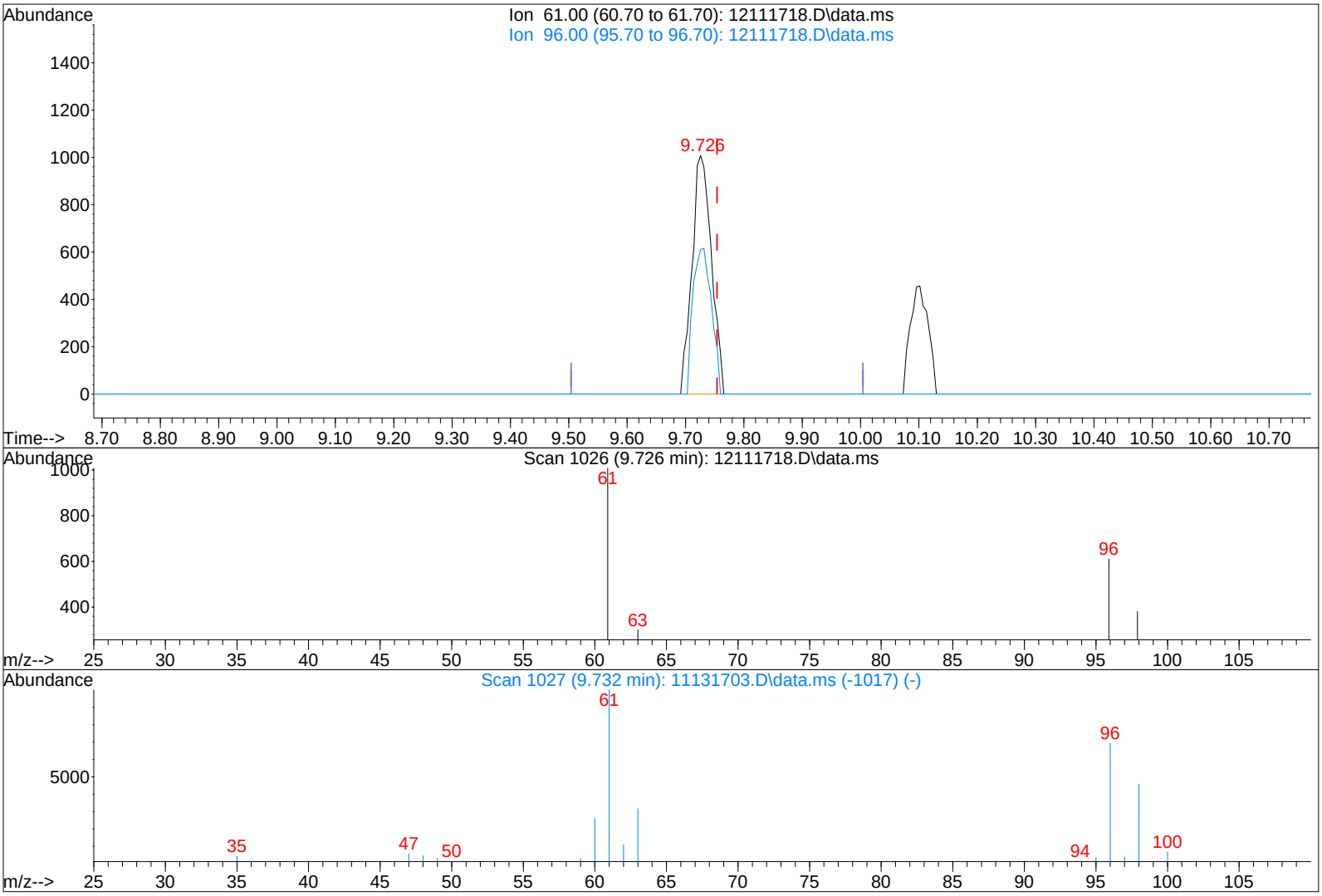
Quant Time: Dec 12 15:19:08 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111718.D Vial: 7
Acq On : 11 Dec 2017 18:12 Operator: WA
Sample : P1706106-003 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:06 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111718.D\data.ms

(23) trans-1,2-Dichloroethene (T)

9.726min (-0.028) 0.22ng

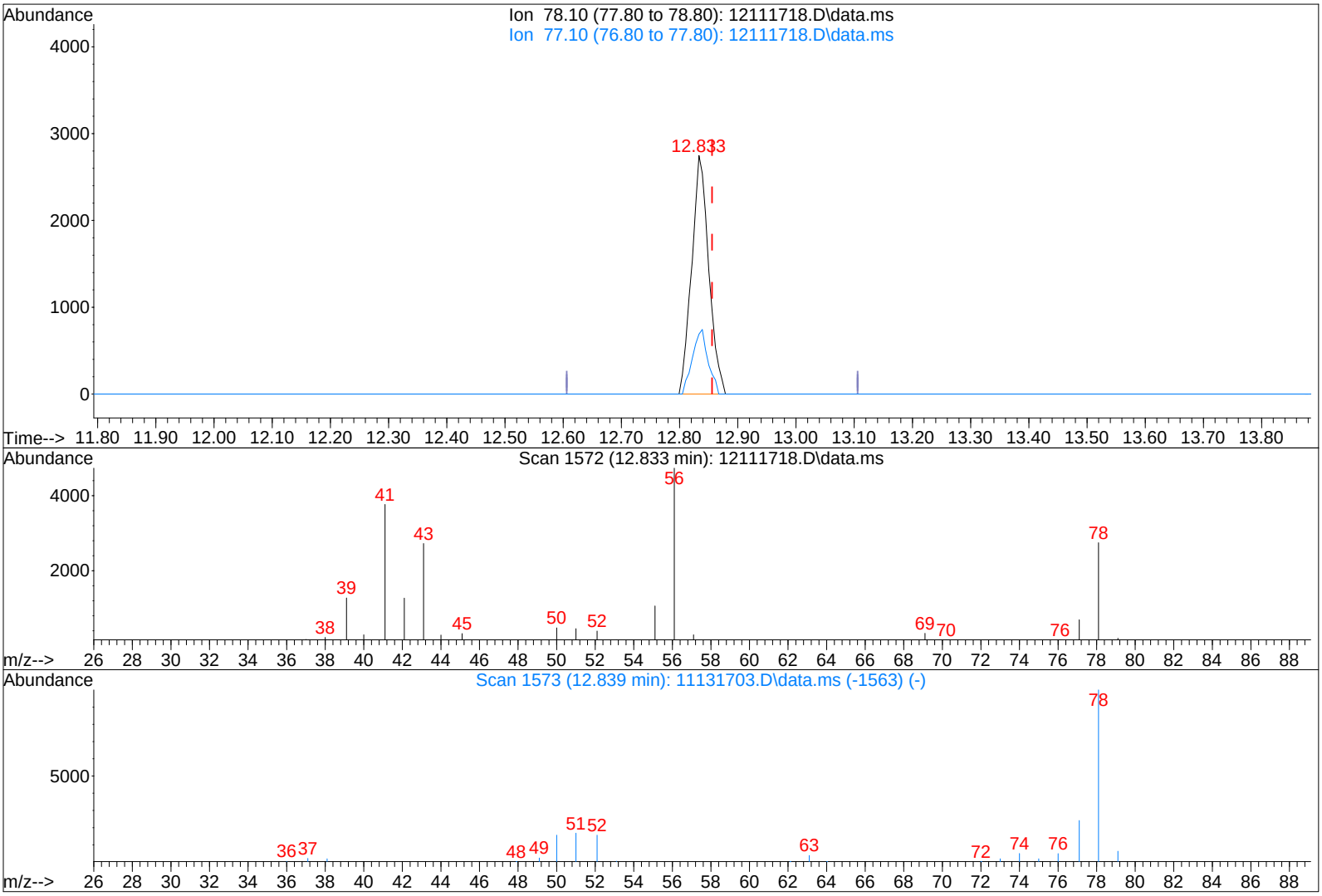
response 2326

Ion	Exp%	Act%
61.00	100	100
96.00	68.00	58.21
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111718.D Vial: 7
Acq On : 11 Dec 2017 18:12 Operator: WA
Sample : P1706106-003 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:06 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111718.D\data.ms

(41) Benzene (T)

12.833min (-0.023) 0.17ng

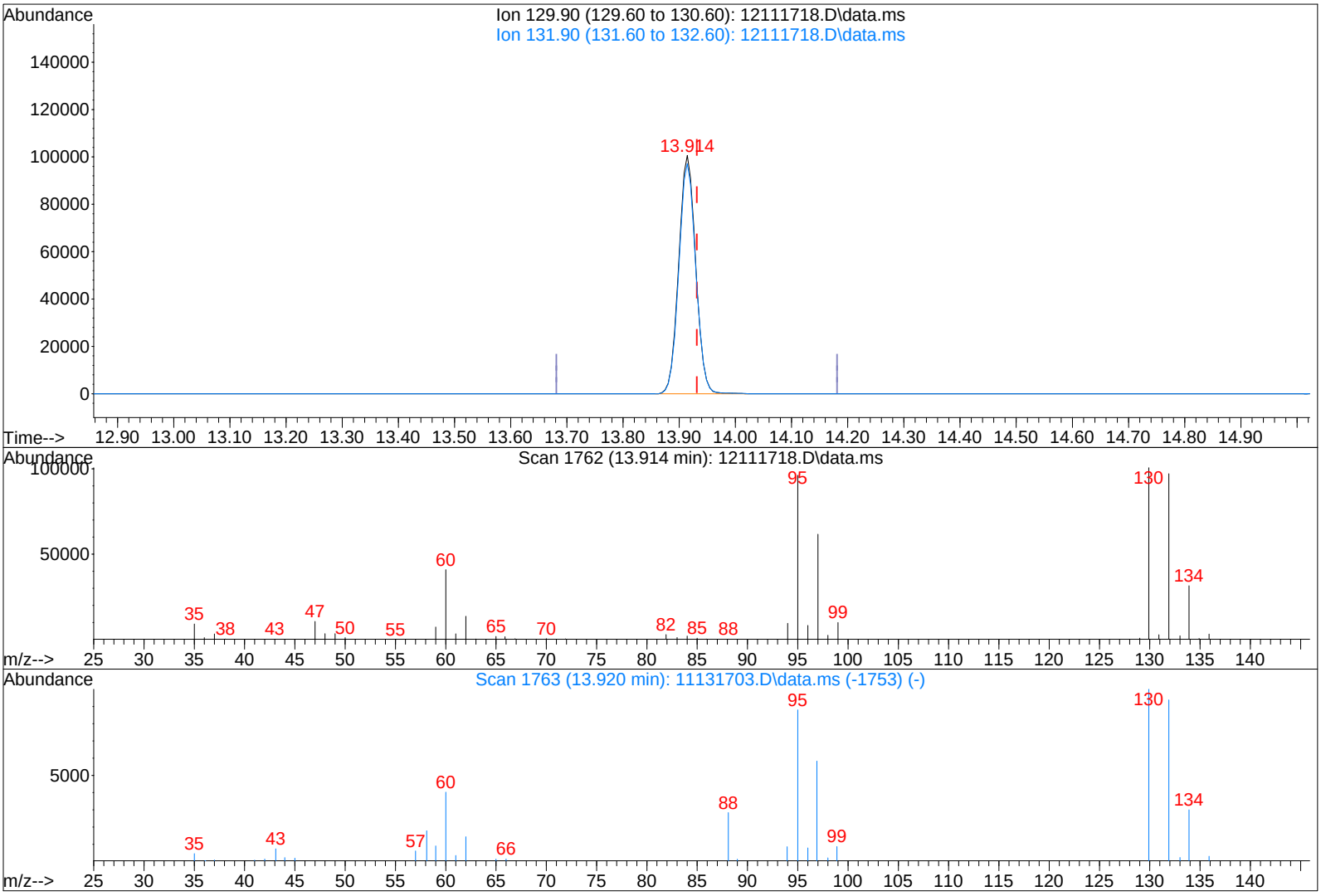
response 5596

Ion	Exp%	Act%
78.10	100	100
77.10	23.50	24.80
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111718.D Vial: 7
Acq On : 11 Dec 2017 18:12 Operator: WA
Sample : P1706106-003 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:06 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111718.D\data.ms

(47) Trichloroethene (T)

13.914min (-0.017) 19.62ng

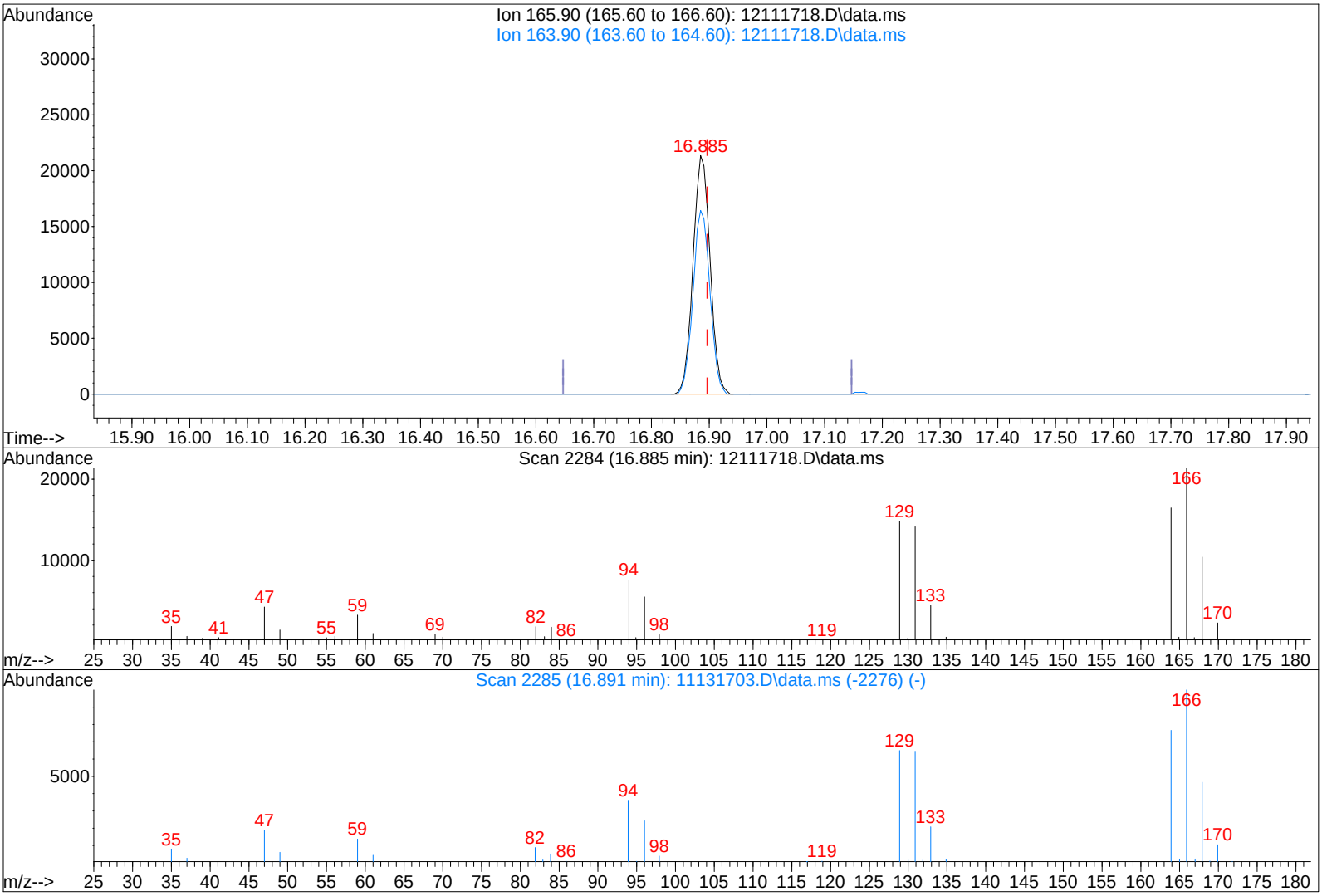
response 210566

Ion	Exp%	Act%
129.90	100	100
131.90	95.90	96.50
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111718.D Vial: 7
Acq On : 11 Dec 2017 18:12 Operator: WA
Sample : P1706106-003 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:06 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111718.D\data.ms

(64) Tetrachloroethene (T)

16.885min (-0.012) 4.27ng

response 43738

Ion	Exp%	Act%
165.90	100	100
163.90	78.30	76.98
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111719.D Vial: 8
Acq On : 11 Dec 2017 18:46 Operator: WA
Sample : P1706106-004 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:30:06 2017
Quant Method : I:\MS13\METHODS\R13110617.M RS 12/13/17
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017 WA 12/13/17
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.14	130	72108	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.23	114	358495	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	151470	12.500	ng		-0.01
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	111482	11.996	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.00%				
57) Toluene-d8 (SS2)	15.65	98	369864	12.294	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.32%				
73) Bromofluorobenzene (SS3)	18.91	174	123157	11.981	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.84%				
Target Compounds							Qvalue
2) Propene	4.40	42	4564928m	455.347	ng		
3) Dichlorodifluoromethan...	4.56	85	10662	0.655	ng		99
4) Chloromethane	4.82	50	1207	0.103	ng		83
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	0.00	54	0	N.D.	d		
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.49	45	59239	10.449	ng		99
11) Acetonitrile	0.00	41	0	N.D.	d		
12) Acrolein	0.00	56	0	N.D.	d		
13) Acetone	7.14	58	24180	4.125	ng	#	85
14) Trichlorofluoromethane	7.41	101	4739	0.324	ng		98
15) 2-Propanol (Isopropanol)	0.00	45	0	N.D.	d		
16) Acrylonitrile	0.00	53	0	N.D.	d		
17) 1,1-Dichloroethene	8.33	96	394	N.D.			
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.	d		
19) Methylene Chloride	8.51	84	22720	2.690	ng		97
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.	d		
21) Trichlorotrifluoroethane	8.93	151	36267	4.899	ng		98
22) Carbon Disulfide	8.80	76	31223	1.034	ng		97
23) trans-1,2-Dichloroethene	9.75	61	377	N.D.			
24) 1,1-Dichloroethane	9.98	63	959	N.D.			
25) Methyl tert-Butyl Ether	10.11	73	179	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D.	d		
27) 2-Butanone (MEK)	10.49	72	3857	0.761	ng		92
28) cis-1,2-Dichloroethene	10.97	61	2871	0.265	ng		98
29) Diisopropyl Ether	0.00	87	0	N.D.	d		
30) Ethyl Acetate	0.00	61	0	N.D.	d		
31) n-Hexane	11.26	57	61390	4.598	ng	#	77
32) Chloroform	11.30	83	158862	11.254	ng		99
34) Tetrahydrofuran (THF)	11.73	72	9701	1.684	ng	#	50
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	12.12	62	119	N.D.			
38) 1,1,1-Trichloroethane	12.37	97	219827	16.286	ng		99
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D.	d		
41) Benzene	12.84	78	13816	0.416	ng		93
42) Carbon Tetrachloride	12.99	117	769	N.D.			
43) Cyclohexane	13.13	84	170878	13.666	ng		95
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	13.52	63	255	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.	d		
47) Trichloroethene	13.92	130	416728	38.750	ng		99
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.	d		
50) Methyl Methacrylate	14.14	100	878	0.261	ng	#	1

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111719.D Vial: 8
Acq On : 11 Dec 2017 18:46 Operator: WA
Sample : P1706106-004 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:30:06 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

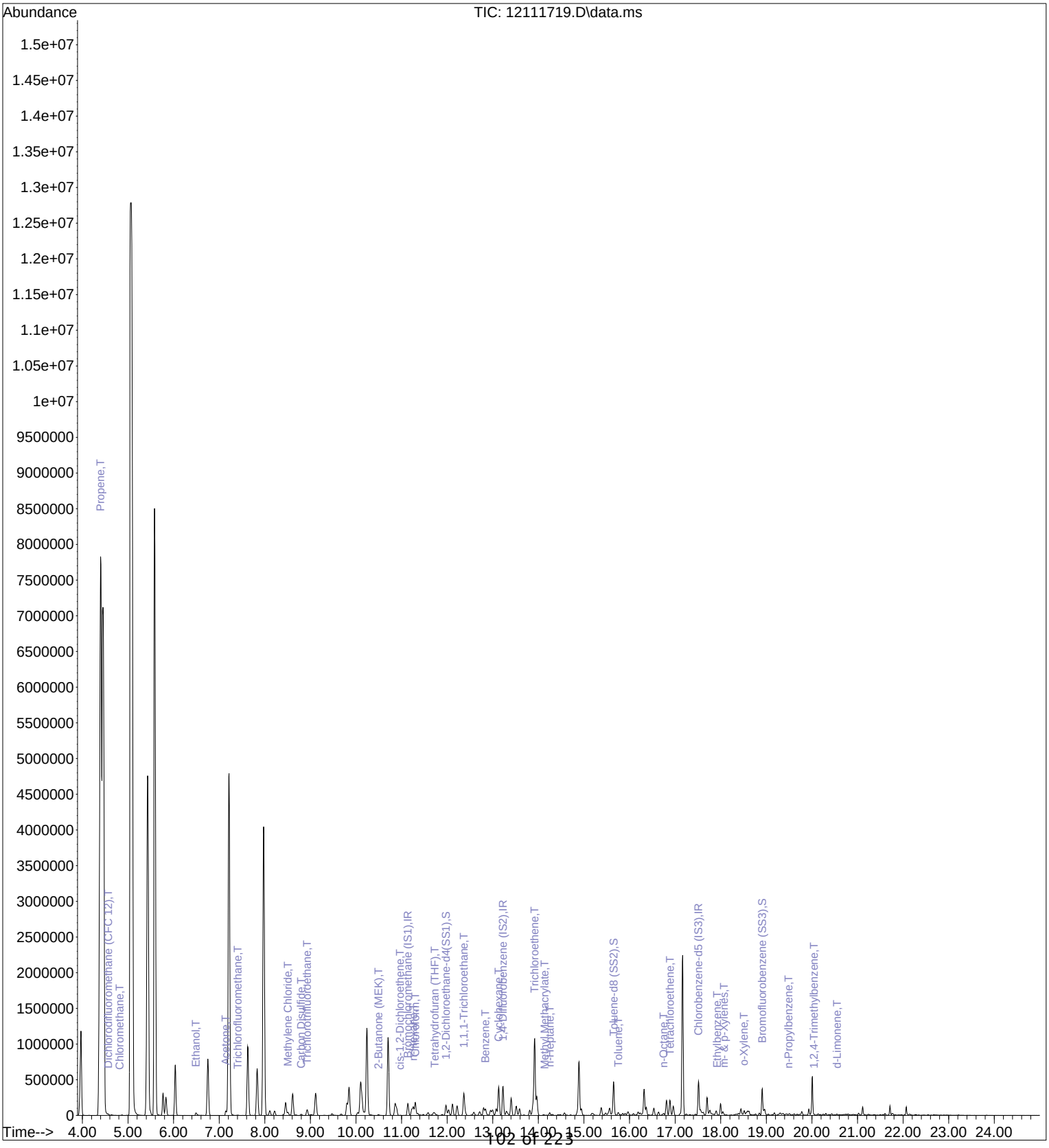
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.25	71	9771	1.216 ng	97
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D. d	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	15.47	97	165	N.D.	
58) Toluene	15.75	91	27563	0.807 ng	97
59) 2-Hexanone	0.00	43	0	N.D. d	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	0.00	43	0	N.D. d	
63) n-Octane	16.75	57	5714	0.805 ng	94
64) Tetrachloroethene	16.89	166	62481	6.077 ng	99
65) Chlorobenzene	0.00	112	0	N.D. d	
66) Ethylbenzene	17.92	91	4057	0.103 ng	91
67) m- & p-Xylenes	18.07	91	7749	0.250 ng	95
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.41	104	1543	N.D.	
70) o-Xylene	18.51	91	5655	0.181 ng	94
71) n-Nonane	18.71	43	1497	N.D.	
72) 1,1,2,2-Tetrachloroethane	18.52	83	942	N.D.	
74) Cumene	19.03	105	983	N.D.	
75) alpha-Pinene	19.38	93	173	N.D.	
76) n-Propylbenzene	19.49	91	7154	0.153 ng	95
77) 3-Ethyltoluene	19.58	105	2198	N.D.	
78) 4-Ethyltoluene	19.62	105	1230	N.D.	
79) 1,3,5-Trimethylbenzene	19.69	105	1232	N.D.	
80) alpha-Methylstyrene	19.82	118	201	N.D.	
81) 2-Ethyltoluene	19.85	105	1762	N.D.	
82) 1,2,4-Trimethylbenzene	20.04	105	4031	0.119 ng	82
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.17	91	662	N.D.	
85) 1,3-Dichlorobenzene	20.19	146	112	N.D.	
86) 1,4-Dichlorobenzene	20.24	146	1296	N.D.	
87) sec-Butylbenzene	20.29	105	618	N.D.	
88) 4-Isopropyltoluene (p-...	20.43	119	824	N.D.	
89) 1,2,3-Trimethylbenzene	20.43	105	2588	N.D.	
90) 1,2-Dichlorobenzene	20.54	146	870	N.D.	
91) d-Limonene	20.55	68	2377	0.180 ng	78
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.24	57	1636	N.D.	
94) 1,2,4-Trichlorobenzene	22.05	180	370	N.D.	
95) Naphthalene	22.16	128	2882	N.D.	
96) n-Dodecane	0.00	57	0	N.D. d	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D. d	
99) tert-Butylbenzene	0.00	119	0	N.D. d	
100) n-Butylbenzene	0.00	91	0	N.D. d	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111719.D Vial: 8
Acq On : 11 Dec 2017 18:46 Operator: WA
Sample : P1706106-004 (400mL) Inst : MS13
Misc : S31-12011701

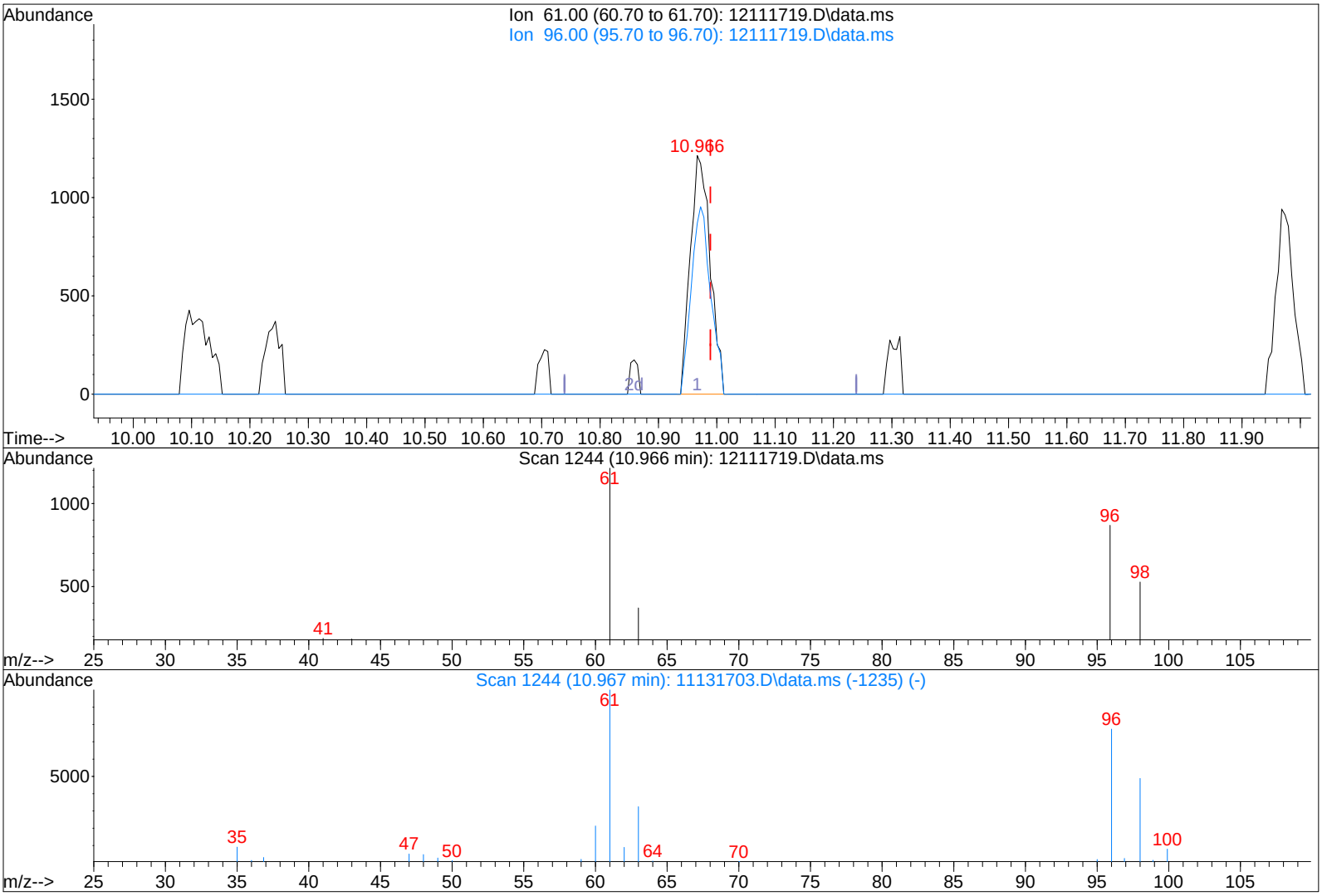
Quant Time: Dec 13 09:30:06 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111719.D Vial: 8
Acq On : 11 Dec 2017 18:46 Operator: WA
Sample : P1706106-004 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:08 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111719.D\data.ms

(28) cis-1,2-Dichloroethene (T)

10.966min (-0.023) 0.26ng

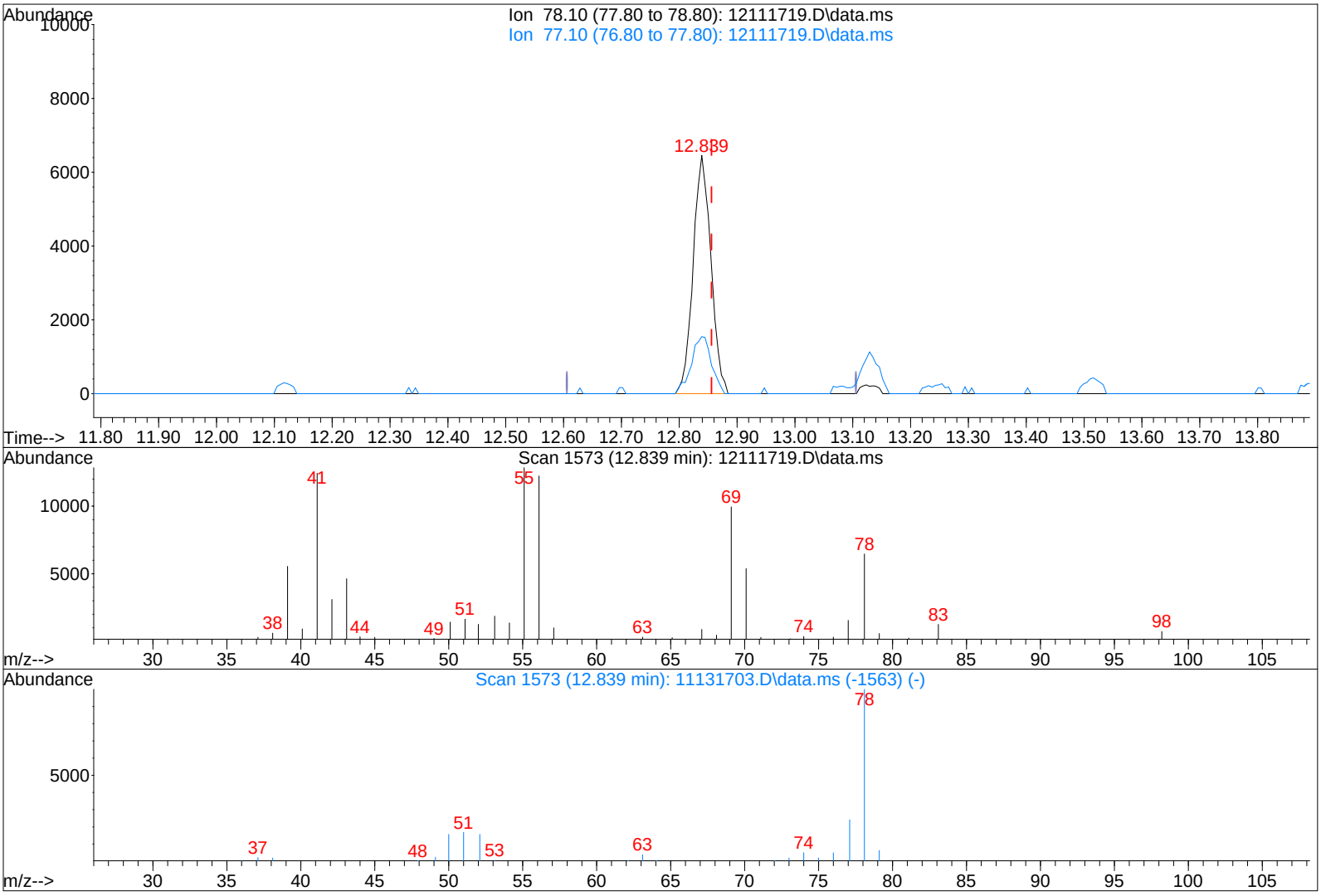
response 2871

Ion	Exp%	Act%
61.00	100	100
96.00	74.60	76.38
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111719.D Vial: 8
Acq On : 11 Dec 2017 18:46 Operator: WA
Sample : P1706106-004 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:08 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111719.D\data.ms

(41) Benzene (T)

12.839min (-0.017) 0.42ng

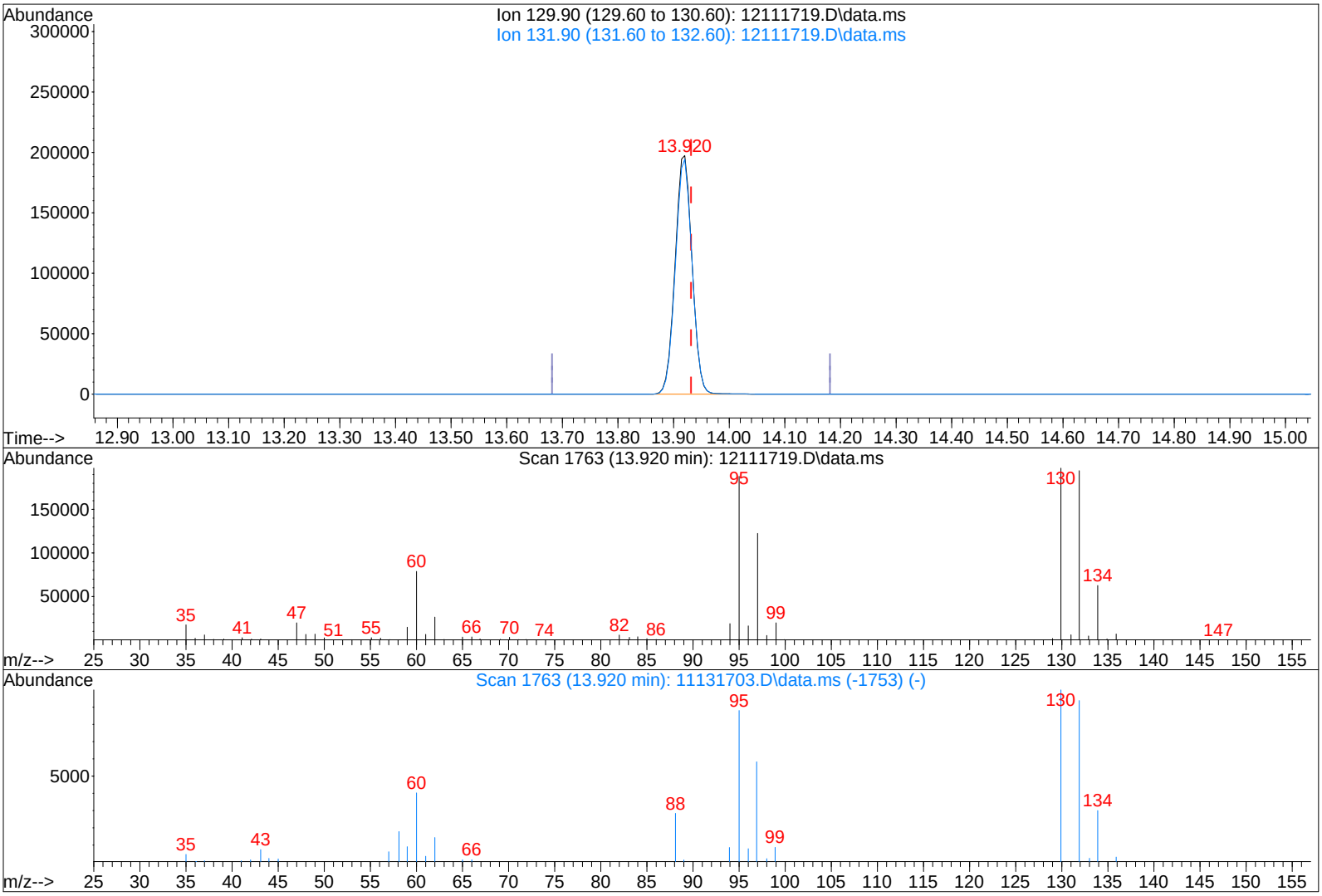
response 13816

Ion	Exp%	Act%
78.10	100	100
77.10	23.50	27.12
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111719.D Vial: 8
Acq On : 11 Dec 2017 18:46 Operator: WA
Sample : P1706106-004 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:08 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111719.D\data.ms

(47) Trichloroethene (T)

13.920min (-0.011) 38.75ng

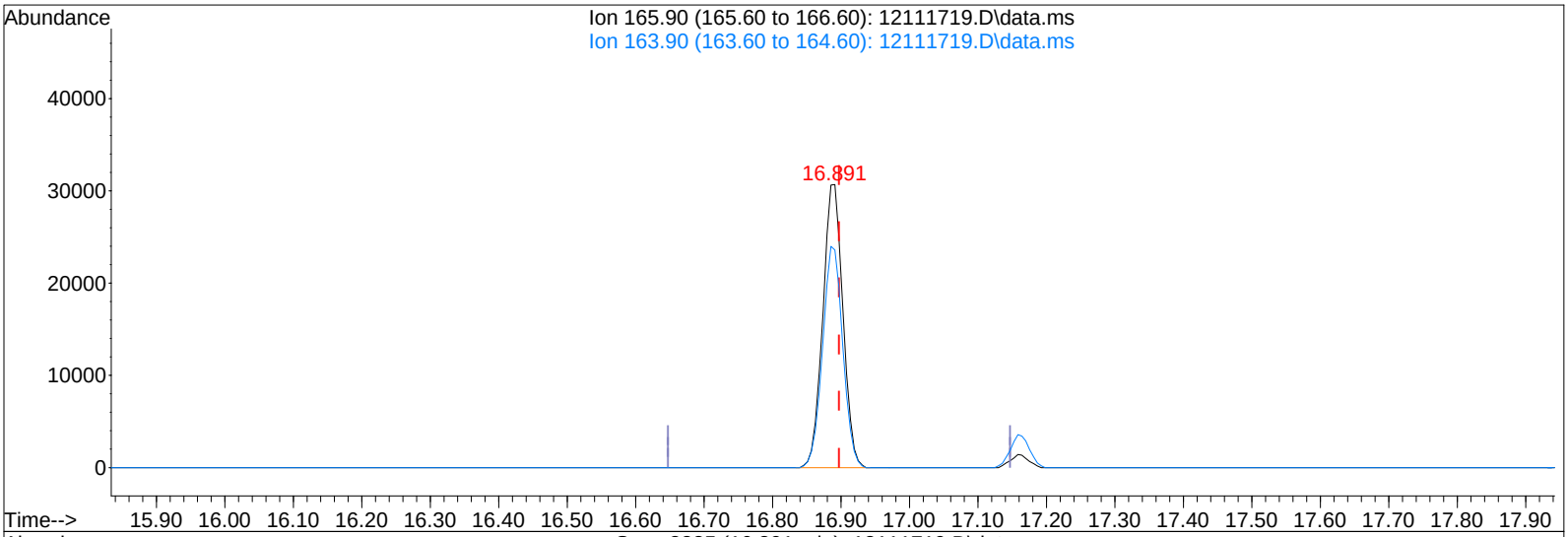
response 416728

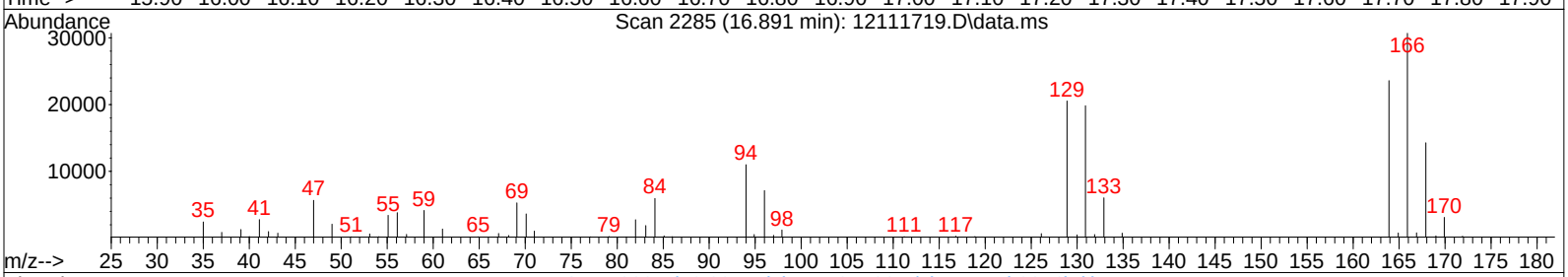
Ion	Exp%	Act%
129.90	100	100
131.90	95.90	97.13
0.00	0.00	0.00
0.00	0.00	0.00

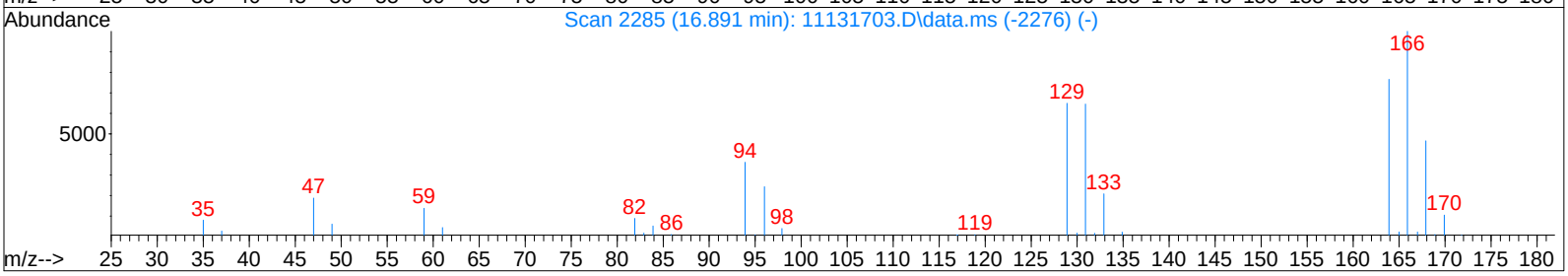
Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111719.D Vial: 8
Acq On : 11 Dec 2017 18:46 Operator: WA
Sample : P1706106-004 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:08 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 12111719.D\data.ms

(64) Tetrachloroethene (T)

16.891min (-0.006) 6.08ng

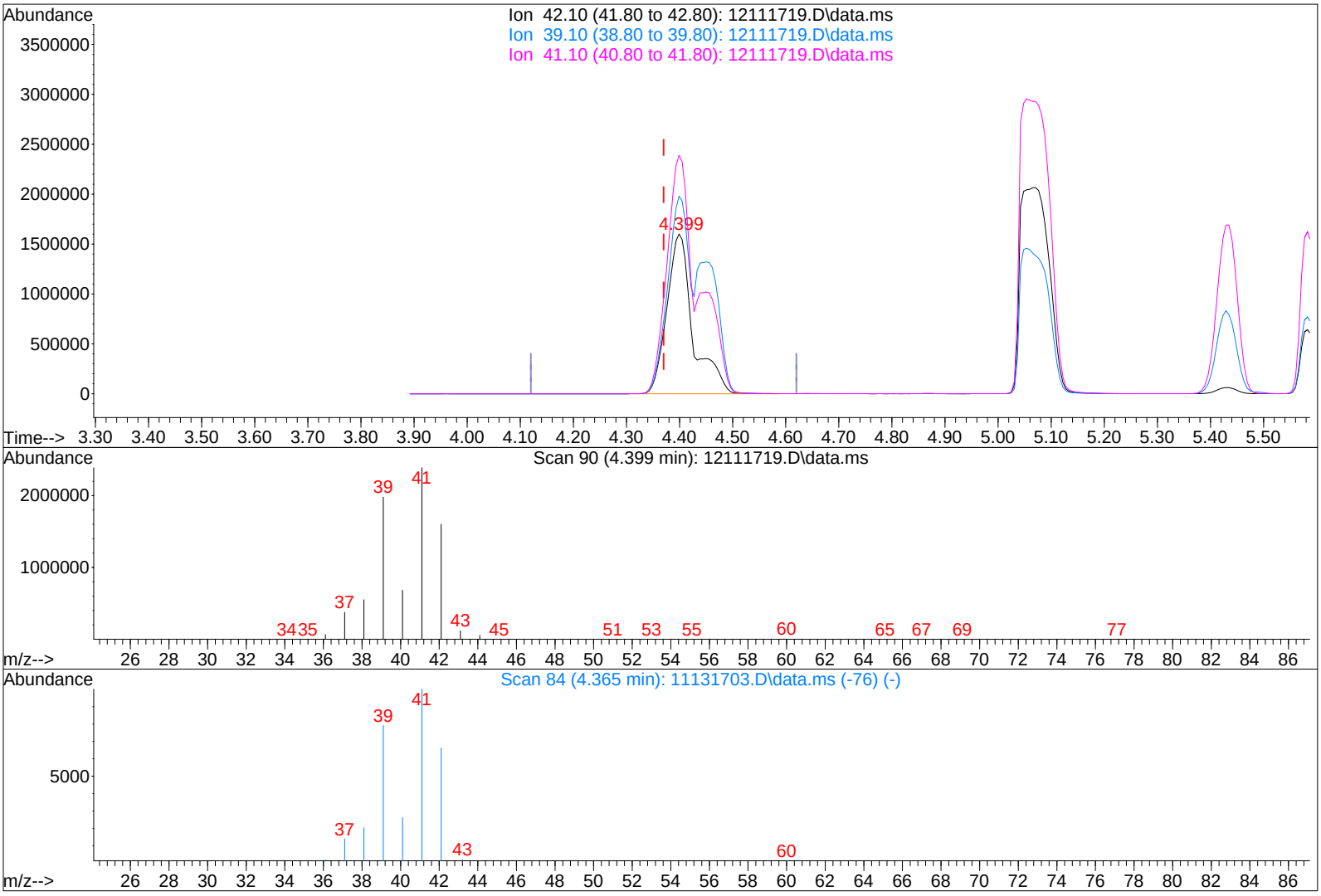
response 62481

Ion	Exp%	Act%
165.90	100	100
163.90	78.30	78.77
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111719.D Vial: 8
Acq On : 11 Dec 2017 18:46 Operator: WA
Sample : P1706106-004 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:08 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111719.D\data.ms

(2) Propene (T)

4.399min (+0.028) 544.27ng

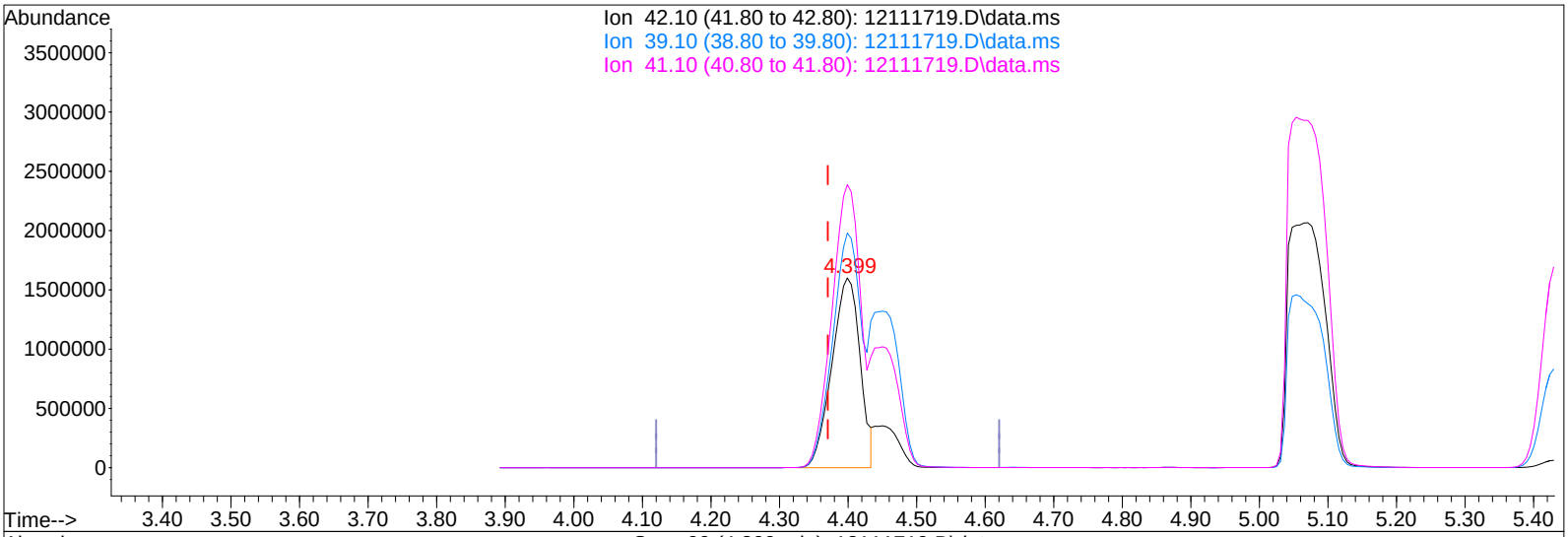
response 5456392

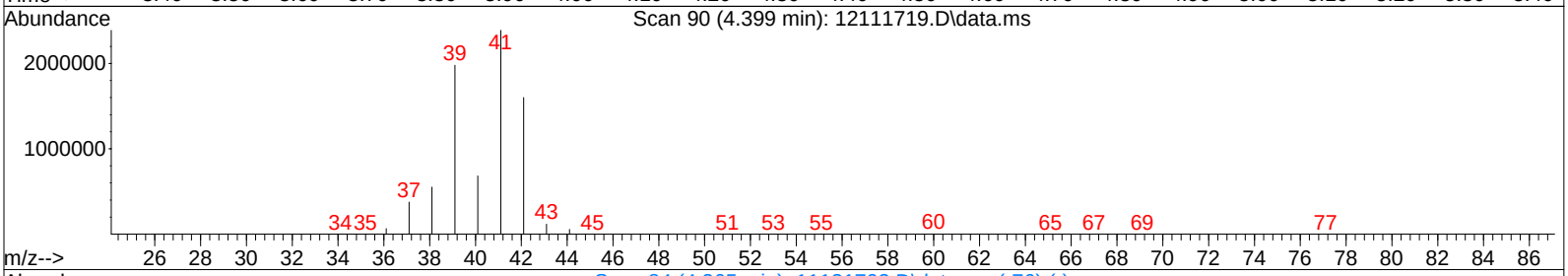
Ion	Exp%	Act%
42.10	100	100
39.10	114.80	105.26
41.10	151.20	131.83
0.00	0.00	0.00

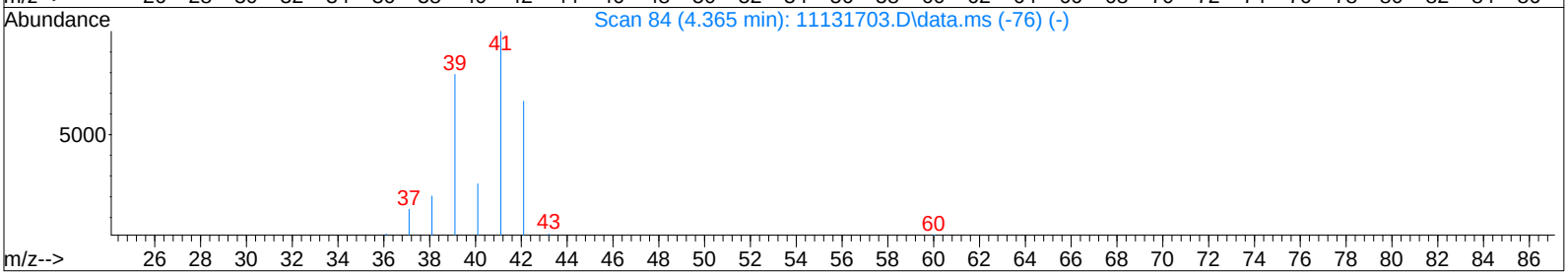
Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111719.D Vial: 8
Acq On : 11 Dec 2017 18:46 Operator: WA
Sample : P1706106-004 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:08 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 12111719.D\data.ms

(2) Propene (T)

4.399min (+0.028) 455.35ng m

response 4564928

Ion	Exp%	Act%
42.10	100	100
39.10	114.80	125.82
41.10	151.20	157.57
0.00	0.00	0.00

IPC

RS 12/13/17 12/13/17

LH 12/15/17

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111720.D Vial: 9
Acq On : 11 Dec 2017 19:19 Operator: WA
Sample : P1706106-005 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:33:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

RS 12/13/17
12/13/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	70069	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.22	114	352588	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	148035	12.500	ng		-0.01
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	108620	12.028	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.24%				
57) Toluene-d8 (SS2)	15.65	98	366485	12.464	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.68%				
73) Bromofluorobenzene (SS3)	18.91	174	120177	11.963	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.68%				
Target Compounds							Qvalue
2) Propene	4.37	42	209670	21.523	ng		99
3) Dichlorodifluoromethan...	4.52	85	9775	0.618	ng		98
4) Chloromethane	4.78	50	522	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.44	54	3977	0.513	ng	#	88
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.49	45	41420	7.519	ng		98
11) Acetonitrile	6.77	41	2540	0.192	ng		78
12) Acrolein	0.00	56	0	N.D.	d		
13) Acetone	7.15	58	34009	5.970	ng	#	28
14) Trichlorofluoromethane	7.37	101	4853	0.341	ng		97
15) 2-Propanol (Isopropanol)	7.63	45	11891	0.612	ng		88
16) Acrylonitrile	7.94	53	862	N.D.			
17) 1,1-Dichloroethene	8.29	96	1188	0.160	ng		97
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.	d		
19) Methylene Chloride	8.49	84	30992	3.776	ng		100
20) 3-Chloro-1-propene (Al...	8.66	41	393	N.D.			
21) Trichlorotrifluoroethane	8.91	151	6923	0.962	ng		98
22) Carbon Disulfide	8.76	76	66526	2.268	ng		99
23) trans-1,2-Dichloroethene	9.73	61	414	N.D.			
24) 1,1-Dichloroethane	9.97	63	3524	0.251	ng		90
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D.	d		
27) 2-Butanone (MEK)	10.49	72	8583	1.742	ng	#	89
28) cis-1,2-Dichloroethene	10.96	61	2430	0.231	ng		97
29) Diisopropyl Ether	0.00	87	0	N.D.	d		
30) Ethyl Acetate	11.30	61	976	0.367	ng		96
31) n-Hexane	11.25	57	25044	1.930	ng		99
32) Chloroform	11.30	83	20165	1.470	ng		99
34) Tetrahydrofuran (THF)	11.72	72	13018	2.326	ng	#	87
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	0.00	62	0	N.D.			
38) 1,1,1-Trichloroethane	12.36	97	693000	52.200	ng		99
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D.	d		
41) Benzene	12.83	78	31143	0.954	ng		99
42) Carbon Tetrachloride	12.99	117	105697	9.167	ng		100
43) Cyclohexane	13.12	84	37990	3.089	ng		95
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.	d		
47) Trichloroethene	13.91	130	1253013	118.464	ng		100
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.	d		
50) Methyl Methacrylate	0.00	100	0	N.D.	d		

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111720.D Vial: 9
Acq On : 11 Dec 2017 19:19 Operator: WA
Sample : P1706106-005 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:33:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

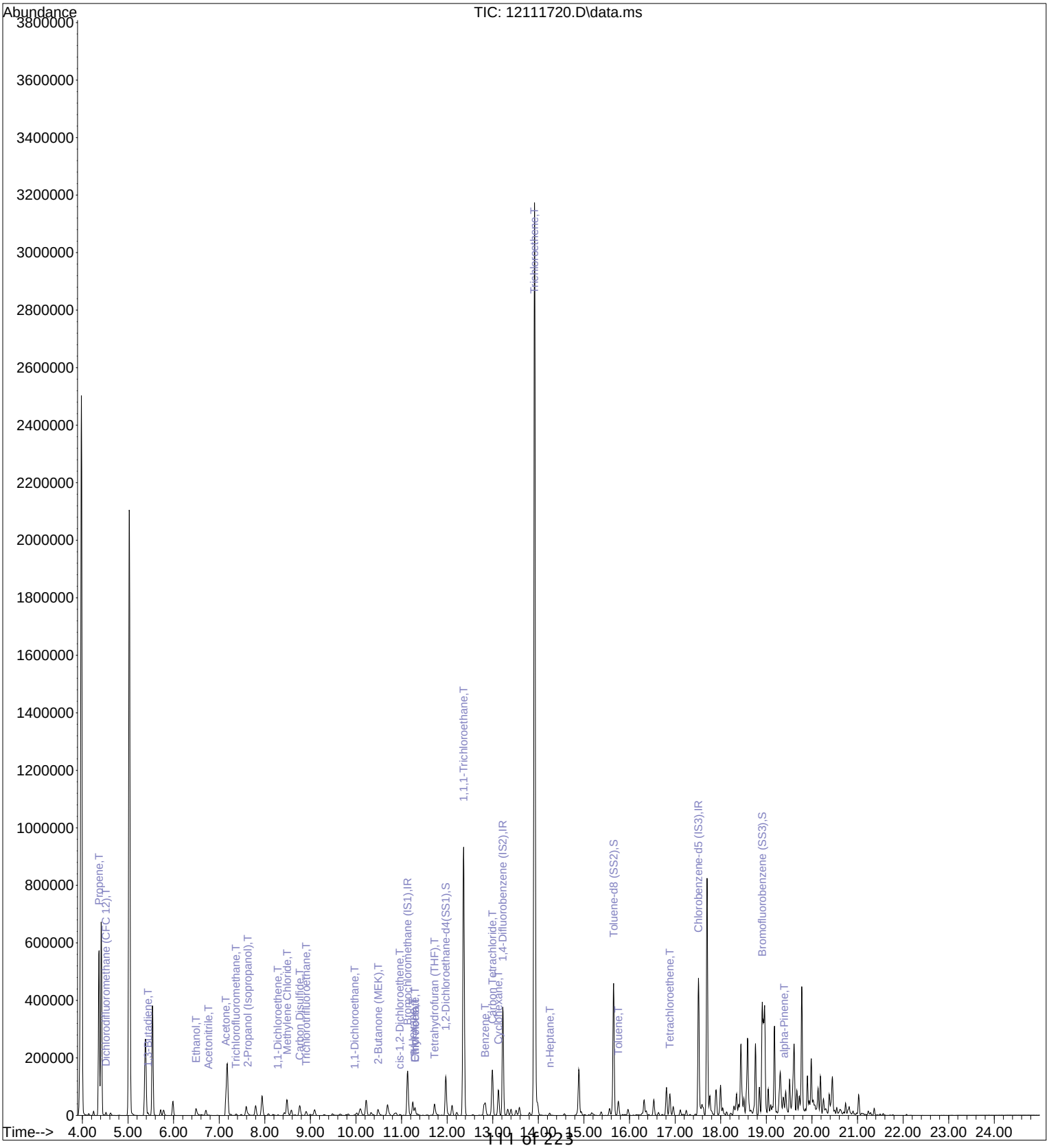
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.25	71	2158	0.273 ng	96
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	14.84	58	348	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	15.38	97	420	N.D.	
58) Toluene	15.75	91	23056	0.690 ng	100
59) 2-Hexanone	0.00	43	0	N.D. d	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	16.63	43	460	N.D.	
63) n-Octane	0.00	57	0	N.D. d	
64) Tetrachloroethene	16.89	166	16679	1.660 ng	100
65) Chlorobenzene	0.00	112	0	N.D. d	
66) Ethylbenzene	17.92	91	1342	N.D.	
67) m- & p-Xylenes	18.08	91	988	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	18.51	91	490	N.D.	
71) n-Nonane	18.73	43	1394	N.D.	
72) 1,1,2,2-Tetrachloroethane	18.51	83	833	N.D.	
74) Cumene	0.00	105	0	N.D.	
75) alpha-Pinene	19.39	93	2176	0.108 ng	70
76) n-Propylbenzene	19.51	91	1418	N.D.	
77) 3-Ethyltoluene	19.59	105	533	N.D.	
78) 4-Ethyltoluene	19.61	105	439	N.D.	
79) 1,3,5-Trimethylbenzene	19.69	105	459	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	19.86	105	175	N.D.	
82) 1,2,4-Trimethylbenzene	20.05	105	343	N.D.	
83) n-Decane	0.00	57	0	N.D. d	
84) Benzyl Chloride	20.19	91	1176	N.D.	
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	0.00	105	0	N.D.	
88) 4-Isopropyltoluene (p-...	20.43	119	215	N.D.	
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.55	68	992	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.24	57	480	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.17	128	712	N.D.	
96) n-Dodecane	22.08	57	620	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D. d	
99) tert-Butylbenzene	0.00	119	0	N.D.	
100) n-Butylbenzene	20.80	91	356	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111720.D Vial: 9
Acq On : 11 Dec 2017 19:19 Operator: WA
Sample : P1706106-005 (400mL) Inst : MS13
Misc : S31-12011701

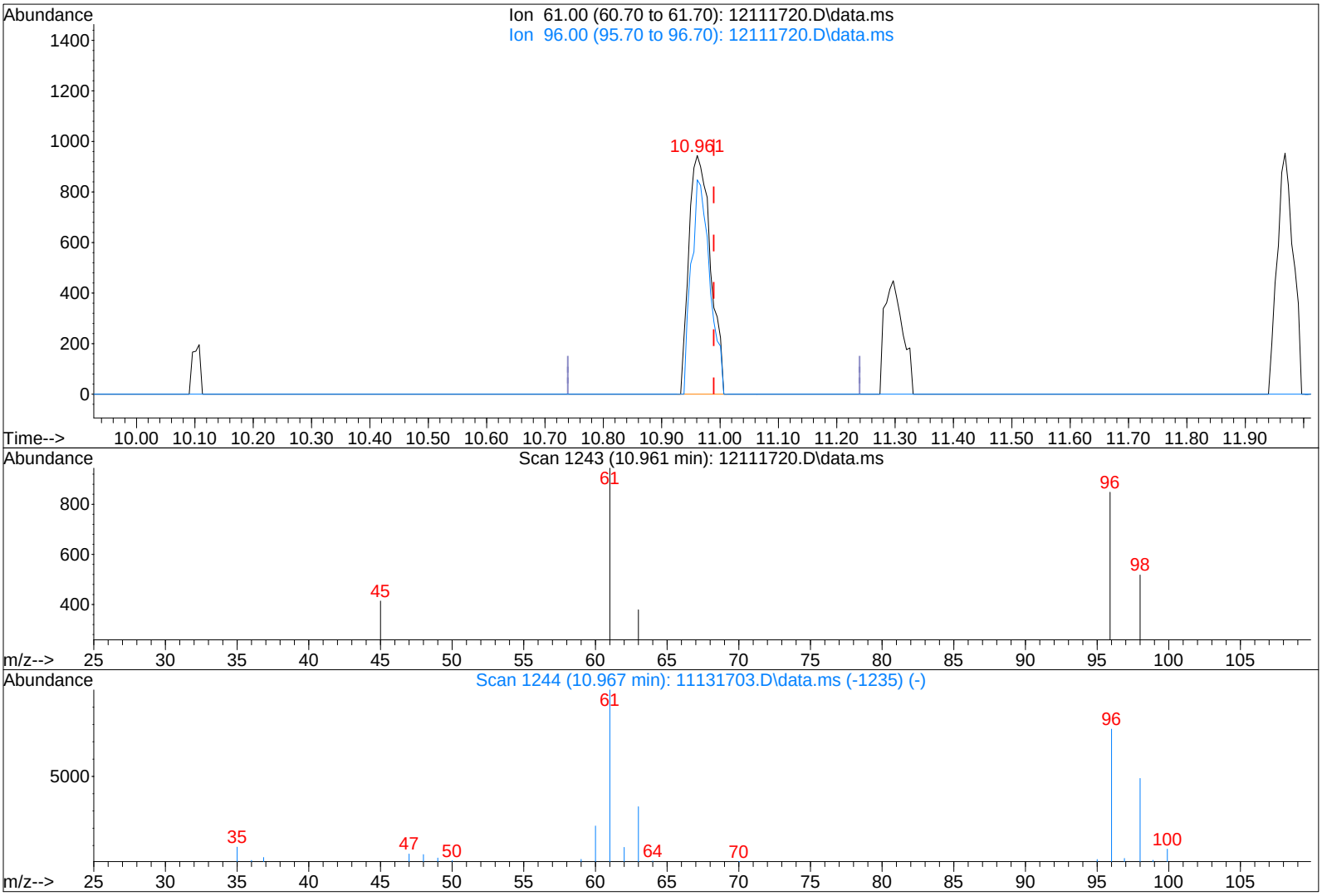
Quant Time: Dec 13 09:33:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111720.D Vial: 9
Acq On : 11 Dec 2017 19:19 Operator: WA
Sample : P1706106-005 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:33:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111720.D\data.ms

(28) cis-1,2-Dichloroethene (T)

10.961min (-0.028) 0.23ng

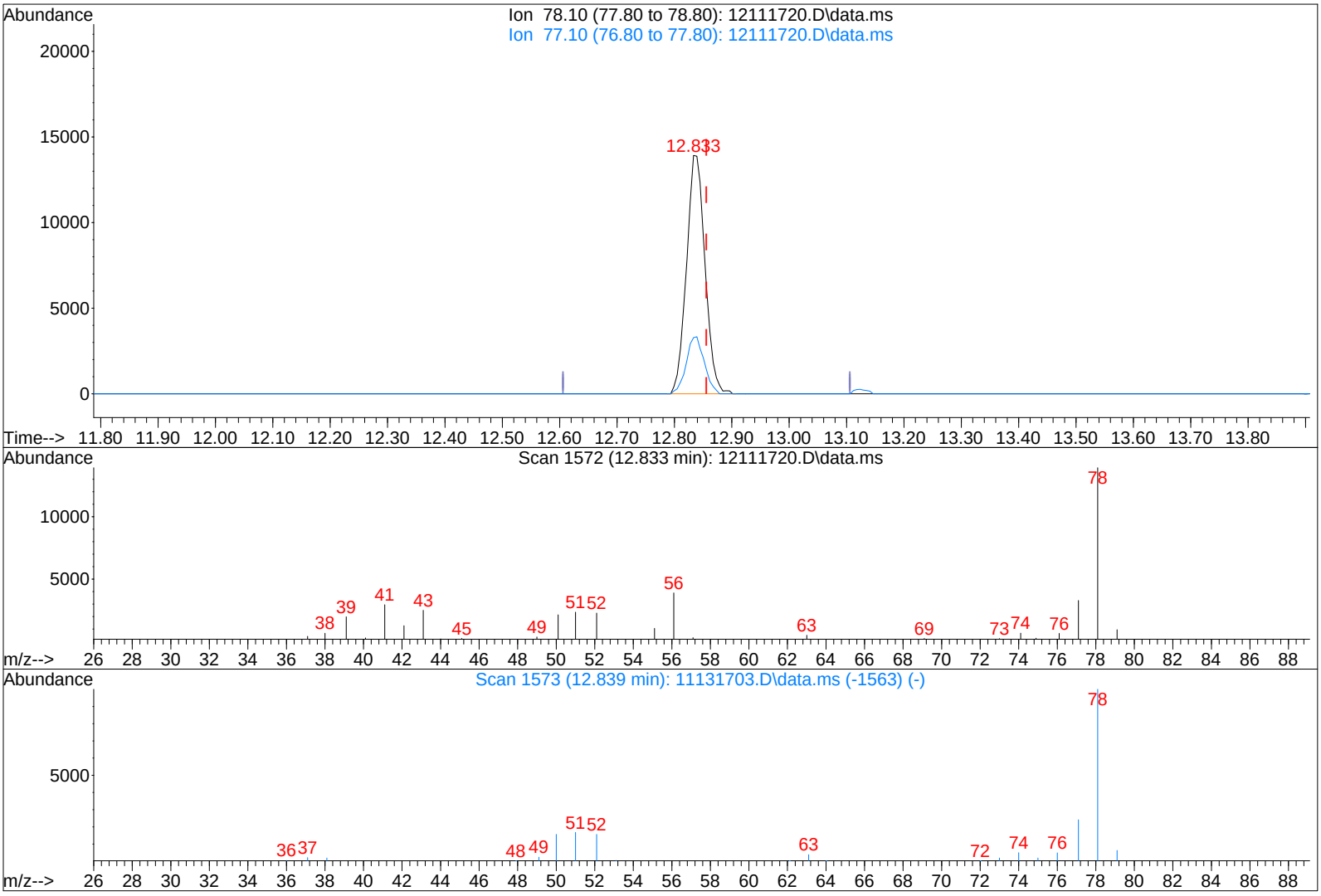
response 2430

Ion	Exp%	Act%
61.00	100	100
96.00	74.60	77.20
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111720.D Vial: 9
Acq On : 11 Dec 2017 19:19 Operator: WA
Sample : P1706106-005 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:33:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111720.D\data.ms

(41) Benzene (T)

12.833min (-0.023) 0.95ng

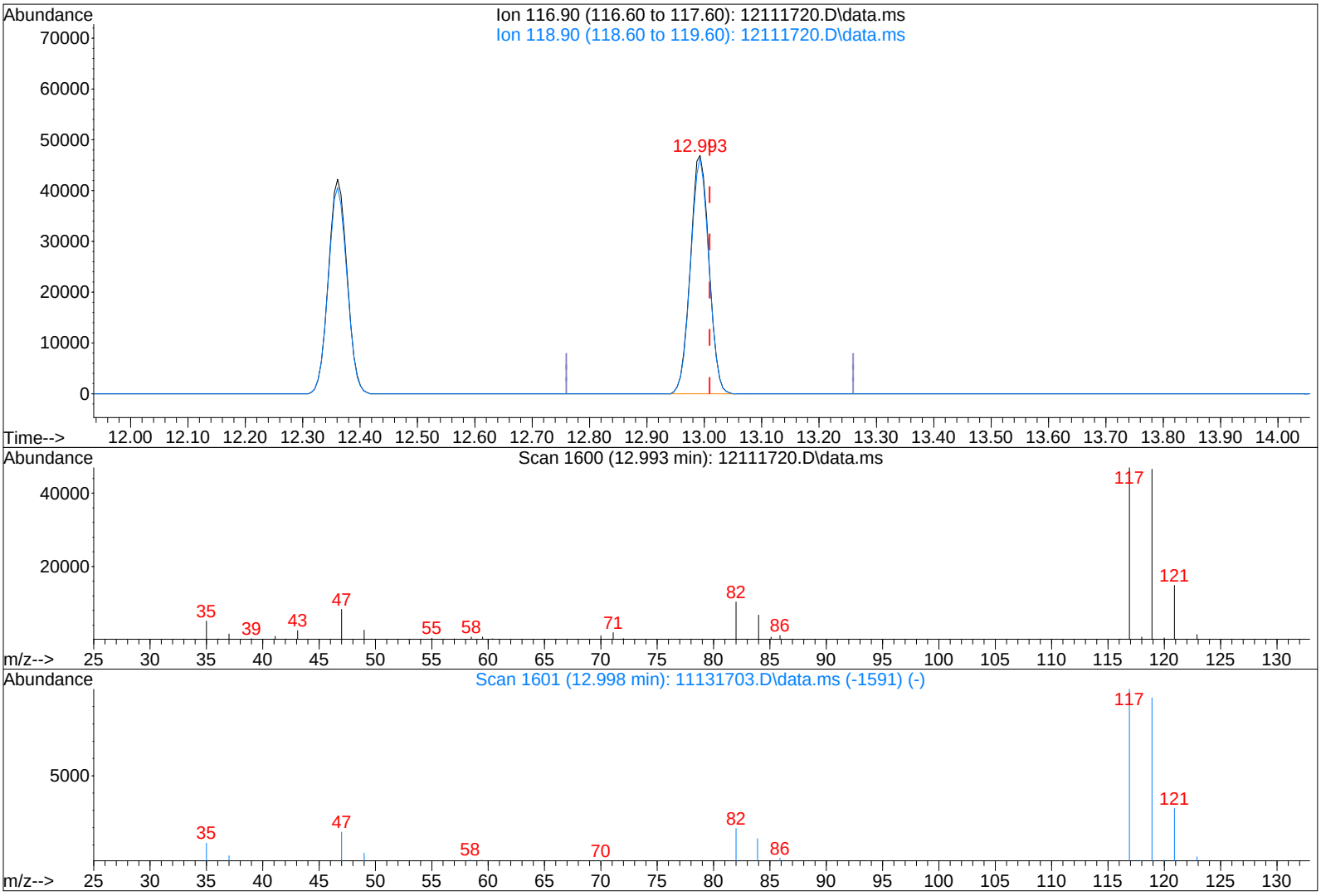
response 31143

Ion	Exp%	Act%
78.10	100	100
77.10	23.50	23.25
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111720.D Vial: 9
Acq On : 11 Dec 2017 19:19 Operator: WA
Sample : P1706106-005 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:33:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111720.D\data.ms

(42) Carbon Tetrachloride (T)

12.993min (-0.017) 9.17ng

response 105697

Ion	Exp%	Act%
116.90	100	100
118.90	96.60	96.76
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111720.D Vial: 9
Acq On : 11 Dec 2017 19:19 Operator: WA
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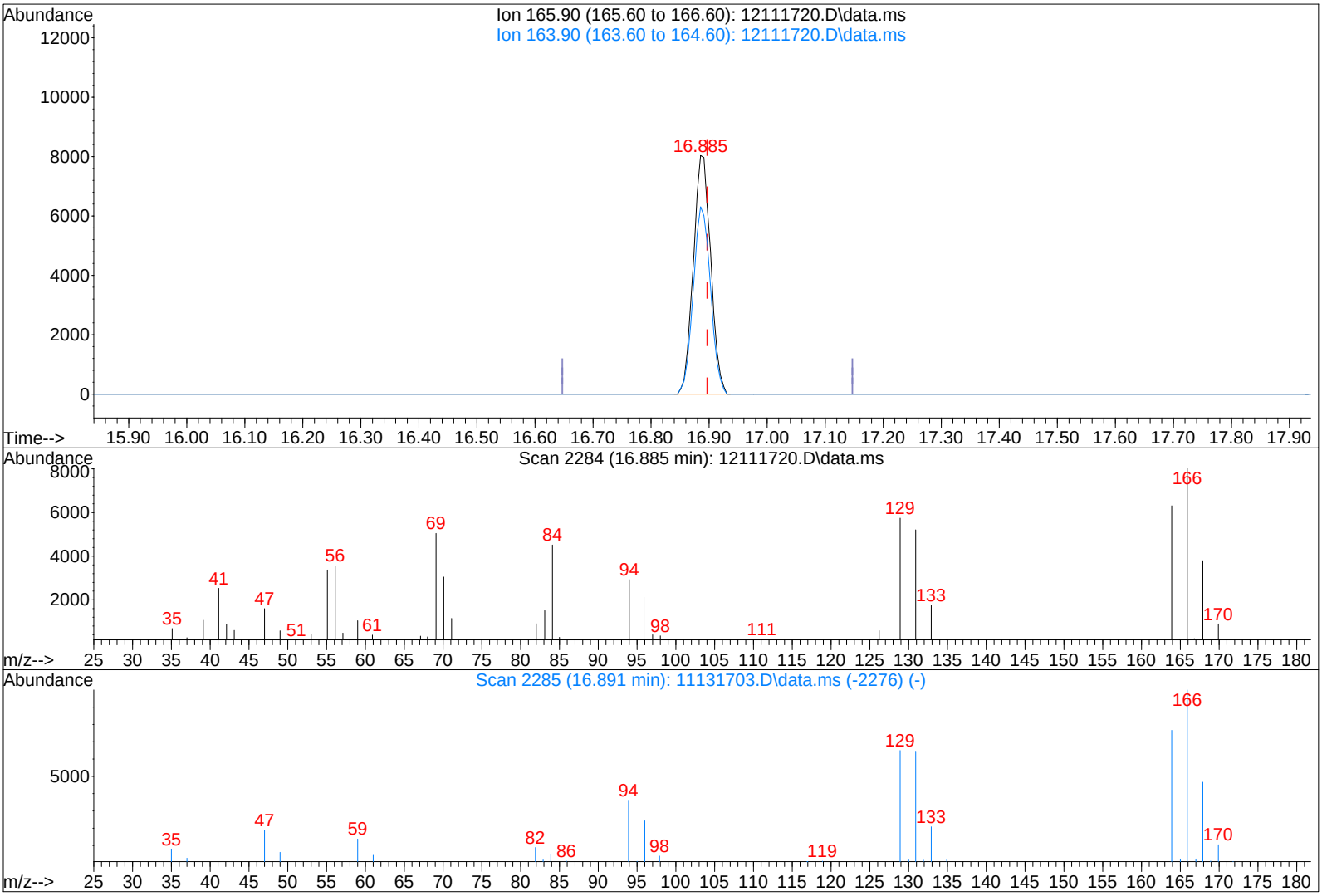


TIC: 12111720.D\data.ms

(64) Tetrachloroethene (T)

16.885min (-0.012) 1.66ng

response 16679

Ion	Exp%	Act%
165.90	100	100
163.90	78.30	78.26
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111721.D Vial: 9
Acq On : 11 Dec 2017 19:52 Operator: WA
Sample : P1706106-005dil (40mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:41:22 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

RS 12/13/17

12/13/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	74976	12.500	ng		-0.04
37) 1,4-Difluorobenzene (IS2)	13.22	114	375227	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	156919	12.500	ng		-0.01
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	114691	11.869	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.96%				
57) Toluene-d8 (SS2)	15.65	98	388616	12.469	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.76%				
73) Bromofluorobenzene (SS3)	18.91	174	128847	12.100	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.80%				
Target Compounds							Qvalue
2) Propene	4.35	42	18466m	1.772	ng		
3) Dichlorodifluoromethan...	4.51	85	867	N.D.			
4) Chloromethane	0.00	50	0	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.44	54	135	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.62	45	190	N.D.			
11) Acetonitrile	0.00	41	0	N.D.			
12) Acrolein	0.00	56	0	N.D.			
13) Acetone	7.19	58	2723	0.447	ng	#	1
14) Trichlorofluoromethane	7.37	101	202	N.D.			
15) 2-Propanol (Isopropanol)	7.74	45	223	N.D.			
16) Acrylonitrile	7.80	53	62	N.D.			
17) 1,1-Dichloroethene	0.00	96	0	N.D.			
18) 2-Methyl-2-Propanol (t...	8.58	59	53	N.D.			
19) Methylene Chloride	8.50	84	3243	0.369	ng		98
20) 3-Chloro-1-propene (Al...	8.59	41	119	N.D.			
21) Trichlorotrifluoroethane	8.92	151	481	N.D.			
22) Carbon Disulfide	8.78	76	7690	0.245	ng		92
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D.			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D.			
27) 2-Butanone (MEK)	0.00	72	0	N.D.			
28) cis-1,2-Dichloroethene	0.00	61	0	N.D.			
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	0.00	61	0	N.D.			
31) n-Hexane	11.25	57	1619	0.117	ng	#	89
32) Chloroform	11.29	83	1615	0.110	ng		97
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.	d		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	0.00	62	0	N.D.			
38) 1,1,1-Trichloroethane	12.36	97	59485	4.210	ng		100
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D.			
41) Benzene	12.83	78	2194	N.D.			
42) Carbon Tetrachloride	12.99	117	8744	0.713	ng		98
43) Cyclohexane	13.12	84	3304	0.252	ng		94
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	13.91	83	972	N.D.			
47) Trichloroethene	13.91	130	91102	8.093	ng		100
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	13.98	57	567	N.D.			
50) Methyl Methacrylate	0.00	100	0	N.D.			

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111721.D Vial: 9
Acq On : 11 Dec 2017 19:52 Operator: WA
Sample : P1706106-005dil (40mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:41:22 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

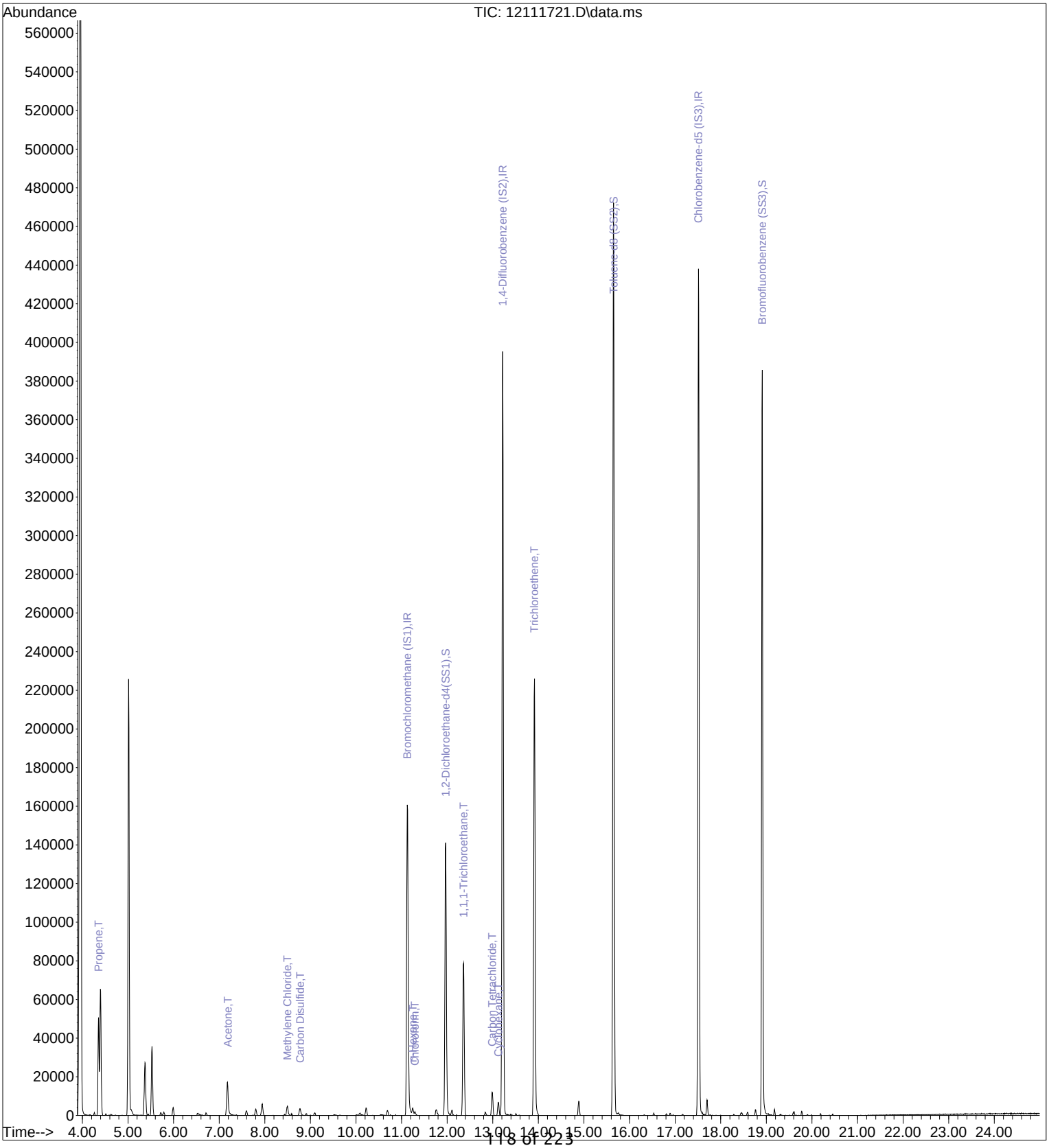
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	0.00	71	0	N.D.		
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	15.76	91	695	N.D.		
59) 2-Hexanone	0.00	43	0	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	0.00	43	0	N.D.		
63) n-Octane	0.00	57	0	N.D.		
64) Tetrachloroethene	16.89	166	499	N.D.		
65) Chlorobenzene	17.70	112	200	N.D.		
66) Ethylbenzene	0.00	91	0	N.D.		
67) m- & p-Xylenes	0.00	91	0	N.D.		
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	0.00	104	0	N.D.		
70) o-Xylene	0.00	91	0	N.D.		
71) n-Nonane	0.00	43	0	N.D.		
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.		
74) Cumene	0.00	105	0	N.D.		
75) alpha-Pinene	0.00	93	0	N.D.		
76) n-Propylbenzene	0.00	91	0	N.D.		
77) 3-Ethyltoluene	0.00	105	0	N.D.		
78) 4-Ethyltoluene	0.00	105	0	N.D.		
79) 1,3,5-Trimethylbenzene	0.00	105	0	N.D.		
80) alpha-Methylstyrene	0.00	118	0	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D.		
82) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.		
83) n-Decane	0.00	57	0	N.D.		
84) Benzyl Chloride	0.00	91	0	N.D.		
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.		
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.		
87) sec-Butylbenzene	0.00	105	0	N.D.		
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D.		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.		
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	0.00	68	0	N.D.		
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	0.00	57	0	N.D.		
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.		
95) Naphthalene	0.00	128	0	N.D.		
96) n-Dodecane	0.00	57	0	N.D.		
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	18.44	55	332	N.D.		
99) tert-Butylbenzene	0.00	119	0	N.D.		
100) n-Butylbenzene	0.00	91	0	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111721.D Vial: 9
Acq On : 11 Dec 2017 19:52 Operator: WA
Sample : P1706106-005dil (40mL) Inst : MS13
Misc : S31-12011701

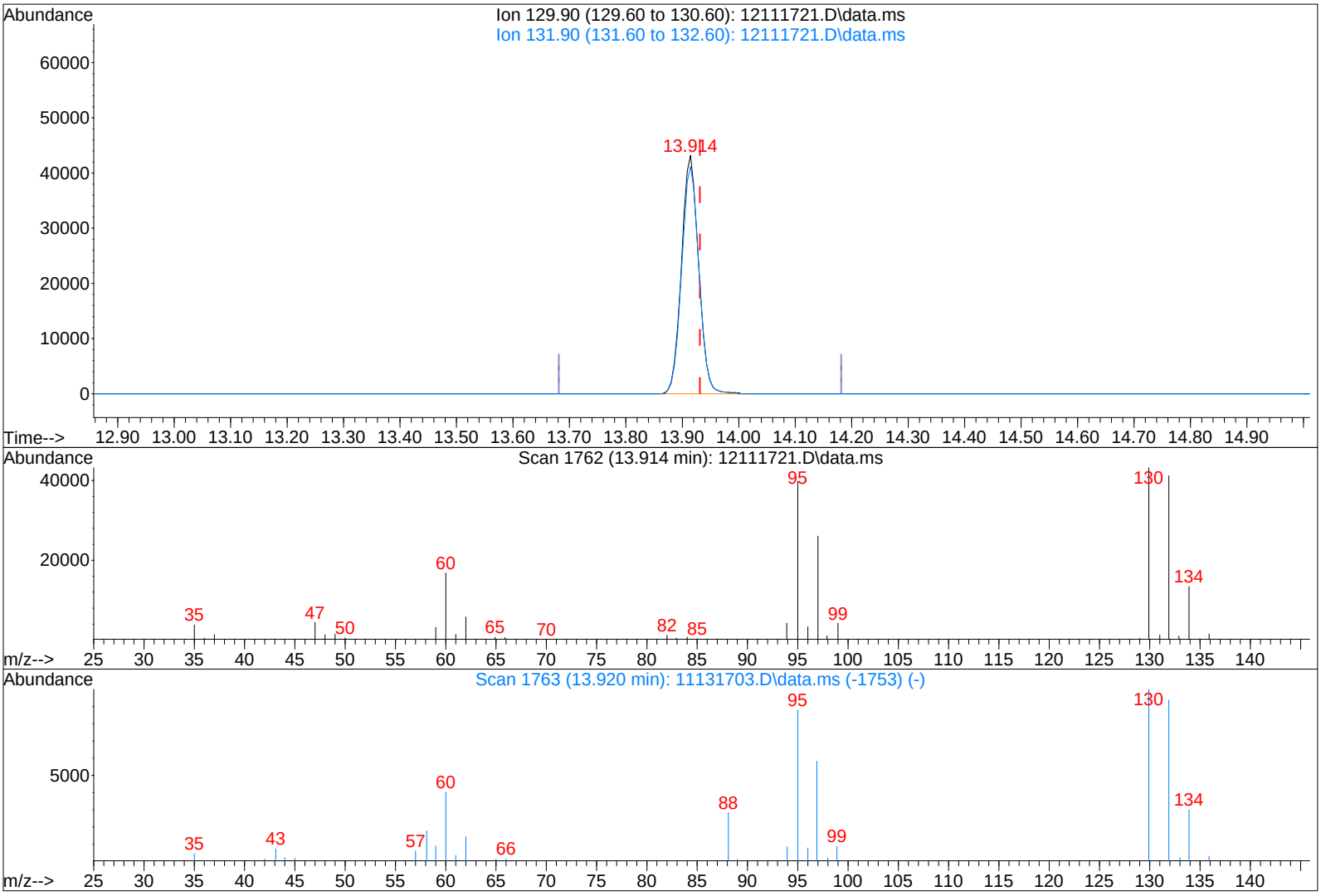
Quant Time: Dec 13 09:41:22 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111721.D Vial: 9
Acq On : 11 Dec 2017 19:52 Operator: WA
Sample : P1706106-005dil (40mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:12 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111721.D\data.ms

(47) Trichloroethene (T)

13.914min (-0.017) 8.09ng

response 91102

Ion	Exp%	Act%
129.90	100	100
131.90	95.90	95.95
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111721.D Vial: 9
Acq On : 11 Dec 2017 19:52 Operator: WA
Sample : P1706106-005dil (40mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:12 2017
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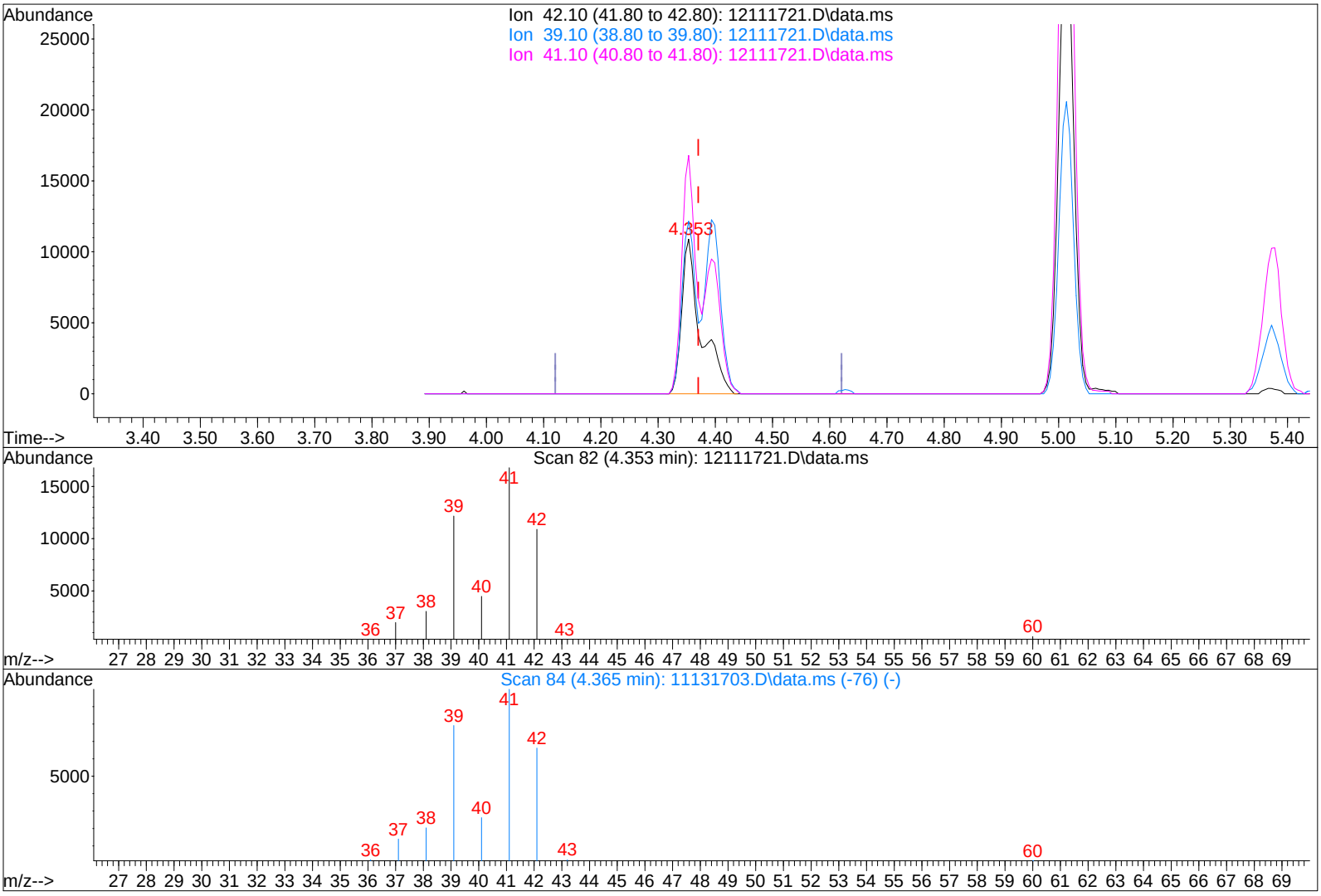
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111721.D\data.ms

(2) Propene (T)

4.353min (-0.017) 2.43ng

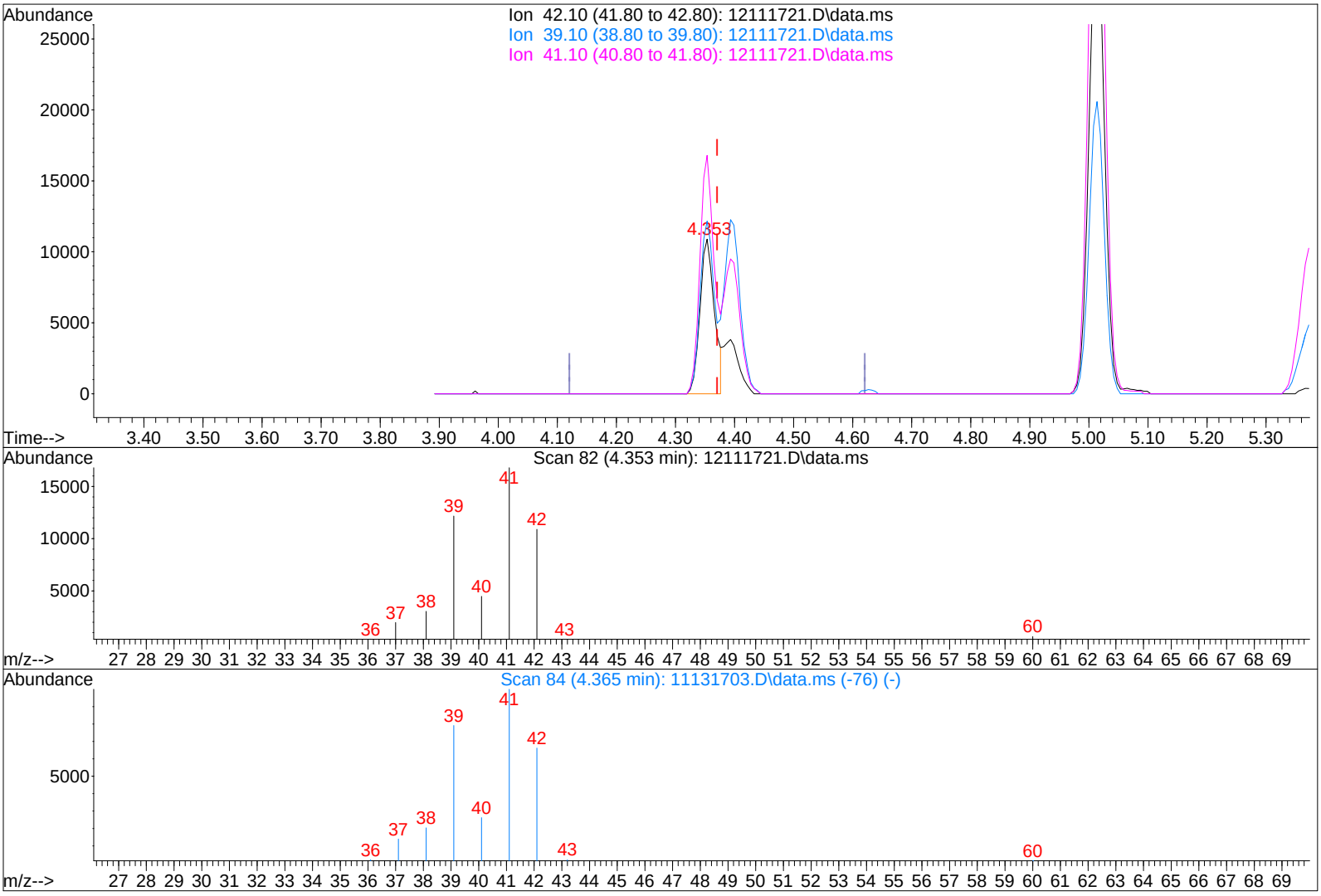
response 25296

Ion	Exp%	Act%
42.10	100	100
39.10	114.80	78.87#
41.10	151.20	113.89#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111721.D Vial: 9
Acq On : 11 Dec 2017 19:52 Operator: WA
Sample : P1706106-005dil (40mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:12 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111721.D\data.ms

(2) Propene (T)

4.353min (-0.017) 1.77ng m

response 18466

Ion	Exp%	Act%
42.10	100	100
39.10	114.80	108.04
41.10	151.20	156.01
0.00	0.00	0.00

IPC

RS 12/13/17

12/13/17

LH 12/15/17

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111722.D Vial: 13
Acq On : 11 Dec 2017 20:26 Operator: WA
Sample : P1706106-006 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:48:34 2017 RS 12/13/17
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS) 12/13/17
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	69696	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.22	114	345614	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	148631	12.500	ng		-0.01
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	109239	12.161	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.28%				
57) Toluene-d8 (SS2)	15.65	98	357152	12.098	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.80%				
73) Bromofluorobenzene (SS3)	18.91	174	120750	11.972	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.76%				
Target Compounds							Qvalue
2) Propene	4.35	42	284400	29.350	ng		99
3) Dichlorodifluoromethan...	4.51	85	9835	0.625	ng		97
4) Chloromethane	4.77	50	1323	0.117	ng		92
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.43	54	7853	1.019	ng	#	88
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.49	45	32487	5.929	ng		98
11) Acetonitrile	0.00	41	0	N.D.	d		
12) Acrolein	6.97	56	113	N.D.			
13) Acetone	0.00	58	0	N.D.	d		
14) Trichlorofluoromethane	7.36	101	4588	0.324	ng		99
15) 2-Propanol (Isopropanol)	0.00	45	0	N.D.	d		
16) Acrylonitrile	0.00	53	0	N.D.	d		
17) 1,1-Dichloroethene	8.29	96	11309	1.530	ng		98
18) 2-Methyl-2-Propanol (t...	8.52	59	1191	N.D.			
19) Methylene Chloride	8.49	84	24618	3.015	ng		98
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.	d		
21) Trichlorotrifluoroethane	8.91	151	873	0.122	ng	#	80
22) Carbon Disulfide	8.76	76	145959	5.003	ng		99
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.	d		
24) 1,1-Dichloroethane	0.00	63	0	N.D.	d		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D.	d		
27) 2-Butanone (MEK)	0.00	72	0	N.D.	d		
28) cis-1,2-Dichloroethene	0.00	61	0	N.D.			
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	0.00	61	0	N.D.			
31) n-Hexane	11.25	57	2923	0.226	ng	#	93
32) Chloroform	11.29	83	2823	0.207	ng		98
34) Tetrahydrofuran (THF)	11.72	72	10172	1.827	ng		92
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	0.00	62	0	N.D.			
38) 1,1,1-Trichloroethane	12.35	97	357097	27.441	ng		100
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D.	d		
41) Benzene	12.83	78	18790	0.587	ng		98
42) Carbon Tetrachloride	12.98	117	574	N.D.			
43) Cyclohexane	13.13	84	24880	2.064	ng		94
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D.	d		
47) Trichloroethene	13.91	130	118196	11.400	ng		98
48) 1,4-Dioxane	0.00	88	0	N.D.	d		
49) 2,2,4-Trimethylpentane...	13.97	57	2807	N.D.			
50) Methyl Methacrylate	0.00	100	0	N.D.			

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111722.D Vial: 13
Acq On : 11 Dec 2017 20:26 Operator: WA
Sample : P1706106-006 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:48:34 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

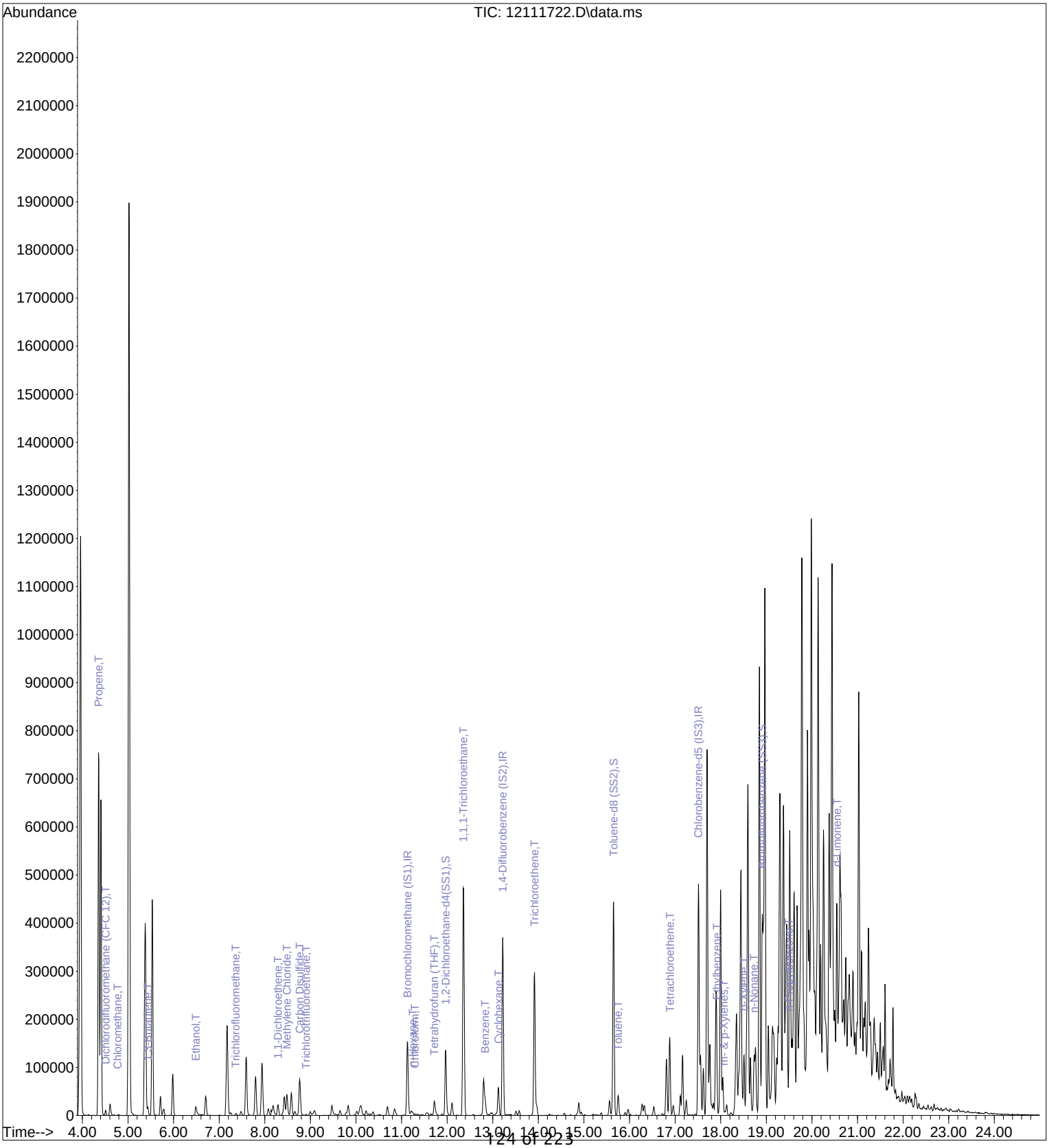
Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
51) n-Heptane	14.24	71	483	N.D.		
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	15.75	91	30100	0.898 ng		99
59) 2-Hexanone	15.97	43	686	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	16.53	43	980	N.D.		
63) n-Octane	16.75	57	136	N.D.		
64) Tetrachloroethene	16.89	166	9652	0.957 ng		98
65) Chlorobenzene	0.00	112	0	N.D. d		
66) Ethylbenzene	17.92	91	3988	0.103 ng		84
67) m- & p-Xylenes	18.07	91	5895	0.194 ng		78
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	18.42	104	755	N.D.		
70) o-Xylene	18.51	91	4487	0.146 ng		83
71) n-Nonane	18.73	43	7572	0.445 ng	#	72
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D. d		
74) Cumene	19.04	105	359	N.D.		
75) alpha-Pinene	19.37	93	1408	N.D.		
76) n-Propylbenzene	19.49	91	7136	~~0.156 ng~~	# FP	25
77) 3-Ethyltoluene	19.58	105	1224	N.D.		
78) 4-Ethyltoluene	19.62	105	866	N.D.		
79) 1,3,5-Trimethylbenzene	19.62	105	866	N.D.		
80) alpha-Methylstyrene	19.83	118	246	N.D.		
81) 2-Ethyltoluene	19.90	105	1186	N.D.		
82) 1,2,4-Trimethylbenzene	20.05	105	1235	N.D.		
83) n-Decane	0.00	57	0	N.D. d		
84) Benzyl Chloride	0.00	91	0	N.D. d		
85) 1,3-Dichlorobenzene	20.24	146	714	N.D.		
86) 1,4-Dichlorobenzene	20.24	146	714	N.D.		
87) sec-Butylbenzene	20.28	105	1109	N.D.		
88) 4-Isopropyltoluene (p-...	20.42	119	851	N.D.		
89) 1,2,3-Trimethylbenzene	20.43	105	2089	N.D.		
90) 1,2-Dichlorobenzene	20.54	146	341	N.D.		
91) d-Limonene	20.55	68	14907	~~1.150 ng~~	# FP	40
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	0.00	57	0	N.D. d		
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.		
95) Naphthalene	22.16	128	663	N.D.		
96) n-Dodecane	22.15	57	1451	N.D.		
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	0.00	55	0	N.D. d		
99) tert-Butylbenzene	20.04	119	504	N.D.		
100) n-Butylbenzene	0.00	91	0	N.D. d		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111722.D Vial: 13
Acq On : 11 Dec 2017 20:26 Operator: WA
Sample : P1706106-006 (400mL) Inst : MS13
Misc : S31-12011701

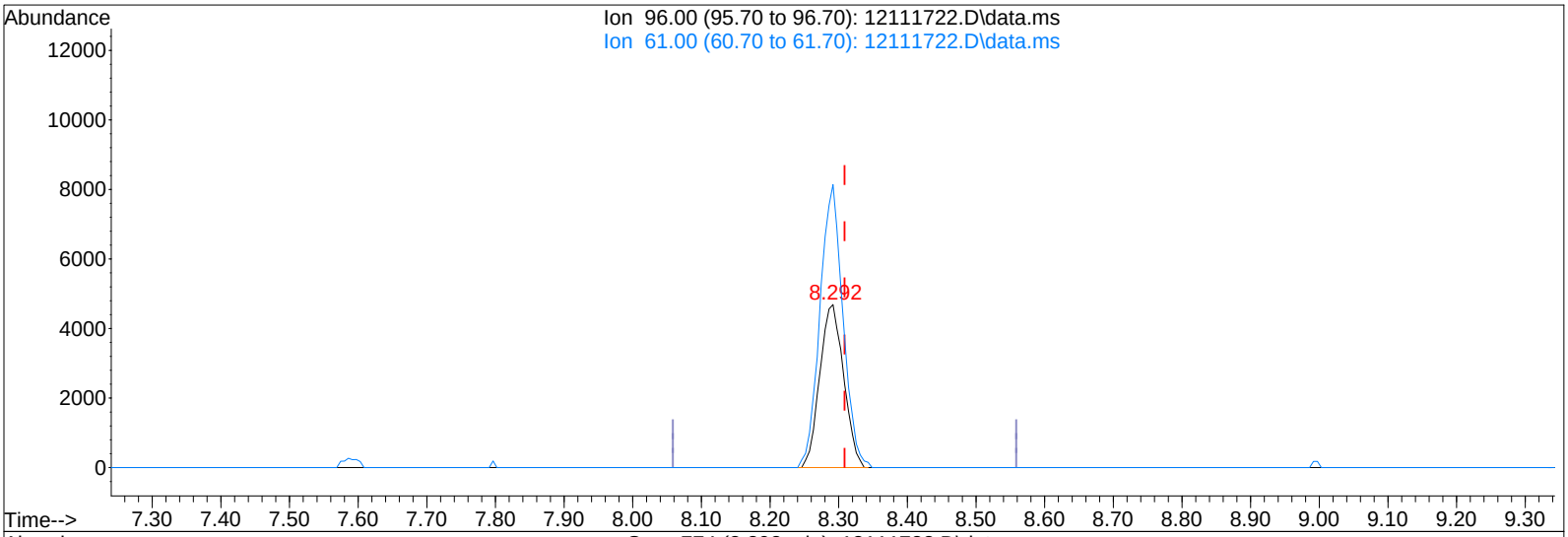
Quant Time: Dec 13 09:48:34 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

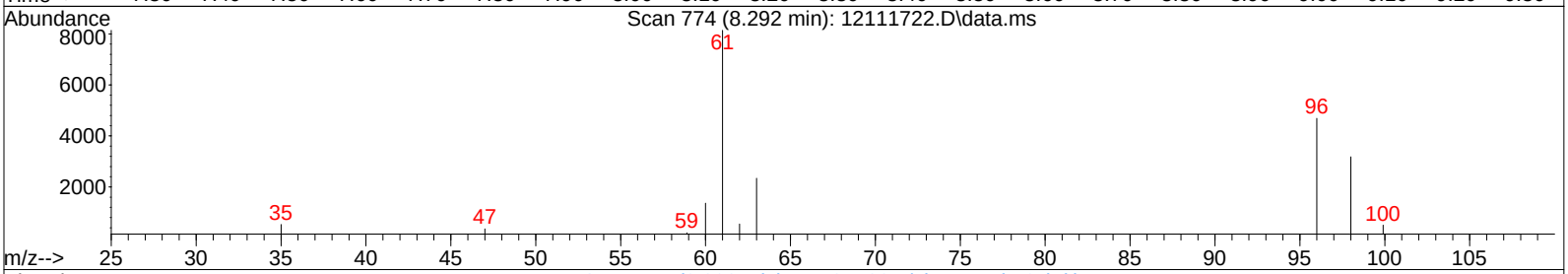


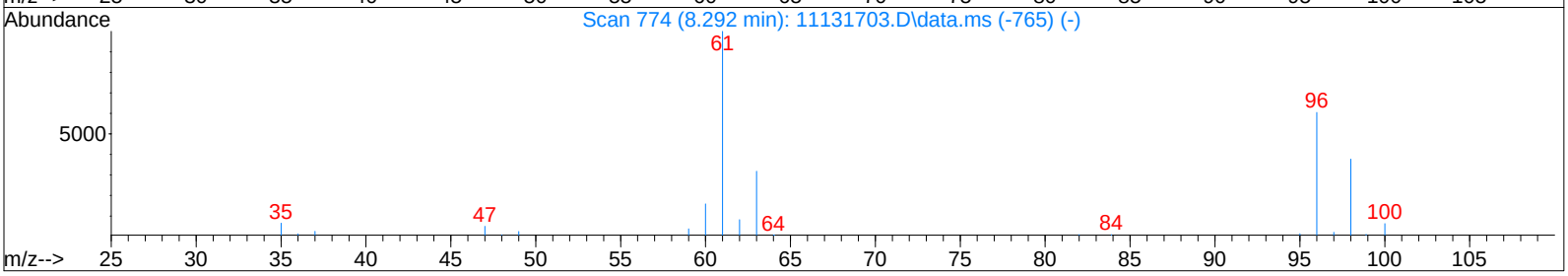
Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111722.D Vial: 13
Acq On : 11 Dec 2017 20:26 Operator: WA
Sample : P1706106-006 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:14 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 12111722.D\data.ms

(17) 1,1-Dichloroethene (T)

8.292min (-0.017) 1.53ng

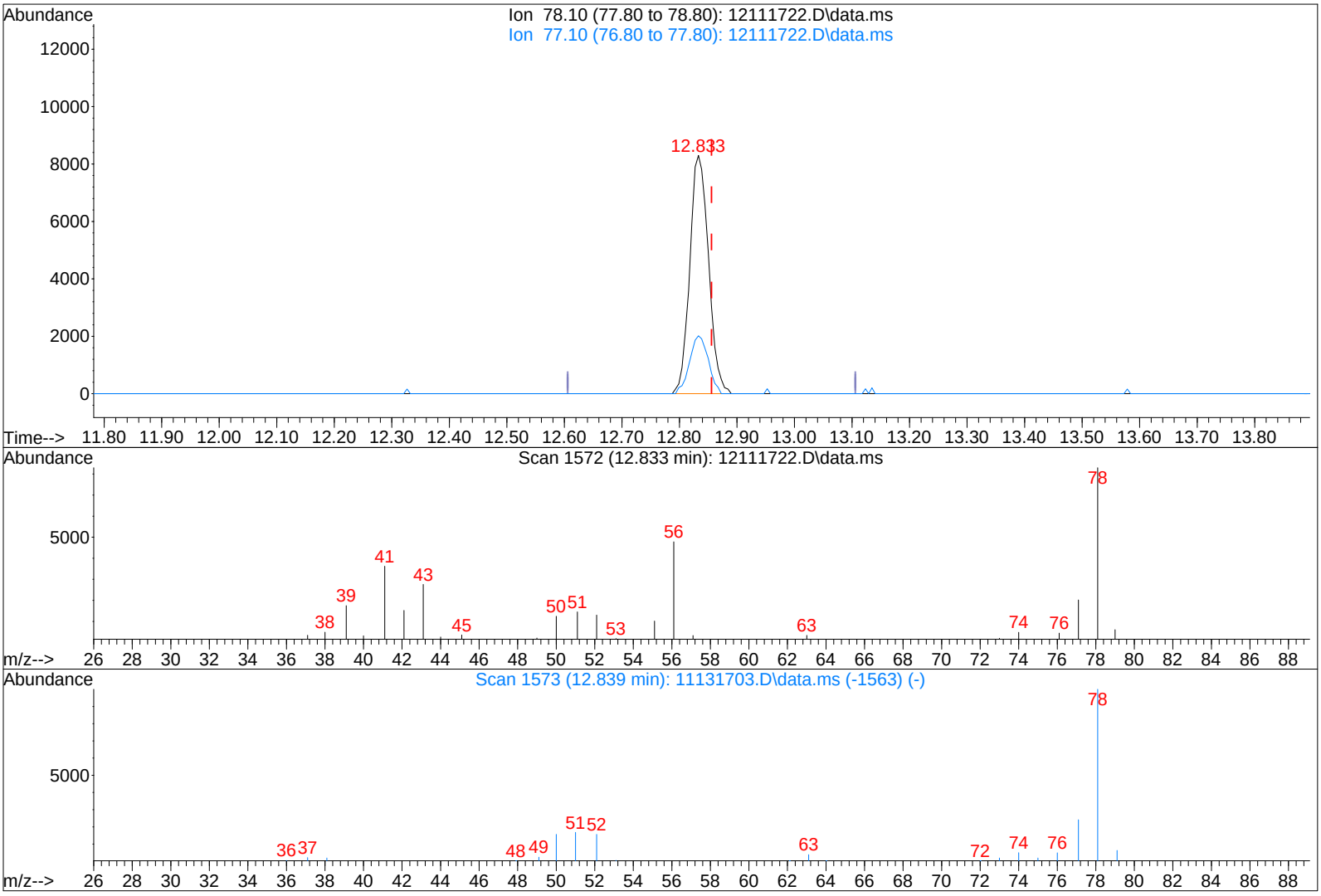
response 11309

Ion	Exp%	Act%
96.00	100	100
61.00	170.40	167.65
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111722.D Vial: 13
Acq On : 11 Dec 2017 20:26 Operator: WA
Sample : P1706106-006 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:14 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111722.D\data.ms

(41) Benzene (T)

12.833min (-0.023) 0.59ng

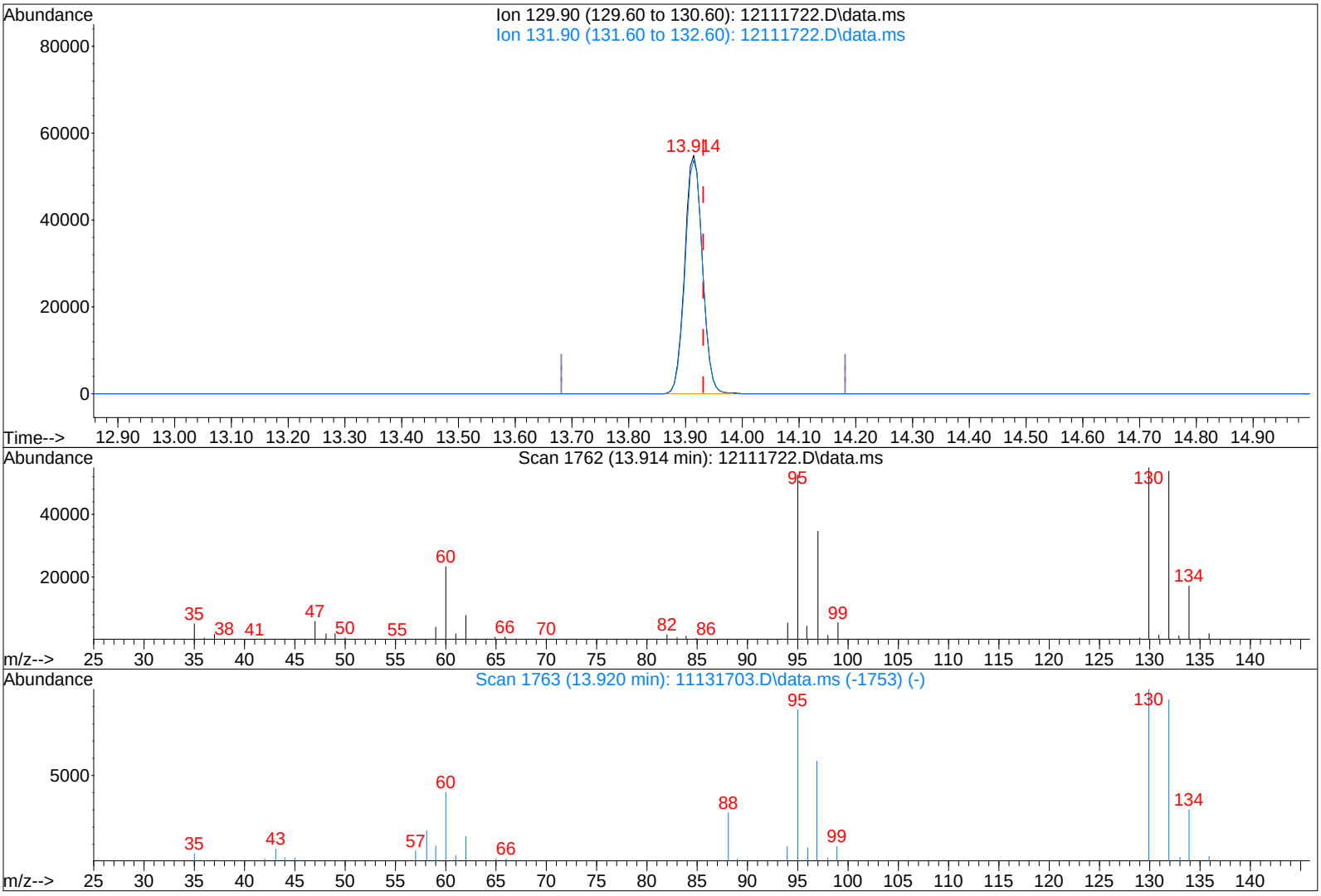
response 18790

Ion	Exp%	Act%
78.10	100	100
77.10	23.50	24.26
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111722.D Vial: 13
Acq On : 11 Dec 2017 20:26 Operator: WA
Sample : P1706106-006 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:14 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111722.D\data.ms

(47) Trichloroethene (T)

13.914min (-0.017) 11.40ng

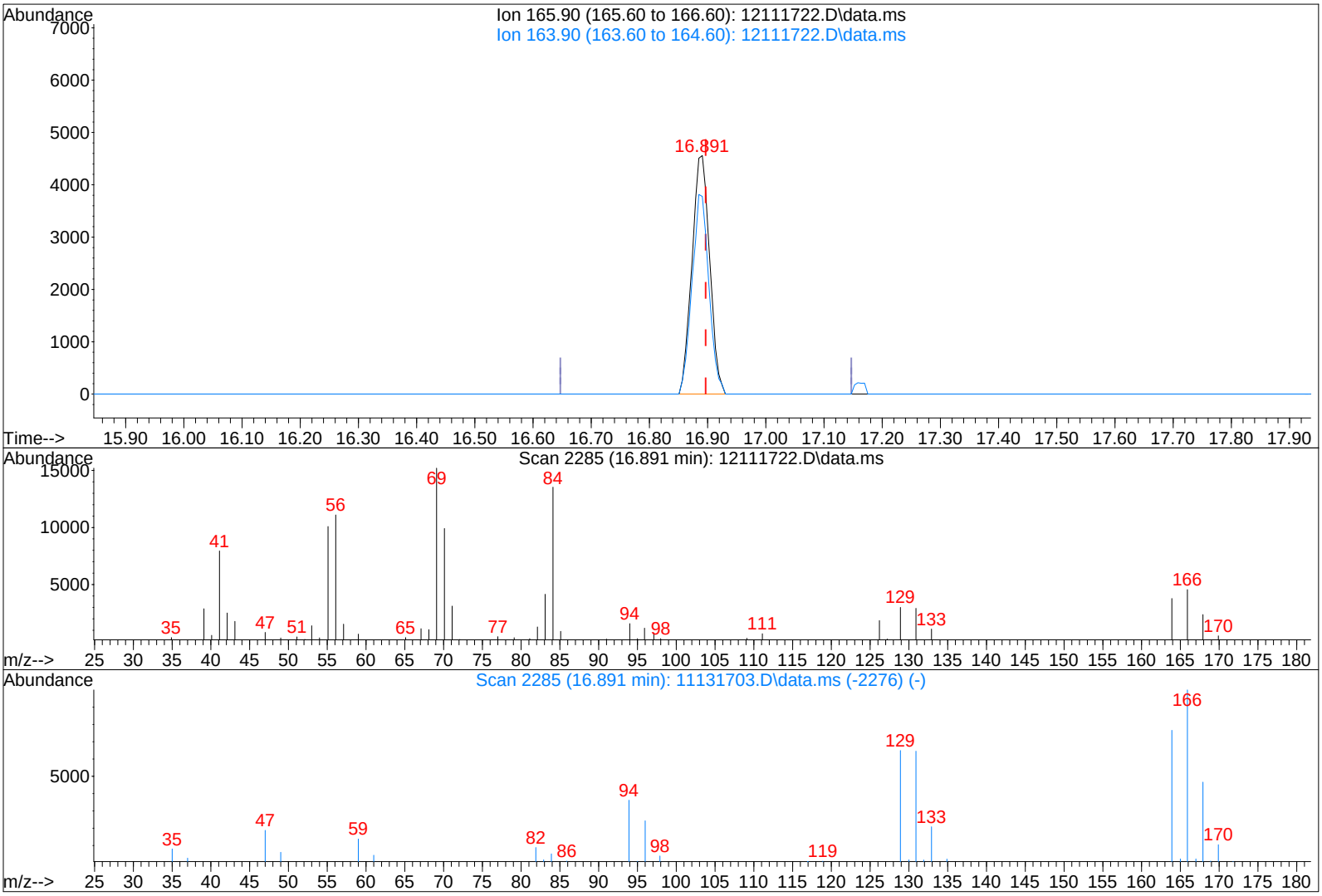
response 118196

Ion	Exp%	Act%
129.90	100	100
131.90	95.90	97.37
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111722.D Vial: 13
Acq On : 11 Dec 2017 20:26 Operator: WA
Sample : P1706106-006 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:14 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111722.D\data.ms

(64) Tetrachloroethene (T)

16.891min (-0.006) 0.96ng

response 9652

Ion	Exp%	Act%
165.90	100	100
163.90	78.30	79.98
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111723.D Vial: 11
Acq On : 11 Dec 2017 21:00 Operator: WA
Sample : P1706106-007 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:50:45 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

RS 12/13/17
WA 12/13/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	70254	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.22	114	351984	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	146844	12.500	ng		-0.01
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	108764	12.012	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.08%				
57) Toluene-d8 (SS2)	15.65	98	368145	12.622	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.96%				
73) Bromofluorobenzene (SS3)	18.91	174	121182	12.161	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.28%				
Target Compounds							Qvalue
2) Propene	4.38	42	2232m	0.229	ng		
3) Dichlorodifluoromethan...	4.52	85	9786	0.617	ng		98
4) Chloromethane	4.79	50	257	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	0.00	54	0	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.49	45	25571	4.630	ng		99
11) Acetonitrile	0.00	41	0	N.D.			
12) Acrolein	0.00	56	0	N.D.			
13) Acetone	7.15	58	10584	1.853	ng		98
14) Trichlorofluoromethane	7.37	101	4583	0.322	ng		99
15) 2-Propanol (Isopropanol)	7.64	45	11298	0.580	ng		95
16) Acrylonitrile	0.00	53	0	N.D.			
17) 1,1-Dichloroethene	8.29	96	6029	0.809	ng		96
18) 2-Methyl-2-Propanol (t...	8.54	59	527	N.D.			
19) Methylene Chloride	8.50	84	7516	0.913	ng		99
20) 3-Chloro-1-propene (Al...	8.50	41	112	N.D.			
21) Trichlorotrifluoroethane	8.91	151	1208	0.167	ng		89
22) Carbon Disulfide	8.76	76	5366	0.182	ng		90
23) trans-1,2-Dichloroethene	9.74	61	484	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D. d			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D.			
27) 2-Butanone (MEK)	10.52	72	129	N.D.			
28) cis-1,2-Dichloroethene	0.00	61	0	N.D.			
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	11.29	61	430	0.161	ng		96
31) n-Hexane	11.25	57	1434	0.110	ng	#	86
32) Chloroform	11.30	83	1580	0.115	ng		99
34) Tetrahydrofuran (THF)	11.74	72	3028	0.540	ng	#	90
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	0.00	62	0	N.D.			
38) 1,1,1-Trichloroethane	12.36	97	154660	11.670	ng		100
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	12.83	78	3771	0.116	ng		98
42) Carbon Tetrachloride	12.99	117	823	N.D.			
43) Cyclohexane	13.12	84	3393	0.276	ng		91
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	13.92	83	404	N.D.			
47) Trichloroethene	13.91	130	46770	4.429	ng		99
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.			
50) Methyl Methacrylate	0.00	100	0	N.D.			

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111723.D Vial: 11
Acq On : 11 Dec 2017 21:00 Operator: WA
Sample : P1706106-007 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:50:45 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

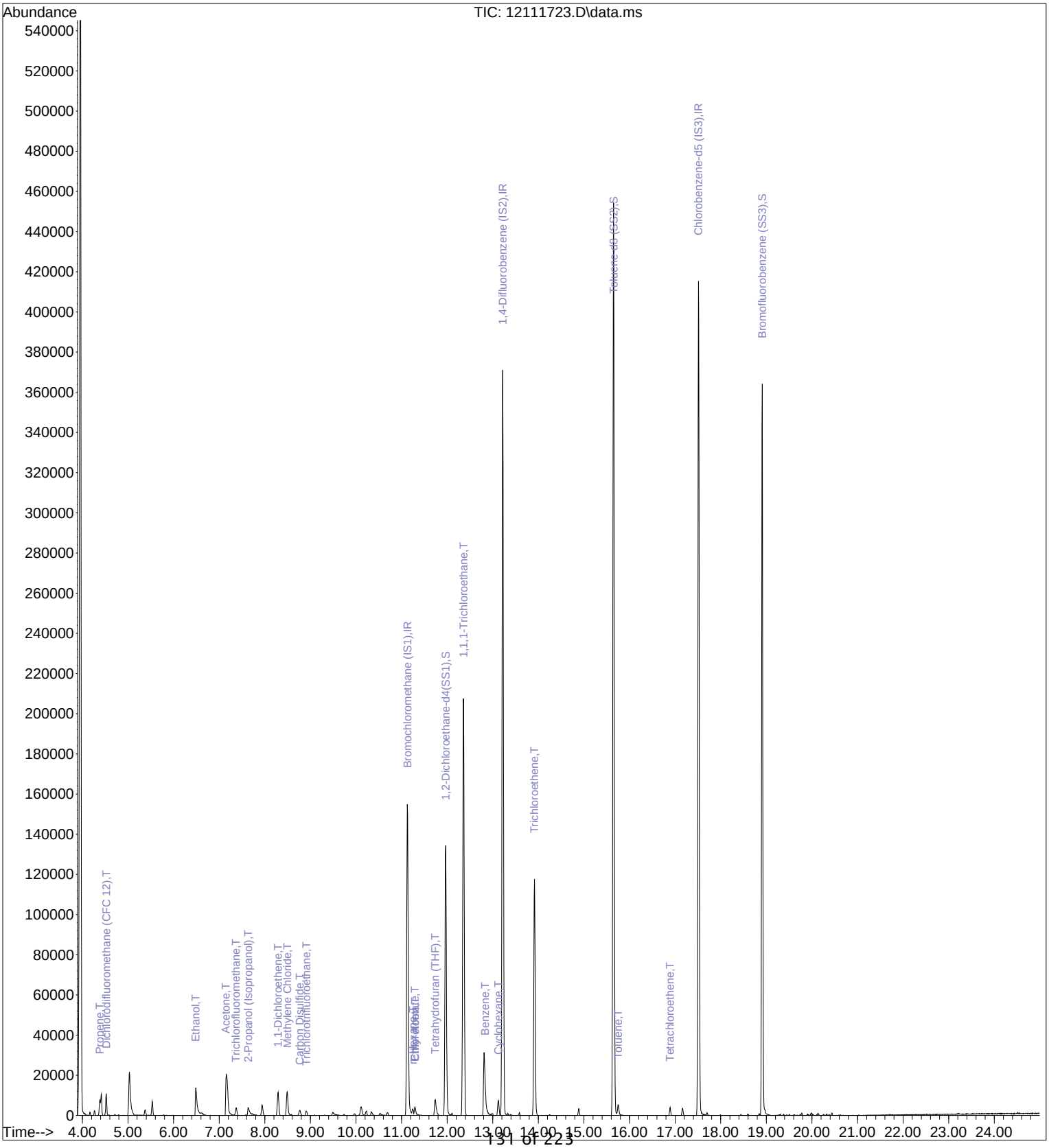
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	0.00	71	0	N.D.	
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.75	91	5606	0.169 ng	98
59) 2-Hexanone	0.00	43	0	N.D.	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	0.00	43	0	N.D.	
63) n-Octane	0.00	57	0	N.D.	
64) Tetrachloroethene	16.89	166	1580	0.159 ng	96
65) Chlorobenzene	0.00	112	0	N.D.	
66) Ethylbenzene	0.00	91	0	N.D.	
67) m- & p-Xylenes	0.00	91	0	N.D.	
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	0.00	104	0	N.D.	
70) o-Xylene	0.00	91	0	N.D.	
71) n-Nonane	0.00	43	0	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	0.00	105	0	N.D.	
75) alpha-Pinene	0.00	93	0	N.D.	
76) n-Propylbenzene	0.00	91	0	N.D.	
77) 3-Ethyltoluene	0.00	105	0	N.D.	
78) 4-Ethyltoluene	0.00	105	0	N.D.	
79) 1,3,5-Trimethylbenzene	0.00	105	0	N.D.	
80) alpha-Methylstyrene	0.00	118	0	N.D.	
81) 2-Ethyltoluene	0.00	105	0	N.D.	
82) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.	
83) n-Decane	20.32	57	349	N.D.	
84) Benzyl Chloride	0.00	91	0	N.D.	
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	0.00	105	0	N.D.	
88) 4-Isopropyltoluene (p-...	0.00	119	0	N.D.	
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	0.00	68	0	N.D.	
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	0.00	57	0	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	0.00	128	0	N.D.	
96) n-Dodecane	0.00	57	0	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	0.00	55	0	N.D.	
99) tert-Butylbenzene	0.00	119	0	N.D.	
100) n-Butylbenzene	0.00	91	0	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111723.D Vial: 11
Acq On : 11 Dec 2017 21:00 Operator: WA
Sample : P1706106-007 (400mL) Inst : MS13
Misc : S31-12011701

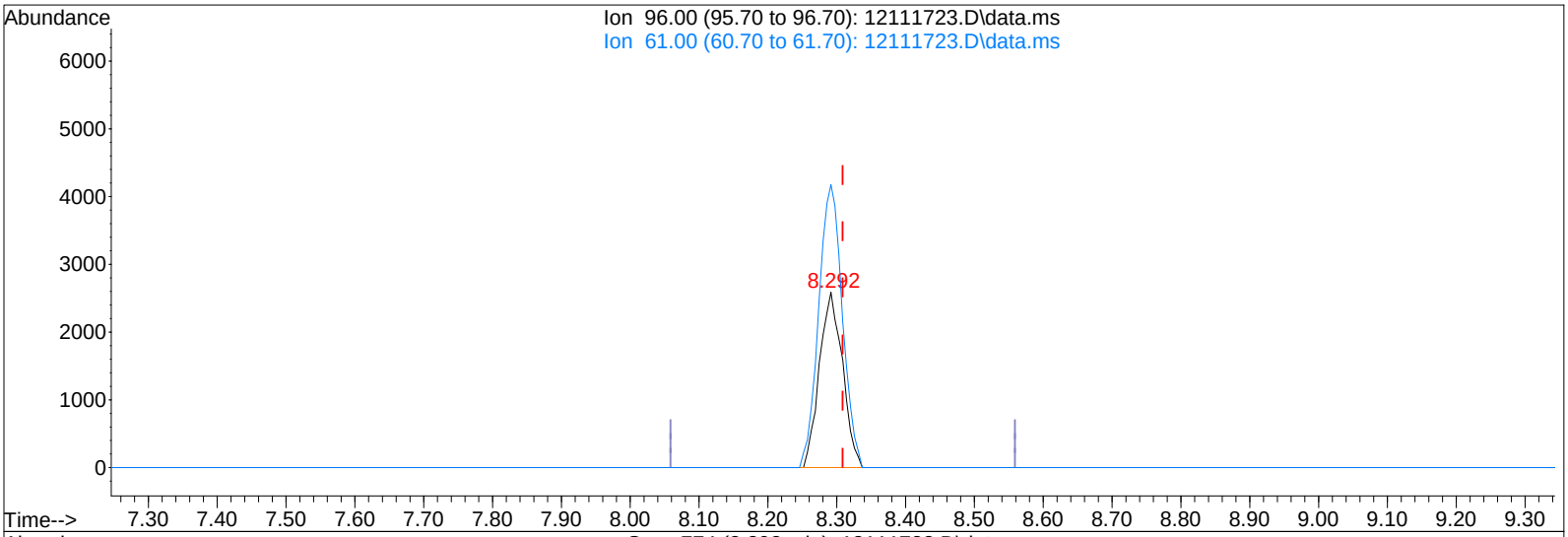
Quant Time: Dec 13 09:50:45 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

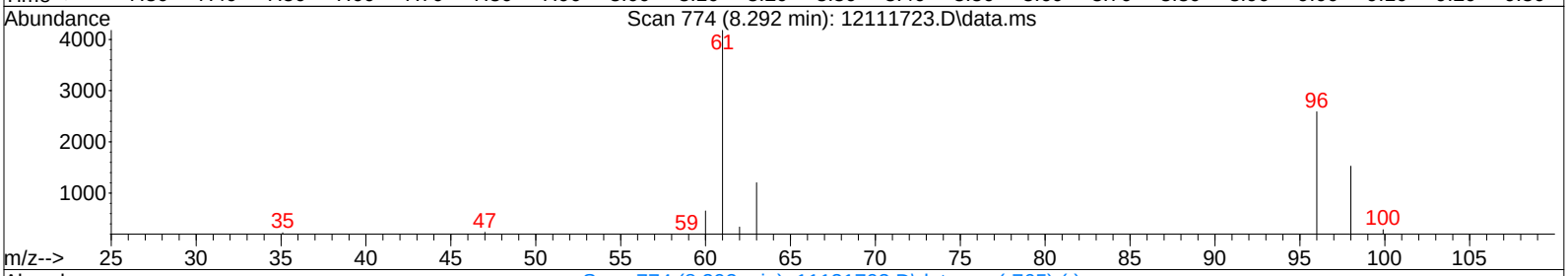


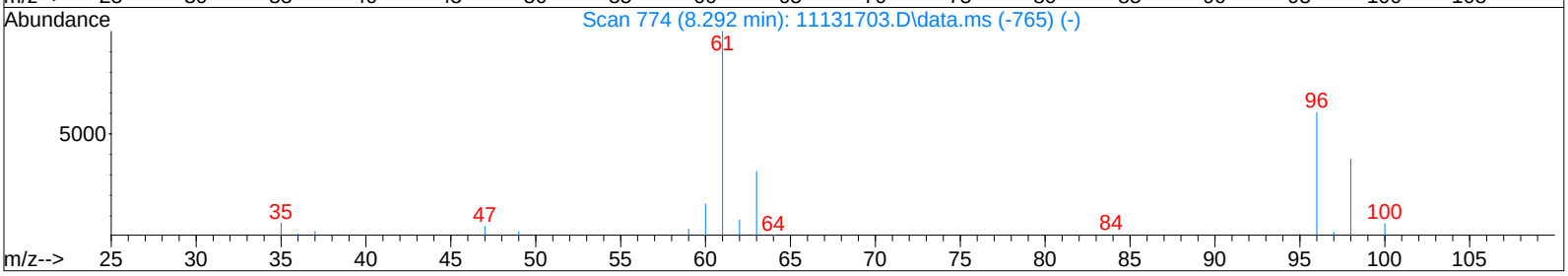
Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111723.D Vial: 11
Acq On : 11 Dec 2017 21:00 Operator: WA
Sample : P1706106-007 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:16 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 12111723.D\data.ms

(17) 1,1-Dichloroethene (T)

8.292min (-0.017) 0.81ng

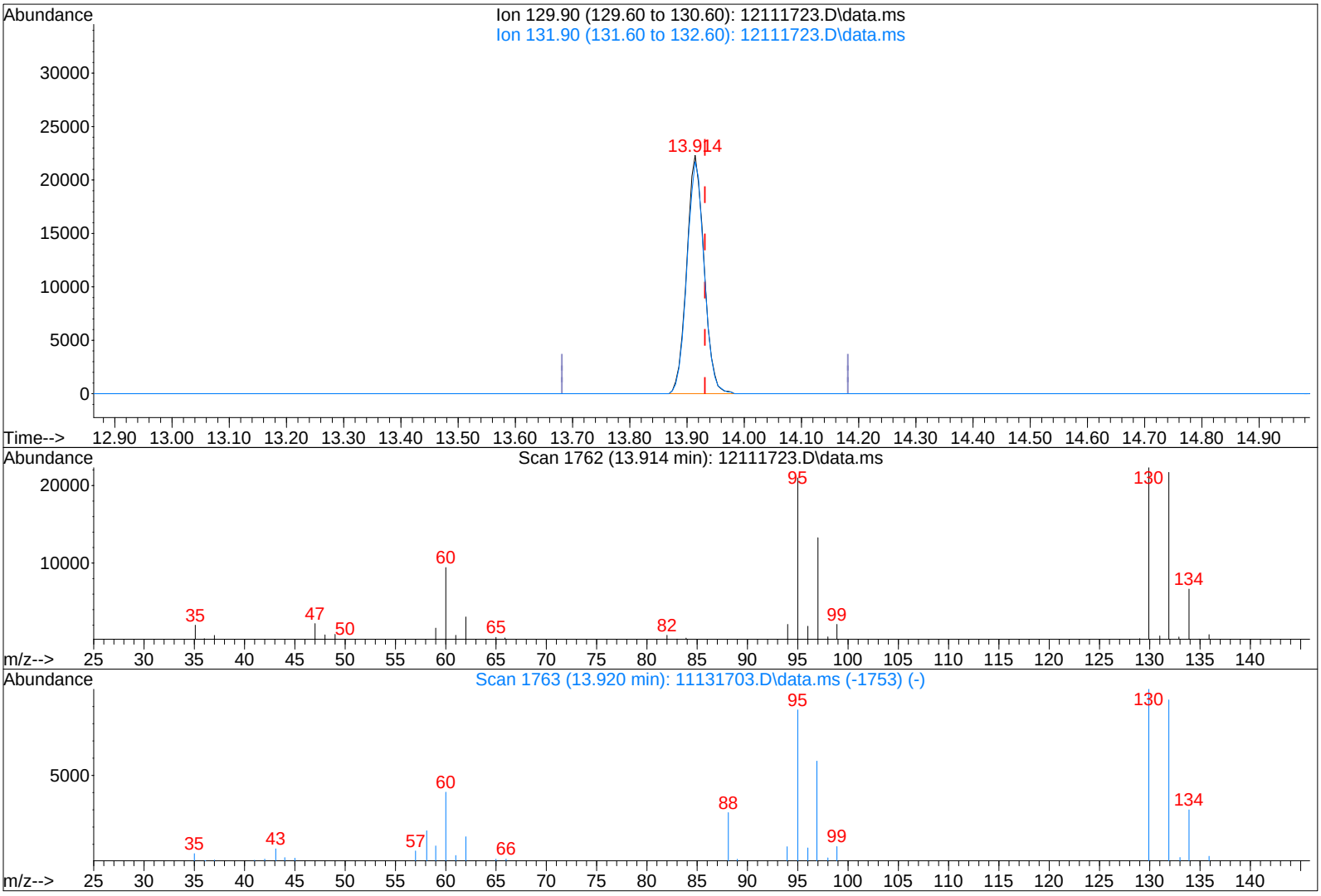
response 6029

Ion	Exp%	Act%
96.00	100	100
61.00	170.40	165.37
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111723.D Vial: 11
Acq On : 11 Dec 2017 21:00 Operator: WA
Sample : P1706106-007 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:16 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111723.D\data.ms

(47) Trichloroethene (T)

13.914min (-0.017) 4.43ng

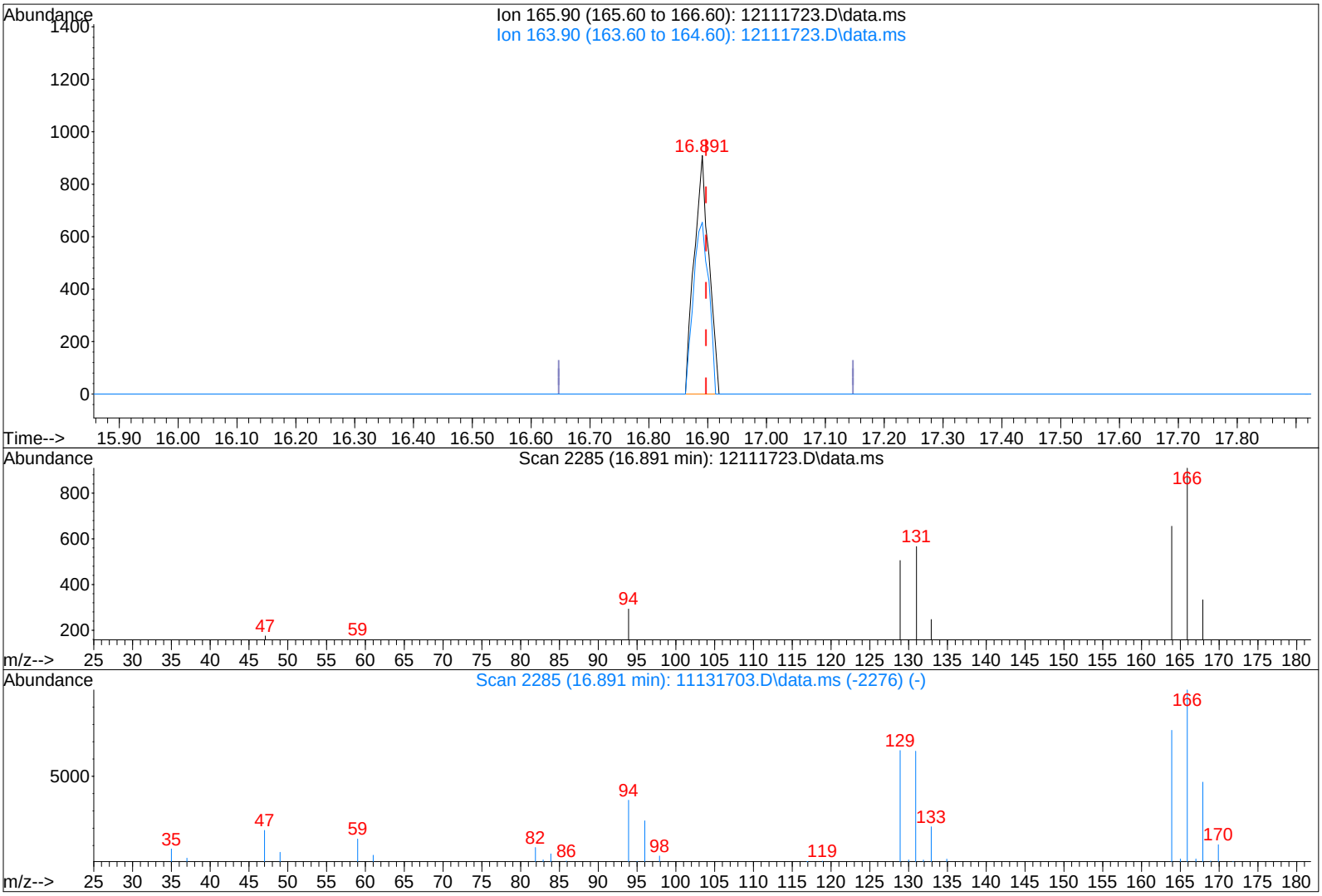
response 46770

Ion	Exp%	Act%
129.90	100	100
131.90	95.90	96.88
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111723.D Vial: 11
Acq On : 11 Dec 2017 21:00 Operator: WA
Sample : P1706106-007 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:16 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111723.D\data.ms

(64) Tetrachloroethene (T)

16.891min (-0.006) 0.16ng

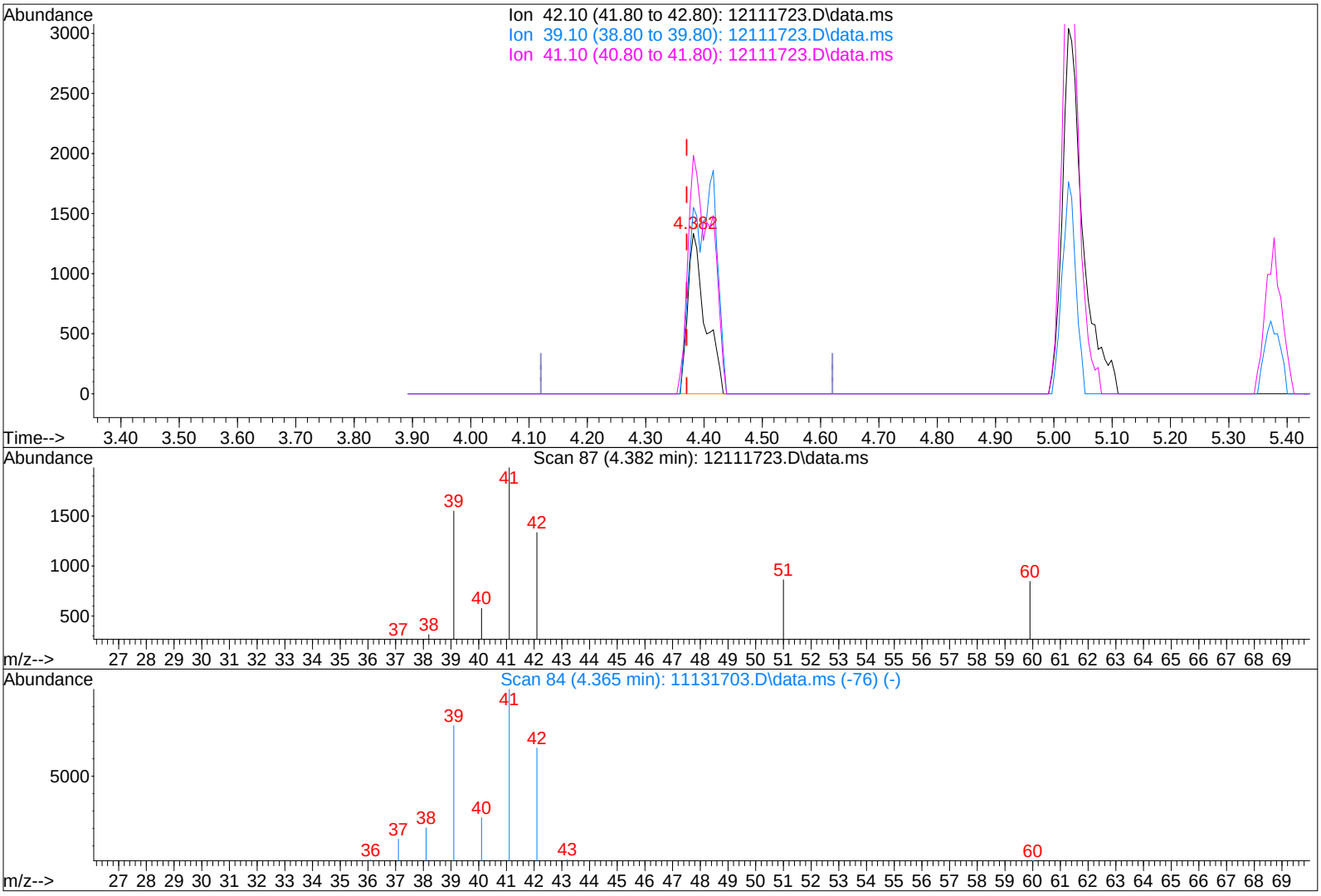
response 1580

Ion	Exp%	Act%
165.90	100	100
163.90	78.30	74.87
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111723.D Vial: 11
Acq On : 11 Dec 2017 21:00 Operator: WA
Sample : P1706106-007 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:16 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111723.D\data.ms

(2) Propene (T)

4.382min (+0.011) 0.29ng

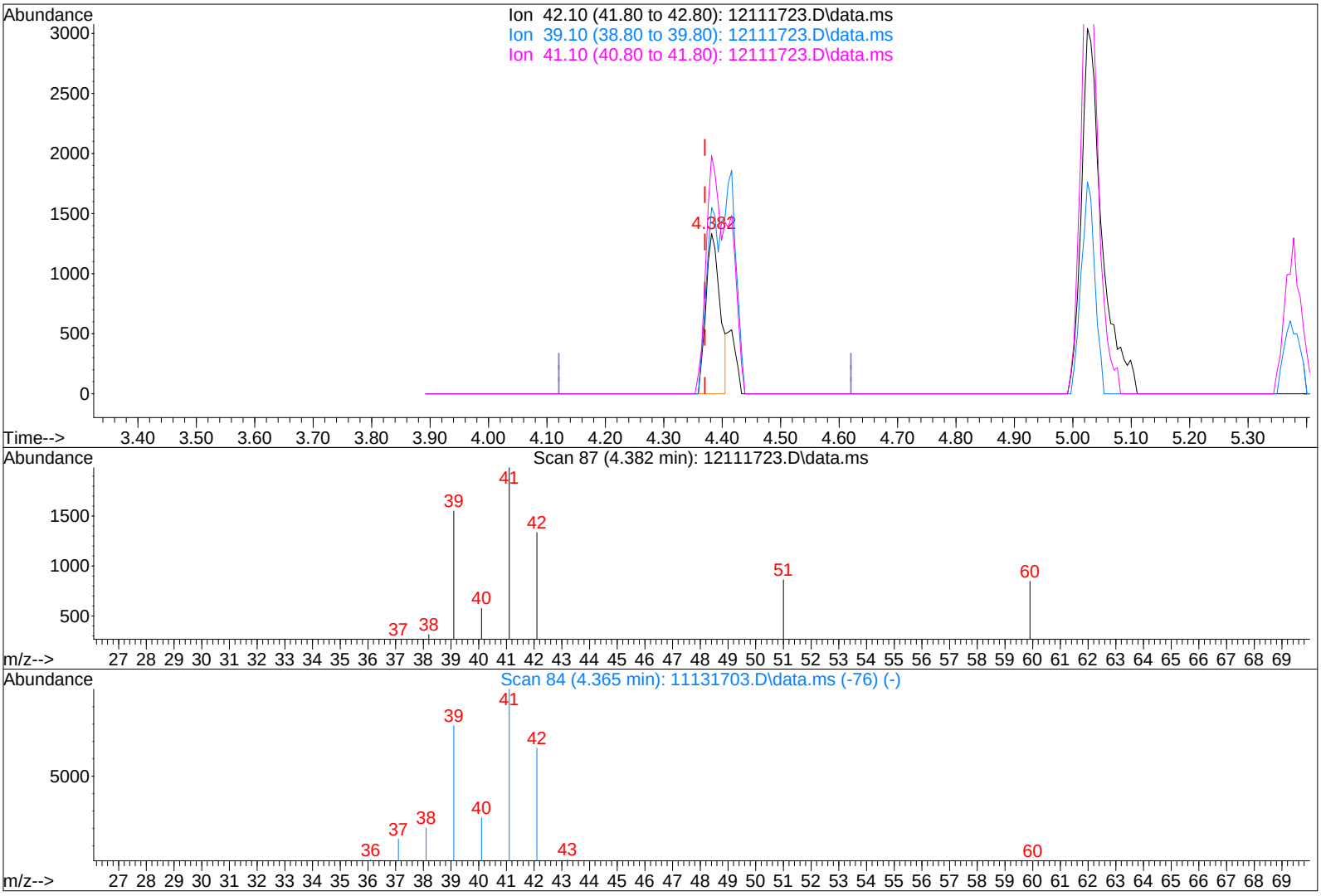
response 2784

Ion	Exp%	Act%
42.10	100	100
39.10	114.80	79.67#
41.10	151.20	196.84#
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111723.D Vial: 11
Acq On : 11 Dec 2017 21:00 Operator: WA
Sample : P1706106-007 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:16 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111723.D\data.ms

(2) Propene (T)

4.382min (+0.011) 0.23ng m

response 2232

Ion	Exp%	Act%
42.10	100	100
39.10	114.80	99.37
41.10	151.20	245.52#
0.00	0.00	0.00

IPC

RS 12/13/17

WA 12/13/17

LH 12/15/17

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111724.D Vial: 12
Acq On : 11 Dec 2017 21:33 Operator: WA
Sample : P1706106-008 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:59:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

RS 12/13/17
12/13/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	71468	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.22	114	352324	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	149378	12.500	ng		-0.01
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	110511	11.998	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.00%				
57) Toluene-d8 (SS2)	15.65	98	365675	12.325	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.56%				
73) Bromofluorobenzene (SS3)	18.91	174	121881	12.023	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.16%				
Target Compounds							Qvalue
2) Propene	4.36	42	279427	28.122	ng		99
3) Dichlorodifluoromethan...	4.52	85	9829	0.609	ng		96
4) Chloromethane	4.78	50	749	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.44	54	8094	1.024	ng	#	87
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	6.69	45	293	N.D.			
11) Acetonitrile	6.78	41	992	N.D.			
12) Acrolein	0.00	56	0	N.D.			
13) Acetone	7.16	58	12226	~~2.104~~	ng	# FP	1
14) Trichlorofluoromethane	7.38	101	4525	0.312	ng		99
15) 2-Propanol (Isopropanol)	7.64	45	11018	0.556	ng	#	26
16) Acrylonitrile	0.00	53	0	N.D. d			
17) 1,1-Dichloroethene	8.29	96	11128	1.469	ng		99
18) 2-Methyl-2-Propanol (t...	8.55	59	1518	N.D.			
19) Methylene Chloride	8.49	84	25373	3.031	ng		100
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D. d			
21) Trichlorotrifluoroethane	8.91	151	863	0.118	ng		84
22) Carbon Disulfide	8.77	76	193906	6.482	ng		99
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.			
24) 1,1-Dichloroethane	0.00	63	0	N.D. d			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	10.09	86	119	N.D.			
27) 2-Butanone (MEK)	10.50	72	1828	0.364	ng	#	34
28) cis-1,2-Dichloroethene	0.00	61	0	N.D.			
29) Diisopropyl Ether	11.30	87	125	N.D.			
30) Ethyl Acetate	0.00	61	0	N.D. d			
31) n-Hexane	11.25	57	2487	~~0.188~~	ng	# FP	36
32) Chloroform	11.30	83	2930	0.209	ng		98
34) Tetrahydrofuran (THF)	11.72	72	11036	1.933	ng	#	89
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	0.00	62	0	N.D.			
38) 1,1,1-Trichloroethane	12.36	97	358240	27.005	ng		100
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	0.00	56	0	N.D. d			
41) Benzene	12.83	78	42648	1.307	ng		99
42) Carbon Tetrachloride	12.99	117	504	N.D.			
43) Cyclohexane	13.13	84	25437	2.070	ng		94
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D. d			
47) Trichloroethene	13.91	130	119463	11.303	ng		99
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	13.98	57	2528	N.D.			
50) Methyl Methacrylate	0.00	100	0	N.D.			

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111724.D Vial: 12
Acq On : 11 Dec 2017 21:33 Operator: WA
Sample : P1706106-008 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 13 09:59:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

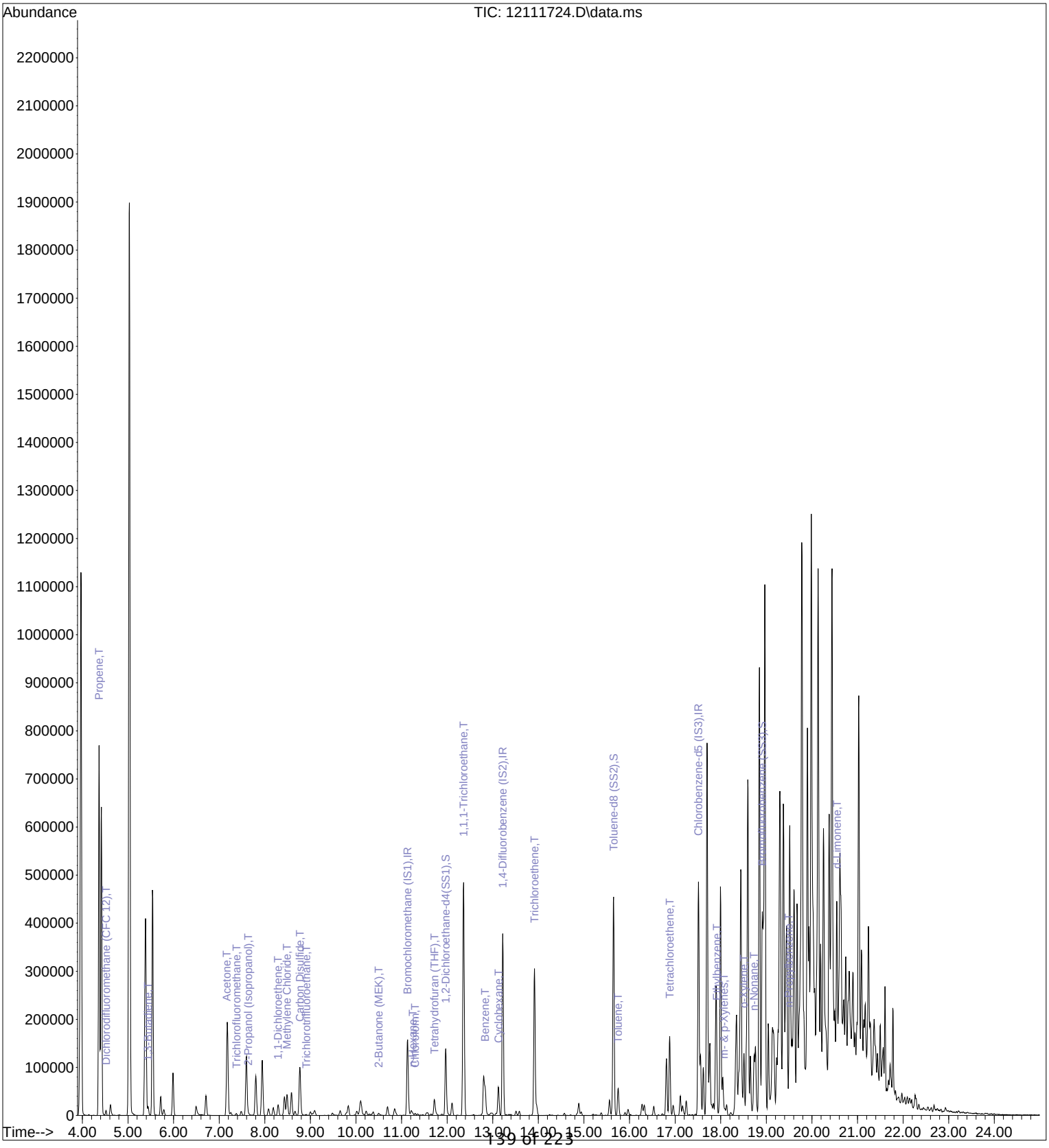
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
51) n-Heptane	14.24	71	268	N.D.			
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.			
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.			
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.			
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.			
58) Toluene	15.75	91	42814	1.270	ng		100
59) 2-Hexanone	15.96	43	687	N.D.			
60) Dibromochloromethane	0.00	129	0	N.D.			
61) 1,2-Dibromoethane	0.00	107	0	N.D.			
62) n-Butyl Acetate	16.53	43	1217	N.D.			
63) n-Octane	0.00	57	0	N.D.	d		
64) Tetrachloroethene	16.89	166	9885	0.975	ng		99
65) Chlorobenzene	0.00	112	0	N.D.	d		
66) Ethylbenzene	17.92	91	10200	0.263	ng		93
67) m- & p-Xylenes	18.07	91	13875	0.453	ng		93
68) Bromoform	0.00	173	0	N.D.			
69) Styrene	18.42	104	837	N.D.			
70) o-Xylene	18.51	91	6256	0.203	ng		91
71) n-Nonane	18.73	43	8187	0.479	ng	#	61
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	d		
74) Cumene	19.04	105	454	N.D.			
75) alpha-Pinene	19.44	93	1121	N.D.			
76) n-Propylbenzene	19.49	91	9072	~~0.197~~	ng	# FP	35
77) 3-Ethyltoluene	19.58	105	2019	N.D.			
78) 4-Ethyltoluene	19.62	105	1380	N.D.			
79) 1,3,5-Trimethylbenzene	19.69	105	857	N.D.			
80) alpha-Methylstyrene	20.00	118	109	N.D.			
81) 2-Ethyltoluene	19.86	105	906	N.D.			
82) 1,2,4-Trimethylbenzene	20.05	105	2628	N.D.			
83) n-Decane	0.00	57	0	N.D.	d		
84) Benzyl Chloride	0.00	91	0	N.D.	d		
85) 1,3-Dichlorobenzene	20.25	146	743	N.D.			
86) 1,4-Dichlorobenzene	20.25	146	743	N.D.			
87) sec-Butylbenzene	20.29	105	1110	N.D.			
88) 4-Isopropyltoluene (p-...	20.43	119	3053	N.D.			
89) 1,2,3-Trimethylbenzene	20.43	105	2487	N.D.			
90) 1,2-Dichlorobenzene	20.55	146	351	N.D.			
91) d-Limonene	20.55	68	13949	~~1.071~~	ng	# FP	38
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.			
93) n-Undecane	0.00	57	0	N.D.	d		
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.			
95) Naphthalene	22.16	128	595	N.D.			
96) n-Dodecane	22.15	57	1397	N.D.			
97) Hexachlorobutadiene	0.00	225	0	N.D.			
98) Cyclohexanone	0.00	55	0	N.D.	d		
99) tert-Butylbenzene	20.04	119	674	N.D.			
100) n-Butylbenzene	0.00	91	0	N.D.	d		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111724.D Vial: 12
Acq On : 11 Dec 2017 21:33 Operator: WA
Sample : P1706106-008 (400mL) Inst : MS13
Misc : S31-12011701

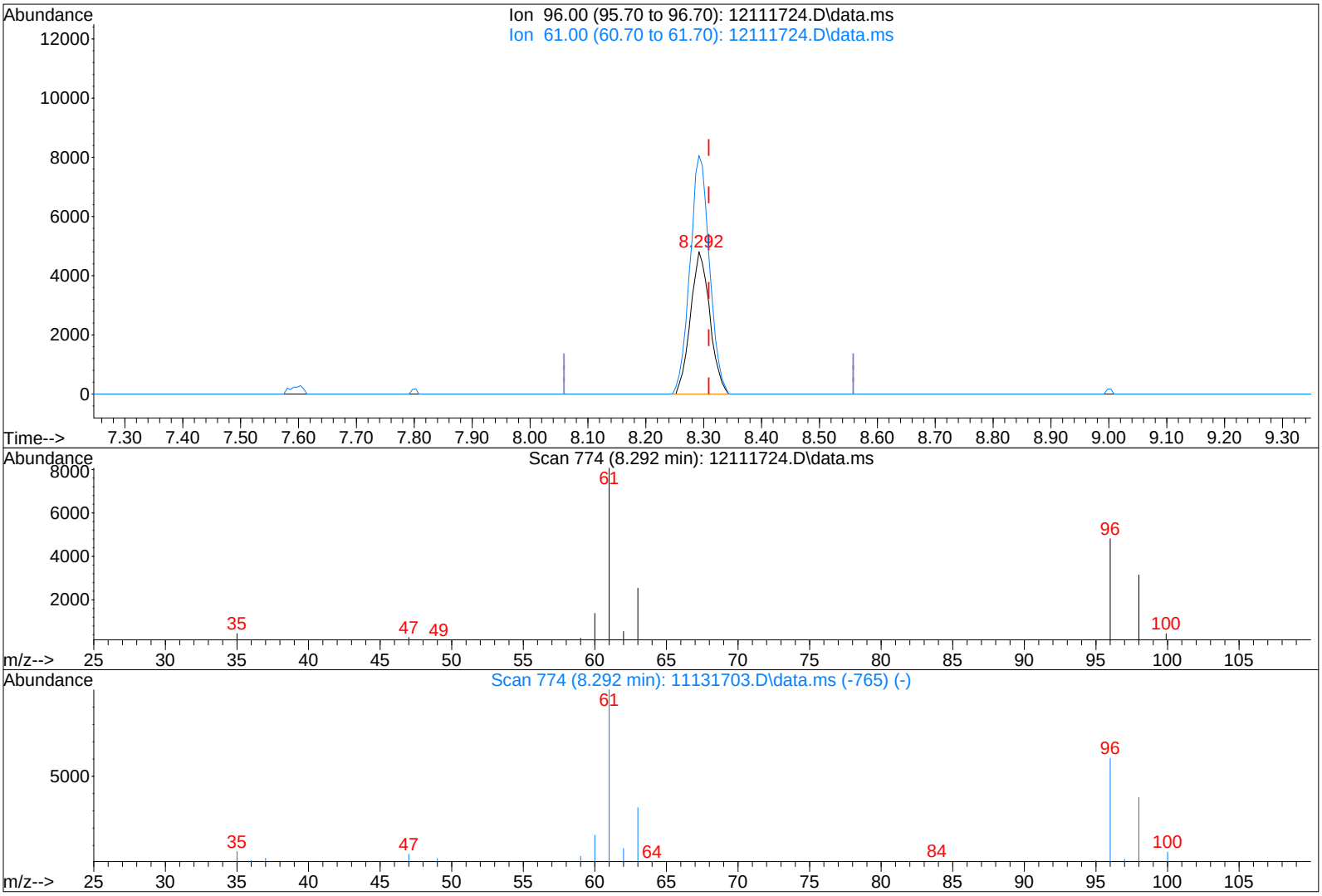
Quant Time: Dec 13 09:59:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111724.D Vial: 12
Acq On : 11 Dec 2017 21:33 Operator: WA
Sample : P1706106-008 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:18 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111724.D\data.ms

(17) 1,1-Dichloroethene (T)

8.292min (-0.017) 1.47ng

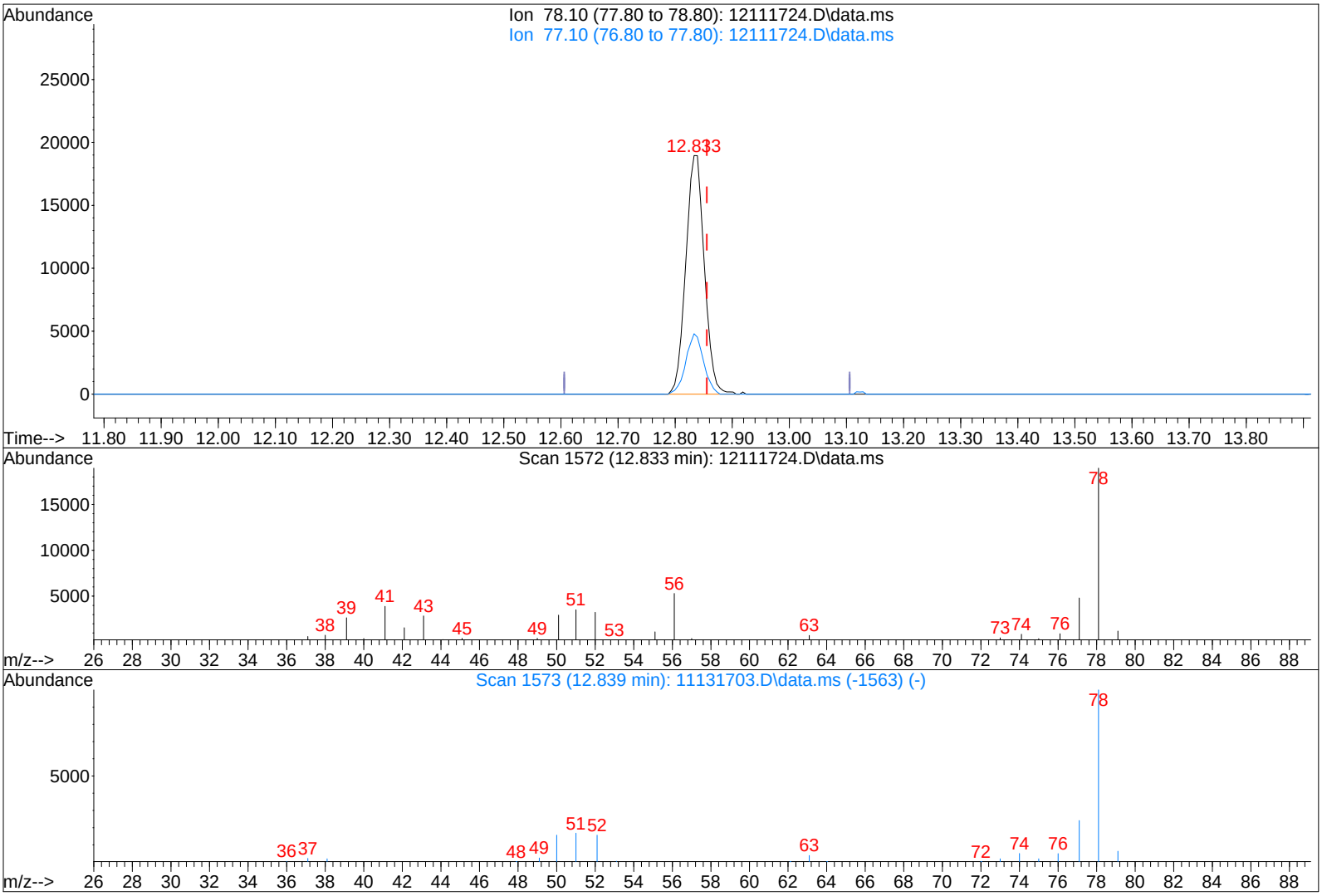
response 11128

Ion	Exp%	Act%
96.00	100	100
61.00	170.40	169.41
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111724.D Vial: 12
Acq On : 11 Dec 2017 21:33 Operator: WA
Sample : P1706106-008 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:18 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111724.D\data.ms

(41) Benzene (T)

12.833min (-0.023) 1.31ng

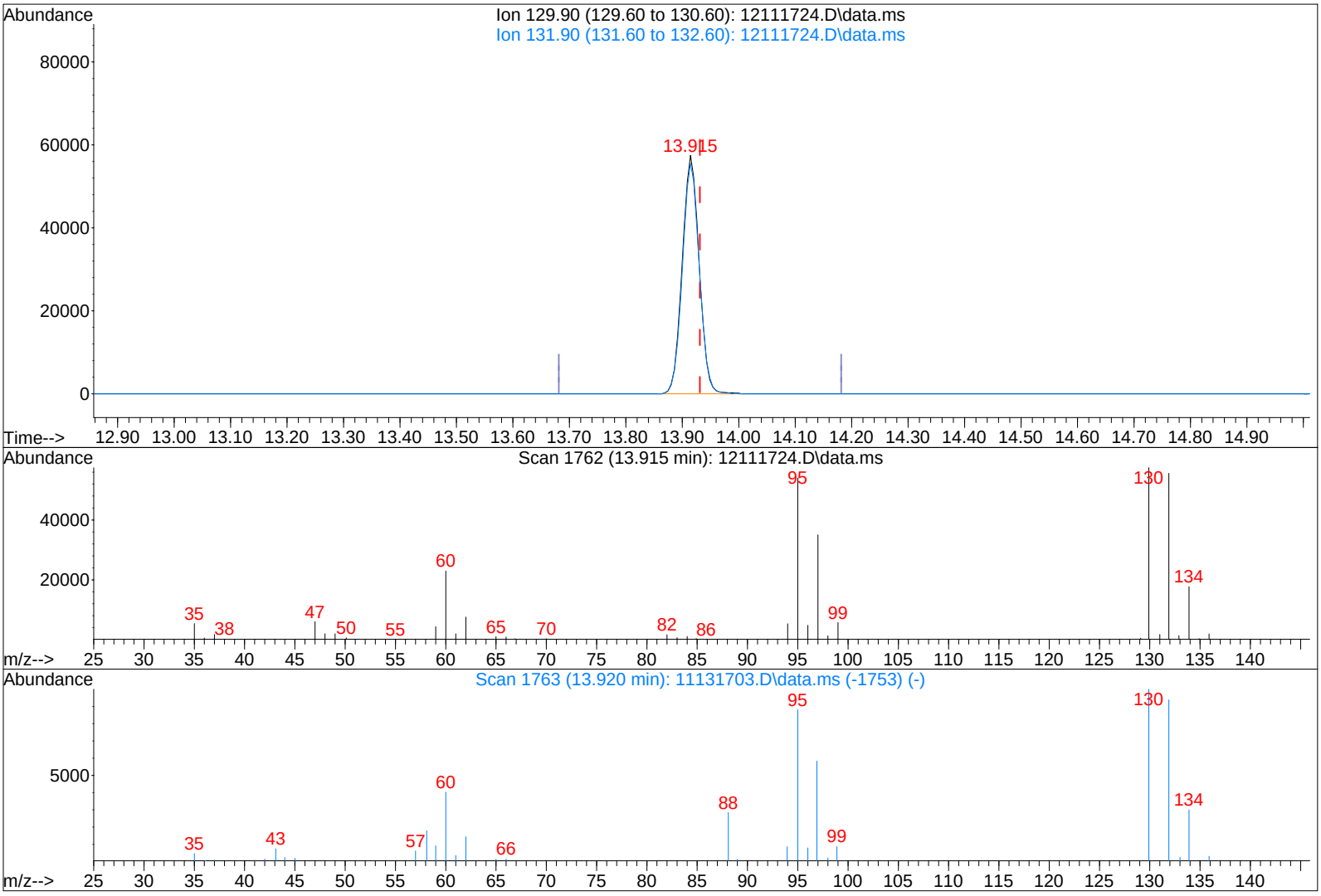
response 42648

Ion	Exp%	Act%
78.10	100	100
77.10	23.50	24.10
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111724.D Vial: 12
Acq On : 11 Dec 2017 21:33 Operator: WA
Sample : P1706106-008 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:18 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111724.D\data.ms

(47) Trichloroethene (T)

13.915min (-0.017) 11.30ng

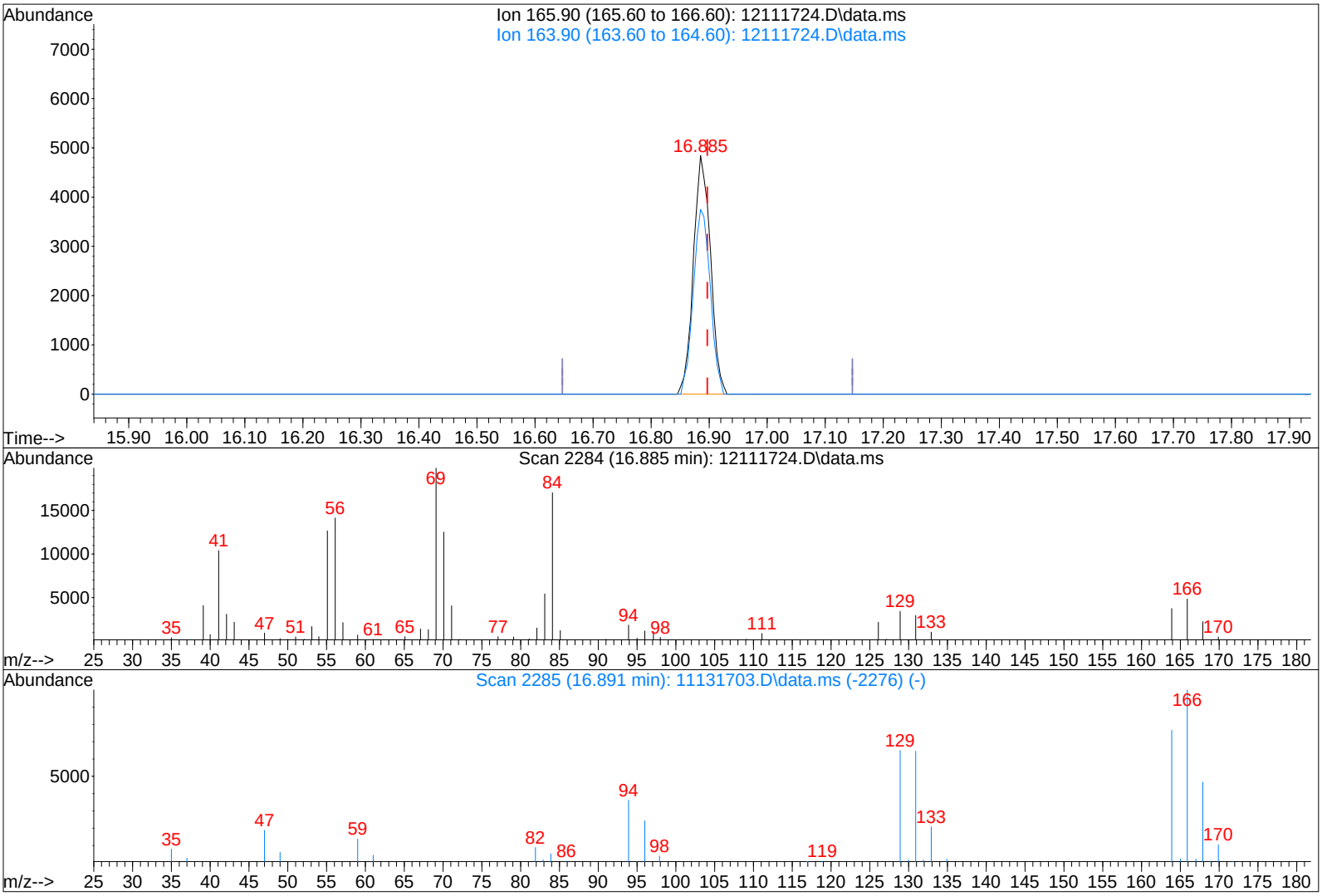
response 119463

Ion	Exp%	Act%
129.90	100	100
131.90	95.90	96.66
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111724.D Vial: 12
Acq On : 11 Dec 2017 21:33 Operator: WA
Sample : P1706106-008 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:18 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111724.D\data.ms

(64) Tetrachloroethene (T)

16.885min (-0.012) 0.97ng

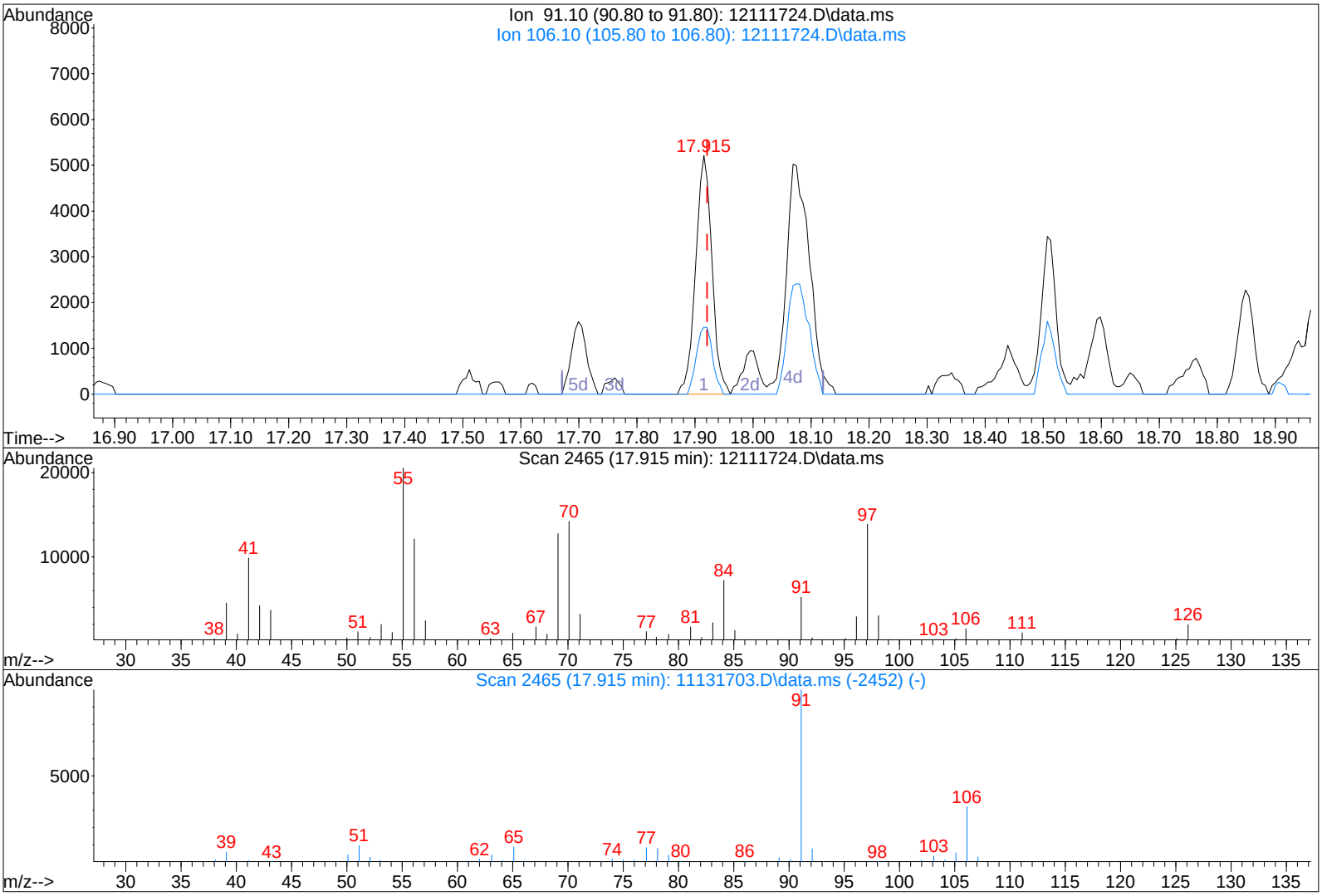
response 9885

Ion	Exp%	Act%
165.90	100	100
163.90	78.30	77.32
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111724.D Vial: 12
Acq On : 11 Dec 2017 21:33 Operator: WA
Sample : P1706106-008 (400mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:18 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111724.D\data.ms

(66) Ethylbenzene (T)

17.915min (-0.006) 0.26ng

response 10200

Ion	Exp%	Act%
91.10	100	100
106.10	31.30	27.67
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111703.D Vial: 3
Acq On : 11 Dec 2017 8:13 Operator: WA
Sample : MB R13121117 1000mL Inst : MS13
Misc : S31-12011701_AC00880

Quant Time: Dec 11 13:54:58 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

12/11/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	75211	12.500	ng	-0.04
37) 1,4-Difluorobenzene (IS2)	13.22	114	376740	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	155335	12.500	ng	-0.01
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	11.96	65	113303	11.689	ng	-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 93.52%			
57) Toluene-d8 (SS2)	15.65	98	391111	12.677	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 101.44%			
73) Bromofluorobenzene (SS3)	18.91	174	126091	11.962	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.68%			
Target Compounds						Qvalue
2) Propene	4.39	42	682	N.D.		
3) Dichlorodifluoromethan...	0.00	85	0	N.D.		
4) Chloromethane	0.00	50	0	N.D.		
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.		
6) Vinyl Chloride	0.00	62	0	N.D.		
7) 1,3-Butadiene	0.00	54	0	N.D.		
8) Bromomethane	0.00	94	0	N.D.		
9) Chloroethane	0.00	64	0	N.D.		
10) Ethanol	0.00	45	0	N.D. d		
11) Acetonitrile	0.00	41	0	N.D.		
12) Acrolein	0.00	56	0	N.D.		
13) Acetone	7.18	58	4293	0.702	ng #	52
14) Trichlorofluoromethane	0.00	101	0	N.D.		
15) 2-Propanol (Isopropanol)	0.00	45	0	N.D.		
16) Acrylonitrile	0.00	53	0	N.D.		
17) 1,1-Dichloroethene	0.00	96	0	N.D.		
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.		
19) Methylene Chloride	8.50	84	621	N.D.		
20) 3-Chloro-1-propene (Al...	0.00	41	0	N.D.		
21) Trichlorotrifluoroethane	0.00	151	0	N.D.		
22) Carbon Disulfide	8.77	76	3221	0.102	ng #	75
23) trans-1,2-Dichloroethene	0.00	61	0	N.D.		
24) 1,1-Dichloroethane	0.00	63	0	N.D.		
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.		
26) Vinyl Acetate	0.00	86	0	N.D.		
27) 2-Butanone (MEK)	10.34	72	327	N.D.		
28) cis-1,2-Dichloroethene	0.00	61	0	N.D.		
29) Diisopropyl Ether	0.00	87	0	N.D.		
30) Ethyl Acetate	0.00	61	0	N.D.		
31) n-Hexane	0.00	57	0	N.D.		
32) Chloroform	0.00	83	0	N.D.		
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.		
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.		
36) 1,2-Dichloroethane	0.00	62	0	N.D.		
38) 1,1,1-Trichloroethane	0.00	97	0	N.D.		
39) Isopropyl Acetate	0.00	61	0	N.D.		
40) 1-Butanol	0.00	56	0	N.D.		
41) Benzene	12.83	78	715	N.D.		
42) Carbon Tetrachloride	0.00	117	0	N.D.		
43) Cyclohexane	0.00	84	0	N.D.		
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.		
45) 1,2-Dichloropropane	0.00	63	0	N.D.		
46) Bromodichloromethane	0.00	83	0	N.D.		
47) Trichloroethene	0.00	130	0	N.D.		
48) 1,4-Dioxane	0.00	88	0	N.D.		
49) 2,2,4-Trimethylpentane...	0.00	57	0	N.D.		
50) Methyl Methacrylate	0.00	100	0	N.D.		

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111703.D Vial: 3
Acq On : 11 Dec 2017 8:13 Operator: WA
Sample : MB R13121117 1000mL Inst : MS13
Misc : S31-12011701_AC00880

Quant Time: Dec 11 13:54:58 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

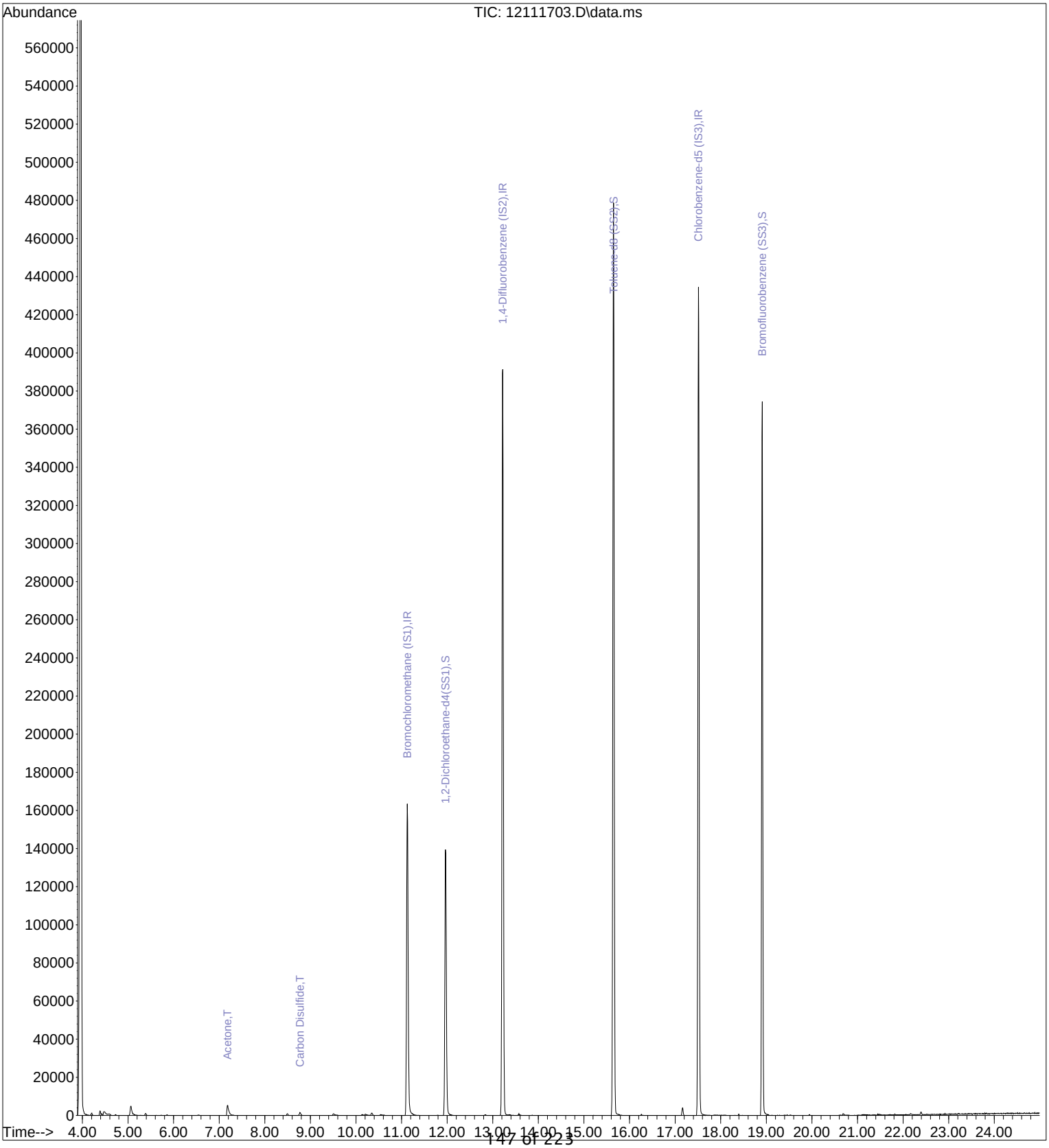
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	0.00	71	0	N.D.		
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.		
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.		
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.		
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.		
58) Toluene	15.75	91	105	N.D.		
59) 2-Hexanone	0.00	43	0	N.D.		
60) Dibromochloromethane	0.00	129	0	N.D.		
61) 1,2-Dibromoethane	0.00	107	0	N.D.		
62) n-Butyl Acetate	0.00	43	0	N.D.		
63) n-Octane	0.00	57	0	N.D.		
64) Tetrachloroethene	0.00	166	0	N.D.		
65) Chlorobenzene	0.00	112	0	N.D.		
66) Ethylbenzene	17.93	91	402	N.D.		
67) m- & p-Xylenes	18.07	91	360	N.D.		
68) Bromoform	0.00	173	0	N.D.		
69) Styrene	0.00	104	0	N.D.		
70) o-Xylene	0.00	91	0	N.D.		
71) n-Nonane	0.00	43	0	N.D.		
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.		
74) Cumene	0.00	105	0	N.D.		
75) alpha-Pinene	0.00	93	0	N.D.		
76) n-Propylbenzene	19.46	91	125	N.D.		
77) 3-Ethyltoluene	19.40	105	165	N.D.		
78) 4-Ethyltoluene	0.00	105	0	N.D.		
79) 1,3,5-Trimethylbenzene	0.00	105	0	N.D.		
80) alpha-Methylstyrene	0.00	118	0	N.D.		
81) 2-Ethyltoluene	0.00	105	0	N.D.		
82) 1,2,4-Trimethylbenzene	0.00	105	0	N.D.		
83) n-Decane	0.00	57	0	N.D.		
84) Benzyl Chloride	0.00	91	0	N.D.		
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.		
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.		
87) sec-Butylbenzene	0.00	105	0	N.D.		
88) 4-Isopropyltoluene (p-...	20.63	119	131	N.D.		
89) 1,2,3-Trimethylbenzene	0.00	105	0	N.D.		
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.		
91) d-Limonene	0.00	68	0	N.D.		
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.		
93) n-Undecane	0.00	57	0	N.D.		
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.		
95) Naphthalene	22.16	128	929	N.D.		
96) n-Dodecane	0.00	57	0	N.D.		
97) Hexachlorobutadiene	0.00	225	0	N.D.		
98) Cyclohexanone	0.00	55	0	N.D.		
99) tert-Butylbenzene	0.00	119	0	N.D.		
100) n-Butylbenzene	0.00	91	0	N.D.		

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111703.D Vial: 3
Acq On : 11 Dec 2017 8:13 Operator: WA
Sample : MB R13121117 1000mL Inst : MS13
Misc : S31-12011701_AC00880

Quant Time: Dec 11 13:54:58 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111704.D Vial: 3
Acq On : 11 Dec 2017 8:47 Operator: WA/RS
Sample : LCS R13121117 25ng Inst : MS13
Misc : S31-12011701/S31-11271704 (12/26)

Quant Time: Dec 11 14:30:27 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 12/11/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.15	130	76317	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.23	114	371111	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.52	82	154029	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.98	65	114102	11.600	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 92.80%				
57) Toluene-d8 (SS2)	15.65	98	380880	12.450	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.60%				
73) Bromofluorobenzene (SS3)	18.91	174	126055	12.060	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.48%				
Target Compounds							Qvalue
2) Propene	4.36	42	222609	20.980	ng		98
3) Dichlorodifluoromethan...	4.51	85	373223	21.667	ng		100
4) Chloromethane	4.77	50	278105	22.504	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	5.03	135	197662	22.358	ng		99
6) Vinyl Chloride	5.18	62	282557	23.725	ng		100
7) 1,3-Butadiene	5.43	54	244579	28.983	ng		98
8) Bromomethane	5.85	94	182298	25.920	ng		100
9) Chloroethane	6.17	64	150143	24.840	ng		99
10) Ethanol	6.53	45	793395	132.231	ng		100
11) Acetonitrile	6.77	41	416801	28.904	ng		99
12) Acrolein	6.94	56	133131	26.576	ng		98
13) Acetone	7.14	58	768519	123.870	ng		89
14) Trichlorofluoromethane	7.38	101	336641	21.740	ng		100
15) 2-Propanol (Isopropanol)	7.62	45	1127911	53.266	ng		97
16) Acrylonitrile	7.86	53	285087	26.406	ng		99
17) 1,1-Dichloroethene	8.30	96	195638	24.178	ng		95
18) 2-Methyl-2-Propanol (t...	8.46	59	1056902	49.617	ng		99
19) Methylene Chloride	8.51	84	204320	22.853	ng		99
20) 3-Chloro-1-propene (Al...	8.66	41	342367	26.773	ng		100
21) Trichlorotrifluoroethane	8.91	151	183509	23.423	ng		98
22) Carbon Disulfide	8.77	76	753263	23.579	ng		100
23) trans-1,2-Dichloroethene	9.74	61	299709	26.601	ng		99
24) 1,1-Dichloroethane	9.98	63	363220	23.714	ng		100
25) Methyl tert-Butyl Ether	10.07	73	638730	24.317	ng		98
26) Vinyl Acetate	10.23	86	242718	137.509	ng		99
27) 2-Butanone (MEK)	10.47	72	143040	26.649	ng		98
28) cis-1,2-Dichloroethene	10.97	61	282223	24.608	ng		99
29) Diisopropyl Ether	11.26	87	171197	22.671	ng		96
30) Ethyl Acetate	11.27	61	149755	51.753	ng		98
31) n-Hexane	11.25	57	322571	22.826	ng		99
32) Chloroform	11.31	83	348498	23.326	ng		100
34) Tetrahydrofuran (THF)	11.71	72	138028	22.644	ng		98
35) Ethyl tert-Butyl Ether	11.84	87	247569	24.870	ng		99
36) 1,2-Dichloroethane	12.09	62	263867	22.976	ng		99
38) 1,1,1-Trichloroethane	12.37	97	311660	22.304	ng		100
39) Isopropyl Acetate	12.79	61	259350	51.550	ng	#	93
40) 1-Butanol	12.80	56	440956	52.003	ng		97
41) Benzene	12.84	78	791685	23.030	ng		100
42) Carbon Tetrachloride	13.00	117	282660	23.291	ng		99
43) Cyclohexane	13.13	84	614332	47.459	ng		97
44) tert-Amyl Methyl Ether	13.47	73	602688	24.279	ng		99
45) 1,2-Dichloropropane	13.68	63	200510	24.719	ng		98
46) Bromodichloromethane	13.86	83	278394	24.552	ng		100
47) Trichloroethene	13.92	130	219958	19.758	ng		100
48) 1,4-Dioxane	13.89	88	171722	26.054	ng		99
49) 2,2,4-Trimethylpentane...	13.99	57	870336	23.679	ng		97
50) Methyl Methacrylate	14.13	100	168802	48.505	ng		98

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111704.D Vial: 3
Acq On : 11 Dec 2017 8:47 Operator: WA/RS
Sample : LCS R13121117 25ng Inst : MS13
Misc : S31-12011701/S31-11271704 (12/26)

Quant Time: Dec 11 14:30:27 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

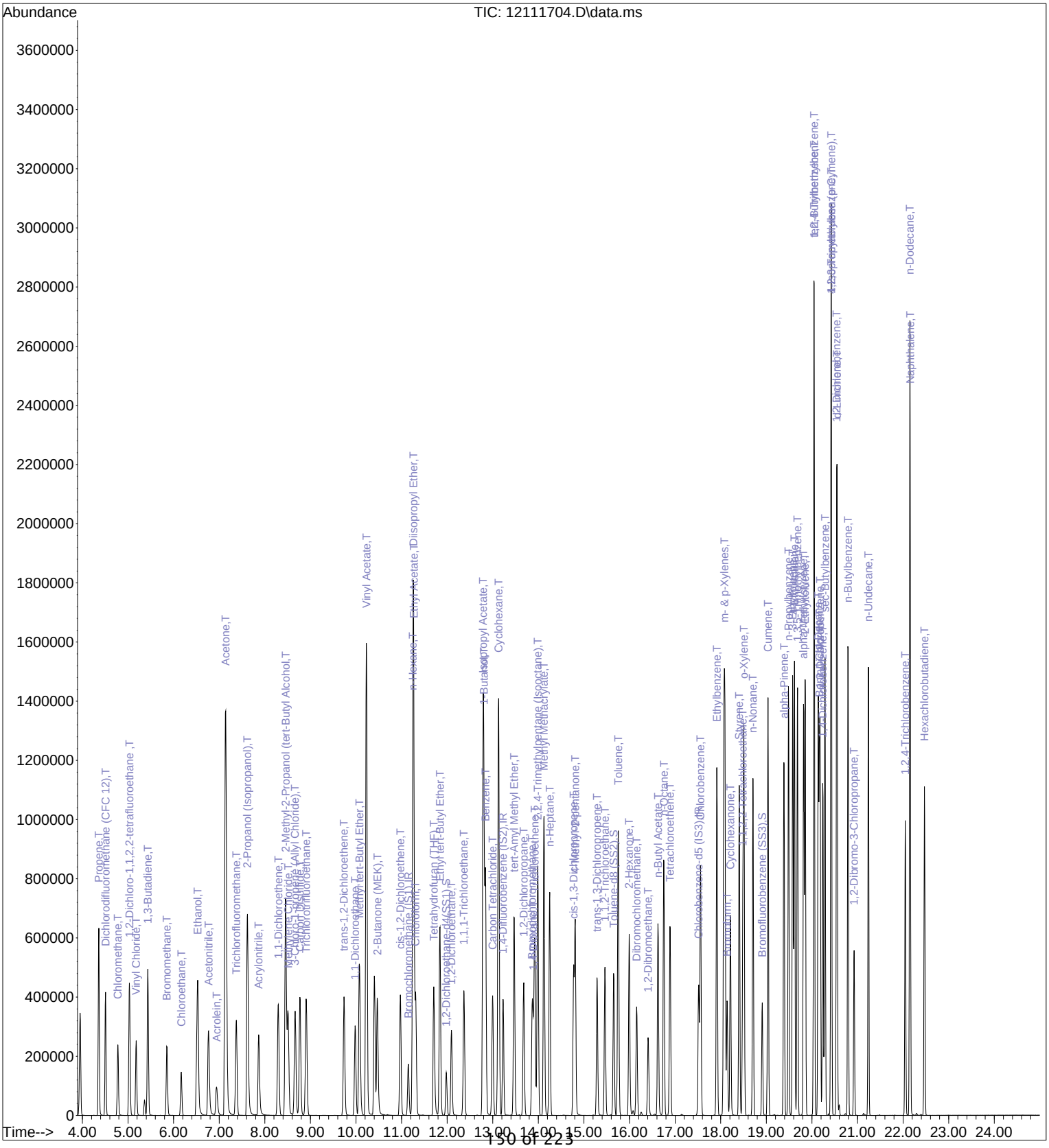
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.25	71	195963	23.556	ng	99
52) cis-1,3-Dichloropropene	14.77	75	333834	25.308	ng	100
53) 4-Methyl-2-pentanone	14.81	58	199323	28.298	ng	99
54) trans-1,3-Dichloropropene	15.29	75	309356	26.640	ng	100
55) 1,1,2-Trichloroethane	15.46	97	195160	24.969	ng	99
58) Toluene	15.75	91	814945	23.451	ng	100
59) 2-Hexanone	15.99	43	489947	25.613	ng	99
60) Dibromochloromethane	16.16	129	245180	25.996	ng	100
61) 1,2-Dibromoethane	16.41	107	221657	27.506	ng	100
62) n-Butyl Acetate	16.62	43	557854	27.385	ng	100
63) n-Octane	16.75	57	175836	24.352	ng	98
64) Tetrachloroethene	16.89	166	240432	22.995	ng	100
65) Chlorobenzene	17.56	112	545896	23.718	ng	100
66) Ethylbenzene	17.92	91	944562	23.651	ng	100
67) m- & p-Xylenes	18.08	91	1493645	47.313	ng	99
68) Bromoform	18.14	173	214474	26.236	ng	99
69) Styrene	18.40	104	597114	25.480	ng	99
70) o-Xylene	18.51	91	745331	23.404	ng	99
71) n-Nonane	18.71	43	429575	24.384	ng	99
72) 1,1,2,2-Tetrachloroethane	18.48	83	349179	25.779	ng	100
74) Cumene	19.04	105	963890	23.182	ng	100
75) alpha-Pinene	19.39	93	501634	23.823	ng	99
76) n-Propylbenzene	19.49	91	1151722	24.258	ng	99
77) 3-Ethyltoluene	19.58	105	987011	23.925	ng	100
78) 4-Ethyltoluene	19.62	105	903731	23.773	ng	100
79) 1,3,5-Trimethylbenzene	19.69	105	794028	22.729	ng	100
80) alpha-Methylstyrene	19.82	118	443616	25.685	ng	93
81) 2-Ethyltoluene	19.85	105	941543	23.332	ng	100
82) 1,2,4-Trimethylbenzene	20.05	105	811689	23.621	ng	99
83) n-Decane	20.14	57	437220	24.603	ng	99
84) Benzyl Chloride	20.16	91	717061	25.583	ng	100
85) 1,3-Dichlorobenzene	20.18	146	480176	24.336	ng	99
86) 1,4-Dichlorobenzene	20.24	146	488665	24.555	ng	100
87) sec-Butylbenzene	20.29	105	1068871	23.501	ng	99
88) 4-Isopropyltoluene (p-...	20.43	119	1023833	23.577	ng	99
89) 1,2,3-Trimethylbenzene	20.43	105	835077	23.881	ng	100
90) 1,2-Dichlorobenzene	20.54	146	459162	23.970	ng	100
91) d-Limonene	20.55	68	333681	24.843	ng	98
92) 1,2-Dibromo-3-Chloropr...	20.93	157	165216	22.557	ng	98
93) n-Undecane	21.24	57	455765	24.557	ng	100
94) 1,2,4-Trichlorobenzene	22.05	180	326751	21.475	ng	100
95) Naphthalene	22.16	128	1010330	21.802	ng	100
96) n-Dodecane	22.15	57	444303	25.634	ng	99
97) Hexachlorobutadiene	22.47	225	230026	21.632	ng	100
98) Cyclohexanone	18.21	55	305490	24.755	ng	97
99) tert-Butylbenzene	20.05	119	792483	23.141	ng	100
100) n-Butylbenzene	20.79	91	861594	24.323	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111704.D Vial: 3
Acq On : 11 Dec 2017 8:47 Operator: WA/RS
Sample : LCS R13121117 25ng Inst : MS13
Misc : S31-12011701/S31-11271704 (12/26)

Quant Time: Dec 11 14:30:27 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111712.D Vial: 3
Acq On : 11 Dec 2017 13:42 Operator: WA
Sample : LCSD R13121117 25ng Inst : MS13
Misc : S31-12011701/S31-11271704 (12/26)

Quant Time: Dec 11 14:45:04 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 12/11/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.15	130	76414	12.500	ng	-0.02
37) 1,4-Difluorobenzene (IS2)	13.23	114	372269	12.500	ng	-0.02
56) Chlorobenzene-d5 (IS3)	17.52	82	155877	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	11.98	65	116010	11.779	ng	-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.24%			
57) Toluene-d8 (SS2)	15.65	98	386463	12.482	ng	-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.84%			
73) Bromofluorobenzene (SS3)	18.91	174	131571	12.438	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.52%			
Target Compounds						Qvalue
2) Propene	4.36	42	227316	21.397	ng	98
3) Dichlorodifluoromethan...	4.51	85	378992	21.974	ng	100
4) Chloromethane	4.78	50	289737	23.415	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	5.03	135	199892	22.582	ng	100
6) Vinyl Chloride	5.18	62	285350	23.930	ng	100
7) 1,3-Butadiene	5.43	54	241697	28.605	ng	98
8) Bromomethane	5.86	94	181674	25.798	ng	99
9) Chloroethane	6.17	64	150188	24.816	ng	100
10) Ethanol	6.53	45	799902	133.147	ng	100
11) Acetonitrile	6.77	41	421753	29.210	ng	100
12) Acrolein	6.94	56	133139	26.544	ng	98
13) Acetone	7.14	58	770898	124.096	ng	89
14) Trichlorofluoromethane	7.38	101	339328	21.885	ng	100
15) 2-Propanol (Isopropanol)	7.62	45	1134092	53.490	ng	97
16) Acrylonitrile	7.86	53	286465	26.500	ng	99
17) 1,1-Dichloroethene	8.30	96	196436	24.246	ng	96
18) 2-Methyl-2-Propanol (t...	8.46	59	1055195	49.474	ng	99
19) Methylene Chloride	8.51	84	204268	22.819	ng	100
20) 3-Chloro-1-propene (Al...	8.67	41	343951	26.863	ng	99
21) Trichlorotrifluoroethane	8.91	151	184570	23.529	ng	98
22) Carbon Disulfide	8.77	76	754048	23.574	ng	100
23) trans-1,2-Dichloroethene	9.74	61	300673	26.652	ng	98
24) 1,1-Dichloroethane	9.98	63	366577	23.903	ng	100
25) Methyl tert-Butyl Ether	10.07	73	644575	24.509	ng	98
26) Vinyl Acetate	10.23	86	244549	138.370	ng	97
27) 2-Butanone (MEK)	10.47	72	143434	26.688	ng	99
28) cis-1,2-Dichloroethene	10.97	61	283651	24.701	ng	99
29) Diisopropyl Ether	11.26	87	173838	22.992	ng	96
30) Ethyl Acetate	11.26	61	153084	52.836	ng	97
31) n-Hexane	11.25	57	329793	23.307	ng	100
32) Chloroform	11.31	83	351578	23.502	ng	100
34) Tetrahydrofuran (THF)	11.71	72	139034	22.780	ng	97
35) Ethyl tert-Butyl Ether	11.84	87	249721	25.054	ng	99
36) 1,2-Dichloroethane	12.09	62	266021	23.135	ng	100
38) 1,1,1-Trichloroethane	12.37	97	315208	22.488	ng	100
39) Isopropyl Acetate	12.79	61	261691	51.853	ng	94
40) 1-Butanol	12.80	56	446645	52.510	ng	97
41) Benzene	12.84	78	803535	23.302	ng	100
42) Carbon Tetrachloride	13.00	117	285444	23.447	ng	100
43) Cyclohexane	13.13	84	622557	47.945	ng	98
44) tert-Amyl Methyl Ether	13.47	73	608816	24.450	ng	99
45) 1,2-Dichloropropane	13.68	63	203047	24.954	ng	99
46) Bromodichloromethane	13.87	83	280376	24.650	ng	99
47) Trichloroethene	13.92	130	221989	19.878	ng	100
48) 1,4-Dioxane	13.89	88	172913	26.153	ng	98
49) 2,2,4-Trimethylpentane...	13.99	57	880525	23.882	ng	97
50) Methyl Methacrylate	14.13	100	171585	49.151	ng	98

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111712.D Vial: 3
Acq On : 11 Dec 2017 13:42 Operator: WA
Sample : LCSD R13121117 25ng Inst : MS13
Misc : S31-12011701/S31-11271704 (12/26)

Quant Time: Dec 11 14:45:04 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

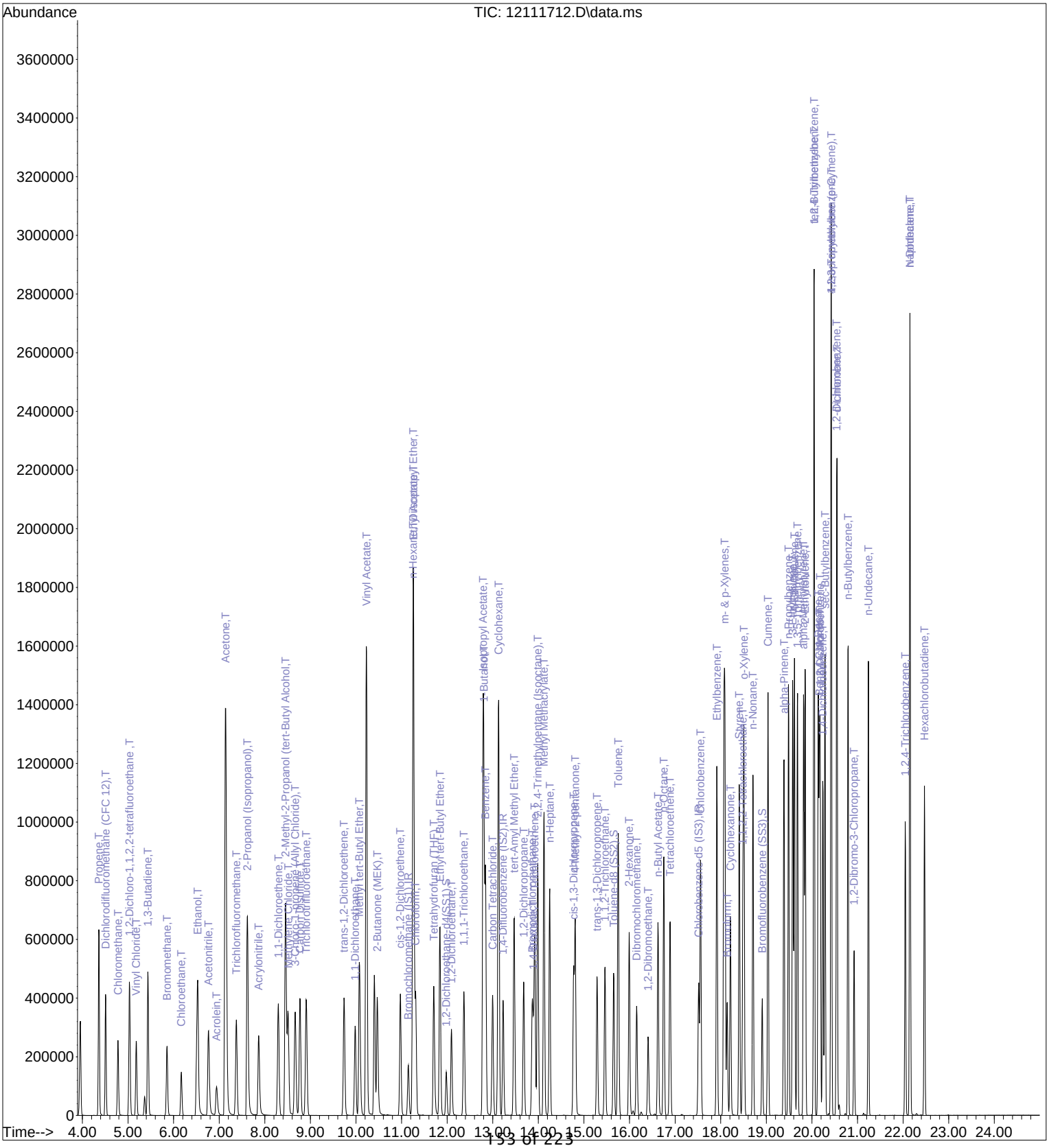
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.25	71	199372	23.892	ng	99
52) cis-1,3-Dichloropropene	14.77	75	336976	25.467	ng	100
53) 4-Methyl-2-pentanone	14.81	58	202200	28.617	ng	99
54) trans-1,3-Dichloropropene	15.29	75	314279	26.980	ng	100
55) 1,1,2-Trichloroethane	15.46	97	197793	25.228	ng	99
58) Toluene	15.75	91	825566	23.475	ng	100
59) 2-Hexanone	15.99	43	498810	25.767	ng	99
60) Dibromochloromethane	16.16	129	246702	25.847	ng	99
61) 1,2-Dibromoethane	16.41	107	224783	27.563	ng	100
62) n-Butyl Acetate	16.62	43	565141	27.414	ng	99
63) n-Octane	16.75	57	178591	24.440	ng	99
64) Tetrachloroethene	16.89	166	249194	23.550	ng	100
65) Chlorobenzene	17.56	112	552936	23.739	ng	100
66) Ethylbenzene	17.92	91	951466	23.541	ng	100
67) m- & p-Xylenes	18.09	91	1511031	47.296	ng	99
68) Bromoform	18.14	173	216157	26.128	ng	99
69) Styrene	18.40	104	601111	25.347	ng	99
70) o-Xylene	18.51	91	754933	23.425	ng	100
71) n-Nonane	18.71	43	436744	24.497	ng	100
72) 1,1,2,2-Tetrachloroethane	18.48	83	352851	25.741	ng	100
74) Cumene	19.04	105	973238	23.129	ng	100
75) alpha-Pinene	19.39	93	504551	23.678	ng	99
76) n-Propylbenzene	19.49	91	1160331	24.150	ng	99
77) 3-Ethyltoluene	19.58	105	988744	23.683	ng	100
78) 4-Ethyltoluene	19.62	105	913839	23.754	ng	100
79) 1,3,5-Trimethylbenzene	19.69	105	799821	22.623	ng	100
80) alpha-Methylstyrene	19.82	118	446012	25.517	ng	93
81) 2-Ethyltoluene	19.85	105	955128	23.388	ng	100
82) 1,2,4-Trimethylbenzene	20.05	105	822446	23.650	ng	100
83) n-Decane	20.14	57	442593	24.610	ng	100
84) Benzyl Chloride	20.16	91	722406	25.469	ng	100
85) 1,3-Dichlorobenzene	20.18	146	482837	24.180	ng	100
86) 1,4-Dichlorobenzene	20.24	146	494332	24.545	ng	100
87) sec-Butylbenzene	20.29	105	1081758	23.502	ng	99
88) 4-Isopropyltoluene (p-...	20.43	119	1034603	23.542	ng	99
89) 1,2,3-Trimethylbenzene	20.43	105	845219	23.884	ng	100
90) 1,2-Dichlorobenzene	20.54	146	464670	23.970	ng	100
91) d-Limonene	20.55	68	336416	24.750	ng	97
92) 1,2-Dibromo-3-Chloropr...	20.93	157	166845	22.510	ng	98
93) n-Undecane	21.24	57	465162	24.766	ng	99
94) 1,2,4-Trichlorobenzene	22.05	180	329580	21.404	ng	100
95) Naphthalene	22.15	128	1016751	21.680	ng	100
96) n-Dodecane	22.15	57	456586	26.030	ng	99
97) Hexachlorobutadiene	22.47	225	233427	21.692	ng	100
98) Cyclohexanone	18.21	55	311374	24.933	ng	97
99) tert-Butylbenzene	20.05	119	801019	23.113	ng	100
100) n-Butylbenzene	20.79	91	870949	24.295	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111712.D Vial: 3
Acq On : 11 Dec 2017 13:42 Operator: WA
Sample : LCSD R13121117 25ng Inst : MS13
Misc : S31-12011701/S31-11271704 (12/26)

Quant Time: Dec 11 14:45:04 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111716.D Vial: 6
Acq On : 11 Dec 2017 17:05 Operator: WA
Sample : P1706106-002dup (75mL) Inst : MS13
Misc : S31-12011701

RS 12/12/17
WA 12/13/17

Quant Time: Dec 12 14:27:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	79389	12.500	ng		-0.03
37) 1,4-Difluorobenzene (IS2)	13.22	114	383000	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	161612	12.500	ng		-0.01
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	120526	11.779	ng		-0.03
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.24%				
57) Toluene-d8 (SS2)	15.65	98	402342	12.534	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.24%				
73) Bromofluorobenzene (SS3)	18.91	174	134409	12.255	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.08%				
Target Compounds							Qvalue
2) Propene	4.36	42	30251	2.741	ng		96
3) Dichlorodifluoromethan...	4.52	85	10606	0.592	ng		99
4) Chloromethane	4.79	50	758	N.D.			
5) 1,2-Dichloro-1,1,2,2-t...	0.00	135	0	N.D.			
6) Vinyl Chloride	0.00	62	0	N.D.			
7) 1,3-Butadiene	5.45	54	657	N.D.			
8) Bromomethane	0.00	94	0	N.D.			
9) Chloroethane	0.00	64	0	N.D.			
10) Ethanol	0.00	45	0	N.D. d			
11) Acetonitrile	6.70	41	888	N.D.			
12) Acrolein	0.00	56	0	N.D.			
13) Acetone	7.15	58	13963	2.163	ng	#	59
14) Trichlorofluoromethane	7.38	101	1497	0.093	ng		87
15) 2-Propanol (Isopropanol)	7.71	45	107	N.D.			
16) Acrylonitrile	7.94	53	63	N.D.			
17) 1,1-Dichloroethene	8.29	96	1901	0.226	ng		96
18) 2-Methyl-2-Propanol (t...	0.00	59	0	N.D.			
19) Methylene Chloride	8.49	84	832	N.D.			
20) 3-Chloro-1-propene (Al...	8.59	41	653	N.D.			
21) Trichlorotrifluoroethane	8.91	151	38512	4.726	ng		99
22) Carbon Disulfide	8.77	76	20602	0.620	ng		95
23) trans-1,2-Dichloroethene	9.72	61	144413	12.321	ng		100
24) 1,1-Dichloroethane	9.85	63	174	N.D.			
25) Methyl tert-Butyl Ether	0.00	73	0	N.D.			
26) Vinyl Acetate	0.00	86	0	N.D. d			
27) 2-Butanone (MEK)	10.49	72	4908	0.879	ng	#	85
28) cis-1,2-Dichloroethene	10.97	61	1050	N.D.			
29) Diisopropyl Ether	0.00	87	0	N.D.			
30) Ethyl Acetate	0.00	61	0	N.D.			
31) n-Hexane	11.25	57	2940	0.200	ng	#	85
32) Chloroform	11.30	83	2092	0.135	ng		96
34) Tetrahydrofuran (THF)	0.00	72	0	N.D.			
35) Ethyl tert-Butyl Ether	0.00	87	0	N.D.			
36) 1,2-Dichloroethane	0.00	62	0	N.D.			
38) 1,1,1-Trichloroethane	12.36	97	116137	8.053	ng		100
39) Isopropyl Acetate	0.00	61	0	N.D.			
40) 1-Butanol	12.87	56	396	N.D.			
41) Benzene	12.84	78	3778	0.106	ng		89
42) Carbon Tetrachloride	0.00	117	0	N.D.			
43) Cyclohexane	13.12	84	3896	0.292	ng		92
44) tert-Amyl Methyl Ether	0.00	73	0	N.D.			
45) 1,2-Dichloropropane	0.00	63	0	N.D.			
46) Bromodichloromethane	0.00	83	0	N.D. d			
47) Trichloroethene	13.91	130	769341	66.961	ng		99
48) 1,4-Dioxane	0.00	88	0	N.D.			
49) 2,2,4-Trimethylpentane...	13.97	57	237	N.D.			
50) Methyl Methacrylate	0.00	100	0	N.D. d			

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111716.D Vial: 6
Acq On : 11 Dec 2017 17:05 Operator: WA
Sample : P1706106-002dup (75mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 14:27:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

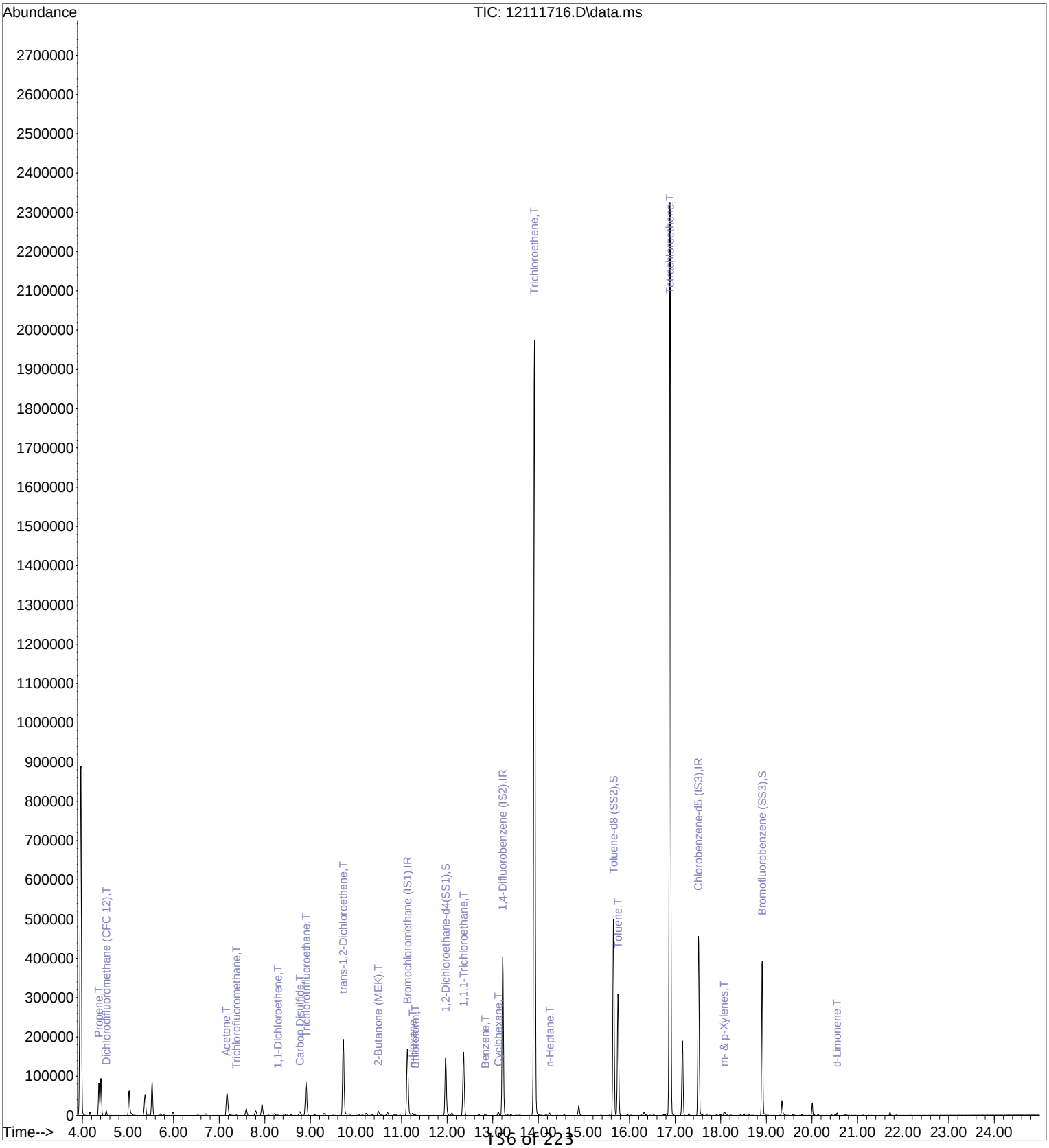
Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
51) n-Heptane	14.25	71	1620	0.189 ng	96
52) cis-1,3-Dichloropropene	0.00	75	0	N.D.	
53) 4-Methyl-2-pentanone	0.00	58	0	N.D.	
54) trans-1,3-Dichloropropene	0.00	75	0	N.D.	
55) 1,1,2-Trichloroethane	0.00	97	0	N.D.	
58) Toluene	15.75	91	268338	7.360 ng	100
59) 2-Hexanone	0.00	43	0	N.D. d	
60) Dibromochloromethane	0.00	129	0	N.D.	
61) 1,2-Dibromoethane	0.00	107	0	N.D.	
62) n-Butyl Acetate	16.49	43	177	N.D.	
63) n-Octane	16.75	57	455	N.D.	
64) Tetrachloroethene	16.89	166	862457	78.615 ng	99
65) Chlorobenzene	17.59	112	115	N.D.	
66) Ethylbenzene	17.92	91	2785	N.D.	
67) m- & p-Xylenes	18.07	91	7916	0.239 ng	96
68) Bromoform	0.00	173	0	N.D.	
69) Styrene	18.42	104	567	N.D.	
70) o-Xylene	18.51	91	2187	N.D.	
71) n-Nonane	18.70	43	526	N.D.	
72) 1,1,2,2-Tetrachloroethane	0.00	83	0	N.D.	
74) Cumene	19.04	105	781	N.D.	
75) alpha-Pinene	19.39	93	258	N.D.	
76) n-Propylbenzene	19.49	91	872	N.D.	
77) 3-Ethyltoluene	19.58	105	1899	N.D.	
78) 4-Ethyltoluene	19.62	105	1356	N.D.	
79) 1,3,5-Trimethylbenzene	19.69	105	510	N.D.	
80) alpha-Methylstyrene	19.83	118	276	N.D.	
81) 2-Ethyltoluene	19.85	105	432	N.D.	
82) 1,2,4-Trimethylbenzene	20.05	105	1842	N.D.	
83) n-Decane	20.14	57	1208	N.D.	
84) Benzyl Chloride	0.00	91	0	N.D.	
85) 1,3-Dichlorobenzene	0.00	146	0	N.D.	
86) 1,4-Dichlorobenzene	0.00	146	0	N.D.	
87) sec-Butylbenzene	20.42	105	205	N.D.	
88) 4-Isopropyltoluene (p-...	20.42	119	852	N.D.	
89) 1,2,3-Trimethylbenzene	20.42	105	205	N.D.	
90) 1,2-Dichlorobenzene	0.00	146	0	N.D.	
91) d-Limonene	20.55	68	1615	0.115 ng	88
92) 1,2-Dibromo-3-Chloropr...	0.00	157	0	N.D.	
93) n-Undecane	21.24	57	364	N.D.	
94) 1,2,4-Trichlorobenzene	0.00	180	0	N.D.	
95) Naphthalene	22.17	128	182	N.D.	
96) n-Dodecane	22.15	57	276	N.D.	
97) Hexachlorobutadiene	0.00	225	0	N.D.	
98) Cyclohexanone	18.23	55	130	N.D.	
99) tert-Butylbenzene	20.00	119	634	N.D.	
100) n-Butylbenzene	20.80	91	125	N.D.	

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111716.D Vial: 6
Acq On : 11 Dec 2017 17:05 Operator: WA
Sample : P1706106-002dup (75mL) Inst : MS13
Misc : S31-12011701

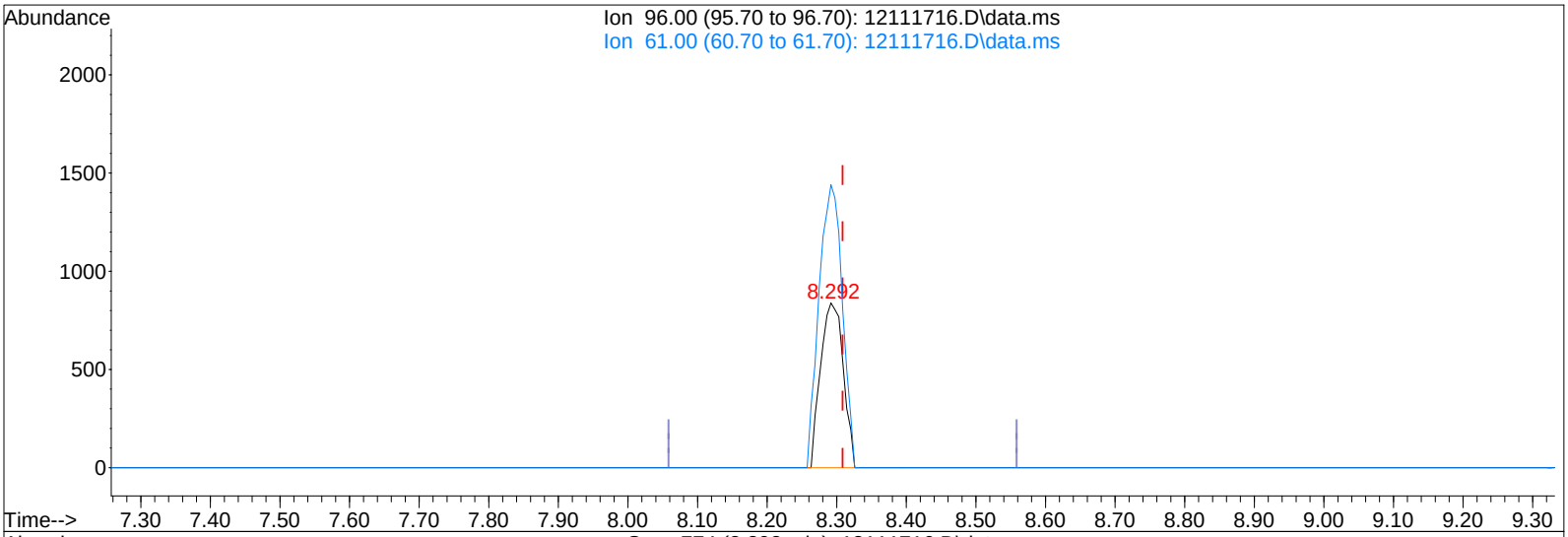
Quant Time: Dec 12 14:27:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

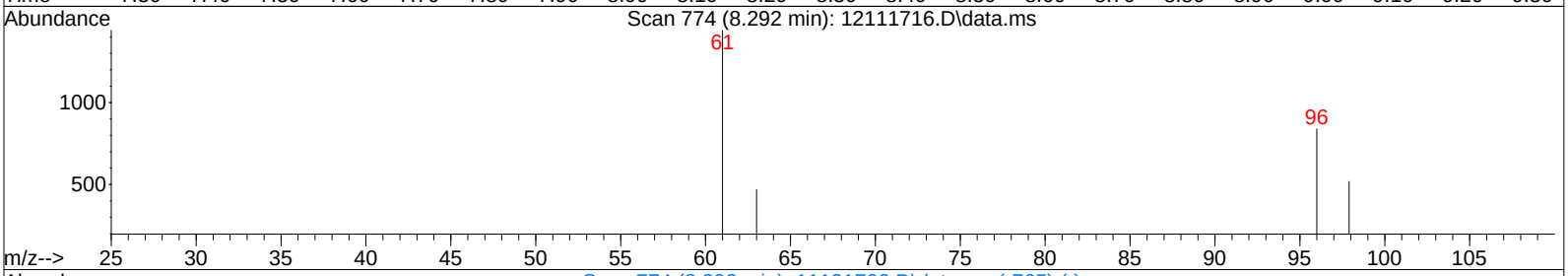


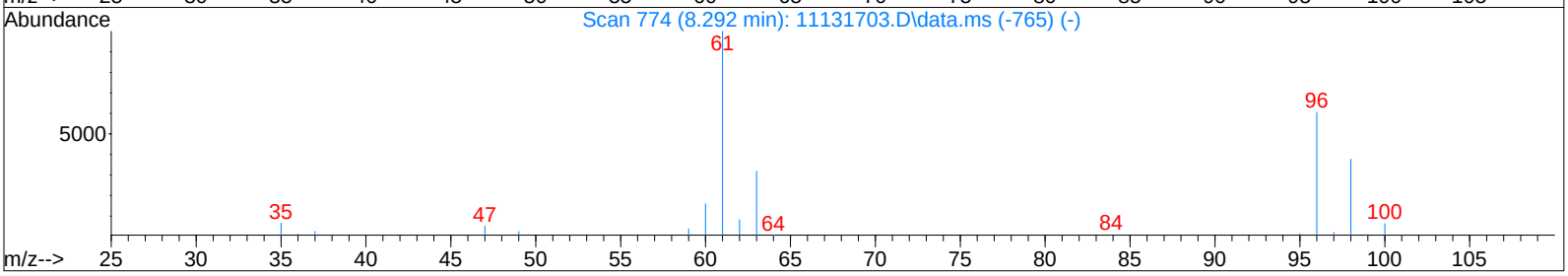
Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111716.D Vial: 6
Acq On : 11 Dec 2017 17:05 Operator: WA
Sample : P1706106-002dup (75mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:02 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M







TIC: 12111716.D\data.ms

(17) 1,1-Dichloroethene (T)

8.292min (-0.017) 0.23ng

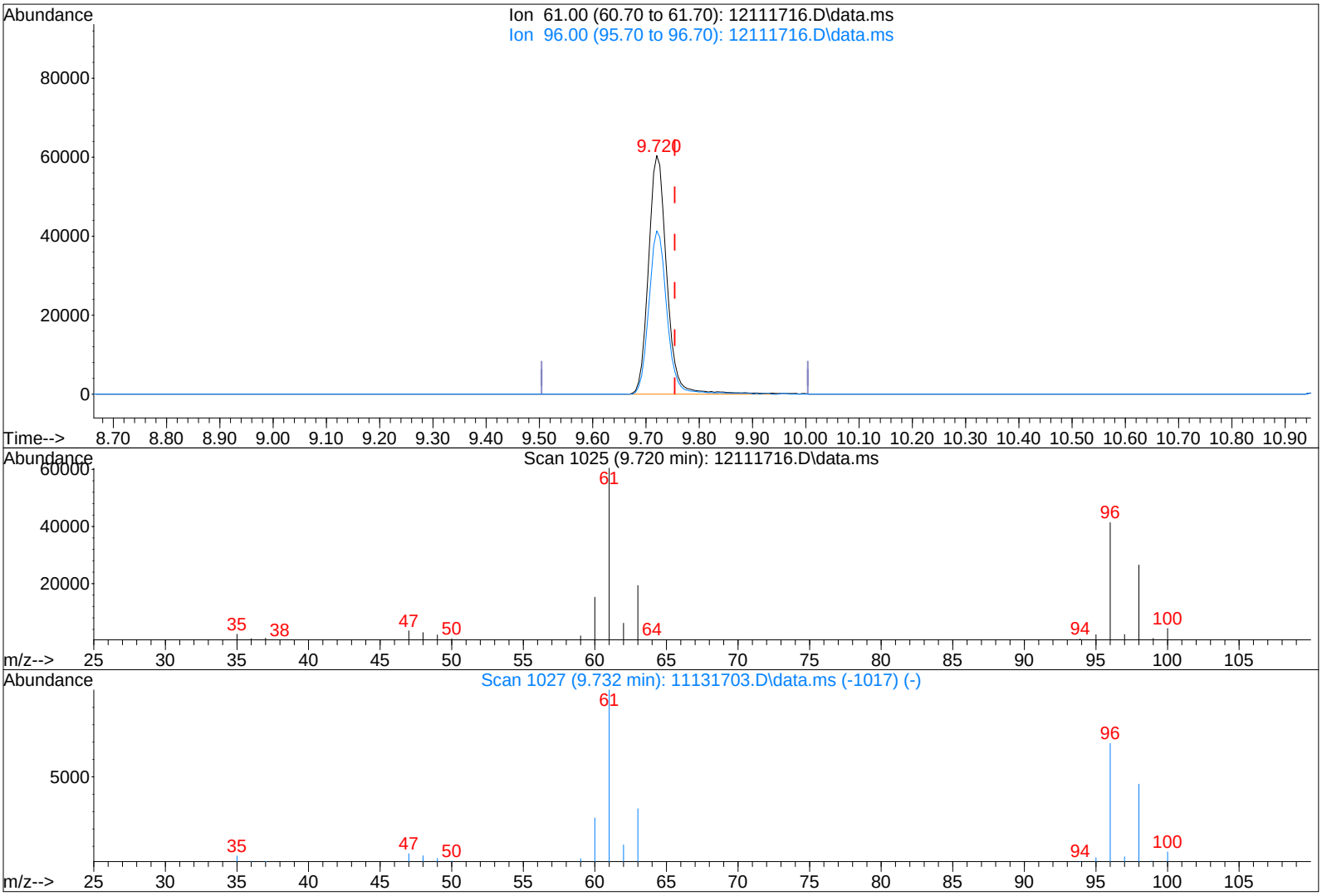
response 1901

Ion	Exp%	Act%
96.00	100	100
61.00	170.40	176.17
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111716.D Vial: 6
Acq On : 11 Dec 2017 17:05 Operator: WA
Sample : P1706106-002dup (75mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:02 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111716.D\data.ms

(23) trans-1,2-Dichloroethene (T)

9.720min (-0.034) 12.32ng

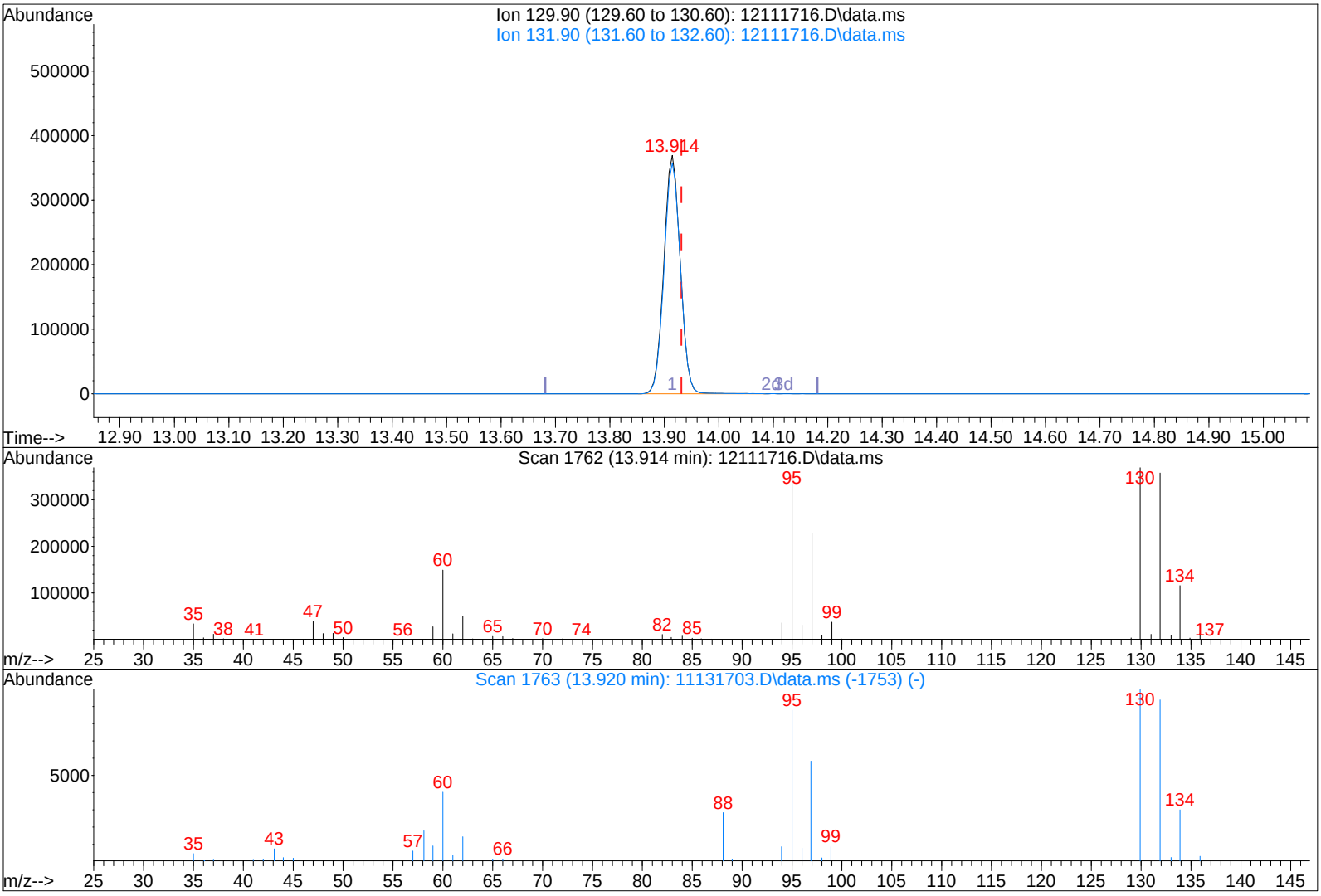
response 144413

Ion	Exp%	Act%
61.00	100	100
96.00	68.00	67.78
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111716.D Vial: 6
Acq On : 11 Dec 2017 17:05 Operator: WA
Sample : P1706106-002dup (75mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:02 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111716.D\data.ms

(47) Trichloroethene (T)

13.914min (-0.017) 66.96ng

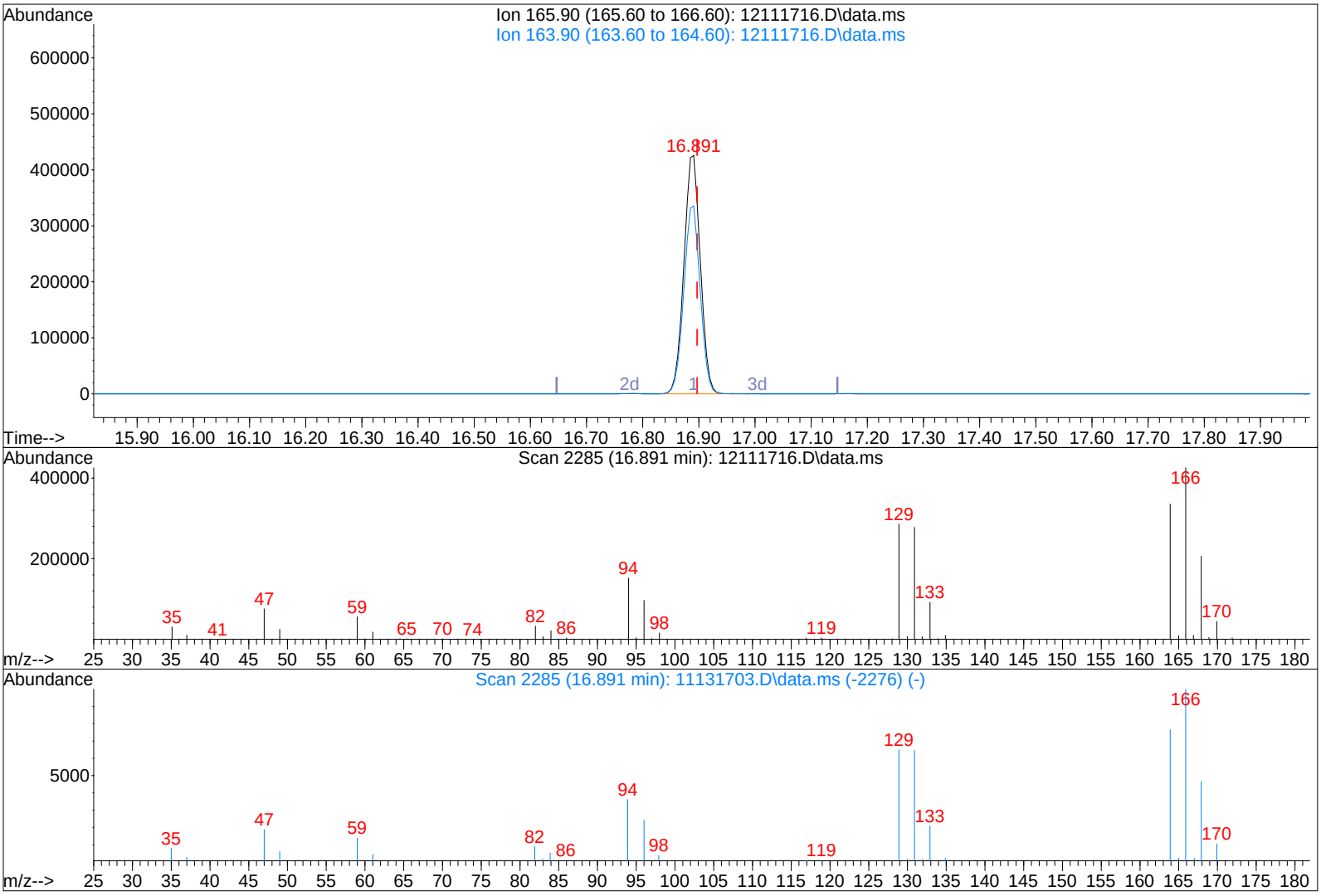
response 769341

Ion	Exp%	Act%
129.90	100	100
131.90	95.90	96.89
0.00	0.00	0.00
0.00	0.00	0.00

Quantitation Report (Qedit)

Data File : I:\MS13\DATA\2017 12\11\12111716.D Vial: 6
Acq On : 11 Dec 2017 17:05 Operator: WA
Sample : P1706106-002dup (75mL) Inst : MS13
Misc : S31-12011701

Quant Time: Dec 12 06:47:02 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



TIC: 12111716.D\data.ms

(64) Tetrachloroethene (T)

16.891min (-0.006) 78.61ng

response 862457

Ion	Exp%	Act%
165.90	100	100
163.90	78.30	78.84
0.00	0.00	0.00
0.00	0.00	0.00

Response Factor Report MS13

Method Path : I:\MS13\METHODS\
Method File : R13110617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Mon Nov 06 15:28:21 2017
Response Via : Initial Calibration

Calibration Files
0.08=11061703.D 0.10=11061704.D 0.20=11061705.D 0.40=11061706.D 1.0 =11061707.D 5.0 =11061708.D 25 =11061709.D
50 =11061710.D 100 =11061711.D

		Compound	0.08	0.10	0.20	0.40	1.0	5.0	25	50	100	Avg	%RSD
1)	IR	Bromochloromethane...	----------	ISTD	----------								
2)	T	Propene	1.861	2.019	1.558	2.428	1.651	1.459	1.630	1.434	1.601	1.738	18.32
3)	T	Dichlorodifluo...	2.417	3.143	2.800	3.437	2.970	2.654	2.988	2.568	2.416	2.821	12.23
4)	T	Chloromethane	1.966	2.388	2.103	2.109	2.089	1.847	2.222	1.874	1.621	2.024	11.17
5)	T	1,2-Dichloro-1...	1.233	1.659	1.456	1.744	1.466	1.317	1.509	1.345	1.302	1.448	11.73
6)	T	Vinyl Chloride	1.796	2.124	1.887	2.390	1.939	1.763	2.049	1.843	1.767	1.951	10.59
7)	T	1,3-Butadiene	1.244	1.567	1.214	1.336	1.366	1.290	1.580	1.432	1.410	1.382	9.40
8)	T	Bromomethane	0.918	1.319	1.176	1.325	1.185	1.042	1.199	1.103	1.100	1.152	11.23
9)	T	Chloroethane		1.110	0.833	1.248	0.981	0.906	1.021	0.915	0.906	0.990	13.55
10)	T	Ethanol	0.838	1.048	0.961	1.082	1.043	0.948	1.066	0.943	0.917	0.983	8.30
11)	T	Acetonitrile	1.401	1.738	2.136	2.896	2.632	2.481	2.834	2.558	2.579	2.362	21.41
12)	T	Acrolein				0.795	0.798	0.772	0.911	0.825	0.822	0.821	5.87
13)	T	Acetone	1.003	1.124	0.998	1.224	1.031	0.941	1.047	0.914	0.864	1.016	10.76
14)	T	Trichlorofluor...	2.246	2.790	2.390	3.270	2.624	2.377	2.625	2.274	2.229	2.536	13.31
15)	T	2-Propanol (Is...	3.123	3.768	3.373	3.581	3.611	3.421	3.972	3.494	2.872	3.468	9.47
16)	T	Acrylonitrile				1.661	1.657	1.697	1.999	1.801	1.795	1.768	7.32
17)	T	1,1-Dichloroet...	1.270	1.402	1.252	1.640	1.310	1.197	1.384	1.240	1.234	1.325	10.31
18)	T	2-Methyl-2-Pro...	3.276	3.890	3.500	3.681	3.890	3.448	4.088	3.310	2.317	3.489	14.93
19)	T	Methylene Chlo...			1.752	1.871	1.418	1.265	1.422	1.275	1.248	1.464	17.06
20)	T	3-Chloro-1-pro...	1.974	2.064	1.798	2.455	2.074	1.971	2.351	2.105	2.058	2.095	9.49
21)	T	Trichlorotrifl...	1.200	1.291	1.187	1.587	1.352	1.182	1.369	1.198	1.183	1.283	10.62
22)	T	Carbon Disulfide				6.881	5.371	4.561	5.231	4.702	4.650	5.233	16.68
23)	T	trans-1,2-Dich...	1.451	1.651	1.605	2.247	1.940	1.835	2.127	1.897	1.856	1.845	13.59
24)	T	1,1-Dichloroet...	2.259	2.767	2.501	3.017	2.520	2.331	2.597	2.317	2.269	2.509	10.17
25)	T	Methyl tert-Bu...	4.112	4.771	4.195	4.258	4.423	4.162	4.669	4.136	3.994	4.302	6.15
26)	T	Vinyl Acetate				0.230	0.275	0.288	0.338	0.306	0.299	0.289	12.47
27)	T	2-Butanone (MEK)				0.721	0.867	0.857	1.012	0.913	0.904	0.879	10.81
28)	T	cis-1,2-Dichlo...	1.517	2.003	1.746	2.286	1.877	1.784	2.068	1.826	1.799	1.878	11.66
29)	T	Diisopropyl Ether	1.019	1.342	1.318	1.447	1.419	1.283	1.202	1.064	1.038	1.237	13.25
30)	T	Ethyl Acetate				0.508	0.483	0.452	0.509	0.454	0.437	0.474	6.51
31)	T	n-Hexane	2.313	2.801	2.409	2.727	2.405	2.114	2.212	1.949	1.901	2.315	13.49
32)	T	Chloroform	2.308	2.542	2.268	2.989	2.444	2.281	2.620	2.312	2.260	2.447	9.85
33)	S	1,2-Dichloroet...	1.562	1.566	1.581	1.630	1.638	1.676	1.655	1.604	1.588	1.611	2.51
34)	T	Tetrahydrofura...	0.961	1.416	0.946	1.121	0.968	0.857	0.972	0.879	0.866	0.998	17.59
35)	T	Ethyl tert-But...	1.404	1.664	1.585	1.705	1.699	1.601	1.802	1.625	1.590	1.630	6.74
36)	T	1,2-Dichloroet...	1.442	1.892	1.718	2.351	1.954	1.863	2.110	1.836	1.763	1.881	13.48
37)	IR	1,4-Difluorobenzen...	----------	ISTD	----------								
38)	T	1,1,1-Trichlor...	0.413	0.503	0.447	0.549	0.491	0.447	0.518	0.443	0.425	0.471	9.82
39)	T	Isopropyl Acetate	0.134	0.174	0.165	0.193	0.181	0.168	0.188	0.165	0.157	0.169	10.44
40)	T	1-Butanol				0.247	0.269	0.282	0.335	0.296	0.286	0.286	10.33
41)	T	Benzene	1.183	1.384	1.135	1.338	1.147	1.043	1.178	1.033	0.979	1.158	11.67
42)	T	Carbon Tetrach...	0.321	0.408	0.383	0.452	0.434	0.401	0.475	0.410	0.394	0.409	10.82

VOA 11/7/17

Method Path : I:\MS13\METHODS\
Method File : R13110617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

43)	T	Cyclohexane	0.412	0.495	0.428	0.503	0.443	0.403	0.456	0.401	0.382	0.436	9.68
44)	T	tert-Amyl Meth...	0.791	0.899	0.790	0.871	0.854	0.795	0.927	0.813	0.786	0.836	6.34
45)	T	1,2-Dichloropr...	0.226	0.292	0.272	0.320	0.275	0.259	0.298	0.262	0.256	0.273	10.00
46)	T	Bromodichlorom...	0.313	0.389	0.340	0.437	0.393	0.373	0.439	0.381	0.370	0.382	10.62
47)	T	Trichloroethene	0.410	0.604	0.397	0.381	0.331	0.302	0.345	0.305	0.300	0.375	25.43
48)	T	1,4-Dioxane		0.174	0.171	0.260	0.230	0.225	0.259	0.230	0.227	0.222	15.14
49)	T	2,2,4-Trimethy...	1.236	1.417	1.237	1.453	1.235	1.116	1.270	1.115	1.063	1.238	10.67
50)	T	Methyl Methacr...				0.118	0.115	0.111	0.130	0.116	0.113	0.117	5.59
51)	T	n-Heptane	0.257	0.301	0.283	0.326	0.292	0.261	0.293	0.258	0.251	0.280	9.05
52)	T	cis-1,3-Dichlo...			0.354	0.453	0.442	0.435	0.520	0.460	0.446	0.444	11.00
53)	T	4-Methyl-2-pen...	0.143	0.187	0.199	0.275	0.265	0.254	0.299	0.262	0.253	0.237	21.05
54)	T	trans-1,3-Dich...			0.250	0.348	0.371	0.406	0.499	0.437	0.426	0.391	20.22
55)	T	1,1,2-Trichlor...	0.193	0.263	0.247	0.315	0.271	0.257	0.300	0.266	0.259	0.263	12.98
56)	IR	Chlorobenzene-d5 (...	----------	----------	----------	ISTD	----------	----------	----------	----------	----------	----------	
57)	S	Toluene-d8 (SS2)	2.560	2.541	2.523	2.488	2.451	2.462	2.424	2.447	2.449	2.483	1.93
58)	T	Toluene	2.847	3.265	2.762	3.156	2.787	2.550	2.888	2.612	2.514	2.820	9.13
59)	T	2-Hexanone				1.509	1.531	1.506	1.731	1.552	1.486	1.552	5.81
60)	T	Dibromochlorom...	0.623	0.647	0.690	0.839	0.790	0.759	0.913	0.823	0.807	0.765	12.47
61)	T	1,2-Dibromoethane	0.430	0.548	0.544	0.739	0.709	0.682	0.801	0.722	0.710	0.654	18.26
62)	T	n-Butyl Acetate			1.101	1.833	1.713	1.667	1.909	1.712	1.637	1.653	15.82
63)	T	n-Octane	0.544	0.612	0.576	0.732	0.594	0.546	0.601	0.544	0.525	0.586	10.67
64)	T	Tetrachloroethene	0.780	0.979	0.833	0.935	0.848	0.779	0.887	0.801	0.795	0.849	8.43
65)	T	Chlorobenzene	1.688	2.156	1.760	2.180	1.868	1.698	1.979	1.770	1.711	1.868	10.36
66)	T	Ethylbenzene	3.145	3.529	3.038	3.830	3.236	3.001	3.441	3.045	2.905	3.241	9.32
67)	T	m- & p-Xylenes	2.525	2.782	2.341	3.082	2.540	2.325	2.682	2.454	2.327	2.562	9.83
68)	T	Bromoform	0.471	0.591	0.580	0.678	0.657	0.670	0.822	0.755	0.748	0.663	16.00
69)	T	Styrene	1.600	1.786	1.594	2.267	1.915	1.848	2.203	1.985	1.919	1.902	12.24
70)	T	o-Xylene	2.512	2.763	2.411	3.063	2.556	2.384	2.760	2.453	2.357	2.584	9.05
71)	T	n-Nonane	1.379	1.513	1.335	1.752	1.462	1.326	1.515	1.337	1.248	1.430	10.57
72)	T	1,1,2,2-Tetrac...	0.874	1.125	0.966	1.210	1.119	1.071	1.263	1.146	1.119	1.099	10.77
73)	S	Bromofluoroben...	0.814	0.820	0.829	0.855	0.853	0.877	0.878	0.853	0.856	0.848	2.72
74)	T	Cumene	3.391	3.758	3.130	3.992	3.321	3.064	3.588	3.156	2.969	3.374	10.19
75)	T	alpha-Pinene	1.571	1.805	1.616	2.025	1.687	1.600	1.847	1.647	1.582	1.709	8.98
76)	T	n-Propylbenzene	3.526	4.093	3.481	4.634	3.907	3.649	4.231	3.722	3.434	3.853	10.44
77)	T	3-Ethyltoluene	2.946	3.397	3.029	4.009	3.443	3.203	3.653	3.409	3.042	3.348	10.14
78)	T	4-Ethyltoluene	2.921	3.243	2.761	3.735	3.062	2.849	3.447	2.886	2.861	3.085	10.60
79)	T	1,3,5-Trimethy...	2.770	3.053	2.640	3.324	2.773	2.611	3.058	2.699	2.589	2.835	8.92
80)	T	alpha-Methylst...	1.051	1.230	1.195	1.634	1.435	1.423	1.687	1.502	1.460	1.402	14.83
81)	T	2-Ethyltoluene	3.019	3.397	3.050	3.950	3.275	3.071	3.569	3.160	2.983	3.275	9.74
82)	T	1,2,4-Trimethy...	2.458	2.743	2.523	3.325	2.811	2.650	3.173	2.803	2.612	2.789	10.36
83)	T	n-Decane	1.270	1.488	1.362	1.708	1.469	1.402	1.591	1.391	1.299	1.442	9.69
84)	T	Benzyl Chloride				1.800	1.866	2.096	2.852	2.570	2.464	2.275	18.44
85)	T	1,3-Dichlorobe...	1.254	1.545	1.362	1.919	1.620	1.526	1.883	1.676	1.626	1.601	13.49
86)	T	1,4-Dichlorobe...	1.292	1.451	1.328	1.952	1.667	1.545	1.916	1.717	1.667	1.615	14.50
87)	T	sec-Butylbenzene	3.267	3.847	3.463	4.391	3.722	3.498	4.108	3.593	3.332	3.691	10.03
88)	T	4-Isopropyltol...	3.082	3.486	3.211	4.207	3.624	3.409	4.047	3.513	3.138	3.524	11.02
89)	T	1,2,3-Trimethy...	2.495	2.834	2.515	3.386	2.814	2.705	3.246	2.868	2.676	2.838	10.67
90)	T	1,2-Dichlorobe...	1.248	1.587	1.347	1.858	1.555	1.484	1.794	1.592	1.524	1.555	12.35
91)	T	d-Limonene	0.892	1.017	0.954	1.306	1.103	1.091	1.270	1.125	1.052	1.090	12.35
92)	T	1,2-Dibromo-3-...				0.571	0.513	0.545	0.700	0.623	0.614	0.594	11.15
93)	T	n-Undecane	1.340	1.435	1.321	1.718	1.588	1.512	1.737	1.511	1.394	1.506	10.10
94)	T	1,2,4-Trichlor...				1.198	1.101	1.085	1.465	1.295	1.265	1.235	11.41

Method Path : I:\MS13\METHODS\
Method File : R13110617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

95)	T	Naphthalene				3.435	3.309	3.312	4.704	4.093	3.711	3.761	14.63
96)	T	n-Dodecane	1.069	1.188	1.116	1.569	1.536	1.531	1.776	1.526	1.349	1.407	17.01
97)	T	Hexachlorobuta...		0.789	0.764	0.967	0.847	0.804	0.990	0.873	0.869	0.863	9.42
98)	T	Cyclohexanone				0.959	0.996	0.958	1.112	1.007	0.976	1.001	5.76
99)	T	tert-Butylbenzene	2.476	3.008	2.650	3.280	2.779	2.592	3.062	2.684	2.482	2.779	10.05
100)	T	n-Butylbenzene	2.273	2.846	2.354	3.442	2.994	2.873	3.392	2.961	2.738	2.875	13.83

(#) = Out of Range

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S31-10121708
20ng/L Std. ID: S31-10261706
200ng/L Std. ID: S31-10261705

11/7/17

Dilution Factors:		5	50	250	1000	Working STD Conc.(ng/L):	4	4	4	4	20	200	200	200	200
	Source Std.	Primary Working Standards				Injection (L):	0.020	0.025	0.050	0.100	0.050	0.025	0.125	0.25	0.50
Compounds	mg/m³	200ng/L	20ng/L	4ng/L	1ng/L	ICAL Points:	0.08ng	0.1ng	0.2ng	0.4ng	1ng	5ng	25ng	50ng	100ng
Propene	1.037	207.4	20.74	4.148	1.037		0.08296	0.1037	0.2074	0.4148	1.037	5.185	25.925	51.85	103.7
Dichlorodifluoromethane	1.048	209.6	20.96	4.192	1.048		0.08384	0.1048	0.2096	0.4192	1.048	5.240	26.200	52.40	104.8
Chloromethane	1.006	201.2	20.12	4.024	1.006		0.08048	0.1006	0.2012	0.4024	1.006	5.030	25.150	50.30	100.6
Freon-114	1.021	204.2	20.42	4.084	1.021		0.08168	0.1021	0.2042	0.4084	1.021	5.105	25.525	51.05	102.1
Vinyl Chloride	1.032	206.4	20.64	4.128	1.032		0.08256	0.1032	0.2064	0.4128	1.032	5.160	25.800	51.60	103.2
1,3-Butadiene	1.059	211.8	21.18	4.236	1.059		0.08472	0.1059	0.2118	0.4236	1.059	5.295	26.475	52.95	105.9
Bromomethane	0.993	198.6	19.86	3.972	0.993		0.07944	0.0993	0.1986	0.3972	0.993	4.965	24.825	49.65	99.3
Chloroethane	1.012	202.4	20.24	4.048	1.012		0.08096	0.1012	0.2024	0.4048	1.012	5.060	25.300	50.60	101.2
Ethanol	5.271	1054.2	105.42	21.084	5.271		0.42168	0.5271	1.0542	2.1084	5.271	26.355	131.775	263.55	527.1
Acetonitrile	1.059	211.8	21.18	4.236	1.059		0.08472	0.1059	0.2118	0.4236	1.059	5.295	26.475	52.95	105.9
Acrolein	1.054	210.8	21.08	4.216	1.054		0.08432	0.1054	0.2108	0.4216	1.054	5.270	26.350	52.70	105.4
Acetone	5.322	1064.4	106.44	21.288	5.322		0.42576	0.5322	1.0644	2.1288	5.322	26.610	133.050	266.10	532.2
Trichlorofluoromethane	1.051	210.2	21.02	4.204	1.051		0.08408	0.1051	0.2102	0.4204	1.051	5.255	26.275	52.55	105.1
Isopropanol	2.107	421.4	42.14	8.428	2.107		0.16856	0.2107	0.4214	0.8428	2.107	10.535	52.675	105.35	210.7
Acrylonitrile	1.056	211.2	21.12	4.224	1.056		0.08448	0.1056	0.2112	0.4224	1.056	5.280	26.400	52.80	105.6
1,1-Dichloroethene	1.061	212.2	21.22	4.244	1.061		0.08488	0.1061	0.2122	0.4244	1.061	5.305	26.525	53.05	106.1
tert-Butanol	2.120	424.0	42.40	8.480	2.120		0.16960	0.2120	0.4240	0.8480	2.120	10.600	53.000	106.00	212.0
Methylene Chloride	1.058	211.6	21.16	4.232	1.058		0.08464	0.1058	0.2116	0.4232	1.058	5.290	26.450	52.90	105.8
Allyl Chloride	1.054	210.8	21.08	4.216	1.054		0.08432	0.1054	0.2108	0.4216	1.054	5.270	26.350	52.70	105.4
Trichlorotrifluoroethane	1.053	210.6	21.06	4.212	1.053		0.08424	0.1053	0.2106	0.4212	1.053	5.265	26.325	52.65	105.3
Carbon Disulfide	1.063	212.6	21.26	4.252	1.063		0.08504	0.1063	0.2126	0.4252	1.063	5.315	26.575	53.15	106.3
trans-1,2-Dichloroethene	1.081	216.2	21.62	4.324	1.081		0.08648	0.1081	0.2162	0.4324	1.081	5.405	27.025	54.05	108.1
1,1-Dichloroethane	1.022	204.4	20.44	4.088	1.022		0.08176	0.1022	0.2044	0.4088	1.022	5.110	25.550	51.10	102.2
Methyl tert-Butyl Ether	1.070	214.0	21.40	4.280	1.070		0.08560	0.1070	0.2140	0.4280	1.070	5.350	26.750	53.50	107.0
Vinyl Acetate	5.281	1056.2	105.62	21.124	5.281		0.42248	0.5281	1.0562	2.1124	5.281	26.405	132.025	264.05	528.1
2-Butanone	1.052	210.4	21.04	4.208	1.052		0.08416	0.1052	0.2104	0.4208	1.052	5.260	26.300	52.60	105.2
cis-1,2-Dichloroethene	1.067	213.4	21.34	4.268	1.067		0.08536	0.1067	0.2134	0.4268	1.067	5.335	26.675	53.35	106.7
Diisopropyl Ether	1.065	213.0	21.30	4.260	1.065		0.08520	0.1065	0.2130	0.4260	1.065	5.325	26.625	53.25	106.5
Ethyl Acetate	2.136	427.2	42.72	8.544	2.136		0.17088	0.2136	0.4272	0.8544	2.136	10.680	53.400	106.80	213.6
n-Hexane	1.066	213.2	21.32	4.264	1.066		0.08528	0.1066	0.2132	0.4264	1.066	5.330	26.650	53.30	106.6
Chloroform	1.061	212.2	21.22	4.244	1.061		0.08488	0.1061	0.2122	0.4244	1.061	5.305	26.525	53.05	106.1
Tetrahydrofuran	1.064	212.8	21.28	4.256	1.064		0.08512	0.1064	0.2128	0.4256	1.064	5.320	26.600	53.20	106.4
Ethyl tert-Butyl Ether	1.059	211.8	21.18	4.236	1.059		0.08472	0.1059	0.2118	0.4236	1.059	5.295	26.475	52.95	105.9
1,2-Dichloroethane	1.055	211.0	21.10	4.220	1.055		0.08440	0.1055	0.2110	0.4220	1.055	5.275	26.375	52.75	105.5
1,1,1-Trichloroethane	1.077	215.4	21.54	4.308	1.077		0.08616	0.1077	0.2154	0.4308	1.077	5.385	26.925	53.85	107.7
Isopropyl Acetate	2.113	422.6	42.26	8.452	2.113		0.16904	0.2113	0.4226	0.8452	2.113	10.565	52.825	105.65	211.3
1-Butanol	2.114	422.8	42.28	8.456	2.114		0.16912	0.2114	0.4228	0.8456	2.114	10.570	52.850	105.70	211.4
Benzene	1.057	211.4	21.14	4.228	1.057		0.08456	0.1057	0.2114	0.4228	1.057	5.285	26.425	52.85	105.7
Carbon Tetrachloride	1.060	212.0	21.20	4.240	1.060		0.08480	0.1060	0.2120	0.4240	1.060	5.300	26.500	53.00	106.0
Cyclohexane	2.135	427.0	42.70	8.540	2.135		0.17080	0.2135	0.4270	0.8540	2.135	10.675	53.375	106.75	213.5
tert-Amyl Methyl Ether	1.057	211.4	21.14	4.228	1.057		0.08456	0.1057	0.2114	0.4228	1.057	5.285	26.425	52.85	105.7
1,2-Dichloropropane	1.066	213.2	21.32	4.264	1.066		0.08528	0.1066	0.2132	0.4264	1.066	5.330	26.650	53.30	106.6
Bromodichloromethane	1.067	213.4	21.34	4.268	1.067		0.08536	0.1067	0.2134	0.4268	1.067	5.335	26.675	53.35	106.7
Trichloroethene	1.061	212.2	21.22	4.244	1.061		0.08488	0.1061	0.2122	0.4244	1.061	5.305	26.525	53.05	106.1
1,4-Dioxane	1.063	212.6	21.26	4.252	1.063		0.08504	0.1063	0.2126	0.4252	1.063	5.315	26.575	53.15	106.3
Isooctane	1.060	212.0	21.20	4.240	1.060		0.08480	0.1060	0.2120	0.4240	1.060	5.300	26.500	53.00	106.0
Methyl Methacrylate	2.112	422.4	42.24	8.448	2.112		0.16896	0.2112	0.4224	0.8448	2.112	10.560	52.800	105.60	211.2
n-Heptane	1.065	213.0	21.30	4.260	1.065		0.08520	0.1065	0.2130	0.4260	1.065	5.325	26.625	53.25	106.5

Q:\TO15 Std. Concentrations\MS13 Std. Conc\2017\R13110617\ICAL Conc. (Primary Source)

Date Updated: 08/29/17
Version: 0

Primary Source Standards Concentrations (Working & Initial Calibration)

1ng/L Std. ID:
4ng/L Std. ID: S31-10121708
20ng/L Std. ID: S31-10261706
200ng/L Std. ID: S31-10261705

Dilution Factors:		5	50	250	1000	Working STD Conc.(ng/L):	4	4	4	4	20	200	200	200	200
	Source Std.	Primary Working Standards				Injection (L):	0.020	0.025	0.050	0.100	0.050	0.025	0.125	0.25	0.50
Compounds	mg/m^3	200ng/L	20ng/L	4ng/L	1ng/L	ICAL Points:	0.08ng	0.1ng	0.2ng	0.4ng	1ng	5ng	25ng	50ng	100ng
cis-1,3-Dichloropropene	1.120	224.0	22.40	4.480	1.120		0.08960	0.1120	0.2240	0.4480	1.120	5.600	28.000	56.00	112.0
4-Methyl-2-pentanone	1.059	211.8	21.18	4.236	1.059		0.08472	0.1059	0.2118	0.4236	1.059	5.295	26.475	52.95	105.9
trans-1,3-Dichloropropene	1.067	213.4	21.34	4.268	1.067		0.08536	0.1067	0.2134	0.4268	1.067	5.335	26.675	53.35	106.7
1,1,2-Trichloroethane	1.064	212.8	21.28	4.256	1.064		0.08512	0.1064	0.2128	0.4256	1.064	5.320	26.600	53.20	106.4
Toluene	1.054	210.8	21.08	4.216	1.054		0.08432	0.1054	0.2108	0.4216	1.054	5.270	26.350	52.70	105.4
2-Hexanone	1.060	212.0	21.20	4.240	1.060		0.08480	0.1060	0.2120	0.4240	1.060	5.300	26.500	53.00	106.0
Dibromochloromethane	1.061	212.2	21.22	4.244	1.061		0.08488	0.1061	0.2122	0.4244	1.061	5.305	26.525	53.05	106.1
1,2-Dibromoethane	1.064	212.8	21.28	4.256	1.064		0.08512	0.1064	0.2128	0.4256	1.064	5.320	26.600	53.20	106.4
n-Butyl Acetate	1.068	213.6	21.36	4.272	1.068		0.08544	0.1068	0.2136	0.4272	1.068	5.340	26.700	53.40	106.8
n-Octane	1.060	212.0	21.20	4.240	1.060		0.08480	0.1060	0.2120	0.4240	1.060	5.300	26.500	53.00	106.0
Tetrachloroethene	1.063	212.6	21.26	4.252	1.063		0.08504	0.1063	0.2126	0.4252	1.063	5.315	26.575	53.15	106.3
Chlorobenzene	1.066	213.2	21.32	4.264	1.066		0.08528	0.1066	0.2132	0.4264	1.066	5.330	26.650	53.30	106.6
Ethylbenzene	1.052	210.4	21.04	4.208	1.052		0.08416	0.1052	0.2104	0.4208	1.052	5.260	26.300	52.60	105.2
m-&p-Xylene	2.123	424.6	42.46	8.492	2.123		0.16984	0.2123	0.4246	0.8492	2.123	10.615	53.075	106.15	212.3
Bromoform	1.063	212.6	21.26	4.252	1.063		0.08504	0.1063	0.2126	0.4252	1.063	5.315	26.575	53.15	106.3
Styrene	1.058	211.6	21.16	4.232	1.058		0.08464	0.1058	0.2116	0.4232	1.058	5.290	26.450	52.90	105.8
o-Xylene	1.055	211.0	21.10	4.220	1.055		0.08440	0.1055	0.2110	0.4220	1.055	5.275	26.375	52.75	105.5
n-Nonane	1.054	210.8	21.08	4.216	1.054		0.08432	0.1054	0.2108	0.4216	1.054	5.270	26.350	52.70	105.4
1,1,2,2-Tetrachloroethane	1.057	211.4	21.14	4.228	1.057		0.08456	0.1057	0.2114	0.4228	1.057	5.285	26.425	52.85	105.7
Cumene	1.052	210.4	21.04	4.208	1.052		0.08416	0.1052	0.2104	0.4208	1.052	5.260	26.300	52.60	105.2
alpha-Pinene	1.046	209.2	20.92	4.184	1.046		0.08368	0.1046	0.2092	0.4184	1.046	5.230	26.150	52.30	104.6
n-Propylbenzene	1.064	212.8	21.28	4.256	1.064		0.08512	0.1064	0.2128	0.4256	1.064	5.320	26.600	53.20	106.4
3-Ethyltoluene	1.050	210.0	21.00	4.200	1.050		0.08400	0.1050	0.2100	0.4200	1.050	5.250	26.250	52.50	105.0
4-Ethyltoluene	1.049	209.8	20.98	4.196	1.049		0.08392	0.1049	0.2098	0.4196	1.049	5.245	26.225	52.45	104.9
1,3,5-Trimethylbenzene	1.049	209.8	20.98	4.196	1.049		0.08392	0.1049	0.2098	0.4196	1.049	5.245	26.225	52.45	104.9
alpha-Methylstyrene	1.049	209.8	20.98	4.196	1.049		0.08392	0.1049	0.2098	0.4196	1.049	5.245	26.225	52.45	104.9
2-Ethyltoluene	1.060	212.0	21.20	4.240	1.060		0.08480	0.1060	0.2120	0.4240	1.060	5.300	26.500	53.00	106.0
1,2,4-Trimethylbenzene	1.051	210.2	21.02	4.204	1.051		0.08408	0.1051	0.2102	0.4204	1.051	5.255	26.275	52.55	105.1
n-Decane	1.059	211.8	21.18	4.236	1.059		0.08472	0.1059	0.2118	0.4236	1.059	5.295	26.475	52.95	105.9
Benzyl Chloride	1.074	214.8	21.48	4.296	1.074		0.08592	0.1074	0.2148	0.4296	1.074	5.370	26.850	53.70	107.4
1,3-Dichlorobenzene	1.071	214.2	21.42	4.284	1.071		0.08568	0.1071	0.2142	0.4284	1.071	5.355	26.775	53.55	107.1
1,4-Dichlorobenzene	1.064	212.8	21.28	4.256	1.064		0.08512	0.1064	0.2128	0.4256	1.064	5.320	26.600	53.20	106.4
sec-Butylbenzene	1.055	211.0	21.10	4.220	1.055		0.08440	0.1055	0.2110	0.4220	1.055	5.275	26.375	52.75	105.5
p-Isopropyltoluene	1.026	205.2	20.52	4.104	1.026		0.08208	0.1026	0.2052	0.4104	1.026	5.130	25.650	51.30	102.6
1,2,3-Trimethylbenzene	1.026	205.2	20.52	4.104	1.026		0.08208	0.1026	0.2052	0.4104	1.026	5.130	25.650	51.30	102.6
1,2-Dichlorobenzene	1.083	216.6	21.66	4.332	1.083		0.08664	0.1083	0.2166	0.4332	1.083	5.415	27.075	54.15	108.3
d-Limonene	1.005	201.0	20.10	4.020	1.005		0.08040	0.1005	0.2010	0.4020	1.005	5.025	25.125	50.25	100.5
1,2-Dibromo-3-chloropropane	1.051	210.2	21.02	4.204	1.051		0.08408	0.1051	0.2102	0.4204	1.051	5.255	26.275	52.55	105.1
n-Undecane	1.053	210.6	21.06	4.212	1.053		0.08424	0.1053	0.2106	0.4212	1.053	5.265	26.325	52.65	105.3
1,2,4-Trichlorobenzene	1.097	219.4	21.94	4.388	1.097		0.08776	0.1097	0.2194	0.4388	1.097	5.485	27.425	54.85	109.7
Naphthalene	1.056	211.2	21.12	4.224	1.056		0.08448	0.1056	0.2112	0.4224	1.056	5.280	26.400	52.80	105.6
n-Dodecane	1.056	211.2	21.12	4.224	1.056		0.08448	0.1056	0.2112	0.4224	1.056	5.280	26.400	52.80	105.6
Hexachloro-1,3-butadiene	1.057	211.4	21.14	4.228	1.057		0.08456	0.1057	0.2114	0.4228	1.057	5.285	26.425	52.85	105.7
Methacrylonitrile	1.067	213.4	21.34	4.268	1.067		0.08536	0.1067	0.2134	0.4268	1.067	5.335	26.675	53.35	106.7
Cyclohexanone	1.039	207.8	20.78	4.156	1.039		0.08312	0.1039	0.2078	0.4156	1.039	5.195	25.975	51.95	103.9
tert-Butylbenzene	1.050	210.0	21.00	4.200	1.050		0.08400	0.1050	0.2100	0.4200	1.050	5.250	26.250	52.50	105.0
n-Butylbenzene	1.054	210.8	21.08	4.216	1.054		0.08432	0.1054	0.2108	0.4216	1.054	5.270	26.350	52.70	105.4

Calibration Status Report MS13

Method : I:\MS13\METHODS\R13110617.M (RTE Integrator)
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration

#	ID	Conc	ISTD Conc	Path\File
1	0.08	0	13	I:\MS13\DATA\2017_11\06\11061703.D
2	0.10	0	13	I:\MS13\DATA\2017_11\06\11061704.D
3	0.20	0	13	I:\MS13\DATA\2017_11\06\11061705.D
4	0.40	0	13	I:\MS13\DATA\2017_11\06\11061706.D
5	1.0	1	13	I:\MS13\DATA\2017_11\06\11061707.D
6	5.0	5	13	I:\MS13\DATA\2017_11\06\11061708.D
7	25	26	13	I:\MS13\DATA\2017_11\06\11061709.D
8	50	52	13	I:\MS13\DATA\2017_11\06\11061710.D
9	100	104	13	I:\MS13\DATA\2017_11\06\11061711.D

#	ID	Update Time	Quant Time	Acquisition Time
1	0.08	Nov 06 13:55 2017	Nov 06 13:10 2017	6 Nov 2017 7:32
2	0.10	Nov 06 13:55 2017	Nov 06 13:10 2017	6 Nov 2017 8:05
3	0.20	Nov 06 13:55 2017	Nov 06 13:10 2017	6 Nov 2017 8:39
4	0.40	Nov 06 13:55 2017	Nov 06 13:10 2017	6 Nov 2017 10:19
5	1.0	Nov 06 13:55 2017	Nov 06 13:10 2017	6 Nov 2017 10:58
6	5.0	Nov 06 13:56 2017	Nov 06 13:10 2017	6 Nov 2017 11:31
7	25	Nov 06 13:56 2017	Nov 06 13:10 2017	6 Nov 2017 12:05
8	50	Nov 06 13:56 2017	Nov 06 13:10 2017	6 Nov 2017 12:39
9	100	Nov 06 13:56 2017	Nov 06 13:47 2017	6 Nov 2017 13:12

VOA 11/7/17

R13110617.M Tue Nov 07 16:42:36 2017

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061703.D Vial: 13
Acq On : 6 Nov 2017 7:32 Operator: WA/RS
Sample : 0.08ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10121708 (11/10)

Quant Time: Nov 06 13:10:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017 11/6/17
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	104371	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.23	114	511024	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.52	82	207679	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	163024	15.523	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 124.16%				
57) Toluene-d8 (SS2)	15.65	98	531591	12.250	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 98.00%				
73) Bromofluorobenzene (SS3)	18.91	174	169054	10.097	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 80.80%				
Target Compounds							Qvalue
2) Propene	4.40	42	1289	0.116	ng		95
3) Dichlorodifluoromethan...	4.55	85	1692	0.093	ng	#	90
4) Chloromethane	4.80	50	1321	0.097	ng		93
5) 1,2-Dichloro-1,1,2,2-t...	5.06	135	841	0.083	ng		71
6) Vinyl Chloride	5.21	62	1238	0.096	ng		81
7) 1,3-Butadiene	5.46	54	880	0.090	ng	#	83
8) Bromomethane	5.87	94	609	0.070	ng		86
9) Chloroethane	6.19	64	624	0.093	ng	#	43
10) Ethanol	6.53	45	2951	0.438	ng		85
11) Acetonitrile	6.81	41	991	0.059	ng		91
12) Acrolein	7.01	56	58	0.010	ng	#	14
13) Acetone	7.19	58	3564	0.495	ng		98
14) Trichlorofluoromethane	7.39	101	1577	0.101	ng		99
15) 2-Propanol (Isopropanol)	7.68	45	4395	0.188	ng		83
16) Acrylonitrile	7.91	53	57	0.005	ng	#	7
17) 1,1-Dichloroethene	8.30	96	900	0.095	ng		95
18) 2-Methyl-2-Propanol (t...	8.55	59	4639	0.198	ng	#	65
19) Methylene Chloride	8.50	84	1672	0.149	ng		98
20) 3-Chloro-1-propene (Al...	8.67	41	1390	0.102	ng	#	57
21) Trichlorotrifluoroethane	8.92	151	844	0.087	ng		88
22) Carbon Disulfide	8.78	76	8551	0.216	ng		94
23) trans-1,2-Dichloroethene	9.74	61	1048	0.084	ng		94
24) 1,1-Dichloroethane	9.98	63	1542	0.093	ng		93
25) Methyl tert-Butyl Ether	10.14	73	2939	0.103	ng		81
26) Vinyl Acetate	10.24	86	430	0.199	ng	#	1
27) 2-Butanone (MEK)	0.00	72	0	N.D.			
28) cis-1,2-Dichloroethene	10.97	61	1081	0.088	ng		97
29) Diisopropyl Ether	11.30	87	725	0.079	ng	#	75
30) Ethyl Acetate	11.31	61	247	0.078	ng	#	10
31) n-Hexane	11.25	57	1647	0.109	ng	#	91
32) Chloroform	11.29	83	1636	0.103	ng		93
34) Tetrahydrofuran (THF)	11.78	72	683	0.097	ng	#	74
35) Ethyl tert-Butyl Ether	11.88	87	993	0.084	ng	#	86
36) 1,2-Dichloroethane	12.08	62	1016	0.091	ng		73
38) 1,1,1-Trichloroethane	12.37	97	1455	0.100	ng		92
39) Isopropyl Acetate	12.82	61	923	0.155	ng		99
40) 1-Butanol	12.88	56	703	0.071	ng	#	69
41) Benzene	12.84	78	4091	0.103	ng		95
42) Carbon Tetrachloride	12.99	117	1113	0.085	ng		96
43) Cyclohexane	13.13	84	2878	0.190	ng		93
44) tert-Amyl Methyl Ether	13.50	73	2734	0.096	ng		94
45) 1,2-Dichloropropane	13.69	63	787	0.086	ng		100
46) Bromodichloromethane	13.87	83	1094	0.087	ng		83
47) Trichloroethene	13.92	130	1423	0.119	ng		99
48) 1,4-Dioxane	13.96	88	377	0.046	ng	#	67
49) 2,2,4-Trimethylpentane...	13.99	57	4284	0.107	ng		88
50) Methyl Methacrylate	14.14	100	342	0.077	ng	#	50

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061703.D Vial: 13
Acq On : 6 Nov 2017 7:32 Operator: WA/RS
Sample : 0.08ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10121708 (11/10)

Quant Time: Nov 06 13:10:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

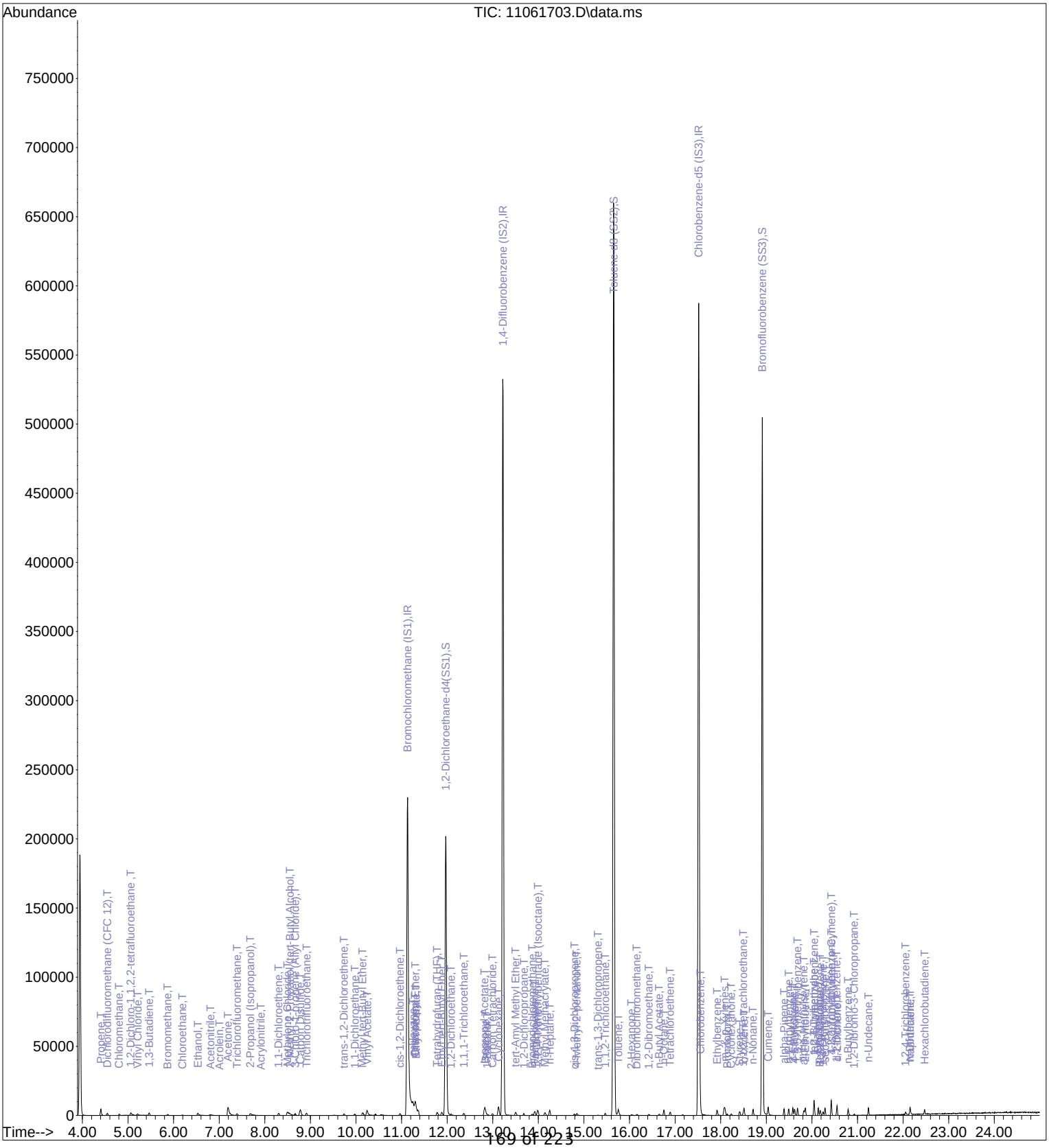
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
51) n-Heptane	14.25	71	894	0.092	ng	#	84
52) cis-1,3-Dichloropropene	14.80	75	1021	0.065	ng		66
53) 4-Methyl-2-pentanone	14.84	58	495	0.057	ng	#	14
54) trans-1,3-Dichloropropene	15.30	75	449	0.033	ng	#	43
55) 1,1,2-Trichloroethane	15.47	97	671	0.070	ng		89
58) Toluene	15.75	91	3988	0.091	ng		97
59) 2-Hexanone	16.04	43	965	0.045	ng	#	25
60) Dibromochloromethane	16.16	129	878	0.070	ng		80
61) 1,2-Dibromoethane	16.42	107	608	0.053	ng		85
62) n-Butyl Acetate	16.65	43	1330	0.056	ng	#	80
63) n-Octane	16.75	57	766	0.090	ng		91
64) Tetrachloroethene	16.89	166	1102	0.078	ng		97
65) Chlorobenzene	17.56	112	2392	0.078	ng		96
66) Ethylbenzene	17.92	91	4397	0.089	ng		93
67) m- & p-Xylenes	18.09	91	7125	0.186	ng		92
68) Bromoform	18.14	173	665	0.057	ng	#	62
69) Styrene	18.41	104	2250	0.070	ng		93
70) o-Xylene	18.51	91	3523	0.092	ng		99
71) n-Nonane	18.71	43	1932	0.099	ng		96
72) 1,1,2,2-Tetrachloroethane	18.50	83	1228	0.070	ng		99
74) Cumene	19.04	105	4741	0.093	ng		95
75) alpha-Pinene	19.39	93	2184	0.085	ng		91
76) n-Propylbenzene	19.49	91	4986	0.085	ng		96
77) 3-Ethyltoluene	19.58	105	4112	0.079	ng		100
78) 4-Ethyltoluene	19.62	105	4073	0.085	ng		95
79) 1,3,5-Trimethylbenzene	19.69	105	3862	0.092	ng		90
80) alpha-Methylstyrene	19.82	118	1465	0.059	ng	#	84
81) 2-Ethyltoluene	19.86	105	4254	0.086	ng		99
82) 1,2,4-Trimethylbenzene	20.05	105	3434	0.083	ng		97
83) n-Decane	20.13	57	1787	0.090	ng		90
84) Benzyl Chloride	20.17	91	1540	0.043	ng		73
85) 1,3-Dichlorobenzene	20.18	146	1785	0.066	ng		93
86) 1,4-Dichlorobenzene	20.25	146	1827	0.066	ng		98
87) sec-Butylbenzene	20.29	105	4581	0.081	ng		95
88) 4-Isopropyltoluene (p-...	20.43	119	4203	0.076	ng		97
89) 1,2,3-Trimethylbenzene	20.43	105	3403	0.081	ng		95
90) 1,2-Dichlorobenzene	20.54	146	1797	0.070	ng		98
91) d-Limonene	20.56	68	1191	0.076	ng		97
92) 1,2-Dibromo-3-Chloropr...	20.93	157	391	0.042	ng	#	56
93) n-Undecane	21.24	57	1875	0.083	ng		93
94) 1,2,4-Trichlorobenzene	22.05	180	926	0.050	ng	#	86
95) Naphthalene	22.16	128	2797	0.048	ng		83
96) n-Dodecane	22.15	57	1501	0.073	ng		88
97) Hexachlorobutadiene	22.47	225	879	0.063	ng		99
98) Cyclohexanone	18.23	55	793	0.057	ng		96
99) tert-Butylbenzene	20.04	119	3455	0.081	ng		100
100) n-Butylbenzene	20.80	91	3184	0.073	ng		98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061703.D Vial: 13
Acq On : 6 Nov 2017 7:32 Operator: WA/RS
Sample : 0.08ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10121708 (11/10)

Quant Time: Nov 06 13:10:44 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061704.D Vial: 13
Acq On : 6 Nov 2017 8:05 Operator: WA/RS
Sample : 0.10ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10121708 (11/10)

Quant Time: Nov 06 13:10:45 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 11/6/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	100080	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.22	114	486695	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	17.52	82	200751	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	156731	15.564	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 124.48%				
57) Toluene-d8 (SS2)	15.65	98	510134	12.161	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 97.28%				
73) Bromofluorobenzene (SS3)	18.91	174	164624	10.171	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 81.36%				
Target Compounds							Qvalue
2) Propene	4.40	42	1676	0.157	ng		96
3) Dichlorodifluoromethan...	4.54	85	2637	0.151	ng	#	89
4) Chloromethane	4.80	50	1923	0.147	ng		93
5) 1,2-Dichloro-1,1,2,2-t...	5.05	135	1356	0.140	ng		87
6) Vinyl Chloride	5.21	62	1755	0.142	ng		89
7) 1,3-Butadiene	5.46	54	1329	0.141	ng		98
8) Bromomethane	5.87	94	1049	0.126	ng		94
9) Chloroethane	6.18	64	899	0.140	ng		66
10) Ethanol	6.52	45	4422	0.684	ng		79
11) Acetonitrile	6.78	41	1474	0.092	ng	#	54
12) Acrolein	6.98	56	308	0.053	ng	#	14
13) Acetone	7.18	58	4790	0.694	ng		91
14) Trichlorofluoromethane	7.38	101	2348	0.157	ng		97
15) 2-Propanol (Isopropanol)	7.67	45	6357	0.283	ng		86
16) Acrylonitrile	7.90	53	488	0.041	ng	#	50
17) 1,1-Dichloroethene	8.30	96	1191	0.131	ng		99
18) 2-Methyl-2-Propanol (t...	8.52	59	6602	0.294	ng		87
19) Methylene Chloride	8.50	84	2154	0.200	ng		98
20) 3-Chloro-1-propene (Al...	8.67	41	1742	0.133	ng		92
21) Trichlorotrifluoroethane	8.91	151	1088	0.116	ng	#	78
22) Carbon Disulfide	8.78	76	8450	0.222	ng		95
23) trans-1,2-Dichloroethene	9.73	61	1429	0.120	ng		90
24) 1,1-Dichloroethane	9.97	63	2264	0.142	ng		89
25) Methyl tert-Butyl Ether	10.14	73	4087	0.149	ng		88
26) Vinyl Acetate	10.24	86	692	0.334	ng	#	1
27) 2-Butanone (MEK)	10.53	72	130	0.020	ng	#	1
28) cis-1,2-Dichloroethene	10.97	61	1711	0.146	ng		93
29) Diisopropyl Ether	11.30	87	1144	0.131	ng	#	64
30) Ethyl Acetate	11.30	61	462	0.152	ng	#	77
31) n-Hexane	11.25	57	2391	0.166	ng	#	88
32) Chloroform	11.30	83	2159	0.141	ng		96
34) Tetrahydrofuran (THF)	11.77	72	1206	0.178	ng		96
35) Ethyl tert-Butyl Ether	11.88	87	1411	0.125	ng	#	85
36) 1,2-Dichloroethane	12.09	62	1598	0.149	ng		76
38) 1,1,1-Trichloroethane	12.37	97	2109	0.152	ng		94
39) Isopropyl Acetate	12.81	61	1432	0.252	ng	#	90
40) 1-Butanol	12.87	56	1222	0.130	ng	#	49
41) Benzene	12.84	78	5696	0.151	ng		98
42) Carbon Tetrachloride	12.99	117	1683	0.135	ng		95
43) Cyclohexane	13.12	84	4113	0.285	ng		96
44) tert-Amyl Methyl Ether	13.50	73	3698	0.137	ng		93
45) 1,2-Dichloropropane	13.68	63	1210	0.138	ng		99
46) Bromodichloromethane	13.87	83	1618	0.136	ng		96
47) Trichloroethene	13.92	130	2494	0.219	ng		96
48) 1,4-Dioxane	13.94	88	720	0.093	ng		91
49) 2,2,4-Trimethylpentane...	13.99	57	5848	0.153	ng		91
50) Methyl Methacrylate	14.14	100	630	0.149	ng	#	66

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061704.D Vial: 13
Acq On : 6 Nov 2017 8:05 Operator: WA/RS
Sample : 0.10ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10121708 (11/10)

Quant Time: Nov 06 13:10:45 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

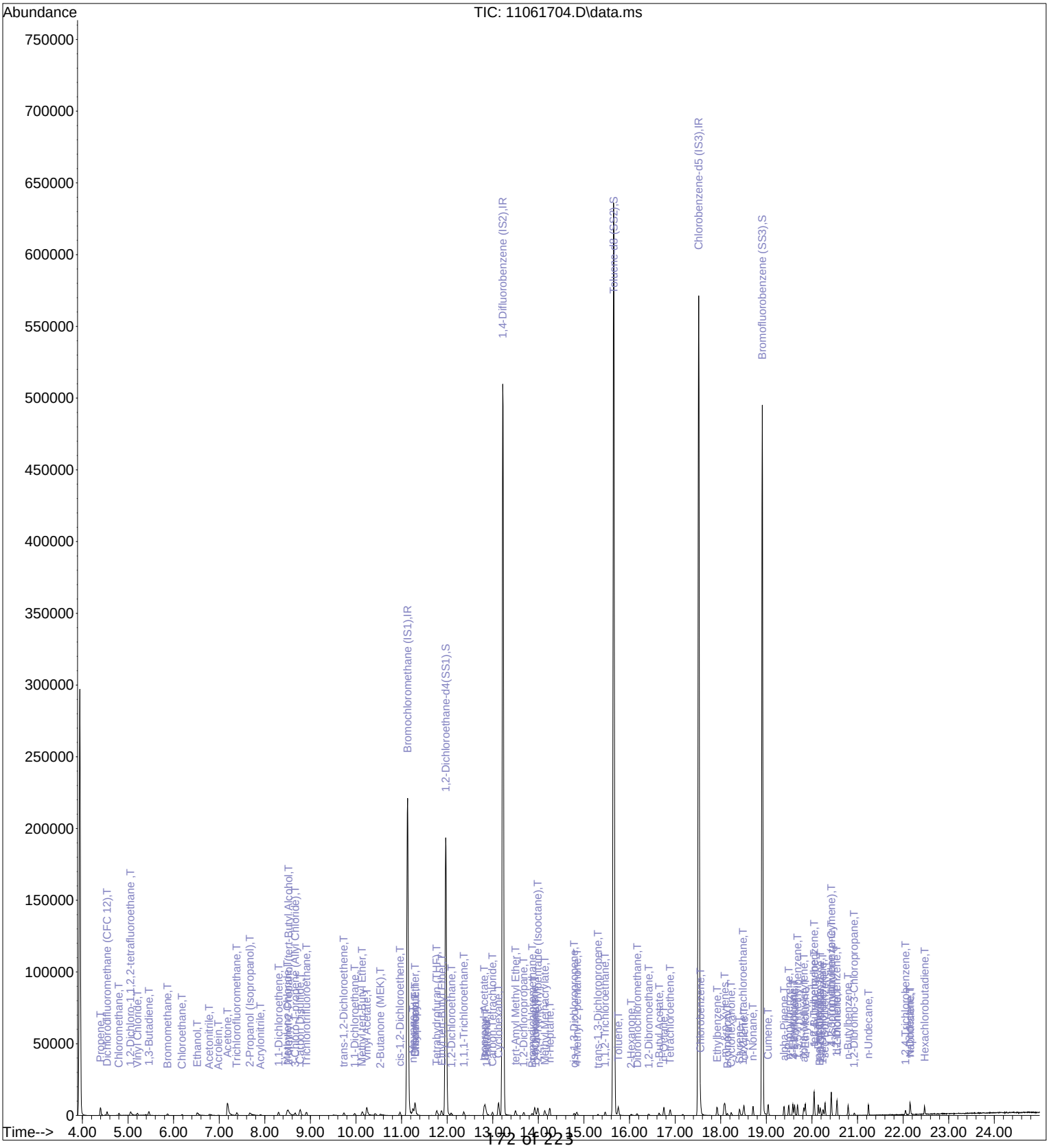
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
51) n-Heptane	14.25	71	1247	0.135	ng		97
52) cis-1,3-Dichloropropene	14.79	75	1501	0.101	ng		84
53) 4-Methyl-2-pentanone	14.85	58	769	0.093	ng	#	50
54) trans-1,3-Dichloropropene	15.31	75	773	0.059	ng	#	43
55) 1,1,2-Trichloroethane	15.46	97	1088	0.119	ng		95
58) Toluene	15.75	91	5527	0.130	ng		97
59) 2-Hexanone	16.04	43	1412	0.068	ng	#	61
60) Dibromochloromethane	16.17	129	1102	0.091	ng		95
61) 1,2-Dibromoethane	16.42	107	936	0.085	ng		96
62) n-Butyl Acetate	16.65	43	2061	0.090	ng	#	78
63) n-Octane	16.75	57	1042	0.126	ng		99
64) Tetrachloroethene	16.89	166	1671	0.123	ng		96
65) Chlorobenzene	17.56	112	3691	0.125	ng		99
66) Ethylbenzene	17.92	91	5962	0.125	ng		99
67) m- & p-Xylenes	18.09	91	9485	0.256	ng		96
68) Bromoform	18.15	173	1009	0.090	ng		76
69) Styrene	18.41	104	3034	0.098	ng		96
70) o-Xylene	18.51	91	4681	0.126	ng		100
71) n-Nonane	18.71	43	2561	0.135	ng		98
72) 1,1,2,2-Tetrachloroethane	18.49	83	1909	0.112	ng		90
74) Cumene	19.04	105	6349	0.129	ng		97
75) alpha-Pinene	19.39	93	3032	0.122	ng		99
76) n-Propylbenzene	19.49	91	6994	0.124	ng		96
77) 3-Ethyltoluene	19.58	105	5728	0.114	ng		99
78) 4-Ethyltoluene	19.62	105	5463	0.119	ng		99
79) 1,3,5-Trimethylbenzene	19.69	105	5143	0.127	ng		93
80) alpha-Methylstyrene	19.83	118	2072	0.086	ng		96
81) 2-Ethyltoluene	19.86	105	5783	0.121	ng		95
82) 1,2,4-Trimethylbenzene	20.05	105	4630	0.115	ng		98
83) n-Decane	20.14	57	2530	0.132	ng		97
84) Benzyl Chloride	20.17	91	1963	0.057	ng		86
85) 1,3-Dichlorobenzene	20.19	146	2658	0.101	ng		94
86) 1,4-Dichlorobenzene	20.24	146	2480	0.092	ng		96
87) sec-Butylbenzene	20.28	105	6518	0.119	ng		99
88) 4-Isopropyltoluene (p-...	20.43	119	5744	0.107	ng		99
89) 1,2,3-Trimethylbenzene	20.43	105	4670	0.116	ng		99
90) 1,2-Dichlorobenzene	20.54	146	2761	0.111	ng		92
91) d-Limonene	20.55	68	1642	0.109	ng		97
92) 1,2-Dibromo-3-Chloropr...	20.93	157	574	0.064	ng		85
93) n-Undecane	21.24	57	2427	0.112	ng		96
94) 1,2,4-Trichlorobenzene	22.05	180	1331	0.075	ng	#	90
95) Naphthalene	22.16	128	3999	0.071	ng		92
96) n-Dodecane	22.15	57	2015	0.101	ng		98
97) Hexachlorobutadiene	22.47	225	1339	0.099	ng		94
98) Cyclohexanone	18.23	55	1240	0.091	ng	#	86
99) tert-Butylbenzene	20.05	119	5072	0.123	ng		96
100) n-Butylbenzene	20.79	91	4817	0.115	ng		94

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061704.D Vial: 13
Acq On : 6 Nov 2017 8:05 Operator: WA/RS
Sample : 0.10ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10121708 (11/10)

Quant Time: Nov 06 13:10:45 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061705.D Vial: 13
Acq On : 6 Nov 2017 8:39 Operator: WA/RS
Sample : 0.20ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10121708 (11/10)

Quant Time: Nov 06 13:10:47 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 11/6/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.13	130	97976	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.22	114	473954	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	17.52	82	196172	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	154935	15.716	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 125.76%				
57) Toluene-d8 (SS2)	15.65	98	495004	12.076	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.64%				
73) Bromofluorobenzene (SS3)	18.91	174	162547	10.277	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 82.24%				
Target Compounds							Qvalue
2) Propene	4.40	42	2532	0.243	ng		99
3) Dichlorodifluoromethan...	4.54	85	4600	0.269	ng		94
4) Chloromethane	4.80	50	3316	0.260	ng		95
5) 1,2-Dichloro-1,1,2,2-t...	5.05	135	2330	0.245	ng		95
6) Vinyl Chloride	5.21	62	3052	0.252	ng		96
7) 1,3-Butadiene	5.46	54	2015	0.219	ng		91
8) Bromomethane	5.87	94	1831	0.225	ng		99
9) Chloroethane	6.19	64	1322	0.210	ng		91
10) Ethanol	6.51	45	7942	1.255	ng		92
11) Acetonitrile	6.77	41	3546	0.225	ng		91
12) Acrolein	6.97	56	779	0.136	ng		87
13) Acetone	7.17	58	8327	1.233	ng		100
14) Trichlorofluoromethane	7.39	101	3938	0.269	ng		95
15) 2-Propanol (Isopropanol)	7.65	45	11142	0.507	ng		92
16) Acrylonitrile	7.88	53	1795	0.153	ng		91
17) 1,1-Dichloroethene	8.30	96	2082	0.233	ng		96
18) 2-Methyl-2-Propanol (t...	8.51	59	11633	0.529	ng		95
19) Methylene Chloride	8.50	84	2906	0.275	ng		99
20) 3-Chloro-1-propene (Al...	8.66	41	2971	0.232	ng		99
21) Trichlorotrifluoroethane	8.92	151	1959	0.214	ng		96
22) Carbon Disulfide	8.78	76	11134	0.299	ng		96
23) trans-1,2-Dichloroethene	9.74	61	2720	0.233	ng		91
24) 1,1-Dichloroethane	9.97	63	4007	0.257	ng		91
25) Methyl tert-Butyl Ether	10.12	73	7037	0.262	ng		94
26) Vinyl Acetate	10.23	86	1629	0.803	ng	#	50
27) 2-Butanone (MEK)	10.52	72	914	0.146	ng	#	36
28) cis-1,2-Dichloroethene	10.97	61	2920	0.254	ng		97
29) Diisopropyl Ether	11.29	87	2200	0.257	ng	#	68
30) Ethyl Acetate	11.29	61	1168	0.392	ng		99
31) n-Hexane	11.25	57	4026	0.285	ng	#	98
32) Chloroform	11.30	83	3772	0.252	ng		97
34) Tetrahydrofuran (THF)	11.76	72	1578	0.238	ng	#	87
35) Ethyl tert-Butyl Ether	11.87	87	2632	0.239	ng		97
36) 1,2-Dichloroethane	12.09	62	2841	0.271	ng		90
38) 1,1,1-Trichloroethane	12.37	97	3652	0.271	ng		98
39) Isopropyl Acetate	12.82	61	2651	0.480	ng	#	89
40) 1-Butanol	12.85	56	2653	0.290	ng	#	66
41) Benzene	12.84	78	9097	0.248	ng		98
42) Carbon Tetrachloride	12.99	117	3079	0.253	ng		97
43) Cyclohexane	13.13	84	6926	0.493	ng		97
44) tert-Amyl Methyl Ether	13.49	73	6335	0.241	ng		97
45) 1,2-Dichloropropane	13.68	63	2199	0.258	ng		96
46) Bromodichloromethane	13.86	83	2753	0.237	ng		99
47) Trichloroethene	13.91	130	3195	0.288	ng		97
48) 1,4-Dioxane	13.94	88	1381	0.182	ng		91
49) 2,2,4-Trimethylpentane...	13.99	57	9943	0.267	ng		94
50) Methyl Methacrylate	14.14	100	1351	0.328	ng	#	82

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061705.D Vial: 13
Acq On : 6 Nov 2017 8:39 Operator: WA/RS
Sample : 0.20ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10121708 (11/10)

Quant Time: Nov 06 13:10:47 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

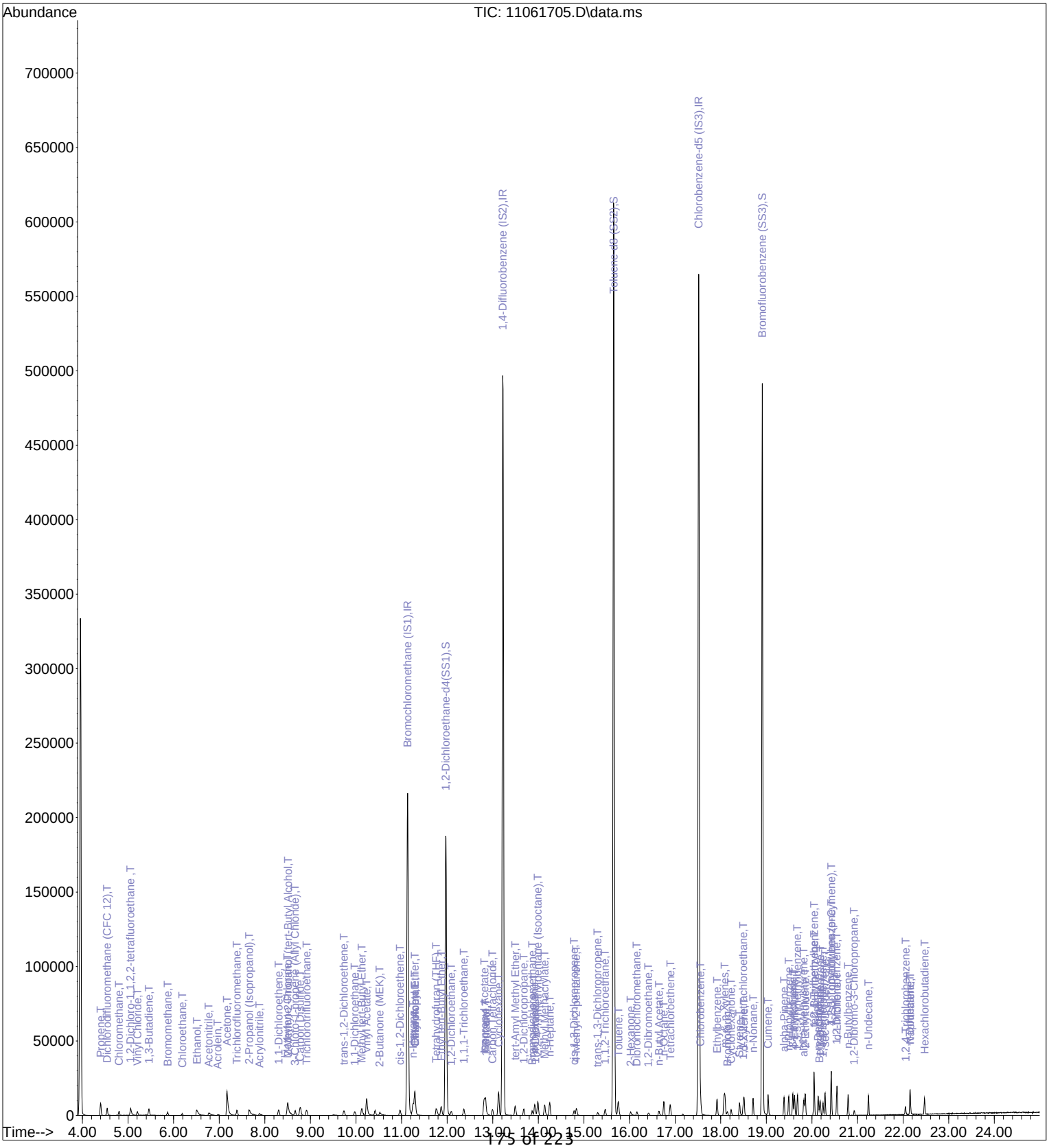
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.25	71	2288	0.254	ng	95
52) cis-1,3-Dichloropropene	14.79	75	3004	0.207	ng	92
53) 4-Methyl-2-pentanone	14.83	58	1600	0.198	ng	79
54) trans-1,3-Dichloropropene	15.30	75	2019	0.159	ng	86
55) 1,1,2-Trichloroethane	15.46	97	1994	0.224	ng	95
58) Toluene	15.76	91	9138	0.220	ng	99
59) 2-Hexanone	16.03	43	3072	0.152	ng	89
60) Dibromochloromethane	16.16	129	2297	0.194	ng	98
61) 1,2-Dibromoethane	16.41	107	1817	0.169	ng	95
62) n-Butyl Acetate	16.65	43	3690	0.164	ng	88
63) n-Octane	16.75	57	1916	0.237	ng	98
64) Tetrachloroethene	16.90	166	2778	0.209	ng	97
65) Chlorobenzene	17.56	112	5888	0.204	ng	99
66) Ethylbenzene	17.92	91	10033	0.216	ng	99
67) m- & p-Xylenes	18.09	91	15598	0.430	ng	99
68) Bromoform	18.15	173	1936	0.177	ng	85
69) Styrene	18.41	104	5294	0.175	ng	98
70) o-Xylene	18.51	91	7983	0.220	ng	99
71) n-Nonane	18.71	43	4417	0.239	ng	96
72) 1,1,2,2-Tetrachloroethane	18.49	83	3204	0.193	ng	97
74) Cumene	19.04	105	10336	0.214	ng	99
75) alpha-Pinene	19.39	93	5305	0.219	ng	100
76) n-Propylbenzene	19.49	91	11626	0.211	ng	99
77) 3-Ethyltoluene	19.58	105	9984	0.204	ng	98
78) 4-Ethyltoluene	19.62	105	9091	0.202	ng	96
79) 1,3,5-Trimethylbenzene	19.68	105	8691	0.219	ng	98
80) alpha-Methylstyrene	19.82	118	3933	0.167	ng	96
81) 2-Ethyltoluene	19.86	105	10146	0.217	ng	97
82) 1,2,4-Trimethylbenzene	20.05	105	8322	0.212	ng	99
83) n-Decane	20.13	57	4527	0.242	ng	95
84) Benzyl Chloride	20.16	91	4070	0.120	ng	91
85) 1,3-Dichlorobenzene	20.19	146	4580	0.179	ng	93
86) 1,4-Dichlorobenzene	20.24	146	4435	0.169	ng	96
87) sec-Butylbenzene	20.29	105	11466	0.213	ng	99
88) 4-Isopropyltoluene (p-...	20.42	119	10340	0.198	ng	98
89) 1,2,3-Trimethylbenzene	20.42	105	8100	0.205	ng	97
90) 1,2-Dichlorobenzene	20.54	146	4579	0.189	ng	97
91) d-Limonene	20.55	68	3009	0.204	ng	99
92) 1,2-Dibromo-3-Chloropr...	20.93	157	1196	0.137	ng	89
93) n-Undecane	21.24	57	4365	0.205	ng	95
94) 1,2,4-Trichlorobenzene	22.06	180	2506	0.144	ng	94
95) Naphthalene	22.16	128	6814	0.124	ng	97
96) n-Dodecane	22.15	57	3699	0.190	ng	94
97) Hexachlorobutadiene	22.47	225	2536	0.192	ng	100
98) Cyclohexanone	18.23	55	2083	0.157	ng	100
99) tert-Butylbenzene	20.05	119	8734	0.216	ng	96
100) n-Butylbenzene	20.79	91	7787	0.190	ng	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061705.D Vial: 13
Acq On : 6 Nov 2017 8:39 Operator: WA/RS
Sample : 0.20ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10121708 (11/10)

Quant Time: Nov 06 13:10:47 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061706.D Vial: 12
Acq On : 6 Nov 2017 10:19 Operator: WA/RS
Sample : 0.40ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261706 (11/24)

Quant Time: Nov 06 13:10:49 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 11/6/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.14	130	91417	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.23	114	437857	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.52	82	185171	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	148984	16.196	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 129.60%				
57) Toluene-d8 (SS2)	15.65	98	460678	11.906	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.28%				
73) Bromofluorobenzene (SS3)	18.91	174	158387	10.609	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.88%				
Target Compounds							Qvalue
2) Propene	4.39	42	7366	0.757	ng		97
3) Dichlorodifluoromethan...	4.54	85	10536	0.661	ng		98
4) Chloromethane	4.80	50	6207	0.521	ng		98
5) 1,2-Dichloro-1,1,2,2-t...	5.05	135	5208	0.587	ng		100
6) Vinyl Chloride	5.20	62	7214	0.640	ng		98
7) 1,3-Butadiene	5.45	54	4140	0.482	ng		97
8) Bromomethane	5.86	94	3849	0.507	ng		99
9) Chloroethane	6.18	64	3694	0.629	ng		91
10) Ethanol	6.49	45	16683	2.826	ng		91
11) Acetonitrile	6.76	41	8973	0.611	ng		92
12) Acrolein	6.96	56	2452	0.460	ng		94
13) Acetone	7.15	58	19053	3.024	ng		98
14) Trichlorofluoromethane	7.39	101	10054	0.737	ng		99
15) 2-Propanol (Isopropanol)	7.63	45	22071	1.077	ng		96
16) Acrylonitrile	7.87	53	5132	0.468	ng		99
17) 1,1-Dichloroethene	8.30	96	5090	0.611	ng		99
18) 2-Methyl-2-Propanol (t...	8.49	59	22827	1.113	ng		97
19) Methylene Chloride	8.50	84	5791	0.588	ng		99
20) 3-Chloro-1-propene (Al...	8.66	41	7570	0.635	ng		95
21) Trichlorotrifluoroethane	8.92	151	4890	0.572	ng		100
22) Carbon Disulfide	8.78	76	21397	0.616	ng		98
23) trans-1,2-Dichloroethene	9.73	61	7107	0.651	ng		98
24) 1,1-Dichloroethane	9.98	63	9020	0.621	ng		98
25) Methyl tert-Butyl Ether	10.11	73	13328	0.531	ng		98
26) Vinyl Acetate	10.23	86	3548	1.874	ng	#	60
27) 2-Butanone (MEK)	10.51	72	2219	0.380	ng	#	54
28) cis-1,2-Dichloroethene	10.97	61	7135	0.665	ng		100
29) Diisopropyl Ether	11.28	87	4509	0.564	ng	#	85
30) Ethyl Acetate	11.29	61	3175	1.143	ng		98
31) n-Hexane	11.25	57	8505	0.645	ng	#	97
32) Chloroform	11.30	83	9278	0.665	ng		99
34) Tetrahydrofuran (THF)	11.75	72	3489	0.565	ng		97
35) Ethyl tert-Butyl Ether	11.86	87	5283	0.513	ng		99
36) 1,2-Dichloroethane	12.09	62	7256	0.743	ng		97
38) 1,1,1-Trichloroethane	12.36	97	8284	0.665	ng		97
39) Isopropyl Acetate	12.80	61	5715	1.119	ng		94
40) 1-Butanol	12.83	56	7308	0.864	ng		82
41) Benzene	12.84	78	19822	0.585	ng		98
42) Carbon Tetrachloride	12.99	117	6718	0.597	ng		98
43) Cyclohexane	13.13	84	15058	1.160	ng		96
44) tert-Amyl Methyl Ether	13.48	73	12899	0.531	ng		98
45) 1,2-Dichloropropane	13.68	63	4777	0.607	ng		98
46) Bromodichloromethane	13.87	83	6536	0.609	ng		98
47) Trichloroethene	13.92	130	5662	0.552	ng		99
48) 1,4-Dioxane	13.92	88	3879	0.554	ng		92
49) 2,2,4-Trimethylpentane...	13.99	57	21577	0.628	ng		98
50) Methyl Methacrylate	14.13	100	3499	0.919	ng		95

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061706.D Vial: 12
Acq On : 6 Nov 2017 10:19 Operator: WA/RS
Sample : 0.40ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261706 (11/24)

Quant Time: Nov 06 13:10:49 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

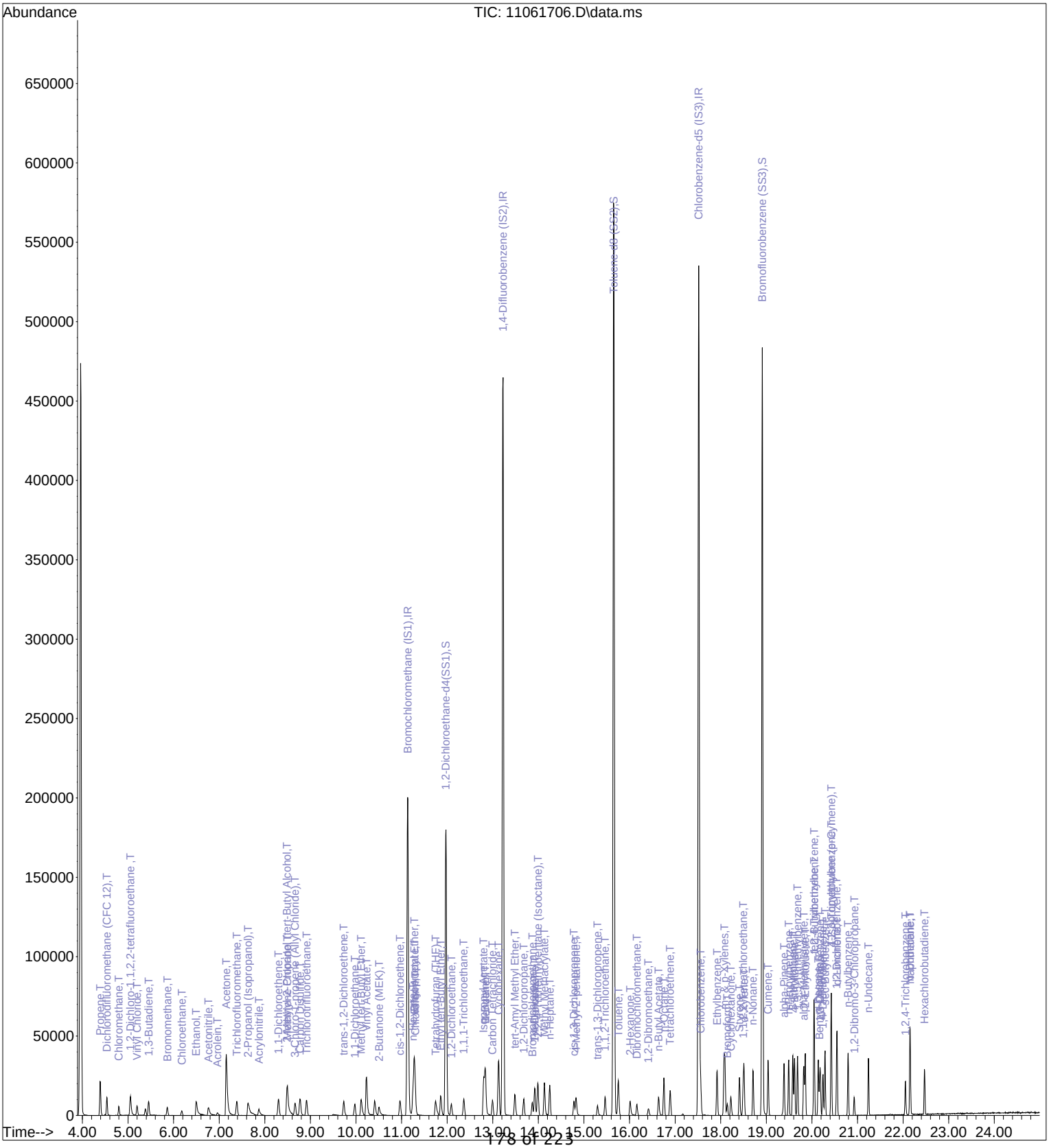
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.25	71	4871	0.586	ng	97
52) cis-1,3-Dichloropropene	14.78	75	7106	0.531	ng	97
53) 4-Methyl-2-pentanone	14.83	58	4077	0.545	ng	94
54) trans-1,3-Dichloropropene	15.30	75	5210	0.444	ng	95
55) 1,1,2-Trichloroethane	15.46	97	4690	0.570	ng	97
58) Toluene	15.76	91	19710	0.503	ng	99
59) 2-Hexanone	16.01	43	9481	0.498	ng	99
60) Dibromochloromethane	16.16	129	5273	0.472	ng	100
61) 1,2-Dibromoethane	16.41	107	4662	0.459	ng	99
62) n-Butyl Acetate	16.63	43	11602	0.547	ng	97
63) n-Octane	16.75	57	4597	0.603	ng	98
64) Tetrachloroethene	16.89	166	5890	0.470	ng	99
65) Chlorobenzene	17.56	112	13769	0.504	ng	99
66) Ethylbenzene	17.92	91	23875	0.544	ng	99
67) m- & p-Xylenes	18.08	91	38776	1.133	ng	98
68) Bromoform	18.14	173	4269	0.413	ng	98
69) Styrene	18.41	104	14211	0.498	ng	98
70) o-Xylene	18.51	91	19151	0.558	ng	99
71) n-Nonane	18.71	43	10940	0.626	ng	100
72) 1,1,2,2-Tetrachloroethane	18.49	83	7579	0.483	ng	99
74) Cumene	19.04	105	24883	0.547	ng	98
75) alpha-Pinene	19.39	93	12552	0.549	ng	80
76) n-Propylbenzene	19.49	91	29217	0.561	ng	99
77) 3-Ethyltoluene	19.58	105	24943	0.540	ng	99
78) 4-Ethyltoluene	19.62	105	23214	0.546	ng	100
79) 1,3,5-Trimethylbenzene	19.69	105	20661	0.552	ng	100
80) alpha-Methylstyrene	19.82	118	10155	0.457	ng	98
81) 2-Ethyltoluene	19.86	105	24810	0.562	ng	99
82) 1,2,4-Trimethylbenzene	20.05	105	20706	0.559	ng	100
83) n-Decane	20.14	57	10716	0.606	ng	98
84) Benzyl Chloride	20.16	91	11455	0.359	ng	98
85) 1,3-Dichlorobenzene	20.18	146	12176	0.504	ng	99
86) 1,4-Dichlorobenzene	20.24	146	12305	0.497	ng	98
87) sec-Butylbenzene	20.29	105	27450	0.541	ng	98
88) 4-Isopropyltoluene (p-...	20.42	119	25576	0.518	ng	99
89) 1,2,3-Trimethylbenzene	20.42	105	20585	0.552	ng	99
90) 1,2-Dichlorobenzene	20.54	146	11924	0.522	ng	98
91) d-Limonene	20.55	68	7775	0.558	ng	95
92) 1,2-Dibromo-3-Chloropr...	20.93	157	3555	0.430	ng	93
93) n-Undecane	21.24	57	10722	0.534	ng	99
94) 1,2,4-Trichlorobenzene	22.05	180	7786	0.474	ng	100
95) Naphthalene	22.15	128	21495	0.413	ng	99
96) n-Dodecane	22.15	57	9818	0.533	ng	99
97) Hexachlorobutadiene	22.47	225	6059	0.485	ng	97
98) Cyclohexanone	18.22	55	5907	0.472	ng	99
99) tert-Butylbenzene	20.05	119	20408	0.535	ng	99
100) n-Butylbenzene	20.79	91	21499	0.556	ng	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061706.D Vial: 12
Acq On : 6 Nov 2017 10:19 Operator: WA/RS
Sample : 0.40ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261706 (11/24)

Quant Time: Nov 06 13:10:49 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061707.D Vial: 12
Acq On : 6 Nov 2017 10:58 Operator: WA/RS
Sample : 1.0ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261706 (11/24)

Quant Time: Nov 06 13:10:51 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 11/6/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.14	130	90866	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.23	114	432687	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.52	82	184158	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.97	65	148824	16.277	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 130.24%#				
57) Toluene-d8 (SS2)	15.65	98	451448	11.732	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 93.84%				
73) Bromofluorobenzene (SS3)	18.91	174	157012	10.575	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.64%				
Target Compounds							Qvalue
2) Propene	4.38	42	12447	1.288	ng		99
3) Dichlorodifluoromethan...	4.53	85	22628	1.428	ng		99
4) Chloromethane	4.79	50	15275	1.290	ng		99
5) 1,2-Dichloro-1,1,2,2-t...	5.05	135	10884	1.235	ng		97
6) Vinyl Chloride	5.19	62	14544	1.297	ng		98
7) 1,3-Butadiene	5.45	54	10515	1.232	ng		98
8) Bromomethane	5.86	94	8552	1.133	ng		99
9) Chloroethane	6.17	64	7219	1.238	ng		99
10) Ethanol	6.49	45	39952	6.809	ng		98
11) Acetonitrile	6.76	41	20263	1.388	ng		99
12) Acrolein	6.94	56	6117	1.155	ng		93
13) Acetone	7.14	58	39886	6.369	ng		99
14) Trichlorofluoromethane	7.38	101	20048	1.479	ng		99
15) 2-Propanol (Isopropanol)	7.61	45	55302	2.714	ng		97
16) Acrylonitrile	7.86	53	12718	1.167	ng		98
17) 1,1-Dichloroethene	8.30	96	10103	1.220	ng		99
18) 2-Methyl-2-Propanol (t...	8.46	59	59943	2.941	ng		99
19) Methylene Chloride	8.50	84	10903	1.114	ng		100
20) 3-Chloro-1-propene (Al...	8.66	41	15888	1.340	ng		95
21) Trichlorotrifluoroethane	8.91	151	10351	1.219	ng		98
22) Carbon Disulfide	8.77	76	41500	1.202	ng		100
23) trans-1,2-Dichloroethene	9.73	61	15241	1.405	ng		99
24) 1,1-Dichloroethane	9.98	63	18721	1.296	ng		100
25) Methyl tert-Butyl Ether	10.10	73	34404	1.379	ng		100
26) Vinyl Acetate	10.22	86	10541	5.602	ng	#	83
27) 2-Butanone (MEK)	10.49	72	6634	1.144	ng		97
28) cis-1,2-Dichloroethene	10.97	61	14561	1.366	ng		99
29) Diisopropyl Ether	11.27	87	10982	1.383	ng	#	70
30) Ethyl Acetate	11.27	61	7507	2.719	ng		97
31) n-Hexane	11.25	57	18639	1.422	ng		99
32) Chloroform	11.30	83	18846	1.359	ng		99
34) Tetrahydrofuran (THF)	11.73	72	7484	1.219	ng		97
35) Ethyl tert-Butyl Ether	11.85	87	13079	1.278	ng		99
36) 1,2-Dichloroethane	12.09	62	14988	1.544	ng		100
38) 1,1,1-Trichloroethane	12.37	97	18296	1.486	ng		99
39) Isopropyl Acetate	12.79	61	13208	2.617	ng		100
40) 1-Butanol	12.82	56	19664	2.352	ng		89
41) Benzene	12.84	78	41974	1.253	ng		99
42) Carbon Tetrachloride	12.99	117	15940	1.434	ng		100
43) Cyclohexane	13.13	84	32729	2.552	ng		98
44) tert-Amyl Methyl Ether	13.48	73	31232	1.302	ng		100
45) 1,2-Dichloropropane	13.68	63	10139	1.303	ng		97
46) Bromodichloromethane	13.86	83	14500	1.368	ng		100
47) Trichloroethene	13.92	130	12160	1.199	ng		97
48) 1,4-Dioxane	13.91	88	8448	1.221	ng		99
49) 2,2,4-Trimethylpentane...	13.99	57	45322	1.335	ng		100
50) Methyl Methacrylate	14.13	100	8406	2.235	ng		100

Data File : I:\MS13\DATA\2017 11\06\11061707.D Vial: 12
Acq On : 6 Nov 2017 10:58 Operator: WA/RS
Sample : 1.0ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261706 (11/24)

Quant Time: Nov 06 13:10:51 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

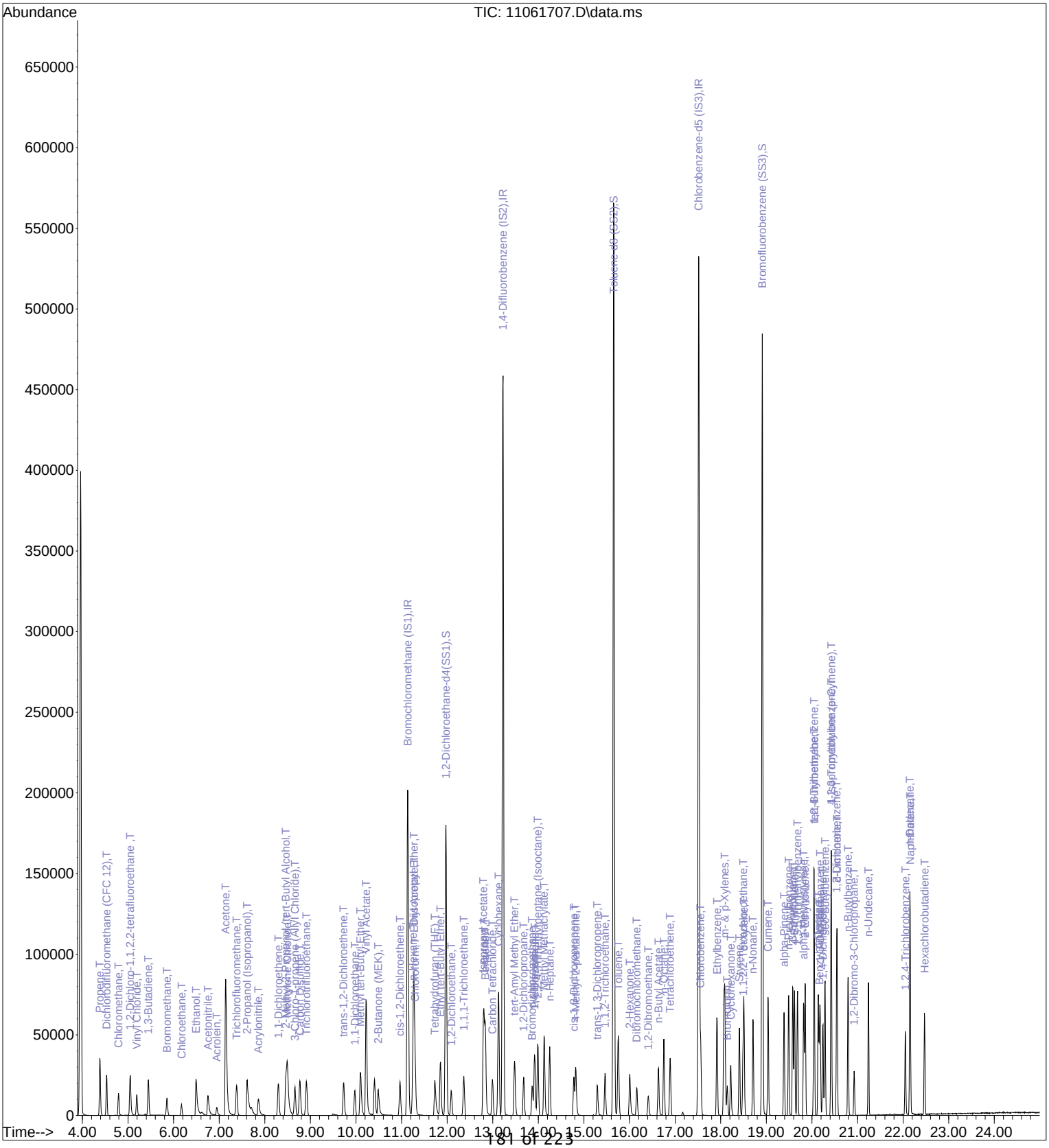
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.25	71	10780	1.313	ng	100
52) cis-1,3-Dichloropropene	14.78	75	17154	1.297	ng	98
53) 4-Methyl-2-pentanone	14.82	58	9702	1.313	ng	96
54) trans-1,3-Dichloropropene	15.29	75	13719	1.183	ng	99
55) 1,1,2-Trichloroethane	15.46	97	9978	1.228	ng	100
58) Toluene	15.75	91	43273	1.110	ng	99
59) 2-Hexanone	16.00	43	23913	1.263	ng	98
60) Dibromochloromethane	16.16	129	12347	1.110	ng	99
61) 1,2-Dibromoethane	16.41	107	11118	1.101	ng	98
62) n-Butyl Acetate	16.63	43	26948	1.278	ng	98
63) n-Octane	16.75	57	9281	1.224	ng	97
64) Tetrachloroethene	16.89	166	13284	1.066	ng	99
65) Chlorobenzene	17.56	112	29340	1.081	ng	100
66) Ethylbenzene	17.92	91	50160	1.149	ng	100
67) m- & p-Xylenes	18.09	91	79452	2.334	ng	98
68) Bromoform	18.14	173	10289	1.001	ng	98
69) Styrene	18.41	104	29856	1.052	ng	99
70) o-Xylene	18.51	91	39731	1.165	ng	99
71) n-Nonane	18.71	43	22696	1.306	ng	99
72) 1,1,2,2-Tetrachloroethane	18.49	83	17426	1.116	ng	99
74) Cumene	19.04	105	51476	1.137	ng	100
75) alpha-Pinene	19.39	93	25993	1.143	ng	99
76) n-Propylbenzene	19.49	91	61238	1.183	ng	99
77) 3-Ethyltoluene	19.58	105	53259	1.160	ng	100
78) 4-Ethyltoluene	19.62	105	47321	1.119	ng	99
79) 1,3,5-Trimethylbenzene	19.69	105	42855	1.152	ng	100
80) alpha-Methylstyrene	19.82	118	22172	1.004	ng	91
81) 2-Ethyltoluene	19.85	105	51150	1.166	ng	99
82) 1,2,4-Trimethylbenzene	20.05	105	43522	1.181	ng	99
83) n-Decane	20.14	57	22912	1.302	ng	99
84) Benzyl Chloride	20.16	91	29526	0.930	ng	98
85) 1,3-Dichlorobenzene	20.18	146	25565	1.063	ng	99
86) 1,4-Dichlorobenzene	20.24	146	26128	1.061	ng	99
87) sec-Butylbenzene	20.29	105	57846	1.147	ng	100
88) 4-Isopropyltoluene (p-...	20.43	119	54774	1.116	ng	99
89) 1,2,3-Trimethylbenzene	20.43	105	42539	1.147	ng	99
90) 1,2-Dichlorobenzene	20.54	146	24809	1.092	ng	99
91) d-Limonene	20.55	68	16336	1.178	ng	100
92) 1,2-Dibromo-3-Chloropr...	20.93	157	7945	0.967	ng	91
93) n-Undecane	21.24	57	24640	1.235	ng	99
94) 1,2,4-Trichlorobenzene	22.05	180	17801	1.090	ng	99
95) Naphthalene	22.16	128	51488	0.995	ng	98
96) n-Dodecane	22.15	57	23889	1.305	ng	98
97) Hexachlorobutadiene	22.47	225	13192	1.062	ng	99
98) Cyclohexanone	18.22	55	15245	1.226	ng	99
99) tert-Butylbenzene	20.05	119	42991	1.134	ng	100
100) n-Butylbenzene	20.79	91	46491	1.210	ng	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061707.D Vial: 12
Acq On : 6 Nov 2017 10:58 Operator: WA/RS
Sample : 1.0ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261706 (11/24)

Quant Time: Nov 06 13:10:51 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061708.D Vial: 14
Acq On : 6 Nov 2017 11:31 Operator: WA/RS
Sample : 5.0ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261706 (11/24)

Quant Time: Nov 06 13:10:53 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 11/6/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.14	130	83538	12.500	ng		-0.01
37) 1,4-Difluorobenzene (IS2)	13.23	114	398457	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.52	82	171128	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.98	65	139993	16.654	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 133.20%#				
57) Toluene-d8 (SS2)	15.66	98	421265	11.781	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 94.24%				
73) Bromofluorobenzene (SS3)	18.91	174	150129	10.881	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 87.04%				
Target Compounds							Qvalue
2) Propene	4.37	42	50567	5.690	ng		99
3) Dichlorodifluoromethan...	4.52	85	92948	6.381	ng		99
4) Chloromethane	4.78	50	62086	5.704	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	5.04	135	44944	5.548	ng		100
6) Vinyl Chloride	5.18	62	60789	5.897	ng		99
7) 1,3-Butadiene	5.44	54	45661	5.820	ng		99
8) Bromomethane	5.85	94	34563	4.981	ng		98
9) Chloroethane	6.17	64	30627	5.711	ng		99
10) Ethanol	6.50	45	166924	30.946	ng		99
11) Acetonitrile	6.76	41	87799	6.541	ng		99
12) Acrolein	6.94	56	27193	5.583	ng		99
13) Acetone	7.14	58	167316	29.062	ng		99
14) Trichlorofluoromethane	7.38	101	83486	6.701	ng		100
15) 2-Propanol (Isopropanol)	7.61	45	240877	12.858	ng		99
16) Acrylonitrile	7.86	53	59889	5.977	ng		100
17) 1,1-Dichloroethene	8.30	96	42424	5.571	ng		99
18) 2-Methyl-2-Propanol (t...	8.45	59	244282	13.036	ng		99
19) Methylene Chloride	8.50	84	44727	4.973	ng		99
20) 3-Chloro-1-propene (Al...	8.66	41	69430	6.371	ng		99
21) Trichlorotrifluoroethane	8.91	151	41591	5.327	ng		99
22) Carbon Disulfide	8.77	76	162005	5.104	ng		100
23) trans-1,2-Dichloroethene	9.74	61	66275	6.644	ng		100
24) 1,1-Dichloroethane	9.98	63	79613	5.997	ng		99
25) Methyl tert-Butyl Ether	10.08	73	148810	6.489	ng		100
26) Vinyl Acetate	10.23	86	50814	29.373	ng	#	93
27) 2-Butanone (MEK)	10.48	72	30124	5.651	ng		96
28) cis-1,2-Dichloroethene	10.97	61	63623	6.490	ng		100
29) Diisopropyl Ether	11.26	87	45659	6.252	ng	#	74
30) Ethyl Acetate	11.27	61	32250	12.704	ng		99
31) n-Hexane	11.25	57	75287	6.249	ng		100
32) Chloroform	11.31	83	80886	6.346	ng		100
34) Tetrahydrofuran (THF)	11.72	72	30475	5.401	ng		99
35) Ethyl tert-Butyl Ether	11.85	87	56646	6.021	ng		99
36) 1,2-Dichloroethane	12.09	62	65692	7.362	ng		99
38) 1,1,1-Trichloroethane	12.37	97	76769	6.770	ng		100
39) Isopropyl Acetate	12.79	61	56637	12.187	ng		100
40) 1-Butanol	12.80	56	94855	12.322	ng		97
41) Benzene	12.84	78	175645	5.693	ng		100
42) Carbon Tetrachloride	13.00	117	67730	6.615	ng		100
43) Cyclohexane	13.13	84	137102	11.610	ng		99
44) tert-Amyl Methyl Ether	13.47	73	133966	6.063	ng		99
45) 1,2-Dichloropropane	13.68	63	44067	6.150	ng		97
46) Bromodichloromethane	13.87	83	63473	6.503	ng		100
47) Trichloroethene	13.92	130	51098	5.471	ng		99
48) 1,4-Dioxane	13.90	88	38055	5.975	ng		100
49) 2,2,4-Trimethylpentane...	13.99	57	188518	6.032	ng		99
50) Methyl Methacrylate	14.13	100	37488	10.824	ng		99

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061708.D Vial: 14
Acq On : 6 Nov 2017 11:31 Operator: WA/RS
Sample : 5.0ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261706 (11/24)

Quant Time: Nov 06 13:10:53 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

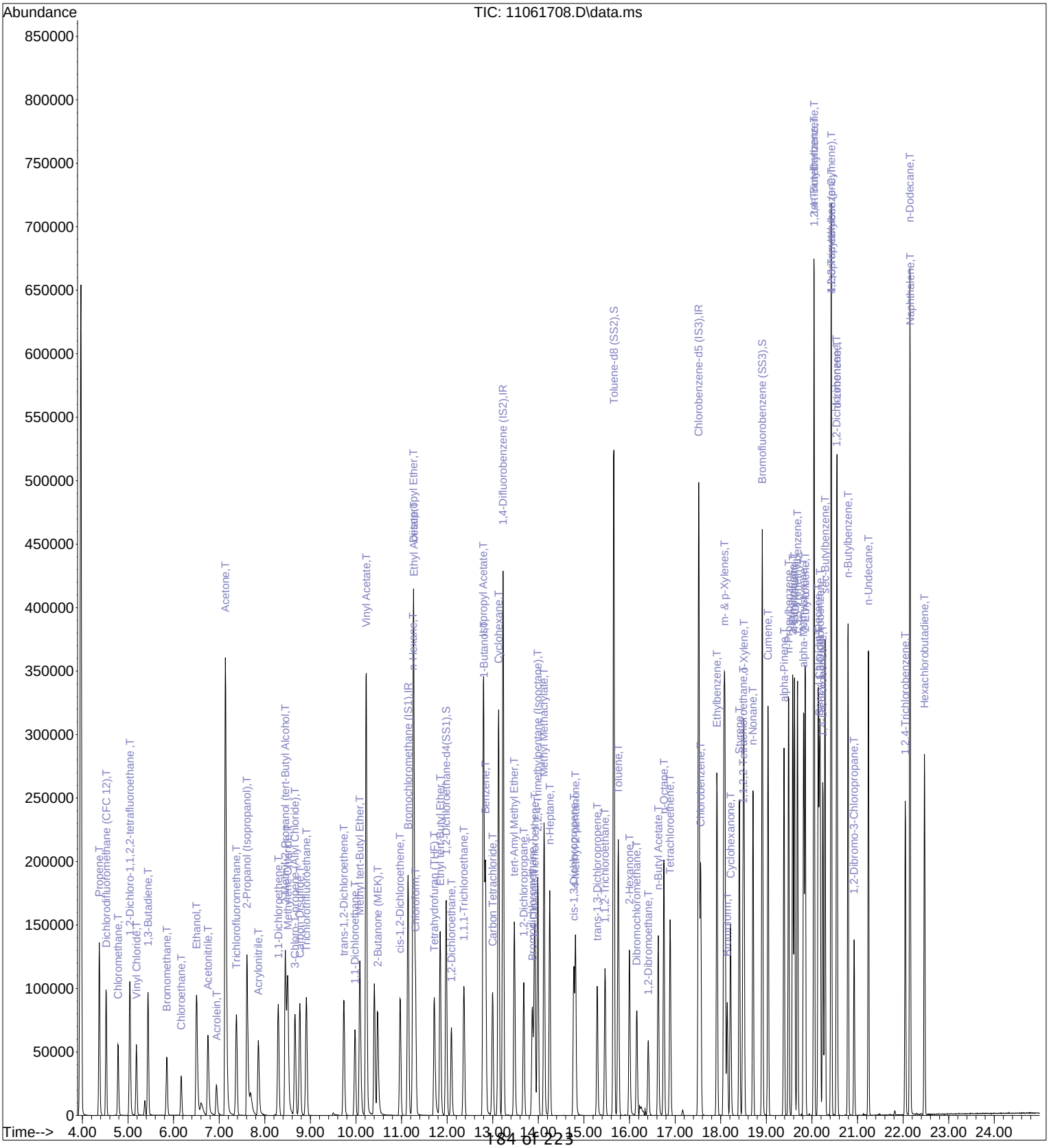
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.25	71	44243	5.852	ng	99
52) cis-1,3-Dichloropropene	14.78	75	77650	6.375	ng	99
53) 4-Methyl-2-pentanone	14.81	58	42819	6.291	ng	97
54) trans-1,3-Dichloropropene	15.29	75	69038	6.465	ng	100
55) 1,1,2-Trichloroethane	15.46	97	43520	5.816	ng	99
58) Toluene	15.75	91	183980	5.079	ng	100
59) 2-Hexanone	16.00	43	109256	6.209	ng	98
60) Dibromochloromethane	16.16	129	55117	5.334	ng	99
61) 1,2-Dibromoethane	16.41	107	49703	5.299	ng	99
62) n-Butyl Acetate	16.63	43	121864	6.221	ng	100
63) n-Octane	16.75	57	39595	5.619	ng	99
64) Tetrachloroethene	16.89	166	56677	4.893	ng	100
65) Chlorobenzene	17.56	112	123936	4.912	ng	100
66) Ethylbenzene	17.92	91	216123	5.328	ng	99
67) m- & p-Xylenes	18.08	91	337866	10.679	ng	100
68) Bromoform	18.14	173	48736	5.104	ng	98
69) Styrene	18.41	104	133804	5.075	ng	100
70) o-Xylene	18.51	91	172157	5.430	ng	99
71) n-Nonane	18.71	43	95675	5.923	ng	100
72) 1,1,2,2-Tetrachloroethane	18.49	83	77510	5.344	ng	100
74) Cumene	19.04	105	220619	5.246	ng	100
75) alpha-Pinene	19.39	93	114563	5.420	ng	99
76) n-Propylbenzene	19.49	91	265752	5.524	ng	100
77) 3-Ethyltoluene	19.58	105	230241	5.397	ng	100
78) 4-Ethyltoluene	19.62	105	204596	5.207	ng	100
79) 1,3,5-Trimethylbenzene	19.69	105	187465	5.423	ng	100
80) alpha-Methylstyrene	19.82	118	102191	4.980	ng	92
81) 2-Ethyltoluene	19.86	105	222822	5.465	ng	99
82) 1,2,4-Trimethylbenzene	20.05	105	190681	5.569	ng	100
83) n-Decane	20.14	57	101659	6.217	ng	99
84) Benzyl Chloride	20.16	91	154092	5.225	ng	99
85) 1,3-Dichlorobenzene	20.18	146	111892	5.008	ng	100
86) 1,4-Dichlorobenzene	20.24	146	112520	4.917	ng	99
87) sec-Butylbenzene	20.29	105	252622	5.391	ng	99
88) 4-Isopropyltoluene (p-...	20.43	119	239422	5.249	ng	100
89) 1,2,3-Trimethylbenzene	20.43	105	189987	5.514	ng	99
90) 1,2-Dichlorobenzene	20.54	146	110027	5.210	ng	99
91) d-Limonene	20.55	68	75034	5.825	ng	100
92) 1,2-Dibromo-3-Chloropr...	20.93	157	39232	5.140	ng	97
93) n-Undecane	21.24	57	108953	5.875	ng	100
94) 1,2,4-Trichlorobenzene	22.05	180	81457	5.367	ng	100
95) Naphthalene	22.16	128	239394	4.981	ng	100
96) n-Dodecane	22.15	57	110645	6.504	ng	99
97) Hexachlorobutadiene	22.47	225	58147	5.040	ng	98
98) Cyclohexanone	18.22	55	68109	5.893	ng	100
99) tert-Butylbenzene	20.04	119	186317	5.288	ng	100
100) n-Butylbenzene	20.80	91	207315	5.806	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061708.D Vial: 14
Acq On : 6 Nov 2017 11:31 Operator: WA/RS
Sample : 5.0ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261706 (11/24)

Quant Time: Nov 06 13:10:53 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061709.D Vial: 15
Acq On : 6 Nov 2017 12:05 Operator: WA/RS
Sample : 25ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261705 (11/24)

Quant Time: Nov 06 13:10:55 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 11/6/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	11.15	130	86747	12.500	ng	0.00
37) 1,4-Difluorobenzene (IS2)	13.23	114	407726	12.500	ng	0.00
56) Chlorobenzene-d5 (IS3)	17.52	82	178685	12.500	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	11.99	65	143531	16.444	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 131.52%#			
57) Toluene-d8 (SS2)	15.66	98	433102	11.600	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 92.80%			
73) Bromofluorobenzene (SS3)	18.91	174	156950	10.895	ng	0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 87.12%			
Target Compounds						Qvalue
2) Propene	4.36	42	293281	31.782	ng	100
3) Dichlorodifluoromethan...	4.51	85	543288	35.918	ng	100
4) Chloromethane	4.78	50	387782	34.308	ng	100
5) 1,2-Dichloro-1,1,2,2-t...	5.04	135	267299	31.773	ng	100
6) Vinyl Chloride	5.18	62	366844	34.271	ng	100
7) 1,3-Butadiene	5.44	54	290347	35.639	ng	100
8) Bromomethane	5.86	94	206582	28.670	ng	100
9) Chloroethane	6.17	64	179242	32.187	ng	100
10) Ethanol	6.54	45	974854	174.043	ng	100
11) Acetonitrile	6.78	41	520746	37.360	ng	100
12) Acrolein	6.95	56	166515	32.925	ng	100
13) Acetone	7.15	58	967085	161.765	ng	100
14) Trichlorofluoromethane	7.38	101	478673	36.998	ng	100
15) 2-Propanol (Isopropanol)	7.64	45	1451823	74.629	ng	99
16) Acrylonitrile	7.88	53	366193	35.196	ng	100
17) 1,1-Dichloroethene	8.30	96	254764	32.217	ng	100
18) 2-Methyl-2-Propanol (t...	8.47	59	1503741	77.280	ng	100
19) Methylene Chloride	8.52	84	260955	27.939	ng	100
20) 3-Chloro-1-propene (Al...	8.67	41	429831	37.980	ng	100
21) Trichlorotrifluoroethane	8.91	151	250106	30.851	ng	100
22) Carbon Disulfide	8.78	76	964643	29.269	ng	100
23) trans-1,2-Dichloroethene	9.74	61	398819	38.505	ng	100
24) 1,1-Dichloroethane	9.99	63	460428	33.398	ng	100
25) Methyl tert-Butyl Ether	10.08	73	866753	36.397	ng	100
26) Vinyl Acetate	10.24	86	309713	172.409	ng	100
27) 2-Butanone (MEK)	10.48	72	184781	33.384	ng	100
28) cis-1,2-Dichloroethene	10.98	61	382817	37.606	ng	100
29) Diisopropyl Ether	11.27	87	222065	29.284	ng	100
30) Ethyl Acetate	11.27	61	188780	71.615	ng	100
31) n-Hexane	11.25	57	409081	32.700	ng	100
32) Chloroform	11.32	83	482324	36.442	ng	100
34) Tetrahydrofuran (THF)	11.71	72	179469	30.631	ng	100
35) Ethyl tert-Butyl Ether	11.85	87	331007	33.882	ng	100
36) 1,2-Dichloroethane	12.10	62	386143	41.671	ng	100
38) 1,1,1-Trichloroethane	12.37	97	454917	39.206	ng	100
39) Isopropyl Acetate	12.79	61	323390	68.005	ng	100
40) 1-Butanol	12.82	56	577304	73.288	ng	100
41) Benzene	12.84	78	1015313	32.160	ng	100
42) Carbon Tetrachloride	13.00	117	410981	39.229	ng	100
43) Cyclohexane	13.13	84	794566	65.753	ng	100
44) tert-Amyl Methyl Ether	13.48	73	798669	35.325	ng	100
45) 1,2-Dichloropropane	13.69	63	258802	35.297	ng	100
46) Bromodichloromethane	13.87	83	382303	38.276	ng	100
47) Trichloroethene	13.93	130	298723	31.257	ng	100
48) 1,4-Dioxane	13.90	88	224921	34.510	ng	100
49) 2,2,4-Trimethylpentane...	13.99	57	1097809	34.329	ng	100
50) Methyl Methacrylate	14.13	100	223460	63.055	ng	100

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061709.D Vial: 15
Acq On : 6 Nov 2017 12:05 Operator: WA/RS
Sample : 25ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261705 (11/24)

Quant Time: Nov 06 13:10:55 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

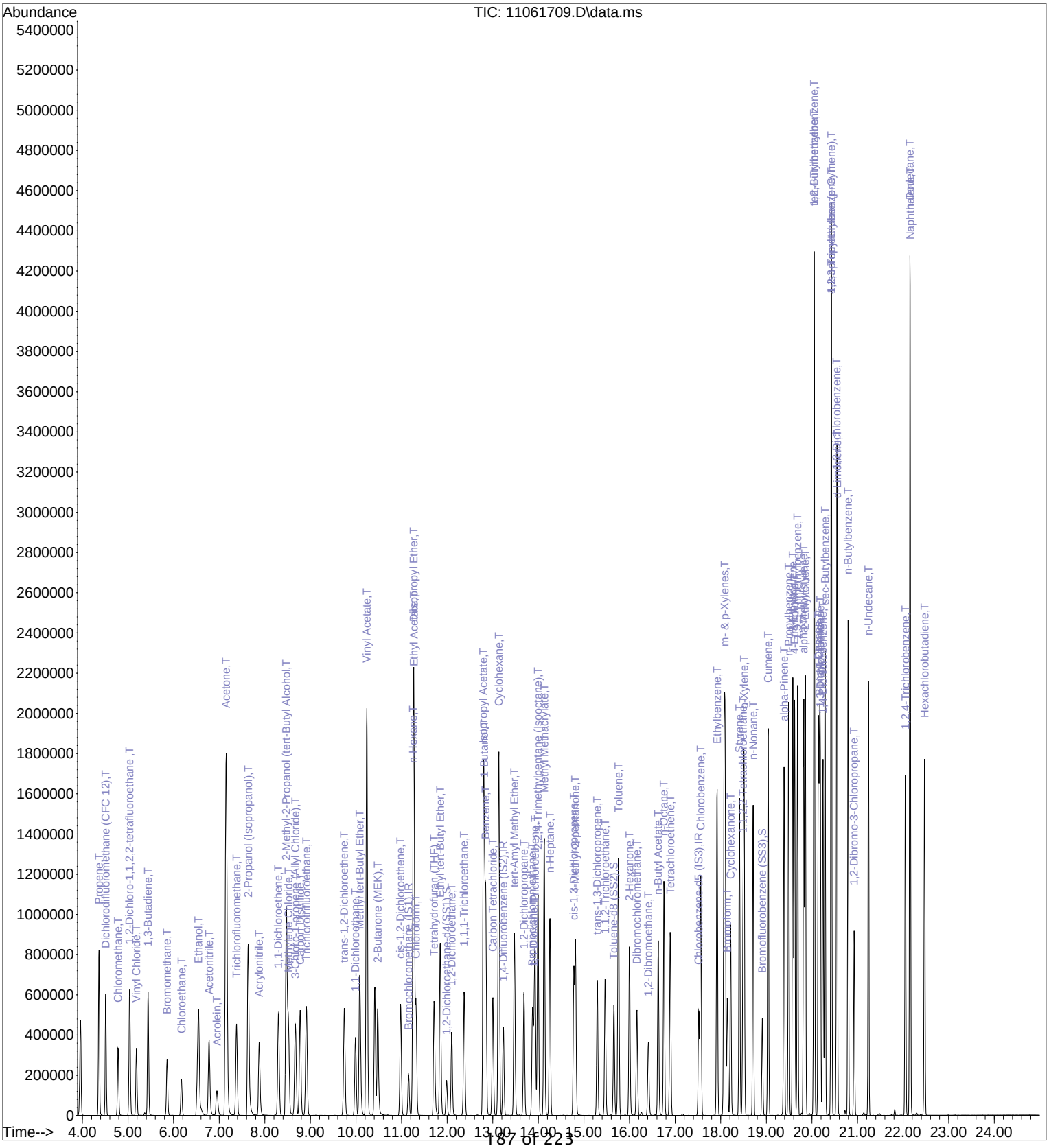
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.26	71	254067	32.842	ng	100
52) cis-1,3-Dichloropropene	14.78	75	474713	38.090	ng	100
53) 4-Methyl-2-pentanone	14.81	58	257820	37.019	ng	100
54) trans-1,3-Dichloropropene	15.29	75	434571	39.768	ng	100
55) 1,1,2-Trichloroethane	15.47	97	260339	34.002	ng	100
58) Toluene	15.76	91	1087966	28.766	ng	100
59) 2-Hexanone	16.00	43	655580	35.681	ng	100
60) Dibromochloromethane	16.16	129	346078	32.075	ng	100
61) 1,2-Dibromoethane	16.41	107	304545	31.096	ng	100
62) n-Butyl Acetate	16.63	43	728693	35.625	ng	100
63) n-Octane	16.75	57	227780	30.958	ng	100
64) Tetrachloroethene	16.90	166	337110	27.873	ng	100
65) Chlorobenzene	17.56	112	753802	28.613	ng	100
66) Ethylbenzene	17.92	91	1293670	30.545	ng	100
67) m- & p-Xylenes	18.09	91	2034699	61.593	ng	100
68) Bromoform	18.14	173	312278	31.322	ng	100
69) Styrene	18.41	104	832773	30.249	ng	100
70) o-Xylene	18.51	91	1040738	31.440	ng	100
71) n-Nonane	18.71	43	570675	33.837	ng	100
72) 1,1,2,2-Tetrachloroethane	18.49	83	477172	31.506	ng	100
74) Cumene	19.04	105	1348983	30.718	ng	100
75) alpha-Pinene	19.39	93	690593	31.293	ng	100
76) n-Propylbenzene	19.49	91	1608955	32.031	ng	100
77) 3-Ethyltoluene	19.58	105	1370617	30.769	ng	100
78) 4-Ethyltoluene	19.62	105	1292353	31.501	ng	100
79) 1,3,5-Trimethylbenzene	19.69	105	1146361	31.758	ng	100
80) alpha-Methylstyrene	19.82	118	632435	29.517	ng	100
81) 2-Ethyltoluene	19.86	105	1351869	31.756	ng	100
82) 1,2,4-Trimethylbenzene	20.05	105	1191666	33.329	ng	100
83) n-Decane	20.14	57	602271	35.274	ng	100
84) Benzyl Chloride	20.16	91	1094482	35.542	ng	100
85) 1,3-Dichlorobenzene	20.19	146	720761	30.897	ng	100
86) 1,4-Dichlorobenzene	20.24	146	728623	30.491	ng	100
87) sec-Butylbenzene	20.29	105	1548735	31.650	ng	100
88) 4-Isopropyltoluene (p-...	20.43	119	1483904	31.156	ng	100
89) 1,2,3-Trimethylbenzene	20.43	105	1190160	33.081	ng	100
90) 1,2-Dichlorobenzene	20.54	146	694525	31.495	ng	100
91) d-Limonene	20.56	68	456280	33.921	ng	100
92) 1,2-Dibromo-3-Chloropr...	20.93	157	262959	32.994	ng	100
93) n-Undecane	21.24	57	653747	33.761	ng	100
94) 1,2,4-Trichlorobenzene	22.05	180	574422	36.249	ng	100
95) Naphthalene	22.16	128	1775275	35.375	ng	100
96) n-Dodecane	22.15	57	670148	37.728	ng	100
97) Hexachlorobutadiene	22.47	225	374127	31.055	ng	100
98) Cyclohexanone	18.22	55	412998	34.222	ng	100
99) tert-Butylbenzene	20.05	119	1148927	31.230	ng	100
100) n-Butylbenzene	20.80	91	1277504	34.262	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061709.D Vial: 15
Acq On : 6 Nov 2017 12:05 Operator: WA/RS
Sample : 25ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261705 (11/24)

Quant Time: Nov 06 13:10:55 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061710.D Vial: 15
Acq On : 6 Nov 2017 12:39 Operator: WA/RS
Sample : 50ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261705 (11/24)

Quant Time: Nov 06 13:10:57 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration 11/6/17
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.16	130	93496	12.500	ng		0.00
37) 1,4-Difluorobenzene (IS2)	13.24	114	447875	12.500	ng		0.00
56) Chlorobenzene-d5 (IS3)	17.52	82	190954	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.99	65	150014	15.946	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 127.60%				
57) Toluene-d8 (SS2)	15.66	98	467358	11.713	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 93.68%				
73) Bromofluorobenzene (SS3)	18.92	174	162809	10.575	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.64%				
Target Compounds							Qvalue
2) Propene	4.37	42	556307	55.935	ng		100
3) Dichlorodifluoromethan...	4.52	85	1006372	61.730	ng		100
4) Chloromethane	4.79	50	704890	57.861	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	5.04	135	513737	56.658	ng		100
6) Vinyl Chloride	5.20	62	711231	61.648	ng		100
7) 1,3-Butadiene	5.45	54	567046	64.579	ng		99
8) Bromomethane	5.87	94	409692	52.753	ng		99
9) Chloroethane	6.18	64	346320	57.701	ng		100
10) Ethanol	6.57	45	1858265	307.812	ng		100
11) Acetonitrile	6.79	41	1013238	67.446	ng		100
12) Acrolein	6.96	56	325006	59.624	ng		100
13) Acetone	7.16	58	1818229	282.183	ng		96
14) Trichlorofluoromethane	7.39	101	893969	64.110	ng		100
15) 2-Propanol (Isopropanol)	7.65	45	2752925	131.295	ng		99
16) Acrylonitrile	7.89	53	711239	63.425	ng		100
17) 1,1-Dichloroethene	8.31	96	492025	57.730	ng		98
18) 2-Methyl-2-Propanol (t...	8.49	59	2624543	125.144	ng		100
19) Methylene Chloride	8.52	84	504424	50.107	ng		99
20) 3-Chloro-1-propene (Al...	8.68	41	829868	68.035	ng		100
21) Trichlorotrifluoroethane	8.92	151	471727	53.987	ng		100
22) Carbon Disulfide	8.78	76	1869443	52.628	ng		100
23) trans-1,2-Dichloroethene	9.75	61	767077	68.713	ng		99
24) 1,1-Dichloroethane	9.99	63	885641	59.604	ng		100
25) Methyl tert-Butyl Ether	10.08	73	1655069	64.483	ng		99
26) Vinyl Acetate	10.25	86	603555	311.730	ng	#	89
27) 2-Butanone (MEK)	10.48	72	359389	60.243	ng		98
28) cis-1,2-Dichloroethene	10.98	61	728607	66.408	ng		99
29) Diisopropyl Ether	11.27	87	423964	51.874	ng		97
30) Ethyl Acetate	11.28	61	362315	127.526	ng		100
31) n-Hexane	11.26	57	777188	57.641	ng		100
32) Chloroform	11.32	83	917532	64.321	ng		100
34) Tetrahydrofuran (THF)	11.72	72	349794	55.391	ng		99
35) Ethyl tert-Butyl Ether	11.85	87	643399	61.105	ng		98
36) 1,2-Dichloroethane	12.10	62	724574	72.550	ng		100
38) 1,1,1-Trichloroethane	12.38	97	854597	67.049	ng		100
39) Isopropyl Acetate	12.80	61	625286	119.703	ng		96
40) 1-Butanol	12.83	56	1121827	129.647	ng		98
41) Benzene	12.85	78	1956371	56.413	ng		100
42) Carbon Tetrachloride	13.00	117	778438	67.642	ng		100
43) Cyclohexane	13.13	84	1535309	115.663	ng		99
44) tert-Amyl Methyl Ether	13.48	73	1540146	62.014	ng		100
45) 1,2-Dichloropropane	13.69	63	499828	62.058	ng		99
46) Bromodichloromethane	13.87	83	729046	66.448	ng		99
47) Trichloroethene	13.93	130	578862	55.140	ng		100
48) 1,4-Dioxane	13.90	88	437966	61.174	ng		100
49) 2,2,4-Trimethylpentane...	13.99	57	2118197	60.299	ng		99
50) Methyl Methacrylate	14.14	100	437290	112.331	ng		98

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061710.D Vial: 15
Acq On : 6 Nov 2017 12:39 Operator: WA/RS
Sample : 50ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261705 (11/24)

Quant Time: Nov 06 13:10:57 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

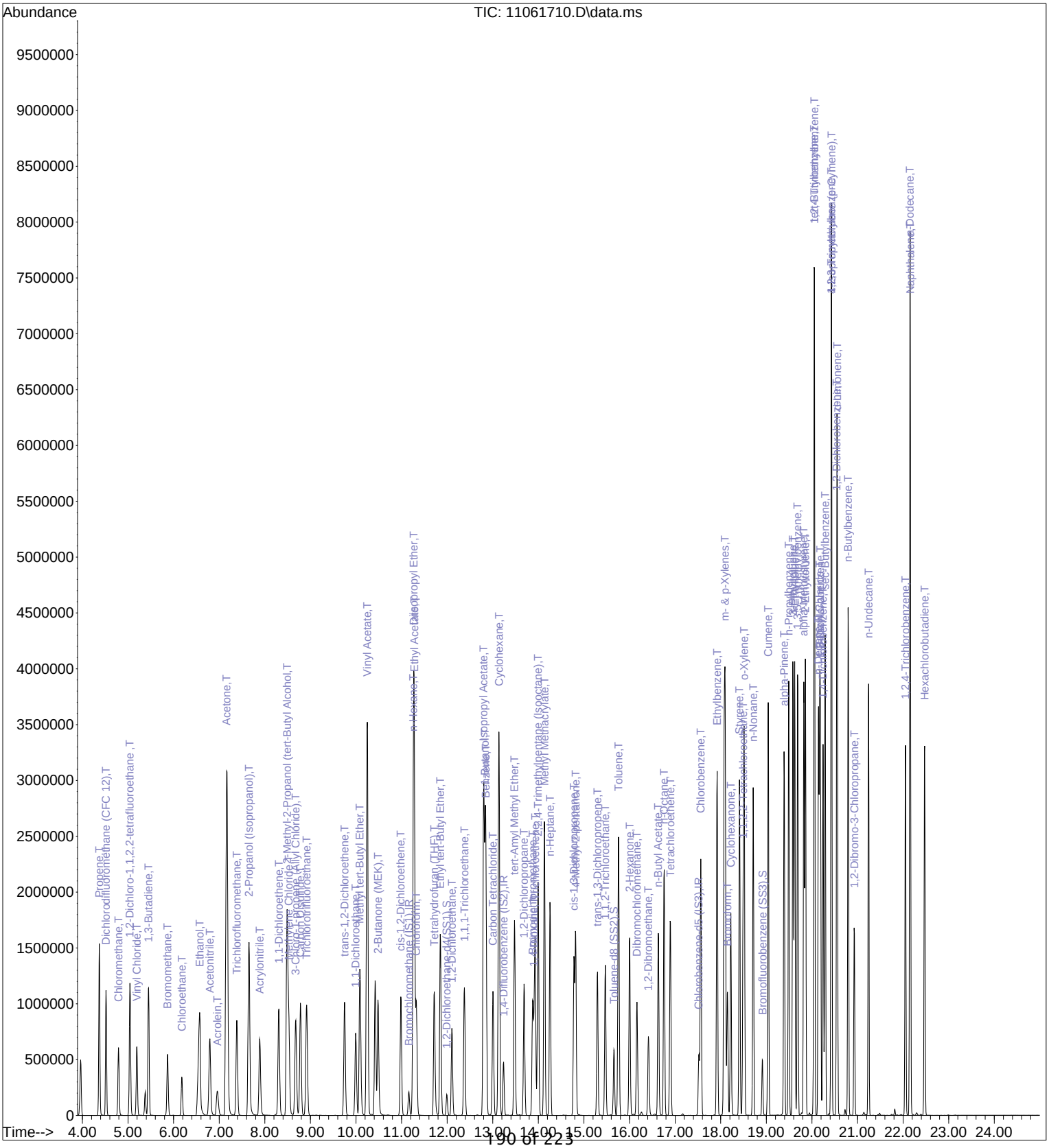
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.26	71	492129	57.913	ng	100
52) cis-1,3-Dichloropropene	14.78	75	923748	67.475	ng	100
53) 4-Methyl-2-pentanone	14.82	58	496798	64.938	ng	99
54) trans-1,3-Dichloropropene	15.30	75	836221	69.663	ng	99
55) 1,1,2-Trichloroethane	15.47	97	506148	60.181	ng	99
58) Toluene	15.76	91	2102599	52.021	ng	100
59) 2-Hexanone	16.00	43	1256274	63.981	ng	99
60) Dibromochloromethane	16.16	129	666679	57.818	ng	100
61) 1,2-Dibromoethane	16.41	107	587043	56.090	ng	100
62) n-Butyl Acetate	16.63	43	1396431	63.883	ng	99
63) n-Octane	16.76	57	440477	56.019	ng	100
64) Tetrachloroethene	16.90	166	650170	50.304	ng	100
65) Chlorobenzene	17.56	112	1441356	51.196	ng	99
66) Ethylbenzene	17.92	91	2446455	54.052	ng	100
67) m- & p-Xylenes	18.09	91	3978677	112.702	ng	99
68) Bromoform	18.15	173	612633	57.501	ng	99
69) Styrene	18.41	104	1603786	54.512	ng	100
70) o-Xylene	18.51	91	1976897	55.884	ng	99
71) n-Nonane	18.71	43	1076448	59.726	ng	99
72) 1,1,2,2-Tetrachloroethane	18.49	83	925106	57.158	ng	100
74) Cumene	19.04	105	2535879	54.034	ng	99
75) alpha-Pinene	19.39	93	1315481	55.778	ng	100
76) n-Propylbenzene	19.49	91	3024626	56.346	ng	100
77) 3-Ethyltoluene	19.58	105	2734137	57.435	ng	100
78) 4-Ethyltoluene	19.62	105	2312152	52.738	ng	100
79) 1,3,5-Trimethylbenzene	19.69	105	2162831	56.067	ng	99
80) alpha-Methylstyrene	19.82	118	1203175	52.547	ng	92
81) 2-Ethyltoluene	19.86	105	2558689	56.243	ng	100
82) 1,2,4-Trimethylbenzene	20.06	105	2250320	58.895	ng	100
83) n-Decane	20.14	57	1125188	61.667	ng	100
84) Benzyl Chloride	20.17	91	2108206	64.062	ng	99
85) 1,3-Dichlorobenzene	20.19	146	1370676	54.981	ng	100
86) 1,4-Dichlorobenzene	20.24	146	1395371	54.640	ng	100
87) sec-Butylbenzene	20.29	105	2894942	55.360	ng	99
88) 4-Isopropyltoluene (p-...	20.43	119	2753359	54.096	ng	99
89) 1,2,3-Trimethylbenzene	20.42	105	2247829	58.465	ng	100
90) 1,2-Dichlorobenzene	20.54	146	1317196	55.893	ng	100
91) d-Limonene	20.56	68	863662	60.081	ng	100
92) 1,2-Dibromo-3-Chloropr...	20.93	157	500432	58.756	ng	99
93) n-Undecane	21.24	57	1215349	58.730	ng	100
94) 1,2,4-Trichlorobenzene	22.05	180	1084968	64.068	ng	100
95) Naphthalene	22.16	128	3301685	61.564	ng	99
96) n-Dodecane	22.15	57	1230666	64.833	ng	98
97) Hexachlorobutadiene	22.47	225	704698	54.737	ng	100
98) Cyclohexanone	18.22	55	799339	61.980	ng	99
99) tert-Butylbenzene	20.05	119	2152841	54.758	ng	100
100) n-Butylbenzene	20.79	91	2383789	59.824	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061710.D Vial: 15
Acq On : 6 Nov 2017 12:39 Operator: WA/RS
Sample : 50ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261705 (11/24)

Quant Time: Nov 06 13:10:57 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061711.D Vial: 15
Acq On : 6 Nov 2017 13:12 Operator: WA/RS
Sample : 100ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261705 (11/24)

Quant Time: Nov 06 13:47:01 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017 WA 11/6/17
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.17	130	100003	12.500	ng		0.01
37) 1,4-Difluorobenzene (IS2)	13.24	114	484702	12.500	ng		0.01
56) Chlorobenzene-d5 (IS3)	17.52	82	205940	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	12.00	65	158774	15.779	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 126.24%				
57) Toluene-d8 (SS2)	15.66	98	504253	11.718	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 93.76%				
73) Bromofluorobenzene (SS3)	18.92	174	176203	10.612	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 84.88%				
Target Compounds							Qvalue
2) Propene	4.37	42	1327899	124.828	ng		99
3) Dichlorodifluoromethan...	4.52	85	2025770	116.175	ng		100
4) Chloromethane	4.79	50	1304612	100.121	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	5.05	135	1063845	109.692	ng		99
6) Vinyl Chloride	5.20	62	1458614	118.204	ng		100
7) 1,3-Butadiene	5.46	54	1194327	127.168	ng		98
8) Bromomethane	5.87	94	873953	105.211	ng		99
9) Chloroethane	6.19	64	733876	114.316	ng		100
10) Ethanol	6.62	45	3865189	598.589	ng		100
11) Acetonitrile	6.82	41	2185417	136.006	ng		100
12) Acrolein	6.97	56	693313	118.917	ng		100
13) Acetone	7.19	58	3680361	534.014	ng		89
14) Trichlorofluoromethane	7.39	101	1874184	125.659	ng		100
15) 2-Propanol (Isopropanol)	7.68	45	4841008	215.859	ng		99
16) Acrylonitrile	7.91	53	1516584	126.442	ng		100
17) 1,1-Dichloroethene	8.31	96	1047064	114.860	ng		96
18) 2-Methyl-2-Propanol (t...	8.51	59	3929722	175.186	ng		100
19) Methylene Chloride	8.54	84	1056387	98.108	ng		97
20) 3-Chloro-1-propene (Al...	8.68	41	1735178	132.999	ng		99
21) Trichlorotrifluoroethane	8.92	151	996605	106.636	ng		100
22) Carbon Disulfide	8.79	76	3954235	104.075	ng		100
23) trans-1,2-Dichloroethene	9.75	61	1604836	134.404	ng		98
24) 1,1-Dichloroethane	10.00	63	1855480	116.750	ng		100
25) Methyl tert-Butyl Ether	10.09	73	3418802	124.532	ng		99
26) Vinyl Acetate	10.27	86	1262757	609.763	ng	#	66
27) 2-Butanone (MEK)	10.50	72	760528	119.189	ng		95
28) cis-1,2-Dichloroethene	10.99	61	1535973	130.884	ng		99
29) Diisopropyl Ether	11.28	87	884312	101.159	ng	#	87
30) Ethyl Acetate	11.29	61	747326	245.924	ng		97
31) n-Hexane	11.26	57	1620941	112.395	ng		99
32) Chloroform	11.33	83	1917934	125.703	ng		100
34) Tetrahydrofuran (THF)	11.72	72	737101	109.128	ng		99
35) Ethyl tert-Butyl Ether	11.85	87	1346781	119.584	ng		97
36) 1,2-Dichloroethane	12.11	62	1487779	139.274	ng		100
38) 1,1,1-Trichloroethane	12.38	97	1774387	128.636	ng		100
39) Isopropyl Acetate	12.80	61	1289729	228.143	ng	#	91
40) 1-Butanol	12.86	56	2341169	250.007	ng	#	47
41) Benzene	12.86	78	4013906	106.949	ng		100
42) Carbon Tetrachloride	13.01	117	1619564	130.039	ng		100
43) Cyclohexane	13.14	84	3165248	220.337	ng		99
44) tert-Amyl Methyl Ether	13.48	73	3219862	119.797	ng		99
45) 1,2-Dichloropropane	13.69	63	1059394	121.540	ng		98
46) Bromodichloromethane	13.88	83	1532113	129.033	ng		99
47) Trichloroethene	13.93	130	1234267	108.638	ng		100
48) 1,4-Dioxane	13.91	88	934101	120.559	ng		99
49) 2,2,4-Trimethylpentane...	14.00	57	4370517	114.963	ng		99
50) Methyl Methacrylate	14.14	100	928732	220.445	ng		96

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061711.D Vial: 15
Acq On : 6 Nov 2017 13:12 Operator: WA/RS
Sample : 100ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261705 (11/24)

Quant Time: Nov 06 13:47:01 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

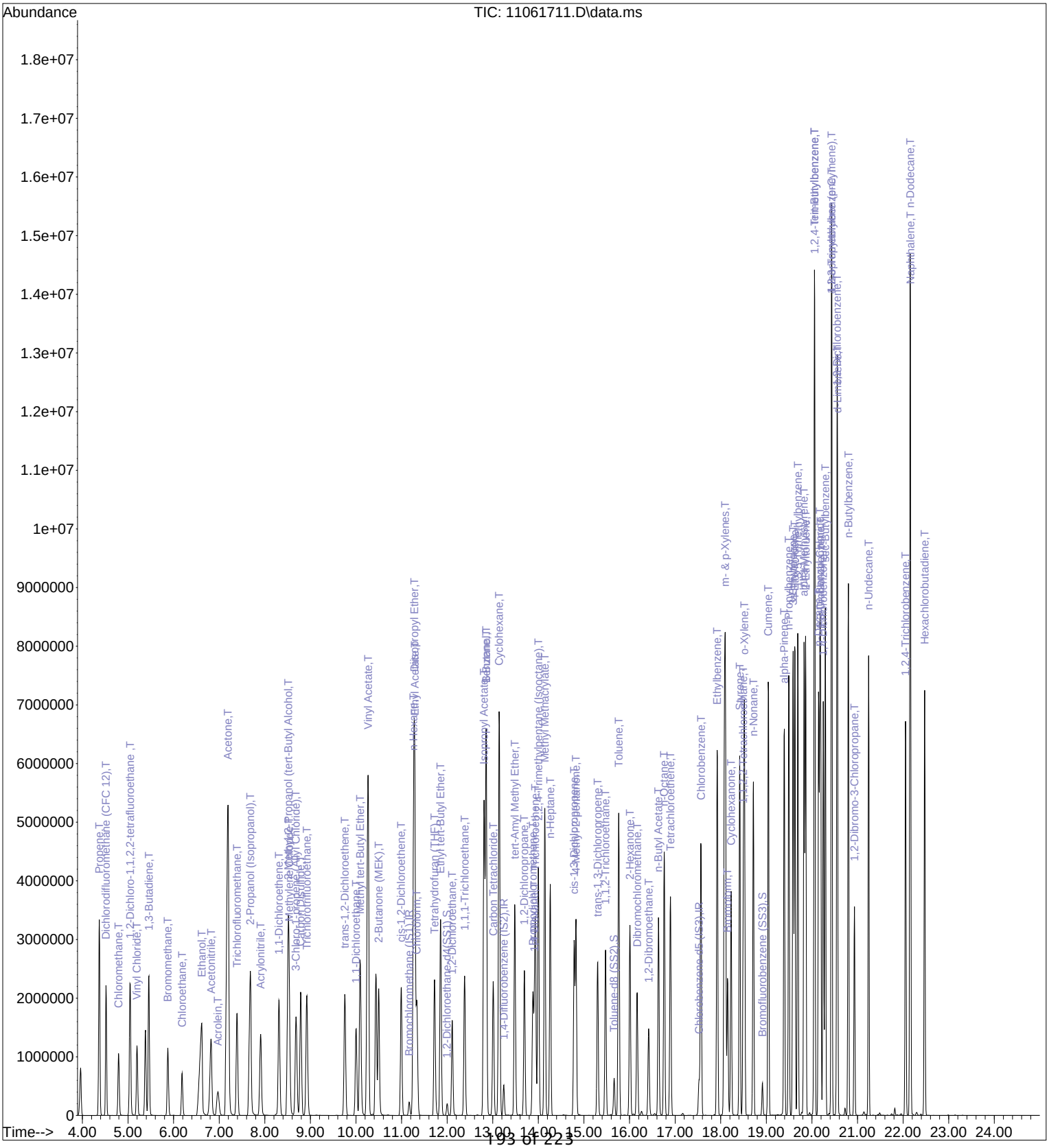
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.26	71	1037171	112.779	ng	100
52) cis-1,3-Dichloropropene	14.79	75	1936988	130.737	ng	99
53) 4-Methyl-2-pentanone	14.82	58	1039129	125.507	ng	97
54) trans-1,3-Dichloropropene	15.30	75	1760901	135.549	ng	99
55) 1,1,2-Trichloroethane	15.47	97	1068789	117.423	ng	100
58) Toluene	15.76	91	4366029	100.160	ng	99
59) 2-Hexanone	16.01	43	2594387	122.515	ng	98
60) Dibromochloromethane	16.17	129	1410032	113.387	ng	99
61) 1,2-Dibromoethane	16.42	107	1243950	110.206	ng	100
62) n-Butyl Acetate	16.63	43	2880909	122.204	ng	99
63) n-Octane	16.76	57	916681	108.098	ng	98
64) Tetrachloroethene	16.90	166	1392322	99.885	ng	100
65) Chlorobenzene	17.57	112	3005376	98.981	ng	99
66) Ethylbenzene	17.92	91	5034305	103.134	ng	98
67) m- & p-Xylenes	18.10	91	8139586	213.787	ng	100
68) Bromoform	18.15	173	1309482	113.962	ng	100
69) Styrene	18.42	104	3345388	105.435	ng	99
70) o-Xylene	18.52	91	4096232	107.368	ng	99
71) n-Nonane	18.72	43	2167692	111.520	ng	97
72) 1,1,2,2-Tetrachloroethane	18.50	83	1949203	111.668	ng	100
74) Cumene	19.04	105	5146047	101.672	ng	98
75) alpha-Pinene	19.39	93	2725999	107.174	ng	100
76) n-Propylbenzene	19.49	91	6020477	103.995	ng	97
77) 3-Ethyltoluene	19.59	105	5262407	102.501	ng	98
78) 4-Ethyltoluene	19.62	105	4944779	104.578	ng	98
79) 1,3,5-Trimethylbenzene	19.69	105	4474205	107.545	ng	99
80) alpha-Methylstyrene	19.83	118	2522418	102.146	ng	92
81) 2-Ethyltoluene	19.86	105	5208629	106.160	ng	98
82) 1,2,4-Trimethylbenzene	20.06	105	4522742	109.754	ng	100
83) n-Decane	20.15	57	2266880	115.197	ng	98
84) Benzyl Chloride	20.17	91	4359945	122.846	ng	97
85) 1,3-Dichlorobenzene	20.19	146	2868985	106.708	ng	100
86) 1,4-Dichlorobenzene	20.25	146	2923005	106.131	ng	99
87) sec-Butylbenzene	20.29	105	5791560	102.692	ng	97
88) 4-Isopropyltoluene (p-...	20.43	119	5304867	96.641	ng	96
89) 1,2,3-Trimethylbenzene	20.43	105	4522990	109.080	ng	99
90) 1,2-Dichlorobenzene	20.55	146	2719365	106.995	ng	100
91) d-Limonene	20.56	68	1742269	112.383	ng	97
92) 1,2-Dibromo-3-Chloropr...	20.93	157	1062438	115.664	ng	96
93) n-Undecane	21.24	57	2417498	108.322	ng	98
94) 1,2,4-Trichlorobenzene	22.05	180	2285577	125.144	ng	99
95) Naphthalene	22.16	128	6455742	111.615	ng	98
96) n-Dodecane	22.16	57	2347410	114.665	ng	95
97) Hexachlorobutadiene	22.47	225	1513250	108.988	ng	100
98) Cyclohexanone	18.23	55	1671177	120.151	ng	99
99) tert-Butylbenzene	20.06	119	4293298	101.255	ng	99
100) n-Butylbenzene	20.80	91	4754298	110.633	ng	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061711.D Vial: 15
Acq On : 6 Nov 2017 13:12 Operator: WA/RS
Sample : 100ng TO-15 ICAL Std Inst : MS13
Misc : S31-10251702/S31-10261705 (11/24)

Quant Time: Nov 06 13:47:01 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:08:56 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061714.D Vial: 3
Acq On : 6 Nov 2017 14:53 Operator: WA/RS
Sample : 25ng TO15 ICV Std Inst : MS13
Misc : S31-10251702/S31-10091704 (11/7)

Quant Time: Nov 06 15:15:11 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:56:58 2017 11/6/17
Response via : Initial Calibration
DataAcq Meth:TO15.M

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.15	130	99336	12.500	ng		-0.01
37) 1,4-Difluorobenzene (IS2)	13.23	114	475162	12.500	ng		-0.01
56) Chlorobenzene-d5 (IS3)	17.52	82	201256	12.500	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.99	65	154823	12.093	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 96.72%				
57) Toluene-d8 (SS2)	15.66	98	500780	12.528	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.24%				
73) Bromofluorobenzene (SS3)	18.92	174	171327	12.544	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 100.32%				
Target Compounds							Qvalue
2) Propene	4.37	42	297958	21.574	ng		99
3) Dichlorodifluoromethan...	4.52	85	514336	22.939	ng		100
4) Chloromethane	4.79	50	392049	24.373	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	5.04	135	271899	23.629	ng		100
6) Vinyl Chloride	5.19	62	378079	24.390	ng		100
7) 1,3-Butadiene	5.45	54	294597	26.821	ng		98
8) Bromomethane	5.86	94	235902	25.769	ng		100
9) Chloroethane	6.17	64	193627	24.611	ng		100
10) Ethanol	6.54	45	1017773	130.320	ng		100
11) Acetonitrile	6.77	41	538086	28.667	ng		100
12) Acrolein	6.95	56	172921	26.520	ng		99
13) Acetone	7.15	58	992465	122.897	ng		91
14) Trichlorofluoromethane	7.38	101	458065	22.726	ng		100
15) 2-Propanol (Isopropanol)	7.63	45	1470893	53.367	ng		98
16) Acrylonitrile	7.88	53	376549	26.795	ng		100
17) 1,1-Dichloroethene	8.30	96	259094	24.601	ng		96
18) 2-Methyl-2-Propanol (t...	8.47	59	1416670	51.095	ng		99
19) Methylene Chloride	8.52	84	268087	23.037	ng		99
20) 3-Chloro-1-propene (Al...	8.67	41	451930	27.151	ng		100
21) Trichlorotrifluoroethane	8.91	151	244606	23.987	ng		100
22) Carbon Disulfide	8.78	76	987853	23.757	ng		100
23) trans-1,2-Dichloroethene	9.74	61	395120	26.942	ng		99
24) 1,1-Dichloroethane	9.99	63	483490	24.252	ng		100
25) Methyl tert-Butyl Ether	10.08	73	852684	24.940	ng		99
26) Vinyl Acetate	10.24	86	321252	139.826	ng		98
27) 2-Butanone (MEK)	10.48	72	189460	27.117	ng		99
28) cis-1,2-Dichloroethene	10.98	61	378438	25.351	ng		99
29) Diisopropyl Ether	11.26	87	266848	27.149	ng	#	71
30) Ethyl Acetate	11.27	61	196575	52.191	ng		99
31) n-Hexane	11.25	57	431054	23.434	ng		99
32) Chloroform	11.31	83	469172	24.126	ng		100
34) Tetrahydrofuran (THF)	11.71	72	183417	23.117	ng		99
35) Ethyl tert-Butyl Ether	11.85	87	334149	25.789	ng		99
36) 1,2-Dichloroethane	12.10	62	366079	24.490	ng		99
38) 1,1,1-Trichloroethane	12.37	97	425771	23.798	ng		100
39) Isopropyl Acetate	12.79	61	337713	52.427	ng		95
40) 1-Butanol	12.81	56	582443	53.647	ng		98
41) Benzene	12.84	78	1051752	23.895	ng		100
42) Carbon Tetrachloride	13.00	117	392020	25.229	ng		100
43) Cyclohexane	13.13	84	809585	48.848	ng		99
44) tert-Amyl Methyl Ether	13.48	73	806189	25.365	ng		99
45) 1,2-Dichloropropane	13.68	63	264899	25.505	ng		98
46) Bromodichloromethane	13.87	83	374646	25.806	ng		100
47) Trichloroethene	13.93	130	296887	20.828	ng		100
48) 1,4-Dioxane	13.90	88	225689	26.744	ng		100
49) 2,2,4-Trimethylpentane...	13.99	57	1135988	24.139	ng		98
50) Methyl Methacrylate	14.13	100	229451	51.494	ng		99

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061714.D Vial: 3
Acq On : 6 Nov 2017 14:53 Operator: WA/RS
Sample : 25ng TO15 ICV Std Inst : MS13
Misc : S31-10251702/S31-10091704 (11/7)

Quant Time: Nov 06 15:15:11 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:56:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

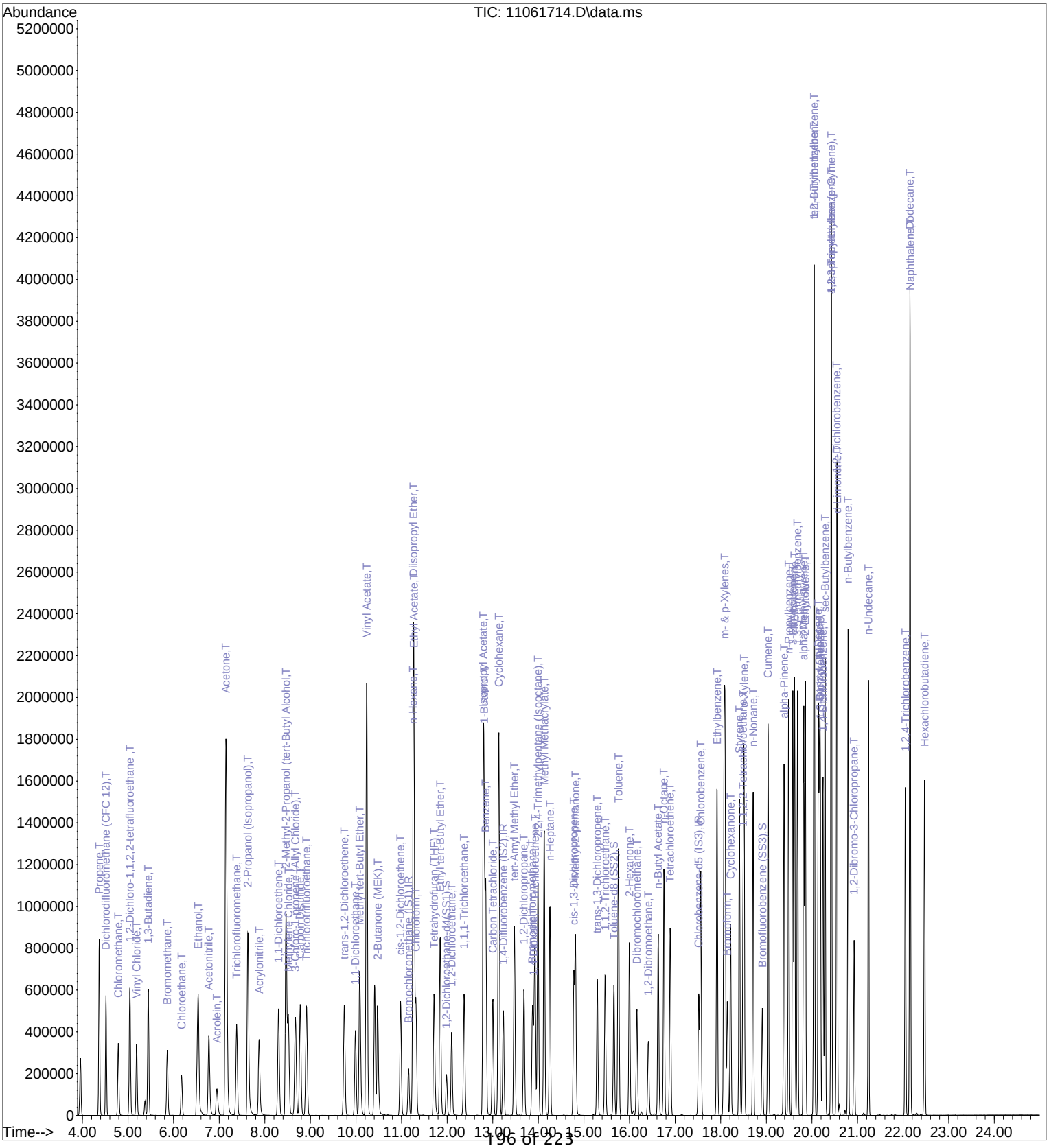
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.26	71	263615	24.749	ng	100
52) cis-1,3-Dichloropropene	14.78	75	452824	26.811	ng	100
53) 4-Methyl-2-pentanone	14.81	58	261019	28.942	ng	100
54) trans-1,3-Dichloropropene	15.29	75	425379	28.610	ng	100
55) 1,1,2-Trichloroethane	15.47	97	261720	26.153	ng	100
58) Toluene	15.76	91	1093491	24.083	ng	100
59) 2-Hexanone	16.00	43	653407	26.142	ng	99
60) Dibromochloromethane	16.16	129	335681	27.240	ng	100
61) 1,2-Dibromoethane	16.41	107	299627	28.456	ng	100
62) n-Butyl Acetate	16.63	43	739025	27.766	ng	99
63) n-Octane	16.75	57	233781	24.779	ng	99
64) Tetrachloroethene	16.89	166	330793	24.213	ng	99
65) Chlorobenzene	17.56	112	748343	24.884	ng	100
66) Ethylbenzene	17.92	91	1280199	24.533	ng	100
67) m- & p-Xylenes	18.09	91	1996598	48.403	ng	100
68) Bromoform	18.14	173	299201	28.012	ng	99
69) Styrene	18.41	104	812083	26.522	ng	100
70) o-Xylene	18.51	91	1017307	24.448	ng	99
71) n-Nonane	18.71	43	574023	24.938	ng	100
72) 1,1,2,2-Tetrachloroethane	18.49	83	473387	26.748	ng	100
74) Cumene	19.04	105	1320757	24.311	ng	100
75) alpha-Pinene	19.39	93	686427	24.949	ng	99
76) n-Propylbenzene	19.49	91	1577076	25.422	ng	100
77) 3-Ethyltoluene	19.58	105	1307748	24.261	ng	100
78) 4-Ethyltoluene	19.62	105	1292452	26.021	ng	100
79) 1,3,5-Trimethylbenzene	19.69	105	1096466	24.021	ng	99
80) alpha-Methylstyrene	19.82	118	605835	26.846	ng	92
81) 2-Ethyltoluene	19.86	105	1307004	24.788	ng	100
82) 1,2,4-Trimethylbenzene	20.05	105	1134631	25.271	ng	100
83) n-Decane	20.14	57	601095	25.888	ng	100
84) Benzyl Chloride	20.16	91	1033156	28.211	ng	100
85) 1,3-Dichlorobenzene	20.19	146	679418	26.353	ng	100
86) 1,4-Dichlorobenzene	20.24	146	687484	26.439	ng	100
87) sec-Butylbenzene	20.29	105	1483614	24.965	ng	100
88) 4-Isopropyltoluene (p-...	20.43	119	1429620	25.196	ng	100
89) 1,2,3-Trimethylbenzene	20.43	105	1163735	25.470	ng	100
90) 1,2-Dichlorobenzene	20.54	146	655174	26.177	ng	99
91) d-Limonene	20.56	68	451761	25.741	ng	99
92) 1,2-Dibromo-3-Chloropr...	20.93	157	245829	25.688	ng	99
93) n-Undecane	21.24	57	635305	26.198	ng	99
94) 1,2,4-Trichlorobenzene	22.05	180	522470	26.280	ng	99
95) Naphthalene	22.16	128	1566830	25.876	ng	100
96) n-Dodecane	22.15	57	644515	28.459	ng	100
97) Hexachlorobutadiene	22.47	225	339180	24.412	ng	100
98) Cyclohexanone	18.22	55	408659	25.344	ng	98
99) tert-Butylbenzene	20.05	119	1102522	24.639	ng	100
100) n-Butylbenzene	20.79	91	1208645	26.113	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 11\06\11061714.D Vial: 3
Acq On : 6 Nov 2017 14:53 Operator: WA/RS
Sample : 25ng TO15 ICV Std Inst : MS13
Misc : S31-10251702/S31-10091704 (11/7)

Quant Time: Nov 06 15:15:11 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 13:56:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **11061714.D** Acq. Method File: **TO15.M**

Data File Path: **I:\MS13\DATA\2017_11\06** Sample Name: **25ng TO15 ICV Std**

Operator: **WA/RS** Misc Info: **S31-10251702/S31-10091704 (**

Date Acquired: **11/6/2017 14:53** Instrument Name: **MS13**

WA 11/6/17

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
2)	**Propene**	**4.37**	**21.574**	26.275	82	**54**	**133**	*	*
3)	**Dichlorodifluoromethane (CFC 1**	**4.52**	**22.939**	**26.600**	86	**64**	**115**	*	*
4)	**Chloromethane**	**4.79**	**24.373**	**26.250**	93	**47**	**140**	*	*
5)	**1,2-Dichloro-1,1,2,2-tetrafluoroet**	**5.04**	**23.629**	**26.325**	90	**60**	**112**	*	*
6)	**Vinyl Chloride**	**5.19**	**24.390**	**26.350**	93	**63**	**127**	*	*
7)	**1,3-Butadiene**	**5.45**	**26.821**	**26.225**	102	**57**	**149**	*	*
8)	**Bromomethane**	**5.86**	**25.769**	**26.225**	98	**63**	**132**	*	*
9)	**Chloroethane**	**6.17**	**24.611**	**26.250**	94	**68**	**129**	*	*
10)	**Ethanol**	**6.54**	**130.320**	**130.375**	100	**62**	**131**	*	*
11)	**Acetonitrile**	**6.77**	**28.667**	**26.200**	109	**56**	**136**	*	*
12)	**Acrolein**	**6.95**	**26.520**	**26.075**	102	**60**	**132**	*	*
13)	**Acetone**	**7.15**	**122.897**	**131.825**	93	**63**	**124**	*	*
14)	**Trichlorofluoromethane**	**7.38**	**22.726**	**26.025**	87	**65**	**113**	*	*
15)	**2-Propanol (Isopropanol)**	**7.63**	**53.367**	**52.775**	101	**62**	**135**	*	*
16)	**Acrylonitrile**	**7.88**	**26.795**	**26.450**	101	**68**	**138**	*	*
17)	**1,1-Dichloroethene**	**8.30**	**24.601**	**26.675**	92	**72**	**118**	*	*
18)	2-Methyl-2-Propanol (tert-Butyl Alc	8.47	51.095	53.350	96	61	128	*	*
19)	**Methylene Chloride**	**8.52**	**23.037**	**26.600**	87	**67**	**116**	*	*
20)	**3-Chloro-1-propene (Allyl Chlorid**	**8.67**	**27.151**	**26.525**	102	**61**	**143**	*	*
21)	**Trichlorotrifluoroethane**	**8.91**	**23.987**	**26.750**	90	**68**	**113**	*	*
22)	**Carbon Disulfide**	**8.78**	**23.757**	**26.725**	89	**68**	**120**	*	*
23)	**trans-1,2-Dichloroethene**	**9.74**	**26.942**	**26.700**	101	**71**	**125**	*	*
24)	**1,1-Dichloroethane**	**9.99**	**24.252**	**26.525**	91	**68**	**118**	*	*
25)	**Methyl tert-Butyl Ether**	**10.08**	**24.940**	**26.625**	94	**60**	**123**	*	*
26)	**Vinyl Acetate**	**10.24**	**139.826**	**132.750**	105	**73**	**135**	*	*
27)	**2-Butanone (MEK)**	**10.48**	**27.117**	**26.450**	103	**70**	**129**	*	*
28)	**cis-1,2-Dichloroethene**	**10.98**	**25.351**	**26.475**	96	**69**	**121**	*	*
29)	Diisopropyl Ether	11.26	27.149	26.600	102	65	117	*	*
30)	**Ethyl Acetate**	**11.27**	**52.191**	**53.300**	98	**66**	**140**	*	*
31)	**n-Hexane**	**11.25**	**23.434**	**26.625**	88	**61**	**124**	*	*
32)	**Chloroform**	**11.31**	**24.126**	**26.500**	91	**69**	**113**	*	*
34)	**Tetrahydrofuran (THF)**	**11.71**	**23.117**	**26.550**	87	**66**	**121**	*	*
35)	Ethyl tert-Butyl Ether	11.85	25.789	26.525	97	69	120	*	*
36)	**1,2-Dichloroethane**	**12.10**	**24.490**	**26.500**	92	**62**	**120**	*	*
38)	**1,1,1-Trichloroethane**	**12.37**	**23.798**	**26.525**	90	**65**	**116**	*	*
39)	Isopropyl Acetate	12.79	52.427	53.275	98	70	126	*	*
40)	1-Butanol	12.81	53.647	53.300	101	62	141	*	*
41)	**Benzene**	**12.84**	**23.895**	**26.625**	90	**66**	**111**	*	*
42)	**Carbon Tetrachloride**	**13.00**	**25.229**	**26.700**	94	**64**	**122**	*	*
43)	**Cyclohexane**	**13.13**	**48.848**	**53.150**	92	**69**	**115**	*	*
44)	tert-Amyl Methyl Ether	13.48	25.365	**26.550**	96	68	119	*	*
45)	**1,2-Dichloropropane**	**13.68**	**25.505**	**26.525**	96	**69**	**121**	*	*
46)	**Bromodichloromethane**	**13.87**	**25.806**	**26.700**	97	**69**	**123**	*	*
47)	**Trichloroethene**	**13.93**	**20.828**	**26.550**	78	**69**	**112**	*	*
48)	**1,4-Dioxane**	**13.90**	**26.744**	**26.600**	101	**74**	**123**	*	*
49)	2,2,4-Trimethylpentane (Isooctane)	13.99	24.139	26.525	91	67	120	*	*

Bold = 75 Compound List

*** = Pass**

Initial Calibration Verification/LABORATORY CONTROL SAMPLE CHECK SHEET

Data File Name: **11061714.D** **TO15.M**
Data File Path: **I:\MS13\DATA\2017_11\06** Sample Name: **25ng TO15 ICV Std**
Operator: **WA/RS** Misc Info: **S31-10251702/S31-10091704 (**
Date Acquired: **11/6/2017** **14:53** Instrument Name: **MS13**

#	Compound Name	Ret. Time	Amt. (ng)	Spike Amt.(ng)	% Rec.	Lower Limit	Upper Limit	* OR Fail	ICV/AZ 70-130%
50)	**Methyl Methacrylate**	**14.13**	**51.494**	**52.950**	97	**75**	**125**	*	*
51)	**n-Heptane**	**14.26**	**24.749**	**26.625**	93	**68**	**118**	*	*
52)	**cis-1,3-Dichloropropene**	**14.78**	**26.811**	**26.025**	103	**74**	**129**	*****	*
53)	**4-Methyl-2-pentanone**	**14.81**	**28.942**	**26.650**	109	**66**	**138**	*****	*
54)	**trans-1,3-Dichloropropene**	**15.29**	**28.610**	**26.625**	107	**75**	**130**	*****	*
55)	**1,1,2-Trichloroethane**	**15.47**	**26.153**	**26.500**	99	**73**	**117**	*****	*
58)	**Toluene**	**15.76**	**24.083**	**26.400**	91	**66**	**114**	*****	*
59)	**2-Hexanone**	**16.00**	**26.142**	**26.425**	99	**58**	**146**	*****	*
60)	**Dibromochloromethane**	**16.16**	**27.240**	**26.450**	103	**67**	**130**	*****	*
61)	**1,2-Dibromoethane**	**16.41**	**28.456**	**26.425**	108	**70**	**127**	*****	*
62)	**n-Butyl Acetate**	**16.63**	**27.766**	**26.850**	103	**62**	**140**	*****	*
63)	**n-Octane**	**16.75**	**24.779**	**26.525**	93	**65**	**121**	*	*
64)	**Tetrachloroethene**	**16.89**	**24.213**	**26.500**	91	**62**	**119**	*****	*
65)	**Chlorobenzene**	**17.56**	**24.884**	**26.525**	94	**66**	**115**	*****	*
66)	**Ethylbenzene**	**17.92**	**24.533**	**26.475**	93	**69**	**117**	*****	*
67)	**m- & p-Xylenes**	**18.09**	**48.403**	**52.975**	91	**67**	**117**	*****	*
68)	**Bromoform**	**18.14**	**28.012**	**26.525**	106	**67**	**135**	*****	*
69)	**Styrene**	**18.41**	**26.522**	**26.350**	101	**70**	**128**	*****	*
70)	**o-Xylene**	**18.51**	**24.448**	**26.400**	93	**67**	**118**	*****	*
71)	**n-Nonane**	**18.71**	**24.938**	**26.500**	94	**61**	**127**	*****	*
72)	**1,1,2,2-Tetrachloroethane**	**18.49**	**26.748**	**26.450**	101	**70**	**125**	*****	*
74)	**Cumene**	**19.04**	**24.311**	**26.525**	92	**68**	**116**	*****	*
75)	**alpha-Pinene**	**19.39**	**24.949**	**26.600**	94	**69**	**122**	*****	*
76)	**n-Propylbenzene**	**19.49**	**25.422**	**26.750**	95	**70**	**118**	*	*
77)	3-Ethyltoluene	19.58	24.261	26.450	92	68	117	*	*
78)	**4-Ethyltoluene**	**19.62**	**26.021**	**26.425**	**98**	**69**	**124**	*****	*****
79)	**1,3,5-Trimethylbenzene**	**19.69**	**24.021**	**26.500**	**91**	**65**	**117**	*****	*****
80)	alpha-Methylstyrene	19.82	26.846	26.525	**101**	71	132	*	*****
81)	2-Ethyltoluene	19.86	24.788	26.700	**93**	67	119	*	*****
82)	**1,2,4-Trimethylbenzene**	**20.05**	**25.271**	**26.550**	**95**	**67**	**124**	*****	*****
83)	n-Decane	20.14	25.888	26.625	**97**	63	129	*	*****
84)	**Benzyl Chloride**	**20.16**	**28.211**	**26.550**	**106**	**75**	**142**	*****	*****
85)	**1,3-Dichlorobenzene**	**20.19**	**26.353**	**26.475**	**100**	**70**	**124**	*****	*****
86)	**1,4-Dichlorobenzene**	**20.24**	**26.439**	**26.750**	**99**	**63**	**124**	*****	*****
87)	sec-Butylbenzene	20.29	24.965	26.575	**94**	68	119	*	*****
88)	4-Isopropyltoluene (p-Cymene)	20.43	25.196	26.600	**95**	65	122	*	*****
89)	1,2,3-Trimethylbenzene	20.43	25.470	26.600	**96**	66	128	*	*****
90)	**1,2-Dichlorobenzene**	**20.54**	**26.177**	**26.750**	**98**	**66**	**125**	*****	*****
91)	**d-Limonene**	**20.56**	**25.741**	**26.625**	**97**	**64**	**135**	*****	*****
92)	**1,2-Dibromo-3-Chloropropane**	**20.93**	**25.688**	**26.300**	**98**	**73**	**136**	*****	*****
93)	n-Undecane	21.24	26.198	26.775	**98**	67	135	*	*****
94)	**1,2,4-Trichlorobenzene**	**22.05**	**26.280**	**27.200**	**97**	**70**	**141**	*****	*****
95)	**Naphthalene**	**22.16**	**25.876**	**26.125**	**99**	**71**	**146**	*****	*****
96)	n-Dodecane	22.15	28.459	26.825	**106**	69	152	*	*****
97)	**Hexachlorobutadiene**	**22.47**	**24.412**	**26.550**	**92**	63	126	*	*****
98)	Cyclohexanone	18.22	25.344	26.150	97	58	138	*	*****
99)	tert-Butylbenzene	20.05	24.639	26.525	93	65	121	*	*****
100)	n-Butylbenzene	20.79	26.113	26.575	98	71	125	*	*****

Evaluate Continuing Calibration Report

Data File : I:\MS13\DATA\2017 12\11\12111701.D Vial: 3
Acq On : 11 Dec 2017 7:00 Operator: WA
Sample : CCV R13121117 25ng Inst : MS13
Misc : S31-12011701/S31-11271704 (12/26)

Quant Time: Dec 11 08:36:47 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

12/11/17

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	93	-0.02
2	T	Propene	1.738	1.344	22.7	77	-0.02
3	T	Dichlorodifluoromethane (CF	2.821	2.263	19.8	70	-0.02
4	T	Chloromethane	2.024	1.799	11.1	75	-0.02
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.448	1.236	14.6	76	-0.02
6	T	Vinyl Chloride	1.951	1.753	10.1	79	-0.02
7	T	1,3-Butadiene	1.382	1.427	-3.3	84	-0.03
8	T	Bromomethane	1.152	1.137	1.3	88	-0.03
9	T	Chloroethane	0.990	0.934	5.7	85	-0.03
10	T	Ethanol	0.983	0.974	0.9	85	-0.10
11	T	Acetonitrile	2.362	2.599	-10.0	85	-0.06
12	T	Acrolein	0.821	0.830	-1.1	85	-0.04
13	T	Acetone	1.016	0.953	6.2	84	-0.06
14	T	Trichlorofluoromethane	2.536	2.045	19.4	72	-0.02
15	T	2-Propanol (Isopropanol)	3.468	3.546	-2.2	83	-0.07
16	T	Acrylonitrile	1.768	1.787	-1.1	83	-0.05
17	T	1,1-Dichloroethene	1.325	1.206	9.0	81	-0.02
18	T	2-Methyl-2-Propanol (tert-B	3.489	3.397	2.6	77	-0.06
19	T	Methylene Chloride	1.464	1.251	14.5	82	-0.03
20	T	3-Chloro-1-propene (Allyl C	2.095	2.103	-0.4	83	-0.03
21	T	Trichlorotrifluoroethane	1.283	1.148	10.5	78	-0.02
22	T	Carbon Disulfide	5.233	4.680	10.6	83	-0.02
23	T	trans-1,2-Dichloroethene	1.845	1.829	0.9	80	-0.02
24	T	1,1-Dichloroethane	2.509	2.236	10.9	80	-0.03
25	T	Methyl tert-Butyl Ether	4.302	3.896	9.4	77	-0.02
26	T	Vinyl Acetate	0.289	0.294	-1.7	81	-0.04
27	T	2-Butanone (MEK)	0.879	0.873	0.7	80	-0.03
28	T	cis-1,2-Dichloroethene	1.878	1.746	7.0	78	-0.02
29	T	Diisopropyl Ether	1.237	1.231	0.5	95	-0.02
30	T	Ethyl Acetate	0.474	0.458	3.4	83	-0.03
31	T	n-Hexane	2.315	1.925	16.8	81	-0.02
32	T	Chloroform	2.447	2.162	11.6	77	-0.02
33	S	1,2-Dichloroethane-d4(SS1)	1.611	1.470	8.8	82	-0.02
34	T	Tetrahydrofuran (THF)	0.998	0.858	14.0	82	-0.02
35	T	Ethyl tert-Butyl Ether	1.630	1.527	6.3	79	-0.02
36	T	1,2-Dichloroethane	1.881	1.626	13.6	72	-0.02
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	95	-0.02
38	T	1,1,1-Trichloroethane	0.471	0.400	15.1	73	-0.02
39	T	Isopropyl Acetate	0.169	0.166	1.8	84	-0.02
40	T	1-Butanol	0.286	0.285	0.3	81	-0.05
41	T	Benzene	1.158	1.014	12.4	81	-0.02
42	T	Carbon Tetrachloride	0.409	0.360	12.0	72	-0.02
43	T	Cyclohexane	0.436	0.395	9.4	82	-0.02
44	T	tert-Amyl Methyl Ether	0.836	0.776	7.2	79	-0.02
45	T	1,2-Dichloropropane	0.273	0.257	5.9	82	-0.02
46	T	Bromodichloromethane	0.382	0.353	7.6	76	-0.02
47	T	Trichloroethene	0.375	0.282	24.8	77	-0.01
48	T	1,4-Dioxane	0.222	0.222	0.0	81	-0.02
49	T	2,2,4-Trimethylpentane (Iso	1.238	1.130	8.7	84	-0.02
50	T	Methyl Methacrylate	0.117	0.109	6.8	80	-0.02
51	T	n-Heptane	0.280	0.247	11.8	80	-0.02
52	T	cis-1,3-Dichloropropene	0.444	0.431	2.9	78	-0.01
53	T	4-Methyl-2-pentanone	0.237	0.257	-8.4	82	-0.02
54	T	trans-1,3-Dichloropropene	0.391	0.400	-2.3	76	-0.02
55	T	1,1,2-Trichloroethane	0.263	0.253	3.8	80	-0.02

Evaluate Continuing Calibration Report

Data File : I:\MS13\DATA\2017 12\11\12111701.D Vial: 3
Acq On : 11 Dec 2017 7:00 Operator: WA
Sample : CCV R13121117 25ng Inst : MS13
Misc : S31-12011701/S31-11271704 (12/26)

Quant Time: Dec 11 08:36:47 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	89	-0.01
57	S	Toluene-d8 (SS2)	2.483	2.475	0.3	91	-0.01
58	T	Toluene	2.820	2.554	9.4	79	-0.01
59	T	2-Hexanone	1.552	1.519	2.1	78	-0.02
60	T	Dibromochloromethane	0.765	0.767	-0.3	75	-0.01
61	T	1,2-Dibromoethane	0.654	0.698	-6.7	78	-0.01
62	T	n-Butyl Acetate	1.653	1.706	-3.2	80	-0.01
63	T	n-Octane	0.586	0.545	7.0	81	-0.01
64	T	Tetrachloroethene	0.849	0.746	12.1	75	-0.01
65	T	Chlorobenzene	1.868	1.703	8.8	77	-0.01
66	T	Ethylbenzene	3.241	2.982	8.0	77	0.00
67	T	m- & p-Xylenes	2.562	2.344	8.5	78	-0.02
68	T	Bromoform	0.663	0.685	-3.3	74	-0.01
69	T	Styrene	1.902	1.887	0.8	76	-0.01
70	T	o-Xylene	2.584	2.353	8.9	76	-0.01
71	T	n-Nonane	1.430	1.353	5.4	80	-0.01
72	T	1,1,2,2-Tetrachloroethane	1.099	1.132	-3.0	80	-0.01
73	S	Bromofluorobenzene (SS3)	0.848	0.811	4.4	82	0.00
74	T	Cumene	3.374	3.030	10.2	75	0.00
75	T	alpha-Pinene	1.709	1.524	10.8	74	0.00
76	T	n-Propylbenzene	3.853	3.593	6.7	76	0.00
77	T	3-Ethyltoluene	3.348	3.187	4.8	78	-0.01
78	T	4-Ethyltoluene	3.085	2.757	10.6	71	0.00
79	T	1,3,5-Trimethylbenzene	2.835	2.535	10.6	74	0.00
80	T	alpha-Methylstyrene	1.402	1.347	3.9	71	-0.01
81	T	2-Ethyltoluene	3.275	2.982	8.9	75	-0.01
82	T	1,2,4-Trimethylbenzene	2.789	2.602	6.7	73	-0.01
83	T	n-Decane	1.442	1.372	4.9	77	-0.01
84	T	Benzyl Chloride	2.275	2.288	-0.6	72	-0.01
85	T	1,3-Dichlorobenzene	1.601	1.514	5.4	72	-0.01
86	T	1,4-Dichlorobenzene	1.615	1.564	3.2	73	-0.01
87	T	sec-Butylbenzene	3.691	3.393	8.1	74	0.00
88	T	4-Isopropyltoluene (p-Cymen	3.524	3.299	6.4	73	0.00
89	T	1,2,3-Trimethylbenzene	2.838	2.643	6.9	73	0.00
90	T	1,2-Dichlorobenzene	1.555	1.450	6.8	72	0.00
91	T	d-Limonene	1.090	1.032	5.3	73	-0.01
92	T	1,2-Dibromo-3-Chloropropane	0.594	0.553	6.9	70	0.00
93	T	n-Undecane	1.506	1.480	1.7	76	0.00
94	T	1,2,4-Trichlorobenzene	1.235	1.118	9.5	68	0.00
95	T	Naphthalene	3.761	3.630	3.5	69	0.00
96	T	n-Dodecane	1.407	1.489	-5.8	75	0.00
97	T	Hexachlorobutadiene	0.863	0.752	12.9	68	0.00
98	T	Cyclohexanone	1.001	0.958	4.3	77	-0.02
99	T	tert-Butylbenzene	2.779	2.505	9.9	73	0.00
100	T	n-Butylbenzene	2.875	2.780	3.3	73	-0.01

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111701.D Vial: 3
Acq On : 11 Dec 2017 7:00 Operator: WA
Sample : CCV R13121117 25ng Inst : MS13
Misc : S31-12011701/S31-11271704 (12/26)

Quant Time: Dec 11 08:36:47 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 12/11/17

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	11.14	130	80504	12.500	ng		-0.02
37) 1,4-Difluorobenzene (IS2)	13.23	114	385667	12.500	ng		-0.02
56) Chlorobenzene-d5 (IS3)	17.51	82	159539	12.500	ng		-0.01
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	11.98	65	118361	11.407	ng		-0.02
Spiked Amount 12.500	Range 70 - 130		Recovery = 91.28%				
57) Toluene-d8 (SS2)	15.65	98	394807	12.459	ng		-0.01
Spiked Amount 12.500	Range 70 - 130		Recovery = 99.68%				
73) Bromofluorobenzene (SS3)	18.91	174	129336	11.946	ng		0.00
Spiked Amount 12.500	Range 70 - 130		Recovery = 95.60%				
Target Compounds							Qvalue
2) Propene	4.35	42	224470	20.055	ng		99
3) Dichlorodifluoromethan...	4.50	85	381879	21.016	ng		100
4) Chloromethane	4.77	50	291345	22.349	ng		100
5) 1,2-Dichloro-1,1,2,2-t...	5.03	135	203171	21.786	ng		100
6) Vinyl Chloride	5.17	62	291210	23.180	ng		99
7) 1,3-Butadiene	5.43	54	243288	27.331	ng		98
8) Bromomethane	5.84	94	181832	24.509	ng		99
9) Chloroethane	6.16	64	152205	23.872	ng		100
10) Ethanol	6.52	45	826815	130.634	ng		100
11) Acetonitrile	6.76	41	443146	29.132	ng		100
12) Acrolein	6.93	56	140820	26.649	ng		98
13) Acetone	7.14	58	816480	124.756	ng		88
14) Trichlorofluoromethane	7.37	101	346134	21.190	ng		100
15) 2-Propanol (Isopropanol)	7.61	45	1203058	53.860	ng		97
16) Acrylonitrile	7.86	53	303751	26.671	ng		99
17) 1,1-Dichloroethene	8.29	96	206078	24.144	ng		95
18) 2-Methyl-2-Propanol (t...	8.45	59	1159422	51.599	ng		99
19) Methylene Chloride	8.50	84	213081	22.594	ng		100
20) 3-Chloro-1-propene (Al...	8.66	41	356817	26.452	ng		99
21) Trichlorotrifluoroethane	8.91	151	194617	23.549	ng		98
22) Carbon Disulfide	8.76	76	800994	23.769	ng		100
23) trans-1,2-Dichloroethene	9.73	61	318344	26.785	ng		99
24) 1,1-Dichloroethane	9.98	63	367980	22.776	ng		100
25) Methyl tert-Butyl Ether	10.07	73	671135	24.222	ng		98
26) Vinyl Acetate	10.23	86	250078	134.310	ng		97
27) 2-Butanone (MEK)	10.47	72	147831	26.109	ng		98
28) cis-1,2-Dichloroethene	10.97	61	300033	24.800	ng		99
29) Diisopropyl Ether	11.26	87	211028	26.492	ng	#	73
30) Ethyl Acetate	11.26	61	157444	51.580	ng		97
31) n-Hexane	11.25	57	330313	22.158	ng		99
32) Chloroform	11.31	83	369284	23.431	ng		100
34) Tetrahydrofuran (THF)	11.70	72	147049	22.869	ng		98
35) Ethyl tert-Butyl Ether	11.84	87	260315	24.790	ng		99
36) 1,2-Dichloroethane	12.09	62	276266	22.805	ng		99
38) 1,1,1-Trichloroethane	12.37	97	332424	22.892	ng		99
39) Isopropyl Acetate	12.79	61	270775	51.789	ng	#	94
40) 1-Butanol	12.80	56	465014	52.770	ng		97
41) Benzene	12.84	78	826364	23.131	ng		99
42) Carbon Tetrachloride	12.99	117	294373	23.341	ng		99
43) Cyclohexane	13.12	84	651041	48.397	ng		97
44) tert-Amyl Methyl Ether	13.46	73	632529	24.519	ng		99
45) 1,2-Dichloropropane	13.68	63	211068	25.038	ng		98
46) Bromodichloromethane	13.86	83	290503	24.653	ng		100
47) Trichloroethene	13.92	130	230580	19.930	ng		100
48) 1,4-Dioxane	13.89	88	182063	26.581	ng		98
49) 2,2,4-Trimethylpentane...	13.98	57	923939	24.189	ng		96
50) Methyl Methacrylate	14.12	100	177770	49.154	ng		98

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111701.D Vial: 3
Acq On : 11 Dec 2017 7:00 Operator: WA
Sample : CCV R13121117 25ng Inst : MS13
Misc : S31-12011701/S31-11271704 (12/26)

Quant Time: Dec 11 08:36:47 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

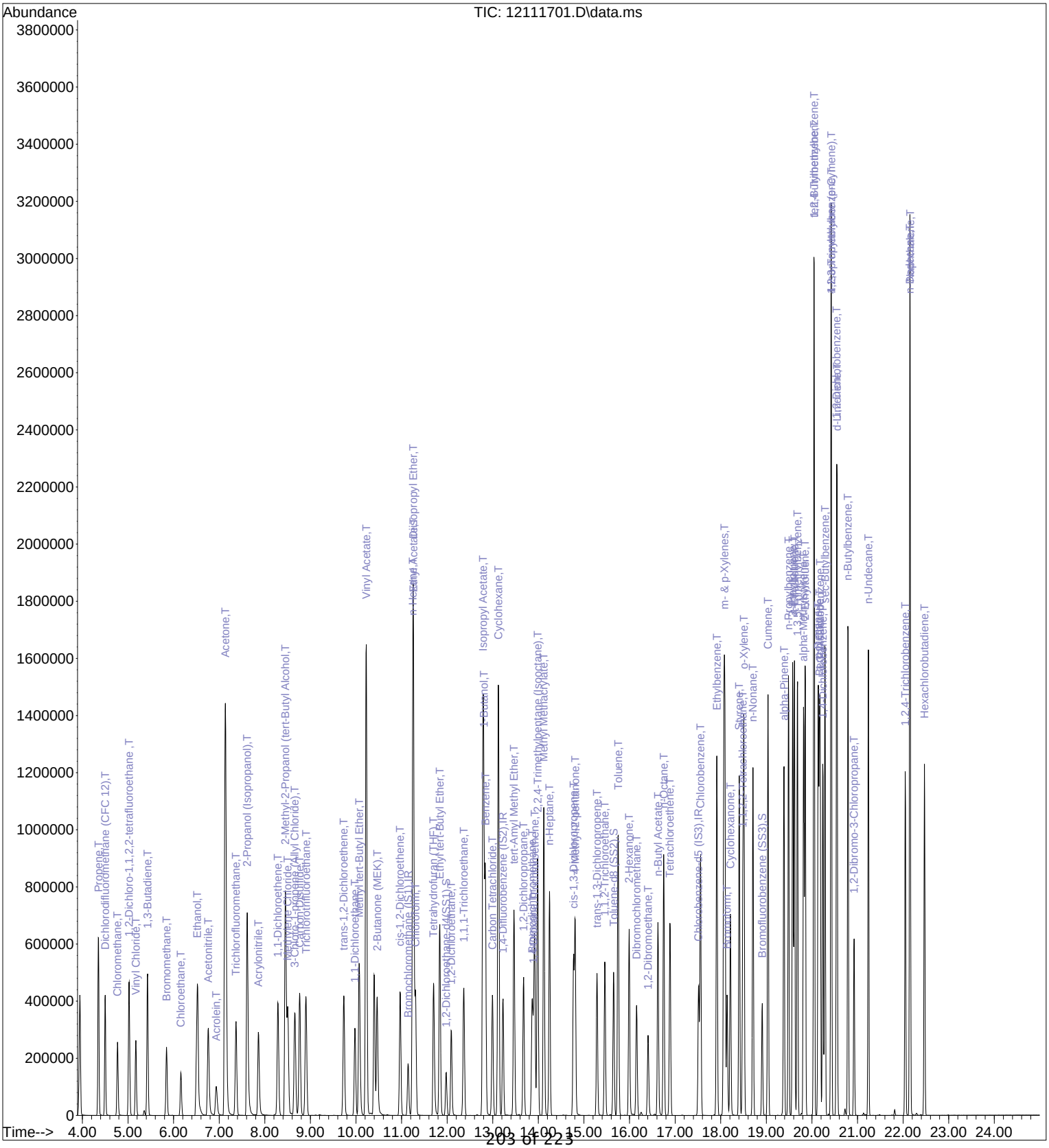
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
51) n-Heptane	14.24	71	203140	23.497	ng	99
52) cis-1,3-Dichloropropene	14.77	75	372185	27.150	ng	100
53) 4-Methyl-2-pentanone	14.81	58	210258	28.724	ng	99
54) trans-1,3-Dichloropropene	15.29	75	329024	27.265	ng	100
55) 1,1,2-Trichloroethane	15.46	97	207972	25.604	ng	100
58) Toluene	15.75	91	858764	23.859	ng	100
59) 2-Hexanone	15.99	43	513800	25.932	ng	98
60) Dibromochloromethane	16.16	129	259626	26.577	ng	100
61) 1,2-Dibromoethane	16.41	107	236936	28.387	ng	100
62) n-Butyl Acetate	16.62	43	581477	27.559	ng	100
63) n-Octane	16.75	57	184167	24.625	ng	99
64) Tetrachloroethene	16.89	166	252949	23.356	ng	100
65) Chlorobenzene	17.56	112	579189	24.295	ng	99
66) Ethylbenzene	17.92	91	1000976	24.198	ng	100
67) m- & p-Xylenes	18.08	91	1587894	48.561	ng	99
68) Bromoform	18.14	173	232287	27.433	ng	100
69) Styrene	18.40	104	636923	26.240	ng	99
70) o-Xylene	18.51	91	792055	24.012	ng	99
71) n-Nonane	18.71	43	454989	24.935	ng	99
72) 1,1,2,2-Tetrachloroethane	18.48	83	381736	27.209	ng	100
74) Cumene	19.04	105	1017181	23.619	ng	100
75) alpha-Pinene	19.39	93	508769	23.328	ng	99
76) n-Propylbenzene	19.49	91	1219772	24.804	ng	99
77) 3-Ethyltoluene	19.58	105	1067846	24.990	ng	100
78) 4-Ethyltoluene	19.62	105	922846	23.438	ng	100
79) 1,3,5-Trimethylbenzene	19.69	105	848419	23.447	ng	100
80) alpha-Methylstyrene	19.82	118	450727	25.195	ng	92
81) 2-Ethyltoluene	19.85	105	1008506	24.128	ng	100
82) 1,2,4-Trimethylbenzene	20.05	105	872425	24.512	ng	100
83) n-Decane	20.13	57	463548	25.184	ng	99
84) Benzyl Chloride	20.16	91	783906	27.002	ng	100
85) 1,3-Dichlorobenzene	20.18	146	517524	25.323	ng	100
86) 1,4-Dichlorobenzene	20.24	146	530992	25.760	ng	100
87) sec-Butylbenzene	20.29	105	1142208	24.246	ng	99
88) 4-Isopropyltoluene (p-...	20.43	119	1079964	24.010	ng	99
89) 1,2,3-Trimethylbenzene	20.43	105	865339	23.892	ng	100
90) 1,2-Dichlorobenzene	20.54	146	500936	25.248	ng	100
91) d-Limonene	20.55	68	331045	23.795	ng	98
92) 1,2-Dibromo-3-Chloropr...	20.93	157	185305	24.426	ng	98
93) n-Undecane	21.24	57	497303	25.870	ng	99
94) 1,2,4-Trichlorobenzene	22.05	180	391495	24.842	ng	100
95) Naphthalene	22.16	128	1223030	25.480	ng	100
96) n-Dodecane	22.15	57	501585	27.939	ng	99
97) Hexachlorobutadiene	22.47	225	253548	23.021	ng	100
98) Cyclohexanone	18.21	55	317458	24.836	ng	97
99) tert-Butylbenzene	20.05	119	839132	23.656	ng	100
100) n-Butylbenzene	20.79	91	934958	25.482	ng	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File : I:\MS13\DATA\2017 12\11\12111701.D Vial: 3
Acq On : 11 Dec 2017 7:00 Operator: WA
Sample : CCV R13121117 25ng Inst : MS13
Misc : S31-12011701/S31-11271704 (12/26)

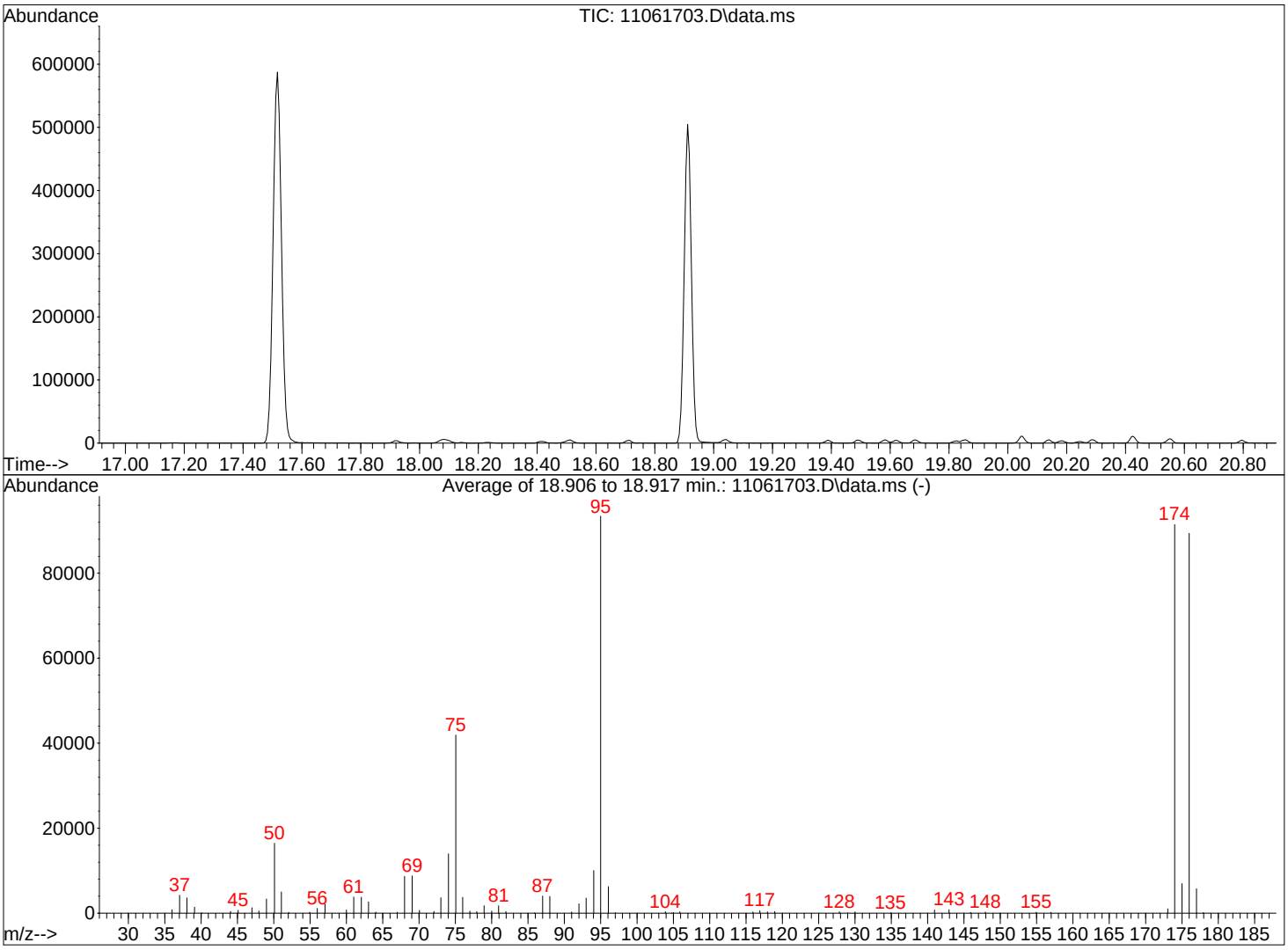
Quant Time: Dec 11 08:36:47 2017
Quant Method : I:\MS13\METHODS\R13110617.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Mon Nov 06 15:28:21 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M



Data Path : I:\MS13\DATA\2017 11\06\
Data File : 11061703.D
Acq On : 6 Nov 2017 7:32
Operator : WA/RS
Sample : 0.08ng TO-15 ICAL Std
Misc : S31-10251702/S31-10121708 (11/10)
ALS Vial : 13 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS13\METHODS\R13110617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Mon Nov 06 13:08:56 2017



AutoFind: Scans 2639, 2640, 2641; Background Corrected with Scan 2632

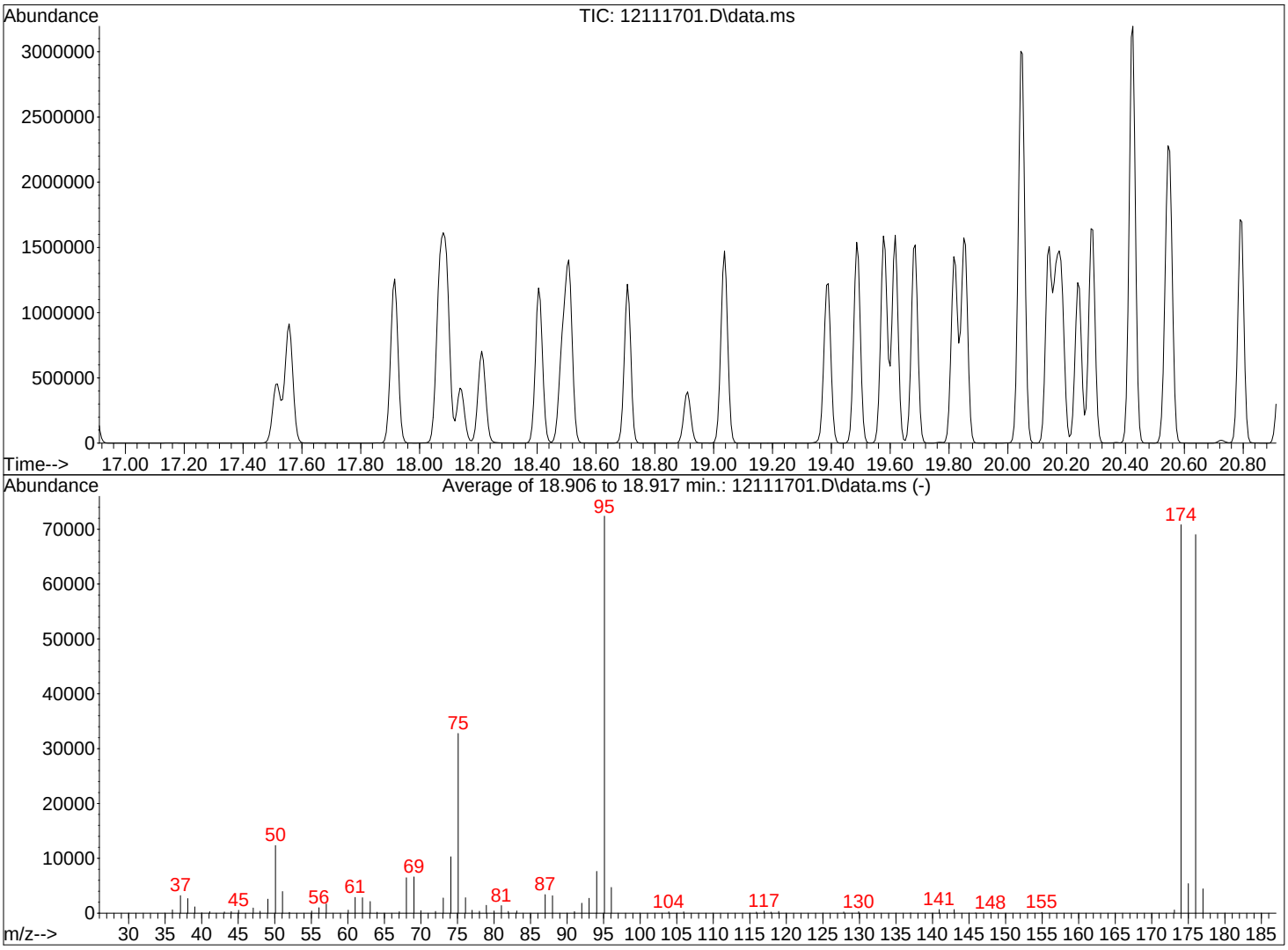
WA 11/6/17

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	17.6	16470	PASS
75	95	30	66	44.9	41912	PASS
95	95	100	100	100.0	93424	PASS
96	95	5	9	6.7	6253	PASS
173	174	0.00	2	1.1	1033	PASS
174	95	50	120	97.9	91440	PASS
175	174	4	9	7.6	6973	PASS
176	174	93	101	97.8	89389	PASS
177	176	5	9	6.4	5752	PASS

Data Path : I:\MS13\DATA\2017 12\11\
Data File : 12111701.D
Acq On : 11 Dec 2017 7:00
Operator : WA
Sample : CCV R13121117 25ng
Misc : S31-12011701/S31-11271704 (12/26)
ALS Vial : 3 Sample Multiplier: 1

Integration File: LSCINT.P

Method : I:\MS13\METHODS\R13110617.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Mon Nov 06 15:28:21 2017



AutoFind: Scans 2639, 2640, 2641; Background Corrected with Scan 2632

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
50	95	8	40	17.1	12352	PASS
75	95	30	66	45.3	32763	PASS
95	95	100	100	100.0	72379	PASS
96	95	5	9	6.5	4711	PASS
173	174	0.00	2	0.8	584	PASS
174	95	50	120	97.8	70821	PASS
175	174	4	9	7.6	5387	PASS
176	174	93	101	97.5	69016	PASS
177	176	5	9	6.4	4428	PASS

12/11/17

Injection Log

Directory: J:\MS13\DATA\2017_11\06\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	11/6/17 6:23	11061701.D	CCV C13110617_25ng	S31-10251702/S31-10101704 (11/8)	WA/RS	16	test
2	11/6/17 6:56	11061702.D	CCV R13110617_5ng	S31-10251702/S31-10261704 (11/24)	WA/RS	3	test
3	11/6/17 7:32	11061703.D	0.08ng TO-15 ICAL Std	S31-10251702/S31-10121708 (11/10)	WA/RS	13	
4	11/6/17 8:05	11061704.D	0.10ng TO-15 ICAL Std	S31-10251702/S31-10121708 (11/10)	WA/RS	13	
5	11/6/17 8:39	11061705.D	0.20ng TO-15 ICAL Std	S31-10251702/S31-10121708 (11/10)	WA/RS	13	
6	11/6/17 10:19	11061706.D	0.40ng TO-15 ICAL Std	S31-10251702/S31-10261706 (11/24)	WA/RS	12	
7	11/6/17 10:58	11061707.D	1.0ng TO-15 ICAL Std	S31-10251702/S31-10261706 (11/24)	WA/RS	12	
8	11/6/17 11:31	11061708.D	5.0ng TO-15 ICAL Std	S31-10251702/S31-10261706 (11/24)	WA/RS	14	
9	11/6/17 12:05	11061709.D	25ng TO-15 ICAL Std	S31-10251702/S31-10261705 (11/24)	WA/RS	15	
10	11/6/17 12:39	11061710.D	50ng TO-15 ICAL Std	S31-10251702/S31-10261705 (11/24)	WA/RS	15	
11	11/6/17 13:12	11061711.D	100ng TO-15 ICAL Std	S31-10251702/S31-10261705 (11/24)	WA/RS	15	
12	11/6/17 13:46	11061712.D	Blank	S31-10251702	WA/RS	3	
13	11/6/17 14:20	11061713.D	0.4ng TO15 ICAL Std	S31-10251702/S31-10121708 (11/10)	WA/RS	13	not used
14	11/6/17 14:53	11061714.D	25ng TO15 ICV Std	S31-10251702/S31-10091704 (11/7)	WA/RS	3	Pass all compds
	Saved as R13110617.M: ranges from 0.08ng --->100ng, except: chloroethane, 1,4-dioxane, HCBD: 0.1ng ---> 100ng; acrolein, acrylonitrile, CS2, MEK,						
	2-Hexanone, Benzyl Chloride, DBCP, 1,2,4-TCB, Naphthalene : 0.4ng ---> 100ng; MeCl2, cis/trans-DCP: 0.2ng ---> 100ng; Ethyl acetate, 1-Butanol:						
	from 1.0ng ---> 200ng; VA: 2ng ---> 500ng WA 11/7/17						
14							
15							
16							
17							

Injection Log

Directory: I:\MS13\DATA\2017_12\11\

	Date/Time	File Name	Sample ID	Misc Info	Operator	Vial	Comment
1	12/11/17 7:00	12111701.D	CCV R13121117_25ng	S31-12011701/S31-11271704 (12/26)	WA	3	*Passes*
2	12/11/17 7:34	12111702.D	CCV C13121117_25ng	S31-12011701/S31-12041703 (01/02)	WA	16	
3	12/11/17 8:13	12111703.D	MB R13121117_1000mL	S31-12011701_AC00880	WA	3	*Passes*
4	12/11/17 8:47	12111704.D	LCS R13121117_25ng	S31-12011701/S31-11271704 (12/26)	WA/RS	3	*Passes*
5	12/11/17 9:36	12111705.D	P1706027-007dil (45mL)	S31-12011701	WA	7	
6	12/11/17 10:21	12111706.D	P1706097-005dil (50mL)	S31-12011701	WA	8	
7	12/11/17 10:55	12111707.D	P1706097-001 (1000mL)	S31-12011701	WA	1	
8	12/11/17 11:28	12111708.D	P1706097-002 (400mL)	S31-12011701	WA	5	
9	12/11/17 12:02	12111709.D	P1706097-003 (400mL)	S31-12011701	WA	6	
10	12/11/17 12:35	12111710.D	P1706097-004 (400mL)	S31-12011701	WA	7	
11	12/11/17 13:08	12111711.D	P1706097-005 (200mL)	S31-12011701	WA	8	
12	12/11/17 13:42	12111712.D	LCSD R13121117_25ng	S31-12011701/S31-11271704 (12/26)	WA	3	*Passes*
13	12/11/17 15:12	12111713.D	P1706106-001 (100mL)	S31-12011701	WA	5	
14	12/11/17 15:48	12111714.D	P1706106-001dil (15mL)	S31-12011701	WA	5	
15	12/11/17 16:21	12111715.D	P1706106-002 (75mL)	S31-12011701	WA	6	
16	12/11/17 17:05	12111716.D	P1706106-002dup (75mL)	S31-12011701	WA	6	*Passes for dup*
17	12/11/17 17:39	12111717.D	System	S31-12011701	WA	3	
18	12/11/17 18:12	12111718.D	P1706106-003 (400mL)	S31-12011701	WA	7	
19	12/11/17 18:46	12111719.D	P1706106-004 (400mL)	S31-12011701	WA	8	
20	12/11/17 19:19	12111720.D	P1706106-005 (400mL)	S31-12011701	WA	9	
21	12/11/17 19:52	12111721.D	P1706106-005dil (40mL)	S31-12011701	WA	9	
22	12/11/17 20:26	12111722.D	P1706106-006 (400mL)	S31-12011701	WA	13	
23	12/11/17 21:00	12111723.D	P1706106-007 (400mL)	S31-12011701	WA	11	
24	12/11/17 21:33	12111724.D	P1706106-008 (400mL)	S31-12011701	WA	12	
25	12/11/17 22:06	12111725.D	CCVend R13121117_25ng	S31-12011701/S31-11271704 (12/26)	WA	3	*Passes - end Dod*

12/12/17

Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\02\11021726.D
Acq On : 03 Nov 2017 03:26 Operator: JM
Sample : 1SS00036 Inst : MS22
Misc : 0.5 + TICS
ALS Vial : 20 Sample Multiplier: 1

Quant Time: Nov 03 14:24:15 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M JM 11/03/17
Quant Results File: R22091217.RES

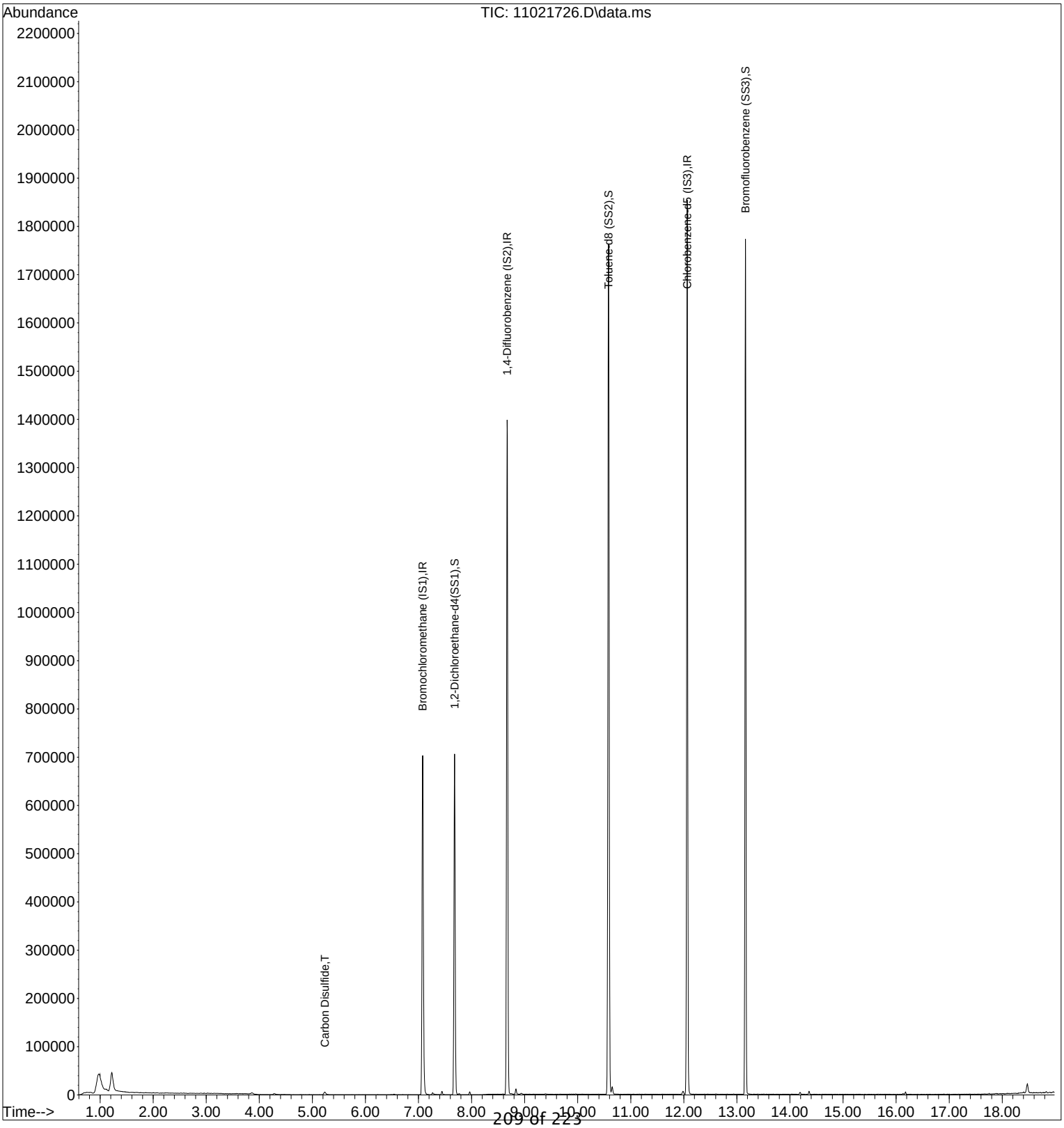
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	7.08	130	243787	25.000	ng	0.00
37) 1,4-Difluorobenzene (IS2)	8.67	114	981540	25.000	ng	0.00
56) Chlorobenzene-d5 (IS3)	12.06	82	472955	25.000	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	7.68	65	420019	29.647	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 118.60%			
57) Toluene-d8 (SS2)	10.58	98	1120943	23.387	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 93.56%			
73) Bromofluorobenzene (SS3)	13.16	174	435454	28.748	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 115.00%			
Target Compounds						Qvalue
22) Carbon Disulfide	5.24	76	8843	0.191	ng	96

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\02\11021726.D
Acq On : 03 Nov 2017 03:26 Operator: JM
Sample : 1SS00036 Inst : MS22
Misc : 0.5 + TICS
ALS Vial : 20 Sample Multiplier: 1

Quant Time: Nov 03 14:24:15 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES



Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\06\11061709.D
Acq On : 06 Nov 2017 07:36 pm Operator: JM
Sample : 1SC00648 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Nov 07 09:06:21 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES

JM 11/7/17

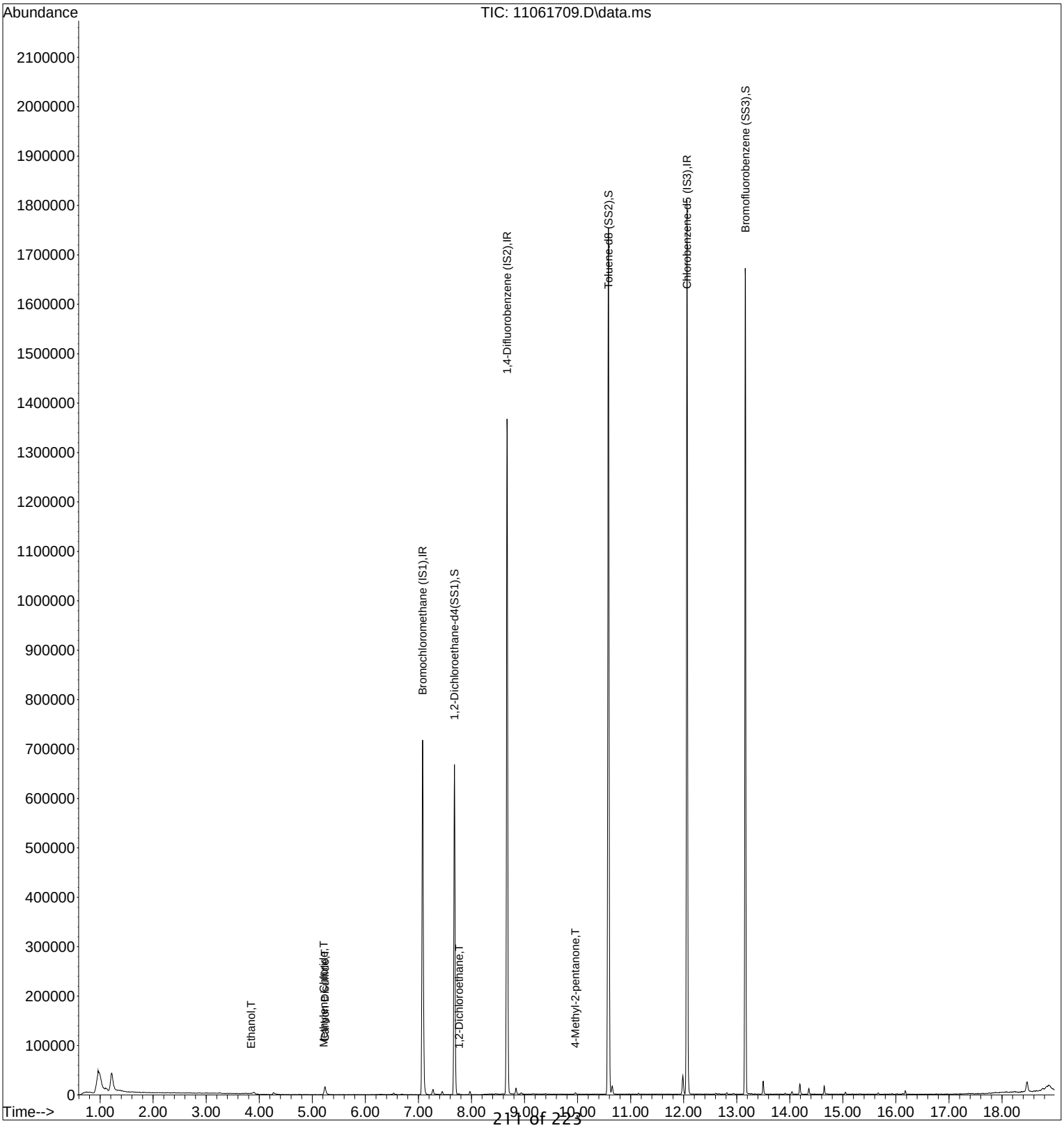
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	7.08	130	253139	25.000	ng	0.00
37) 1,4-Difluorobenzene (IS2)	8.67	114	980922	25.000	ng	0.00
56) Chlorobenzene-d5 (IS3)	12.06	82	463308	25.000	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	7.68	65	398439	27.085	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 108.36%			
57) Toluene-d8 (SS2)	10.58	98	1123085	23.920	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 95.68%			
73) Bromofluorobenzene (SS3)	13.16	174	411023	27.700	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 110.80%			
Target Compounds						Qvalue
10) Ethanol	3.84	45	636	0.088	ng	# 37
19) Methylene Chloride	5.22	84	816	0.075	ng	92
22) Carbon Disulfide	5.24	76	28661	0.597	ng	98
36) 1,2-Dichloroethane	7.77	62	1133	0.077	ng	# 1
53) 4-Methyl-2-pentanone	9.96	58	621	0.061	ng	# 59

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\06\11061709.D
Acq On : 06 Nov 2017 07:36 pm Operator: JM
Sample : 1SC00648 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Nov 07 09:06:21 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES



Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\03\11031715.D
Acq On : 03 Nov 2017 10:30 pm Operator: JM
Sample : 1SS00180 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Nov 06 09:12:26 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES

JM 11/6/17

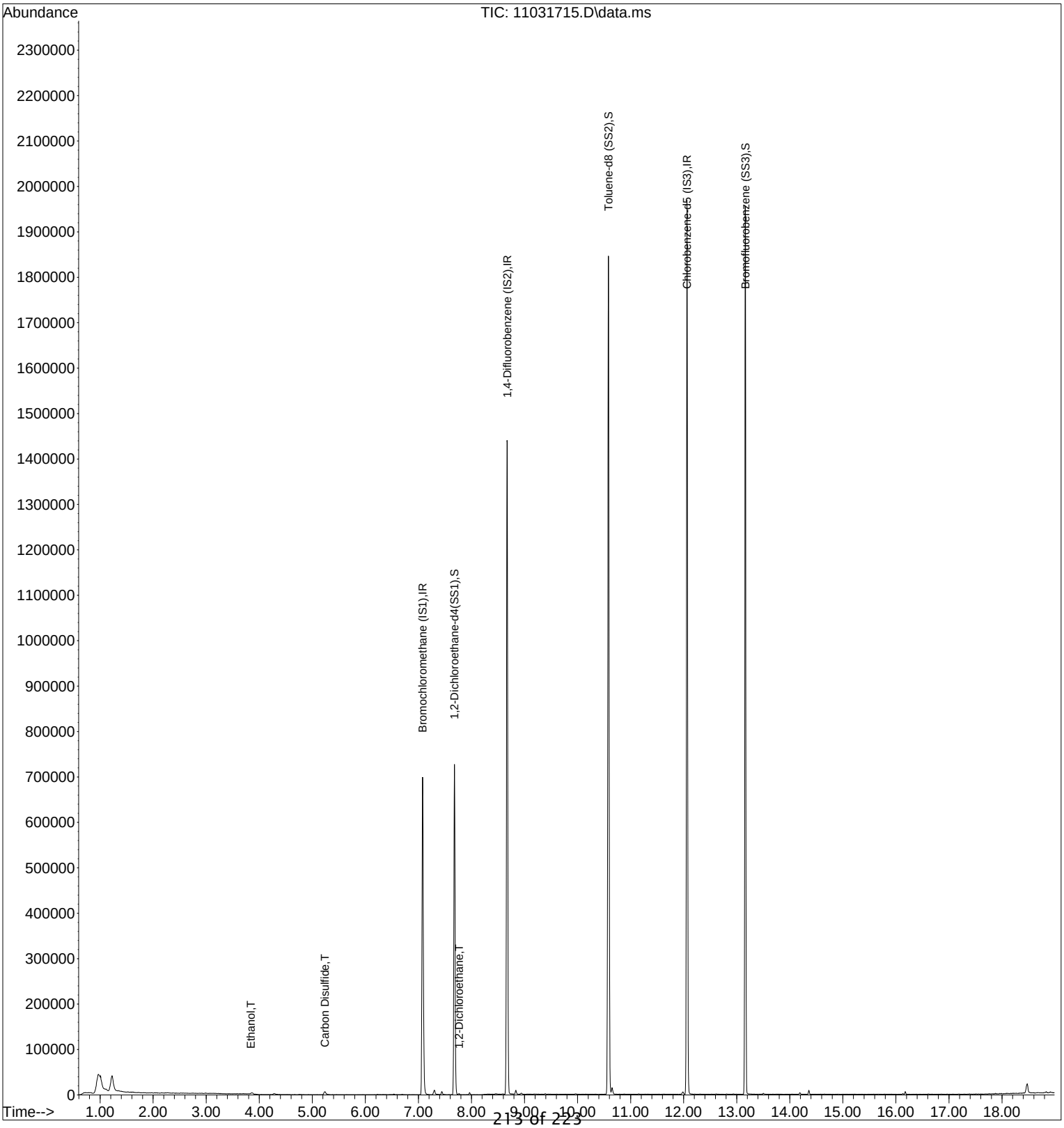
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	7.08	130	247177	25.000	ng	0.00
37) 1,4-Difluorobenzene (IS2)	8.67	114	1019391	25.000	ng	0.00
56) Chlorobenzene-d5 (IS3)	12.06	82	497033	25.000	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	7.68	65	439732	30.613	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 122.44%			
57) Toluene-d8 (SS2)	10.58	98	1155450	22.940	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 91.76%			
73) Bromofluorobenzene (SS3)	13.16	174	467482	29.367	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 117.48%			
Target Compounds						Qvalue
10) Ethanol	3.84	45	693	0.098	ng	# 37
22) Carbon Disulfide	5.24	76	11655	0.249	ng	97
36) 1,2-Dichloroethane	7.77	62	1463	0.102	ng	97

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\03\11031715.D
Acq On : 03 Nov 2017 10:30 pm Operator: JM
Sample : 1SS00180 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Nov 06 09:12:26 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES



Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\06\11061724.D
Acq On : 07 Nov 2017 02:28 am Operator: JM
Sample : 1SC00582 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 18 Sample Multiplier: 1

Quant Time: Nov 07 09:06:47 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES

JM 11/7/17

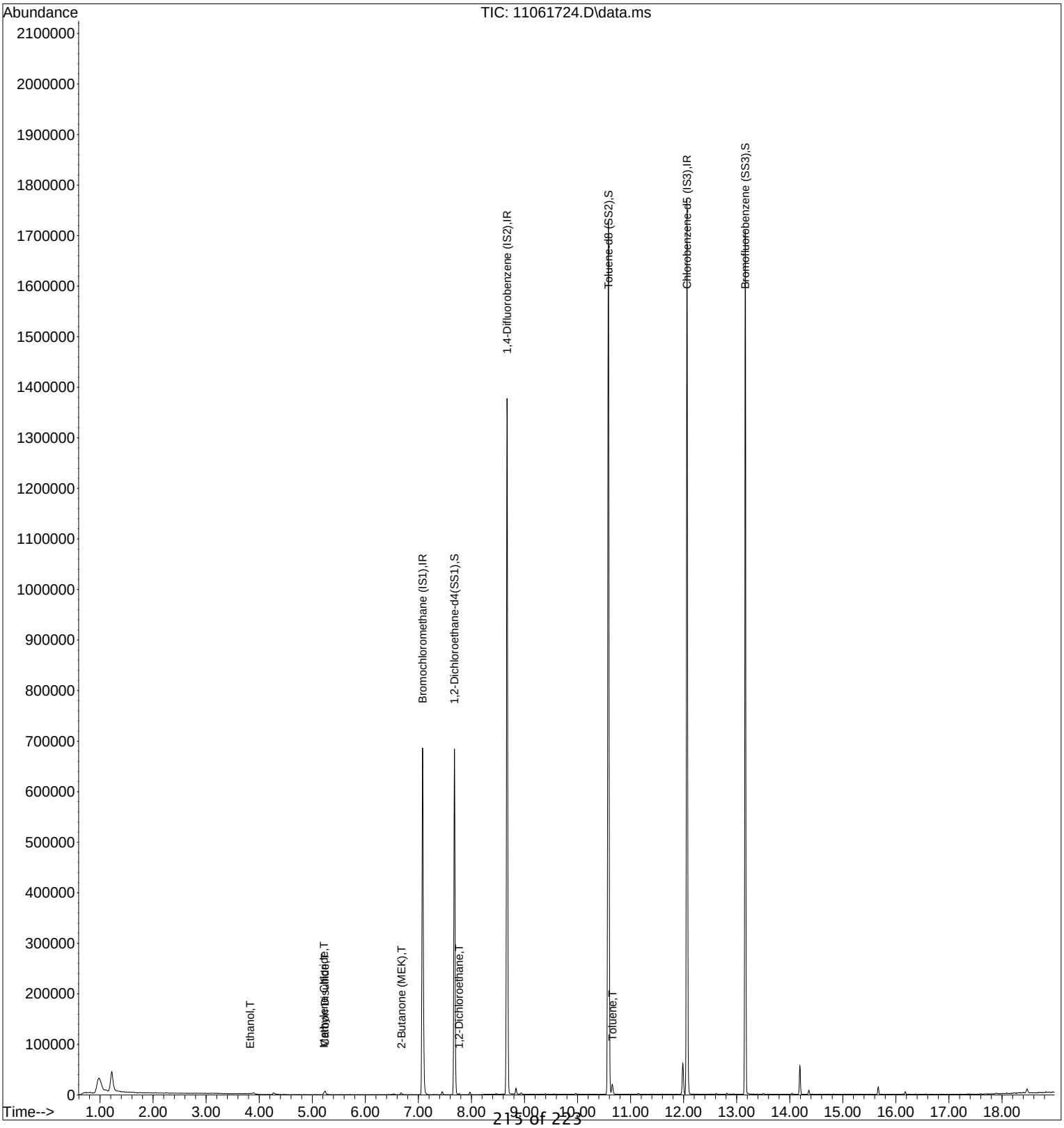
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	7.08	130	239796	25.000	ng	0.00
37) 1,4-Difluorobenzene (IS2)	8.67	114	963721	25.000	ng	0.00
56) Chlorobenzene-d5 (IS3)	12.06	82	457023	25.000	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	7.68	65	406134	29.144	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 116.56%			
57) Toluene-d8 (SS2)	10.58	98	1089256	23.519	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 94.08%			
73) Bromofluorobenzene (SS3)	13.16	174	417402	28.517	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 114.08%			
Target Compounds						Qvalue
10) Ethanol	3.83	45	540	0.078	ng	# 37
19) Methylene Chloride	5.22	84	1114	0.108	ng	99
22) Carbon Disulfide	5.24	76	12041	0.265	ng	98
27) 2-Butanone (MEK)	6.68	72	956	0.145	ng	# 43
36) 1,2-Dichloroethane	7.77	62	1207	0.087	ng	# 1
58) Toluene	10.66	91	4771	0.115	ng	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\06\11061724.D
Acq On : 07 Nov 2017 02:28 am Operator: JM
Sample : 1SC00582 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 18 Sample Multiplier: 1

Quant Time: Nov 07 09:06:47 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES



Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\06\11061715.D
Acq On : 06 Nov 2017 10:19 pm Operator: JM
Sample : 1SC00605 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Nov 07 09:06:33 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES

JM 11/7/17

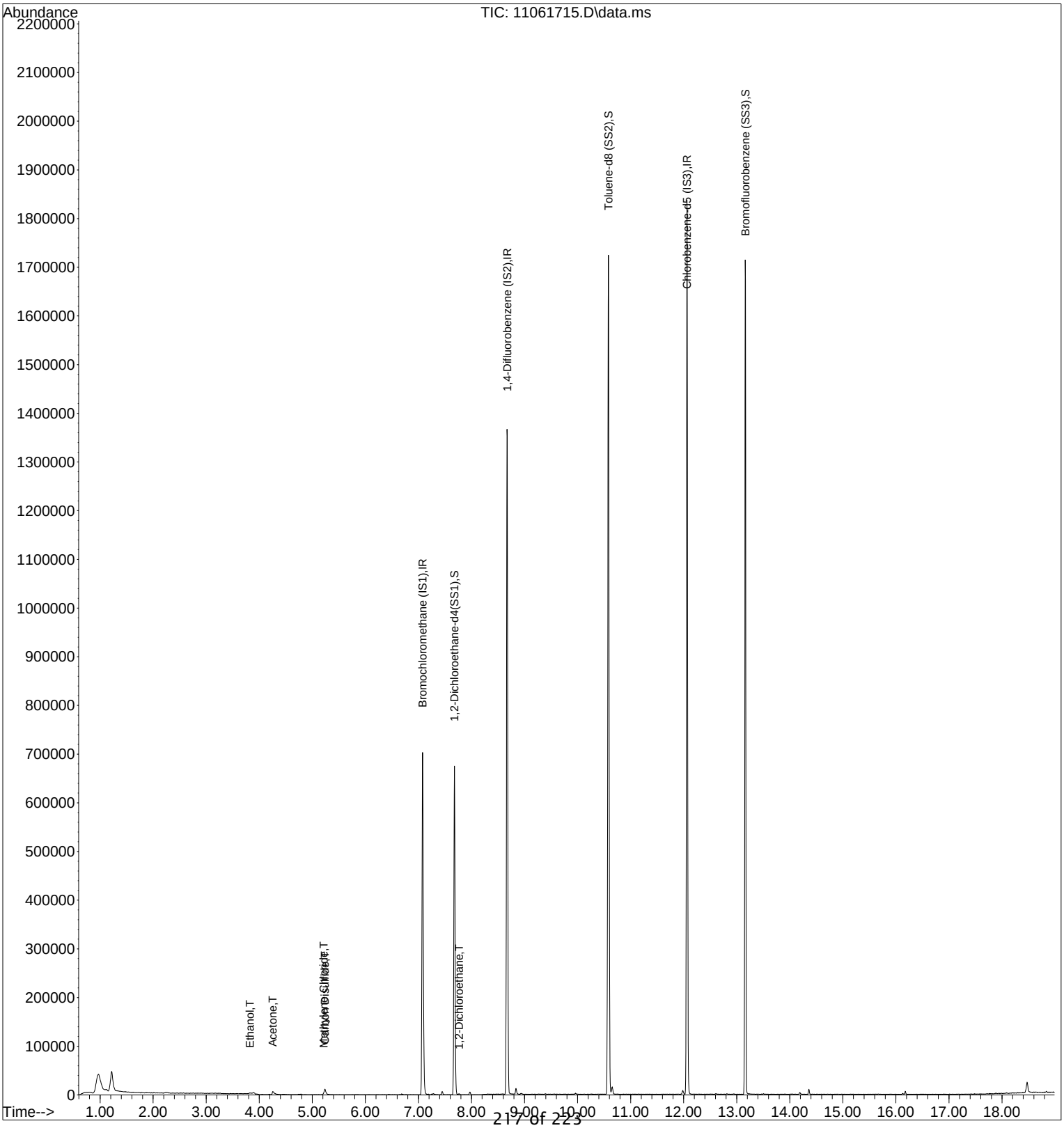
Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) Bromochloromethane (IS1)	7.08	130	245828	25.000	ng		0.00
37) 1,4-Difluorobenzene (IS2)	8.67	114	974337	25.000	ng		0.00
56) Chlorobenzene-d5 (IS3)	12.06	82	463696	25.000	ng		0.00
System Monitoring Compounds							
33) 1,2-Dichloroethane-d4(...	7.68	65	401040	28.073	ng		0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 112.28%				
57) Toluene-d8 (SS2)	10.58	98	1108930	23.599	ng		0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 94.40%				
73) Bromofluorobenzene (SS3)	13.16	174	416729	28.061	ng		0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 112.24%				
Target Compounds							Qvalue
10) Ethanol	3.83	45	2689	0.381	ng		72
13) Acetone	4.26	58	4285	0.553	ng		87
19) Methylene Chloride	5.22	84	1213	0.115	ng		94
22) Carbon Disulfide	5.24	76	19862	0.426	ng		97
36) 1,2-Dichloroethane	7.77	62	1308	0.092	ng	#	1

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\06\11061715.D
Acq On : 06 Nov 2017 10:19 pm Operator: JM
Sample : 1SC00605 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 10 Sample Multiplier: 1

Quant Time: Nov 07 09:06:33 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES



Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\03\11031708.D
Acq On : 03 Nov 2017 07:21 pm Operator: JM
Sample : 1SS00088 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Nov 06 09:12:14 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES

JM 11/6/17

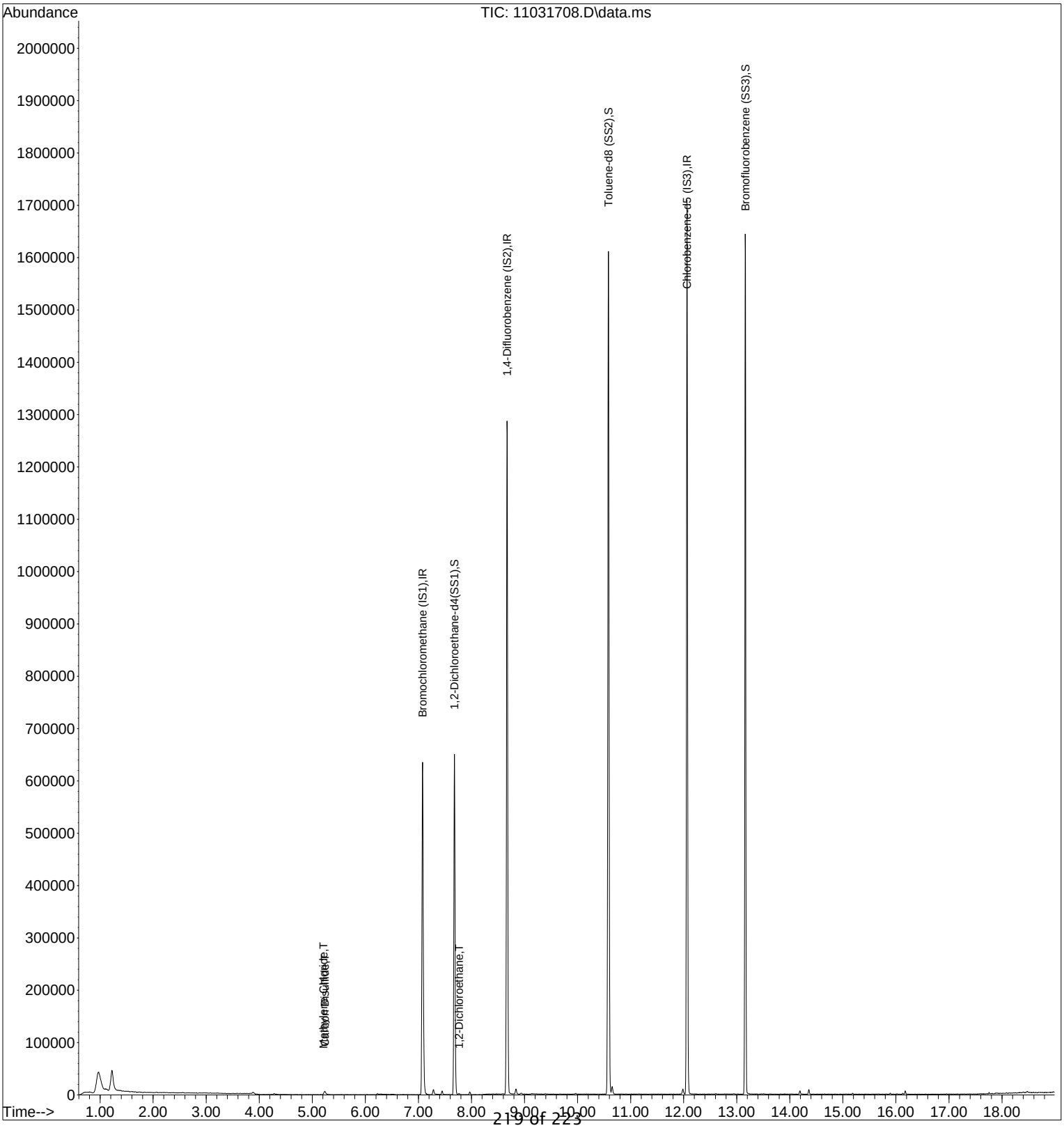
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	7.08	130	224042	25.000	ng	0.00
37) 1,4-Difluorobenzene (IS2)	8.67	114	903747	25.000	ng	0.00
56) Chlorobenzene-d5 (IS3)	12.06	82	434838	25.000	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	7.68	65	385005	29.571	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 118.28%			
57) Toluene-d8 (SS2)	10.58	98	1017415	23.088	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 92.36%			
73) Bromofluorobenzene (SS3)	13.16	174	397839	28.567	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 114.28%			
Target Compounds						Qvalue
19) Methylene Chloride	5.21	84	905	0.094	ng	98
22) Carbon Disulfide	5.24	76	11082	0.261	ng	98
36) 1,2-Dichloroethane	7.76	62	1266	0.098	ng	# 1

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\03\11031708.D
Acq On : 03 Nov 2017 07:21 pm Operator: JM
Sample : 1SS00088 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 4 Sample Multiplier: 1

Quant Time: Nov 06 09:12:14 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES



Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\03\11031716.D
Acq On : 03 Nov 2017 10:57 pm Operator: JM
Sample : 1SS00039 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Nov 06 09:12:28 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES

JM 11/6/17

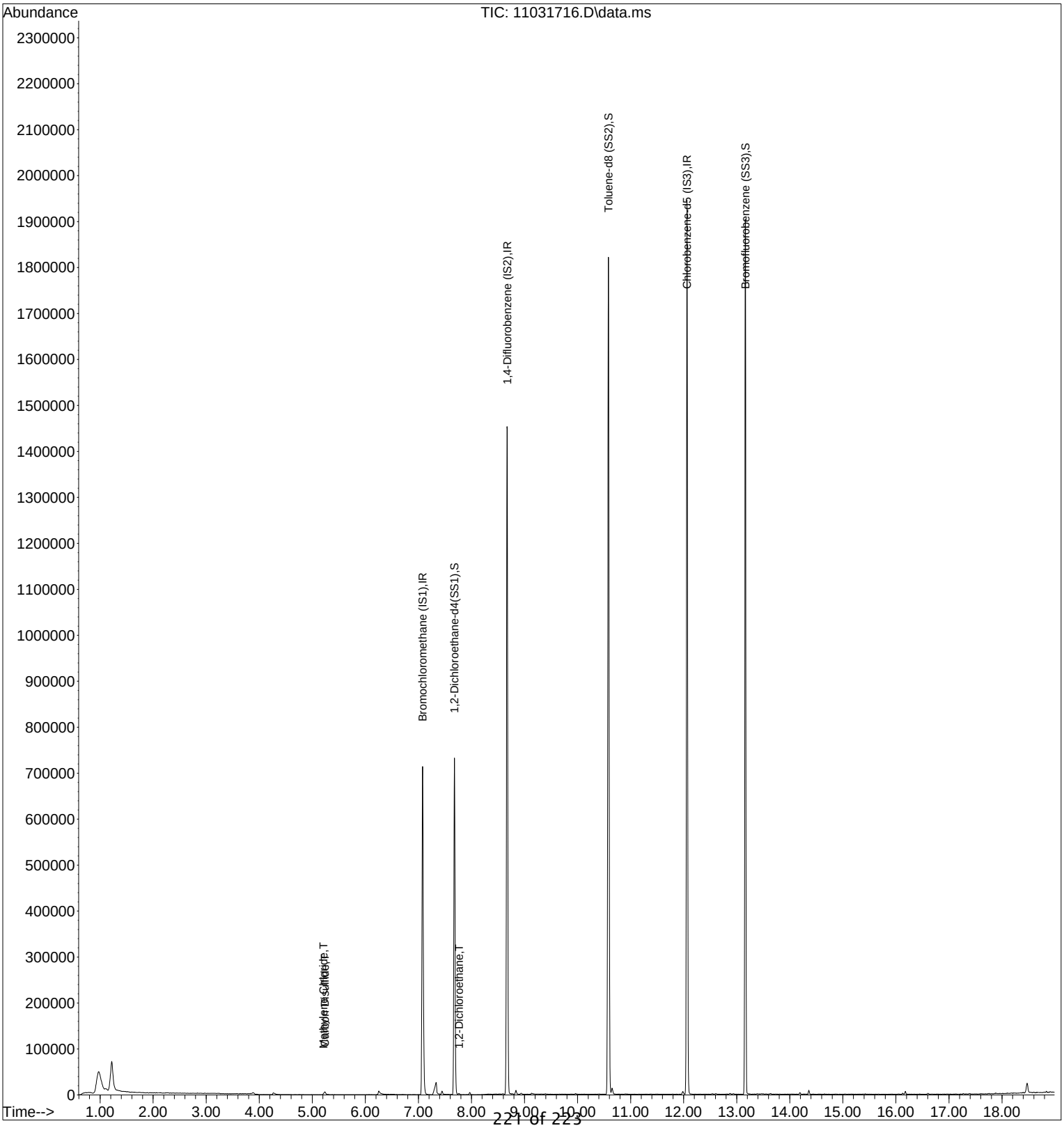
Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	7.08	130	244842	25.000	ng	0.00
37) 1,4-Difluorobenzene (IS2)	8.67	114	1026948	25.000	ng	0.00
56) Chlorobenzene-d5 (IS3)	12.06	82	495001	25.000	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	7.68	65	436412	30.672	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 122.68%			
57) Toluene-d8 (SS2)	10.58	98	1156124	23.047	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 92.20%			
73) Bromofluorobenzene (SS3)	13.16	174	473266	29.853	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 119.40%			
Target Compounds						Qvalue
19) Methylene Chloride	5.21	84	1141	0.108	ng	97
22) Carbon Disulfide	5.24	76	10103	0.218	ng	95
36) 1,2-Dichloroethane	7.77	62	1500	0.106	ng	# 1

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\03\11031716.D
Acq On : 03 Nov 2017 10:57 pm Operator: JM
Sample : 1SS00039 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 11 Sample Multiplier: 1

Quant Time: Nov 06 09:12:28 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES



Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\03\11031725.D
Acq On : 04 Nov 2017 02:59 am Operator: JM
Sample : 1SS00154 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 19 Sample Multiplier: 1

Quant Time: Nov 06 09:12:42 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES

JM 11/6/17

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min)
1) Bromochloromethane (IS1)	7.08	130	244048	25.000	ng	0.00
37) 1,4-Difluorobenzene (IS2)	8.67	114	1021749	25.000	ng	0.00
56) Chlorobenzene-d5 (IS3)	12.06	82	482650	25.000	ng	0.00
System Monitoring Compounds						
33) 1,2-Dichloroethane-d4(...	7.68	65	435455	30.704	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 122.80%			
57) Toluene-d8 (SS2)	10.58	98	1144633	23.402	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 93.60%			
73) Bromofluorobenzene (SS3)	13.16	174	447277	28.935	ng	0.00
Spiked Amount 25.000	Range 70 - 130		Recovery = 115.76%			
Target Compounds						Qvalue
22) Carbon Disulfide	5.24	76	10095	0.218	ng	95
36) 1,2-Dichloroethane	7.76	62	1383	0.098	ng	# 1

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data File: I:\MS22\Data\2017 11\03\11031725.D
Acq On : 04 Nov 2017 02:59 am Operator: JM
Sample : 1SS00154 Inst : MS22
Misc : 0.5 +TICS
ALS Vial : 19 Sample Multiplier: 1

Quant Time: Nov 06 09:12:42 2017
Quant Method : I:\MS22\Methods\R22091217.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Sep 14 10:19:53 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M
Quant Results File: R22091217.RES